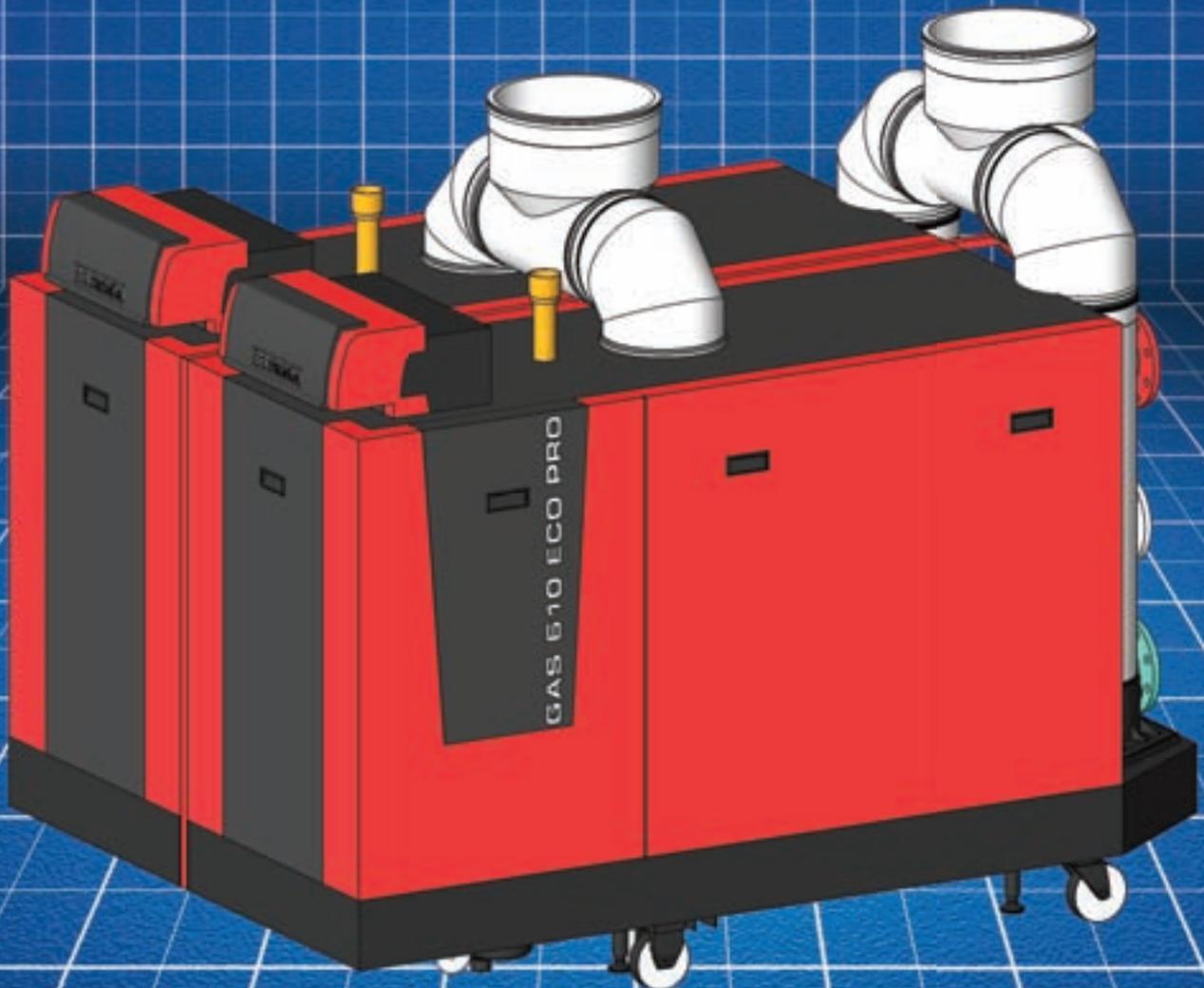
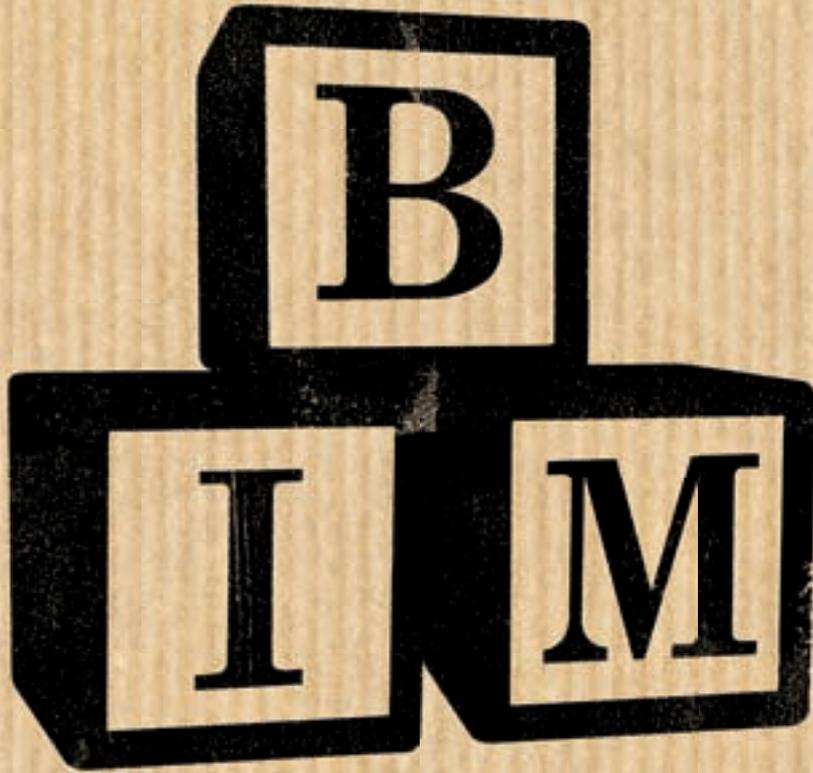


REMEHA COLLABORATING WITH BIM





Designing buildings isn't as easy as ABC. It's as easy as BIM.

We understand the day-to-day pressures of construction. The deadline squeezing. The rising operation costs. The ever-changing regulations. That's why we're always looking for ways to make planning for the future as easy as ABC. And why we now offer BIM files on all our condensing boilers. Available to download free from our website, these files will ensure your drawings are accurate, up to date and completely sharable. Not only do BIM files ensure our boilers fit perfectly into your plans, they provide essential asset data such as heat outputs, emissions and sizes to help you stay out of trouble. The result? Reduced construction times and costs. And less time on the naughty step. To find out more call **0118 978 3434** or visit **remeha.co.uk**

It's a wonderful world, let's keep it that way.

 **remeha**

commercial

Editorial

Editor: Alex Smith
Tel: 01223 273520
Email: asmith@cibsejournal.com

Senior reporter: Liza Young
Tel: 01223 273529
Email: lyoung@cibsejournal.com

Designer: James Baldwin
Technical editor: Tim Dwyer

Advertisement sales

Sales manager: Jim Folley
Tel: 020 7324 2786, jim.folley@redactive.co.uk

Sales executive: Darren Hale
Tel: 020 7880 6206,
darren.hale@redactive.co.uk

Sales executive: Patrick Lynn
Tel: 020 7880 7614,
patrick.lynn@redactive.co.uk

Senior sales executive: Paul Wade
Tel: 020 7880 6212,
paul.wade@redactive.co.uk

Advertising production: Jane Easterman
Tel: 020 7880 6248,
jane.easterman@redactive.co.uk

Advertising production: Jane Easterman
Tel: 020 7880 6248,
jane.easterman@redactive.co.uk

Advertising production: Jane Easterman
Tel: 020 7880 6248,
jane.easterman@redactive.co.uk

For CIBSE

Publishing officer: Neil Walsh
Tel: 020 8772 3696, nwalsh@cibse.org
Publishing co-ordinator: Nicola Hurley
Tel: 020 8772 3697, nhurley@cibse.org

Editorial advisory panel

George Adams, engineering director,
Spie Matthew Hall

Patrick Conaghan, partner, Hoare Lea
Consulting Engineers

Rowan Crowley, director, einsidetrack

James Fisher, e3 consultant, FlaktWoods

David Hughes, consultant

Philip King, director, Hilson Moran

Nick Mead, group technical director,
Imtech Technical Services

Jonathan Page, building services consultant
engineer, MLM

Dave Pitman, director, Arup

Christopher Pountney, senior engineer,
Aecom

Alan Tulla, independent lighting consultant

Ged Tyrrell, managing director,
Tyrrell Systems

Hannah Williams, mechanical engineer, Atkins

Ant Wilson, director, Aecom

Terry Wyatt, consultant to Hoare Lea

Editorial copy deadline: First day of the month
preceding the publication month

Printed by: Warners Midlands PLC

The opinions expressed in editorial material do not necessarily represent the views of the Chartered Institution of Building Services Engineers (CIBSE). Unless specifically stated, goods or services mentioned in editorial or advertisements are not formally endorsed by CIBSE, which does not guarantee or endorse or accept any liability for any goods and/or services featured in this publication.

CIBSE, 222 Balham High Road, London SW12 9BS
Tel: +44 (0) 20 8675 5211, www.cibse.org
©CIBSE Services Ltd. ISSN 1759-846X

Subscription enquiries

If you are not a CIBSE member but would like to receive CIBSE Journal, subscribe now! Costs are £80 (UK) and £100 (international). For subscription enquiries, and any change of address information, please contact Neil Walsh at nwalsh@cibse.org or telephone +44 (0)20 8772 3696. Individual copies are also available at a cost of £7 per copy plus postage.

