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Cover illustration: Gary Bullock
Skills shortage prompts overseas hiring

EC Harris looks to Greece, Romania and Asia for talent

The industry’s skills shortage is delaying projects and prompting employers to look to overseas markets to fill the gaps needed for the project pipeline. There were warnings in February from the Construction Industry Training Board that the industry needs to recruit an extra 200,000 people by 2019 while still replacing its retirees and leavers, and a prediction extrapolated from an RICS survey that 27,000 projects planned for 2015-19 may not be viable because of a lack of qualified personnel.

The latest alarming headlines follow a prediction late last year from KPMG that the skills shortage in London and the south east will start to bite in earnest from April, when a project “bulge” requires a labour force of 604,000, but the industry can only muster 430,000.

The data is supported by the experience of firms who are struggling to resource projects and to recruit professionals with the relevant skillsets.

Greg Marshall ICIoB (right, top), who runs Greg Marshall Quantity Surveying, told Construction Manager that he was currently turning down up to five new approaches a week, backing up the RICS’s warning that viable projects could simply be shelved. “Some clients are quite desperate to find commercial support, it is hindering the growth of their business,” he said.

Marshall added: “The industry doesn’t learn, as a young surveyor in the recession of the early 1990s I had just passed my HNC and was called in to the managing surveyor’s office expecting promotion, and was one of the first to be made redundant! Training and investment in apprentices and trainees has always been the first budget to be cut in this industry and there has been virtually no investment in training over the recession. “I meet plenty of other quantity surveyors my age in their forties, a few in their thirties but very rarely anyone in their twenties – the industry is storing up major problems as surveying is not the only profession this is happening to.”

KPMG's head of infrastructure, building and construction, Richard Threlfall told CM that he had undertaken informal research on delayed projects.

“The fact that such a huge percentage of projects in the [government’s project pipeline] list either have already started or are due to start by the end of 2016 when already there’s a large tidal wave of work coming out reinforces the sense that the industry is going to struggle to find the workforce to deliver it.

“The question is, are there already actual jobs that are being delayed? I’ve asked that question at industry gatherings for some time, and the answer is now ‘absolutely, yes’. There is real evidence out there that projects are being delayed.”

And at EC Harris, recruitment and resource lead Bill Maynard described strenuous efforts at the leading consultancy to fill its vacancies.

“The problem is the dearth in the middle ground, the senior quantity surveyors and project managers who’re able to run a project – everyone’s looking for the same people because they’ve all got the same projects. We’ve got good numbers of graduates and apprentices coming through, but it’s two to 3 years before they’re really ready to look after projects.”

“So we’re constantly building our brand to become a brand of choice, being seen regularly in social media, for instance. Maynard said his team was particularly looking to recruit project managers, QoS, building surveyors and estimators. “Our HR team is also looking in EU countries for people with the right skills – sometimes its just a question of looking on LinkedIn and contacting people,” he said, mentioning Romania and Greece.

“And we’re also running a campaign in Asia through our contacts in EC Harris offices there. If we find people with the right qualifications and experience, we can offer them training in language skills and report writing, and we’re able to sponsor their work visas.” Maynard said that EC Harris was targeting an intake of around 10 from its Asia campaign.

CITB launches year-long review to revise grant system

The Construction Industry Training Board has embarked on an Investment Funding Review to seek the industry’s opinions on how it should fund and deliver the training it offers employers, and the operation of the CITB grant scheme.

The training body says that it wants to “invest employers’ levy funding in training that truly makes a difference to the construction industry’ and to “meet industry needs and priorities, both now and in the future.”

The CITB has been criticised for using levy funding in a way that fails to respond to the industry’s changing needs. In particular, courses at its Bircham Newton training centre in Norfolk often address very niche skills, or are judged more expensive than similar provision elsewhere.

There have also been calls to switch some levy funding into training for the industry’s more BIM- and knowledge-based future.

The review will involve desk analysis, research and consultation and the design and testing of new funding arrangements.

The CITB will also be consulting employers and plans to launch an online consultation. It will then use the feedback and other research to shape proposals for future funding arrangements.

The plan is to introduce a phased programme of changes to funding allocations from early 2016 onwards.
BIM and Design for Manufacture specialist Bryden Wood is to set up a representative office in Singapore. The new office is a response to government-level backing for DfM strategies in the construction sector, which is a reaction to the city state’s political decision to reduce its dependence on migrant labour, and the introduction of a system of levies and quotas for construction companies.

“The Singapore government is saying we no longer want to be dependent on labour from overseas, so it’s now mandating the number of people you can have on site,” said Bryden Wood director Jaimie Johnston. “So either the project takes longer, or you come up with a DfM idea, so it’s hopefully fertile ground for us. They’ve already started on a BIM journey, now they’re using it to drive DfM.”

In the UK, Bryden Wood has already pioneered DfM strategies for Circle healthcare group, the Metropolitan Police, London Gatwick airport and others, with Johnston saying it sees itself as “the R&D office of the building industry”.

“Some architects want a portfolio of beautiful buildings, but we’re more interested in solving the big problems. But we’re fed up of doing it on our own. Why aren’t more there more construction companies joining us?” said Johnston.

Bryden Wood was also lead consultant on Russia’s £10bn Gutenborg project, where the client has now U-turned on the assembly-plant approach. However, the firm has picked up work from other Russian clients, including a private healthcare provider.

“We’ve got to be global - we now know all the clients in the UK that want what we do, so now we have to ship some of this abroad,” said Johnston.

“We now know all the clients in the UK that want what we do, so now we have to ship some of this abroad”
Six of the best young achievers

CIOB members lined up for prestigious Construction Youth Trust scheme

Six CIOB members have been shortlisted for the prestigious Construction Youth Trust Duke of Gloucester’s Young Achievers Scheme 2015.

Chartered and incorporated members have been shortlisted in the Construction Delivery, Surveying and Project Management categories of the award, which are organised by the Construction Youth Trust charity and sponsored by the CITB and leading industry employers.

Now in its fourth year, the scheme recognises exceptional young people who have overcome barriers in their life to achieve a great start in their career.

In the Project Management category three of the seven shortlisted professionals are CIOB members. Jaime Pedrosa ICIQB and Nazma Uddin ICIQB both work for construction manager Rise Management Consulting.

Pedrosa, who graduated last year with a self-funded distance learning degree in construction management at the College of Estate Management, said he was honoured to be shortlisted.

“There are so many great stories in construction. These awards give a great platform to hear those stories,” he said.

Nochum Dewhurst MCIQB, director of Dewhurst Consultants, is the third CIOB member shortlisted in the Project Management category. Dewhurst has set up Community Construct, a charity that arranges for contractors to carry out free or cost-price essential repairs in the homes of disadvantaged people.

One of two members shortlisted in the Surveying category, Jagdip Hayer ICIQB, is a graduate quantity surveyor for Berkeley Homes in Rugby. Determined to “make his name in the industry”, Hayer moved to England from India without his parents when he was 11 years old and is now studying for his masters in construction economics and management.

Ross Harris ICIQB, a consultant quantity surveyor for Solomon’s Europe, who was the first person in his family to go to university, joins Hayer in this category.

The list is rounded off by BAM Construction’s Zeshan Afzal MCIQB, a finalist for Construction Delivery, who was the youngest person ever to become a chartered member of the CIOB in Scotland.

Afzal, who is now the Scottish branch chairman for CIOB Novus and a STEM ambassador said he wants to “use his achievements to encourage more young people in Scotland to consider working in the construction industry”.

Winners in each of the five categories will be selected from the full shortlist of 36 of the industry’s rising stars, with an overall winner selected from these category winners at a ceremony at the UnderGlobe in London on 19 March.

Each winner will receive a cash prize along with a one-year mentoring programme to enable them to make an even greater impact in their careers.

Christine Townley, executive director, commented: “These exceptional young people show real drive in developing their own careers and commitment to giving back to their local communities in different ways.”

The award’s sponsors are KPMG, Aecom, EC Harris and John Rowan & Partners.

Chris Blythe

An energy policy to put the wind up you

They say one of the best ways to learn is to teach. Certainly having to teach others does make you think a lot harder about how you explain things.

My favourite subject is meteorology. Trying to explain the weather, what causes it and what to expect in certain conditions does get you thinking about the British climate and how it affects us on a day-to-day basis.

As I write this, the weather forecast is for a few days of high pressure. A couple of weeks ago we also had a spell of high pressure, this time one that had come for Scandinavia. It brought some of the coldest weather of the winter and record cold temperatures.

One of the features of high pressure is light to no wind. This makes a pleasant change from strong winds brought about by deep low-pressure systems coming off the Atlantic. We have had a few of those this winter, too - in fact several back to back with winds regularly above 70 miles per hour.

For your average wind turbine the typical British weather is problematic. When the wind does not blow the turbines don’t go. But it is worse: in very cold weather, instead of giving electricity to the National Grid, the turbines take energy to turn them so they don’t seize up. In the absence of wind, the grid also has to rely on coal and gas to provide back-up electricity.

When the wind blows too much, the poor old turbines blow down, catch fire or are shut down to avoid damage. The operators get compensation when they have to shut down as they get paid for not producing electricity.

The University of Edinburgh has reported that wind-powered energy is expensive and can only be delivered with a subsidy from the consumers, who pay over the odds. You would think that common sense would prevail and that the government would be halting the implementation of more turbines, especially those sited way out at sea.

Unfortunately, it is not the case because, under European Union law, energy consumed needs to be 15% renewable by 2020.

I may have given the impression that just the UK has a problem with wind power. But in eastern Europe it is even colder and it is where the winter high pressures come from, so they don’t have wind either.

The good news for the construction industry is there will be a need to build back-up plants to burn gas shipped from halfway across the world.

The more I try and explain the weather to student pilots, the more I see stationary wind turbines.
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Skills shortages aren’t just a numbers game

ANOTHER WEEK, ANOTHER skills crisis press release. Amid news from the RICS about the 27,000 viable projects that could be put at risk by the shortage of trained and qualified surveyors, or the 200,000 extra people the CITB believes the industry needs to recruit by 2019, or KPMG arguing that the front-loading of the government project pipeline is forcing contractors to deal with skills shortages earlier than anticipated, it does sometimes seem that the only thing the industry is good at is manufacturing alarmist headlines.

Of course, behind every headline there is a project manager wondering how to resource the next project, or a client wondering if the advice they’re getting comes from A team on top of their game or the under-qualified B team. Skills shortages are real, and impacting employers and projects all around us. As KPMG’s Richard Threlfall has said, informal polls of clients and contractors give clear signals that projects are being delayed.

But let’s not get so mesmerised by the shock-value headlines that we are paralysed into inaction. There are certain practical things the industry could do immediately, and longer-term attitudes it could adopt, to shrink those alarming numbers to a more manageable scale.

A particular choke-point appears to be the shortage of quantity surveyors, and a fall-off in the number studying surveying. Industry employers and organisations need to act together to formulate a new employer-sponsored conversion course to bring in new talent. Then at the other end of the spectrum we have the many hundreds of thousands of people who left the industry during the downturn years. Many will be older people, perhaps not looking for full-time work, but whose skills and operational experience could be extremely valuable when the challenge is simply getting things built. There’s a general cult of youth in the industry, as in society as a whole, that’s at odds with demographics, longer working lives and the fact that construction is a complex discipline where experience counts.

Longer down the age range, there will also be many others who left through redundancy, frustration and insecurity. The Construction Leadership Council has a pilot project to reach out to former construction workers in the housebuilding sector. But given the urgency of the skills needs, why is the project not trying to address construction as a whole?

Finally, if we continually talk about a skills shortage in terms of raw numbers, then we will naturally seek solutions that improve processes and efficiency as well as attracting the right talent. It’s a question of perception, and all the surveys and reports risk distracting us from seeking a range of solutions.

Elaine Knutt, editor

More Construction Manager online and on Twitter

Our twice-weekly newsletters give you breaking news, and online-only content, including more coverage of skills shortages and the carbon agenda, and fresh perspectives on the week’s news. Sign up at www.construction-manager.co.uk. For news from CM and other sources as it happens, join our 6,300+ Twitter followers @CMnewsandviews.

Feedback

Check your carbon footprints

Martin Brown, sustainability consultant, Construct CO₂

Minimising and reducing carbon in construction has been a central plank of industry sustainability strategies for many years. It is therefore embarrassing for the industry that, as Construction Manager reports, we still don’t have a handle on construction carbon figures (That sinking feeling, February).

A sustainability strategy for construction set a 2012 target of 15% reduction from the 2008 figure of 48 tonnes of CO₂ per £m spend, which should give us about 42 tonnes per £m at 2012 with targets for further reductions by 2020 and 2050 in line with UK targets.

But indications are that, despite a focus on sustainability, with just about every organisation in construction self-claiming to be sustainable, the industry’s emissions actually rose by 13% over the period from 2008 to 2012.

As a major emitter of CO₂ – when adding in transport and travel – the construction industry has a social responsibility to address and reduce. The fact that we as an industry don’t really know what our carbon footprint is is downright unacceptable. Why is it that do we not understand or monitor construction CO₂?

“Cash is king, carbon is queen” was a rallying call from former chief construction adviser Paul Morrell. But few rallied.

BREEAM hasn’t followed through. It just has a requirement to record travel, transport and energy use, but not to reduce, monitor over time or collate. As an industry we have a mass of disparate spreadsheets across the country that probably contain all the data we need.

Recording data at site level is deemed too time consuming, and put into the “too busy to do” box by contractors – except those who use Construct CO₂, unless their clients are telling them to do so.

In the main, clients do not require...
Vox pop
What will be the main impact of the new CDM Regulations 2015?

Martin Cox
Senior CDMC,
head of H&S at Pellings
The new CDM regulations are a huge backward step for onsite health and safety. The changes do not appear to be about improving site safety. The word “competency” doesn’t appear in the draft or in the regulations. There is no requirement to check the construction phase plan – the contractor just has to tell the client one is in place. This may lead to people working with inaccurate or outdated documents and practices, as a “copy and paste” culture develops, especially among smaller contractors.

