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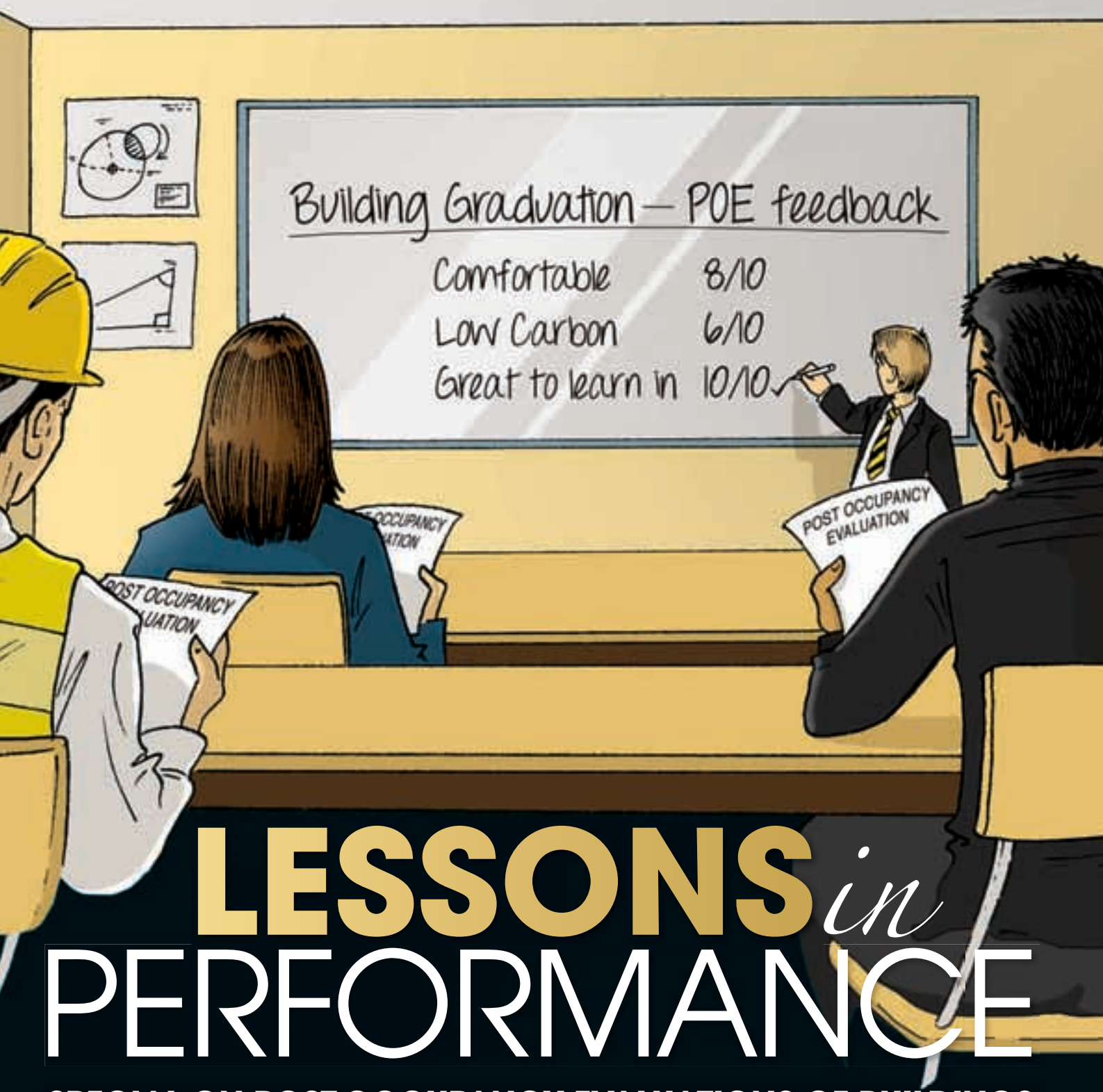
March 2012



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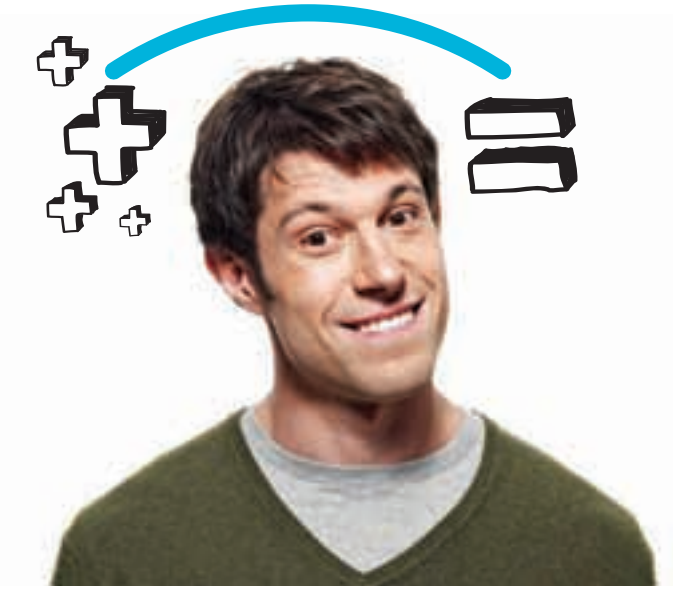

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On a mission to probe buildings

Remember PROBE? No, not the problematic British space mission to Mars but the important CIBSE-backed work undertaken in the 1990s to evaluate the performance of buildings. The aim was to find out what really makes certain types of building tick when it comes to cutting energy use.

These case studies, published in the forerunner to *CIBSE Journal*, pointed the way to a future where the industry could bridge the gap between low-energy design intentions and performance outcomes.

So where are we now? Well, we're in the midst of taking some important steps towards improving building performance. The latest proposed revisions to the Building Regulations next year, contained in a series of consultation documents (see our News pages 6 and 10), take on board a lot of the lessons learnt and promoted by leading building sector professionals in the past decade. The Part L document also gives PROBE a name check.

> We need more PROBE-type studies to learn why non-domestic properties are performing well, or failing to do so

The proposals are also highly pragmatic: they reflect the view of the housebuilders themselves, a view eloquently expressed in this issue by the boss of Barratt Developments, Mark Clare (page 22). Put simply, the government's 2016 target for all new homes to be 'zero carbon' won't be achievable unless these homes are both affordable and workable from the user's perspective and their day-to-day experiences.

Hence, in the Part L consultation document it is made clear that ministers' 'preferred option' is for the further reduction in emissions for new homes to be 8% (the industry consensus had been for a 25% cut). As Mark Clare rightly stresses, these new green homes can only have the low-energy outcomes we desire if the end-users are willing and able to operate them in a low carbon way, day in, day out.

Of course, saving energy in Britain's building stock is not just about new homes. We also need lots more PROBE-type studies to learn why non-domestic properties are performing well, or failing to do so.

One key reason for doing this is well illustrated in our Building Performance Special in this issue (page 30): studying even well-performing buildings offers key lessons not just for that site but for the wider sector.

So we need more British PROBES – not the expensive follies of the space programme but the, in many ways, much more down-to-earth kind that offer proven outcomes for the built environment.

Bob Cervi, Editor
bcervi@cibsejournal.com

NEWS

All the latest news from around the building industry

CONSULTATION IN MANY PARTS

The government's proposals to amend the Building Regulations in England in 2013 are divided in four sections:

- **Section one:** Building Regulations Parts A, B, C, K, M and N. These cover, respectively, 'structure', 'fire safety', 'site preparation', 'protection from falling, collision and impact', 'access' and 'glazing'. The section also includes a new draft Approved Document K.
- **Section two:** Part L – 'conservation of fuel and power'. This section also includes proposals on 'consequential improvements for existing buildings' and 'works in existing buildings'.
- **Section three:** Part P – 'electrical safety – dwellings'.
- **Section four:** The local authority Buiiding Control system.

The closing date for comments on the documents is 27 April 2012, except for Part L, which is 27 March. All documents can be downloaded at **www.communities.gov.uk/planningandbuilding/buildingregulations/buildingregulationschanges**

Plans signal key changes to Building Regulations

Lighter regulatory burden on builders is government's 'preferred' option

The government's announcement of proposed changes to the Building Regulations signals a significant rationalisation of the rules in 2013.

The consultation on the proposals, issued last month, says that ministers' preferred option is for an 'aggregate' new homes carbon emission reduction target of 8% on 2010 levels.

This is a big reduction on the 25% target previously proposed and widely backed by the sector.

Ministers' preferred target for non-domestic new buildings in 2013 is set much higher, at 20%.

The consultation document on the changes also proposes a 26% reduction target, adding that this option 'has the advantage of reducing the impact of the 2016 change to full zero carbon'.

But it says that this would 'introduce a higher cost for housebuilders at a time when the government has a commitment to reduce the burden on the housebuilding industry'.

It adds: 'The role of Part L is to provide reasonable provision for the conservation of fuel, not to dictate what can or cannot be built ... Setting a less demanding regulatory level now would provide more time to reassess these standards in advance of the move to zero carbon [new homes] from 2016.'

CIBSE said this argument would need 'careful consideration' backed by 'hard evidence'. It added that it was pleased with the government's proposals to improve the compliance process for ensuring new buildings meet required standards.

Further reduction in emissions for new homes is cut to 8%

The consultation document says that the government is seeking to work with the industry to establish an 'agreed benchmark for a quality assurance approach' next year.

It also acknowledges that the 'design-and-build' approach to new-home construction can lead to poor-performing buildings.

It adds that more data and analysis are needed on building performance, including the PROBE-style studies published in the 1990s in *Building Services Journal*, the forerunner to *CIBSE Journal*.

Government officials comment on Part L, page 10; Barratt chief sets out low carbon challenges, page 22; post-occupancy evaluation special, page 30

Analysis Wide-ranging proposals warrant close scrutiny

This is a comprehensive package which addresses a number of issues, extending well beyond the traditional reviews of Part L, and it is a further significant improvement in the process to have the whole package co-ordinated in this way.

Key topics which are addressed in the package include the proposal to extend consequential improvements to homes, under clearly defined circumstances.

The building control part of the package looks to address the current situation in which completion certificates are made effectively voluntary by the Building Regulations themselves, which is an essential requirement of better compliance with the regulations. There are also proposals for increased application of self certification, which CIBSE will be reviewing carefully.

A key change in the energy efficiency elements is the introduction of a second method of demonstrating the efficiency of lighting, which allows the use of the lighting efficiency numeric indicator (LENI) instead of the traditional calculation based on luminaire efficacy. The Society of Light and Lighting believes that this has the potential to deliver up to 30% improvement in installed lighting system efficiency.

The package looks to introduce common sense reforms to the Part P regime, although the electrical specialists will want to look carefully at the detail to try to achieve a balanced and reasonable approach.

The proposals for reducing the emissions from new homes may be the most contentious. Of the two options, the option preferred by the government offers a further reduction of 8%, with an alternative 26% cut also proposed.

This needs some careful consideration. 'Sustainability' has three elements – environmental, social and economic, and there has to be an acceptance that targets set in the boom years may need adjusting in more straitened times.

But the danger is that those who want to minimise changes in the standard for new homes will tend to maximise the claimed costs of tougher targets, and minimise the benefits and the rate at which costs are likely to fall as the regulations tighten and everyone has to adopt new solutions. There is a real need for decisions based on hard evidence here.

Hywel Davies is technical director of CIBSE. www.cibse.org

CHINESE CHALLENGE

Construction of a huge development in northern China, designed by Atkins, has begun. The 300,000 sq m riverside mixed-use development is centred on a series of landscaped squares and paths and includes a 30-storey five-star hotel tower, 1,500 residential units, and office and retail space.

The development is enclosed on two sides by water, and integrated into the surrounding neighbourhoods on its other faces. These boundary conditions presented a significant challenge for the architects as there were four 'fronts' to the development, meaning that façade design and building form had to be carefully modelled to integrate well in all directions, according to Atkins.

Ministers seek Supreme Court ruling on tariff cut

The government has pledged £46om to the feed-in tariff (FiT) scheme but has insisted that it will proceed with a legal challenge over its plans to cut the tariff for domestic solar photovoltaic installations.

It has also relaxed the requirement for all eligible properties to have an Energy Performance Certificate (EPC) rating of C or above. They will only require a D rating.

Other plans, which are currently the subject of a public consultation that ends in April, include increasing the tariff for micro-combined heat and power (CHP) from 10.5p/kWh to 12.5p/kWh. This is less than the 15p recommended by the industry, but still received a warm welcome.

However, the Solar Trade Association (STA) said it was disappointed by the the Department for Energy and Climate Change's (DECC's) decision to try to push ahead with its plan to cut the solar tariff by half to 21p per kWh.

'This could prolong by several months the consumer uncertainty for installations between 12 December 2011 and 3 March 2012, which is most regrettable,' the STA said.

In January the government failed to overturn in the Court of Appeal an earlier High Court ruling that the planned tariff cut, affecting installations completed on or before 12 December 2011, was unlawful because it would take effect before the end of a consultation on the plan.

Last month DECC made a concession by putting back the completion cut-off date to 2 March, with the revised rate applying from 3 March.

DECC said in a statement on its application to appeal to the Supreme Court: 'We want to see the available funding spread as far and wide as possible, making FiTs a scheme for the many not a scheme for the few, supporting sustainable jobs in solar and in a whole range of small scale renewables.'

The government estimates that the cost of solar PV systems has fallen by 45% since 2009, but the surge in demand created by the FiT scheme has led to a huge overspend of the predicted budget.

In Brief

GREENHOUSE EMISSIONS RISE
UK emissions of greenhouse gases rose by 3.1% in 2010 – with an estimate of 590.4m tonnes of MtCO2e, compared to 572.5m tonnes in 2009. Ministers put the blame on exceptionally cold weather and a greater use of fossil fuels.

RENEWABLES UP GLOBALLY
Last year saw a 40% increase in the value of global renewable technology deals, according to PwC. The consultancy says much of the increase can be attributed to concern over nuclear power following the Fukushima crisis in Japan last year.

PLANNING GAINS QUERIED
A study into the costs and benefits of the planning system finds that the government's proposed reforms are likely to have little or no effect on growth and could even undermine public wellbeing. **www.vivideconomics**

CORRECTION
Mike Landy from the Renewable Energy Association has asked us to point out that he does not recall making some of the comments attributed to him in our article on the IMechE heating conference 'Fabric of Success' (February *Journal*, page 31). He believes the comments were made by other speakers during an open discussion at the end of the conference. We apologise for any errors made.

More professionals expect to be using BIM this year

One third of industry 'already using BIM'

Professionals are increasingly taking up building information modelling

Almost everyone in the industry will be using building information modelling (BIM) in five years' time, according to the latest research into the adoption of this approach to building design and management.

A survey of 1,000 construction professionals, carried out by the software consultancy NBS on behalf of the government's BIM Working Group, found that three quarters of people who were aware of it expect to be using BIM by the end of this year.

However, a large number of firms think it is still too expensive to consider at the moment and there remains some confusion about the definition of BIM, with many still referring to it as '3D CAD'.

Almost one third of the sample (31%) said they were using BIM at the end of last year. This is a considerable increase on 2010, when only 13% had adopted it.

Only a fifth (21%) said they were unaware of the technology compared with 43% a year earlier.

Almost everyone (19 out of 20) said they expected to be using it on projects by 2017, according to the NBS research.

A majority of users (65%) say using BIM technology delivers cost efficiencies, and a growing number report that clients will increasingly insist on it being used on their projects.

However, the economic situation is reportedly slowing adoption: 'The survey revealed that the perceived expense and time commitments involved in adopting BIM technology remain the main barriers to greater industry-wide adoption in the current economic climate, particularly for smaller businesses,' said NBS.

Stephen Hamil, head of BIM at RIBA Enterprises, said: 'The survey clearly shows that the question is no longer will BIM be adopted, but how quickly? The fact that three quarters of those aware of BIM predict they will be using it on projects by the end of the year shows the speed with which things are moving.'

For more information visit:
www.thenbs.com

US energy efficiency is crowded out, says report

The US is not ambitious enough about energy efficiency and allows 'riskier and more expensive' plans for developing new energy sources to take precedence, according to a report from the American Council for an Energy-Efficient Economy (ACEEE).

The report outlines how the US could cut energy consumption by almost 60%, add nearly two million jobs, and save energy consumers as much as $400bn per year by 2050.

Greater investment in energy efficiency would allow lower investments in power plants and other supply infrastructure, substantially lowering overall energy expenditures, it says.

Each household could save around $2,600 a year, it claims, if the country stopped letting new energy developments 'crowd out' energy efficiency schemes.

Cooling towers in Chicago. The US is criticised for not doing enough about energy efficiency

'Large-scale energy efficiency advances are by far the smartest investment for America,' said ACEEE director of economic and social analysis John Laitner.

ACEEE outlined potential savings of 60% in existing buildings, and 70% to 90% in new buildings, through the use of 'advanced heating and cooling systems' including ground-source heat pumps and condensing boilers and by cutting energy distribution losses. **www.aceee.org**

See ASHRAE conference report, pages 27-28

In Brief

BIDS TO RUN GREEN BANK

The Business Secretary Vince Cable has reported that 32 bids have been received from companies wanting to run the Green Investment Bank. The bank is designed to accelerate private sector investment in the UK's transition to a green economy, with priority sectors including offshore wind power generation and waster processing/recycling. **www.bis.gov.uk**

LEGAL CONTRACTS UPDATE

HVCA Publications, the publishing arm of the Heating and Ventilating Contractors' Association, has launched three updated commercial and legal contracts – CL21 Conditions of Trading, CL70 Maintenance Agreement, and CC8/11 Condition of Sub-Sub-Contract. The three contracts form part of a suite of commercial and legal publications that the organisation plans to update regularly. **www.hvcapublications.co.uk**

Davey sets out stall on energy efficiency

PA

New Energy Secretary Ed Davey addresses the media on taking office. He pledges to cut energy waste

New man at helm of energy policy emphasises energy efficiency

The new Energy and Climate Change Secretary, Ed Davey, has sought to establish his green credentials by emphasising the importance of energy efficiency in buildings.

Following fellow Liberal Democrat Chris Huhne's resignation as Energy Secretary, Davey last month launched the Energy Efficiency Deployment Office (EEDO).

The new body is charged with 'developing a new strategy to identify the potential for further energy efficiency'.

It will support delivery of the Green Deal, the rollout of smart meters and the increase in renewable heat.

'I'm hugely enthusiastic about energy efficiency. It's the cheapest way of cutting carbon – and cutting bills for consumers. It has to be right at the heart of what we do,' said Davey on his first day in the job.

'Two out of three consumers think their home is wasting energy, but only one in three is going to do anything about it. That has to change. We need to get out there and show people what energy efficiency can really do for them.'

He reiterated the role the Green Deal could play in generating employment – with up to 65,000 new jobs predicted by the government – and tackling 'some of the most inefficient housing stock in the EU'.

Various industry commentators have expressed doubts about the direction of the Green Deal. Graham Meeks of the CHP Association said it had 'its limits, adding it is vital that we now see a concerted effort to dramatically increase the productivity of the energy we use across the whole of the economy'.

David Frise, head of sustainability at the Building & Engineering Services Association (B&ES), formerly the HVCA, said it was vital for the government to find better ways of including smaller firms in the delivery process.

'At the moment the Green Deal looks worryingly like an exclusive club for firms with big financial muscle,' he said.

Top official insists Part L change is 'not backsliding'

A leading government official has said that the lower carbon target of 8% proposed for new homes (see News page 6) was an attempt to bring in the change in a 'staged' way that would be more manageable for some housebuilders not able to adopt the 'Full Energy Efficiency Standard' now.

Bob Ledsome, head of building regulations at the Department for Communities and Local Government (DCLG), was outlining the current consultation on changes to Building Regulations Part L in 2013.

He said: 'As we've moved through the zero carbon homes consultation process, we've all learnt about what is realistic and economically viable to do – what can be achieved on site.'

Ledsome, who was speaking at the recent Zero Carbon Hub annual conference in London, insisted: 'I don't think it is a question of any backsliding on targets. It's a recognition of what sensibly can be done, and we would be very interested to hear what consultees have to say about it.'

He added that the consultation's proposal for a new 'compliance' regime for house builders was aimed at addressing the question of 'actual' and 'predicted' low carbon performance of new homes.

He said such a regime would enable builders to demonstrate that they had a quality assurance process in place for delivering low carbon homes. The assurance process could be taken forward via a BSI standard, he added.

Some speakers and delegates at the conference criticised the SAP modelling tool used for building design, questioning whether it could provide low carbon designs that would deliver the intended energy performance in practice.

Neil Jefferson, chief executive of the Zero Carbon Hub, which has produced definitions of zero carbon homes for government, said: 'I want to see proper investment in SAP, so that the models we see in future are fit for purpose.'

Paul Morrell calls for an 'Existing Homes Hub' to be set up

Stewart Baseley, chairman of the Home Builders Federation, said: 'I wonder whether further changes to the Building Regulations in 2013 are sensible, in light of the SAP issue.'

He added: 'I'm not opposed to Part L changes [in 2013] but are we doing the right thing in making changes before getting SAP right?'

Ledsome responded: 'The work that has been done on compliance has shown that it's not just about SAP or homes not being built properly on site – there's a whole collection of issues that are bound into getting ourselves collectively in a position where we can give an assurance to regulators, building control and house buyers that homes will perform as they're meant to.'

This was why the government was proposing that a 'PAS' specification – currently used to assess whole-life carbon emissions of, for example, consumer products – be adopted for zero carbon new homes, he said.

Conference delegate John Tebbit, industry affairs director at the Construction Products Association, challenged some speakers' comments on the possible inadequacies of SAP. He said that

jon le-bon/Shutterstock.com

Key role for MVHR in new homes

Mechanical ventilation with heat recovery (MVHR) will play an increasing role in new homes, according to research.

A report written by the Zero Carbon Hub's VIAQ (Ventilation and Indoor Air Quality) Task Group highlighted the need for better air quality in homes that are now built to 'tighter' standards with reduced air leakage and improved insulation.

The group said heat recovery also provides a clear benefit in such dwellings as they have a relatively low heating demand.

However, the researchers said there was a need for a better evidence base to support the case for MVHR and 'a more robust approach' to the design and installation of the systems to improve quality. They also highlighted the importance of controlling sources of indoor pollutants – whatever the ventilation system.

'With mechanical ventilation systems presently representing nearly 50% of overall new-build ventilation solutions, and the market set to dramatically increase over the next year or so, now is the time to focus on quality,' said Kelly Butler, marketing director of the British Electrotechnical and Allied Manufacturers Association (BEAMA), who contributed to the report.

For more information visit:
www.zerocarbonhub.org

on carbon-cutting target

the experience of Robust Details with inspections on party walls and floors showed that there were variations from specification in over 20% of inspected dwellings.

Whilst this is not an issue for Robust Details as their details are deliberately designed to cope with variations, it would be strange if there was not a similar variation in other parts of dwellings from as- designed specification to as-built specification. If the final as built specification was not being properly entered into the as-built SAP, then that could lead to significant differences between theoretical and actual performance. However, the latest testing from the Good Homes Alliance has shown as-built fabric performance broadly in line with SAP predictions.

Another senior government official, David Wagstaff from DECC, added that energy performance certificates (EPCs) for new homes were being redesigned so that home energy performance could be 'properly assessed and the right [improvement] measures identified'. This would bring EPCs in line with the Green Deal, he said.

Paul King, chairman of the Zero Carbon Hub, called for the long-awaited definition of 'allowable solutions' to be issued by ministers, which would help to complete the picture on the zero carbon homes policy.

The officials said there would be information on this in the March 2012 Budget, adding that the outcome would be in line with the Hub's existing recommendations on 'carbon compliance' levels.

Paul Morrell, the government's chief construction adviser, suggested that the industry needed an 'Existing Homes Hub' that would focus on making older dwellings low carbon. He said the new Green Construction Board was considering the case for such a body.

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Visit us at Ecobuild!

Ecobuild is the world's biggest event for sustainable design, construction and the built environment and the UK's largest construction event of any kind. It is being held at the Excel Centre in London on 20-22 March and will have more than 1,500 exhibitors, as well as seminars, conferences, speakers and product demonstrations.

Come and visit CIBSE on stand N1130 for the latest news about the Institution and demonstrations of our new Knowledge Portal – **www.cibseknowledgeportal.co.uk** – the online tool which gives our members free online access to all CIBSE publications, as well as easily referenced links to hundreds of other resources and online content (see page 20).

CIBSE president Andy Ford will be hosting a panel discussion (on 20 March at 12.30pm in South Gallery 33) on the theme: 'Professional institution knowledge sharing – can the sector benefit?'

Panellists from the Institution of Engineering Technology, Institution of Mechanical Engineers, BRE, Royal Institution of Chartered Surveyors, Institution of Civil Engineers and Royal Institute of British Architects will discuss how shared knowledge networks and improved use of information technology can help engineering businesses overcome their resource and skills challenges, as and when the economy improves.

There will also be the chance to win an iPad by recommending a new member, so if you know someone who has been thinking about membership or would benefit from becoming a CIBSE member, keep an eye open for our Ecobuild promotions running throughout March.

Visit **www.cibse.org/success** for more information.

Transatlantic ties

Ron Jarnagin (left) and Andy Ford (right) present Jeff Gatlin with his certificate of CIBSE membership

ASHRAE/CIBSE relationship grows

At the recent ASHRAE 2012 Winter Conference in Chicago, CIBSE chief executive Stephen Matthews and president Andy Ford hosted a reception to celebrate the strengthening relationship between the two institutions.

Increasing numbers of ASHRAE members have expressed interest in CIBSE membership, with 120 ASHRAE members having applied to join the Institute through the reciprocal route. Andy Ford announced that a new, more streamlined route to licentiate membership for ASHRAE members will soon be available. This will be included in the refreshed mutual recognition agreement between the two institutions when it is published in April.

To mark this development, Andy Ford ceremonially conferred certificates of membership on three ASHRAE members. Stephen Matthews gave a speech describing how CIBSE and ASHRAE were facing the same challenges and stood a far better chance of overcoming them through working together. He said that, in spite of these challenges, 'not since railroads and steam has there been a better time to be an engineer'.

Ron Jarnagin, ASHRAE president, said that he was pleased by the closer links, as it allowed members to be 'exposed to new technologies since heating, ventilation and air conditioning and refrigeration technology differs due to geographic, environmental, cultural and economic requirements. This exposure makes for more well-rounded engineers and more well-rounded engineering organisations.'

Jeff Gatlin, who received CIBSE membership at the event, endorsed this view: 'Seeing the impact of my day-to-day work from beyond the shores of North America has made me a more conscientious engineer.' He added that the ASHRAE-CIBSE mutual recognition of their respective full membership grades is 'an important step to eventual recognition of engineering credentials across the Atlantic'.

Annual symposium details

The second annual Technical Symposium is being held at Imperial College, London, on 18 and 19 April.

The event will see ASHRAE joining with CIBSE to deliver an unprecedented array of fully refereed technical papers that cover areas of interest and concern to both practitioners and researchers.

Delegates will also be able to take advantage of valuable networking opportunities during lunches and an evening reception, which will provide the greatest opportunity for sharing information within the building services community.