The 2013 US annual subscription price is £100. Airfreight and mailing in the US by Air Business, C/O Worldnet Shipping NY Inc, C/O Air Business Ltd / 155-11 146th Street, Jamaica, New York, NY 11434. Periodical postage pending at Jamaica NY 11431. US Postmaster: Send address changes to CIBSE Journal, C/O Air Business Ltd / 155-11 146th Street, Jamaica, New York, NY 11434.

Tangible assets

BIM doesn't have to be difficult. The proliferation of task groups, software and BIM jargon may make it seem impenetrable at times, but strip away the terminology and it's essentially straightforward. It's about sharing information through the supply chain to enable the efficient delivery and operation of buildings.

By 2016 central government contracts will have to be procured through Level 2 BIM. That may sound daunting, but the level of complexity required should not be beyond the capabilities of anyone working in the industry today. It means that information about building components and systems will have to be standardised and shared between collaborators. It's information that already exists, and can be shared via spreadsheets. CIBSE is among those working on the simplification of the process. It is creating standardised product templates for M&E components. This is a collaborative effort and CIBSE is calling on other groups to help populate the product data templates. Icom is one body that recently backed the open data approach (page 7).

The information attached to assets will enable facilities managers to operate buildings properly and close the performance gap. In our interview on page 13 Geoff Prudence, head of CIBSE Facilities Management Group, believes the philosophy of BIM and asset management could be retrofitted, giving it enormous potential to improve the energy performance of our existing stock.

Alex Smith, editor
asmith@cibsejournal.com



Why information is BIM

As one of the first heating manufacturers to embrace Building Information Modelling, Remeha Commercial is delighted to sponsor this month's supplement on the new collaborative approach to constructing and maintaining buildings. The benefits resulting from using BIM are undeniable: time and cost savings, greater efficiency, increased value and improved productivity at the design stage, matched by improved performance efficiencies, reduced carbon emissions and further savings in maintenance and operation throughout the operational life of the building.

It is the information contained within a BIM file that makes it

more than a 3D model; accurate, relevant, regularly-updated, digital data that will save architects, specifiers and facilities managers valuable time in research, encourage smarter design, and facilitate potential changes and updates to the project.

Undoubtedly, there is a learning curve ahead of us all, with more work still required to standardise templates and software if we are to ensure a uniformly high level of service. However, on the upside, it is encouraging to see from the 2014 NBS National BIM Report that the majority of our industry has now adopted BIM, using it for at least one project in the last year – evidence of a steep upward trend ahead of

CONTENTS

04 GAME ON

How industry is gearing up for mandatory BIM

07 NEWS

Human BIM, new survey and award opportunity

08 KEEPING IT REAL

Developing a model for real-time BIM at the Co-op's headquarters

12 THE FACE OF FM

Geoff Prudence on why the success of BIM depends on facilities managers

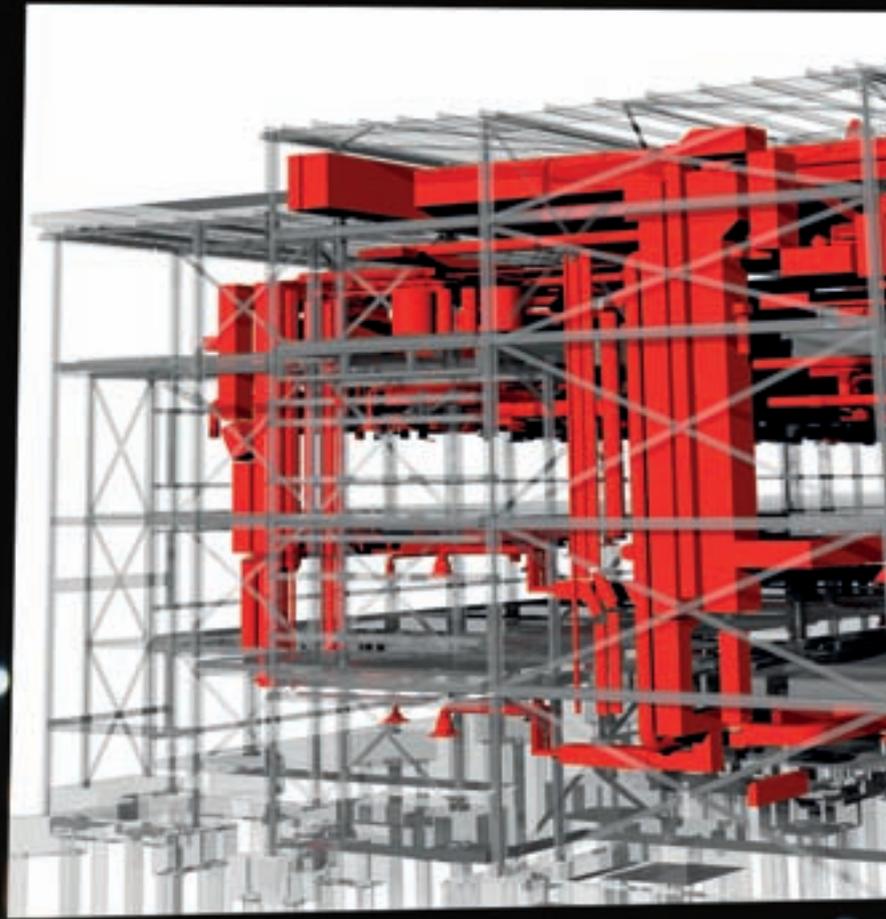
17 BIN THE CATALOGUES

How product data templates will simplify collation of BIM-ready data



the 2016 government mandate that is supported by Remeha's own research. With increased support now available for those professionals switching to working in the BIM environment, this exciting – if challenging – time for the building services industry is surely one to be welcomed as a means of improving one of the long-standing issues of our industry – efficiencies in construction.

Chris Meir is national sales manager
at Remeha Commercial
Twitter: @RemehaUK;



GAME ON

Engineers need to stop tying themselves up in knots about BIM and simply start playing, writes **Ewen Rose**

What do 3D computer games and building information modelling (BIM) have in common? Apparently, they are understood intuitively by teenagers.

Experts are urging engineers to 'see' the world, and visualise information, the way a teenage gamer would because – while the building services industry ties itself in knots about the legal implications, who owns the BIM model, and how to reform the supply chain – 'Generation Y' is just getting on with it.

Teenagers 'get' BIM, and don't see the barriers that hinder adoption and paralyse decision-making at the corporate level. Alison Watson – founder of the Class of Your Own education initiative that is transforming the way

engineering is taught in secondary schools – puts modelling of buildings in the hands of 11-year-olds, and believes companies could take on teenage BIM trainers. 'These kids are not fazed by technology,' she says. 'If you are looking for BIM training, I have a group of 14-year-olds who could really help you out.'

Agility

Watson recently had to explain to the judging panel of an international architectural competition that the team to which it had just awarded top prize was made up of 13-year-old schoolchildren from Tauheedul Islamic Boys' High School. The team members were duly flown to the US to accept their award.

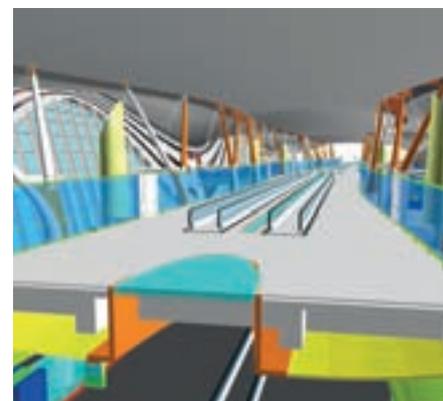
This new generation – tethered to gaming

technology and 24-hour communications tools – have the mental agility and perspective to work in BIM geometry, claims Watson, and they would find it odd to design in any other way.

It is not just the younger generation adopting a gung-ho, 'let's just do it' approach, however: the mechanical and electrical (M&E) delivery team at Balfour Beatty Engineering Services adopted BIM part way through the construction of the Terminal 2B building at London Heathrow airport. The complexity of the scheme – and the inherent problems of working 'air side' – meant they could see immediate benefits in 'virtual' design, linked to off-site construction, to speed up the schedule and cut costs, even though the project was already well advanced. They dragged the supply chain with them, giving additional training, on the job, to specialist suppliers.

This is far from the conventional wisdom of how BIM should be introduced, which urges supply chains to work together from concept

LEVEL 3



What we don't need is anyone trying to sell us a proprietary system that locks users out or presents information in a confusing way – Mike Holding

design stage – and get all their ducks in a row – before initiating the BIM process. However, it demonstrates that companies with sufficient clout are going to make it happen, because they recognise the financial and practical benefits.

'A lot of people are confused about BIM – and many see it as a negative development – but, basically, it is about efficient processes and everyone can benefit. It is an opportunity to stop wasting money on construction,' says Mark Tindall, ex-CEO of software provider Amtech.

'And it is about software. I don't know why people keep saying it isn't. The software is the tool that will make it happen, and we need to get the technical building blocks right.'

Those building blocks include the way in which manufacturers will be expected to deliver their product information. The CIBSE BIM steering group is now making significant progress on this, with the development of standardised product data templates (PDTs).

Arup's Carl Collins and Hoare Lea's Richard Vincent are touring the country, encouraging manufacturers to present their information in this common format. The products are represented by their digital geometry – so they can be imported into 3D models – but more basic information about weights, sizes and general dimensions is represented, too.

'Manufacturers have been champing at the bit to get on with this,' says Paul Marsden, specification sales manager at Baxi Commercial. 'It is with some relief that we are finally seeing some real progress.'

He points out that the government's 2016 deadline for the use of Level 2 BIM on all centrally procured projects was 'just round the corner', but adds that this 'does not demand anything the industry is not perfectly capable of delivering'.