Clients need to be aware these new rules place a lot more responsibility on them, and that they will be more liable than before for mistakes (see page 30).

Sajeesh Nair MCIOB
Senior project manager,
Cranbrook Basements
We work a lot on high-end domestic projects that will now fall under the new CDM regulations. The appointment of a principal designer will increase associated costs and require additional resources on small projects. The focus on health and safety will put extra pressure on small companies, who will have to assess their workers’ training needs against the needs of the job.

But the regulations will have a positive impact in the long run by improving health and safety, and reducing the number of accidents on smaller, less professionally managed sites.

Paul Bussey
Author, CDM 2015: A Practical Guide for Architects and Designers
The new regulations clarify and improve how health and safety will be practically managed. Although the current regulations may be perceived to be working well, they are not. There is too much bureaucracy and a fear of prosecution that leads to design paralysis. Designers are thereby discouraged from taking innovative decisions.

The updated CDM regulations return us to the original intentions of the 1994 regulations before construction health and safety became its own separate industry.

Paul Kimpton
Managing director,
Building Safety Group
The new regulations will help drive a health and safety message to smaller businesses in the construction industry. A lot of domestic projects will now be brought fully under the CDM regulations, as they will need to notify the Health and Safety Executive.

All projects will also now need a construction phase plan that will have to be regularly updated.

However, in the short term this may cause problems, as many businesses will not be aware of their responsibilities or have the skills to manage them. Smaller businesses will need to understand their new duties or take competent advice, which will cost money.

Steven Carey
Partner, Charles Russell Speechlys
The replacement of the CDM co-ordinator role with that of principal designer may lead to CDM co-ordinators relabelling themselves as principal designers or to one of the existing design team taking on and subcontracting this role.

In either case it is questionable whether this will mean the client has discharged its duty to appoint “a designer with control over the pre-construction phase” as principal designer.

A consultant appointed solely as CDM co-ordinator is not a designer and will not fulfil the criteria.

Jonathan Hall
Director, Alford Hall Monaghan Morris
For designers I don’t see the new CDM regulations having any significant change on how we design. HSE’s intention is that there will be less paperwork, so hopefully we will need to fill out less to demonstrate our competence.

As far as “principal designer” goes, architects need to think very carefully about whether they have the resource, skills and knowledge to undertake this role properly and fully. The definition is very wide, so the architect may not always be best placed to take on this role. CDMCs are very useful and provide objective critical view. It is important that the skills that have been built up are not lost to the industry, as this would be a step backwards.

”It is important that the skills that have been built up are not lost to the industry”
Jonathan Hall, Alford Hall Monaghan Morris

Contact us
Do you have an opinion on any of this month’s articles? Email: construction-manager@atompublishing.co.uk

That they have completed the overall infrastructure to handle flood water (Flood risk construction: the plain truth, January).

Yet again the European Union regulations are a fit for all locations in the EU, which is not how nature works. The UK needs to draw a line in the sand. I am certain the more backward EU members do not so blindly follow the regulations as the UK does.
NEED HELP ON BIM?
bim.construction-manager.co.uk
Our industry needs priorities, not targets

Stephen Gruneberg, reader in construction economics at the University of Westminster, sets out his alternative paradigm and six priorities for a new industrial strategy

CONSTRUCTION 2025 has targets of a 33% reduction in construction costs, a halving of delivery times and emissions, and exports to be increased by 50%. Of course, the construction targets could be achieved by lowering specifications and building inferior buildings speedily, at the expense of quality, working conditions, wages and the environment.

Targets skew the industry towards the contradictory aims of cost reduction and speeding up delivery, instead of producing quality buildings, improving productivity, training, and providing the built environment society and the economy requires, such as adequate housing and infrastructure.

The time has come for an approach to strategic planning that replaces targets with priorities.

Alternative Construction 2025
Six broad operational objectives form the core priorities of the proposed alternative industry strategy, which would be overseen by a new government department, the Ministry of Construction, supported by four industry-driven groups responsible for its detailed development.

First, the industry should be seen as competitive, as measured by the international sales of UK-based firms, regardless of their country of ownership or registration. Only by competing with the best firms in other countries can the quality and value of UK construction be seen as keeping up with the highest international standards. The Ministry of Construction could publish an annual report that monitors competitiveness, and assesses exports and import penetration.

In addition, a new International Construction Group (ICG) would focus on the international competitiveness of construction, both at home and abroad. International competition forces firms to raise the quality of their output to international standards in order to sell. In a global construction market it is vital for firms to meet international standards of quality, productivity and delivery.

Awareness of international competitiveness – even for those firms that are not directly engaged in overseas work – would serve to improve performance in the UK.

The second priority is a quality output, measured in terms of the satisfaction of clients. Complaints and disputes must be monitored and recorded at industry level. The Ministry of Construction would report annually on satisfaction.

Third, the built environment industry needs to be perceived as efficient. Construction firms and professionals should not only produce what clients require but should seek to surpass their requirements and expectations. Those who do should be recognised with awards, such as the CIOB’s Construction Manager of the Year Awards.

Moreover, the built product itself needs to meet sustainability criteria. Again, performance – including productivity – of the built environment and the industry, should be reported on.

One of the existing strategy’s objectives is to improve the construction industry’s image. But the term “image” implies appearance rather than substance. Reputation, on the other hand, is based on performance. It is valued and recognised by construction firms and their clients. The priority should be to create an excellent reputation through work produced, regardless of whether they are routine works and projects, or iconic buildings and structures.

The London skyline, Olympic Games and regeneration of UK cities demonstrate that we can produce buildings and structures that are admired the world over. An annual survey and report of outstanding construction achievements should be published and celebrated, but with a critique of any serious failures.

Fifth, people matter. Those who work in the industry should deliver to high standards of workmanship, take pride in their work and have a professional attitude to co-workers, clients and others. Qualifications, status and recognition should be reflected in pay scales, and terms and conditions. The image of the industry cannot improve until the people who work in it are respected and what they build is appreciated.

Be productive
Finally, the construction industry needs to be a productive and innovative wealth producer. Its output is a key component of the productive capacity of the country. Productivity is ultimately the source of wages, profits and the standard of living of all those in construction, and labour productivity is improved the more plant and equipment is used. The Ministry of Construction could publish an annual report on productivity.

Construction strategy needs to move away from a target-setting culture, where no one can be held responsible for failing to adhere to the targets, and instead should be based on continuous improvement and review.

This alternative industry strategy seeks to challenge and enable firms throughout the industry to find their own solutions by putting them on a path of continuous improvement.

“Construction strategy needs to move away from a target-setting culture, where no one can be held responsible for failing to adhere to the targets”
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Stephen Cousins looks at efforts to persuade the construction sector to look closer to home. Illustration by Gary Bullock

The UK construction sector consumes roughly 5 million cubic metres of softwood each year. But despite an abundance of forests and woodland, a staggering 80% of it comes from abroad, and Britain remains the world’s third-largest net importer of forest products, after China and Japan.

That is not to say the industry has no desire to use more home grown material. Research published in October by the not-for-profit promotion organisation Grown in Britain found that 92% of large contractors would support an industry-wide commitment to use more home-grown timber, and more than 60% said they would add clauses into contracts to encourage its specification.

But, if there is so much latent support, why has specifying home-grown timber not been a priority for the sector?

There are several factors. The UK has a historic dependence on imported timber that dates back hundreds of years, and many manufacturing and craft skills are in short supply. In addition supply chains are often unaware of the provenance of the timber they use, or the suitability of locally grown timber for more demanding, high-value applications (case study, overleaf).

Charlie Law, managing director of environmental consultancy Sustainable Construction Solutions and co-chair of the construction sector task group at Grown in Britain tells Construction Manager: “Too many people are specifying C24-strength grade timber sourced from Europe, when C16 grade, most commonly found in the UK, would be sufficient (box, right).

“This is either because of over-specification by the architect or structural engineer, because they want to ‘play it safe’, or because builders revert to what they have done previously and use the higher grade because they haven’t looked into what they should be using.”

The Grown in Britain campaign is working alongside industry, research and academic organisations, such as the Forestry Commission, the Timber Research and Development Association (TRADA), and building research group BRE to spearhead efforts to increase the demand and supply of locally sourced timber, and create an economically, socially and environmentally viable future for the UK’s forests and woodlands. Grown in Britain also has a construction sector task group drawing in representatives from several UKCG members.

Meanwhile Napier University’s Wood Studio is investigating new higher-value products. Recent initiatives include efforts to improve the capacity of UK hardwood production and enable smaller commercial plantation owners to gain certification more cheaply. And new high-performance construction timber products are being developed, including an initiative that should deliver the UK’s first cross-laminated timber (CLT) products from 2016, as well as thermally modified hardwoods suitable for cladding, decking or joinery.

Carbon copies

Construction’s interest in home-grown timber is intensifying, driven in part by the Social Value Act 2012, which has created a need to demonstrate support for local industry and jobs. Boosting Britain’s timber industry could also play an important role in achieving targets set in the government’s Industrial Strategy for Construction, which aims for a 50% reduction in the gap between exports and imports for construction products and materials by 2025.

A new focus on embodied carbon, rather than just operational carbon, has increased scrutiny of emissions created by the transport and manufacture of timber.

The woodland area in the UK in 2014 is 3.1 million hectares: 1.4 million hectares (44%) are independently certified as sustainably managed.

13,000 hectares of new woodland were created in the UK in 2013-14.

Timber is graded in accordance with BS EN 14081: softwood is given a C rating and hardwood a D rating. The higher the structural rating given to a piece of timber, the stronger it is.

Softwood is rated from C14 to C50. The most commonly used grades are C16 and C24 being. C27, C30 and C35 are also available commercially.

The few structural hardwood grades include oak (D30-D40), iroko (D40), ekk (D60) and greenheart (D70).

Timber is graded visually by registered, qualified graders, based on characteristics such as knots, fissures and slope of grain against permissible limits for the species, or with a strength-grading machine.
Case study: an enterprising East Anglian exemplar

Due for completion at the end of April, the £11.6m Enterprise Centre on the University of East Anglia’s (UEA) Norwich Campus aims to push the use of British timber on a large-scale – 3,400 sq m – project to its limits.

Adapt Low Carbon Group, an UEA enterprise set up to promote low-carbon business practice, wanted to create an exemplar scheme as a catalyst for others to adopt bio-renewable materials. Architect Architype and contractor Morgan Sindall had to convince the supply chain to adapt to construct a building from local timber.

For Architype, timber was the natural option for designing a sustainable building, and to reduce embodied carbon sourcing locally was key. After reading a report by InCrops, a research team based at UEA, which highlighted the potential for local timber to be used as a structural building material, the architect set out not only to specify timber from the UK, but from East Anglia specifically.

“Using this untapped resource has the obvious benefit of reducing carbon, and could perhaps create an industry in the local area,” explains Ben Humphries, associate director at Architype.

As the local timber industry produces low-grade fencepost and pulp, there was no existing supply chain, so sourcing local wood was a challenge. First, the Forestry Commission had to be convinced of the potential benefits, then Cygnum, a timber-frame company, had to be persuaded to work with timber from outside its existing supply chain. Finally, Thompson, a local timber mill, had to accept the loss of productivity caused by altering the mill’s usual set-up.

The result is that 70% of the building’s timber frame is constructed from Corsican pine, sourced from Thetford Forest, just 30 miles from site. However, as there is nowhere to grade this timber in the UK, it had to be sent to Ireland, where it was processed and the remainder of the material for the frame – Sikta spruce – was sourced.

“It’s still a massive success,” says Humphries. He acknowledges the embodied carbon of the building may have been lower if all the timber had come from Ireland, as it would have only travelled one way, but “proving locally grown timber from East Anglia, in this case Corsican pine, can be used structurally was equally important”, he says.

Local timber was also specified for other elements. Perhaps most importantly, the 7.5 metre signature columns that form the entrance canopy are constructed from glue-laminated larch, also from Suffolk.

“Proving locally grown timber from East Anglia can be used structurally was important”

Ben Humphries, Architype

Reclaimed oak from Norfolk forms much of the building’s cladding: African iroko recycled from the university’s chemistry

For Architype, timber was the natural option for designing a sustainable building, and to reduce embodied carbon sourcing locally was key. After reading a report by InCrops, a research team based at UEA, which highlighted the potential for local timber to be used as a structural building material, the architect set out not only to specify timber from the UK, but from East Anglia specifically.

“Using this untapped resource has the obvious benefit of reducing carbon, and could perhaps create an industry in the local area,” explains Ben Humphries, associate director at Architype.

As the local timber industry produces low-grade fencepost and pulp, there was no existing supply chain, so sourcing local wood was a challenge. First, the Forestry Commission had to be convinced of the potential benefits, then Cygnum, a timber-frame company, had to be persuaded to work with timber from outside its existing supply chain. Finally, Thompson, a local timber mill, had to accept the loss of productivity caused by altering the mill’s usual set-up.

The result is that 70% of the building’s timber frame is constructed from Corsican pine, sourced from Thetford Forest, just 30 miles from site. However, as there is nowhere to grade this timber in the UK, it had to be sent to Ireland, where it was processed and the remainder of the material for the frame – Sikta spruce – was sourced.

“It’s still a massive success,” says Humphries. He acknowledges the embodied carbon of the building may have been lower if all the timber had come from Ireland, as it would have only travelled one way, but “proving locally grown timber from East Anglia, in this case Corsican pine, can be used structurally was equally important”, he says.

Local timber was also specified for other elements. Perhaps most importantly, the 7.5 metre signature columns that form the entrance canopy are constructed from glue-laminated larch, also from Suffolk.

“Proving locally grown timber from East Anglia can be used structurally was important”

Ben Humphries, Architype

Reclaimed oak from Norfolk forms much of the building’s cladding: African iroko recycled from the university’s chemistry
"We are producing more than 3.7 million cubic metres of C16 sawn wood suitable for high-value uses such as timber frame"

Andy Leitch, Forestry Commission Scotland

of building materials. This trend is supported by the increasing take-up of European Union-driven environmental product declarations – product labels drawn up following a certified process that also quantify embodied carbon.