Sessions during the two-day event will include:

- Planning and assessing building energy systems performance;
- Prediction of building energy and environmental impact;
- Tools and techniques for energy modelling and optimisation;
- Building information modelling applications;
- System designs to minimise energy use;
- Passive building systems design;
- Power and energy design and measurement;
- Storage and utilisation of energy; and
- Building performance assessment.

The debate, 'Cities are not sustainable', promises to be particularly lively, with international industry pundits thrashing out the issues in front of the audience.

The meeting will be attended by ASHRAE president Ron Jarnagin, ASHRAE chief executive Jeff Littleton, CIBSE president Andy Ford, CIBSE president-elect David Fisk, and CIBSE chief executive Stephen Matthews.

The registration fee includes lunches, refreshments and digital papers, as well as an informal evening reception (with food and drink) at the Natural History Museum.

Please book as early as possible via **www.cibse.org/symposium2012**. There are no specific conference hotels but there is plenty of choice in the South Kensington area.

Seeing the light over street lamps

Exterior illumination goes under the spotlight at the Institute of Education

The Society of Light and Lighting welcomed Dr Mark Rea to the biannual Trotter Paterson Memorial Lecture on 31 January to present his paper: 'Whatever happened to visual performance?'.

The paper looked at the progress of lighting research in the field of visual performance, a topic that was central to lighting research in the 20th century. In this instance, Dr Rea, director of the Lighting Research Center of Rensselaer Polytechnic Institute in New York, applied the principles of visual performance, such as RVP (relative visual performance), to street lighting.

There has been much discussion about streetlights recently in an effort to save energy, and the widely-held assumption that more light reduces the number of road traffic accidents is one that needs to be closely examined.

Dr Rea studied a statistical database, which had been developed in the state of Minnesota to record data on road lighting and traffic accidents, and used regressional models to predict the annual occurrence of accidents in various instances.

An analytical approach – including the use of photometric simulation and RVP – was used to calculate comparative values. The values from both studies were then used to examine the percentage of accidents that could be prevented

© Julie R Kane

with the use of lighting. When the cost of lighting was compared to the costs of accidents that could be avoided with the installation of lighting, a very minimal benefit was indicated.

A larger benefit was shown when the lighting levels were tripled during the four busiest hours of nighttime traffic, when 50% of accidents are expected. In doing this, nominal accidents would be reduced by 2.8%, while operation costs would remain the same.

The Trotter Paterson Memorial Lecture was held in the Institute of Education in London. Dr Mark Rea's presentation is available to view at **www.sll.org.uk**

The Trotter Paterson Lecture was created in 1951 to commemorate the lives of Alexander Trotter and Sir Clifford Paterson, founding members and past presidents of the Illuminating Engineering Society.

Maths and science input required

The Royal Society recently launched its new Vision for Science and Mathematics Education 5-19 project, including a call for views.

The society is eager to take on the ideas of practising professionals in engineering about how and what schools should be teaching, to enable us to meet future challenges.

Please make sure the building services voice is heard loud and clear by giving your input at **www.royalsociety.org/education/policy/vision**

The deadline for responses is 16 March.

Media interns sought

The British Science Association is appealing for CIBSE members to apply for its 2012 Media Fellowship.

Scientists, social scientists, engineers and clinicians can experience life in the heart of the newsroom, spending three to eight weeks this summer working with hosts including the BBC, *The Guardian* and *Nature*. They will produce accurate, well-informed news about developments in science, and work alongside the UK's top science editors in the British Science Festival press centre.

Successful candidates will return to work with media confidence, contacts, and first-class communication skills. For eligibility criteria, experiences from past media fellows, and the online application form, go to **www.britishscienceassociation.org/mediafellows** Applications close on 16 March.

Ten years and getting brighter

To celebrate the 10th anniversary of Ready, Steady, Light, a two-day event will be held on 19-20 March at Rose Bruford College in London.

For the first time, a junior version of the event will be run on 19 March, with the main event following on 20 March.

The senior event will bring together up to 15 teams, which will compete to design an exterior lighting scheme in just 180 minutes using a range of supplied equipment. .

Entry is restricted to one team per organisation. We would also like to encourage team organisers to include first-timers to the event. Each team must be led by a Society of Light and Lighting member.

There will be prizes for the following categories:

- Founders Prize;
- Most Creative Effect, based on the natural features of the site and the theme;
- Best Technical Solution for taking into account energy use, light pollution and health and safety; and
- Peer Prize.

Junior Ready Steady Light is open to anyone over the age of 16. Aimed at A-level and college students, it's an opportunity to experience the inspiration of light first hand.

Teams will be put together on the day and there's even a place in the established event up for grabs, so register now to secure your place.

For full details and entry information, visit **www.sll.org.uk/events**

Part L 2013 talks begin

A summary of the proposals in the next round of Building Regulation changes

The consultation on the next round of changes to the Building Regulations was launched on 31 January.

The current consultation addresses Parts A (Structure), B (Fire Safety), C (resistance to contaminants and moisture), K (Protection from Falling), M (Access) and N (Glazing Safety). Changes are also proposed relating to Access Statements, Security, Changing Places toilets and Regulation 7 on the durability of products.

The consultation package is divided into four parts. Section one outlines the consultation approach and then presents proposals to change various technical aspects of the regulations. Section two outlines proposals to increase the energy efficiency of buildings and connects with the emerging Green Deal requirements. Section three contains proposals in relation to electrical safety in homes (Part P). Section four outlines changes to the building control system.

The proposed changes are due to come into effect in three stages: those relating to energy efficiency will be phased in to coordinate with the introduction of the Green Deal, which is due to begin in October 2012; the deregulatory proposals in the consultation are intended to come into force in April 2013; and those proposals that have a regulatory impact are expected to come into force in October 2013.

There will be a workshop at CIBSE on 6 March, with presentations by the Department of Communities and Local Government, which will explain the details of the proposals. For more information contact **cbreslin@cibse.org**

Members wishing to contribute to CIBSE's response can find further details at **tinyurl.com/88lwvxo** The deadline for responses to the overall consultation is 27 April, but responses affecting the Green Deal are required by the end of March. The Society of Light and Lighting also has a page, looking in particular at proposals to adopt aspects of the Lighting Efficiency Numerical Indicator (LENI) in the 2013 changes to Part L. See **www.sll.org.uk/part-l**

To see the full, easy-to-read version of the consultation, visit **tinyurl.com/78agcnw**

Training and development

This is a good time for all new trainees who may be following an approved employer training scheme to register with CIBSE.

Trainees must hold a grade of CIBSE membership, such as graduate, for those progressing towards ACIBSE/IEng or MCIBSE/CEng, or student for LCIBSE/EngTech. If they have not already applied, we would invite them to do so as soon as possible. School leavers who are on an appropriate academic course of study are eligible to apply for student membership.

Information and application forms for all grades of Institute membership are available on the CIBSE website under the 'Membership' section.

The registration form is included in the current *Training and Development Manual*; trainees can email it direct to Olwen Williams at **owilliams@cibse.org** A confirmation of registration will be sent via email.

Further information on the training and development that is available from the Institution can be viewed at **www.cibse.org** and by clicking on the CIBSE > IPD & CPD > Employer Training Schemes tab.

New members, fellows and associates

Fellows

Stuart Richard Robert Mackenzie
Belfast, UK

Martin Radley
Wallington, UK

Members

Siu Lun, Kenneth Au Yeung
Kowloon, Hong Kong

Ho Fung Cheung
Aberdeen, Hong Kong

Wai Yee Chiu
Hong Kong, Hong Kong

John Francis Cork Geaney
Republic of Ireland

Man Kit Hui
N.T., Hong Kong

Chi Keung Lam
Hong Kong, Hong Kong

Wai Sze Law
Hong Kong, Hong Kong

Wing Leung Wilson Leung
Sheung Shui, N.T., Hong Kong

Ka Fai, Li
Hong Kong, Hong Kong

James Daniel McLoone
Lifford, Republic of Ireland

Chi Ying Poon
Kowloon, Hong Kong

Vijay Rajaram
Singapore, Singapore

Chi Ming To
Yuen Long, Hong Kong

Yu Sang Yiu
Hong Kong, Hong Kong

Ning, Zhu
Shanghai, People's Republic of China

Licentiate

Martin Harker
Keighley, UK

Lee James Lindop
Newcastle-Under-Lyme, UK

Paul Bryant
Southampton, UK

Christopher Maloney
Cambridge, UK

FELLOWS

Martin Radley

Martin is an electrical engineer and director at Arup. He has experience in a wide spectrum of project sectors. He recently relocated to Johannesburg to lead Arup's buildings practice for southern Africa.

Stuart Mackenzie

Stuart is an associate director with JCP Consulting in Belfast and has 19 years' experience in the building services industry. He is responsible for the development of sustainable design practice and the delivery of projects. Recently he has focussed his efforts on energy conservation projects for the healthcare, education and industrial sectors.

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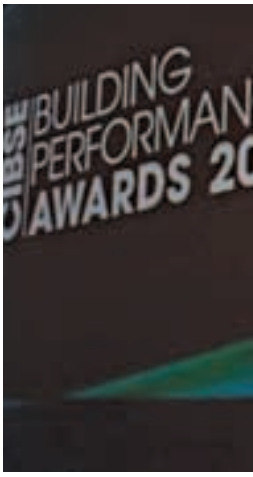
A TIME FOR CELEBRATION



The second-ever CIBSE Building Performance Awards 2012 were held last month to mark the real energy efficiency achievements made in building services

Some of the biggest names in construction and building services picked up accolades at the CIBSE Building Performance Awards 2012, which were sponsored by Imtech.

In total, 15 awards were presented at London's Grosvenor House Hotel, last month to honour those contractors, clients, consultancies and projects that have gone the extra mile to lower carbon emissions, reduce energy use and ensure buildings perform as intended.

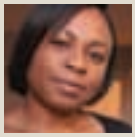
As last year, CIBSE president Andy Ford presented the Graduate of the Year award to 2011 winner, Angela Malynn, a mechanical engineer with Arup, before BBC newscaster Huw Edwards took to the stage.

Launching the awards, Edwards said: 'I've had a special new focus on some of the buildings I've seen, what people are trying to achieve with the design of those buildings, how green are they, how carbon friendly or restrictive are they, all of these things are very, very big factors, not just in tonight's awards, of course, but in the way we think about building projects for the future and the kind of buildings we are leaving to future generations.'

Much praise was given to the winning projects by the judges, who were impressed by the standard of submissions and, for the first time since the awards were launched, specially commended a project – by Fraser Brown MacKenna Architects. Entered as part of the Refurbishment category, the Queen Mary University's GE Fogg Building in London underwent a £2.9m transformation, which reduced solar gain by 20% and improved thermal comfort, as well as giving it a striking new identity. See page 4 of the CIBSE schools supplement for an article on this project.

THE JUDGES

BUKKY BIRD
Tesco



Bukky is head of environment at Tesco Property. She is an experienced environmental engineer with a background in mechanical building services.

PADDY CONAGHAN
Hoare Lea

Paddy is a member of the *Journal*'s editorial panel and a partner at mechanical and electrical consulting engineers, Hoare Lea.

HYWEL DAVIES
CIBSE

Hywel is the judging panel chairman, and CIBSE's technical director, responsible for the technical development of CIBSE's publications, guidance and policy for engineers.

ANDY FORD
Mott Macdonald

Andy is this year's CIBSE president and the technical director at management, engineering and development consultancy, Mott Macdonald.

THE WINNERS

BUILDING OPERATION

Sponsor: Gratte Brothers

Winner: Transport for London

Judges: We were impressed by the extremely detailed analysis of the performance of each site.

Profile: From 2008-11, 21 of Transport for London's comparable sites have reduced annual utility bills by a total of £270,000.

BUILDING SERVICES CONSULTANCY OF THE YEAR

Sponsor: Baxi Commercial Division

Winner: AECOM

Judges: We felt that AECOM demonstrated many of the characteristics being sought in the CIBSE Building Services Consultancy of the Year.

Profile: Key cornerstones of AECOM's philosophy are robust environmental management and the implementation of sound sustainability principles.

CLIENT ENERGY MANAGEMENT PROGRAMME

Sponsor: Lochinvar

Winner: British Land

Judges: We were pleased to find evidence of energy performance figures. The monitoring and optimisation process supports greater collaboration with occupiers and building management teams.

Profile: A new advanced metering system and optimisation process has been rolled out at nine office buildings and two shopping centres. Savings are being seen ahead of schedule, with a total reduction of 9% in base-building consumption.

CLIENT OF THE YEAR

Sponsor: Imtech

Winner: University of Bradford

Judges: The campus-wide strategy shows the client's commitment to move forward towards their carbon reduction target of 50% by 2020.

Profile: Creating a low-carbon estate at the University of Bradford has so far seen an overall scope 1 and 2 carbon footprint fall of 8%. The target is to achieve 50% reduction in scope 1 and 2 emissions by 2020 against a 2005 baseline.

COLLABORATIVE WORKING

Sponsor: Cooltherm

Winner: Harrods

Judges: We were impressed with the Harrods entry, which demonstrated how the challenges of a difficult logistical project at the heart of one of the most famous department stores in the world could be met by team working and collaboration.

Profile: The department store sought a new refrigeration system. A carbon dioxide refrigerant operating as a transcritical installation was a proven alternative. This is believed to be the first application in the UK to employ parallel compression technology in conjunction with full heat recovery.

CONTRACTOR OF THE YEAR

Sponsor: In association with the HVCA and sponsored by Elta Fans

Winner: IMTEQ Aqua Ltd

Judges: We were impressed by the way in which Imtech had delivered a complex project that was critical to the functioning of the client's business and had enormous potential to disrupt the operation of the university.

Profile: A major redevelopment project at Anglia Ruskin University, in Cambridge, was carried out while the university remained fully operational and split the campus in two.

ENERGY-USING PRODUCT

Sponsor: FlaktWoods

Winner: COOL-PHASE low-energy cooling and ventilation system

Judges: We were impressed with the submission for COOL PHASE. It clearly set out the case for using this novel, low energy cooling system

DAVID HUGHES
Consultant

David is a member of the *Journal*'s editorial panel, a past president of CIBSE and a consultant in the building services industry.

DOUG KING
King Shaw Associates

Doug is a contributor to the Masterclass series in the *Journal*, and a founder member of low carbon consulting engineers, King Shaw Associates.

IAIN MACRAE
Thorn Lighting

Iain is head of global lighting application management at lighting company, Thorn Lighting.

GRAHAM MANLY
Gratte Brothers

Graham is the business development director at building services company, Gratte Brothers.

RICHARD PARTINGTON
Richard Partington Architects

Richard is a director and founding member of architectural practice, Richard Partington Architects.

PETER RICKABY
Rickaby Thompson Associates

Peter is director of specialist energy and environmental consultancy, Rickaby Thompson Associates.

to reduce energy consumption for building ventilation.

Profile: Cool-phase is a low-energy alternative to air conditioning that reduces energy consumption and CO2 emissions by up to 90%. The natural cooling, ventilation and heat recovery system uses 'thermal batteries' to capture free energy and release it when needed, with clean, fresh air.

NEW BUILD PROJECT OF THE YEAR (PRIVATE)

Sponsor: Amtech

Winner: Max Fordham

Judges: The unique nature of this floating visitor centre demanded a design that responded to the environment in every way. The integration of the services and the floor design, and the innovation in kitchen servicing and sewage management, particularly attracted our attention.

Profile: Brockholes Visitor Centre is built on a 2,400 sq m concrete pontoon that floats on a lake. Key aspects of the scheme are the open vaulted buildings with no ceilings or wall voids. The shallow plan depths, opening roof-lights and tall space heights provide exceptional daylighting to the main spaces and are naturally ventilated.

NEW BUILD PROJECT OF THE YEAR – PUBLIC

Sponsor: Amtech

Winner: Max Fordham

Judges: We were impressed by the level of detailed data provided in this entry, and the way that it was being used to help deliver improved performance.

Profile: The new John Hope Gateway project at Royal Botanic Garden in Edinburgh involved close collaboration between the architect, building services engineer, and structural engineer. The result was an energy-efficient building that has achieved an 'A' Energy Performance Certificate rating.

PASSIVE (ENERGY-RELATED) PRODUCT OF THE YEAR

Winner: Datum Phase Change

Judges: RACUS (Reducing Air Conditioning Units and Systems) ceiling tiles have been used on several recent projects, including one listed building where the passive ceiling tiles could be used to reduce overheating in spaces that could not have mechanical ventilation or cooling installed for heritage reasons.

Profile: RACUS is a passive suspended ceiling tile incorporating bio-based phase change material (PCM) utilising the oil from the soya plant and fatty acids. This is the world's first bio-based PCM ceiling tile that absorbs, stores and releases excessive latent heat gains to promote indoor comfort for occupants and also reduce the energy demand of HVAC systems.

TRAINING FOR BUILDING PERFORMANCE

Sponsor: SummitSkills

Winner: Norland Managed Services

Judges: In our view, the Norland entry was a good example of how building performance can be improved by putting people with the training and knowledge needed to deliver building performance on site on a day-to-day basis.

Profile: Energy Matters, a comprehensive energy supply and management solution, and an accompanying Energy Matters Training programme has reduced the energy base load by 25% at Morgan Stanley, saving more than £450k – equivalent to 2,500 tonnes of CO2 per year.

> We were impressed with the Harrods entry, which demonstrated how the challenges of a difficult logistical project at the heart of one of the most famous department stores in the world could be met by team working and collaboration – *The Judges*

The CIBSE Building Performance Awards 2013 will be held on Wednesday 6 February, subject to confirmation

REFURBISHMENT PROJECT

Sponsor: Vaillant

Winner: Norman Disney & Young

Judges: The Angel Building demonstrates what can be achieved in a 1980s building to deliver that up to date, quality designed office space served by modern energy efficient services.

Profile: A low-energy displacement ventilation system provides 'free' cooling for a large proportion of the year, resulting in the high-efficiency water cooled chillers being used for less time and enabling heat recovery of up to 65%. This gives a 44% reduction in CO2 emissions.

SPECIALLY COMMENDED: FRASER BROWN MACKENNA ARCHITECTS

Profile: Queen Mary University's GE Fogg Building, a tired and uncomfortable academic building in London, underwent a striking transformation, extending its life for a fraction of the cost of a rebuild.

CARBON CHAMPION OF THE YEAR

Sponsor: Remeha

Winner: University of Bradford

Judges: We were impressed by the apparent willingness of the university to tackle energy efficiency more effectively over a sustained period. A comprehensive programme has reduced energy use by 8% since 2005.

Profile: The University of Bradford has embarked on an ambitious and visionary programme to reduce energy use and carbon emissions. Their efforts involve all their staff, students and visitors and address their social responsibilities.

LOW CARBON CONSULTANT OF THE YEAR

Sponsor: Spirotech

Winner: Andrew Gardner

Judges: Andrew Gardner's carbon returns show that, over the year, he helped his clients to save approximately 61 tonnes of carbon dioxide.

Profile: This year's winner has worked for several large and prestigious clients, looking for ways to reduce their buildings' energy use, and to reduce their carbon emissions and carbon reduction commitment liabilities.

COMMISSIONING PROJECT OF THE YEAR

Sponsor: CMR

Winner: The Darling Quarter project, Sydney (Norman Disney & Young)

Judges: We considered the Norman Disney & Young entry an excellent example of commissioning on a large-scale development.

Profile: Norman Disney & Young's submission set out how they had undertaken the commissioning management of the entire 1.5 hectare Darling Quarter project site. It set out the organisation, scheduling, resource and quality planning, and the delivery of documents for the project.

COMMITTED TO LOWERING CARBON OUTPUT THROUGH EXCELLENCE IN SYSTEM EFFICIENCY

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KNOWLEDGE IS POWER

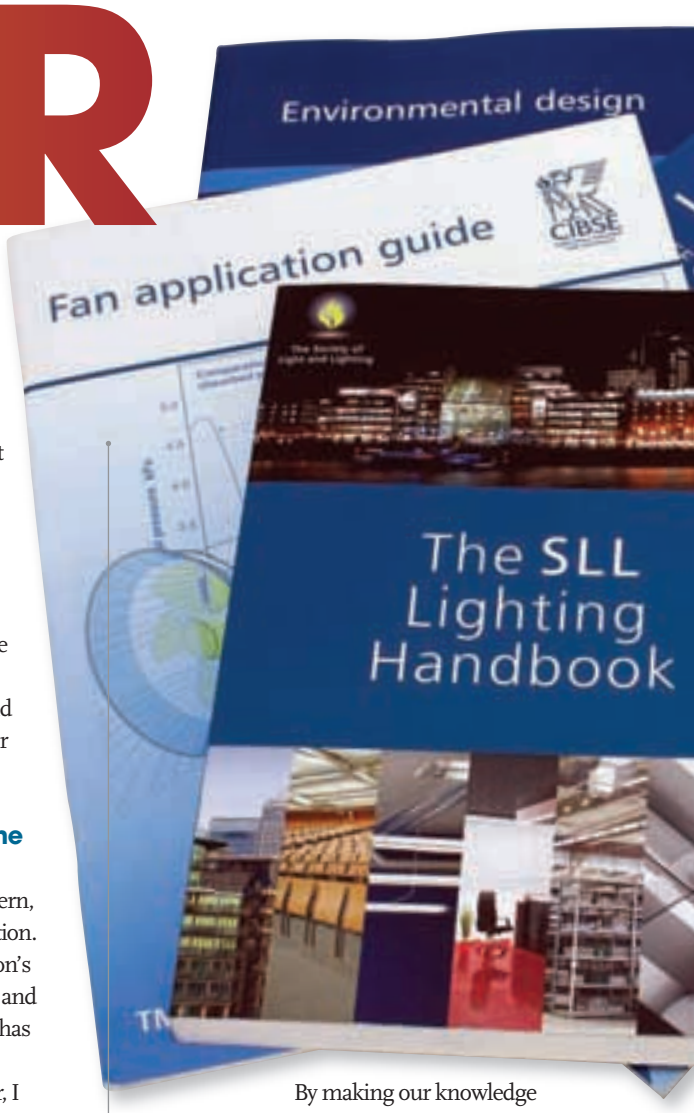
Four months after the initial launch of CIBSE's new free online tool, the Knowledge Portal, one of its creators, **Brian Moss**, answers a Q&A session with the *Journal* about its development

Brian Moss is a past president of CIBSE and, in his former post as chairman of PROD – the CIBSE Publications, Research Output and Delivery Committee – he played a crucial role in the development of the Knowledge Portal. So the *Journal* asked him for an inside view on the thinking behind the tool and the Institution's plans for its future.

What were the main aims of the Knowledge Portal project?

It is vital for CIBSE that we are a modern, forward-thinking engineering institution. A fundamental aspect of the Institution's work is the dissemination of accurate and trusted information, and the internet has become *the* medium for this.

As a long-standing CIBSE member, I am pleased to see the Institution taking a pioneering approach in offering all of its core technical guidance on the web in a fully searchable, downloadable form. This is vital in appealing to our members, who now routinely expect to be able to access web-presented information, as well as helping us to attract the next generation of engineers to the Institution.



By making our knowledge easily available, we benefit our members, while the Institution benefits as well, as the Knowledge Portal will encourage more engineers – and architects, surveyors and building managers – to join its ranks. This, in turn, allows us to strengthen our influence and further improve our service.

What are the main benefits for CIBSE members?

I believe the main benefit is the immediate access to information. For instance, you're in a client's premises and a query has arisen about the wording of a specified British Standard. No problem: the abstracts of standards relevant to building services are automatically accessed against the relevant subject matter on the CIBSE Knowledge Portal. Simply display the standard's abstract on your computer and, if the actual standard

Case study

Deddy El-Rashid, a CIBSE member and director of operation for Airkon Pratama in Indonesia, has used the Knowledge Portal to assist in a variety of projects, such as the energy audit for the prestigious Sampoerna Strategic Square in the heart of Jakarta.

He said: 'I have downloaded a wide range of content – including the Knowledge Series (on topics including Making Buildings Work and Energy Efficient Cooling), Technical Memoranda, the Commissioning Code and CIBSE guides (such as *Guide F on Energy Efficiency in Buildings*). I use these resources both in the office and on site, through a laptop or iPad.

'Having these publications available online allows me to do tasks such as creating an operation manual, or using checklists during handovers.

'In future I would like to see more promotion of the Knowledge Portal internationally – and sharing of documents and knowledge between CIBSE members from across the world.'

is required, order it by clicking the link. Alternatively, you're at a site meeting and there's disagreement about a Building Regulation or standard. No problem: references and links to the appropriate UK legislation are automatically accessed against the relevant subject on the CIBSE Knowledge Portal. By putting the guides and other peer-reviewed technical information published by CIBSE literally at your fingertips, the frustration resulting from a lack of immediate design information becomes a thing of the past.

And the Knowledge Portal is being constantly updated?

Absolutely. A trawl through engineering libraries, especially those owned by individuals, soon makes one aware that, at some time or another, most designers use out-of-date information. You can't fall into that trap when you use the Knowledge Portal.

What were the main challenges of the project?

The technical challenges – ensuring that the high-level goals of the Institution were matched by the practical limitations of technology. By using a phased approach we have been able to improve functionality since the original rollout.

Were you worried about the risks of such a project?

Obviously, it is a bold step for any Institution to make all of its core technical guidance available online, and it raises questions about the fair use and sharing of this information. However, we strongly believe that the risks here are strongly outweighed by the extra value we can offer to our members, especially those outside the UK.

How successful has the project been so far?

We are very pleased with the initial response to the Knowledge Portal, and the statistics [see the 'Fast facts' box, right] show that the Knowledge Portal has reached a large audience. And this is not just existing members taking advantage of the new benefits available to them – there has also been a steady number of new affiliate members joining through the Knowledge Portal, which is a very positive sign for CIBSE. It is particularly interesting that there have been visitors from more than 100 different countries.

What plans are there for the Knowledge Portal in the future?

Proposed future improvements include increasing the amount of available content from non-CIBSE organisations, improving the coverage of non-UK legislation and re-formatting and organising the material, so that it is more conveniently structured and user-friendly, including more photographs and video presentations.

The engagement of members will also be vital to its continued success – and there is the potential to integrate it with social media and to use the platform to build communities, allowing members to interact with each other, while also including systems to enable user feedback for improvements and suggestions for new content.

We would be delighted to hear from our members about how the Knowledge Portal could be improved. To make your views known, email **cibsepublications@cibse.org** **CJ**

FAST FACTS

In its first four months of use, the Knowledge Portal has secured some impressive results. As of 17 February, they read as follows:

19,763 – Total number of visits

123 – Countries that have accessed the tool; 28% of usage comes from overseas

181,035 – Total pages viewed

6.56 – Time of the average visit (in minutes)

17,707 – Documents downloaded

866 – Downloads of *Guide A*, the portal's most popular document

Access the Knowledge Portal at:
www.cibseknowledgeportal.co.uk

The only port of call

CIBSE launched the Knowledge Portal in November 2011 as an online tool, allowing unlimited access for members to search and download the full range of CIBSE peer-reviewed published guidance, abstracts of thousands of British standards that are directly relevant to the building services sector as well as providing links to other relevant publications.