'The level 2 BIM model is designed to provide basic information about sizes, weights, and

dimensions of services equipment,' he says.

Marsden warns against allowing the process to be dictated by 'computer geeks and software vendors', however.

'It is important that contractors are not intimidated by this process – they are all perfectly capable of working in a Level 2 BIM framework,' he says. 'Our most pressing task is to collate information from existing documents and drawings, so that it can be presented in a standard format and in a place where it can be shared with all members of the supply chain.'

Easy access

Much of this information can be extracted from existing spreadsheets without the need for expensive software upgrades or training – and, of course, product information is already gathered through the Construction Operations Building Information Exchange (COBie).

However, PDTs are designed to be far simpler than COBie, and easier to access in an 'open', non-proprietary framework, using a basic spreadsheet format. PDTs include everything that is not in the project design model. The idea is that they remain separate, and the design team brings them together when required; they also remain the property of the manufacturer, but are hosted in a central database, such as the

6 If you are looking for BIM training, I have a group of 14-year-olds who could really help you out – Alison Watson



➤ CIBSE Knowledge Portal (see page 17 for more on PDTs).

Collins and Vincent have identified more than 150 templates to cover frequently deployed products. ‘Some manufacturers are hard to reach – they are numerous and some are disengaged. Some contractors are not on board, and some disciplines have yet to adopt BIM,’ says Collins. ‘CIBSE is not trying to do this on its own. It is already working with several other professional bodies, manufacturers’ groups and contractors.’

Some manufacturers were initially nervous about committing to something they feared would change (again), but now most recognise that ‘this is the direction of travel, and that we are asking for information they already have,’ Collins told the Crystal Clear BIM conference, organised by Amtech.

The process to produce the PDTs is being sponsored by the CIBSE Patrons, because members see these as crucial to getting BIM for building services off the ground. Patrons chairman David Fitzpatrick described it as ‘absolutely fundamental to everything we are trying to achieve in terms of digital working, and in improving supply chain collaboration’.

However, there is still confusion out there – it has taken some time even to get to this early stage, and this has made some suppliers suspicious of the whole process. ‘There has been quite a bit of mis-information around BIM,’ says Mike Holding, managing director of Dunham-Bush. ‘I think it has been pushed too hard in some quarters. The important thing is

not to panic. Reputable manufacturers have all the information required to populate the Level 2 templates already – we just need a clear and standard system for doing it, so that anyone can access the information. What we don’t need is anyone trying to sell us a proprietary system that locks users out, or presents information in a confusing way.’

The government seems happy to get what it needs from COBie, and to leave industry sectors developing their own resources to ensure they can deliver their part of the process. The PDTs will, therefore, become an invaluable library of product data for designers.

The introduction of Government Soft Landings (GSL) – which aims more closely to match predicted and

actual building performance – will make information about how to operate buildings even more critical, according to Rob Manning, a former CIBSE president, and now a member of the BIM team at the Department for Business Innovation & Skills (BIS). He told the Crystal Clear conference that the new specification PAS 1192-3 – which defines the operation of buildings – will be ‘the means for receiving information so that it is simple to access, and not the same mess as O&M [operating & maintenance] manuals’. (See interview with Geoff Prudence on page 12).

The Technology Strategy Board (TSB), which provides funding for innovation, is paying for the development of a national classification system and digital plan of works, to underpin BIM and GSL. This will require the industry to provide information in a specified format.

‘The industry might not like it, but the government is creating the demand, and the industry will have to respond,’ says Manning. ‘This work will complete the jigsaw puzzle for delivering Level 2 BIM.’

CIBSE is leading a consortium of professional bodies, which is being supported by the TSB.

So why is the government so determined to impose BIM? Because reform is in the air – and BIM is a means to a bigger end. Without BIM, it is hard to see the government delivering its 2025 Construction Strategy, which requires a 33% cost reduction in both the construction and operation of buildings, projects delivered 50% faster, and with 50% fewer carbon emissions.

‘There is a feeling that construction has resisted being reformed for so long, but it is not going to get away with it this time,’ said CIBSE technical director, Hywel Davies. ‘BIS wants a modern, information-driven industry, and BIM is the Trojan horse to deliver that change.’

The perceived wisdom is that 80% of a building’s value is realised during its operational lifetime, but the industry’s focus remains on the 10% involved in the construction phase. That has to change, and you have to start somewhere, says Simon Carter, of NG Bailey, who is bid manager for Bailey’s facilities services division. ‘The most significant benefits from BIM will be long-term and post-install, but it is appropriate that BIM is being driven by the designers and installers. If systems are not correctly installed, we can’t maintain them.’

So, we should get to Level 2 in the BIM game fairly easily – but then the fun really starts, because Level 3 is a whole new world, in which building operators get access to massive amounts of virtual data. Of course, by then, the teenagers will already be on Level 4. 🎮

MODEL TEACHER JOINS CLASS OF YOUR OWN

Arup has created a human BIM model that will inspire the next generation of engineers, writes **Alex Smith**

A human form modelled in BIM software is to join the teaching staff of a school taking part in the Class of Your Own education scheme.

The 3D model – nicknamed Project_Ove – attempts to relate organs of the human body to building services, using BIM. It was developed by Arup as part of a submission to an Autodesk conference.

As well as a full structural skeleton, Arup's artificial body has data-rich mechanical, electrical and plumbing (MEP) systems, which are capable of automatically calculating required loads, outputs, duct and pipe sizing, acoustic criteria and so on.

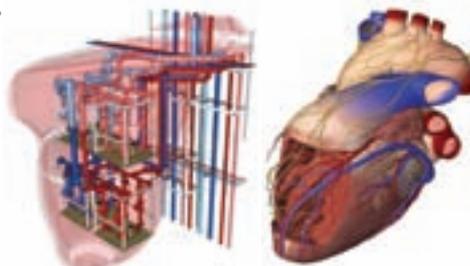
Casey Rutland, associate director & BIM specialist at Arup Associates, said: 'It's our crash test dummy. We can see how components perform individually, and how they relate to the rest of the building. It's helping us to close the performance gap.'

The model is based on the Gherkin, in London, but there is no plan to build it for real (although a Disney vice-president has attended one presentation). As an exercise for Arup's cost team, though, the total construction price was calculated at £363 m. 'It's not a terribly efficient shape,' conceded Rutland.

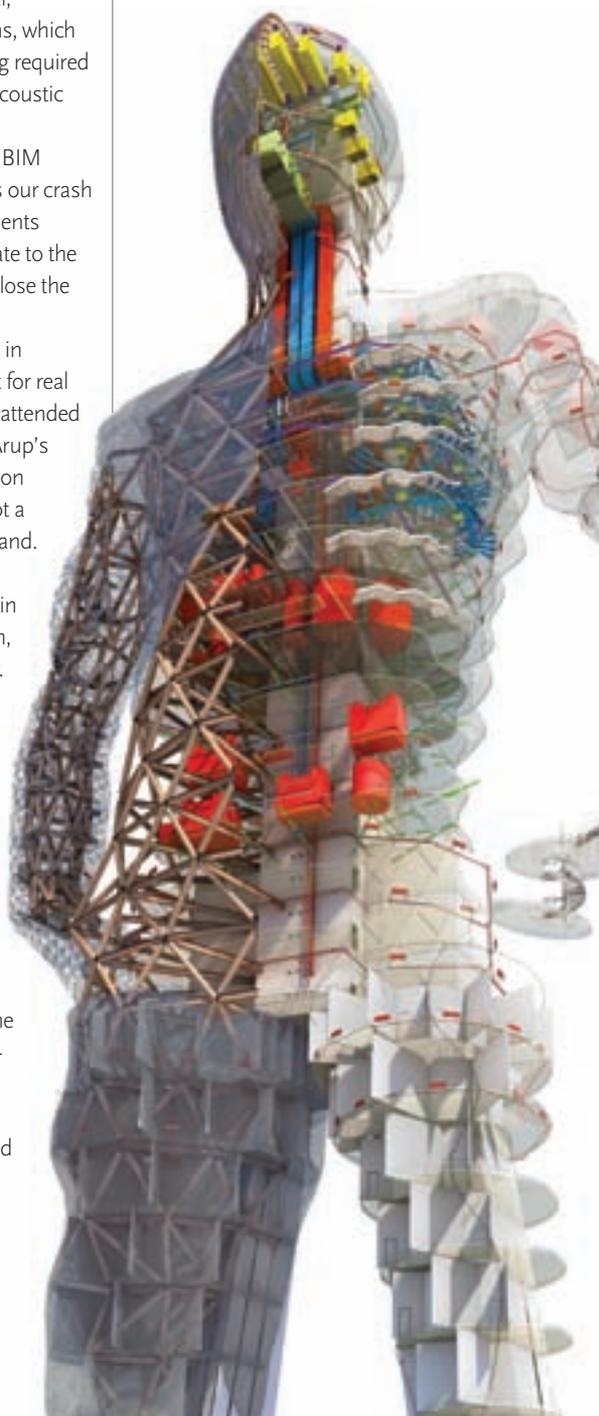
The BIM model – which contains offices, social space, and a datacentre in the brain – does have a virtual function, however, as a 24-hour research facility. The HVAC system represents the lungs, the pump system the heart and circulatory system, and the electrical system the nerves.

Casey says the model has enabled Arup to improve workflows around BIM, and various Arup groups have been involved in the project, including fire engineers who looked at smoke movement, and the vertical transportation team, which ensured the two lifts are workable, even at an eight-degree incline through one of the legs.

The model's data is intended to be open to all, said Rutland, who revealed that Project_Ove would be used as a teaching aid at a school Arup is sponsoring as part of Class of Your Own. 