Interest is also being fuelled by the need to build housing faster and to higher standards of thermal efficiency and airtightness – a brief that can lend itself to timber-frame construction.

It all seems to be having some effect: the amount of UK softwood and hardwood, delivered to primary wood processors rose to 11 million green tonnes in 2013 - up 7% on the previous year - the most recent statistics from the Forestry Commission show.

However, more could be done to boost timber production. A 2012 report produced by the government’s Independent Panel on Forestry, set up following the public outcry at plans to sell off large areas of public forests and woodland, revealed a drastic economic underutilisation of Britain’s woodland resources. Everyone agrees that economic viability must underpin woodland’s environmental and social sustainability.

“Part of it means increasing the number of managed woodlands in the UK to create a renewable resource,” says Steve Cook, principal sustainable development manager at Willmott Dixon and co-chair of Grown in Britain’s construction task group.

“About half of woodlands in the UK are not managed. Trees self-plant, and grow bent and buckled to reach the light. This overgrowth reduces the amount of good-quality timber we can fell, it prevents public access to woodland, damages the health of trees, and brings greater risk of pests and diseases.”

Given that it typically takes 50 to 100 years to produce UK timber that can be used in construction, constant funding is needed to manage woodland, clear access and footpaths, and make it safe for the public. By insisting on home-grown timber, contractors and their supply chains provide the economic incentive to attract new producers to invest.

Grown in Britain also offers a timber certification scheme with reduced fees to encourage the establishment of small plantations.

“The Forest Stewardship Council charges more than £1,000 a year for certification, regardless of the size of the provider, which is too expensive for small scale operations. The Grown in Britain standard ensures forests comply with FSC [Forest Stewardship Council] and PEFC [Programme for the Endorsement of Forest Certification] standards, but fees are waived for woodlands under 20 hectares,” explains Cook.

Low estimation

One huge obstacle to boosting the UK timber market is the general perception of UK timber as a low-value product only suitable for applications such as falsework, palettes or fencing.

“We need to get rid of that misinformation,” says Andy Leitch, timber development policy adviser at Forestry Commission Scotland. “The fact is we are producing more than 3.7 million cubic metres of C16 sawn wood suitable for high-value uses such as timber frame.”

In a timber-framed house, it is normally the thickness of the insulation required by Building Regulations that determines the thickness of the structure. For example, if wall insulation exceeds a thickness of 100mm, or roof or ceiling...
Specifying UK timber

> joist insulation exceeds 150mm, in many cases a C16 timber could be used. However, most specifiers would choose C24 in the belief that the higher strength is needed to support the structure.

Over-specification can be avoided by using online tools such as Timbersizer and Connections, provided by TRADA, which enable users to calculate the types of UK timber suitable for different spans, all compliant with the Eurocode 5 design standard for timber structures.

Although the tools are currently only accessible for a fee, Grown in Britain and TRADA are looking at how to fund an alternative free or lower-cost version. TRADA has also produced an information pack, in collaboration with Grown in Britain, that lists all UK-manufactured timber and its relative availability.

“A lot of imported timber is American white oak, but we should be specifying European or English oak,” says Grown in Britain’s Law. “However, it depends on the product. If you’re looking for the immediate supply of 1,000 oak-veneered doors, the capacity just isn’t there and UK veneer trades are severely depleted.”

Meanwhile, Napier University’s Wood Studio is spearheading efforts to find higher-value applications for British softwoods, including the development of the UK’s first cross-laminated timber (CLT) panels, which look set to go into full-scale factory production soon.

Designed and tested in collaboration with timber companies Binderholz, from Austria, and B&K Structures in the UK, the product comprises glued-together layers of Scottish Sitka spruce to create Eurocode 5-compliant panels of comparable strength to those produced in Europe.

Having completed fire testing, market research and work to identify the timber resource for the next 25 to 30 years, Napier is now close to setting up a large-scale industrial plant in central Scotland.

“Two investors have been selected to joint fund the project, with confirmation expected before Easter,” says Peter Wilson, who heads the Wood Studio at Napier’s Institute for Sustainable Construction. “It might take another 18 months to two years to get the factory built and the CLT machines made, all of which are bespoke designed.

“A lot of CLT currently use in the UK is hugely over-engineered for the types of uses it is put to. We don’t expect to displace the large European manufacturers, as their output is phenomenal, but there are lot of things we can do to complement the imported material, using it for internal walls, for example.”

Hard sell

British hardwood production – such as ash and sycamore – might account for just 5% of British timber products, but were researchers are also developing new products to increase capacity. BRE is currently leading research investigating the thermal modification of British hardwoods, such as ash and sycamore, to improve their durability and resistance to poisonous fungi and insect attack, which are typical causes of rot and damage to hardwoods across Europe.

Trials of the technology, carried out in collaboration with Wiltshire-based hardwood processors Vastern Sawmills and Tyler Hardwoods, have involved heating lumber to high temperatures in controlled conditions to reduce moisture content and alter the materials’ properties. Apart from improving durability, the thermal modified timber (TMT) process enhances dimensional stability, and helps make the wood suitable for exterior products, such as cladding, window joinery or decking.

“Our primary drive was to get higher-value British wood products into construction, but there is also potential to make better use of the large volumes of trees being felled as a result of diseases such as ash dieback, rather than see them go up in smoke in biomass energy units,” says Ed Suttie, director for timber at BRE.

“Thermally modified timber could provide an alternative to expensive tropical hardwood materials that have become less popular because of concerns about the sustainability of resources, or preservative-treated timber involving the use of unenvironmental chemicals.”

The team is currently looking at setting up a TMT plant in the UK, probably in Wiltshire, Suttie adds: “We have assessed the availability of ash, sycamore and other hardwood species within a 20-, 50- and 70-mile radius of where we think the plant should be, and there was more than we could have ever hoped for. By April we should have enough data to start building a full business case for a plant, ready to target investment.”

It is a bold vision that could significantly boost hardwood supply. But, like so many of the initiatives mentioned here, a thriving British timber industry requires proactive contractors, and supply chains willing to seek out home-grown alternatives to the over-engineered and less sustainable imported products that have often become the default setting. CM
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HM Government
When it comes to developing and adopting BIM, the UK is a leading light. Elaine Knutt takes a tour of countries to see how well BIM translates – and whether the UK can turn its expertise into an export.

“Every country will develop in their own way, reflecting their government, clients and procurement routes”
Nashwan Dawood, Teesside University

Nashwan Dawood, professor at the School of Science and Engineering at the UK’s Teesside University, has first-hand experience of BIM’s global variations: he has been appointed to recommend a BIM-adoption route for the government of Qatar, while his senior lecturer colleague, Mohamad Kassem, is undertaking a similar project for the government of Brazil.

“I think every country will develop in their own way, reflecting their government, clients and procurement routes,” says Dawood. “The way contracts are procured has a massive impact.”

Meeting of minds
Phil Bernstein, vice-president of software provider Autodesk, also has a global overview of the factors shaping BIM adoption around the world: “The technology is at the intersection of work processes, national standards, contractual models and project delivery models,” says Bernstein, a former architect at Cesar Pelli Associates. “Construction is highly localised, and BIM is a knowledge system about the way things get built, so the technology operates at the intersection of the delivery model and the software. BIM adoption is a non-trivial problem.”

Around the world, we are seeing most advanced construction markets grapple with BIM to some extent, and most people have a rough notion of a global “league table” of adoption. “You’ve got the super-early adopters in the Nordics, the Austrians and Dutch have stuff going on, and the French and Germans are starting to get engaged,” says Angelo Cribini, professor at the University of Brescia in Italy. “The beginning is taking some time, and then typically starts developing faster as more people see the benefits and figure out ways of using the technology.”

But measuring and comparing BIM adoption internationally is tricky, as BIM is a slippery concept that can mean anything from 3D modelling, to full digital...
project management from tender notice to hand-over. McGraw Hill's 2013 survey, the Business Value of BIM in Construction in Major Global Markets, suggests an implementation league table headed by the US, followed by Germany, France, Australia, Canada, UK, Japan, New Zealand, South Korea and Brazil. The NBS International BIM Report 2013 survey shows a slightly different hierarchy: 67% of respondents in Finland are using BIM, 66% in Canada, 57% in New Zealand and just 43% in the UK.

**Lingua franca**

But BIM it’s clear that BIM is becoming a lingua franca for the sector internationally, and there are genuine attempts to ensure that construction trade barriers – in terms of different national technical standards, terminology and contracting models – are not simply digitally replicated in nationalistic BIM policies. “There’s a lot of exchange at international level, and a lot of competition because everyone wants to upskill their industry,” comments Jennifer Whyte, professor at the School of Construction Management and Engineering at the UK’s University of Reading.

However, in the UK we have become attached to the idea that the UK can lead from the front in establishing BIM protocols and methods that are adopted around the world – which could then translate into market opportunities for British contractors and consultants overseas.

The 2013 government-backed report Growth Through BIM looked at how to maximise the growth effect of the UK BIM strategy for export markets. It says: “The export of UK construction services and products is most practicable into countries which recognise UK classification, standards and contract processes... One arm of any export drive must be to spread the reach of UK standards.”

The UK’s BIM Task Group’s success in laying down nationally agreed protocols and processes has certainly been turning heads in many countries. The model has had a direct influence on our European Union neighbours – the European Commission is now funding an EU BIM Task Group with representatives from each member state – while France and Germany have also both established similar government-backed task groups, although only France has adopted a partial mandate.

Reading’s Whyte says the game changer for the UK that other countries should adopt was our client-centred approach, which instantly raised the debate above commercial interests: “The thing the UK has done right is to focus on the client’s perspective, so it’s not about arguments about who gets value out of it. The client owns the model and gets that as a deliverable. That moves everyone forward in a great leap,” she says.

Then there is the international BuildingSMART organisation, which has national chapters in many countries. It aims to pave the way to fully “open” interoperable BIM that would help to dissolve the artificial barriers between individual companies and national markets.
Feature BIM adoption

> BuildingsSMART’s UK chapter is also, promoting home-grown innovations to an international audience, achieving the significant success of ensuring that the UK’s PAS 1192:2 is converted into an ISO (an international working group is currently engaged on this task). It now hopes to promote overseas awareness of the forthcoming Digital Plan of Works.

But how realistic is that notion that we will see UK BIM standards go forth into the world, forging a pathway for UK contractors and consultants to follow? Teesside’s Dawood has his doubts, pointing out that standards are only documents until they are officially adopted - and that takes political will. “The ISO standard can exist, but it will only be enforced if the client is behind it,” he says.

Autodesk’s Bernstein, however, suggests the UK’s leading role in rolling out BIM will restore a historic global advantage: “The UK has always been seen as a construction and engineering leader worldwide. After we [at Cesar Pelli Associates] built Canary Wharf, the UK-based management team picked up and went to Kuala Lumpur to build the Petronas Towers. The ability to box that expertise and bring it with UK suppliers and expertise is one impact of modernising a construction industry.”

Export strength

So perhaps the “soft” factors of reputation and image are the most realistic way for the UK to convert its lead on BIM into commercial advantage. There may well be future successes in exporting BIM documents and protocols – PAS 1192:2 becoming an ISO, the Employer’s Information Requirements and the Digital Plan of Works for instance - but meaningful adoption in other countries will depend on the underlying market characteristics, which our country-by-country analysis shows are highly varied.

Yet there is little doubt among the international commentators. Construction Manager spoke to the UK is seen as acting as a world leader on BIM, and that its progress to level 3 BIM is likely to cement that position. The advantages may not be direct, but for a generation of UK-trained and BIM-skilled consultants and contractors, the distance between one country and another is getting smaller.

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US: “Deep into the adoption curve”

The federal US system, with its 50 different state legislatures, has left a clear imprint on BIM, believes Autodesk vice-president Phil Bernstein: “There is no central government mechanism, no Paul Morrell or Mark Bew. But some of the earliest ideas emerged from the GSA [General Services Administration] – a federal government body that had a lot of interesting ideas about technical standards.”

The GSA provides co-ordination to federal government, including on the procurement and management of government offices, Bernstein explains. “But since the credit crunch the GSA has been largely de-funded, so it’s not building anything. So you get private sector initiatives, such as the American Institute of Architecture’s protocols, and standards from the construction associations. And you get states such as Maryland or Wisconsin, generating their own standards.

He adds that universities have also been active in publishing standards for clients, for instance the Penn State BIM standard has been widely adopted beyond the campus.

Another US client cited as a BIM leader is California-based private healthcare provider Sutter Healthcare. “They started IPD [Integrated Project Delivery], and developing contracts that really embrace collaboration to give contractors an incentive to collaborate,” says Jennifer Whyte, professor at the University of Reading. However, the IPD approach - often manifested in a “Big Room” for co-located, profit-and-loss sharing contractors and consultants, appears to have been stopped in its tracks by the downturn.

But what to UK ears sounds like a confusing picture has not held the sector back: BIM adoption is at about 70% in the US. “There’s been a lot of entrepreneurial activity and discontinuous efforts to write standards. But we are deep into the adoption curve here. There’s no argument about whether it’s worth it. BIM is already working,” says Bernstein.

CHINA: “Forces not aligned”

China has made BIM part of its most recent five-year economic plan. But Autodesk vice-president Phil Bernstein points out that adopting BIM is not necessarily as simple as decreeing it: “There are some structural differences to the Chinese market: it’s controlled top-down and there’s a lot of entrepreneurial activity. The two forces are not aligned.”

Nor is there alignment in BIM standards. Two approaches compete: a national standard being developed by a forum of academics and one already published by the Ministry of Housing and Rural Development.

And while the argument for BIM adoption around the world is the promise of greater productivity, efficiency and profitability, that is less of a motivator in China, he says. “Right now, the use of technology on design and construction in China is quite early on the adoption curve but, as the construction economy continues to mature, it will face the same issues as other markets: commodity prices, managing risk, and informational transparency,” says Bernstein. “It will be interesting to see whether these things push the standards.”

There is another, more immediate, disincentive to invest: “Well over half the software used is pirated, so why bother with BIM?” asks Bernstein.