The search functionality works across all Knowledge Portal content, presenting the results in clear subsets – CIBSE, other documents and the British Standards Institution. Documents are interlinked, allowing users to follow cross-referrals from one document to another.

DIFFICULT DELIVERY

There is no doubt that building sector professionals know how to construct energy efficient dwellings, but several challenges remain for delivering a truly low carbon housing stock, argues **Mark Clare**

As a property developer, we are very pleased to see the rise in 'fabric first' solutions for new low carbon homes. This approach has enabled us to avoid expensive renewable technologies. We need technologies that deliver thermal and airtightness performance. But this approach still has to be at a cost that enables us to deliver affordable solutions – and we are not there yet.

Indeed, the most important challenge that the whole building industry has to crack is reducing the costs of delivery of such homes. Costs have come down for Level 3 and 4 dwellings under the Code for Sustainable Homes. And we have also seen our supply chain stepping up significantly, with better technology and, as volume increase, better prices. But we still have some way to go to make low carbon affordable.

Some might argue that we can simply reduce the land cost, or charge the customers more. But in reality the result will simply be fewer houses being built. We also have some real concerns about the price of carbon. It is completely unacceptable if, as suggested, the price is set higher than the European trading mechanism, the ETS. Given how expensive housing is in Britain, why would we then 'tax' it unfairly? It is customers who will pay if the charge is unfair, either directly or indirectly because fewer homes will be built.

Another key obstacle to the delivery of low carbon homes lies in those local authorities that still insist on setting requirements for housebuilders to install renewables – despite the fact that we can deliver the standard required with a fabric-only solution.

A Code Level 6 Barratt dwelling. Can developers afford to build many more such developments?

It is not clear whether the attitude of local councils here is down to a lack of understanding, or to a desire to ensure everyone knows the development is lower carbon.

In reality, forcing developers to deliver renewables when they aren't required leads to some serious unintended consequences. The property will be more expensive; it will also be more complicated for the customer, who will have to pay for ongoing maintenance and future replacement; and there is the carbon footprint of the unnecessary manufacture of the renewable units themselves.

The government needs to ensure that local authorities are properly informed on the best and most appropriate technology solutions available for various applications. Organisations such as BRE could act as an important catalyst in this process.

> Forcing developers to deliver renewables when they aren't required to leads to some serious unintended consequences

One of the key issues for housebuilders themselves is selling the benefits of this new generation of more efficient homes to customers. We certainly need to focus more on this in the future – but also in a cost-effective way. One of the concerns often voiced by consumers is the cost of maintaining renewable technologies.

Of course, looking forward, it is the way our customers live in their low carbon, new homes that will define their carbon footprint. So, in the longer term, we have an even bigger communication task ahead – one that is aimed at helping customers live a more sustainable life. While that sounds like a pretty tall order now, as awareness increases, people will want to understand how they can do their bit.

However, as a nation, the real challenge for reducing the carbon footprint of our homes is to start dealing with existing stock. This stock is very old and inefficient in comparison with other Western nations. It is now time to move the energy efficiency focus onto existing homes.

So in summary, it's important that 'allowable solutions' provide incentives for innovation. We must have informed planning decisions and not 'greenwash'. And, while the job of delivering low carbon new homes isn't done yet, the whole built environment sector has made real progress. Most importantly of all, there is no doubt we do all now know how to deliver a low carbon home; we just have to ensure it is an affordable one.

MARK CLARE is chief executive of Barratt Developments. This is an edited extract from a speech made to the recent Zero Carbon Hub annual conference. **www.zerocarbonhub.org; www.barrattdevelopments.co.uk**

Your letters

Downplaying renewables

Although I hesitate to disagree with Professor Colin McInnes (Opinion, February *Journal*, page 20), I would like to point out some anomalies in his downplaying of renewable energy.

Nuclear power is far from carbon free, if the complete fuel cycle is considered. Additionally, how much CO2 is associated with the Fukushima clean-up, and in constructing the new containment for the Chernobyl reactors? Furthermore, it is universally accepted that no other technology is more heavily subsidised than nuclear power.

Professor McInnes makes no mention of energy conservation and energy efficiency that, if applied extensively, reduce the need for fuel and power and make the deployment of benign renewables the preferred long-term solution.

Even if all the downsides associated with shale gas (see reports from the Tyndale Centre and Cornell University) are acceptable, it can only be considered as a very limited stop-gap step to real sustainability.

Brian Edwards

Flues can get clogged

The article in the January *Journal* makes reference, on page 43, to horizontal flues on biomass systems. These clog with soot and tar, require frequent cleaning, cause flue pressure problems and greatly increase the chance of a flue fire and should be avoided. The forthcoming CIBSE Applications Manual on biomass systems (to which I am a contributor) will include clear guidance to this effect.

David Palmer

Solar does make sense

I was interested to read about the research from the Centre for Infrastructure Management at Sheffield Hallam University stating that solar panels can save households up to £420 a year, but still take between 15 and 17 years to pay back installation costs (February *Journal*, page 12).

Solar thermal is a very cost-effective option for new-build social housing. Solar thermal really is *the* cost-effective solution for producing cheap hot water in new buildings.

Mike Darvill

Support the diploma

Since the government announced it was cutting its Diploma support programme, some have speculated that the demise of the qualification is imminent. The consensus in the built environment is that this would be a damaging blow to training in the sector. The government needs to offer the qualification for at least another three years to assess its real value.

Key members of the UK Contractors Group (UKCG), such as Wates, Kier, Balfour Beatty and my own company, Seddon Construction, are strongly in favour of the diploma and it's not difficult to see why.

As well as supporting young people in their pursuit of knowledge and sector-specific skills, we are also developing a generation of workers who can solve problems, work as part of a team, and get the best out of each other.

For all these reasons, UKCG member companies will be taking on Diploma holders as a priority. To secure a bright future for the construction industry we need robust qualifications. From apprentices to graduates, the Diploma in Construction and the Built Environment will give them all the skills they need for their career.

It stands to reason that employers should get behind this qualification to develop the right candidates, with the right skills to take the industry forward.

Roy Cavanagh MBE

MANUFACTURER'S VIEWPOINT

Let's practise what we preach, writes Martin Fahey of Mitsubishi Electric, sponsor of this column

Anyone who has read this column over recent months will know that I have focused on the building services industry's impact on reducing energy consumption.

With everyone facing rising energy prices, increasingly tough legislation and the demand for a low carbon future, our industry is at the heart of the debate and, individually or collectively, we can make a difference more than any other sector.

Buildings account for 44% of all UK greenhouse gas emissions (more than industry or transport) and while we are creating new low carbon buildings, it is estimated that around 75% of existing buildings will still be in use in 2050, so to a large degree, our future is already built.

Part of the answer, therefore, has to be improving the energy efficiency of these buildings. But even without the current austere climate, persuading companies to spend money on this area is a major challenge – yet it can quickly make a difference.

> We have used a mixture of ground and air source heat pump systems

At our Hatfield headquarters we have taken a building that was originally rated at 'E' and upgraded it to a 'B' grade, using off-the-shelf equipment to increase its efficiency.

The office was built in 1986 and is a typical, three-storey, steel-framed, glass-fronted building, which acts as the base for around 300 staff.

Originally cooled with a chiller system and heated with a gas boiler, we made the decision to remove the chiller and replace it with a VRF system. This enabled us to use waste heat from cooling one area and offset it against heating needs elsewhere.

This is epitomised in the building's restaurant, where waste heat generated in the kitchen and restaurant area is used to preheat the water that will be used for washing up in the afternoon. We have now developed this concept with every building service so that, step by step, we have improved and upgraded almost every angle. We have only done this when equipment reached the end of its life and needed replacement, or when we could make the business case to justify the expenditure in upgrading equipment.

The lesson here is that, as an industry, we already work with technologies that can help improve the efficiency of almost any building.

However, our own journey from an 'E' to a 'B' has taken eight years which highlights the business need for an evolutionary approach rather than revolutionary one.

We have used a mixture of ground and air source heat pump systems including the latest heating-only heat pump units, but all of this equipment is readily available today, so as an industry, we can stop waiting for a silver bullet to arrive and demonstrate what can be achieved with what we already have.

I mentioned financial constraints, which are real for anyone. In the case of Hatfield, we now need to look long and hard at the building's cladding, which is starting to reach the end of its natural life.

Like any business though, we can't just stop everything and vacate, but by looking at those areas where we can make a difference and simply planning accordingly, we have been able to demonstrate where real energy savings can be made.

Martin Fahey is sustainable solutions manager at Mitsubishi Electric and co-ordinator of the company's Green Gateway programme. Further information is available at ***greengateway.mitsubishielectric.co.uk***

SAFETY FIRST

How will the Löfstedt Report on health and safety legislation impact on the construction sector? **Hywel Davies** looks at the recommendations

The coalition government came to power with a promise to reduce burdens on business. One of its early acts was to ask Lord Young of Grafham to conduct a review of health and safety legislation and the compensation culture. Lord Young recommended that government should seek to reduce the burden of bureaucracy on businesses. As a result, Professor Ragnar Löfstedt, a leading risk management specialist, was appointed to propose appropriate ways to simplify the existing raft of health and safety legislation.

The Löfstedt Report is based on a review of science and risk-based evidence, which included more than 250 responses to an open call, meetings with more than 30 individual stakeholders, and wider stakeholder gatherings chaired by the professor. He also accompanied inspectors on various inspection visits, studied the available scientific literature, and spoke to other health and safety regulators and policy makers in Sweden, the EU and at the European Agency for Safety and Health at Work in Bilbao.

The report's 26 recommendations focus on high-risk activities to reduce and simplify regulatory requirements on business. Löfstedt is clear that any changes should not lead to a reduction in health and safety protection.

The headline conclusion is that there is no evidence for radically altering current health and safety legislation. This was the overwhelming view expressed by a wide range of stakeholders, including employers. Given the government's focus on costs to business, Löfstedt specifically points out that 'there is evidence that work-related ill health and injury is itself a considerable burden on business (as well as a cost to society more generally) and that the regulatory regime offers vital protection to employees and the public'.

The report also highlights other factors that may cause businesses to go beyond what regulations require. These include inconsistent enforcement by regulators and the influence of third parties promoting generation of unnecessary paperwork.

Six key recommendations highlight areas that need to be addressed by the government. These are summarised below, along with an indication of the government response.

A. Exempting from health and safety law those self-employed whose work activities pose no potential risk of harm to others. The report quite specifically excludes from this category self-employment on construction sites (although a self-employed consultant working from home is within the scope of this change).

B. The Health and Safety Executive (HSE) should review all its Approved Codes of Practice (ACoPs). The initial phase of the review should be completed by June 2012, so businesses have certainty about what is planned and when changes can be anticipated. The government has indicated that it intends to do this to the timetable proposed. This means that, for example, the ACoP L8 on legionella will be reviewed.

C. HSE to undertake a programme of sector specific consolidations to be completed by April 2015.

Löfstedt reports that there are 46% fewer health and safety regulations than in 1974 (when the Health and Safety at Work etc Act was passed). Government has accepted this recommendation and committed to reducing the number of health and safety regulations by a further 50%. For the construction sector, the proposed review will address the Health and Safety (First Aid) Regulations 1981, the Construction (Head protection) Regulations 1989, the Working at Height Regulations 2005, the Notification of Tower Cranes Regulations 2010, and the Notification of Conventional Tower Cranes (Amendment) Regulations 2010.

D. Legislation to be changed to give the HSE the authority to direct all local authority health and safety inspection and enforcement activity, in order to ensure consistency and focus on the most risky businesses. This is primarily aimed at ending variations in enforcement by local authorities, which give rise to many of the more extreme stories about health and safety enforcement.

E. Clarification of pre-action standard disclosure (Woolf) lists a review of regulatory provisions that impose strict liability by June 2013. This recommendation is accepted.

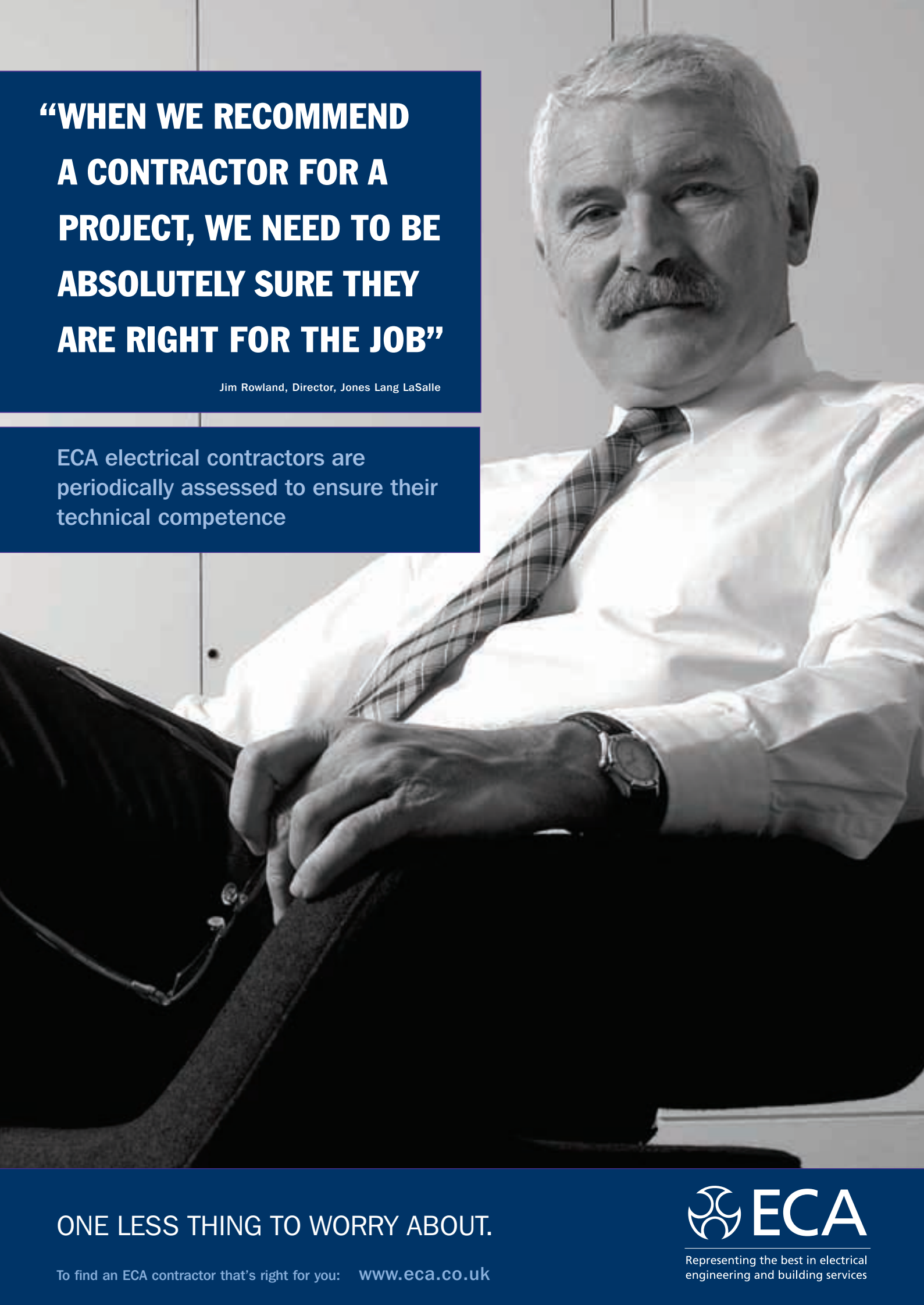
F. Those responsible for developing impact assessments should be different from those who have drafted the directives or regulations. The government accepts the principle, and considers that for UK legislation this is addressed by the Regulatory Policy Committee. In Europe, it is working with the Commission to achieve similar outcomes.

The first three of these are likely to have the most immediate and direct impact on the construction sector. The review of ACoP L8 on legionella will be particularly relevant to the revision of *CIBSE TM13: Minimising the risk of Legionnaires' disease*, which is currently underway. CIBSE will also be working with the Construction Industry Council to contribute to the wider review of legislation, in particular the CDM Regulations.

WEB LINKS

The Department of Work and Pensions published Professor Löfstedt's report, *Reclaiming health and safety for all: An independent review of health and safety regulation* on 28 November 2011. See **www.dwp.gov.uk/docs/lofstedt-report.pdf**

● **HYWEL DAVIES** is technical director of CIBSE **www.cibse.org**



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Jim Rowland, Director, Jones Lang LaSalle

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Wind of change

An upbeat mood in the US is helping to drive the building services sector, reports **Ewen Rose** from ASHRAE's Winter Meeting in Chicago – the 'windy city'

Chicago hosted the country's largest-ever heating, ventilating, air conditioning and refrigeration (HVACR) exhibition, the AHR Expo, at the end of January.

In total, 1,968 exhibitors from 35 countries took part, despite Chicago's forbidding winter weather. And the mood was buoyant. More than 70% of manufacturers there said they expected 2012 to be an 'excellent' or 'good' year for business, while 60% said it would be much better, or better, than 2011.

They believe the big opportunities are in retrofit and renovation, with the healthcare sector seen as the most lucrative.

The organisers of the show, International Exposition Co, told the *Journal* that the AHR Expo was a notable bright spot in the US economy as a whole. However, share prices have started to rise and manufacturers, generally, are reporting improved order books as the sluggish recovery creaks into gear.

The ASHRAE Winter Meeting, which took place in tandem with the expo, proved an equally upbeat gathering of nearly 3,000 delegates – despite the usual political uncertainty that accompanies a presidential election year.

Crippling financial deficit

An oft-repeated view in Chicago is that President Obama is 'anti-business'; many at both the Chicago events said the lack of incentives and fiscal support had slowed the recovery. The Federal programme of spending on 'green' projects has also fallen victim to the cutbacks to try and deal with the country's crippling financial deficit. Similarly, a raft of proposed energy bills remain stuck in the Washington law-making machine.

However, ASHRAE president Ron Jarnagin told the *Journal* that the general situation was not hindering development in the building services sector. 'The economy is not impeding us, and our efforts to improve buildings do not depend on energy legislation or on tax incentives,' he said.

There is a strong feeling in the US that it is futile to wait for politicians to put systems in place to get the market moving again.

'People often compare the current situation to the Great Depression, but things are very different now,' said Jarnagin. 'Back then the government built major infrastructure projects to get the economy moving again, but we are not waiting for that to happen this time.

'We accept that the deficit must be addressed and, therefore, there will be a

> The economy is not impeding us, and our efforts to improve buildings do not depend on energy legislation or on tax incentives
> *–Ron Jarnagin*

Angela Malynn, CIBSE/ASHRAE Graduate of the Year, says sustainable design is what good engineers have always striven for

certain amount of pain, but businesses are getting on with generating revenue so we can all pay our bills.'

US economists agree that businesses have been stockpiling cash to insulate themselves from the effects of any further shocks. Many attending the Chicago meeting reported some of that money was now being released for investment in building refurbishment and energy saving equipment.

There was also a noticeable improvement in the unemployment situation in the US at the turn of the year – 257,000 new jobs appeared in the private sector in January – with the unemployment rate falling to 8.3%. Also, house prices have stabilised – a key indicator of better times ahead, according to Jarnagin.

'ASHRAE has a role to play in job creation by increasing excitement about the opportunities in improving buildings,' he said. 'People have a choice about what they invest in and our job is to persuade them of the value in saving energy and the improved productivity possible in a better building.'

CIBSE at work

The broader role of CIBSE was also seen at work during the meeting, particularly during a 'UK perspectives' session chaired by CIBSE/ASHRAE group chairman, Tim Dwyer. The role in our market of European and domestic legislation, along with financial incentives, prompted several ASHRAE members to remark on the different emphasis on opposite sides of the Atlantic. They believe that practical implementation is more of a focus for North American engineers.

This is largely explained by the fact that individual US states follow their own legislative path, rather than one set by a single central authority, although many US engineers used the meeting to call for more legislation to help embed sustainability in construction projects.

However, the meeting coincided with a report from the Institute of Electric Efficiency, which revealed that US consumers reduced their energy consumption by 21% in 2010, and that figures for 2011 were expected to show another significant improvement.

The report also showed that increasing use of energy efficient appliances in buildings had produced a 112 million MWh saving.

More than half of US states have imposed mandatory energy saving targets on their power suppliers. California leads the way with an annual $1.5bn budget for energy efficiency measures, followed by New York with $1bn. This is clearly starting to show measurable results and is a contributor to the growing mood of optimism in the US building services sector.

Angela Malynn, the current CIBSE/ASHRAE Graduate of the Year who attended the Chicago conference, was struck by the American 'can do' attitude driving the upturn.

'There was a real sense of optimism at the meeting and it is clear that the members of ASHRAE have a lot of influence over the direction of the industry and of the society itself,' she said.

'Sustainability continues to be a big driver on both sides of the Atlantic, but I do wish people would stop trying to package it as something new,' added Malynn. 'Sustainable design is what good engineers have always striven for – this is not something we have just woken up to.' **CJ**

● **www.ashrae.org**

ASHRAE What's in a name?

During the meeting, ASHRAE launched its new identity with a revamped logo and the dropping of its full 'legal' name. It will no longer be referred to as the American Society of Heating, Refrigerating and Air Conditioning Engineers, but simply 'ASHRAE'.

There was apparently considerable debate about dropping the 'A' to emphasise the society's international standing, but this was rejected by the overseas membership, according to president-elect Tom Watson.

'The fact we're even discussing this shows that the old geographical boundaries between engineers no longer apply,' he said. 'Our members now work across country borders and many of our standards are adopted worldwide.'

He also pointed out that the society had long ago moved beyond its 'traditional niche' in HVACR into much broader areas, including subjects as diverse as smart grids, building information modelling and even the air quality inside the space shuttle. The original 1959 ice crystal logo was, therefore, considered too old-fashioned and a more forward-looking and dynamic identity was needed.

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TEST of TIME

Too many new public and commercial buildings fail to live up to their expectations for energy savings and user comfort, but can the good ones maintain their performance? With support from CIBSE, a team of experts returns to a university building that was found to perform exceptionally well in the late 1990s. **Bill Bordass** and **Adrian Leaman** report on their findings. A separate article on the performance of school buildings generally starts on page 39

A 'PROBE' investigation into the Elizabeth Fry Building at the the University of East Anglia in the 1990s found that it had exceptionally good performance in many respects. A recent follow-up visit found that, despite some inevitable 'drift' in its operations, it is still performing better than many brand-new buildings. In the background is the Queen's Building, an earlier building by the same design team

In the early 1990s, the editorial advisory board of *Building Services Journal* (the forerunner of *CIBSE Journal*) had wondered how well the buildings it featured actually performed in practice. In 1994 the *Journal* made a successful bid under the government's Partners in Technology programme to undertake and publish the 'PROBE' (Post-occupancy Review Of Buildings and their Engineering) studies.

Between 1995 and 2002, a total of 20 non-domestic buildings were surveyed, typically two to four years after handover. The process, results and general findings are described in 29 articles in the *Journal*, and in reviews elsewhere.

PROBE number 14 investigated the Elizabeth Fry Building at the University of

Bill Bordass

Administration office for the Hub: This was occupied in September 2011, replacing the popular ground floor seminar rooms. Note the lowered blackout blinds (inherited from the former seminar rooms) to counter solar glare through the side windows

Roderick Bunn

East Anglia (UEA). It revealed a modest but refined building that had exceptionally good performance in many respects. Annual gas consumption for heating and hot water was 35 kWh/sq m of treated floor area (TFA), while other buildings surveyed by PROBE tended to use 100 kWh/sq m or more.

Overall levels of occupant satisfaction were the best in the PROBE dataset, particularly in summer. The cover of the April 1998 edition of the *Journal* therefore asked the question, 'The Best Building Ever?'. In 2011, PROBE team members returned to review how well the building had fared since then.

Fine-tuning

The Elizabeth Fry Building benefited from a client representative, Peter Yorke, who was seeking good-quality, robust, low-energy buildings at normal cost levels and had gained considerable experience from previous UEA projects. The design team was keen to oblige and had worked together before on the adjacent Queen's Building. The result was a 'keep-it-simple-and-do-it-well' design. During construction, critical details affecting insulation and airtightness were followed through by the team with Elizabeth Fry's builder Willmott Dixon and the university's clerk of works, who visited the site daily.

In 1995, the first year of operation, gas use for heating was 65 kWh/sq m, good for the UK but disappointing in relation to some Swedish Termodeck buildings. Fortunately, with the encouragement of Termodeck's UK representative Derrick Braham, the building was being monitored for the government's *Energy Efficiency Best Practice programme*. This showed that the boilers sometimes put too much heat into the fabric via the supply air, only for it to be removed by extra outside air ventilation some time later.

A strategy based largely on mass sensing was therefore proposed, but could not be implemented using the original standalone controllers. In 1996 the university therefore extended its new Trend building management system to Elizabeth Fry – ahead of schedule. The results were dramatic, with gas consumption halved in 1997, the year analysed in the PROBE survey.

> In 1998 the Elizabeth Fry Building set new highs for overall comfort, summer temperature, and air quality, in terms of average responses to the Building Use Studies occupant survey

Roderic Bunn

Gradual changes were made to Elizabeth Fry over a 15-year period, resulting in increasing occupancy levels and a proliferation of computer equipment. This is north façade of the building, facing on to Chancellor's Drive, a bus route

The new control strategy was simple: during occupancy hours, the AHUs endeavoured to maintain a supply air temperature of approx 21C by varying the amount of heat recovery. If slab temperatures in locations towards the room ceiling outlets fell below 20C, the heating was boosted to maximum, with recirculation at night. If the slab temperatures rose above 22C, the heat exchangers were bypassed and outside air cooling was extended overnight.

Monitoring showed that the thermal inertia of the hollow core slabs made finer control unnecessary: it simply increased energy use. The lecture room systems also included air quality control to boost air volumes for short periods if needed, bypassing the Termodeck.

Building features Elizabeth Fry in the 1990s

Elizabeth Fry is a four-storey rectangular building with a gross internal area of 3,250 sq m and treated floor area (TFA) 3,130 sq m. Its principal elevations face almost north, on to the main distributor road, Chancellor's Drive; and south, on to a courtyard.

In the 1990s it had lecture rooms on the lower ground floor, and seminar rooms and offices on the upper ground floor.

On the first and second floors were one-, two- and four-person teaching and administrative offices at the west end, seminar rooms and common rooms at the east end, and a catering kitchen.

It was the second building in the UK to use the Swedish Termodeck system of mechanically ventilated hollow core concrete floor and roof slabs with exposed soffits.

It was very well insulated: block walls with 200 mm mineral fibre cavity fill; triple-glazed (2+1) aluminium-clad timber windows with blinds between the inner and outer panes; a roof with 300 mm of insulation and a profiled metal sheet covering; and an insulated floor.

The U-values of all these elements remain better than the limiting requirements in the 2010 edition of Approved Document L2A.

Thermal inertia was further enhanced by blockwork internal and external walls and good airtightness. With a design heat loss of only 15 W/sq m, two 24 kW domestic wall-hung condensing boilers could provide all the heat required, with a third in reserve.

Heating and cooling is entirely through the air. The four air-handling units incorporate heat recovery: the two AHUs serving the lecture rooms having conventional cross-flow systems; and the offices and seminar rooms the more efficient (nominally 85%) flow-reversing regenerators.