The organs of the human body relate to different aspects of building services in Arup's Project_Ove model



Icom adopts PDTs for non-domestic heating products

The Industrial and Commercial Energy Association (Icom) has created a BIM Working Group to oversee the creation of product data templates (PDTs) for the non-domestic heating industry.

The working group will collaborate with CIBSE, which has developed the PDT concept. PDTs provide manufacturers with a standard product 'questionnaire' that has to be completed only once for each product.

Icom director Ross Anderson said: 'By working with CIBSE on this project, we are able to take advantage of the PDT concept, and make it relatively easy and straightforward for members to meet this growing requirement.'

CIBSE predicts that more than 190 PDTs will be required to cover the most commonly used MEP products.

PDTs are written in a simple spreadsheet format, and include all general, product-specific questions in COBie UK 2012, so that most COBie spreadsheets for products can be automated. (See page 17).

BIM Survey now live

The third CIBSE Annual BIM Survey is now online at <http://cibse.polladdy.com/s/bim2014>. This quick-to-answer survey will help the work of CIBSE, and provide evidence of the industry's real needs. This can then be used to inform government and other organisations, to help guide future BIM policy and the development of resources.

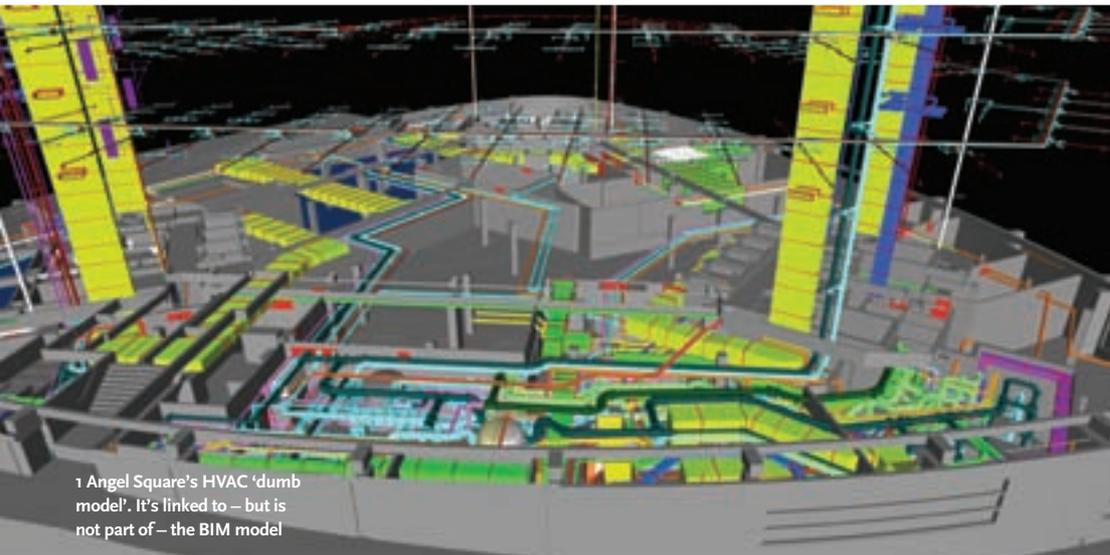
This year's survey has been augmented by input from the CIBSE Facilities Management Group because, increasingly, the value of BIM is seen in building operation, as well as design, procurement and construction.

Whether you actively use BIM or are still to embark on the road to BIM, please take a few minutes to complete this survey to ensure it can reflect the experiences and desires of the industry.

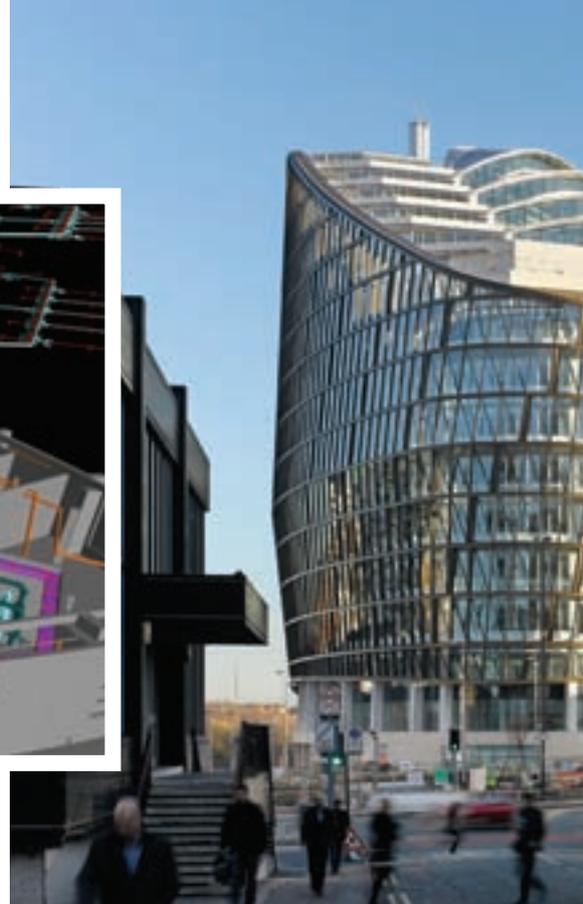
For more information on BIM, visit www.BIMtalk.co.uk

Call for BIM entries

The industry's best BIM projects will be eligible to enter CIBSE's 2015 Building Performance Awards. The Collaborative Working Partnership award rewards integrated processes that deliver comfortable, sustainable, low carbon, energy-efficient buildings that satisfy the needs of organisations and the people who use them. The awards are open for entries between 2 June and 11 September 2014. More information at www.cibse.org/bpa



1 Angel Square's HVAC 'dumb model'. It's linked to – but is not part of – the BIM model



Bolt-on performance

If building performance can be bolted onto BIM, facilities managers will have a powerful tool for monitoring energy use. **Tristan Gerrish's** research project is attempting to achieve just this at Co-op's headquarters in Manchester

Understanding exactly what building information modelling (BIM) is, or means, is one of the main challenges facing the construction engineering industry. However, it is at least agreed that implementing BIM will mean changes to all aspects of engineering design. One area that has the potential to benefit from it is the management of building performance.

Accurately predicting how much energy your building is going to use can be difficult – occupants are not predictable, build quality isn't constant, and services are not infallible. This is where BIM can help in managing the vast amount of performance-related data created during design, and generated throughout occupation.

Facilities management (FM) tools for monitoring and managing building operations are beginning to integrate BIM into their solutions. These tools mainly focus on the recording of asset information and spatial data within a BIM model, to populate a proprietary maintenance management system. Some are beginning to integrate building performance

alongside this, but none fully integrate energy performance data alongside the objects they represent in the BIM model.

Background

Completed at the end of 2012, 1 Angel Square forms the centrepiece of Noma, an £800m, mixed-use development scheme in Manchester. The flagship building houses the Co-op Group's new headquarters, and boasts the highest ever BREEAM new-build office rating (95.16%). However, hitting a one-off target does not necessarily mean the building will continue to operate at a high level during its life-cycle.

After the completion of 1 Angel Square, Buro Happold had lots of information – and a high-performance office building – but no way of using this information effectively to manage the high levels of performance expected of such a project. So, in conjunction with Loughborough University, the firm is looking at how best to use the information generated through design, and the extensive monitoring of in-use performance to maintain and improve the building throughout its continuous commissioning.

Using data we already have

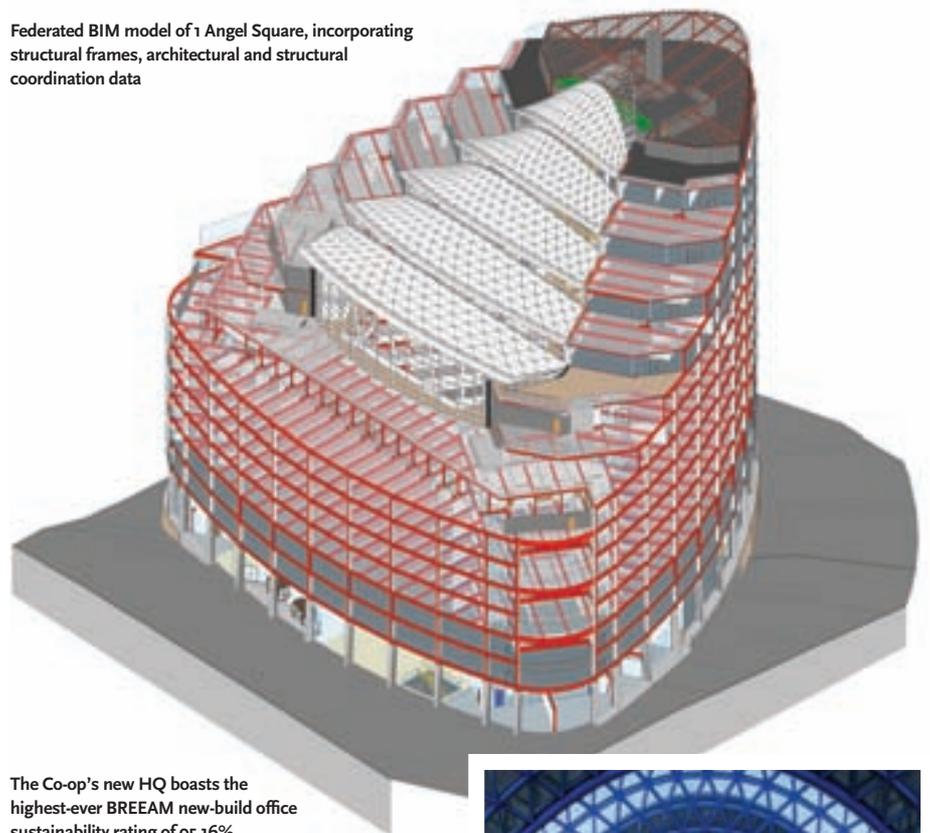
With BIM, information describing a building can be linked to its relevant systems – or even embedded within the model itself – to populate an information repository. The aim of the research, by Buro Happold and Loughborough University, is to link these disparate sets of data, to facilitate the creation of an intelligent BIM model linked to the fundamental make-up and performance of a building.