Meanwhile, Growth Through BIM author Richard Saxon adds that Hong Kong’s BIM adoption agenda is being led by the Housing Authority.

And Reading University professor Stuart Green FCIOB believes Taiwan is actually a BIM market to watch, as it is “forging ahead in many areas, including integrating the Internet of Things and augmented reality in construction.”

“Taiwan is forging ahead in many areas, including the Internet of Things and augmented reality in construction”

Stuart Green, Reading University
BRAZIL: “Moving very fast”

Brazil has a reputation as an academic BIM centre – its universities are third behind the US and Sweden on publishing BIM-focused academic papers. In terms of practical applications, Brazil’s National Department of Transport Infrastructure is embracing BIM in the hope of making 30% cost savings. Schemes that could benefit include the 937km BR 040 highway linking Brasilia and Rio de Janeiro. “Brazil is starting to get a grip on BIM,” says Teesside University professor Nashwan Dawood. “One of my colleagues [Mohamad Kassem] did a report on different BIM standards and protocols and the government is taking it forward to enable the adoption from a policy and strategic level. Brazil doesn’t have the same massive growth as in Qatar, but BIM is moving very fast.”

Kassem has worked with Brazilian professor Sergio Leusin, a consultant in BIM implementation in Brazil, to make recommendations for a strategy. At the time of his appointment Kassem said: “Brazil is a massive economy and the country is undergoing a huge amount of construction work. Changes that result in efficiency savings, even small ones, have the potential to save the Brazilian economy billions of pounds... BIM can bring real benefits to the construction industry and there is a real momentum towards innovation in the industry and I hope my work can help improve BIM diffusion in Brazil.”

Elsewhere in Latin America, Panama’s ongoing project to add a new set of locks at either end of the Panama Canal has adopted BIM from start, and a new airport for Mexico City will also use it.

QATAR: “a mismatch on the ground”

Nashwan Dawood, professor at Teesside University, is advising the Qatar government on its BIM strategy. His challenge is to find a modus vivendi with existing practices and ideas. “There’s a mismatch on the ground between the German, British and US standards adopted by different construction companies, so the idea is to come up with a system that reflects the way construction is run and the building is managed,” says Dawood. “For instance, the American Institute of Architects’ Levels of Definition system is heavily used by consulting engineers and US-based project managers – that’s what their training is. But the latest trend in Singapore is a concerted switch to promoting Design for Manufacture and Assembly techniques – a politically-driven decision.”

“The Singaporean government is saying we no longer want to be dependent on labour from overseas, so it’s now mandating the number of people you can have on site. So either the project takes longer, or you come up with DFMA ideas, so it’s hopefully fertile ground for us,” says Bryden Wood director Jamie Johnston.

SINGAPORE: “Hyper-modernisation”

Singapore has the benefit of being a small market – like the Nordics – so it is easier to start adopting new methodologies, says Arto Kiviniemi, professor of digital architectural design at the University of Liverpool.

“In the UK and US, you have to think about formal contracts more. In Singapore, it’s easy to push the whole industry to doing something.” A 2013 survey found 76% of firms using BIM, and this is predicted to rise to 96% by this year.

Autodesk vice-president Phil Bernstein describes “a pretty sophisticated approach, they are convinced that hyper-modernisation of the construction sector is critical to their economy. They’ve put hundreds of millions of dollars into BIM initiatives - including training funds and free software – and are the most advanced construction industry in Asia.”

Singapore’s BIM fund, part of the Construction Productivity and Capability Fund, began in June 2010 and covers costs of training, consultancy, software and hardware. The BIM agenda is led by the Building and Construction Authority, but with the close involvement of government ministers because of the clear line to national economic policy. It introduced a BIM roadmap in 2010 and has now published the second version, which apparently shares features with level 3 BIM.

Singapore is also a world leader in the digitisation and automation of the issuing of building permits. “The system is up and running. It’s called Corenet and its development started in the 1990s,” explains Kiviniemi. The process streamlines the process for regulatory building code permissions, while a new e-submission process for architectural designs for all projects over 5,000 sq m has now been added.

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“Brazil doesn’t have the same massive growth as in Qatar, but BIM is moving very fast”

Mohamad Kassem, Teesside University
**Feature: BIM Adoption**

Public sector BIM standards or requirements are already in place for Norway, Denmark, Finland and Sweden, although often at a sub-national level, and led by “intelligent” public sector clients such as Norway’s regional health authorities and its Statsbygg government property agency, Finland’s Senate Properties, a state-owned enterprise, and Stockholm County Council.

The Nordics are what Brescia University professor Angelo Ciribini calls the “super-early adopters”: Finland, for instance, has had a public sector mandate since 2007. And Arto Kiviniemi, professor at the University of Liverpool says the Nordics have a natural advantage in their size: there are fewer players and people to convince.

“In Finland, the Confederation of Finnish Construction Industries decided in 2002 that BIM is a core element of their technology strategy, and people simply agreed to start working in the new way. It did not require contractual changes as a small market forces you to work in a reliable way. It simply was enough to have a core element of their technology strategy, and people simply agreed to start working in the new way.”

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“A small market forces you to work in a reliable way. In a huge market, there are more potential partners.”

Arto Kiviniemi, Liverpool University

**FRANCE:** “It’s a massive business”

Like Germany, France has recently taken a step forward on BIM, with the establishment of the “Le Plan Transition Numérique dans le Bâtiment” task group to flesh out the details of a BIM mandate from the Ministry of Dwellings (Ministère du Logement), and has been given a budget of €20bn over three years.

“Following several years of neglect, suddenly the government woke up!” Angelo Ciribini, professor at Brescia University. “But the mandate from the ministry covers housing and general construction, so it’s not so clear whether it will deal with civil engineering and infrastructure.”

The new group will take forward an outline BIM plan announced last year, which includes the ambition of developing 500,000 houses using BIM by 2017. And also in 2014, France kicked off a research project on BIM for the infrastructure sector, MINnD, to develop and explore open BIM standards for infrastructure projects. It is being funded by contractors and suppliers including Bouygues and Lafarge.

Ciribini points out that the relative size of construction companies in France gives them more control on BIM standard-setting than their counterparts in the UK. “With a €16bn turnover, Vinci can influence the way things are going and the way the government does things. It’s a massive business.”

**GERMANY:** “A position of ‘worst practice’”

Germany’s extensive BIM standard system is embracing BIM, but its legally protected professional titles and fee scales are proving more of a barrier to BIM’s collaborative mindset. Growth Through BIM author Richard Saxton explains: “The Germans have a particular problem in that [architects and consulting engineers] have a defined Plan of work and fee scales, so changing that is highly disruptive. It’s not optional: it’s defined and protected in law.”

Autodesk vice-president Phil Bernstein adds: “The German industry is extremely conservative. The Americans will use a piece of software if it does 80% of what they want, whereas the Germans and Japanese want it to be exactly right. The adoption of advanced technology is behind.”

That is not the whole picture: Germany has some of the largest contractors in the world, and Zublin and Hochtief are said to be particularly advanced in BIM. Hochtief, via its Hochtief ViCon arm, is very active in the Middle East.

Germany is also catching up in its home market. In January, government minister Alexander Dobrindt announced the creation of Germany’s Digital Building Platform, a BIM task group set up by trade associations to lay the groundwork for public sector BIM adoption, including “standardising of process and device descriptions, developing guidelines for digital planning methods and providing sample contracts.”

The platform is part of Germany’s ongoing Reform Commission for Major Projects - a committee of experts who are examining why a series of big public sector projects in Germany went badly over budget or were late.

“You could say that Germany has started from a position of ‘worst practice’,” says Angelo Ciribini, professor at Brescia University in Italy, adding that Germany’s federal system will make it harder to implement a national BIM mandate.

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GDP: $328bn

**FINLAND**

Population: 5.4 million

GDP: $211bn

**SWEDEN**

Population: 9.7 million

GDP: $418bn

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Population: 82.6 million

GDP: $3,512bn
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Model shown includes FlexCargo, not available on all models.
moving from analogue transactions to digital, and experiencing the benefits of the information age. BIM has become a metaphor for this industry change, and is helping to set a compelling vision of how a digitised sector looks when enabled by web-friendly computer readable data.

Paradigm shift
We build – or more likely assemble – right the first time and efficiently, to create assets that give customers and society added value, more sustainability and better value for money. Of course, not all these objectives are obtained by BIM in isolation. But when combined with other paradigms, such as Design for Manufacture and Assembly or lean construction practices, we can envisage a new wave in our built environment.

Laing O’Rourke, for example, is already developing innovative digitised Design for Manufacture and Assembly approaches to drive efficiencies in the design and manufacture of advanced mechanical and electrical products.

As level 2 BIM emerges from adolescence this summer with the completion of all the constituent parts

What do I need to know about Proposed changes to ISO14001?

This summer will bring the largest change in ISO14001, the international environmental management system standard, since it was introduced 20 years ago.

ISO14001 is the world’s second-most popular international standard on quality management after ISO9001, so any revision is big news, especially one as well considered and thought through as this is.

The standard is implemented at 380,000 businesses and organisations across the world. It gives a structure for identifying the issues to manage, and provides plans to improve performance in each area and a framework for regular review.

At the highest level the new standard has undergone a complete renumbering and re-ordering, so it looks entirely different from the existing text. However, the environmental management principles remain broadly similar, albeit with six key changes:

- Historically companies have considered the impact of their work on the environment. The new standard also requires consideration of the impact of environmental change on the company.
- Systems will need to get “outside the gate” and include supply chain and product issues.
- The scope has to include the views of wider stakeholders.
- Systems have to be integrated into day-to-day operations, and not just be the preserve of the environment manager.
- There must be more two-way involvement from senior managers.
- It focuses on higher-quality data.

Industry 4.0 heralds a new era for construction

Aecom’s David Philp makes the case for the industry to embrace “disruptive innovation” – and enter the era of virtualisation and the sensor-rich Internet of Things

SINCE THE INVENTION of the power loom nearly 250 years ago, our industry has witnessed, contributed to and been shaped by a series of industrial revolutions. The first, in the 18th century, brought the mechanical loom – the first piece of disruptive engineering; the second heralded automation in the world’s first assembly lines; and the third ushered in electronics, information technology and further automation.

Each era sought to automate, improve efficiency and harness the latest production methods – goals that are probably still present in your organisational strategy or innovation roadmap.

We can learn much from these shifts – most notably that disruptive change is not easy. Despite the use of new, effective tools and processes, it is heuristic bias – our tendency to think in pre-set ways – that is the most difficult nut to crack.

Indeed, the words of Robert Calvert’s 1985 song, Ned Ludd, “He turned to his workmates and said: ‘Death to machines. They tread on our future and they stamp on our dreams’,” will resonate with those trying to implement BIM or any transformational change.

Today our construction sector is at a turning point. Following the economic downturn, we are generally leaner, more innovative and, at last, in the midst of a new industrial revolutionary cycle, moving from analogue transactions to digital, and experiencing the benefits of the information age. BIM has become a metaphor for this industry change, and is helping to set a compelling vision of how a digitised sector looks when enabled by web-friendly computer readable data.

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Illustration: Peter Quinnell

Proposed changes to ISO14001?

The key components of an Industry 4.0 – such as self-directed decision-making, embedded sensor-rich networks and industrial-additive manufacturing – are at early stages in the construction sector but we are nearer to virtualisation than we think. Author Jeremy Rifkin refers to this as a “third industrial revolution” – one that is green and harnesses the “three internets”: communications, energy, and transport and logistics. This will create a new technology platform, the Internet of Things, which connects everything and everyone.

Working groups such as the Manufacturers Strategic BIM Forum (MSBF), whose members include Tata and Lafarge, are already looking at how the Internet of Things will help to enable intelligent materials and infrastructure that can provide real-time feedback and create a truly circular economy with predictable recycle flows.

An always-on construction environment that continuously feeds enormous amounts of data into deep analytics programmes and crunching predictive algorithms, could help us automate much of today’s analogue processes – such as procurement – and at the same time radically improve the low productivity levels that have blighted our industry.

The Department for Business, Innovation and Skills (BIS) has identified autonomous systems as one of the “eight great technologies” the government believes necessitates support. BIM could be an area in which UK industries are at the vanguard.

Whatever your view, digital does matter and, as we head towards Industry 4.0, or whatever you wish to call it, you need to get ready. The best place to start is with a solid foundation of level 2 BIM. It is time to prepare for the technological and cultural changes generated by the industrial revolution of the 21st century.

David Philip FCIOB is BIM director, EMEA+1, of Aecom

The revisions are welcome, as they make ISO14001 a much more relevant and effective standard in our view. As a business we spend as much time helping companies adapt to climate change as we do on cutting energy use. It makes every sense to bring both areas under the ISO14001 umbrella.

Likewise, products and supply chains often have larger environmental impacts than direct operations, so including these is sensible.

Of course, there is also a catch. Poorly implemented systems will remain poor, as will poorly certified systems. That is not the fault of the standard, but the effectiveness of the implementation process and the quality of certifiers.

Although the final standard will not be published until the summer, we do not expect many substantive changes from the current drafts. So there is plenty to crack on with now, including putting some specific plans into your objectives and targets for this year.

Louise Wood is an associate director at WSP Group.

BIM bytes:
Turning the art of delegation into a science

Interfaces between different design team members are important on any project, whether between different consultants, between consultants and a tier 1 contractor, or between a tier 1 contractor and its designer, tier 2 or 3 subcontractors and suppliers. It is the lack of clarity of these interfaces that can often give rise to project problems and disputes.

The design processes described in professional appointments, building contracts, design programmes, and in project execution plans do not always clearly identify the points at which a consultant designer – whether an architect, structural engineer or M&E or otherwise – expects additional detail to be added by the tier 1 contractor through contributions from its appointed tier 2 or 3 subcontractors and suppliers. This situation is complicated further where the appointment of the tier 1 contractor (and therefore of its tier 2 or 3 subcontractors and suppliers) is not completed until the project is about to start on site.

The benefit of BIM in demanding greater clarification of interfaces – and possibly influencing the timing of the appointment of the tier 1 contractor (and its tier 2 or 3 subcontractors and suppliers) – can help.