Following initial monitoring, six small (200W) electric heaters were added in six rooms to counter additional heat loss through overhangs and exposed corners.

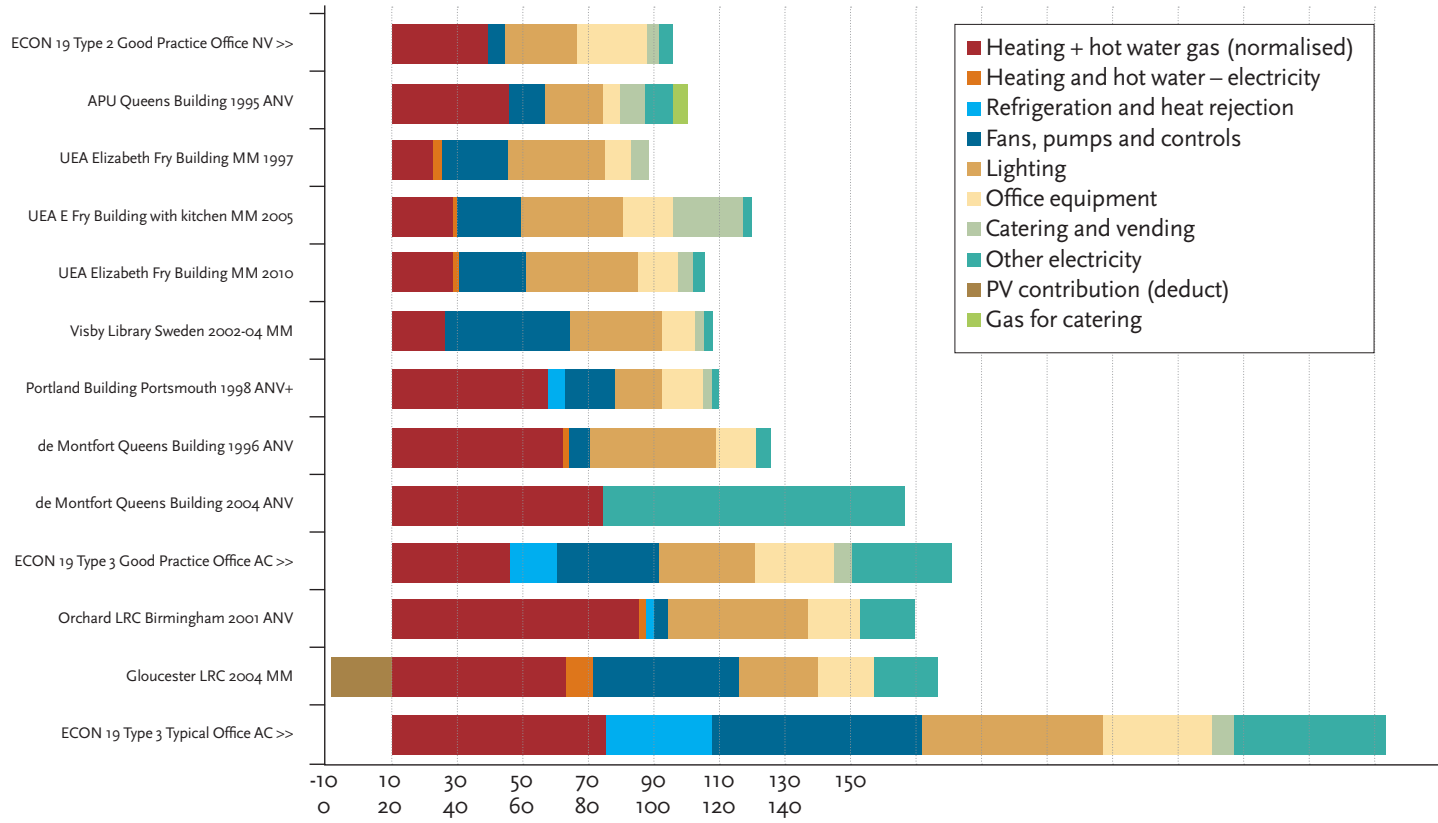
1995 to 2011

During this 15-year period, changes to the building were gradual. PCs inevitably appeared on everyone's desk, with computer projectors and audio-visual systems in the lecture rooms and some seminar rooms. Room occupancy increased generally, while staff and student common rooms on the first and second floors were converted into offices and meeting rooms. In 1997 the building contained 70 office workstations. In 2010 there were 120.

Changes in operation of the catering kitchen on the top floor significantly affected overall energy use. In the 1990s the kitchen was used for special events, typically one a week; and usually just for serving, not cooking.

During 2004-06 the kitchen was in regular daily use while the Sainsbury Centre was being refurbished. In 2008 the kitchen and dining area were converted into a densely-occupied, open-plan postgraduate administrative office with 25 workstations: a purpose to which it is not very well suited, because the kitchen only had three small windows and no views.

Bigger changes happened in summer 2011. However, these alterations are too new to be evaluated reliably for energy use and occupant satisfaction, so this



Annual CO2 emissions from university buildings (kg/m² Treated Floor Area at UK CO_2 factors of 0.184 for gas and 0.525 for elecricity)

AC = air conditioned, **ANV** = advanced natural ventilation, **MM** = mixed mode, **NV** = naturally ventilated

The diagram shows the estimated breakdown of energy use in 1997, 2005 (when the catering kitchen was in full operation) and 2010, in relation to office benchmarks from the Carbon Trust's Energy Consumption Guide 19 (marked with chevrons) and to other university buildings reviewed in PROBE and related studies. The graphs are expressed as annual CO2 emissions at Defra 2011 UK factors. The data are sorted by CO2 emissions for heating, hot water, cooling, ventilation and lighting.

At all three dates, Elizabeth Fry still maintains its place towards the low-carbon end of the range. The biggest changes between 1997 and 2010 are in heating and hot water, largely due to the change to 24/7 hot water and the appearance of some additional electric heaters. Lighting and office equipment energy use have also gone up owing to increased occupancy and equipment levels.

In relation to other buildings and benchmarks, energy use for heating and hot water is still good, while lighting has deteriorated owing to the low efficiency of the original pelmet system and greater hours of use now. CO2 emissions from fans, pumps and controls (mostly fans) are reasonable in relation to the other mixed-mode buildings and to air-conditioned benchmarks, but nevertheless of a similar magnitude to those from heating and hot water.

article does not change them. The changes included stripping-out the popular ground-floor seminar rooms and their heavy blockwork walls and providing a student hub and administration centre for a large number of faculties.

The Hub includes pigeon holes and deposit boxes for coursework and a four-position enquiries counter behind the entrance hall.

To the east, it has a drop-in area for students and staff, with soft chairs, a kitchenette and vending machines. To the west, there are open-plan offices for 45 administrative staff and a hub room for the computer system (the servers are elsewhere).

Energy use

Annual energy use in calendar year 1997 was 61 kWh/sq m treated floor area (TFA) of electricity, 31 kWh/sq m of gas for heating, and 4.2 kWh/sq m for domestic hot water.

In the ensuing years, annual electricity use rose inexorably by some 2 kWh/sq m every year, to a total of 75 kWh/sq m in mid-2004. In 2004-06, with the all-electric catering kitchen in daily use, annual consumption climbed to 90 kWh/sq m. It then fell to 72 kWh/sq m in the year to June 2008. Data after that is unreliable owing to metering faults.

In addition, annual gas consumption for heating fluctuated within a narrow range of 27-33 kWh/sq m. The total in the year to July 2007 was 28.5 kWh/sq m, after which there was a meter fault. Resumed measurements revealed higher figures of 35-36 kWh/sq m for the years to July 2009, 2010 and 2011. The reasons include

> Fifteen years on, Elizabeth Fry remains a comfortable, low-energy building in relation to most of its peers, although some things have drifted a little

Building Use Studies (BUS) occupant survey results for 1998 and 2011

The diagrams above show average responses by staff to 12 key questions in the BUS surveys in 1998 (on the left) and 2011 (on the right), just before the recent changes. For comparability, the 2011 survey excludes occupants in the converted kitchen and dining area. The satisfaction scales run from 1 (poor, on the left) to 7 (good), apart from the final question – the effect of environment in the building on perceived productivity – which goes from –20% to +20%. Green squares show where average scores are significantly better than benchmark values at the 95% confidence level. Orange circles indicate averages that are similar. For most occupant satisfaction variables, The Elizabeth Fry Building remains significantly above average. There are no red triangles, which would indicate scores significantly worse than average. The question about image (to visitors) was not asked in 1998.

The score for overall comfort in 2011 is at the 79th percentile of the reference data set, while in 1998 it was at the very top. Two things have happened since then: perceived conditions in the building are not quite as good (e.g. the overall comfort score has fallen from 5.41 to 5.20), whilst buildings with better comfort levels have subsequently been surveyed. The 1998 result for Elizabeth Fry now falls at the 90th percentile of the 2011 reference dataset.

The main influence on comfort is likely to be the higher occupation density. The variable most affected is summertime temperature, where the average score has fallen from what was a very good 5.30 (the most comfortable in the 1998 dataset) to 4.24. The effect is exacerbated by a loss of perceived control in the open plan areas. Perceived air quality in summer has also fallen, but remains significantly above average. The average score for noise has dropped from 5.05 to 4.24, and is now indistinguishable from the average. The main causes are probably the creation of open plan offices and the growth in traffic on Chancellor's Drive – particularly regular buses, which did not go past the building in 1998. Some people also mentioned noise from the ventilation plant.

Air leakage Pressure tests reveal change

Envelope pressure tests have been carried out three times by building services research body BSRIA:

- In December 1994, before the building was handed over. The result was 0.97 air changes per hour at 50 Pascals pressure, equivalent to an air leakage index of 4.2 m/h (cu m per hour per sq m of exposed envelope area) and an air permeability of about 3 m/h, 30% of the current limiting requirement in Part L.
- In February 1998, as part of the PROBE survey, giving an air leakage index of 6.5 m/h, equivalent to a permeability of 4.7 m/h. With the front doors sealed, the air leakage index fell to 6.2 m/h.
- The test in September 2011 gave the surprising result of a 5.3 m/h air leakage index (air permeability 3.8 m/h), better than in 1998. The main reason is thought to be the removal of the catering kitchen and its ventilation plant. BSRIA also thinks the lecture room ventilation plants may not have been sealed off as well in 1998.

Smoke tests in 2011 confirmed similar leakage routes to earlier tests, including the entrance doors, particularly the main revolving door which needed new seals; the perimeters of the rooflights over the main and escape stairs; and through the windows themselves, though their seals remain in good condition.

A new leakage route had also appeared under the cills of the windows, where the compressible foam plastic seals had begun to deteriorate and fall out. The mastic seals around the window and door frames were also cracking, but little air leakage was detected here.

More about the pressure test results can be found in: R Bunn, Elizabeth Fry, Ageing gracefully? DeltaT magazine 6-8, February 2012, published by BSRIA ***www.bsria.org.uk***

a period when the main regenerative heat exchanger failed and the cold 2010-11 winter.

In 1998 and 1999, the self-contained water heater used as little as 3 kWh/sq m of gas, even less than in 1997. Consumption then rose to 4.4 kWh/sq m in 2000 and 5.5 in 2001, perhaps owing to temperature adjustments. In 2003-08, consumption nearly tripled to 12-14 kWh/sq m, owing to a change to 24/7 operation at 55C (65C on Sundays), resulting from concerns about legionella. In 2009 a new condensing water heater was fitted and its gas use fell to 11 kWh/sq m. Although the building is more heavily used, most of the extra consumption in relation to the PROBE survey data is thought to be from standing losses from lightly-insulated and uninsulated pipework.

The box on the previous page shows an estimated breakdown of annual energy use

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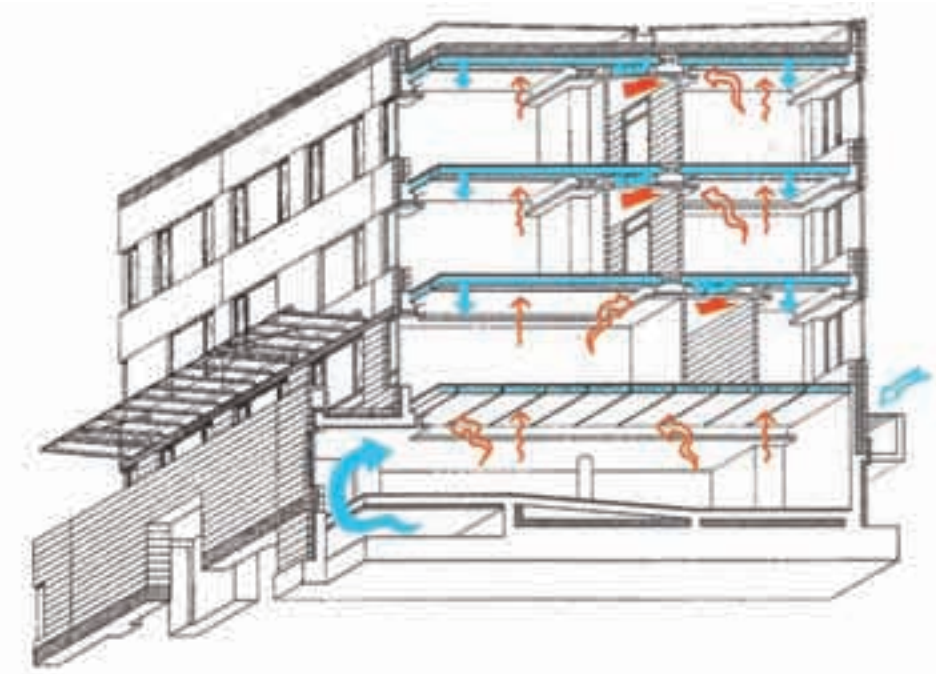


Section showing heat storage in the ventilated concrete slabs. In winter, if the fabric gets cold, additional heating is provided by the boilers at night with the relevant air handling units on full recirculation

in 1997, 2005, and 2010, in comparison with other buildings and various benchmarks.

Occupant satisfaction

In 1998, Elizabeth Fry set new highs for overall comfort, summer temperature, and air quality, in terms of average responses to the Building Use Studies (BUS) occupant survey questionnaire used in PROBE.

Four main reasons were identified for these high scores: the design and construction of the building; stable winter and summer temperatures; a predominance of cellular offices (in which comfort tends to be higher owing to better perceived control); and only half the staff spending all the week in the building (permanent occupants tend to be more critical of the indoor environment).

Reported problems included glare through the perforated blinds and unshaded side windows on the south side, still air, dark ceilings when the pelmet lights were off, and reflections in computer screens. There were also some complaints of cold.

The 2011 survey shows that occupant satisfaction has fallen back a little, both absolutely and relatively, because the reference dataset now includes more buildings with good performance levels. However, average comfort levels are still good (see previous page) and are typically within the second decile of the dataset. Occupants also rate the quality of cleaning very highly.

Conclusions

During briefing, design and construction, and in the two years after handover, the building received an unusual level of attention. However, time and again we find that few buildings work well without such attention to detail and some support after handover – which is why we have been striving to develop and promote the UK *Soft Landings* approach (see **www.softlandings.org.uk**).

Fifteen years on, Elizabeth Fry remains a comfortable, low-energy building in relation to most of its peers, although some things have drifted a little. For example, after common rooms were converted to offices, some local complaints of cold were dealt with by adding standard 2 kW electric heaters, not the original 200W ones. Replacement light fittings in the student hub are also more powerful than necessary, typically with twin tubes where single tubes would have been sufficient – thereby missing the opportunity to tackle the originally high installed power density of 22 W/sq m.

Where spaces have been converted to open-plan offices, comfort has been affected, particularly acoustics, owing to high occupancy densities and reflective exposed concrete ceilings. More overheating is also reported, though some complaints of cold persist. Solar glare from the south-facing slit windows (which do not have blinds) is more of a problem in the open-plan than in cellular offices and seminar rooms, where the furniture could be arranged to suit.

In hindsight, with changes of kitchen, stores, and so on, to offices, the question arises as to whether the building should have had a more uniform pattern of windows to facilitate changes. On the other hand, does management really need to alter buildings so much? Several occupants expressed regret at losing prime teaching and meeting space to administration facilities.

Now that UEA has many more buildings to look after, it is a credit to the robustness of Elizabeth Fry's design and fine-tuning and to UEA's maintenance and cleaning that its performance remains good. Twenty years after it was designed, why have so few newer buildings caught up? We hope to explore the broader issues in a future article. **CJ**

● **BILL BORDASS** and **ADRIAN LEAMAN** are independent consultants who also work with the Usable Buildings Trust charity. The PROBE articles and other related papers can be downloaded from the PROBE section of **www.usablebuildings.co.uk** The authors wish to thanks those organisations who supported their work: CIBSE, UEA and Build with CaRe (**www.buildwithcare.eu**). In addition, BSRIA and Willmott Dixon sponsored a new pressure test by BSRIA: its results are summarised on the previous page

PROJECT TEAM

Architect: John Miller & Partners (Richard Brearley)

Services engineer: Fulcrum Consulting (Andy Ford)

Structural engineer: F H Samuely & Partners

M&E installation contractor: Matthew Hall

Energy adviser (fabric): Energy Advisory Associates (David Olivier)

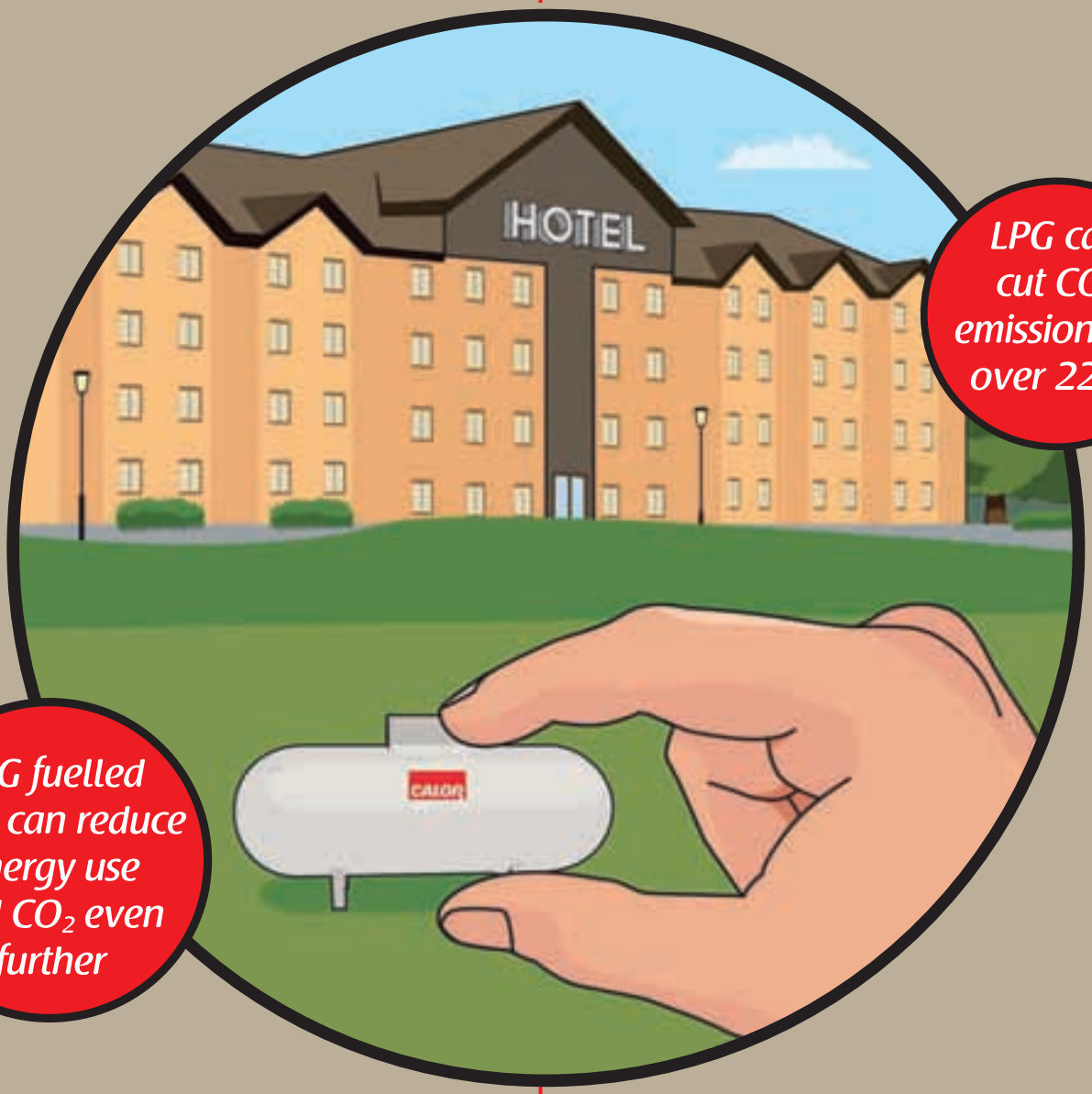
Quantity surveyor: Stockings & Clarke

Builder: Willmott Dixon

UEA services engineer: Martyn Newton

Pressure testing: BSRIA

One small change makes a big difference.



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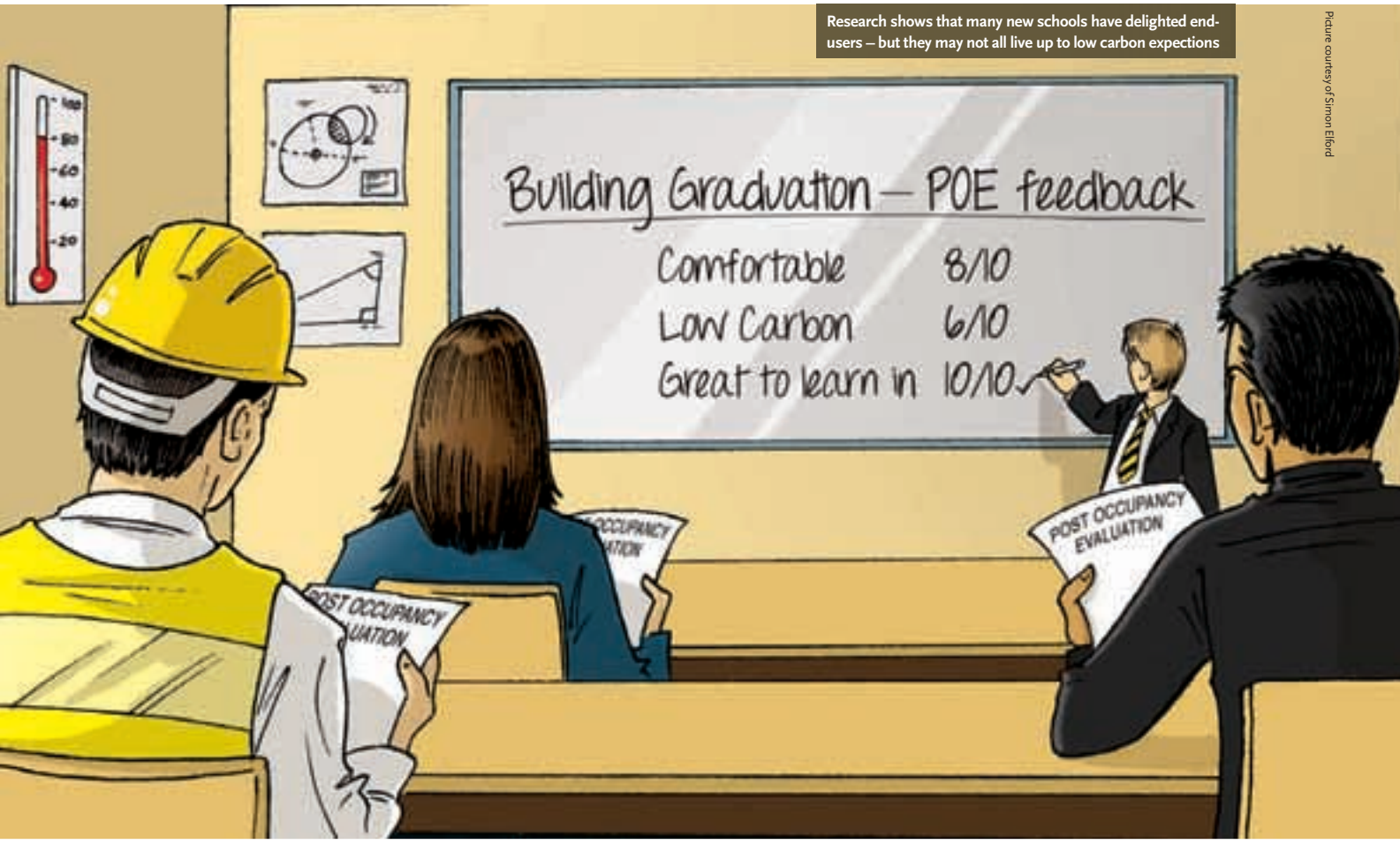

Research shows that many new schools have delighted end-users – but they may not all live up to low carbon expections

Picture courtesy of Simon Elford

Work in PROGRESS

To what extent have new schools been successful in cutting energy use, and what lies behind the gulf between predicted and actual performance of some educational buildings? **Judit Kimpian** and **Esfandiar Burman** report on the interim findings of new research into these issues

Over the past decade or so, few systematic studies have been published on how effective policy and legislation has been in producing low carbon buildings that work in practice. Systematic post-occupancy evaluations (PoEs) that could provide a robust answer have been scarce. But in 2010 the Technology Strategy Board (TSB), an independent, government-funded body, launched its Building Performance Evaluation (BPE) programme. This has provided an opportunity for the industry to get under the skin of recently completed and refurbished projects – including some schools – to find out what works when it comes to designing, constructing and operating low carbon buildings.

Stockport Academy, Greater Manchester, was one of three academies in the study

Schools appear to be a dominant building type in the BPE programme. This could be because so many new schools have been built in the past decade, but it could also be argued that plenty of offices, retail parks and other buildings have also sprung up across the UK. What sets schools apart is the scrutiny they have had to undergo in terms of energy performance, which makes them an ideal candidate for the BPE programme.

All buildings funded by Partnership for Schools (PfS) had to gain a BREEAM Very Good or Excellent rating, which would require significant improvements to building fabric and system efficiency compared with Building Regulations minimum requirements. In addition, all education buildings are required by law to obtain and put on show a Display Energy Certificate (DEC), which mandates the annual reporting of operational energy use in the public domain.

Aedas, an architectural practice, was successful in securing two separate BPE bids covering the detailed comparative analysis of five educational institutions – three academies and two schools. These are: Petchey Academy in North London; Stockport Academy, Greater Manchester; Academy 360, Sunderland; Brine Leas School, Nantwich, Cheshire; and Loxford School of Science and Technology, Ilford, Essex.

Four of the five are large secondary schools more than 15,000 sq m; the fifth, Brine Leas, a sixth-form centre, is just under 3,000 sq m. Aside from Stockport Academy, which was procured under a traditional JCT contract, all the buildings were constructed under a design-and-build contract.

Petchey Academy was the only institution that was procured before BREEAM assessment became mandatory in 2004. Loxford School, the only naturally ventilated building, was BREEAM Excellent, while the rest achieved BREEAM Very Good. When the study commenced, all the buildings apart from Petchey Academy were in their first year of occupation.