Current work is based on getting together the sum total of information related to the building's design, and putting it in a common format. This entails stripping the BIM model down to its relevant parts – the coordinated model reached 300Mb, meaning quickly navigating it becomes impossible – ready to attribute building performance data.

Alongside the BIM model, the as-built energy model is also being redeveloped to closely match actual operations, and to provide the 'theoretical baseline' to which actual performance can be assessed – including HVAC equipment-level performance



Federated BIM model of 1 Angel Square, incorporating structural frames, architectural and structural coordination data



The Co-op's new HQ boasts the highest-ever BREEAM new-build office sustainability rating of 95.16%



predictions – and calibrated to actual building operation. The output from this model will be compared with recorded performance from the building's 3,000 sensors, which will monitor everything from space temperature and CO₂ levels, to air pressure within riser ductwork.

The performance gap present in 1 Angel Square can be viewed from these data sets. Upon calibration of the energy performance model, these two data sets will be ready for the next phase in this project – attribution to a BIM environment.

Using that data intelligently

Studies looking at predicted/actual building performance are common, but none have been based around a BIM model for their calibration and use in reducing the apparent performance gap. Equipment faults contribute to the performance gap, and many faults cannot be

predicted. However, the effects of deteriorating equipment can be, using extensive monitoring systems and means of determining how the building should perform. In this case, maintenance may move from reactive to preventive, reducing equipment downtime and preventing unnecessary additional problems because of this.

Managing such a large amount of data is difficult when using the conventional methods of O&M manuals, Excel tables and unsorted pdfs, referring to the relevant systems outputting performance data. In attributing this information to objects within a BIM environment, the maintenance and monitoring of the building can be much more effective, and linked to additional relevant documentation.

Preliminary findings

Given the early stages of this project, technical findings are limited. However, several interesting points on how BIM is currently being used have been found.

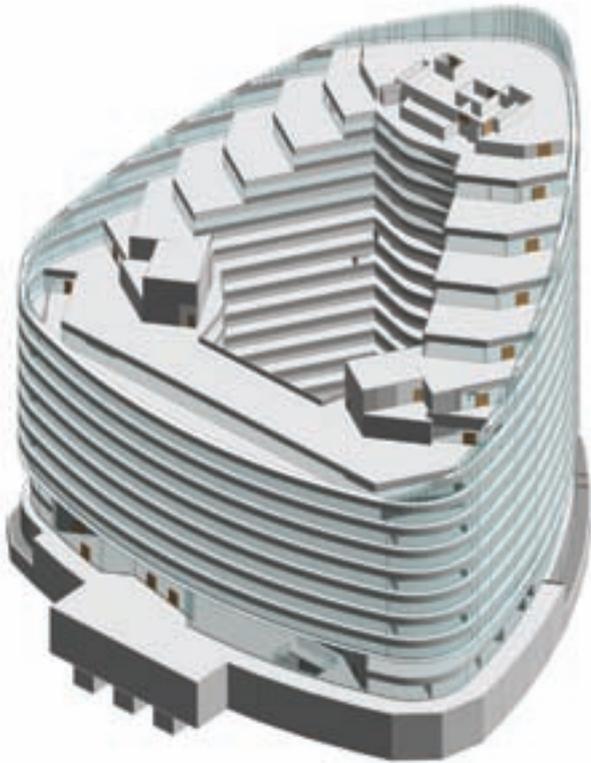
Lack of information transfer

Coordination breaks down when a certain aspect of design cannot be completed using current BIM tools. In some cases, workarounds may be present, but often systems are designed in the traditional way, using 2D CAD, and merely referenced in the BIM model. In this way, intelligent data attribution isn't possible,

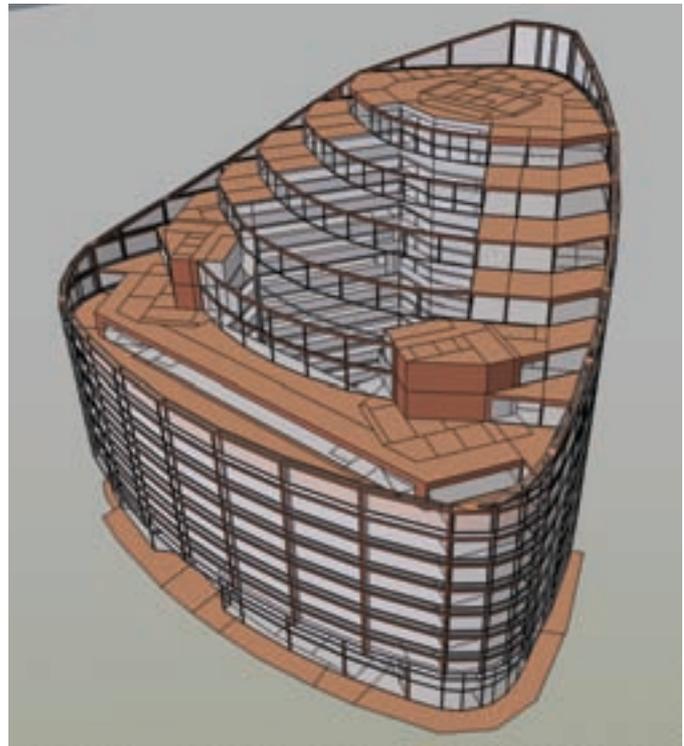
Facts and figures

1 Angel Square

- Buro Happold services: structural engineering, services, fire engineering, IT communications & control, safe & secure, lighting, façades, computational analysis, geotechnical
- 320,000ft² high-quality office space
- BREEAM Outstanding, achieving the highest interim score of 92.25% under BREEAM Offices 2008
- Use of BIM to coordinate the structural engineering, architecture and building services
- Combined heat and power energy system, using Co-op-grown rape-seed oil
- Extensive BMS space monitoring and equipment sensor network



Simplified BIM model, which is ready for performance-data attribution



As-built energy model of 1 Angel Square, including detailed HVAC network and BMS conditions monitoring climate control

Early agreement on the extent to which BIM will be used on a project is essential to everyone understanding what is required of them

resulting in inaccurate, fragmented models as each constituent is updated separately. With energy modelling, this is even more visible. BIM authoring tools, such as Revit, are beginning to include some energy analysis capabilities. For more comprehensive simulations, dedicated simulation tools must be used. However, moving information from one to the other can be difficult. Strict modelling processes must be followed for this to be possible and, even then, geometry intersections and zero-area zones can mean rebuilding the model would be faster.

BIM capability

Early outputs from this research have been input-led into the BIM implementation scheme for Buro Happold, but are also applicable to other engineering firms.

Some contributors to design are not capable of producing information ready for input into the shared model. Whether because of the technological limitations previously described – or a lack of investment in training for staff – it is likely that some parties involved in building design may be less capable than others.

BIM capability is limited by the least capable stakeholder in the design process – inside and outside of the organisation – and there is only one way to overcome this; commitment to a standard of practice at the outset of a project.

Early agreement on the extent to which BIM will be used on a project is essential to everyone understanding what is required of them, and to

the impact their reluctance to comply will have on the project.

Effort must be made by everyone to meet a certain standard of modelling. By doing so, a ready-made package – containing all relevant information – can be fed into the O&M manuals upon design completion, greatly reducing the effort in preparing these.

Conclusion

Uniformity in BIM adoption can support a reduction in errors, and enable development to be recorded in a logical manner. When it comes to implementing new technologies and processes, uniformity enables each organisation or individual to see what they need to do, and how to do it – and the same goes for BIM adoption.

The whole-building, shared BIM model may never fully exist; however, the benefits of such a model are what we strive to achieve – reducing the effort required to engineer effectively, and making best possible use of the information we already have. Moreover, by using this information, buildings can – and will – be operated far more effectively.

Further details on this research can be found at www.lboro.ac.uk/research/cice/current-research-engineers/tristan-gerrish.html

TRISTAN GERRISH is a research engineer within Buro Happold's building services team, Leeds. tristan.gerrish@burohappold.com

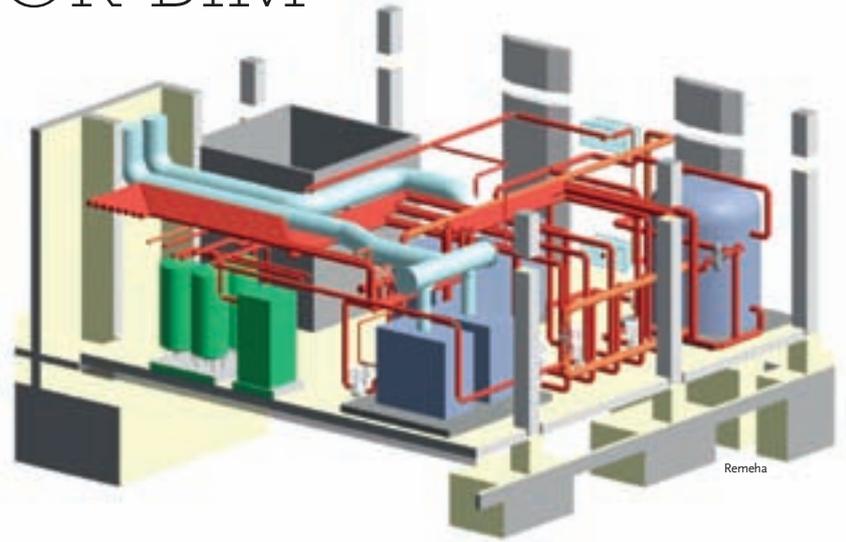
How real-time BIM could work

Integrated fault finding/fixing work flow

1. Problem reported by automated system, monitoring actual performance against expected
2. Areas impacted by this problem shown in BIM model – also highlighting potential services causing the problem
3. Work order generated to investigate/ solve fault, using BIM model to supply relevant equipment data/maintenance procedures/supplier contact information
4. Indicated services checked and fixed

PREPARING FOR BIM

From 2016, Level 2 Building Image Modelling (BIM) will be mandatory for all UK public sector projects over £5million with the government anticipating a reduction in capital building costs of 20 per cent and a similar drop in carbon emissions. Heating manufacturer Remeha Commercial is ahead of the curve.