BIM can particularly address uncertainty that has arisen on projects where an architect or other design consultant has believed that it can unilaterally delegate some of its design responsibilities to others in the supply chain.

Appointments should be very clear that a design consultant has no authority unilaterally to delegate design responsibilities. Therefore, clear agreement on the matrix of design contributions and their timing through the use of BIM models should be a more effective means of defining and limiting a consultant’s potential liability.

The issue of delegated design responsibility has been subject to some case law guidance as to how the overall cost of damages claimed should be share between the responsible parties. The general principle is that the contributions should be “just and equitable” with regard to the extent of that person’s responsibility for the damage caused.

Such terms are by their nature vague and uncertain, and therefore unhelpful to commercial enterprises that seek to properly enter into business relationships with known risks for a known reward. So it is better, then, to use a BIM protocol – whether the CIC’s or otherwise – and its model production and delivery table to clearly establish any delegation of responsibility for design.

Assad Maqbool is a partner at Trowers & Hamlins specialising in projects and construction.

BIM+ speaks to Richard Gelder, director at Hays Recruitment; Mike Johnson, managing director at Johnson, a BIM recruitment specialist; and Tamsyn Curley, director at architectural recruiters, Place Careers, to find what is happening in the BIM jobs market. Go to bim.construction-manager.co.uk to read what they have to say.
The updated Construction (Design and Management) Regulations 2015 come into force on 6 April, and will apply to all building and construction works.

The new regulations place a large focus on clients’ roles and liabilities. Clients must set out clear expectations and arrangements for how health and safety will be managed on a project at the earliest opportunity.

In particular there is a duty to notify and ensure “appropriate” provisions take place, including the requirement to check the principal contractor’s construction phase plan – this is a duty that previously lay with the CDM co-ordinator (box, below).

Clients must appoint a principal designer and a principal contractor when more than one contractor will be working on a project at any time. Should the client not make the appointments in writing - for instance, if they rely on oral agreements - they will be legally responsible for fulfilling that parties’ duties.

And when written appointments are made, clients will still be legally obliged to ensure appointees not only have the “skills, knowledge, experience and training” (SKET) for their specific roles, but are fulfilling their relevant duties.

When appointing duty holders, the Health and Safety Executive and the Construction Industry Training Board (CITB) recommend using Safety Schemes in Procurement (SSIP) or publicly available specification 91 (PAS 91), both of which we understand are being modified to factor in SKET for each duty holder, in particular for the principal designer.

Following criticism that the CDM 2007 approved code of practice had “gold plated” standards to above those legally required, the HSE is reluctant to stipulate specific skills, knowledge and experience the principal designer should have.

The regulations define principal designer as “the designer appointed under regulation 5(1)(a) to perform the specified duties in regulations 11 and 12”, while “designers” includes anyone who: “prepares or modifies a design; or arranges for, or instructs, any person under their control to do so”.

Designers can be architects, consulting engineers, quantity surveyors, chartered surveyors, interior designers, temporary work engineers, technicians or anyone who specifies or alters a design.

Meanwhile, the definition in the CITB draft guidance says: “The principal designer must be a designer on the project and be in a position to have control over the design and planning stage. This will usually be an organisation or, on smaller projects, an individual with: a technical knowledge of the construction industry, relevant to the project; an understanding of how health and safety is managed in the design process; the skills to be able to oversee health and safety during the pre-construction phase of the project and the ongoing design.

But the CITB also says the role can be combined with others, such as that of project manager.

These sometimes contradictory definitions leave ambiguity for clients, and one can foresee a range of options:

Example 1: A surveying consultancy with in-house construction health and safety, and design expertise, but independent of the designers, is appointed as principal designer until project completion.

Example 2: The architect is appointed as principal designer until project completion, but chooses to outsource health and safety co-ordination until they update their systems and upskill their team.

Example 3: The architect or a consultancy with in-house construction health and safety, and design expertise is appointed as principal designer until the end of concept design stage, when the principal contractor takes on the role.

Example 4: The principal contractor takes on the role of project designer from the concept design stage until completion.

Example 5: The client that follows 2, 3 and 4 above but does not have in-house expertise appoints an independent construction health and safety adviser. The client must arrange for the management of health and safety through the planning, design and construction phases of the project, and ensure sufficient information is provided in the health and safety file for the lifecycle of the facility, building or structure.

Appointing the principal designer earlier than the current CDM co-ordinator, together with clients having the clout and teeth to plan, manage, monitor and control health and safety information, should be a huge benefit to the industry.

Stephen Coppin MCIOB is a partner of health and safety services at Rider Levett Bucknall.
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3D printing enters uncharted territory
New technology brings with it a raft of complications for contractors, as May Looi explains

FOLLOWING A VISIT to a 3D-printing workshop organised by Construction Manager, in late 2013 I wrote an article that questioned whether the technology was the next step in construction, and briefly considered the legal implications of this.

Just more than a year later, 3D printing appears to be the “next big thing” in construction, rivalling BIM in its capacity to grab headlines. There have been suggestions that 3D printing could help solve the UK housing crisis, and leading architects Foster & Partners and Zaha Hadid Architects have discussed its potential to build anything from a showcase pavilion to suburban homes.

Most recently, a Chinese company, Winsun Decoration Design Engineering Co, is reported to have constructed a five-storey building - the tallest using the technology - and a 1,100 sq m mansion, which was 3D printed before being assembled on site.

Beyond the headlines, 3D printing does provide great potential to fundamentally change the construction industry by altering the design, fabrication and installation processes. However, such radically new methods of working bring risks of liability and contractual issues.

This technology is evolving alongside BIM, which is intrinsically linked to progressive forms of construction, but also raises legal and contractual challenges.

Legal and contractual issues
This article focuses on the more likely immediate use of 3D printing in the UK: discrete elements or sections within a building, such as cladding panels - a goal recently mentioned by Skanska and Loughborough University. Although 3D printing does not fundamentally change the construction process, the new technology and working processes bring potential duties and risks that should be considered at the outset to ensure clarity between parties and avoid unnecessary disputes.

First, there is the lack of established technical standards for 3D-printed components, such as a relevant British Standard. Construction team members and the client should agree a standard and, if relevant, working process, in writing, to ensure consistency and avoid a mismatch in expectations.

Furthermore, the scope of 3D printing should be laid out in the construction documents, and the position made consistent across the contracts for all the construction team. The client is likely to want knowledge - and some control - over which parts of the project are 3D printed.

There is then the issue of responsibility for any defects or imperfections in the 3D-printed objects, or damage during printing or transport. It could be said that 3D-printed elements are no different from those fabricated in the conventional way. However, to ensure clarity, it would be better to set out where risk lies between the parties, and when the responsibility for the 3D-printed sections passes from one party to another - particularly if this is different from other aspects of the project.

Given that today’s generation of machines are susceptible to dust and dirt, the parties responsible for carrying out the 3D printing will want to have appropriate warranties and indemnities in place from the machinery and materials manufacturers and suppliers.

Post-completion aspects should also be considered. The lifespan of 3D-printed building parts is still imprecise and parties will need to decide whether this affects the agreed lifetime of the building.

If maintenance and renovation of the 3D-printed elements is not expected to be as straightforward as for traditionally constructed or manufactured parts, the maintenance or handling requirements and instructions should be clearly set out to the client to avoid misunderstanding and unnecessary claims later on.

Clients may seek express terms in warranties and guarantees relating to the quality, lifespan and fitness for purpose of the 3D-printed elements of the buildings.

Insurance waver
Finally, there is the matter of insurance. Parties should discuss with their broker whether their existing policy wordings are wide enough to cover their liability arising from the 3D-printing process, any additional warranties or guarantees required by the client and whether extensions are needed to ensure suitable cover for possible claims.

The construction industry is on the cusp of an exciting and innovative time. However, how courts will apply the established legal principles of construction law to these new technologies is uncertain. To minimise the risk of disputes, project teams will need a combination of open communication and clear contract terms that are appropriate for the particular project and the parties’ obligations within it.

May Looi is a senior associate at Kennedys.

In the UK 3D printing is likely to be used for discrete elements or sections, such as cladding, as at the 3D Print Canal House project in Amsterdam, which was 3D printed before being assembled on site.
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They may not talk about it, but some of the UK’s largest contractors, including Mace, ISG and Skanska, are working on building data centres. Because of concerns about revealing information that could compromise their physical security, as well as client confidentiality agreements, these developments are rarely seen in the press. However, these anonymous buildings play a vital part in our lives.

Data centres are the physical representations of the internet: the place where all the data that each of us produce and receive every day – whether sending emails, updating our Facebook status or uploading digital images to “the cloud” – is physically stored.

Our increased reliance on computers and digital devices means that, as a nation, we are creating more data than ever before. This, in turn, is leading to continued growth in the construction of facilities to store this data.

**The Architecture of the Internet**

Demand for these anonymous-looking buildings that store vast amounts of personal data that we hold in “the cloud” is growing exponentially. **Tom Ravenscroft** explains what it takes to build a data centre.
Technical Services

Clockwise from far left: Telehouse’s Telehouse West in London Docklands; Lloyds Banking Group’s Copley data centre in Halifax; Facebook’s data centre in Oregon, US; Telehouse’s Telehouse North 2 in London Docklands; and Telecity Group’s Joule House data centre in Manchester.

“Often the client is looking for an anonymous building. They are designed to blend in.”
Andy Almond, Pick Everard

“With the amount of data more than doubling every two years, corporate storage is becoming more of an issue every day,” says Steve Webb, chief information officer at Ark Data Centres, which designs, builds and operates data centres in the UK.

It is a little-known but nevertheless expanding sector of the construction market. Commercial real estate consultant CBRE reports that in London alone 75,000 sq m of data centres have been built over the past five years. It predicts the “market will remain healthy in the short-to-medium term”.

“During the last recession we were continuously busy,” says Malcolm Howe, critical systems partner at engineering consultancy Cundall. “It’s always been a good sector to be in and now we are seeing a lot of work coming through.”

Data centres are extremely functional buildings built to provide a secure, stable and controlled environment to house racks of servers. The large-scale data centres of global technology giants such as Facebook’s “Arctic Circle” data centre in Lulea, Sweden, or Google’s €75m facility in Dublin, are well-known examples.

However, owner-occupied data centres only represent a small proportion of the market. Most of the UK’s storage is based in colocation sites run by hosting providers such as Telecity Group, Global Switch, Digital Realty and Virtue, which, because of their sensitive nature, clients do not like to promote. And, unlike many building types, data centres are not designed to advertise their function.

Andy Almond, director at Pick Everard, an architecture practice that has designed several data centres, says: “Often the client is looking for an anonymous building. They are designed to blend in.” This means that a data centre will typically have an aesthetic similar to that of a warehouse, although the main difference externally will be its increased height – server racks are typically 2 metres high – along with the presence of multiple air-handling plants that may be visible on the building’s roof.

“Money is spent on protecting the data, not the building,” explains Almond. “The envelope of the building is not that expensive – it is essentially a big shed. The cost comes from the servicing.”

It’s what’s inside that counts

While the exteriors are rarely visually or architecturally appealing, the security of these servers is the reason the buildings are so interesting internally.

Nick Card, operations director at Skanska’s M&E contracting arm, SRW Engineering Services, explains: “The building of data centres is generally not complicated. However, the services contained within them are.”

The two key functions of the services are to provide electrical infrastructure resilience for the servers (box, overleaf) and to ensure they are cooled correctly. In a typical data centre, about 70% of the building will be “white space” for servers. The remaining 30% contains the plant needed to power and cool the servers.

“Servers need to be located in a highly controlled environment to reduce the risk of server failure,” continues Card. “Loss of servers represent a risk to all businesses and we have all read about the damage done to various brands when they fall over.”

“The combination of power and cooling, along with highly specified security and fire-detection systems, make data centres highly services orientated, with the services being a key and fundamental part of the facility.”

Even a minute of downtime can lead to huge financial losses, so resilience is the primary design concern. There are four tiers of data centre resilience, as defined by the Uptime Institute consortium. Tier 4 is the most robust: maintenance can be carried out without interruption to service, so it should never fail.

However, increased reliability comes at a cost and Tier 3 data centres are seen...
Around 70% of data centres’ internal area is “white space” for servers.

Cool customers
The servers generate a huge amount of heat, so continuous cooling is needed to maintain the temperature of the servers within the allowed tolerances. As well as penalties for loss of power, the operators of commercial data centres will be penalised if the temperature, which is monitored by sensors, deviates beyond the boundaries agreed.

Any break in the cooling could also lead to “thermal runway” - where a rise in temperature changes the conditions in a way that leads to a further increase, and causes the servers to shut down.

Like all areas associated with IT, the design of data centres is evolving rapidly as operators and users aim to improve the sustainability credentials of what is an extremely power-hungry building. In an old data centre, cooling can use 30%-40% of the power, so it is in this area that most energy-saving advances have been made in the past five years.

A change in the industry-standard design guidance has helped: the technical standards set out by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) have increased the range of acceptable air temperatures for data centres.

“Ten years ago server inlet temperatures were often maintained within half a degree of 23°C. Now the range is between 16°C and 27°C,” says Cundall’s Howe. “This broadening of temperature range allows a free cooling air strategy to be developed.”

Free cooling systems use low external temperatures to chill water and have the potential to save huge amounts of power in data centres.

Another innovation in the sector is the advancement of modular construction. ISG has been pioneering in this area and, with Gardner DC Solutions and BBlur Architecture, has developed a modular concept called DATA a RAY. This claims to offer up to 10,000 sq m of Tier 3 space in less than 12 months – twice as fast as a traditional build. However, as power is often the key determining factor in data centre construction times, the advantages of modular construction have so far not been fully realised and most data centres continue to be traditionally built.

Although you may not have realised it when you are walking or driving around the country, you have almost certainly passed a data centre. Perhaps it was a warehouse-style building covered in air-cooling units, or a what you took for a B1 office and light industrial development on a secondary business park.

But those anonymous buildings might be where your emails are stored, and they are almost certainly a growth market for contractors and consultants in the years to come. CM

### Zinc whiskers: what 10 out of 10 builders of need to know

These tiny particles of metal can be a hidden hazard in data centres, as Tim Brown explains.