Background

These projects have provided an opportunity to review pertinent industry questions about low carbon design. Given the seemingly

Photo courtesy of Aedas

TSB funding Embedding the principles of 'POE'

The Technology Strategy Board (TSB) is running a four-year, £8m programme to promote Building Performance Evaluation (BPE) in all its forms, *writes Roderic Bunn*. The objective is to obtain a greater understanding of the difference between anticipated performance of new and refurbished buildings, and their actual in-use performance.

The motivation for this work goes back to the PROBE (Post-occupancy Review Of Buildings and their Engineering) research project in the 1990s, the results of which were published in editions of *Building Services Journal* (*CIBSE Journal*'s forerunner). The findings drew attention to the credibility gap between design intention and reality. Although PROBE popularised post-occupancy evaluation (POE) as a technique for understanding how buildings are performing, the industry was wary of POE and unfamiliar with the assessment tools.

The TSB's programme of work therefore intends to embed the principles of POE and project feedback throughout the supply chain as an essential and routine part of construction procurement. The aim is to upskill the construction industry in post-occupancy feedback tools, such as thermography and airtightness testing, CIBSE TM22 for energy assessment, and the Building Use Studies (BUS) method for carrying out occupancy surveys

The TSB is funding two types of study for domestic buildings: post-completion and early occupation; and in-use post-occupancy. For non-domestic buildings, studies can be for buildings under construction and those in operation.

Studies are ranging across a variety of building types including schools, care homes, offices and innovation centres.

To date, research is being carried out on 3,663 dwellings on 32 sites nationwide, and 40 non-domestic buildings, of which eight are under construction and 21 are in the education sector. The results from all the studies will be made public.

For more information on the programme, visit **www.innovateuk.org**

Roderic Bunn is a building performance evaluator at BSRIA and the Technology Strategy Board

unstoppable trend towards design-and-build (D&B), Aedas was keen to study whether the procurement route had an impact on the buildings' achieved performance – would D&B deliver long-term value or contribute to higher operational and maintenance costs? Are lower design-stage EPC ratings, which the government and BRE are relying on for improved energy performance, matched by lower energy consumption in use? How significant is the role of occupant engagement in achieving low-carbon expectations? Would different ventilation strategies affect comfort differently, and would natural ventilation bring about lower energy use? Would technologies such as biomass boilers, ground-source heat pumps and solar water heaters reduce carbon emissions as planned?

The R&D group at Aedas led the investigation and teamed up with University College London's (UCL) Dejan Mumovic and researcher Esfandiar Burman to identify the causes behind the differences between the predicted and achieved energy use of buildings. This is a thorny issue. As BPE participants pointed out at a Roundtable held at Aedas last September, very few buildings have a realistic design-stage energy use prediction against which one could compare operational energy use like-for-like.

Compliance calculations (Part L and EPCs) bear little resemblance to actual consumption. As the Aedas-designed CIBSE|RIBA benchmarking platform CarbonBuzz points out, they only focus on fixed building services at fixed occupancy and operating hours, excluding any operational factors such as the intensity of use. So Aedas R&D and UCL have been looking to take the BPE process a step further and construct a more realistic 'prediction' of energy use that takes into account operational factors. In the process the team has begun to gather evidence that demonstrates these 'operational risks'.

'Design' vs 'as-built'

Part L and Energy Performance Certificate (EPC) assumptions are often unrealistic in terms of system efficiency and building fabric. For example ground source heat pumps in reality often don't contribute as much as assumed during design. U- and

> What sets schools apart is the scrutiny they have had to undergo in terms of energy performance

Photo courtesy of Aedas

Loxford School in Ilford, Essex, was the only naturally ventilated school in the study. It received a BREEAM Excellent rating

G-values often get worse when more cost-effective glazing systems are selected during construction.

Even with good attention to airtight construction and robust detailing actual airtightness can fall short of expectations. Entrance lobbies, which create a buffer zone to the outside, can easily fall prey to cost cutting under the guise of 'value engineering'. Doors to the outside can be left open, so the schools end up heating the outdoors instead of the corridors. When wintertime temperature controls are not responsive enough teachers and pupils often leave windows open to lower temperatures. This means that much of the effort that went into creating an air-tight building fabric is compromised by large cavities left by open doors and windows. Many might argue that this is an 'occupant-related impact' no designer can be responsible for, yet, a deeper understanding of what prompts occupants to leave openings ajar might alter the perception of 'value' during cost-engineering.

Night purge is another common challenge. In the case of automated high-level openings, cheaper actuators are frequently chosen – and these can jam. In other cases the infrared security sensors were found to be triggered by insects or even air movement. After a few incidents like this the automated night-time ventilation gets turned off. Setting the sensitivity of the sensors correctly and turning them away from windows and air ducts are being tested as part of the current study.

Appliance and equipment loads

Even if fabric and system assumptions were more realistic, compliance calculations don't include the energy loads of appliances – which is a major source of energy use and heat gain in contemporary school buildings. Special equipment such as training kitchens, furnaces, workshop equipment, reprographics, and server rooms are also omitted from these calculations, as are external lights and sports floodlights. When a building is intensively used it tends to have more equipment in it. If this is well managed through automated shut-off schemes and user engagement, the extra consumption is relatively small. If, however, these schemes are not in place, electricity consumption can 'go through the roof'.

Commissioning, controls and management

Lighting controls are other casual offenders. All the buildings Aedas have studied, including the POEs done outside the BPE programme, had issues with controls. Lighting is often not hooked up to the BMS and commonly only one small remote control is provided to manipulate lighting across a whole building. Daylight sensors have a tendency to escape commissioning. In reality these should override PIRs, yet this could not be demonstrated in the buildings studied. Timer settings for PIR-controlled lights are often set up to be too long (ie, beyond 20 minutes) so that the lights never get a chance to dim between classes.

When it comes to the control of heating, cooling and ventilation, the biggest culprits are building management systems (BMS) and commissioning. The frustration with BMS in schools is so great that Roundtable participants wanted to design them out altogether. Finding a building with a well-run system, where main and sub-meters are

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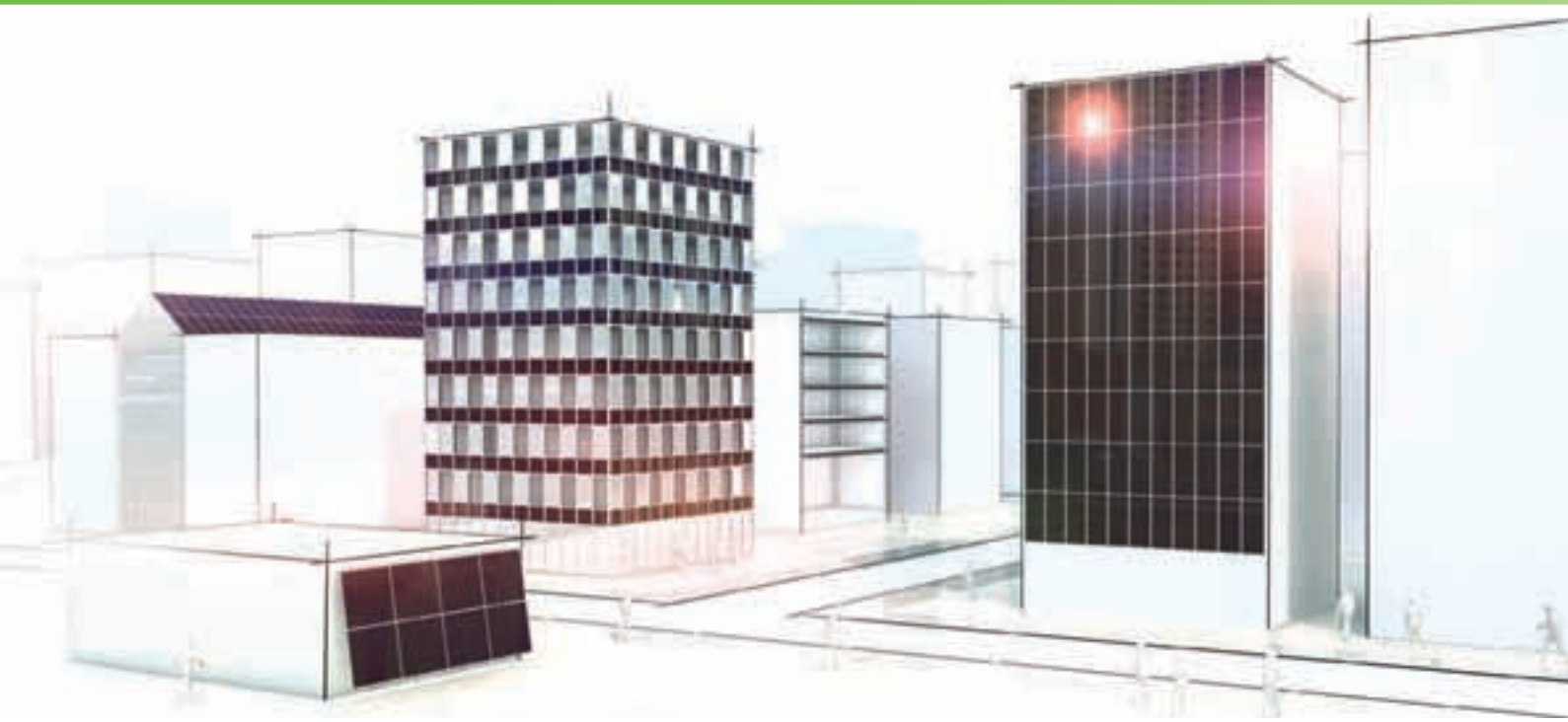

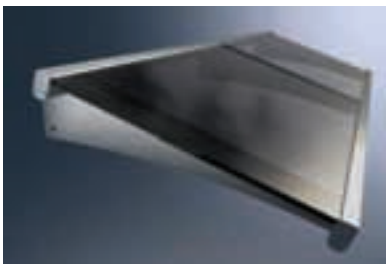

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measuring what they were intended to and are hooked up to the BMS, is a rarity. For services to appear via the system interface and be properly profiled is almost unheard of. It would undoubtedly help if building log book requirements were adhered to and the specialists carrying out the commissioning were more involved in the training of facilities managers.

However, most school staff are unprepared for managing a building with complex interdependent services, or even for procuring adequate facilities management services robustly. This is why there is so much enthusiasm for the UBT/BSRIA Soft Landings scheme in education buildings by the POE-savvy – they know that occupant engagement is key to low carbon operation.

In some of the mechanically ventilated buildings, heating systems were fighting cooling systems, and summer and winter profiles and setpoints were programmed incorrectly. Sub-metering can be a quagmire. Although the research team managed to reconcile sub-meters with main meters in the buildings that Aedas has studied, many BPE participants have a story to tell about metering. When it is in place and it is working, it is remarkable because problems are so much quicker to diagnose; but getting to that point seems to be an industry-wide challenge. So what early conclusions could we draw about possible remedies?

Conclusions

The BPE process is not without its risks but the rewards in terms of learning and insight are tremendous. Most of the issues highlighted are complex and are not routinely addressed already because they require collaboration across contractual boundaries or lack a clear line of responsibility and incentives.

Interestingly many of the BPE explorations are led by architects who in theory have little to do with the energy consumption of buildings. Yet this is a major concern for the profession and not just because of climate change concerns. What is confirmed by these studies is that there is much more to achieving a low-carbon operation than what compliance requires in terms of building services and fabric standards. Commissioning and training has been a recurring theme along with occupant engagement and better risk management up front. The question is how to build this into the construction process without over-burdening design teams with further regulation?

> The more data there is about the gap between compliance and actual performance, the more the appetite will grow for robust predictions

In addition to compliance, the tackling of operational energy use collaboratively must be the way forward. But who is to take responsibility for this in a live project environment in which everyone is concerned about liability? The hope is that the more detailed data there are in the public domain about the gap between compliance and actual performance (see CarbonBuzz) the more the appetite will grow for more robust predictions – using compliance calculations only will eventually become the riskier option.

In the meantime some forward-looking local authorities have already started targeting DEC ratings for refurbishments and new-build. This transforms the risk-management process: all of a sudden, detailed energy predictions are performed; design measures that contribute to energy targets are ringfenced from value engineering; contractors' energy related performance indicators are tied to financial incentives; and specifications are scrutinised to a whole new depth. As part of this process the client also takes early ownership of the risks that operational and occupancy factors present to low-energy operation.

If this approach proves successful it might just mean that project teams will be able to set more realistic expectations and design buildings and systems that are resilient to occupants and their long-term needs. In the meantime more pilots are required to put this approach to the test.

Aedas is barely halfway through the BPE programme, so the findings thus far are very much preliminary. But judging from the feedback from early Building Use Surveys occupants seem mostly delighted with the architecture of the buildings but tend to find building systems frustrating.

This seems to indicate that buildings can still function satisfactorily despite the excessive energy consumption and related comfort and usability issues. Yet energy consumption is critical and not just because in some cases the savings could pay for extra teachers. Climate change is part of the school curriculum, and a building communicates more about responsibility to the next generation than many structured lessons. It is encouraging to see that in conjunction with the BPE studies, most of the schools have embarked on the Eco-Schools programme, engaged in switch-off campaigns and have undertaken remedial action since the start of the monitoring.

As to the future of post-occupancy evaluations – all eyes are on Soft Landings and carbon tracking being incorporated in government contracts and BREEAM. Controversial or common sense? **CJ**

● **JUDIT KIMPIAN** is a director at Aedas and the CarbonBuzz project. **ESFANDIAR BURMAN** is an EngD student at UCL. The academies BPE projects were led by Dan Rigamonti, and the schools projects by Sophie Chisholm and Judit Kimpian. The BPE project evaluator is Roderic Bunn. The leader of the TSB BPE programme is Dr Kerry Mashford, lead technologist at the Technology Strategy Board

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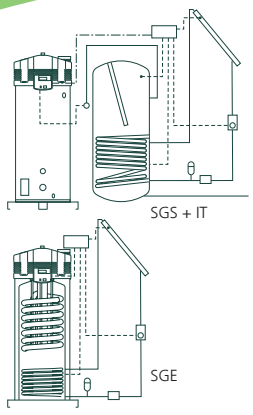

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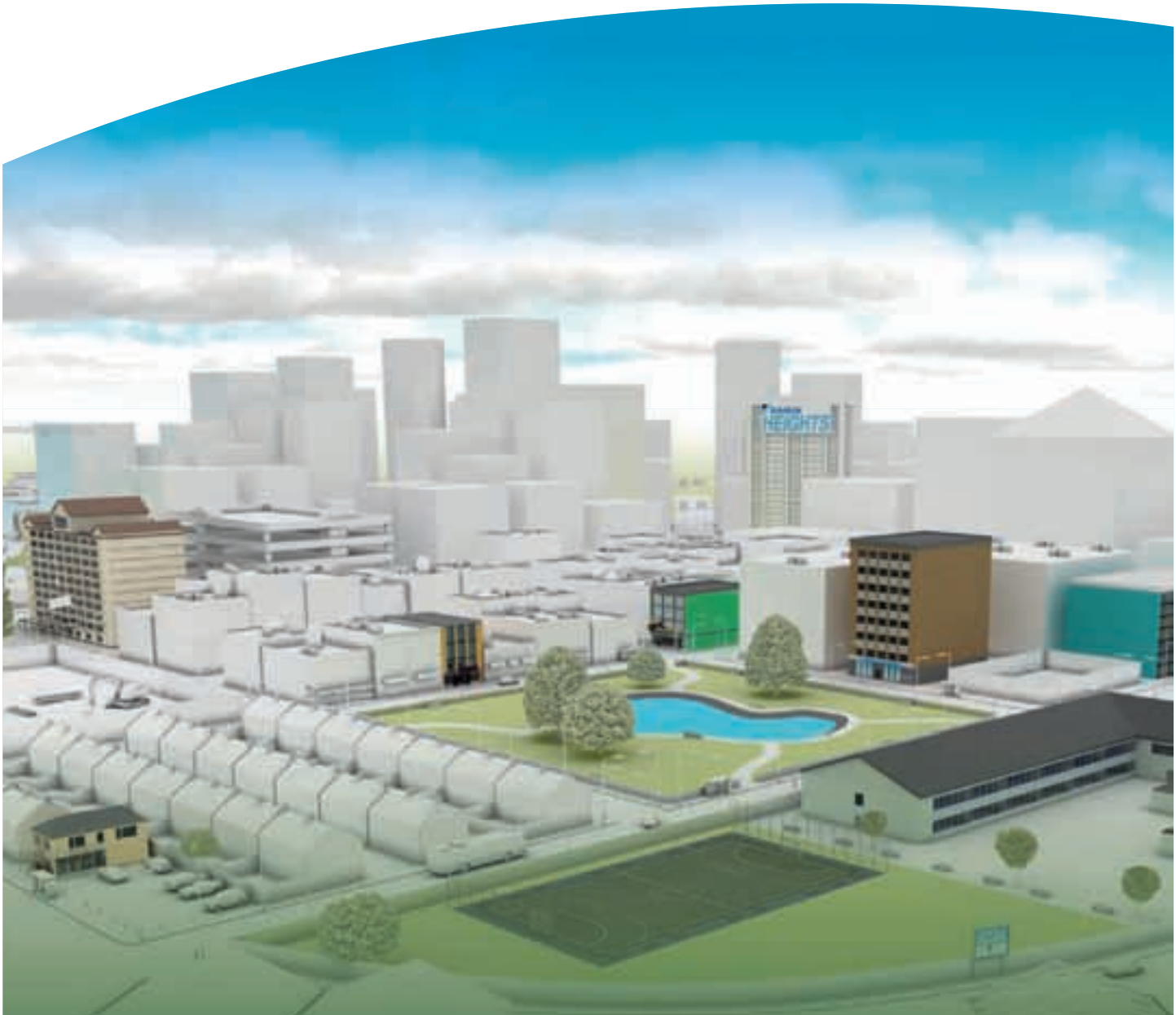

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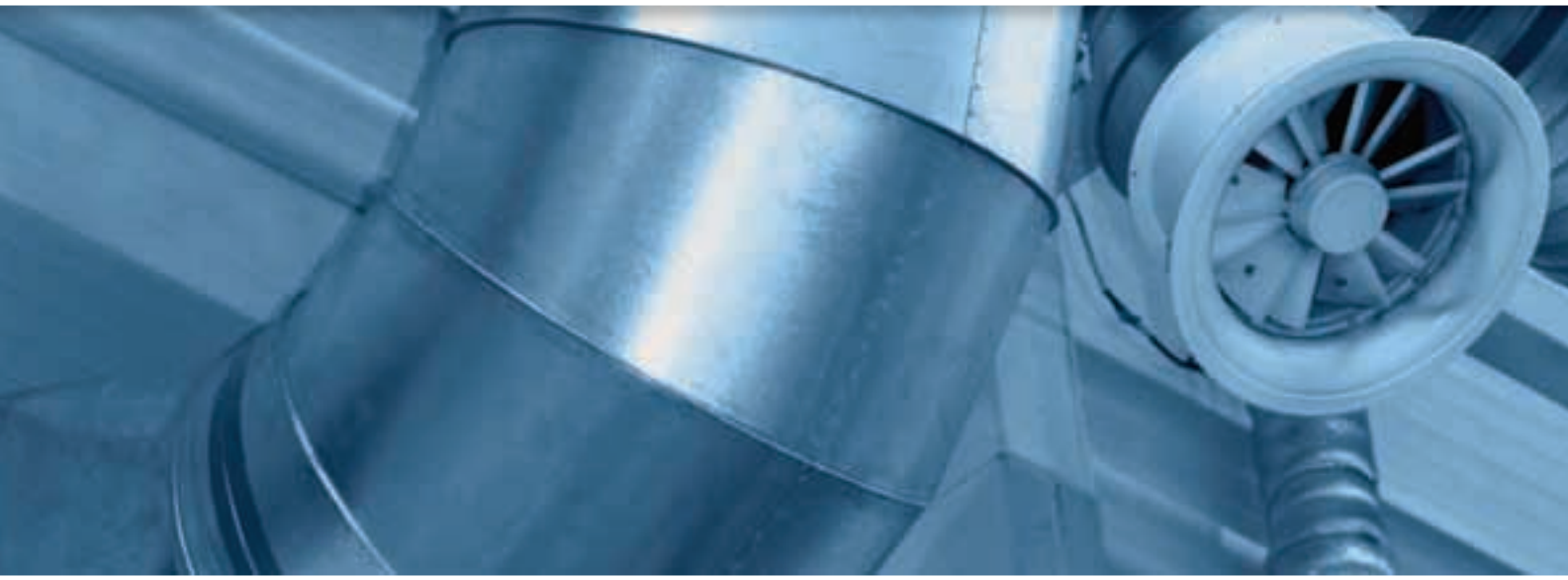
CLEAN SWEEP?

Many kinds of ventilation system are challenged by poor-quality external air. **Tim Dwyer** looks at the lessons provided by a CIBSE guide, below, while on page 52 we look at how air movement via louvres can be made more effective



The challenge of keeping internal environments acceptable and safe can apply to all sorts of ventilation

Whether it is for a naturally ventilated design, mechanical ventilation or mixed mode, the challenge is still the same – to provide an internal environment that is both acceptable and safe for the occupants. The external air quality largely determines the opportunity to introduce 'fresh air' into a building system. Despite improvements over recent decades, air pollution is still seen as a challenge in the UK.

So the implications of poor air quality are clear, and having access to the best quality of outdoor air must be a consideration in the design of ventilation systems. *CIBSE TM21: Minimising pollution at air intakes* divides air pollution into 'gaseous' and 'particulate', and these are further sub-divided into two categories, primary and secondary pollutants. The table on the next page provides an abstracted set of pollutants commonly associated with indoor air quality.

The actual prediction of any pollutant can be a challenge but – unlike primary pollutants that are emitted directly by the polluting process, such as vehicle emissions or a local toilet ventilation discharge – secondary pollutants by their very nature are more difficult to forecast. They are generated by breakdown reactions involving the primary pollutants and are dependent upon a coincident set of conditions.

For example, levels of 'ground-level' ozone will depend on chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. In urban areas, ozone concentrations will be impacted by a combination of exhaust from

Substance	Guideline limit value by volume
benzene (C_6H_6)	5.0 µg.m^{-3}
carbon monoxide (CO)	10 mg.m^{-3}
formaldehyde (CH_2O)	100 µg.m^{-3}
lead (Pb)	0.5 µg.m^{-3}
nitrogen dioxide (NO_2)	200 µg.m^{-3} (1 hour exposure)
ozone (O_3)	120 µg.m^{-3}
particulate matter ($PM_{2.5}$ and PM_{10})	25 µg.m^{-3} (PM_{10}), 50 µg.m^{-3} (PM_{10})
polycyclic aromatic hydrocarbons	1 ng.m^{-3} (see original source)
sulphur dioxide (SO_2)	350 µg.m^{-3} (1 hour exposure)

Selection of commonly quoted environmental pollutants – see original data source for full data: EC Air Quality Standards http://ec.europa.eu/environment/air/quality/standards.htm

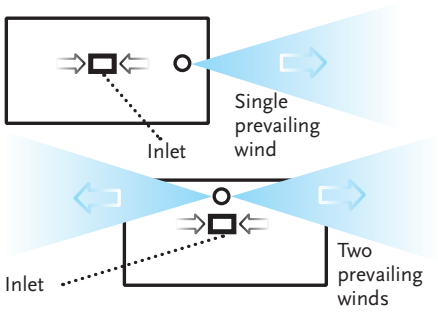


Figure 1: Position of intake relative to exhaust as a function of prevailing winds (Source: CIBSE TM21)

motor vehicles and the level of solar radiation. There will also be some delay in the reaction between the NO2 and the sunlight.

This reaction time could well account for the findings reported in TM21 indicating that ozone levels at roof level exceed those at street level in research undertaken by BSRIA (*Location of ventilation air intakes* 1996). This is due to the delay on the production of ozone as the NO2 diffuses from its original tailpipe location.

Ozone is particularly important in the assessment of indoor air quality, due to its secondary impact when it reacts with certain organic compounds inside the building to produce short-lived products that adversely affect human health.

The pollutants that are included in the particulate category cover a very wide range of sizes and sources, ranging from agricultural and horticultural dusts to industrial process and vehicle emissions. There is increasing concern about the health effects of the smaller range designated PM2.5 that can particularly result from diesel emissions and biomass boilers. The table (left) provides a subset of the pollutants that are considered relevant in the assessment of air quality. As suggested by BRE in *Ventilation for healthy buildings – reducing the impact of urban air pollution*, the local environmental health department should be consulted to determine whether monitoring has already been carried out at a location with a similar environment close to the site under consideration. It would be prudent to ensure that the quality of a building's incoming air meets at least the UK Air Quality Standard Regulations 2010. These refer to the EC Directive 2008/50/EC on ambient air quality, which sets limits for concentrations of principal air pollutants in outdoor air.

There are a number of methods for determining the expected levels of pollutants in outdoor air that will account for regional, district and local pollution sources. BRE Trust's Ventilation for Healthy Buildings guidance includes a methodology for the prediction of external air quality. It considers a building's location and its relation to the immediate surroundings, structures and local topography, and the contributing sources of pollutants from long-, intermediate- and short-range distances.

As well as considering the effect of local industrial and background pollution, CIBSE TM21 also provides a method to estimate the expected emissions from local traffic. However, as resources and data sources allow, this may be more effectively assessed through the use of computational fluid dynamics (CFD) analysis.

TM21 shows that increased carbon monoxide (CO) concentrations from major roads will reduce to imperceptible levels at a distance of 200m. The impact of local traffic pollution on the internal

There are several methods for determining the expected levels of pollutants in the outside air

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> It would be prudent to ensure that the quality of a building's incoming air meets at least the UK Air Quality Standard Regulations 2010

environment is somewhat attenuated by the building itself, and the primary pollutants tend to decrease with height, with NO_2 concentrations being lowest at roof level.

Vehicle emissions increase as vehicle speed reduces. Hence it is preferable not to site intake louvres close to road junctions or areas where traffic is travelling slowly. Intakes facing side streets away from main traffic would normally be preferable.

However, attention must be paid to any local loading bay or vehicle entrance, and the effects of local wind vortices on contributing sources of pollution should be considered. Air intakes located close to vehicle parking spaces or entrances are likely to entrain CO emitted from the cars.