Collaborating for greater efficiency

BIM is more than a digital 3D model or a piece of software; it is a whole new way of working. Collaboration is its key premise between architects, specifiers and manufacturers throughout the entire lifecycle of an asset. Through BIM, all members of the project team can insert, extract, update or modify information at different phases in the facility's lifecycle to support and reflect the roles of that discipline or manufacturer. This collaborative use of interoperable, evolving, open and shareable asset data creates a source of information that promotes greater efficiency, increased value and improved productivity throughout the project, from the design process to the

BIM – the benefits

For the construction team:

- Efficiency and time savings throughout the project
- Cost and waste savings – e.g. clash detection
- Improved supply chain collaboration – robust data
- More predictable project outcome

For the end user:

- Easier visualisation of finished asset
- More reliable budget and programme
- Asset register (planned maintenance)
- Robust O&M data – future alteration or change of use

long-term operation and maintenance of a building.

Remeha BIM Library

As a leading heating manufacturer, Remeha Commercial was one of the first to embrace the level of design required by BIM. However, with no template available as yet to act as a guideline, Remeha found it had, in effect, to create its own standard. Remeha began by carrying out research with its customers to identify and evaluate the level of information needed on their Level 2 and Level 3 projects before creating the Remeha BIM library. The test phase followed, again conducted with its customers.

Once assured of the quality of its BIM service, its content and ease of accessibility via the company website, Remeha launched its BIM library to the industry.

Increased accuracy

The Remeha BIM library consists of digital 3D REVIT files containing a wealth of valuable data from the shape, size and weight of the product to the heat outputs, carbon and NOx emissions, service and maintenance areas, and maintenance schedules. Remeha BIM files are regularly updated, providing architects, specifiers and FM managers with accurate and reliable information that will save valuable time in research, facilitate potential changes, promote smarter design and increase productivity. Similar to a CAD block, they can be inserted directly into the design. Providing

all the relevant, product-specific data, they enable pipework runs, flues and pumps to be sized and drawn with little input from the design engineer, saving time and costs, offering increased accuracy and simplifying future maintenance.

Benefits now

The number of customers registering for Remeha BIM files is high and growing exponentially, demonstrating an increased interest, awareness and use of BIM by the industry in projects ahead of 2016. With the Government incentive, ever-improving software, and increased support in the form of courses and best practice

guidance, now is the time to take the leap into BIM.

The full Remeha BIM library of its condensing and 'super condensing' boilers is available for free download from the company website: www.remeha.co.uk. For further information, call us on: 0118 978 3434

Remeha families are very good and usable, with the correct and relevant level of detail supported by equally good contact and communication with the local and national representatives – Andy Bishop, associate at Hoare Lea

remeha
commercial

For further information please visit our website at www.remeha.co.uk or call 0118 978 3434

THE FACE



OF FFM

Could BIM be the catalyst for more joined-up thinking between design and construction, and operation and maintenance? Yes, says CIBSE Facilities Management Group chair Geoff Prudence, as **Andrew Brister** reports

G Geoff Prudence CEng FCIBSE is passionate about what he does. For the 25-plus years he has been working in the facilities management (FM) industry he has been promoting the vital role it plays in building services engineering. As chair of CIBSE Facilities Management Group, he feels strongly that FM professionals should be involved at the earliest stages of a building's design, so that the best possible operational efficiencies can be achieved over its life-cycle. After all, who knows better than the facilities team about the costs and effectiveness of different maintenance strategies, and the effect that system choice has on these?

Could the industry's move towards all things BIM be the driver for change that will help bring about Prudence's vision? 'My take on it is that, yes, BIM will bring about more effective design and more effective construction, but the real opportunity – and what will prove to be the success of BIM – will be in terms of real end-to-end life-cycle considerations and information flow,' argues Prudence.

Certainly, there seems to be a realisation among clients that something has been missing in the design and construct cycle. Too often, buildings are just handed over, and information about running the shiny new asset is an afterthought. As well as involvement in the CIBSE Facilities Management and CIBSE BIM groups, Prudence chairs the pan-industry BIM4FM Task Group, which is making sure the needs of the profession, and clients, are represented in the drive towards BIM. 'We are trying to ensure that the information we should be feeding into BIM is what the FM industry needs, and what is needed for the operational life-cycle over a 30-60-year timeframe,' he says. 'Let's agree what standard

classifications are required for plant items, and what maintenance requirements are needed, to assist the process.'

BIM4FM is well placed to do this because it enjoys representation from all the trade associations and institutions with an interest in FM, including CIBSE, the Chartered Institute of Building, the Royal Institution of Chartered Surveyors, Building Futures Group, and the British Institute of Facilities Management.

'It has been said that the acronym BIM should stand for building information management, not modelling, because that's what it's really about. And the 'building' is the growing of the data, rather than the physical building,' says Prudence.

With Government Soft Landings being mandated alongside BIM in 2016, this is clearly a

“ People in FM need to wake up to BIM, realise there is an attraction, and get engaged – if you don't get involved, you don't deserve a seat at the table

good time to be in FM. 'I'm a great supporter of BIM,' Prudence says. 'There's a lot of good work being done, and the interest has grown exponentially in the past three to four years. Like all things, it needs grounding, and embedding. People are hungry for case studies and the like, so they can see the reality.' Prudence, and the CIBSE FM Group and BIM4FM, will be doing just this, providing snapshots of where BIM is starting to work, and signposting best practice. 'We need to encourage people in the FM world to wake up to it, realise there is an attraction, and get engaged – because, if you don't get involved, you don't deserve a seat at the table,' says Prudence.

The next stage is to try to engage with the computer-aided facilities management (CAFM) sector – and, indeed, the wider construction software providers. 'Standardisation comes up time and again,' says Prudence. 'How will we make it work? One of the misconceptions out there is that it's about selling software to create the model. You need to decide what you want to achieve, and then automate it through software. The software should not be the driver – it should be the enabler.'

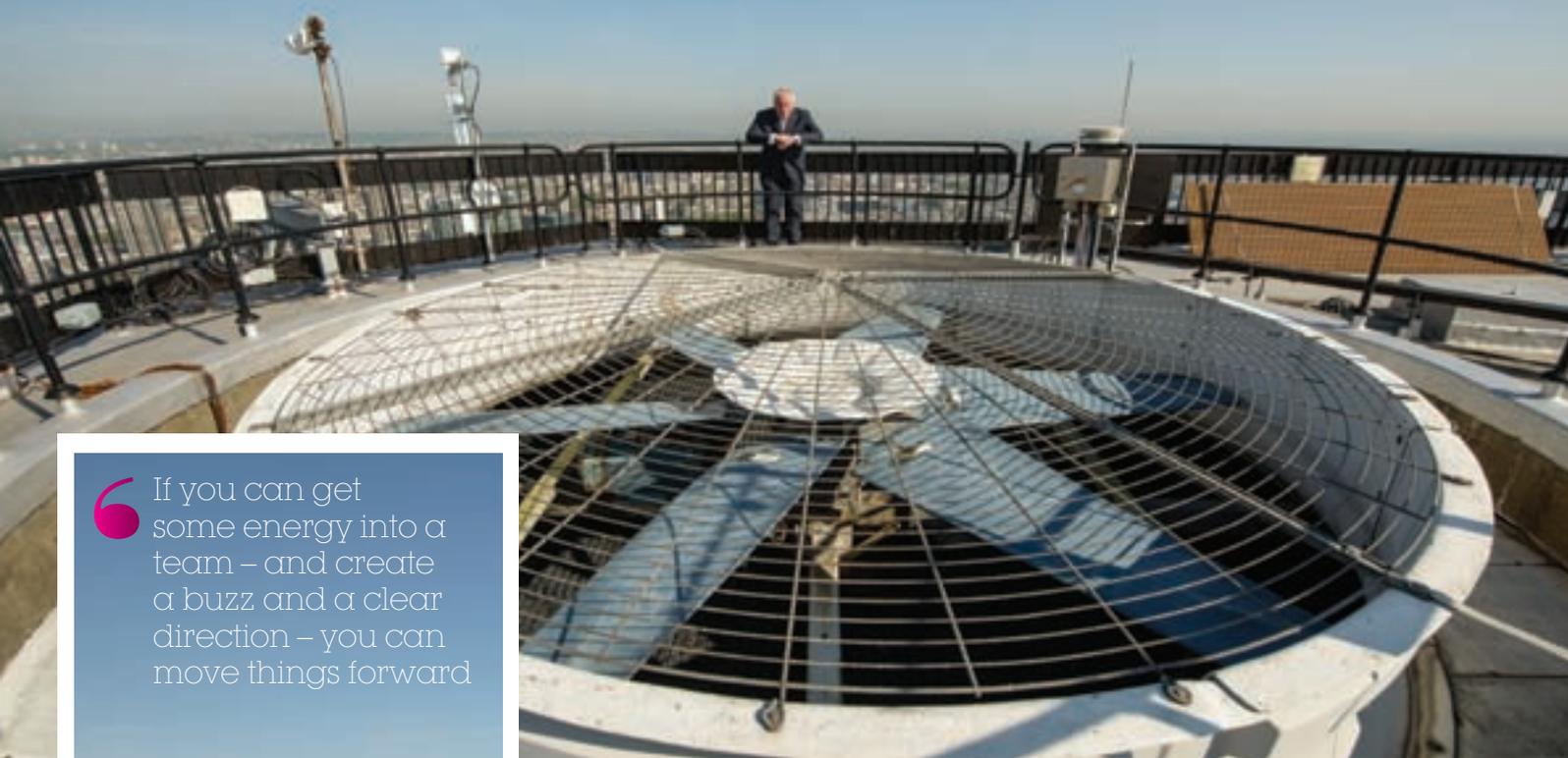
Prudence thinks there are two big questions that need to be asked about BIM: who pays for it, and what about existing buildings? 'Eighty per cent of buildings that will be in use by 2050 are already there,' he says. 'I believe that retrofitting buildings using the BIM philosophy will help, and the private sector will adopt BIM to drive better decision-making, and take better control of asset management and infrastructure – and cost efficiencies will flow, and support the use of BIM.'