What are zinc whiskers?
Zinc whiskers were first recorded in the 1940s by Bell Laboratories and have been researched extensively by NASA. They are tiny filaments of zinc that can grow from galvanised surface, including electroplated floor tiles and cable management systems. They are usually a few millimetres long and a few microns in diameter but their rate of growth can vary.

What causes zinc whiskers?
The zinc used in the galvanising process is the catalyst for zinc whiskers to grow. Research suggests stress initiates growth. This may be residual stress from the galvanising process, mechanical stress from cutting, bending or fitting the galvanised materials on site, or thermal stress from the environment in which the galvanised materials have been installed.

Why are they a concern?
After growing on galvanised surfaces, zinc whiskers can detach themselves and float around the data centre. They may be tiny, but they are conductive and have the capacity to conduct tens of milliamperes before melting. So there is a potential for zinc whiskers to bridge tightly spaced electrical conductors and cause electrical shorts, causing nuisance glitches or damage to sensitive hardware.

How serious is the risk?
As the whiskers melt following contact with an energy source, it is difficult to assess how many faults they have caused.

Much of the discussion on zinc whiskers has identified cable management systems as the main source, so Unitrunk commissioned research by Colin Gagg of the Open University’s Materials Engineering Group. He concluded that any galvanised surface used in a data centre carries a risk of zinc whiskers.

How can the risk be reduced?
The most commonly specified finishes for cable management systems in interior installations are electro-zinc and pre-galvanised. These are often specified for data centre environments but will not prevent zinc whiskers. Raising the specification to hot-dip galvanised cable trays is an option, but we believe this may simply delay the problem.

Alternatively, some form of encapsulation - such as a powder coating - is often recommended to seal the zinc surface. However, if the encapsulation is breached - by cutting the cable management on site or because of abrasion during or after installation, for example - the risk is likely to return.

The third option - which we recommend - is to specify a stainless steel cable management system.

Tim Brown is national sales manager at cable management specialist Unitrunk.
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Aecom to roll out TfL accreditation nationwide

Global consultancy Aecom has been appointed by Transport for London (TfL) to manage its Fleet Operator Recognition Scheme for the next five years.

Aecom will expand the accreditation scheme, which aims to improve vehicle safety and environmental performance, across the whole of the UK.

The voluntary scheme has accredited more than 210,000 vehicles since it was established in 2008. It is currently only available to companies that operate fleets, including vans, lorries, mini-buses and coaches, in the Greater London area.

Mayor of London Boris Johnson said: “The Fleet Operator Recognition Scheme has helped to deliver cleaner and safer freight fleets in the capital and, with it now set to roll out nationwide, this is great news for road users up and down the country.”

Aecom will manage and develop the scheme with the Chartered Institute of Logistics and Transport, undertaking promotion, marketing and governance, while Fleet Source - a company that offers fleet operators auditing, training and compliance services – will be responsible for the accreditation audits and training.

Richard Robinson, chief executive, civil and infrastructure for Europe, the Middle East and Africa, at Aecom, said: “As a company committed to improving safety in transport, we are delighted to deliver such an important scheme.

“Through its standards, accreditation and promotion of good practice, the Fleet Operator Recognition Scheme has contributed to safer, greener and more efficient road fleet operations in London, and we look forward to growing the scheme outside the capital.

“Today’s contract award builds on our ongoing work in construction logistics and cycle safety, cementing Aecom’s strategy in the UK to design, build, finance and operate major schemes for our clients.”

Aecom already manages for TfL the Construction Logistics and Cycle Safety project to develop national standards for the industry to protect cyclist and other vulnerable road users.

TfL will be exhibiting in Hall 4 at the Commercial Vehicle Show 2015.

Euro diesel directive is not “fuel economy disaster”, as feared

Ian Lumsden, UK marketing director at heavy goods vehicle manufacturer Iveco, believes the European Commission’s diesel engine emission legislation Euro-6 has not turned out to be the “fuel economy disaster” some hauliers feared.

The European Union directive on forcing down emissions of nitrous oxides (NOx) and particulates for diesel-engined vehicles did not include a focus on further cutting CO₂ emissions. So it had been thought that cutting use of NOx and particulates would make engines work harder - thereby increasing fuel consumption.

However, speaking at Iveco’s annual press conference, Lumsden said: “Forget which make, industry reports suggest that 10mpg (at 44 tonnes) is fast becoming commonplace, with operators reporting figures in excess of that. These are fuel economy figures that would have been unimaginable not too many years ago.”

Also at the event Iveco predicted UK truck registrations could hit 40,000-41,000 this year, thanks to a buoyant economy and an absence of new legislation that could distort demand.

This would be a huge increase on 2014, when fewer than 35,000 trucks were registered, figures from the Society of Motor Manufacturers and Traders.

Iveco will be exhibiting in Hall 4 at the Commercial Vehicle Show 2015.
This new Mercedes-Benz truck has been donated to the Metropolitan Police Service for its cycle safety programme, Exchanging Places.

By giving cyclists the opportunity to sit in the driver’s seat of a heavy goods vehicle (HGV) and experience how difficult it can be to see bikes, the scheme aims to tackle the most common cause of serious injury and death to cyclists: collisions involving an HGV.

The programme is run by the Met’s Cycle Safety Team and forms part of the MPS Roads and Transport Policing Command. It draws its funding from TfL.

Since the scheme was launched in 2007, 15,000 cyclists have taken part, and the Met now needs a dedicated vehicle.

The Mercedes-Benz Actros truck is provided on a one-year lease, and has been given police livery and blue lights. It is only driven by trained police drivers and will not be used for patrols or enforcement.

Police sergeant Simon Castle, roads and transport policing command, said: “We are grateful to Mercedes-Benz and Sparshatts of Kent for supplying us with this vehicle, which is perfect for our Exchanging Places programme.

“The feedback [from the programme] is overwhelmingly positive: 97% of cyclists say they would change their riding as a result of sitting in the driver’s seat, and 99% would recommend it to a friend. I urge cyclists to watch the Exchanging Places film on the Met’s YouTube channel and attend an Exchanging Places event. It is a potential life saver.”

The Metropolitan Police will be in Hall 4 at the Commercial Vehicle Show 2015.
Taking evasive action against alien invasions

A new European Union directive and domestic community legislation place new responsibilities on construction professionals in managing invasive alien species. The Property Care Association explains.

TWO NEW SETS OF REGULATIONS could result in fines of thousands of pounds and prosecution for industry professionals and businesses if Japanese knotweed and other invasive weeds are not managed appropriately and in a timely fashion (box, opposite).

The new Invasive Alien Species Regulation 2014, which came into force in January, obliges member states to control and manage invasive alien species in the European Union.

The regulations class Japanese knotweed in the same bracket as the grey squirrel, the mitten crab, wild boar and the signal crayfish, which means that anyone responsible for introducing, keeping, selling or releasing them into the wild could face a fine or imprisonment.

Under the new regulations, government agencies will have the power to issue control orders that require the removal of high-risk invasive weed species from specified sites, which could include housing projects and neighbouring properties.

The full list of high-risk species is still to be finalised by the European Commission. Max Wade, a technical director at Aecom and chairman of the Property Care Association’s Invasive Weed Control Group, will be following the directive’s evolution closely, so that measures for dealing with any implications of the new regulations can be integrated into the association’s training, services and advice.

Another development relevant to invasive weed control also has implications for the construction sector. Part 4 of the new Anti-social Behaviour, Crime and Policing Act 2014 has introduced community protection notices, which could be issued by local authorities or the police to force landowners to deal with Japanese knotweed and other non-native invasive plants. It allows fines of up to £20,000 to be imposed on companies that fail to tackle the problem. Individuals would also be forced to comply, or face a fine of up to £2,500.

Although the act does not explicitly refer to invasive non-native plants, accompanying Home Office guidance makes it clear that failure to control them could be considered anti-social behaviour. This is primarily because of the impact that plants such as Japanese knotweed can have on property values and owners’ ability to sell their properties.

Community protection notices, which are intended to be flexible in scope, could be issued if a person or an organisation’s unreasonable conduct is having a continuing detrimental effect on the quality of life of those in the locality. This could include failing to control invasive plants on a property, or allowing them to spread from a property.

The European angle

Invasive weeds of particular concern are already listed in schedule 9 of the Wildlife and Countryside Act 1981. So, although there is no legal requirement to control them, it is an offence to cause the plants listed to grow in the wild.

Section 14(2) of the act states: “If any person plants or otherwise causes to grow in the wild any plant which is included in part 2 of schedule 9, he shall be guilty of an offence.” In fact, anyone convicted...
Japanese knotweed
(Fallopia japonica)
Japanese knotweed is a problem in most of the UK. It is particularly abundant in cities. The species arrived in Great Britain in 1825 as an ornamental plant used in large gardens because of its imposing size and sprays of white flowers. By 2000, it was everywhere.

The plant does not produce viable seeds in Great Britain and Ireland. It spreads through fragments of underground stem (rhizomes) and, occasionally, from freshly cut stems.

The plant’s tall, dense stems can exacerbate flooding along water courses by obstructing water flow and, after winter dieback, leave river banks exposed to erosion.

The National House Building Council recognised the threat to buildings and other structures posed by Japanese knotweed in the early 1990s. But it was not until this century that the threat was considered “significant”.

The Department for Environment, Food and Rural Affairs advises Japanese knotweed is fenced off on sites. There should be clear signs, so only appropriately briefed personnel enter the enclosure to deal with the infestation and waste. This includes areas with waste plant material or soil contaminated with the plant. Rhizomes are classified as controlled waste.

Tracked vehicles must not be used in the affected area and vehicles leaving the site should be pressure-washed.

It is an offence to facilitate the spread of Japanese knotweed in the wild in Great Britain and Northern Ireland.

Himalayan balsam
(Impatiens glandulifera)
The GB Non-Native Species Secretariat describes Himalayan balsam as an “annual herb with stout, succulent, reddish translucent hollow stems” and “deep purplish-pink to white flowers, with a strong balsam smell”.

Himalayan balsam is well established and extremely invasive throughout most of lowland UK, but is less prevalent in upland areas.

It is considered to have a high impact, and can spread rapidly on the soft banks of water courses, where its presence can exclude most other plants and in times of flood, impede the flow of water.

Dangers of alien invasive species
Managing alien invasive species

The National House Building Council recognised the threat to buildings and other structures from Japanese knotweed in the 1990s.

> of a more proactive approach to these troublesome plants.

“The EU regulations represent an important change in emphasis and involve using risk-based assessments linked to avoidance and preventative measures, as well as identifying and cutting off pathways of spread,” he explains.

“This biosecurity approach emerging from government and the EU points the direction invasive weed control is going. Just as in Scotland, it is anticipated that England, Wales and Northern Ireland will be subject to control orders that require landowners to deal with a given weed or weeds.”

The Property Care Association predicts the new regulations will bring about a greater focus on protection against the spread of Japanese knotweed and other invasive species as part of the construction process. Development sites provide a fertile environment for invasive species, so it is important that those in the industry are aware of the issue.

The association believes that the problem can be managed and contained, particularly if construction professionals are alert to it from the beginning. For instance, a member company recently visited a site that had become overrun with Japanese knotweed.

The problem had stemmed from a single plant that had been tucked up behind some hoardings. Workers were driving over it without realising what it was, so a single plant that would have been easily treatable led to the entire site becoming infected.

For construction teams, carrying out a specialist survey to identify invasive species on site well in advance of development can help to reduce the risks associated with Japanese knotweed and other schedule 9 species.

It is important for construction managers to be aware of the presence of invasive species on their sites – if they are inadvertently spread, development can be delayed, remedial costs can increase rapidly, and developers can open themselves up to prosecution and bad publicity.

Once an invasive weed is identified, a management plan can be put in place and control can get under way.

By the Invasive Weed Control Group of the Property Care Association

The association offers training to help construction professionals deal with the problem of invasive weeds.

There are two levels of certification and the training is relevant to those in the invasive weed control industry, and in construction and development, surveying, horticulture, ecology and land remediation.

The association has also launched a course to enable professionals in local authorities to identify Japanese knotweed and develop strategies for its control and eradication.

In addition, it has published targeted guidance, including its code of practice for the management of Japanese knotweed. The association also worked with Japanese knotweed control companies in the UK to set up the Invasive Weed Control Group in 2012 alongside the RICS, supported by the Council of Mortgage Lenders and the Building Societies Association.

For details go to www.property-care.org

CPD test paper
Managing alien invasive species

1 With which of these statutes must construction companies and managers comply in relation to alien invasive species?
   - European Union Invasive Alien Species Regulation 2014
   - Wildlife and Countryside Act 1981
   - Environmental Protection Act 1990
   - All of the above

2 Which of these is not a hazard that will spread Japanese knotweed in Great Britain and Ireland?
   - Seed germination
   - Contaminated soil
   - Freshly cut stems
   - Rhizome fragments

3 Which act lists the plants for which it is an offence to cause them to grow in the wild?
   - European Union Invasive Alien Species Regulation 2014
   - Anti-social Behaviour, Crime and Policing Act 2014
   - Schedule 9 of the Wildlife and Countryside Act 1981
   - Environmental Protection Act 1990

4 Which sanctions under the Anti-social Behaviour, Crime and Policing Act 2014 could be applied to order the control of invasive species?
   - Anti-social behaviour order
   - Criminal behaviour order
   - Community protection notices
   - Surrender of property

5 What measures does Department for Environment, Food and Rural Affairs advise for sites with Japanese knotweed?
   - The site must be fenced off
   - Only briefed personnel can enter the site to deal with infestation
   - Rhizomes are dealt with as controlled waste
   - All of the above

Have you registered yet?

The CIOB has launched a dedicated CPD portal on the Construction Manager website, featuring CPD modules from the magazine as well as additional study topics from a wide range of industry experts. To complete the questionnaire below, and explore the free CPD content available, please register at: www.construction-manager.co.uk/cpd
Get a global view of the built environment

Global Construction Review tracks the complex flows of money, ideas and talent to provide a world view of the built environment business.

www.globalconreview.com
IN THE RADAR
All the latest news and developments from the CIOB at HQ and in your area, including regional awards.