When considering mechanically ventilated buildings, the principal concern is the position of the intake louvre. Apart from sources beyond the building curtilage and the ventilation systems themselves, local sources that can impact the quality of the air entering the louvre will include:

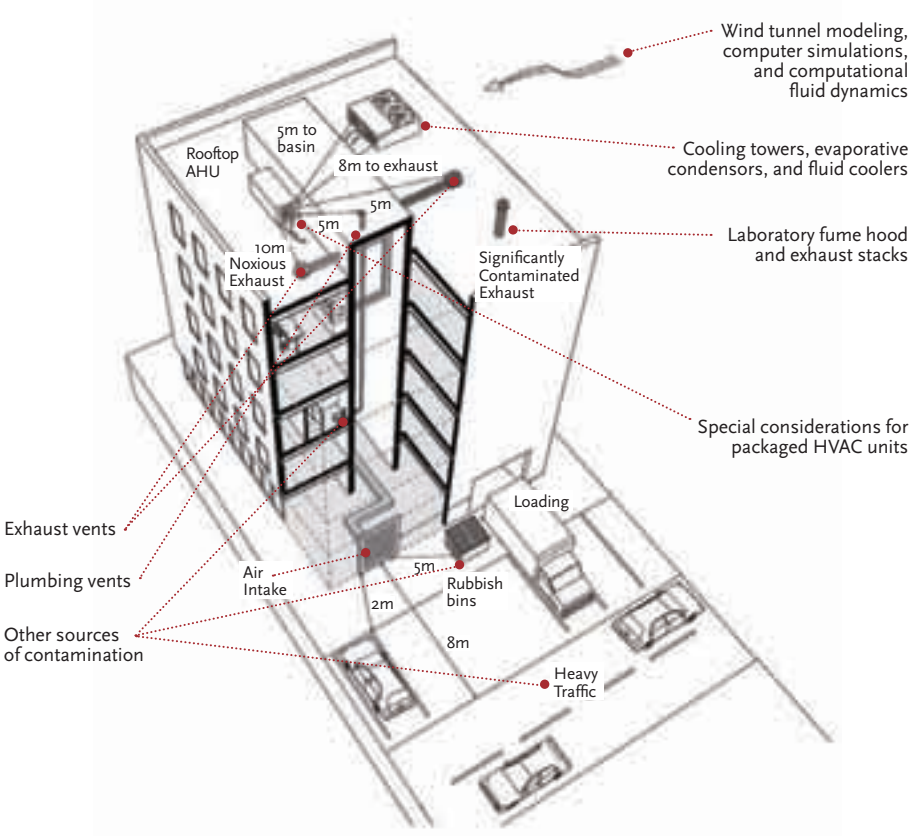
- Cooling towers;
- Plumbing or oil tank vents;
- Exhausts from standby generators (or combined heat and power engines);
- Vehicle loading bays;
- Roosting ledges for birds;
- Areas where leaves or other litter might collect;
- Stagnant water (eg, on flat roofs); and
- Gardens or areas of vegetation.

CIBSE TM40: *Health issues in building services* reports that a study of office occupants has shown that air inlets located within 8m of an exhaust outlet or a rubbish container will double the reported respiratory symptoms; a similar distance from a roadway will increase the reports by 190%.

TM21 includes practical guidance on the siting of intake louvres (as in Figure 1) that requires an understanding of local meteorological conditions and the influences on the microclimate by the building and its surroundings.

To provide a wider commentary, ASHRAE's *Indoor Air Quality Guide – Best practices for design, construction and commissioning* (a version of which is freely downloadable) provides extensive background information in this area and includes specific guidance on the positioning of intake louvres (see Figure 2). **CJ**

Figure 2: Guidance on location of ventilation intakes (Source: *ASHRAE Indoor Air Quality Guide*)



Original source: *Indoor Air Quality Guide – Best practices for design, construction and commissioning* © ASHRAE 2009
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Increasing the size of the louvre face will enable the same airflow to be achieved at lower velocity

When louvres are being specified, it is important to consider a range of issues that could affect the overall performance of the installation. **Chris Marney** offers some practical advice

Getting air into or out of a building without letting water through the hole is a simple concept but it does have its complications. Critically, you need to address the unavoidable trade-off between the louvre's ability to let air through the grilles, and its ability to keep water out. With louvre design, if you reduce resistance to airflow, you are also likely to be reducing resistance to water penetration.

Ambiguous performance claims and an increasing emphasis on energy reduction mean that specifying weather louvres as '50% free area' no longer represents an adequate design brief. As with any product, knowing the performance requirement for a weather louvre is crucial.

However, getting from a notional requirement to a practical product specification capable of delivering that performance can prove problematic. And when you come to product selection, how can you be sure the louvre will perform as promised?

Knowing your requirement

Airflow: The volume of air required by your system and the size of the opening through which the air is introduced are key factors affecting louvre selection and the subsequent fan power requirement.

The system designer should quantify the system's required volume of air in m3/s. This should then be expressed as a velocity onto the louvre, taking into account the area of the louvre face. For example, a volume requirement of 2 cu m/s through a louvre with a face area of 1 sq m equates to a face velocity of 2 m/s. The same requirement through a louvre with double the face area will equate to half the face velocity.

The test standard for weather louvres (EN 13030:2001) provides a means of rating the louvre's air resistance, based on the pressure drop across the louvre. This is expressed as a class based on the coefficient of discharge between 1 and 4, with 1 representing the lowest air resistance. A typical, reasonably water-resistant louvre will achieve a rating of 3. Designers selecting a unit with a higher class should be aware of potentially higher, long-term fan power costs.

Water penetration: For some applications, water penetration is not an issue – perhaps ductwork behind the louvre has drains that can handle the ingress. For others, however, penetration of water is a major consideration and getting it wrong can mean major disruption and cost to rectify the problem.

Defining this water rejection requirement can be difficult. The test standard helps by banding water rejection effectiveness, based on the percentage volume of water rejected by the louvre when subjected to simulated wind and rain. The closest you are likely to get to a useful definition of your water penetration requirement is in considering which of these bands best matches your need.

As well as how critical water rejection is to your application, you also need to consider the ultimate positioning of the louvre, both in terms of geographical climate and whether its position will be sheltered or exposed.

Finding the balance

Having considered your ideal requirement for airflow and water rejection, you now need to combine the two in order to begin product selection. The first point to appreciate is that the 'perfect' louvre does not exist and that, for most systems, you should expect at least a small amount of water penetration.

The second point is that there is a direct relationship between face velocity and water rejection capability for any given louvre. This is emphasised in the standard test for weather louvres, which measures water penetration at eight different face velocities ranging from zero to 3.5m/s. Broadly speaking this data indicates whether the louvre will meet the water rejection requirement at your known face velocity. It follows that improved water rejection, without sacrificing freedom of airflow, requires a more highly engineered, and usually higher-priced, product.

Size matters

Increasing the size of the louvre face will enable the same air volume to be achieved at lower velocity. This not only reduces the fan power requirement but also improves the water resistance of the louvre, since the faster you suck air through the louvre, the more challenged the louvre is in keeping droplets out. Of course, this relies on having the space (and design foresight) for this to be an option.

> There is an unavoidable trade-off between the louvre's ability to let air through the grilles and to keep water out

Even if you are less concerned with water penetration, sizing your louvre for maximum energy efficiency is something designers should be considering. In fact, the more water you can allow to penetrate, the lower your running costs will be, since there will also be less resistance to air.

Identifying suitable products

Once you know your required face velocity and water penetration requirement, you are much closer to making an informed choice as to the best available product option. However, you still need to specify the requirement in meaningful terms and have confidence that the product you choose will deliver on its promised performance.

Speaking the supplier's language: Suppliers of weather louvres define products in many ways but the most useful indicator of performance is the ratings provided by the test standard, for water penetration and coefficient of discharge, as detailed above. Hence you should express the louvre performance requirement in the following terms:

- Water penetration class A-D;
- At face velocity 0-3.5m/s (based on the air volume requirement and louvre face area); and
- Coefficient of discharge class 1 to 4.

If you are able to express your own requirement in these terms, you should be able to shortlist available products to match. To establish the performance of the weather louvre, make sure it is stated in direct relation to the required face velocity.

Product assurance: A robust certification scheme will combine two elements of product assurance to provide confidence to specifiers:

- *Type testing:* Testing (to EN 13030:2001 in the case of weather louvres) measures the performance of a one-off sample but gives no assurance that the design and manufacture of the product are consistently applied to subsequent units; and
- *Factory production control (FPC):* Factory audits are used to give assurance of consistent and robustly controlled production methods. FPC audits relate directly to the product range and so go beyond the more general audits conducted for ISO 9001 management system certification.

Independent type testing and FPC together provide a higher level of confidence to both manufacturers and specifiers that weather louvres are fit for purpose. **CJ**

CHRIS MARNEY is manager of BSRIA Cert, whose weather louvre certification scheme, supported by manufacturers, was recently launched. BSRIA has also published its Weather Louvre Specification Guide.
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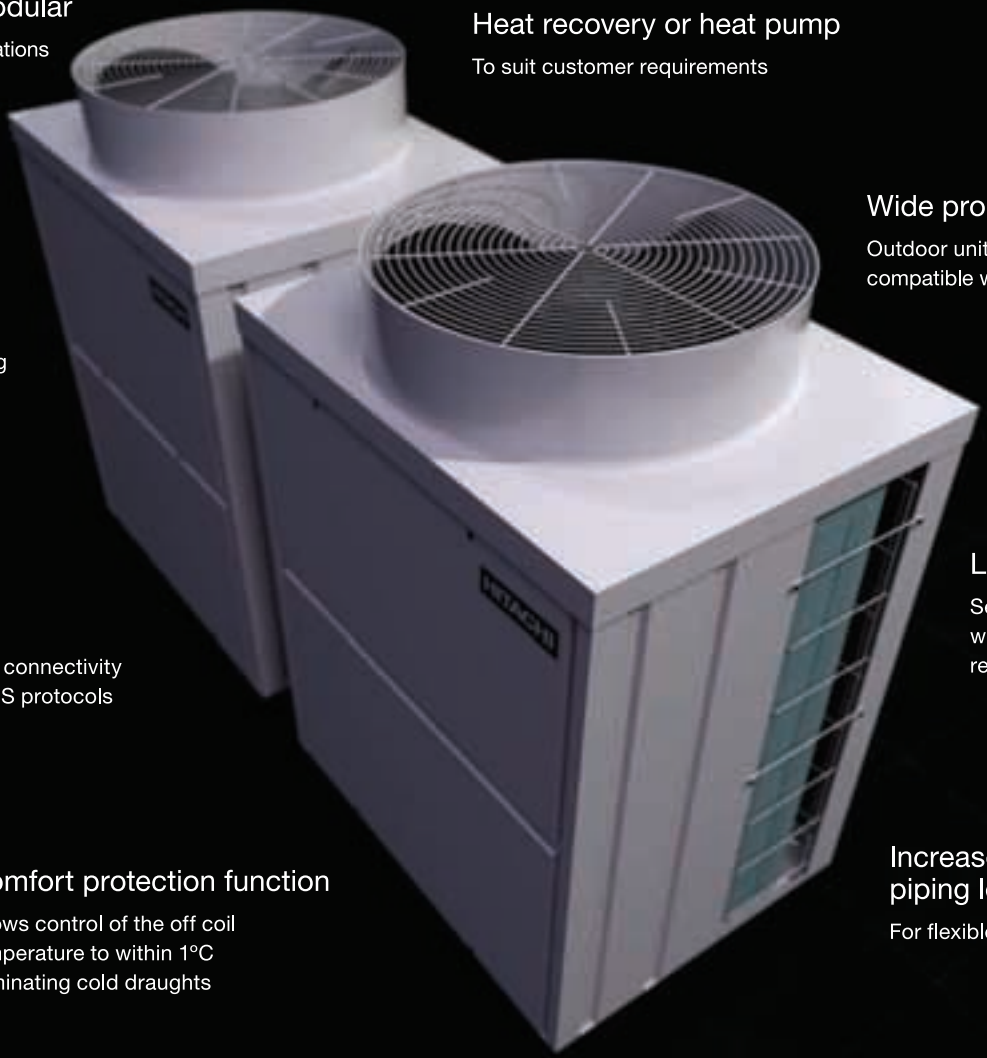

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Combined heat and power and district heating systems are being assessed against the carbon content of electricity supplied by coal-fired power stations

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POWER BROKERS

Many building services engineers are using wrong calculations to evaluate heating systems. As a result, argues **James Thonger**, they are overstating the benefits of district energy networks

In recent years there has been a lot of enthusiasm in the industry for the adoption of district heating (DH) systems as a way of reducing carbon emissions – and helping to meet the government's target of an 80% emissions cut by 2050. Moreover, many local planning policies continue to encourage the installation of fossil fuel-powered combined heat and power (CHP) installations, often attached to DH networks.

This is surprising because it is well known to engineers that CHP systems cannot deliver the optimum fuel (and therefore carbon) savings unless truly low-grade waste heat is extracted from the generators.

It is worth considering why these DH and CHP schemes appear to have such an enthusiastic following amongst planning authorities despite such modest carbon savings.

Calculating carbon

It is clear that, despite the EU Directive on Co-Generation, many proponents of CHP and DH are still using incorrect carbon reference values for the determination of their potential carbon savings. The directive says that CHP should be assessed against central same-fuel, grid-supplied electricity and a modern high-efficiency same-fuel boiler (because it is the alternative uses of the same fuel that are being compared for efficiency of use). Energy (and carbon) savings can be determined by following the formula in the directive (see the box on the next page).

However, many engineers still seem to use calculations where average grid carbon content – or, worse, coal-fired grid carbon content – is used as the electrical efficiency reference value when justifying fossil fuel gas-fired CHP or DH.

There are a number of reasons why this is a wrong calculation methodology, not only because it goes against the directive but, more importantly, because it makes no sense to justify the inefficient combustion of a low carbon fossil fuel (gas) against the carbon emissions of a high carbon fossil fuel (coal).

The justification is made on the assumption that the burning of gas in

It is argued that the use of gas in CHP will offset coal burning in power stations, but the more likely outcome is less gas being available to combust in power stations

CHP will offset coal burning in power stations. However, the more likely effect is that there is less gas available to combust in power stations, given that natural gas (along with all other fossil fuels and biofuels) has a limited supply. That is why the directive makes the logical assumption that *all* fuels should be consumed at their highest efficiency possible. This way we strive for maximum efficiency, minimum fuel consumption and the best possible carbon reduction.

The use of an average grid carbon factor in the engineer's computations has the disadvantage that the carbon content of the supplied heat will increase over time as the electricity grid carbon content decreases. Moreover, the carbon content of heat from a typical gas-fired CHP in 2050 will be considerably higher than conventional gas-fired boilers (see Figure 1).

Energy savings Extract from EU directive*

(b) Calculation of primary energy savings

The amount of primary energy savings provided by cogeneration production defined in accordance with Annex II shall be calculated on the basis of the following formula:

$$PES = \left[1 - \frac{1}{\frac{CHP\ H_\eta}{CHP\ E_\eta} + \frac{Ref\ H_\eta}{Ref\ E_\eta}} \right] \times 100\%$$

Where:

PES is primary energy savings.

CHP H_η is the heat efficiency of the cogeneration production defined as annual useful heat output divided by the fuel input used to produce the sum of useful heat output and electricity from cogeneration.

Ref H_η is the efficiency reference value for seperate heat production.

CHP E_η is the electrical efficiency of the cogeneration production defined as annual electricity from cogeneration divided by the fuel input used to produce the sum of useful heat output and electricity from cogeneration. Where a cogeneration unit generates mechanical energy, the annual electricity from cogeneration may be increaced by an additional element representing the amount of electricy which is equivalent to that of mechanical energy. This additional element will not create a right issue guarantees of origin in accordance with Article 5.

Ref E_η is the efficiency reference value for separate electricity production.

***Source: EU Directive on Co-Generation: http://europa.eu/legislation_summaries/energy/energy_efficiency/l27021_en.htm**

Distribution losses

It is evident from the published data that many calculations for DH systems fail to correctly account for the energy used in the distribution of the heat energy. Many engineers still make the assumption that the comparison for a DH system should be made against other DH systems; in so doing they fail to account for distribution or pumping losses or for the differing characteristics of energy requirement timings of different types of building connected to the DH/CHP network.

Clearly this is incorrect because pumping and distribution losses do not occur when the fuel source is consumed within the building itself (using, for example, a gas boiler). And, of course, the heating may simply be turned off when it is not needed or when the building is unoccupied.

It is regrettable that the CHP quality assurance system (CHPQA) fails to take DH pumping and distribution losses into account, since it is clear that the losses can be very significant. In an article in the *CIBSE Journal* last year (August 2011, page 16), heat losses from one of the country's newest DH networks, for the London Olympics, were stated to be just 1C per km – which sounds quite reasonable until it is realised that this is at maximum flow on a 16 km distribution network with a

flow temperature of 95C and a return temperature of 55C. If we assume an average 8 km round trip, this 1C loss per km results in a 20% heat loss, as follows:

((8 km x 1C/km) / (95C – 55C)) x 100 = 20% heat loss to the ground

Since fossil fuel-powered CHP only saves 20% of energy at best, it is clear that these losses become very significant for the carbon emission viability of the CHP/DH system. In addition, the DH system needs to account for its pumping losses, which consume electricity, further eroding the potential energy savings.

Even the modest carbon savings claimed for DH/CHP networks demand further scrutiny to account for heat lost through the transmission network and storage devices; heat lost to heat-dump; and energy used in pumping, controls, inverters and central plant room conditioning.

Making comparisons

In order to decrease the carbon intensity of the DH systems, designers often install biomass boilers. Biomass is used because it is assigned a very low carbon factor due to its short carbon cycle. It is clear that the energy savings for the DHS system should be compared against biomass boilers installed within the buildings they serve. However, this is rarely done because the DH notionally benefits from a comparison against a (higher carbon fuel) gas-fired boiler (see Figure 2).

DH systems often require top-up heat to supplement the CHP systems that are correctly sized on a high utilisation factor. Consequently it is usual that gas-fired boilers provide a significant quantity of the overall annual heat demand in the network. For instance, the Olympics DH network currently has a total heat capacity of 92.8 MW, of which 80 MW is supplied by gas-fired boilers (see the *Journal* article). Again, the central DH boiler efficiencies, together with the pumping losses and heat losses, need to be compared with the modern high-efficiency condensing boilers installed within the buildings in which they serve.

Other features of DH systems that require accurate energy modelling are thermal storage devices and the overall temperature differences within the system.

The temperature differences in DH systems need to be high to minimise the pumping losses. However, to control return temperatures, the heat-emitting devices need to operate with low temperatures, and the water-heating devices need to operate on a single pass heat exchanger in order to generate low return water temperatures. This means that the DH system must be at a variable volume flow rate to maintain the low return water temperatures.

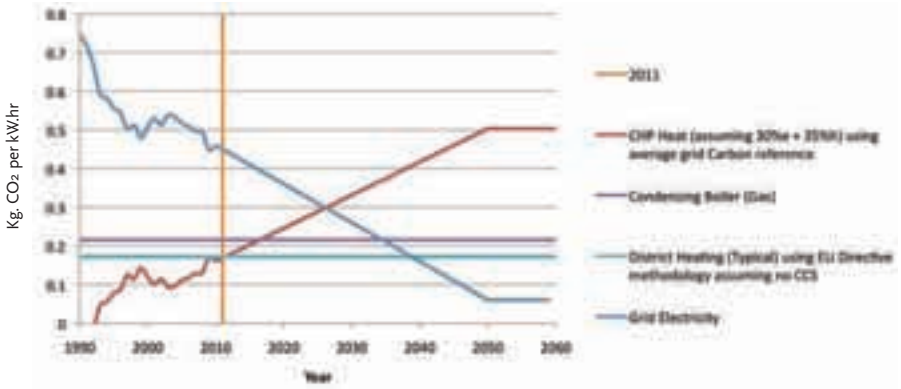

Figure 1: The effect of using the average grid carbon factor for CHP

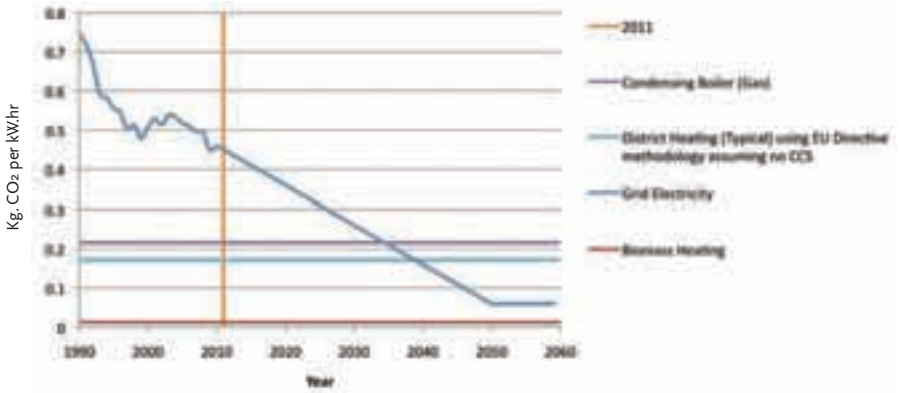

Figure 2: Relative carbon content of biomass heating

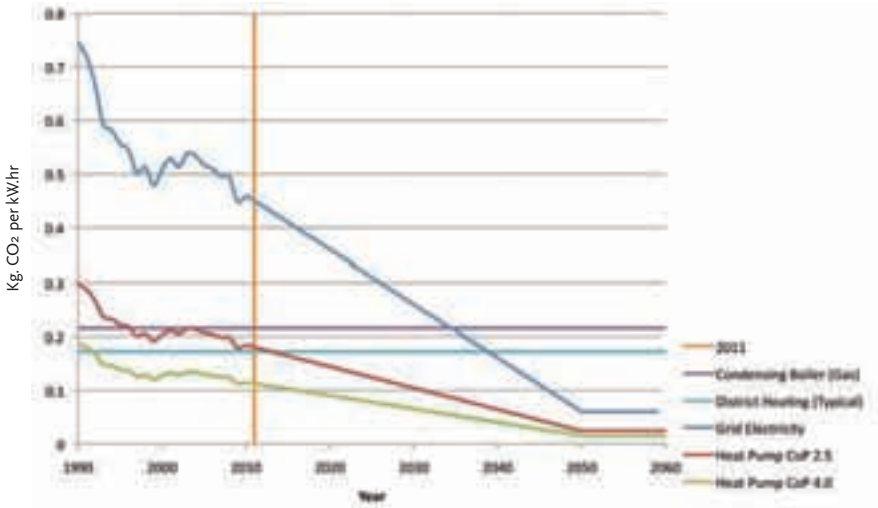

Figure 3: Carbon content of a range of heating sources over time to 2060

Zero carbon

Following the publication of the government's Carbon Plan in December 2011 it is clear that any proposed DH system needs to demonstrate how it is to become zero carbon by 2050. Since carbon capture and sequestration (CCS) techniques are currently considered

> It is surprising that many local planning policies continue to encourage the installation of fossil fuel-powered combined heat and power installations

Courtesy of CPV Ltd

Local district heating systems are increasing around the UK. Here, at the Binton Farm project, at Seale, near Farnham, Surrey, pipes are laid for a new network heating scheme fed by a biomass energy centre

impracticable on small-scale plant, it should be assumed that the small-scale fossil fuel-powered CHP systems will need to be decommissioned in the near future. DH systems will need to be fed by zero carbon fuels such as biomass, refuse combustion or even heat pumps fed from a zero carbon electricity grid. Let us consider these three sources.

Biomass: Sources are not plentiful in the UK, and it is becoming increasingly clear that the transportation of large quantities of biomass from across the world, to burn in an urban area, is unlikely to be a practical solution for zero carbon heating when considered on a worldwide basis. Besides which, concerns over air quality in urban areas are likely to rise in the future.

Refuse combustion: This is clearly a desirable process if the refuse is being diverted from landfill. However, the combustion of refuse in urban areas has very significant planning considerations, not least the transportation issues related to refuse collection. In general the siting of refuse incinerators should be considered the starting point of the possible DH system, not a feature that can be added at a later date. In addition, increasing levels of waste recycling will mean less combustible waste being available over time.

Heat pumps: These beg the question, why not just install local heat pumps and avoid the pumping and heat losses associated with the DH system (see Figure 3). It is possible that there may be some benefits in a DH system in areas of very high urban density, where buildings can pump heat into a network that can pump heat out. However, this model has very different operating characteristics to the current or proposed DH systems.

Conclusion

It can be seen that, in all DH/CHP systems – whether centralised or distributed – the load characteristics need to be analysed and recorded in comparative studies. DH system designers need to predict and meter the actual heat and energy losses in their system to enable correct choices over the operational criteria and extent of DH area coverage to ensure maximum energy savings.

It is essential that CHP and DH systems correctly account for the energy consumption against agreed reference standards as defined by the EU Directive on Co-Generation. In this way the carbon savings can be assured since they will directly link to the energy savings.

Moreover, all DH systems need to certify and publish their delivered heat energy carbon dioxide content (as $kgCO_2/kW.hr$), both now and into the future, to allow building users and legislators to make informed choices over whether to accept the heat or opt for lower-carbon forms of heating. The delivered heat carbon content needs to account for all of the energy losses in the system on an annual basis. Only in this way can the DH systems demonstrate that they offer true low carbon heating.

Finally, all DH and CHP systems need to consider how their installation is to become virtually zero carbon by 2050, since it is clear that this will not be achieved by the current practice of arithmetic efficiency manipulations. It is time for the building services engineering profession to regulate itself to ensure that the UK is developing its infrastructure to achieve the real carbon emissions reductions demanded in the UK Carbon Plan. Failure to do so will mean that we will continue to mislead ourselves and those that rely on our advice. **CJ**

JAMES THONGER is an associate director with Arup. **www.arup.com**

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LEARNING TOOL

A new free tool that combines the CIBSE admittance method with a user-friendly front-end aims to make building physics more accessible to non-specialists and students in the construction sector. **Tom De Saulles** explains

> The PDA tool allows the user to create a room and experiment with its design to see how the internal temperature and loads change in response to 'what if?' questions

The current consultation on Part L 2013 will undoubtedly produce plenty of feedback. But whatever the outcome, the direction of travel will continue to be underpinned by the 'fabric first' approach, which is central to government policy.

Ensuring the fabric is made to work hard does of course require a good understanding of building physics, which is typically limited to one or two members of the design team. But, with an increasing emphasis on fabric energy efficiency, a basic working knowledge of the subject would perhaps be beneficial to all involved in designing and procuring buildings.

With this in mind, and to make building physics more accessible to professionals and students alike, a new modelling tool called the Passive Design Assistant (PDA) has been produced, aimed specifically at educational and early stage design needs.

What can the PDA do?

The PDA allows the user to create a room and experiment with its design, to see how the internal temperature and loads change in response to 'what if?' questions relating to orientation, glazing, thermal mass, ventilation, and so on. The consortium behind the PDA comprises Arup (project leader), the Concrete Centre and AHMM architects, with a financial contribution from the Technology Strategy Board (TSB).

In addition to being free to download, a key feature that sets the PDA apart is its front-end, which has been specifically configured to allow the user to simultaneously view input and output data, helping highlight connections between cause and effect. This is achieved with a permanently visible graph of the hourly operative temperature or heating/cooling load across the chosen design day.

The graph is updated almost instantaneously in response to user inputs – made possible by use of the CIBSE admittance method, which is capable of performing a very rapid thermal analysis of the design. The near real-time feedback helps enhance the overall user experience and the educational value of the tool.

The interface also includes an interactive 3D depiction of the room to help visualise its form, orientation and fenestration. Other features of the PDA include the ability to:

- Directly compare the performance of up to four designs;
- Use sliders and spinners for much of the data input;
- Choose from a large range of UK locations or input user defined climate

A new early stage design tool aims to provide educational and practical benefits to professionals

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data for any location in the world;
- Choose between normal or warm summer conditions;
- Calculate and display U-values and other thermal properties information; and
- Provide help and guidance within the tool.