Prudence feels that FM's time has finally come, after years of calling for early involvement of the sector in the design and build cycle. 'At last, we are starting to see a systems approach to thinking



IMAGES COURTESY OF SIMON VIER

The photos were taken at the top of London's Tower 42 where Prudence started his career in FM



If you can get some energy into a team – and create a buzz and a clear direction – you can move things forward



in the design process,' he says. 'You design the system against use and business impact, look for efficiencies and manage the information flow, right through to the O&M manuals.' Prudence believes that a defined, written, articulated maintenance strategy should be part of the design process, including the type of maintenance and indicative costs.

The fact that the efforts of Prudence and others are finally being recognised is down to sheer hard work. 'It's through people, like myself, getting involved, being prepared to take part in industry groups and being open to opportunities,' he says.

Prudence has been involved with CIBSE for more than 20 years, active in the FM Group since the late 90s, and group chair for the past nine years. 'Like all things, you get out of it what you put in. I value the experience, the support and the opportunity to engage with people in other practices and institutions. That's why I do it – it's a great opportunity to get involved, develop knowledge, and lead change in our industry.'

Prudence is also involved with the revision of CIBSE Guide M – the industry-recognised bestseller on building services maintenance engineering and management – which will be out later this year. With the recent publication of other key industry documentation – including PAS 1192-3, RICS' NRM 3, BS 8544: 2013 and B&ES' SFG20 – there is now comprehensive guidance and methods for managing and costing maintenance over the life-cycle of a building.

'CIBSE Guide M and the other publications allow the practitioner to bring to the table the value of engineering maintenance, a maintenance strategy, and FM,' says Prudence.

He also supports the wider work of CIBSE to bring in new members, at all levels, including IEng. 'I would encourage all sorts of people to get involved,' he says. The recruitment drive includes countries from across Europe, the Middle East and Africa: 'We will be providing guidance that tackles some of the issues from different countries and cultures.'

Prudence's career spans a wide range of sectors – including transportation, power infrastructure, finance, government, local authorities and higher education – and he's always been an advocate for change. A common thread has been engaging with people. 'If you can get some energy into a team – and create a buzz and a clear direction – you can move things forward,' he says. 'I expect a certain standard – integrity, being to time, effective delivery, and values; it's about respect for people.'

I can't help but notice his immaculate attire and highly polished shoes: 'How can you maintain an estate if you can't even maintain your shoes,' he quips. Perhaps the importance of looking sharp goes along with his infectious energy for all he does, and can also be attributed to his interest in all things Mod – from the 60s music (he plays drums in a band) to his scooter. Vespa or Lambretta? Vespa, of course. 

 To get involved with the CIBSE Facilities Management Group visit www.cibse.org/groups It will have a stand at The Facilities Show on 17-19 June at Excel London where a panel debate will be held at 10.30 am on 18 June entitled 'Facilities management: A weather report.'



LG's VRF integrated in a BIM tool

A dynamic environment relies on total dynamic system solution. Buildings have always been a vibrant dynamic entity that needed complete integration in the environment. To follow this principle LG Electronics Air Conditioning and Energy Solutions Division has decided to set up an integration into certified tools for modelling.

One such tool is eQuest®, a sophisticated, yet easy to use, freeware building energy analysis tool that analyzes building designs, confirm energy code compliance and demonstrates energy performance improvements for LEED® certification. eQUEST® uses the DOE-2 energy simulation base developed by the U.S. Department of Energy. As ANSI (ASHRAE) standards are similar to EN (European ones) but the European Union hasn't provided (yet) a BIM tool integrating EU standards and as eQuest® is a freeware, LG Electronics considered that for the moment it is suited to provide an indication analysis of LG's VRF impact on buildings through this tool.

Difference in design concept when LG's VRF is modelled in-situ

A study has been conducted on an old hospital

building being renovated into a more energy efficient one, placed in Bucharest (Romania's Capital) with an approximate footprint of 1393 m² and 5 floors with a simulation environment over a period of 8760 hours.

After the architectural design has been defined in eQuest® and all other profiles have been set to the "Default" mode for medical facilities with the incidence on healthcare and laboratory facility, the design of the various HVAC systems has been done accordingly to the following conditions and the auto-size rules of the DOE2 database:

Seasonal Thermostat Setpoint:
 $T_{COOL}=27^{\circ}\text{C}$, $T_{HEAT}=20^{\circ}\text{C}$ in occupied mode and $T_{COOL}=30^{\circ}\text{C}$, $T_{HEAT}=18^{\circ}\text{C}$ in unoccupied mode.

Design temperatures: Indoor
 $T_{COOL}=27^{\circ}\text{C}$, $T_{HEAT}=20^{\circ}\text{C}$ and Supply
 $T_{COOL}=11^{\circ}\text{C}$, $T_{HEAT}=49^{\circ}\text{C}$

Three types of HVAC systems have been chosen for simulation in order to be able to provide a comparison analysis: System 1 Chiller+Boiler (very efficient gas boiler), System 2 Heat Pump Chiller and System 3 Multi V IV air to air heat pump. System 1 & 2 have been simulated from the eQUEST® library under baseline conditions and for System 3 a library has been created and integrated into eQUEST®.

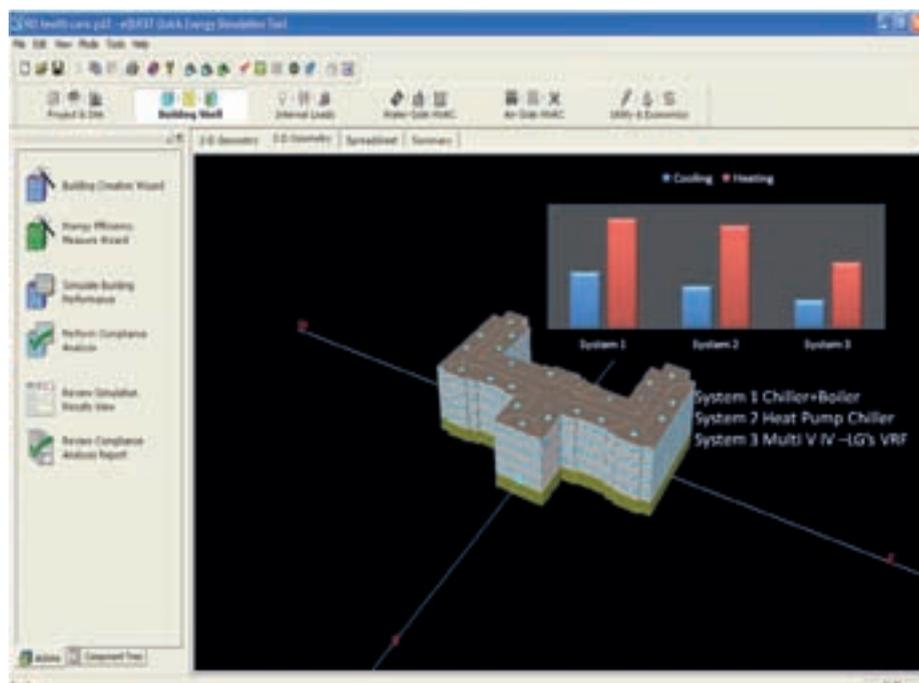
After simulating all 3 options under same conditions, the results concluded that using Multi V IV air to air heat pump, the electrical consumption of the building is significantly reduced, System 3 being almost 2 times more efficient than System 1 and a quarter more efficient than System 2. The provided analysis is based on numerical simulation results and the models have not been tested on real-time conditions.

The provided comfort by confidence

LG Electronics Air Conditioning and Energy Solutions Division is driven to provide a total package to its partners, amongst which designers represent a key entity. For designers, LG's commitment is extended into providing BIM analysis with VRF solutions to secure the confidence of an integrated design considering various scenarios. Once all hypothesis exhausted by completed simulations, designers can enjoy the comfort of a completed job with several options provided for the job.



For further information
 please contact
monica.marza@lge.com





Behind every great solution there's a great team.

We have over 160 years of experience delivering innovative space and water heating solutions for commercial applications from 30kW to 4.5MW. So it's hardly surprising we take great pride in the people that make it happen. Our knowledgeable team provides help and advice from project conception, through to specification, installation and commissioning. We will continue to support you through our aftercare service and genuine parts are available across the UK.

Talk to our experts on 0845 070 1055 or visit www.baxicommercial.co.uk



 0845 070 1055
 baxicommercial.co.uk

BAXI


BAXI-SENERTEC UK


ANDREWS
WATER HEATERS

POTTERTON
COMMERCIAL

BAXI
COMMERCIAL

Binning the catalogues

CIBSE's new product data templates aim to streamline the way information is imported into BIM. **Paddy Conaghan** and **Tim Dwyer** explain how...