MACE’S ED DIXON SAYS WE’RE MISSING A TRICK WITH CARBON REDUCTION MEASURES

LEARNING CURVE
Gen up on carbon measures. Plus this month’s One to Watch, Zeshan Afzal

IN GOOD COMPANY
The overhaul of Norfolk County Council’s 1960s HQ is symbolic of a root and branch efficiency strategy

MEMBER BENEFITS
Take advantage of exclusive member offers

DATES FOR YOUR DIARY
All the key events you need to know about in your region
The CIOB has announced 2014’s top innovators and researchers working on built environment ideas in its annual International Innovation and Research Awards.

The 2014 competition registered 178 entries from 17 different countries, with cash prizes on offer of up to £2,000. The judging panel consists of 17 judges, including CIOB Innovation and Research Panel members to select six premier award winners.

Professor Stuart Green MCIOB, chair of the judging panel, said the entries "once again surpassed all expectations".

“The judging panel was unanimous in its assessment that the overall quality standard was the best ever,” said Professor Green. “Innovation in the built environment is undoubtedly alive and well. Several of the entries were nothing short of inspirational. “It has been especially gratifying to see excellence spread so evenly across the different award categories. Industry participation in the CIOB I&R awards gets stronger every year, and the quality of the entries from the university sector bodes well for the next generation of innovators.”

For more on the winning entries and the Awards go to http://iandrawards.ciob.org

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AWARDS

Innovation award winners impress judges with “inspirational” work

Highly Commended Phil Pyatt (Education and Employers Taskforce, UK)
Merit Dr Kung Weng (Andy) Ng, Dr Wing Tak (Arthur) Leung, and Dr Tak Wa (Caroline) Chan (City University of Hong Kong)

Research Paper Award
Premier Dr Yingsen Feng (University of Western Sydney, Australia)
Highly Commended Professor Craig Langston, (Bond University, Australia)
Merit Dr Libby Schweber (University of Reading, UK) and Dr Hasan Haroglu, (Kingston University, UK)

Undergraduate Dissertation Award
Premier Idei Van (Eileen) Chin (BSc in Project and Facilities Management, National University of Singapore)
Highly Commended Richard Smith (BSc in Architectural Engineering and Design Management, Loughborough University, UK)
Merit Mark Doherty (BSc in Construction Management, Leeds Beckett University, UK)

Masters Dissertation Award
Premier Dean Elder (MSc in Infrastructure Engineering, University of Ulster, UK)
Highly Commended Susumu Isoda (MSc in Construction Management, University of Reading, UK)
Merit Hassan Ahmadu (MSc in Project Management, Ahmadu Bello University, Nigeria)

I Innovation Achiever’s Award
Premier Robert Harris and Mr Stanley Whetstone, (OXYPOD, UK)
Highly Commended Matthew Holloway and Thomas Lipinski, (Q-Bot Ltd, UK)
Merit Dr Amar Bennadji (Robert Gordon University, UK) and Mike Tweats (Icynene Kishorn Insulation, UK)

Digital Innovation
Premier Heba Bevan, (Cambridge University, UK)
Highly Commended Dr Maxwell Mallia-Parfitt and Professor Jennifer Whyte, (University of Reading, UK)
Merit Kieran Standing and Antonio Torres (Bam Ferrovial Kier JV, UK)

Innovation in Education and Training
Premier Dr Robby Soetanto, (Loughborough University, UK)

Access the CIOB website at www.ciob.org
Click on the election box
Insert your membership number
Insert your PIN as your date of birth in the eight-digit format (ddmmyyyy)

TRUSTEE ELECTION

CIOB 2015 TRUSTEE ELECTION: VOTING OPENS FOR CORPORATE MEMBERS

The election for the CIOB’s Board of Trustees commences on 11 March. All Corporate Members (MCIOB/FCIOB) are eligible to vote. Please look out for your ballot papers which will drop through your post box early in March. Voting can be by post or online. Voting online cannot be easier:

Access the CIOB website at www.ciob.org
Follow the instructions on the ballot site
The deadline for voting is 8 April at 12pm. All candidates within the election have been through a rigorous competency assessment on your behalf so reward the most able by voting for them. Make your voice heard and exercise your vote.
Only corporate members who have paid their 2015 subscriptions by 28 February will be eligible to vote.

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Could you be 2015’s Construction Manager of the Year?

Are you ready to join the elite? Entries are now open for the most highly prized accolade in the construction industry.

If you have completed a project in the UK between 11 March 2014 and 12 March 2015, you could be eligible to enter the CIOB’s Construction Manager of the Year Awards 2015.

CMYA is unique. They are the only awards to focus solely on the talents and leadership skills of construction managers. Entry is free and open to CIOB Members and non-members alike.

Thanks to the rigorous judging process, the awards are highly prized throughout the built environment sector and all finalists are offered the chance to apply for corporate CIOB membership without having to undergo the Professional Review process.

As last year’s varied crop of winners demonstrated, age and experience are irrelevant. You could win a gold category at any stage of your career, whether you have just completed your first project or you are approaching retirement.

The size and type of the project doesn’t matter: whether you worked on a small residential scheme, a restoration project or a skyscraper, the judges are looking for exceptional problem-solving and flexibility in a fast changing environment. Gold and silver medallists add cachet to any bid team.

Read about the crop of 2014 winners and finalists, learn about the CMYA process, download the entry form and check out entry criteria at www.cmya.co.uk

The deadline for entry is 12 March 2015.

Vacancies on CIOB Health and Safety Group

The CIOB Health and Safety Advisory Committee aims to highlight relevant issues, promote good practice and provide a resource service base on health and safety to the members of the CIOB and the construction industry.

In recent years the Committee has: produced official responses to government requests including consultation on replacement of the Construction (Design and Management) Regulations 2007; published survey results on general and specialist health and safety subjects; worked with other institutes on best practice reviews; and promoted the work of CIOB scholars.

The committee meets formally two to three times a year with many communication opportunities in between. You will be part of a core group of people with a significant voice in the industry.

If you are interested in applying for either position or have any questions, contact Judy Parker or send a brief career resume to parker@ciob.org.uk. Applications closing date is 31 March 2015.

Apply now to join the CIOB H&S Advisory Committee.
PROFESSIONAL CONDUCT COMMITTEE (PCC)

FINDINGS AT HEARINGS HELD ON 22 OCTOBER 2014 AND 4 DECEMBER 2014

The following findings at these hearings recognise the seriousness with which the CIOB regards CPD compliance and demonstrates the need for members to act with integrity at all times. Whilst the PCC takes its responsibilities extremely seriously, and only imposes the sanction of expulsion where it is necessary and proportionate to do so, the committee will take such action in serious cases to safeguard the dignity, integrity and reputation of the Institute.

Samantha Teague, Institute Secretary

- Mr Kieran Gregory, Devon
- Mr Dean Potter, Hampshire
- Ms Lauren Taylor, Surrey
- Mr Simon Nicholson, London
- Mr Sion Kinsey, Wales
- Mr Steven Greening, Isle of Wight
- Mr Thomas Moorcroft, Yorkshire
- Mrs Karen Ratcliffe, Shropshire
- Mr Martin Power, Midlands
- Mr Nigel Appleton, Hampshire
- Mr Velji Vekaria, Middlesex

SUMMARY OF FINDINGS FOR EACH OF THOSE LISTED ABOVE:

Failure to comply with Rule 13 of the RRPPC, which requires members to undertake CPD, by virtue of failing to provide evidence of continuing professional development when requested.

PENALTY: Expulsion

COSTS: £250

AWARDS

South West awards offer new BIM prize

The South West Built Environment Awards (SwBEA) are now open for entry and this year they include a new BIM category. For the eighth year running the CIOB and Constructing Excellence South West are joining forces to present the premier awards in the region for the construction industry at its annual dinner which takes place on 12 June at the Bristol Marriott Hotel City Centre.

This event is now recognised as being in a class of its own, celebrating good practice combined with great entertainment and networking. The extremely popular evening event will be attended by representatives of local and regional companies together with senior figures in the industry.

Winning a SwBEA Award automatically qualifies you for entry into the National Constructing Excellence Awards, where the best that the region has to offer is pitted against the best nationwide.

There are eight award categories: Achiever of the Year; Client of the Year; Health & Safety; Heritage; Innovation; Integration & Collaborative Working; Leadership & People Development; Project of the Year; SME Award; Sustainability; Value; Young Achiever and – new for 2015 – BIM Project of the Year.

Tables of 10 are available for £750 plus VAT (includes: three-course dinner, awards presentation and entertainment) and an individual Seat is £75 plus VAT (includes: a seat on a table with other seat bookers, three-course dinner, awards presentation and entertainment).

For more information, entry forms and to book a table visit www.buildswawards.org.uk

SCHOLARS RECEIVE AWARDS AT MEET THE PRESIDENT EVENT

QE II SCHOLARSHIPS PRESENTED AFTER ENTERTAINING INTERVIEW WITH PROFESSOR GHASSAN AOUAD

At a recent ‘Meet the President’ joint event with East of England, South East and London CIOB branches, Professor Ghassan Aouad, the President of the CIOB presented the QEII Scholarships.

The scholarships are given to university students who have excelled in their first two years of study - those showing potential to be the future leaders of the construction industry. The students are nominated by CIOB-accredited universities. The award winners were:

- James Suttie, University of Greenwich
- Nathan Clothier, Highlands College Jersey /o London South Bank University
- Oliver Notley, Kingston University
- Ed Clarke, Anglia Ruskin University
- Andrew Pring, University of West London

Each student receives £500 for his final year study support. More than 100 people attended the event to listen to the president being interviewed by London branch Senior Vice Chair, Ayo Allu FCIOB. Ghassan entertained the audience with his answers on everything from leadership in the industry and his passion for NOVUS to his plans to write a book and how he is introducing his daughters to the industry.

Enter the South West Built Environment Awards now

(Costs: £250 plus VAT)

HAVE WE GOT YOUR CONTACT DETAILS CORRECT?

If you have moved or changed any of your details recently, don’t forget to tell us. You can update your details online – simply log in to “members area” of the website www.ciob.org. Or email us at memenquiry@ciob.org.uk or call our membership customer services team on +44 (0) 1344 630706 for further help.

If you would rather post your details send them to: The Chartered Institute of Building, 1 Arlington Square, Downshire Way, Bracknell RG12 1WA, UK.
Novus West Midlands took a tour of the Birmingham Gateway Project in January, which also gave the group an insight into BIM at work. The project is a redevelopment scheme to regenerate Birmingham New Street railway station and the Palladium Shopping Centre above it. The scheme forms part of the Big City Plan – a City Centre Masterplan designed to improve Birmingham over the next 20 years. Birmingham Gateway is due for completion in September.

The tour was a hit with those who attended. Neil Bramwell ICOB said it was excellent: “The speakers were very knowledgeable and were happy to answer any questions. The BIM demonstration was very good. I think everyone appreciated the speakers from Mace staying late into the evening so that we could have a full tour of the construction site.”

Aaron Murphy ICIOB, assistant commercial manager at DBK Ltd, also praised the team from Mace. “They were more than happy to answer any questions and provided a very detailed tour.”

Richard Sapcote FCIOB from Shaylor's and West Midlands branch past chair said he was “very impressed with two significant aspects.”

“BIM was used throughout and adapted, so site operatives, end users and clients, such as the retail tenants, could visualise the interior at various stages of construction – very difficult when the old floors/walls were still in place,” he said. “There was clever use of 3D goggles and gaming hand devices. Also the demolition activity to remove the central core of the building to provide the concourse is quite a transformation and jaw dropping when you first see the open plan area.

“The construction team used BIM with lean construction techniques to establish the most efficient removal strategy and sequence, which cut months off the programme. It’s taking shape very quickly and I cannot wait until September to see the finished station.”

Laing O’Rourke held an event for school leavers last month at its HQ in Dartford to talk to students about its cadet programme: a five-year, part-time degree development programme. The programme offers development in four areas: commercial and procurement; construction management and planning; engineering; and IT. It gives school leavers an opportunity to complete an accredited degree while working as a Laing O’Rourke employee, combining academic learning with on-the-job training.

Those who attended heard from past ‘cadets’ such as Ben Webb, who is now working for Laing O’Rourke and studying at London Southbank University.

The firm is recruiting until the end of March. See www.laingorourke.com/european-careers/sponsored-learning/cadets.aspx
London Novus took a tour of the Houses of Parliament in January – an event that sold out within three days of it being advertised. The young construction professionals were taken aback by the magnitude of the 1,000-year-old architecture and construction methods employed.

The tour comprised a visit to the Prince’s Chamber, Royal Gallery, Queen’s Robing Room, House of Commons, Lords Chamber as well as the monumental Westminster Hall. There was even an opportunity to stand in David Cameron’s position when addressing the house during debates.
January saw the 50th anniversary of Sir Winston Churchill, an illustrious leader who has much to teach today’s construction industry. However, did his famed “never let a good crisis go to waste” quote – which gave rise to Wostenholme’s seminal 2009 report ring true? Six years later, the industry is roaring away from the crash, the central London market is booming and the downturn is quickly fading to a distant memory.

But what did we learn? Did we manage to cut carbon, reduce costs and improve delivery? Did we batten down the hatches, hide ourselves away and use the time to train and to spawn innovation? With unemployment declining, 2.6% growth in the past year and a bumper start to 2015, things certainly do seem to be improving.

But what about the bad news? My worry is that, without confronting the harsh realities of our current carbon quandary, we will never really work out what is required to bring about the change we so drastically need.

During the Second World War Churchill set up the Statistical Office to drip-feed news on the state of the economy into the cabinet. Knowing that his charisma and political standing would prevent his subordinates from coming forward with bad news, Churchill relied on the Statistical Office to produce reliable bad news that would help to inform decisions on the war effort.

Surely as an industry we can ask our ‘cabinet’ (CIC, GCB) to rely on the Statistical Office (UKCG, FMB) to produce better quality bad news so we can really start to delve into the detail and uncover the issues at hand?