The admittance method

The admittance method was used in the PDA as it provides a good balance between speed and accuracy, appropriate to the sketch design stage when ideas are being explored. It was originally created in the 1960s by Danter and Loudon[1,2] and, although developed as a manual calculation procedure, it remains a useful and widely used technique that takes account of the dynamic effects of heat storage in the building fabric. A more detailed explanation of the admittance method can be found in *CIBSE Guide A*[3], but a brief overview is offered here.

The underlying principal of the admittance method is that the behaviour of space can be characterised as being in a steady cyclic state, in which daily variations in heat gain and loss about the mean value are assumed to be equal across 24 hours.

This allows the dynamic nature of the space to be calculated in response to a sine wave within a 24 hour period. It also enables the calculation to be split into a constant (mean) response and the variation from the mean at any point during the day (swing).

The mean response of the building fabric is expressed by the U-value, whilst its cyclic response is described by the decrement factor and admittance value (referred to as the Y-value). Finally, a solar gain factor deals with the absorption and release of solar gain from the fabric, along with the transmission and absorption properties of the glazing.

Use of the admittance method in the PDA follows five basic steps:
- The mean heat gains/losses are calculated for the chosen design day;
- The mean operative temperature is then determined using the result from step 1 and mean weather data for the design day;
- The swing (mean-to-peak) heat gain/loss is calculated for each hour of the day;
- The swing in operative temperature is calculated for each hour of the day and added to the mean value to give the actual operative temperatures across the day; and
- The absolute heating/cooling load can now be determined for each hour of the day.

> The admittance procedure is capable of reproducing the results of more complex calculation methods when the same assumptions are made

Additional features

While developing the PDA, the development team at Arup supplemented the methodology with a number of additional algorithms that support features including the ability to specify a variable ventilation rate and the use of U- and G-values to specify glazing.

Similarly, walls and floors can by defined by their U- and Y-values, or alternatively by listing the materials that make up each layer of the construction element. Another useful feature is the ability to specify weather data for any location in the world.

Overheating risk

As with all tools, users should be aware of any limitations they may have and, in respect of the admittance method, this largely relates to the assumed steady cyclic state that represents a repeating 24-hour period.

The implication of this is that the PDA results are based on a period of similar external conditions – that is, the room has experienced a repeating load profile during the preceding days. Actual weather patterns are, of course, generally more erratic.

However, this limitation is not as significant as might be expected, particularly when using the PDA to predict peak summertime conditions during a warm spell, when external conditions are generally repeated over several days. This makes the PDA particularly useful for investigating the risk of overheating in new and existing buildings subject to either normal or warm external conditions – the latter being representative of a hot summer or the more frequent summertime conditions we are likely to experience in response to future climate change.

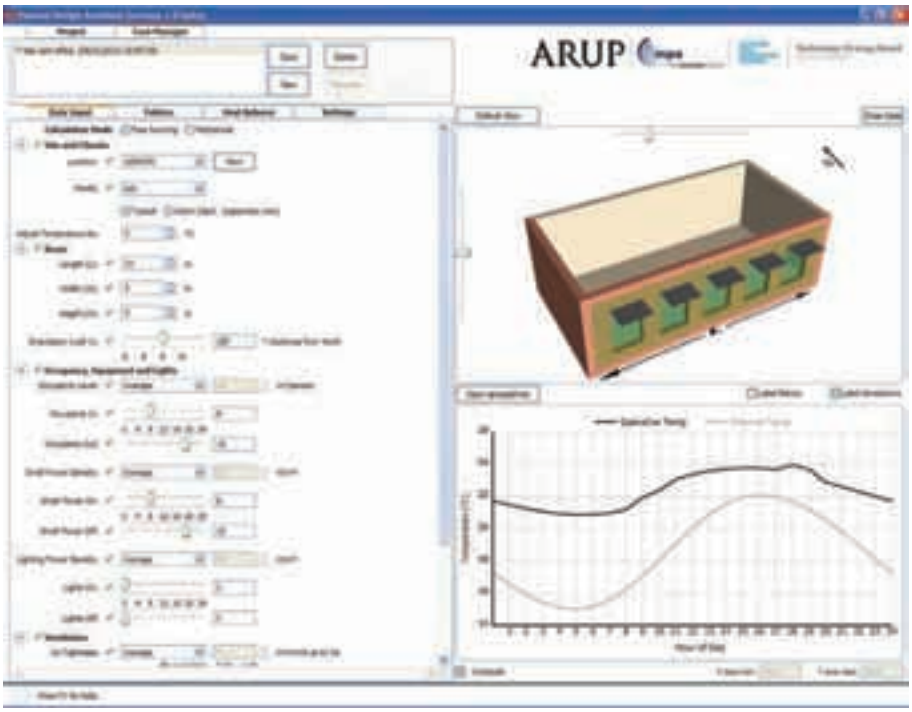
Software validation

To check that the PDA is sufficiently accurate, it has been subject to a series of CEN validation tests and has also been compared with results from the Arup in-house thermal modelling program (Oasys ROOM).

In general, the exercise found that the PDA gives results that are very consistent with those of the CEN tests[4] and Oasys ROOM[5]. This demonstrates that the admittance procedure is capable of reproducing the results of more complex calculation methods when the same assumptions are made.

However, a problem that did come to light was the treatment of thin internal walls in the admittance method, which tends to break down when a small thickness is specified.

This issue, along with other details of the PDA development and validation, is the subject of a technical paper[6] that has been submitted to CIBSE ASHRAE Technical Symposium being held in April in London. Hopefully the the PDA tool – the download details are below – will make a helpful contribution to the understanding of building physics and passive design. **CJ**



The PDA tool is now available to download free. Visit www.arup.com/Publications/Passive_Design_Assistant.aspx

● **TOM DE SAULLES** is the building sustainability manager at the Concrete Centre. Version 1.0 of the PDA can be downloaded without charge at **www.arup.com/Publications/Passive_Design_Assistant.aspx**

REFERENCES

1. Danter. E., *Heat exchanges in a room and the definition of room temperature*, IHVE Symposium, June 1973.
2. Loudon A. G., *Summertime temperatures in buildings without air conditioning*, BRS CP 47/68, 1968.
3. *CIBSE Guide A (Environmental Design)*, *Section 5 – Thermal response and plant sizing*, 2006.
4. CEN European Committee for Standardisation. *BS EN ISO 13791 Thermal performance of buildings – Calculation of internal temperatures of a room in summer without mechanical cooling – General criteria and validation procedures*, 2004.
5. **www.oasys-software.com**
6. White A. et al., *Passive Design Assistant – A tool to elucidate the principals of passive design, CIBSE ASHRAE Technical Symposium*, April 2012 (paper awaiting approval).

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Basic acoustic terminology for building services

This module explains the fundamentals of acoustic terminology used in building services as a basis for setting standards and maintaining acceptable noise levels

Acoustic analysis for building services becomes more demanding with novel forms of passive and active environmental systems. However, the basic principles of acoustics do not change – it is simply their application. The impact of 'sound' in buildings can be airborne and so heard directly by the ear, or passed through surfaces so that it is felt as vibrations. Whether that sound is treated as 'noise' will depend on circumstance – a hum from a fan may be reassuring sound for the facilities manager but could be an intrusive noise to the office worker. This CPD will explain the underlying acoustic terminology that provides a basis for setting the standards and maintaining airborne noise at an acceptable level appropriate to the application.

A very simple (pure tone) sound will travel through the air as shown in Figure 1.

The distance between the ripples of successive high pressure points is known as the wavelength, λ (m), of the sound and the frequency, f (Hz), is the number of times that the pressure peaks per second at a particular point. The pressure 'wave' will travel through the air at speed c ($m \cdot s^{-1}$), varying the pressure at each point somewhere between maximum and minimum pressure; this range is twice the amplitude, P (Pa). Wavelength and frequency are related by $\lambda = c / f$.

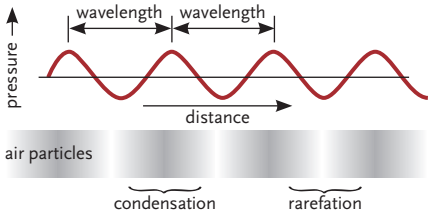

Figure 1: A representation of a simple pure tone travelling through air

The sound travelling in the air (by successive collisions of molecules) will have a velocity of about 343 metres in one second; this can be determined from the simplified relationship $c = 20\sqrt{T}$, where T is the absolute temperature of the air, K. A person would 'hear' the sound as the tympanic membrane in their ear moves in and out, as the sound 'wave' changes the pressure on the outside of the ear. The sound will also pass through solid materials, albeit much faster, as the molecules are more densely packed (for example, through brick at about 3,000 m/s). Whether passing through the air or through a solid, there will be some attenuation of the sound's strength as it travels, since some of the energy will be scattered and absorbed by the material (and some converted to heat). And, of course, for sound to travel there does need to be a liquid, gas or solid, so that there is a transfer of pressure variations – the more densely packed molecules will transfer sound more effectively.

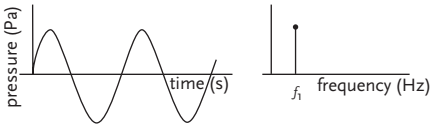

Figure 2: Simple pure tone resolved into a single frequency and rms pressure

Sound is related to a cycling of pressures, typically illustrated by a sinusoidal wave (as in Figure 2). This form of representation is a convenience that illustrates the pressure variations with time at a particular point; actually, the sound is a longitudinal wave (moving in all directions), with areas of high and low pressure (known as 'compressions' and 'rarefactions', as in Figure 1) that 'travel' like the ripples on a pond, where the wave moves (losing intensity as it proceeds) without any flow of water. A 'pure tone' can be represented simply in terms of its frequency, f_1, with its strength represented by the height of the line (as in Figure 2).

More complex sounds can be resolved into a number of different frequencies (each with their own amplitudes) that can be represented as combining together to make a sound. For example, the relatively

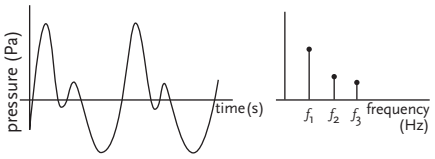

Figure 3: A slightly more complex sound

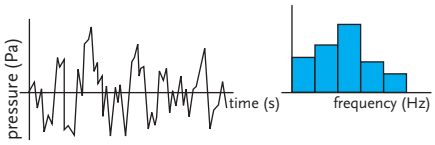

Figure 4: Octave band frequency analysis

simple waveform in Figure 3 could be resolved into three frequencies, each with their own strength.

In the real world, there are sounds that are said to be 'continuous', such as that shown in Figure 4. This is made up of many frequencies that make it practically impossible to break it up into discrete pure tones. In order to represent this type of sound, which is very common, the frequencies are measured in 'bands' (similar concept to 'bins' in external temperature assessments). These bands (that may be 'octave' or '1/3 octave' bands) more readily visualise the characteristic of the sound by losing the detail of individual frequencies. The use of octave band analysis must be employed with care, since there may be peaks of frequencies that occur within the band that will be 'levelled out' by the averaging effect within a complete band.

> In the hearing range, perceived loudness is critical in the assessment of the acoustic environment, as this will influence the design and operation of systems so that they do not adversely affect people

The actual strength of a particular sound felt by the ear is related to the fluctuations of sound pressure (Pa) reaching the ear. The strength of the source itself is determined by the sound energy output, known as sound power (W), and for a piece of equipment would typically be assessed in a test chamber. The sound power is an attribute of the item that is generating the sound (such as a fan), and is normally assumed constant for a piece of equipment regardless of location. However, the sound pressure is related to the position of the listener relative to the sound source, and is affected by the distance from the source and by the acoustic surroundings.

The range of sound powers (and resulting sound pressures) is very large – from a whisper at 10^{-9} W through to a space rocket at 10^{6} W. Human sound perception does not vary linearly with the intensity – intensity being the amount of sound power per unit area ($W \cdot m^{-2}$) – and the listener would not perceive a 10^{15}-fold difference between the whisper and a rocket but relate it to their threshold of hearing in a way that is similar to a logarithmic scale. So, to better represent the ear's response to sound, and to allow the manipulation of these numerically disparate values, logarithms are typically used.

The threshold of hearing corresponds to a pressure variation less than a trillionth of atmospheric pressure, and to reflect this, a reference sound power (or datum) is taken as 10^{-12} W (1 pW), and the **sound power level** is calculated relative to this.

$$\text{sound power level, } L_W = 10 \log_{10} \frac{\text{sound power}}{\text{reference sound power}} \text{ decibels (dB)}$$

The value of the 'Bel' is given by the log (to base 10) of the ratio of two quantities – in this case, two sound powers. The 'decibel' is a tenth of a Bel (hence the multiplier '10' in the equation) and provides a more usable scale – the Bel is not used in acoustics.

So, for example, if a fan has a sound power of 0.001 W, the sound power level would be

$$10 \log_{10} \frac{10^{-3}}{10^{-12}} = 10 \log_{10} 10^{9} = 90 \text{ dB}$$

As the ear responds to sound intensity I, where $I = p^2/\rho c$ and ρ is the air density ($kg \cdot m^{-3}$) and c is the speed of sound ($m \cdot s^{-1}$), the **sound pressure level** uses a ratio of the square of the sound pressure to provide a usable and relevant metric for sound pressure. So,

$$\text{sound pressure level, } Lp = 10 \log_{10} \frac{(\text{sound pressure})^2}{(\text{reference sound power})^2} \text{ decibels (dB)}$$

$$= 20 \log_{10} \frac{p}{p_{ref}} \text{ decibels (dB)}$$

and p_{ref} is the pressure at the lower end of human audibility 2×10^{-5} Pa (or 20 μPa)

So, for example, in the middle of a library, if the sound pressure is 1.2×10^{-3} Pa, the

$$\text{sound pressure level, } Lp = 20 \log_{10} \frac{1.2 \times 10^{-3}}{2 \times 10^{-5}} = 36 \text{ dB}$$

A 3 dB change in sound pressure level is just noticeable, a 5 dB change clearly noticeable, and a 10 dB change is twice (or half) as loud.

If there is more than one source of sound in a room, then the sound pressure level may be added together by first converting back to the square of sound pressure, adding and then reconverting back to dB or, rather more easily (but approximately), the table below may be used to add the different sources together.

If the levels to be added differ by… (dB)	The total is the larger level plus… (dB)
0 or 1	3
2 or 3	2
4 to 9	1
10 or more	0

Figure 5: Approximate method of adding dB sound sources together

So, for example, if one source has a sound pressure level of 45 dB and another 46 dB, the difference is 1 dB, and so the overall sound pressure level is (46 + 3) = 49 dB.

The ear does not respond equally to all frequencies. This appreciation of loudness is reflected in the **phon** scale, as shown in Figure 6. For example, a 50 phon contour would show values of L_p for other frequencies that are perceived equally loud as 50 dB at 1,000 Hz, and looking at a frequency of 100 Hz, a

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sound pressure level of about 70 dB will have the same perceived loudness as 50 dB at 1,000 Hz.

The curves indicate that generally low (or very high) frequency sounds need to have a greater sound pressure level to be perceived as loud as mid-range frequencies. These curves were developed from original experiments in the 1930s and have recently been altered in ISO226[1], notably with the shift of the most sensitive frequency from 4 kHz to 3.5 kHz and amended to be less sensitive at frequencies below 1 kHz.

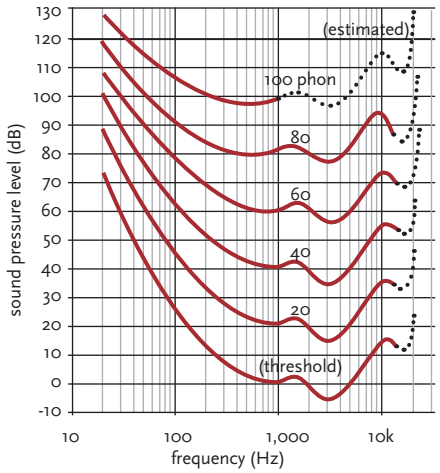

Figure 6: Phon – equal loudness contours

(Data source: ISO 226:2003)

Octave band centre frequency	63	125	250	500	1000	2000	4000	8000	Total*
Band L_p	45	44	45	46	45	44	42	40	53
A-weighting	-26	-16	-9	-3	0	+1	+1	-1	
A-weighted L_p dbA	19	28	36	43	45	45	43	39	51

*$10 \log_{10} (10^{L_{63}/10}+10^{L_{125}/10}+\ldots 10^{L_{8000}/10})$

Figure 7: Example A-weighting of octave band sound pressure levels

A young person may be able to hear sounds from 20 Hz to around 20 kHz. Below this, frequencies are known as infrasound; higher than this normal hearing range is termed ultrasound. In the hearing range, perceived loudness is critical in the assessment of the acoustic environment, as this will influence the design and operation of systems so that they do not adversely affect people.

The value of sound pressure level may be weighted in terms of the ear's ability to hear them. There are several different methods of weighting that may be applied, but for the relatively low intensities within buildings, weighting network A, or **dBA**, is commonly used. This weighting practically simulates the 40 phon contour by attenuating the lower frequencies and clipping the highest frequencies. Where there is predominantly low frequency noise, dBA may well underestimate the apparent loudness. However, this weighting is widely used to determine noise levels for building services applications.

For example, a series of octave band sound pressure levels have been measured in a room (as in Figure 7), and the dBA weightings are applied to determine the total A-weighted sound level.

Noise weightings B and C relate to higher phon levels and are not often used in building services applications – they take greater account of lower frequencies.

When using a sound meter, the reading is normally directly in dBA, and there is no need to convert; indeed, it is the more expensive instrumentation that allows an octave band analysis (or even a 'third octave band' where greater discrimination is required). If octave band frequency analysis is available, then the data may be transferred onto a set of **noise criteria** (NC) curves or **noise rating** (NR) curves. These are useful, as they not only give a value that can be compared to design standards but will also help identify frequency bands that may cause potential problems.

The NC curves are of American origin and were originally designed for use in office applications to assess the noise. The NR curves are European, designed for general 'environmental' application, and are more tolerant of the lower frequency noise but less tolerant of high frequencies. Figure 8 provides an NR value for the spectrum used to determine 51 dBA above – this provides an NR47.

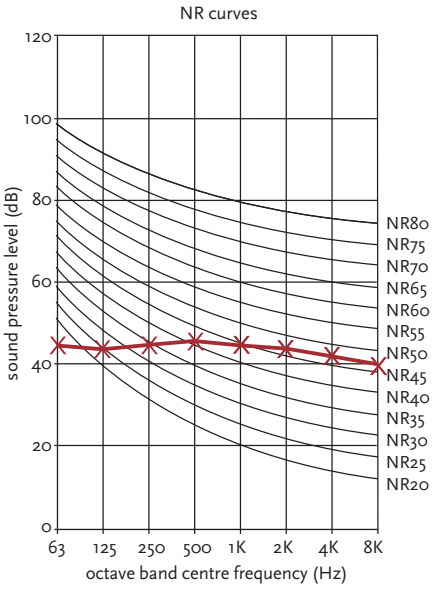

Figure 8: Noise rating curves

dBA may be approximately translated into NC or NR by taking 5 away from the dBA level.

When the sound level is measured, it will be (as set on the measuring device) '**fast**' to show quickly varying noise, '**slow**' to dampen out variations and give a more consistent reading, or '**continuous**' to 'average' out the sound over an extended time period. Continuous 'equivalent' dBA is typically abbreviated to L_{Aeq} and is widely used to record environmental noise.

A future CPD will consider the application of these acoustic concepts to buildings and systems.

Further reading:

CIBSE Guide B5: *Noise and Vibration Control for HVCA*, 2002.

References

1. *ISO 226:2003 Acoustics – Normal equal-loudness-level contours.*

Module 38

March 2012

1. If a sound of frequency 330 Hz is travelling through air at 0C, what will its wavelength be?

- ☐ A 0.01m
- ☐ B 0.05m
- ☐ C 0.10m
- ☐ D 0.50m
- ☐ E 1.00m

2. When sound pressure level is determined from sound pressure, what is the value of the reference sound pressure?

- ☐ A 1 pW
- ☐ B 90 dB
- ☐ C 20 μPa
- ☐ D 10^{-9} W
- ☐ E 1 Pa

3. Using the phon scale, what approximate sound pressure level at 100 Hz is likely to sound the same loudness as 80 dB at 1,000 Hz?

- ☐ A 10 dB
- ☐ B 80 dB
- ☐ C 90 dB
- ☐ D 100 dB
- ☐ E 1,000 dB

4. At what frequency range is the ear likely to be most sensitive?

- ☐ A Less than 10 Hz
- ☐ B 10 Hz – 100 Hzl
- ☐ C 100 Hz – 1 kHz
- ☐ D 1 kHz – 10 kHz
- ☐ E Above 10 kHz

5. Which one of these is likely to be most influenced by lower frequency components?

- ☐ A dBA
- ☐ B dBC
- ☐ C NR
- ☐ D NC
- ☐ E Phon

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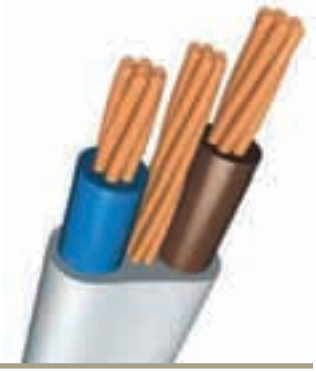

To celebrate 20 years of CableCalc, Castline Systems has released a new, free version of its popular CableCalc program, which will calculate single phase radial and ring circuits, wired in twin and earth cable. It even includes free technical support by email. CableCalc Level P is a fully working, unlimited use version and provides far more than just simple volt drop calculations. CableCalc Level P can be downloaded from **www.castlinesystems.com** free of charge.

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Armstrong speeds the way for Neasden Depot refurbishment

Armstrong 8000 Series packaged pump solutions have helped to keep tight deadlines on track for London Underground's refurbishment of Neasden Depot, the largest depot in the London Underground network. The major refurbishment project currently under way at the depot will create facilities suitable to accommodate a new fleet of air-conditioned Tube trains. Armstrong 8000 Series pump solutions are complete fluid management systems, pre-designed and made off-site, with the capability to be configured to suit the specific application.

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Corps Security has incorporated the latest ADPRO by Xtralis video and audio transmitter/recorder technology into its state-of-the-art Corps Monitoring Centre. This announcement further enhances the longstanding relationship between the two organisations, and allows Corps Security to provide a service that detects, assesses and responds to threats quickly, with minimal false alarms.

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Pupils and staff at Dr Thomlinson's Church of England Middle School in Rothbury, Northumberland, are benefiting from ultra-efficient, heating and hot water, thanks to two 251kW fully condensing, gas-fired Ultramax R603 boilers, supplied by MHS Boilers – part of Elco Heating Solutions. Replacing an ageing gas-fired system, the installation is designed to increase energy efficiency and reduce the carbon footprint for the school. The M&E contractors were Cleveland-based Geoffrey Robinson Ltd.

For more information visit www.mhsboilers.com

St Helens takes the advantage with Prysmian FP

Prysmian's FP200 Gold cable has been installed into the fire alarm and the voice alarm system at St Helens RFC's new stadium, Langtree Park. The Saints have left their old ground at Knowsley Road to begin the season at the new 18,000-capacity stadium. Fire safety systems are of paramount importance. Prysmian's FP200 Gold complies with the requirements of both fire alarm standard BS 5839 and emergency lighting standard BS 5266, and is BASEC and LPCB certified. This hard skin, fire resistant cable incorporates unique Insudite insulation.

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Outstanding lesson for school energy saving with Dimplex

An acclaimed Hertfordshire school is setting the standards in energy saving, and is one of the first in the UK to install a Dimplex air source heat pump. Sir John Lawes School in Harpenden has an Ofsted rating of 'Outstanding' for its Education for Sustainable Development work. A Dimplex LA 40 TU, 40 kW air source heat pump has been installed by Dimplex installer partner Azure Natural Energy Systems, to provide heating for three new classrooms, two offices and communal area in the new building.

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Wade for quality drainage products and innovations

At its factory at Halstead, Essex, Wade manufactures a range of drainage products for use in, on and near buildings, worldwide. Its latest product innovation is a stainless steel mitred grating for use where a drainage channel is required to follow a right-angled change of direction

The grating comprises laser-cut components, including mortises and tenons, that are assembled then welded to produce a strong, rigid, level and straight product. A feature of this new design is the appearance of continuous strips of metal running through the corner. The grating fits snugly in the stainless steel channel and, to suit site requirements, may be loose or discretely secured.

For more information visit www.wade.eu

Chevin Housing Association offers tenants a cosier low-cost future with air source heat pumps

Residents in some 30 homes are looking forward to a cosier new year following the replacement of their electric storage heaters with air source heat pumps. Chevin Housing Association operates across Yorkshire, Humberside and the North Midlands, managing more than 8,000 homes, and is a member of the Together Housing Group. Having trialled the Ecodan heat pumps in three of its properties, the social housing landlord has chosen to use a £175,000 grant, awarded by the Department of Energy and Climate Change, to fit more of these pumps to its homes.

For more information visit www.domesticheating.mitsubishielectric.co.uk

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Nuaire pioneers Sunwarm technology on major housing products

Nuaire has successfully completed a major residential project alongside UK housebuilder Pye Homes and electrical subcontractor A W Gorrett. Orchard Close in Bredon, close to the town of Tewkesbury, is a development of 28 new build properties consisting of two-, three- and four-bedroom homes. Oxford-based housebuilder Pye Homes, known for developing quality new build properties across the south of England, appointed Nuaire to provide a range of ventilation solutions suitable for each of the properties across the development.

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For more information visit www.marcocm.com/xspace

Rinnai reaching the highest points on earth

Going above and beyond the call of duty is Rinnai public relations and advertising manager Barry Lynn, pictured here with a Rinnai company logo just below the east face of Aconcagua, a near-7,000-metre peak on the borders of Argentina and Chile. Aconcagua is the highest mountain in the Americas and acknowledged as one of the Seven Summits of the World. Rinnai is one of the UK's leading suppliers of continuous flow water heating products for both commercial and domestic applications.

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College saves energy and money with Stokvis system

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Stanley puts Dynamic Controls back in control

Valve manufacturer Dynamic Controls has upgraded its security with Stanley Convergent Security Solutions (Stanley CSS) and moved to Sonitrol alarm monitoring. Dynamic Controls is a leading manufacturer of high and low pressure cartridge valves, manifolds, reducing stations and fluid/gas systems for critical, demanding applications, including submarines, aircraft carriers and navy surface ships. The existing intruder alarm system had come to the end of its life, and Dynamic Controls turned to Stanley CSS for a solution.

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ETDE in the UK, a wholly owned subsidiary of Bouygues Construction, has truly unique in-house competences with integrated technical engineering and services capabilities, providing its clients with a full lifecycle project partner from conception, design and construction through to facilities management. All ETDE entities within the UK – Contracting, Ecovert FM, David Webster and ICEL – will be rebranded as ETDE, Energy and Service Division. I will continue to provide world class capabilities and solutions to its public and private clients for infrastructure services and process, electrical, mechanical engineering and specialist turnkey critical facilities, facilities management and energy and sustainability. With its local, regional office networks throughout the UK, ETDE's philosophy is to provide robust, best value, sustainable solutions tailored to its client's specific needs. Working across education, healthcare, government, industrial, data centre, biotechnology, advanced technology, aerospace and renewable energy sectors, its approach is based on applying technical excellence, innovation and continuous improvement policies.