6 PDTs save designers and manufacturers time and money, and can be used by engineers to compare products quickly

One of the major drivers of interest in building information modelling (BIM) in the UK is the government's mandate for collaborative 3D BIM on its projects by 2016. This will result in the structured digitisation of project and asset information, documentation and data, and will change the way building services firms work with government clients.

This catalyst for action should not be seen in isolation; there is a much broader demand for

BIM – both nationally and internationally – being driven by informed clients, government agencies and forward-looking consultants, contractors and building operators, who see the benefits of connecting the formerly disparate information sources throughout a building's life.

An integral part of these immediate BIM deliverables is the production of information for handover to the government client, in the form of construction operations building information exchange (COBie) spreadsheets. However, many find producing information in COBie format daunting, because it appears to be underpinned by a large, complex database.

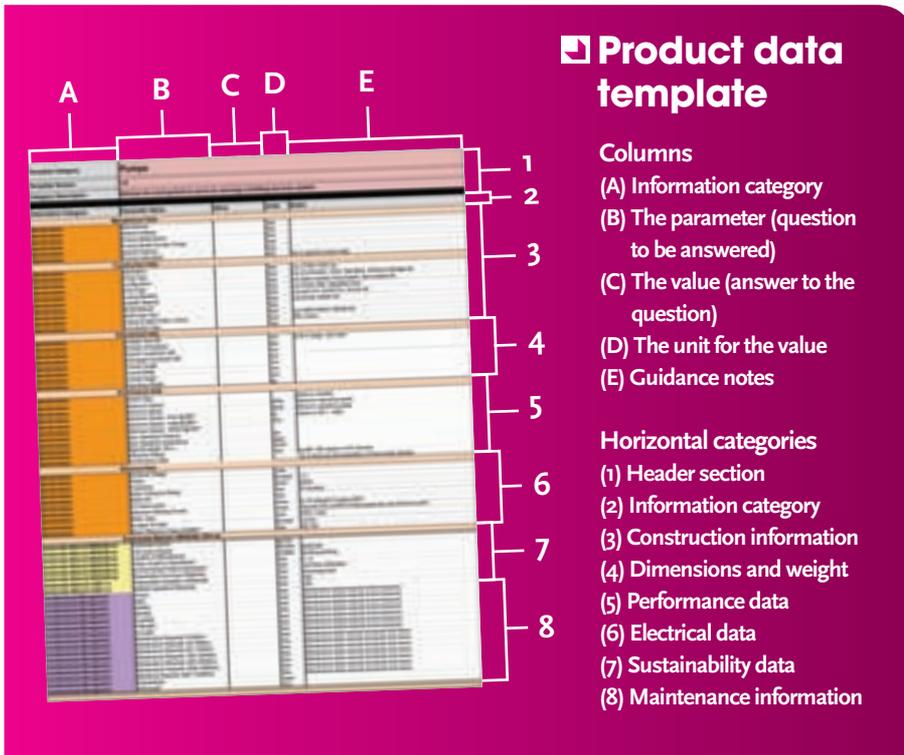
CIBSE's BIM initiative – the product data template (PDT) – aims to streamline the process, and to take the grunt work out of importing product information into BIM models. Manufacturers use the standardised templates, which are in a COBie format, to enter their product information. Specifiers then use the populated PDTs provided by manufacturers (known as product data sheets) to feed-in to their BIM design process, saving them the time and hassle of gathering together all the manufacturers' information.

PDTs save manufacturers and designers time and money, and can be used by engineers to compare the specifications of different products quickly. Here's how it works.

Simplifying COBie

COBie asks for product information that is in the BIM – or in a catalogue provided by the manufacturer of the equipment – and this is then consolidated into a single, digital format; for example, the COBie output for a circulating pump. There is an extensive list of data fields, but about 50 are unique to each pump – the remainder being information that is common to a range of pumps. The information required by COBie does not reflect the whole rich data set that might have been needed – or even developed – throughout the design and





➤ construction process, but is limited to data that is required by the end-user client and the facilities management (FM) operator.

If that extended information is joined with the COBie set, it would add another 50 fields of data, so doubling the unique questions to be answered to describe that pump fully.

By critically examining this extended list of data, repetitive fields can be removed, and the sheet re-ordered to produce a technical schedule (above) that is known as the product data set. This aims to provide everything anyone wants to know about a product and its application.

The product data set is a pro forma, which looks like the widely used technical schedule from a contractor or consultant. It comprises five columns (A-E above) – instead of the 13 used by COBie – and only column three, containing the values, needs to be completed; the others are pre-completed and fixed.

The rows of a product data set follow a prescribed order, to create a standard data structure grouped in blocks of information categories (as above, 1-8).

The header contains product type, function, classification, reference and other general information. The contact information lists the manufacturer's information, including a link to their website. The remainder of the orange block contains information directly used in the specification and construction process – such as dimensions and weights, performance data and relevant electrical data.

The yellow section contains information on product sustainability, while the purple one

includes maintenance procedures.

As the product data-set schedule is comprehensive, it can be used by:

- Designers, who can use it to describe a generic product and its application
- Buyers, who can send it to their supply chain providers
- Product makers, who can use it to respond to product enquiries
- Commissioning engineers, who can mark it up with actual performance achieved
- Operators, who can use the data in FM processes, directly or via COBie.

This information lives on with the installation, and is accessible throughout a building's life, as an essential resource for the end user, building operator and maintainer.

The product data set comprises two types of input: Firstly, general product data – which is intrinsic to a product irrespective of its application – such as: who made it; what it's built from; its size and weight; applicable standards; sustainability information; and maintenance procedures. This is fed by PDTs.

Then there is project-specific data, which defines the product's application; for example, its operating conditions, performance and related electrical-control data. This can all be delivered from the design process – it would be held by the BIM, and fed directly into the product data set, becoming increasingly refined as the project evolved.

The general product data may appear, at first sight, to be simple, because it is all included in product catalogues. However, catalogues

present information in disparate ways, and not in a digital format, directly usable by BIM. To seek out and transcribe this data into a digital model is time-consuming and prone to error.

So the CIBSE BIM Group – working with a wide range of industry partners, including consultants, research associations, contractors, manufacturers, facilities managers, and end users – has developed the PDT, to provide a unifying template for this general product data.

PDTs were devised to fast-track the flow of general product information into the BIM. In a single spreadsheet, they provide standard formats for digitally presenting general product data, and delivering the information needed by those involved in selecting, buying, installing, and operating a product.

CIBSE will hold and maintain the standard PDT for every mechanical, electrical and plumbing (MEP) product used in the building services industry, and these will be free to download. The target users are manufacturers and suppliers looking to present catalogue information in a BIM-usable format. It is expected that other institutions – or standards agencies – will develop and curate PDTs for products used in their sector.

Once a PDT's data fields are completed by a manufacturer or supplier for their particular product range, it becomes a product data sheet (PDS). This then becomes the manufacturer's property – to use in promoting their product – and it delivers extremely valuable input into BIM, providing a unique, universal resource for BIM builders and users – and some are already developing PDTs.

The manufacturer or supplier does not need any expertise in BIM, and the spreadsheet can be used directly with any BIM platform. It provides all the general information normally required, and a web link to download further data on a product's key features.

Sales and technical support teams can confidently use PDSs to answer general product enquiries, thus avoiding a lot of effort in dealing with clarifications and queries. PDSs from different manufacturers can also be interrogated with search engines, to long-list suitable products for a project. Decision-makers can share the same formatted data in agreeing product selection, reducing the information requests and exchanges required in the laborious technical submission process.

A PDS will provide the data that, otherwise, would take many hours of catalogue searching to find. It will save time and money, and provide an incentive for specifiers to consider products for which manufacturers have supplied a PDS.

For more, visit bimtalk.co.uk or see the links to example PDTs on the CIBSE website. 

Recognising the people
that are driving the agenda
for building performance

CALL FOR ENTRIES

ENTER NOW FOR:

- » Building Services Consultancy (up to 100 employees)
- » Building Services Consultancy (over 100 employees)
- » Building Performance Training Programme
- » Collaborative Working Partnership
- » Facilities Management Operations

ENTRY DEADLINE: THURSDAY 11 SEPTEMBER 2014



Collaborative Working
Award Winner 2014

*Kevin Shepherd,
Project Director
at Norland*

“It’s amazing
to win the award,
for Norland and our
customer (EE) it’s a
recognition of what
we’ve done as a
partnership”



Headline sponsor:



In association with:



Sponsored by:



FIND OUT MORE AT:
www.cibse.org/bpa

 @CIBSEAwards

For sponsorship enquiries please contact jim.folley@redactive.co.uk or 020 7324 2786

Wessex ModuMax mk2

THE BENEFITS KEEP ON STACKING UP

Compliant with ErP and Building Regs Part L - 2013

Gross Seasonal Efficiencies up to 95.32%

Models for 20°C or 30°C differential temperature

Fast response, low water content

Low NOx emissions <40mg/kWh

15 condensing models with outputs 100 – 750kW

BIM objects coming soon

Meet the Wessex ModuMax mk2. Retaining the iconic space saving design, these boilers are now available with wider differential temperature options. A great solution for district heating schemes and projects where condensing boilers are used with renewable energy sources.



MODELS FOR
20°C or 30°C
DIFFERENTIAL TEMPERATURE



Talk to us today:

0845 450 2865 | sales@hamworthy-heating.com

hamworthy-heating.com

[@heatingatwork](https://twitter.com/heatingatwork)



Hamworthy

Heating *at work.*