For more information visit www.etde.co.uk or email contracting@etde.co.uk

PRODUCTS & SERVICES

JS Air Curtains eliminates draughts at London Fire Brigade

JS Air Curtains has supplied an electrically heated air curtain for the London Fire Brigade headquarters in Union Street, South London. As well as keeping the cold out in the winter, it also keeps the heat out during the summer. JS supplied the attractive, round 2m Rund air curtain in brushed stainless steel to contractor Arkas, which installed it horizontally above the double entry sliding doors leading into the London Fire Brigade's HQ reception area. A time switch and digital thermostat were also provided.

For more information call Mike Verney on 01903 858656 or email sales@jsaircurtains.com

Why your public building project needs a 'Hi-Lo Lectern'

The Hi-Lo Lectern is the first UK-made DDA compliant lectern with motorised height adjustment (from 746mm to 1169mm), suitable for all users and events, and complying with EU regulations about access and facilities for disabled people within public buildings. Any user can easily adjust the height for maximum comfort. A reading lamp and power socket is provided, with two microphone connectors on anti vibration mounts. It is available in silver, black or white powder coated finishes as standard – or can be finished in any RAL colour.

For more information call 01707 390122 or email sales@aluminium-structures.co.uk

Evinox launches COP 5 air source heat pump – most efficient in UK

Evinox has launched a range of COP 5 air source heat pumps (ASHPs). The excellent coefficient of performance figures for the Evinox PHRIE range makes it the most efficient ASHP in the UK. The range is suited to residential and commercial applications and features 10-18 kW outputs with two single phase models and 1 three phase model. Additional models with outputs from 5-25 kW will be launched shortly. The PHRIE features a heat exchanger with AISI 316 stainless steel plates and heat insulation.

For more information call 01372 722277 or visit www.evinox.co.uk

Drilling contractor utilises ground source energy from Vaillant

The installation of a 14 kW Vaillant geoTHERM ground source heat pump has been completed at Waters End Farm in Cranbrook, Kent. Waters End Farm is a private property set in the idyllic Kent countryside – and it will now benefit from a renewable heating system. Using latent energy stored in the ground, Vaillant's heat pump range can generate hot water for space heating and domestic hot water use, while making a significant contribution towards the reduction of environmental pollution.

For more information call 01634 292300 or visit www.vaillant.co.uk

Airedale pushes the boundaries of scroll compressor chiller technology

Airedale has pushed the boundaries in the application of scroll compressors to chiller technology, and responded to market demand for a compact, efficient, high-capacity scroll chiller, with the new 460 – 930 kW air cooled DeltaChill and 450 – 1,010 kW DeltaChill FreeCool. The R410A configured chillers offer exceptional application flexibility, enhanced by a combined 182 models, two sound variants and three efficiency levels. For example, customers for whom efficiency is paramount can opt for the highest efficiency level.

For more information visit www.airedale.com

LST radiators and modular condensing boilers

Supaflex Agencies, agents for Clyde, achieved significant September 2011 orders. Some 400 Centurion LSTs have been supplied to the Abbeyfield Care Home near Cambridge, plus two Clyde 900 kw Super Modulex modular condensing boilers, with a 290 kw model at the Swiss Cottage SSS/Academy. The 900 kw models have 8 X 110 kw modules and eight down-firing radiant burners. With a burner fault, all the rest operate. Each modulates on a cascade to 22 kw. Multiple burner Modulexes have significant advantage over single/twin burner boilers. A joint October CPD was presented to CIBSE/HVCA.

For more information call 01223 874234 or visit www.supaflex-agencies.com

Tridium's open platform enables Aldesa to increase renewable energy output

Aldesa Renewable Energy Group has achieved its goal of improving the performance and availability of its photovoltaic energy generation plants, with the assistance of Tridium, the global open software framework specialist for building automation systems. Tridium's universal software framework, NiagaraAX, has helped resolve the challenge of multiple communications protocols, and provides Aldesa with control system access via a web browser to significantly reduce maintenance costs and improve operational efficiency.

For more information visit www.tridiumeurope.com

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

Classroom ventilation units

Aircraft Air Handling's 260mm-high classroom ventilation units are silenced to nr25. The plate recuperator is 60% efficient, with an air volume of 0-500 litres. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

For more information visit www.aircraftairhandling.com

Be Safe Direct launch catalogue for fire and safety products

Sourcing all fire and safety product needs has just gotten easier thanks to the launch of the Be Safe Direct catalogue. Director of Be Safe Direct, Sam Riley, said: 'Our catalogue features more than 1,000 products and will provide one of the most comprehensive sources for both fire and safety products, meaning purchasers will have a one-stop-shop for all their needs. As a special introduction, we are offering 5% discount on all products – simply enter promotional code CAT2012 when you place your order.'

For more information call 0845 604 5653 or visit www.besafedirect.com

Mobile unit allows control of energy use

Mitsubishi Electric has released details of a special mobile display unit, which has been developed specifically to allow the company to take its range of advanced air conditioning control systems out to customers' buildings. The display contains all of the company's most popular control systems from the M2M platform, which allows customers to integrate multiple sites into one network, to the advanced AG150 touch screen controller with webserver capabilities and energy meter interfaces showing operators the full potential of energy monitoring.

For more information call 01707 282 880 or email air.conditioning@meuk.mee.com

SE Controls provides comfort and safety at new hospital

A combined smoke and natural ventilation solution from SE Controls is helping create a comfortable and safe environment for patients, visitors and staff at Salford Royal Hospital's new £90m Hope Building. Designed by architects HKS and constructed by Balfour Beatty, the five-storey Hope Building houses a new A&E department, as well as providing 242 beds.

SE Controls developed the fire engineered smoke and natural ventilation solution around the original fire specification, and worked closely with the consultants to create an effective and reliable system that maximises comfort, safety and energy efficiency by linking in to both the building management system (BMS) and the separate fire alarm system. Within the hospital, the smoke and natural ventilation system is split into two zones to allow maximum control over the temperatures and ventilation needs, both in the main concourse and the atrium areas of the building.

For more details call 01543 443060 or visit www.secontrols.com

Highray – elegant and effective lighting from Riegens

Riegens Lighting's Highray luminaire has been designed for applications where an elegant but effective, combined direct and indirect lighting solution is required. Wire suspended, the pendant Highray luminaire offers a choice of lamp type, which includes a 41,W (3,000K) LED option and is manufactured in satin matt/white or opal reflector, depending on the choice of light source. With an ingress protection rating of IP20 or IP40 for the HIT version, the luminaire is available with a choice of control gear.

For more information call 01376 330400 or visit www.riegens-lighting.com

Open for business – the Buderus training academy

Buderus has reaffirmed its commitment to M&E contractor, consultant and specifier training with the opening of a brand new £1.5m training and assessment facility at its headquarters in Worcester. Within the new academy are a number of innovative features geared towards providing an authentic training experience for contractors and consultants alike. Included within the new facility is a 100 sq m open-plan training area featuring a life-sized single storey brick building, equipped with a commercial solar heating system.

For more information visit www.buderus.co.uk/training

Ten-year guarantee first for CO Alarm

The very first battery carbon monoxide alarm range with a full 10-year guarantee has been launched by Kidde Fyrnetics, the world's largest manufacturer of residential smoke, heat and CO alarms. The new TenYCO self-contained, state-of-the-art carbon monoxide alarms are specially designed for quick and simple installation by non-electricians and for low cost of ownership. Both models are small in size, with a neat appearance, and can be wall-mounted or used free-standing.

For more information visit tenyco.kiddefynetics.co.uk or email kiddefyr@ukgateway.net

ATAG focuses on solar power and carbon reduction targets at Ecobuild

ATAG Heating's reputation for super high-efficiency, low emission boilers and for delivering the latest developments in solar powered heating, will be further enhanced by its display of innovative products at Ecobuild 2012. Highlight of the stand will be a solar powered system featuring the world's first vacuum flat panel and based around its best selling A203C combination boiler, one of the few boilers on the market that accepts pre-heated water.

For more information call 01243 815770

Complete climate control solution from Panasonic

For any facility dealing with pharmaceuticals, controlled temperature and monitoring is a necessity for accommodating storage and manufacturing processes. DDD Pharmaceuticals' new site in Watford not only required controlled cooling for the warehouse, but also heating and cooling facilities for the offices at the plant. Equipment from Panasonic's comprehensive range of heating and cooling solutions was supplied by TF Solutions, as Panasonic's VRF range ably satisfied all requirements using a single, integrated system. The new Panasonic technology installed also delivers on excellent energy efficiency grounds.

For more information visit www.panasonic-heating.co.uk or email uk-aircon@eu.panasonic.com

Certified weathering performance

Gilberts has strengthened its position in the air distribution market by being the first manufacturer to gain BSRIA Cert certification on their WH-75 range of high performance external weather louvres. BSRIA Cert's new scheme is designed to ensure that weather louvres are classified correctly in accordance with the relevant test standard and that the performance classification claimed is both valid and repeatable through the manufacturing process. BSRIA recognised that simply testing to a standard would not necessarily provide the full spectrum of confidence that a specifier needs.

For more information call 01253 766911 or email sales@gilbertsblackpool.com

15th century chapel enters the modern age with Priva BMS

Rosslyn Chapel, a Category A listed building and Scheduled Ancient Monument, now features a Building Management System (BMS) supplied by Priva as part of a refurbishment project that has seen the construction of a visitor centre and a biomass plant that heats the whole site. The Priva BMS, engineered and installed by Campbell Control Services, brings this 15th century building firmly into the modern era in terms of cost-efficient, environmentally-friendly building management, without alterations to the historic fabric of the structure.

For more information visit www.priva.co.uk

PRODUCTS & SERVICES

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Supaflex dual shut-off QRCs and hoses for FCUs, chilled beams and radiant panels

Supaflex provides 1/2", 3/4" and 1" dual shut off brass quick release couplings for CHW/LTHW hose connections to fan coil units, chilled beams, radiant panels and similar M&E equipment, where interchangeability is required and ease of removal or maintenance by an FM contractor. They have twin 'O' ring seals with robust bodies that do not suffer from stress cracking when mated with a BSP taper hose thread. This can cause untold troubles for FM contractors or, even worse, untold insurance damage if leaking onto building fabric and fittings, resulting in a very irate client/building owner or tenant. Please see website case studies, 7 and 8 in particular.

● **For more information call 01223 874 234 or email www.supaflex.com**

Belfast port business reuses, recycles and saves on retrofit

With thousands of ageing R22 systems now reaching the end of their working life, a replacement installation in Belfast's city docks has highlighted the advantages of R22 Replace technology from Mitsubishi Electric. HEYN Handling Solutions realised that its air conditioning system was nearing the end of its useful operating life. The R22 Replace Series can often utilise and 'recycle' existing R22 pipework, electrics, drains and control wiring, leading to significant savings on both install costs and the time frame required to complete the project.

● For more information call 028 777 67114 or visit **www.mitsubishielectric.co.uk/aircon**

A versatile range of radiator valves from MHS

The high-quality, versatile range of radiator and towel rail valves from MHS is designed to combine sophisticated style with engineered precision, while maintaining consistent heating output. Available in a choice of 11 designs, these essential finishing touches will suit most applications, seamlessly blending with either contemporary or traditional style radiators. Competitively priced, MHS valves feature straight, angled, manual or TRV versions with an extensive choice of colours and finishes to complement existing décor.

● **For more information visit www.mhsradiators.com**

LG spaces out on style and efficiency

New from LG is the Multi V Space II unit. It is designed to provide the perfect ambience – 16 kW cooling, 18 kW heating – via ceiling and floor units in living spaces such as urban loft developments and apartments. Key features of the Multi V Space II include: front suction and front discharge, reduced noise, a four-step modular design, and right or left hand side discharge options. Outdoor units feature a right-side or left-side airflow system, high-speed air discharging, and no interference between floors.

● **For more information visit eu.lgeaircon.com**

Water supply pipe sizing and drainage design software

What is the HWS flow for 12 hand-wash basins each having a 6 LPM outlet at 38 deg C, when the HWS is 60 deg C, the CWS at 10 deg C, the average usage is considered to be 15s duration and the frequency is 60s? Answer: 0.4 L/s. If you are unable to give the answer in under 30 seconds, then you should be using FlowCheck; one of 5 applications within the PH Office Calculation Suite, priced at £95 + VAT, supplied as a binder enclosing a CD and user guide.

● **For more information visit www.phoffice.co.uk/design-software.php**

More componenets for Solarflo water heating system

Andrews Water Heaters, part of Baxi Commercial Division, has announced additions to the components of the SOLARflo solar thermal water heating system, including an extended choice of flat plate collector, the introduction of a new heat pipe evacuated tube option, and added protection for the pump station. The new SOL25OH flat plate solar thermal collector, manufactured within the BDR Thermea group, measures 2.35 sq m and is suitable for installation in landscape or portrait orientation.

● **For more information call 0845 070 1055 or visit www.andrewswaterheaters.co.uk**

PRODUCTS & SERVICES

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

Solatube launches Energy Care Optima range delivering exceptional thermal performance

The Solatube Energy Care Optima range meets the strict criteria set for passive house construction and is available as an upgrade for the Solatube Brighten Up Series. Independent tests show the Solatube Energy Care Optima range now meets the stringent criteria set by Passive House standards, with outstanding U-values. Independent testing was carried out to BS EN ISO 12567-1 2000 for windows and doors. The Solatube 160 DS Energy Care Optima produced a U-value of 0.5W/m²/K.

For more information call 01234 241466 or visit www.solatube.co.uk

Grundfos pumps are EuP ready – today

There is now less than a year to go to the 1 January 2013 EuP/ErP deadline that will change the stand-alone circulator market in Europe forever. This EU directive on energy using products (EuPs) sets strict new requirements for energy efficiency that encompasses domestic and light commercial circulator pumps, and has already started to impact on motors. Grundfos is not just ready – it's way ahead. The Grundfos ALPHA2 and MAGNA commercial circulators have met the EuP demanded requirements for many years.

For more information call 01525 850000 or email uk-sales@grundfos.com

Get up-to-speed with wood heating

Renewable alternatives to fossil fuels are a firm fixture in modern buildings and thus a key consideration when it comes to design and specification. Helping architects and specifiers understand the nuances of wood heating is leading biomass solutions provider, Euroheat, which is offering free training at its exhibition centre in Bishop's Frome, Hertfordshire. Candidates can choose from one of two half-day sessions, from 10am – 3pm, on either 10 or 12 April.

For more information visit www.training.euroheat.co.uk

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See: Taking Control - CIBSE Journal Dec 2011

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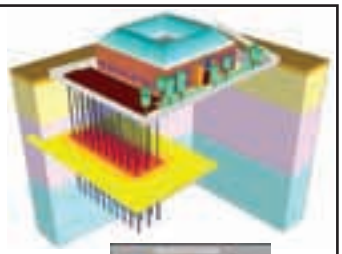

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CIBSE JOURNAL

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June 2012	Chillers CIBSE supplement*
July 2012	Air conditioning Car park ventilation
August 2012	Heat pumps Healthcare
September 2012	Air conditioning, air movement & ventilation

* = Supplements

Editorial submission: Please send editorial proposals/ ideas three months before publication date, eg, 1st October for January publication.

Send to: editor@cibsejournal.com.

The final editorial copy deadline is one month before publication date.

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(Ref no. HRE0235)
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Salary: £56,154 - £59,982 inclusive of London weighting

You will be responsible for directing and leading the Building Technical Services Business Team and provide a centralised, core repairs, maintenance and project service to the whole Council excluding the residential estate; develop the professional management of service contracts, planned maintenance, building related statutory compliance and health & safety matters across the entire corporate estate including leading on the creation and development of the corporate property maintenance related investment programme.

Planned Maintenance Manager

(Ref no. HRE0234)
Grade: PO7
Salary: £46,701 - £49,452 inclusive of London weighting

Leading a small team you will be responsible for service contracts and the planned maintenance programme of the corporate estate excluding residential properties; promote our services to all premises managers and work closely with the incumbent term contractor to ensure that servicing requirements and works arising from routine inspections are undertaken including managing service sheets and certificates.

Please visit our website www.lambeth.gov.uk to apply on online. Alternatively, e-mail to recruitment@lambeth.gov.uk quoting appropriate reference number in the subject heading for an application pack. (CVs will not be considered).

Closing date for both posts: Thursday, 22nd March 2012.

Lambeth is committed to Safer Recruitment and aims for quality services and equal opportunities for all.

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You will be committed to delivering a first class customer focussed service in a competitive environment and the promotion of Local Authority Building Control. Educated to degree level (or with equivalent qualifications or experience) and holding a professional qualification or significant experience in an appropriate field you will be fully conversant with the controlling legislation. For the Group BCO position you will have expert knowledge and be required to lead the Mechanical and Electrical surveyors.

Local government package of conditions and benefits apply to this appointment.

To apply online please visit www.cityoflondon.gov.uk/jobs Alternatively contact the Corporate Recruitment Unit on 020 7332 3978 (24hr answerphone) quoting reference number BE011. Minicom services for the hearing impaired available on 020 7332 3732.

Closing date is 12 noon on 15 March (Interviews are expected to be held during week commencing 26 March).

The City of London is committed to Equal Opportunities and welcomes applications from all sections of the community.

CITY OF LONDON

miller construction

Senior Consultants

Integrated Solutions, part of Miller Construction (UK) Limited, is seeking to recruit two Senior Consultants to work within its Consultancy business unit. The aim of the Consultancy offering is to provide clients with Professional and Technical services. Our initial focus will be to:

- Provide carbon reduction and energy efficiency solutions for built assets that incorporate funding, risk management, installation and maintenance services
- Place project management staff into selected public sector organisations and SPVs
- Work closely with internal and external partners to support their businesses.

Reporting to the Consultancy Director - Integrated Solutions, the prime objective of the Senior Consultant role is to provide technical support to clients and their representatives in the provision of consultancy services aimed at delivering sustainable and low carbon solutions. One of these roles will be based in the Midlands with the other based in the North of England.

Your main responsibilities will be to:

- Interpret and develop the client's brief
- Manage the production of relevant information including drawings, calculations, reports, specifications and reviews
- Be the interface between project consultants and contractors
- Supervise and develop team members
- Advise and manage built asset interests for clients
- Ensure work is delivered to the specified quality.

You'll ideally:

- Have the ability to work closely with clients, both internal and external to develop professional relationships
- Establish and maintain a network of contacts and advisors
- Have good communication skills, including influencing and persuading
- Have diplomacy and tact
- Have the ability to assimilate information and determine the appropriate and correct course of action
- Be able to quickly identify potential problems and either take preventative action or provide cost effective and practical solutions
- Advise clients on potential solutions that require a technical input
- Have a degree or equivalent in mechanical engineering/building services/building environment services or similar
- Be familiar with BREEAM and/or similar sustainability measurement tools
- Ideally be a member of a relevant professional body.

To apply submit your full CV quoting current remuneration and benefits package to Dan Adorisio, Consultancy Director ideally via email at **dan.adorisio@miller.co.uk**

We are committed to Equal Opportunities and actively encourage applications from disabled people. Disabled applicants will be offered an interview providing they meet the minimum criteria for the job.

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Senior Mechanical Design Engineer | Heathrow | to £32LTD+ | ref: 2179
Our client is looking for an engineer with hands on design and practical site experience. You will be the interface between the consultant and contractor and will be responsible for technical solutions for the project. 12-24 month contract!

Senior Mechanical Design Engineer | Cambridge | to £45K+ | ref: 4797
We are looking for an engineer for an award winning M&E consultancy. Ideally you will be degree qualified and have progressed to IEng or CEng status. Excellent opportunity!

Intermediate Electrical Design Engineer | Southampton | to £35K | ref: 1956
We looking for an electrical engineer for a new M&E consultancy. Ideal candidates will be degree qualified with relevant post graduate experience and be keen to progress to Chartered status.

Electrical Technical Director | Berkshire | £60-70K++ | ref: 2053
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BAR753/JA

Senior Electrical Design Engineer

London (West End), £50,000 + benefits

Our client has a requirement for a Senior Electrical Design Engineer to join their Mission Critical team. The company have been established for over 30 years and have developed into an international multi-disciplinary consultancy, employing 400 staff in 20 worldwide offices. The successful candidate will be working primarily on data centres within the financial district, and should be degree qualified with previous mission critical project experience.
BAR757/PA

Senior Electrical Building Services Engineer

Oxfordshire, £37k - £43k + benefits

This market leading client has been established for over 80 years with offices throughout the UK. The company are able to offer structured career progression in conjunction with exposure to varied and technically challenging projects in the finance, commercial, defence, leisure, and culture sectors. The company are seeking a senior electrical engineer who has previous experience of UK building regulations, is conversant with Amtech or Hevacomp calculation software and has completed a degree in electrical engineering or building services.
BAR751/JA

Electrical Building Services Engineer

Greater London, £30k - £35k + benefits

This is a fantastic opportunity to join a fast paced expanding consultancy that has recently relocated to new offices. The MD is a passionate leader and is looking for an exceptional engineer to supplement his team. Successful candidates will possess a solid track record in a consultancy environment, will be client facing, and possess the ability to manage projects, negotiate fees, and undertake initial and detailed design. Applicants will be proficient in Hevacaomp or Amtech and have completed a degree in building services.
BAR759/JA

For further information and to apply, please call us on **+44 (0)203 176 2666** or email **cv@b-a-r.com**

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Thinking of your future

Events & Training

NATIONAL EVENTS AND CONFERENCES

Getting Ready for Green Deal 2012
07 March, Coventry
One of several one-day workshops to show where the opportunities lie.
www.cibsetraining.co.uk/green-deal

CIBSE Ireland Annual Conference 2012
08 March, Dublin
The conference will explore 'Engineering opportunities – an integrated approach'.
www.cibse.org

The ACR Show 2012
13-15 March, Birmingham
Free advice on the latest technical and legal developments in the field of air conditioning and refrigeration.
www.acrshow.co.uk

Ecobuild
20-22 March, London
The world's biggest event for sustainable design, construction and the built environment.
www.ecobuild.co.uk

Heating Services Explained
21–23 March, London
One of several one-day workshops to show where the opportunities lie.
www.cibsetraining.co.uk/mcc

Collaborative Working: an introduction to BIM-enabled cooperation
27 March, Bristol
What will this new BIM-driven world look like and who will be leading it?
www.architecture.com

CIBSE Ireland SDAR* Awards
29 March, Dublin
A celebration of interesting or innovative projects in which there is data, analysis and evidence of success or failure.
www.cibse.org

CIBSE ASHRAE Technical Symposium: building systems and services for the 21st century
18-19 April, London
The second CIBSE Technical Symposium, in conjunction with ASHRAE, is intended to bring to the fore latest research and practice.
www.cibse.org/events

SOCIETY OF LIGHT AND LIGHTING

SLL masterclasses – One building a minute
29 March, Newcastle
This series brings speakers from Philips, Thorn, Tridonic, Trilux and Wila to talk about refurbishment.
www.sll.org/events

Junior Ready Steady Light
19 March, London
A new event being launched to celebrate Ready Steady Light's 10th birthday.
www.sll.org/events

Ready Steady Light
20 March 2012, London
Up to 15 teams will compete to design an exterior lighting scheme in just 180 minutes.
www.sll.org/events

CIBSE GROUPS AND REGIONS

Tackling the issue of fat, oil and grease commercial drainage systems
06 March, London
The different ways of managing fat, oil and grease in commercial drainage systems and the relevant legislation and controls.
www.cibse.org/sophe

Low carbon comfort – boiler room design and layout
20 March, London
Speaker Nick Barnard. Organised by the Home Counties North East region.
wsww.cibse.org/events

Society of Public Health Engineers presents water efficiency in domestic and commercial bathrooms
21 March, Manchester
With Martin Cook, of Twyford Bathrooms.
www.cibse.org/sophe; m.atherton@dssr.co.uk

Association of Building Engineers' South West region conference and exhibition
21 March, Somerset
Guest speaker Anthony Burd from the Department of Communities and Local Government. Theme: the renewable revolution.
www.abe.org.uk; southwest@abe.org.uk

CPD TRAINING

Visit **www.cibsetraining.co.uk,** call 020 8772 3660 or email **eventbookings@cibse.org**

Building (Scotland) Regulations Section 6 (Energy)
02 March, Aberdeen

Gas Safety Regulations
06 March, London

Inspection and testing of electrical installations
07 March, London

Customer care: the key to profitability
08 March, London

How to specify a ground source energy system
09 March, London

LCEA EPC Training
12 and 13 March, Birmingham

Building electrics basics 3: physical distribution within building constraints
14 March, London

Introduction to electrical services in buildings
14 March, London

Building electrics basics 4: final outlets and component selection
15 March, London

Power System Harmonics
15 March, London

Heating Services Explained

21 – 23 March 2012, London

www.shutterstock.com/Dmitry Kalinovsky

Heating systems are a vital part of the building services that affect everyday life. Yet many people who have responsibility for running heating systems efficiently have very limited knowledge of how they are designed and operate.

This three-day course is targeted both at those who are engaged on the perimeter of the building services industry, and for those entering the industry that have technical knowledge but limited practical understanding.

The course covers: the basic concepts behind the design and operation of heating systems; the main components; how they operate; the characteristics of the various types of system; and how they should be controlled.

While some detailed aspects of design will be covered to give delegates an understanding of the design process, particularly in relation to efficient operation, the course is not intended to provide delegates with the knowledge to carry out detailed design calculations.

To find out more or to book a place, visit **www.cibsetraining.co.uk/mcc**

Variable flow water system design
16 March, London

Part L Building Regulations 2010
20 March, London

Introduction to Legionella Control
21 March, London

Heating Services Explained (three days)
21 March, London

Introduction to Facilities Management
27 March, London

Fire safety engineering design: principles and application (three days)
28 March, London

CPD DEC update for assessors
28 March, London

CPD AC Lodgement Update
30 March, London

Lighting and Energy Efficiency
03 April, Leeds

Fire resisting and smoke control doorsets
11 April, London

Effective Maintenance Management
12 April, London

Send your events to cbailey@cibsejournal.com

Ventilation Solutions

by Fläkt Woods Limited

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To discover more come and see us at Ecobuild, Stand N1642

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Fast and accurate controls to drive high speed dampers or invertors. Full PID stand alone controls with BMS interface.

DPM PRESSURE SENSOR

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CAV AND VAV DAMPERS

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Metal Damper

AIR MANAGEMENT SYSTEM

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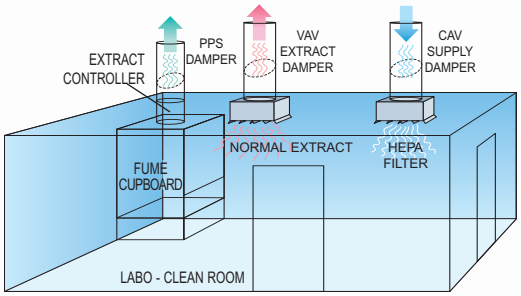

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Poly-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.

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