Seeing the wood from the trees

It seems as an industry we have a complete lack of ability to see, or tackle, the real issues affecting the environment. We focus on sustainable site cabins but the real problem is the enormous volumes of embodied carbon from logistics. We use low-flow hoses for cleaning vehicles when the real issue is the huge volume of water used to commission a building. We concern ourselves with segregation of waste when really the issue is, of course, volume.

This takes me back to my CIOB Scholarship research, completed last year, from which the single most useful finding of my research was that the ‘power is in the production line’ – or put another way – we need to empower those who are out there delivering the work to make better decisions that result in more sustainable outcomes. This simply can’t be achieved by sitting in front of a computer or reading a contract – it takes time and effort.

From time to time I get the feeling we’re pulling in the right direction but then I remember that we seem to have gotten way ahead of ourselves, looking far into the distance and obsessing over social media, drones and the circular economy and forgetting that buildings are built on conversations between people and not online. I’m no technophobe and I recognise that there are solutions there that can help us, but for all the glitz and the glamour of the London market, there’s a tail end of the industry out there that desperately needs bringing up to speed.

Churchill said: “A pessimist sees difficulty in every opportunity; an optimist sees the opportunity in every difficulty” and I couldn’t agree more; we have a great opportunity here to improve the industry while the going is good and the answer to how is right under our noses. Sound management, positive relationships and a solid grip of the real issues at hand could help to turn 2015 into the year that made all the difference.

The power is in the production line: we need to empower those who are out there delivering the work”
DO YOU KNOW YOUR STUFF?

**KNOWLEDGE**

**CARBON IN CONSTRUCTION: DO YOU KNOW YOUR STUFF?**

Based on a London branch Sustainability Strategy Group event Andrew Pratt MCIOB gives us the scientific lowdown on carbon output.

*What is it?*

Carbon in construction is the quantity of greenhouse gases (GHGs) that are generated by the construction process. This is the fossil fuels used in material production, their transportation and on site, energy used in site accommodation, and the transportation of operatives to site. Units used are kilogram (kg) or tonne (t) of carbon dioxide equivalent CO2e.

GHGs are held attributable for global warming, which in turn is held responsible for climate change. GHG can be natural or manmade. It should be noted that CO2 is a trace gas and currently constitutes about 0.04% of the atmosphere. The main gases are nitrogen 78% and oxygen 21%. Carbon dioxide CO2 makes up roughly five-sixths of GHG.

*Why do we have to measure it?*

The Climate Change Act 2008 states that the UK must reduce its carbon output from 1990 levels by 80% by 2050. The Morrell Report of 2010 asked whether the construction industry was fit for purpose for the transition to a low-carbon economy and asked the industry to decarbonise. Reducing carbon in construction can also be viewed as a resource-efficiency strategy that could lead to reduction in costs and greater competitiveness.

*How do we measure it?*

There is a common metric of carbon dioxide equivalent CO2e that compares the global warming potential (GWP) of all GHG to carbon dioxide. For example, obviously, 1kg CO2 = 1kg CO2e however, methane is considered to have a GWP of 2, therefore 1kg CH4 = 21kg CO2e. Defra has published fuel conversion factors showing 1kwh mains electricity to have a carbon content of 0.494kg CO2e and 1 kwh natural gas to be 0.185kg CO2e. Significant work has been completed to show the embodied carbon in a variety of materials and this is readily available from manufacturers.

The Environmental Agency has a carbon footprint tool which when used shows 1,530 bricks at the factory gate include 1 tonne of CO2e. This is based on the bricks having a density of 1.9t cu m and a carbon conversion factor of 0.24 t CO2e per tonne of material. If the 1,531 bricks travelled 100km from the factory gates to site by road this would add 44 kg of CO2e to the calculation. If you used the data from the Inventory of Carbon and Energy then a similar calculation will show a 1.81t bricks have a embodied carbon of 1.1t CO2e. It is important to qualify the source of the information/data used.

To help grasp the units CO2e it is worthwhile measuring the fuel use of a dwelling. For example, a house using per year 28,496 kwh of gas and 4,208 kwh of mains electricity, and having a internal floor area of 118 m², has a total energy use of 276 kwh/m². Using the conversion factors above this equates to 63 kg CO2e.
Norfolk County Council's HQ was in such a poor state a total new build was considered. Instead a mammoth refurb is under way.

Generally water penetration in many areas has caused structural decay and resulted in damage to the fabric and finishes. This has led to concrete spalling and carbonisation in some of the structural elements.

Many of the roofs were found to be leaking and with inadequate levels of insulation and so needed to be replaced. This, coupled with a lack of edge protection to the roofs, restricted access for inspection and maintenance.

The windows throughout County Hall are single-glazed bronzed metal. Many window mechanisms have malfunctioned, preventing adequate ventilation and causing the building to be very hot in the summer and excessively cold in the winter when high heat loss was the issue.

The glass curtain wall to the ninth floor plant areas was in a dangerous state and required replacement with a more appropriate material suitable for the plant and equipment within the space, and the level of exposure to the prevailing weather conditions.

The heating was not very effective because of corrosion of the pipes and malfunction of the dampers. Some areas had been decommissioned during the oil crisis in the mid-1970s in a bid to reduce operating costs this contributed to the variances in seasonal temperature changes.

Cracks and ingress

Inspection of the concrete frame revealed that water ingress has decayed movement joints causing distress to the frame. The concrete frame suffers from ‘creep’. Along with thermal expansion and contraction this is causing the faience block cladding to deteriorate, crack and detach.

This necessitated the construction of a crash deck barrier system over the main entrances to the building because of the risk of falling masonry.

“The staff remain in the building while works are carried out and are kept informed of events with a weekly emailed update”
all the abutment details need to be sealed, as this was a prime source for water penetrating into the building at high level.

The wiring is subject to cyclical testing and repair and now requires major renewal. The electrical supply is not resilient and alterations are desirable to decrease the likelihood of disruption of service delivery through interruption of supply.

The entire above ground foul, waste and rainwater drainage is either blocked by scale or corroded, and the fibre rainwater downpipes have decayed and require replacement.

The existing mechanical heating and water distribution within the building is of an age where replacement with a more efficient system to reduce costs is an essential rather than just being desirable.

Moving in the right direction

The decision was made for the building to remain partially occupied with either a single or two floors only being vacated to enable the refurbishment works to proceed.

The process for this work requires the refurbishment to be commenced on a top-down principle which has caused some logistical issues with materials and manpower movements throughout the building, while maintaining the office environment for the delivery of services.

The use of a dedicated external hoist has allowed movement of materials to be segregated from the staff lifts internally.

The external envelope of the main tower is being over clad in a new window and rainscreen system to provide a thermally improved and weatherproof environment for the newly refurbished floors.

Floors seven, eight and nine have now been completed and handed back to Norfolk County Council for their reoccupation and use. Two other areas – one on the sixth floor and the other on the ground floor of the south wing – were due to be handed back as CM went to press.

The project is not just a refurbishment project as the completed floor areas provide the ability to implement 10-desk arrangement for efficient and collaborative working between teams who in the past have been geographically separated by the previous internal layout arrangements.

The staff remain in the building while the refurbishment works are carried out and are kept informed of events with a weekly emailed update via the communications team.

On each floor regular updates and progress photographs are displayed within the lift lobbies with key milestone dates displayed to indicate when the more disruptive works will be undertaken.

To supplement this, the contractor has also engaged a floor walker who provides a link with staff to ensure they have up-to-date information in all areas affected by the works.

FACT FILE

- JCT Standard format without quantities 2011
- Approximate contract value is £30m
- The programme for the works commenced in April 2013 with the target for completion for spring 2016.
- Currently the project is on time and within the client’s budget.
MEMBER BENEFITS

FULL CORPORATE MEMBERSHIP OF CIOB brings with it many benefits, not least the descriptors Chartered Construction Manager or Chartered Builder, the right to vote or to become a trustee. Being a member or fellow also gives you exclusive access to discounts and special deals on products and services that could enhance your professional development, help your business or boost your earning power. Products and services currently on offer from our special partners are listed below...

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MARCH TO APRIL 2015

**EAST OF ENGLAND**
- Hertfordshire AGM: 10 March, 7pm, Mercure Hatfield Oak Hotel Contact: coh@ciob.org.uk Visit to Grand Arcade Project: 11 March, 6pm, Cambridge Contact: mix@ciob.org.uk Unexposed Ordnance and AGM: 17 March, 6.30pm, University Centre, Peterborough Contact: mix@ciob.org.uk Visit to County Hall and AGM: 19 March, 6pm, County Hall Norwich Contact: mix@ciob.org.uk Party Wall and Essex AGM: 19 March, 7pm, Anglia Ruskin University, Chelmsford Contact: coh@ciob.org.uk CIOB and Bedfordshire AGM: 24 March, 11am, Swan Hotel, Bedford Contact: coh@ciob.org.uk

**CIOB ELECTIONS**
- Adjudication Law and AGM: 25 March, 6pm, ISG, Ipswich Contact: kpercival@ciob.org.uk Branch AGM/50th Anniversary: 31 March, 6pm, British Racing School, Newmarket Contact: shill@ciob.org.uk

**EAST MIDLANDS**
- Membership Workshop: 11 March, Northants Contact: swilliams@ciob.org.uk CSI of Buildings: 12 March, Leicestershire Contact: jnewton@ciob.org.uk

**NORTHERN COASTLINE**
- Committee Meeting: 3 March, 5.45pm, University of Aberdeen Contact: wmarshall@ciob.org.uk Technical Event: Health & Safety: 11 March, 5.45pm, University of East Anglia Contact: coh@ciob.org.uk Committee Meeting: 31 March, 5.45pm, Contact: wmarshall@ciob.org.uk EAST OF SCOTLAND Committee Meeting: 10 March, 5.45pm, RMP, Colinton Road, Edinburgh HS5 Update and AGM: 17 March, 5.45pm, Heriot Watt University HIGHLANDS & ISLANDS CENTRE Inverness Royal Academy Site Visit: 11 March, 4pm, site office car park Contact: finlay.black@millers.co.uk

**NORTH WEST**
- Dry & Wet Rot Control: 3 March, 6.30pm, Leyland Golf Club, Leyland Contact: bbrown@ciob.org.uk Technical Dilemma: 12 March, 6.30pm, Irish World Heritage Centre, Manchester Contact: bbrown@ciob.org.uk Modern Construction Methods: 17 March, 6.30pm, The Cots, Knutsford Contact: kperviv@ciob.org.uk CIOB North West Exhibition: Liverpool Regen 2015: 24-25 March, 10am-5pm, St George’s Hall, Liverpool Register at www.reg-2015.ciob.org.uk

**SCOTLAND DUNDEE CENTRE**
- Committee Meeting: 3 March, 5.45pm. Contact: wmarg herself. @ciob.org.uk Technical Event: Health & Safety: 11 March, 5.45pm, University of Abertay Contact: wmarshall@ciob.org.uk Technical Event: Health & Safety: 11 March, 5.45pm, University of Abertay Contact: wmarshall@ciob.org.uk Committee Meeting: 31 March, 5.45pm, Contact: wmarshall@ciob.org.uk EAST OF SCOTLAND Committee Meeting: 10 March, 5.45pm, RMP, Colinton Road, Edinburgh HS5 Update and AGM: 17 March, 5.45pm, Heriot Watt University HIGHLANDS & ISLANDS CENTRE Inverness Royal Academy Site Visit: 11 March, 4pm, site office car park Contact: finlay.black@ millers.co.uk

**NORTH EAST**
- Tees Valley Unlimited (LEP) - The Future: 18 March, Thirteen Group, Hudson Quay, Middlesbrough Contact: dthorpe@ciob.org.uk An Introduction into 3D Documentation and BIM: 17 March, 11am -11.45am, Elevate Hall, Carrville, County Durham Contact: dthorpe@ciob.org.uk CDM Update: 10 March, 6pm, The Angel View, Gateshead Contact: dthorpe@ciob.org.uk

**SOUTH WEST**
- Temporary Works & Brunel Centre AGM: 10 March, 6.30pm Contact: jward@ciob.org.uk Legal Event & Gloucestershire Centre AGM: 17 March, 6.30pm, Brickendon Golf Club Contact: jward@ciob.org.uk Canals & Wesssex AGM: 25 March, 6.30pm, The Town Hall, Devizes Contact: jward@ciob.org.uk Canals & Wesssex AGM: 19 March, 6.30pm, The Hollies Hotel, Martock Contact: jward@ciob.org.uk

**SOUTH EAST**
- Fellowship Workshop: 5 March, 6.30pm, venue tbc Contact: amberuk@ciob.org.uk Student Challenge: 11 March, 2pm, 8.30pm, Cheshington Safari Hotel, Cheshendon Contact: amberuk@ciob.org.uk Design for Sustainability: 11 March, 7pm, Holiday Inn Central, Ashford Contact: blawrence@ciob.org.uk Party Walls In-Depth: 17 March, 6.15pm Betchworth Park Golf Club, Dorking Contact: phael@ciob.org.uk Soft Landings Date: 18 March, 6.30pm, Wokingham, TBC Contact: joparker@ciob.org.uk Site Visit - University of Kent Library: 19 March, 2015, 9.30am, University of Kent Contact: blawrence@ciob.org.uk Sussex AGM and CPO Claiming Time and Associated Costs under Construction: 19 March, 6pm, Pelham House Hotel, Lewes Contact: ageorge@ciob.org.uk Novus in Hampshire: Getting Ahead with LinkedIn and Coffee Date: 25 March, 6pm, Portsmouth University Contact: phael@ciob.org.uk Building Regulations: 31 March, 6pm, Holiday Inn, Oxford Contact: blawrence@ciob.org.uk

**SOUTHWEST**
- Presentation: 18 March, time tbc, Inverness College, UHI Longman Campus Contact: ross.caimis@iuli.ac.uk WEST OF SCOTLAND CENTRE Improving Quality within Construction Sector: 26 March, 6.30pm, New Southern General Hospital Project Office Contact: wmarshall@ciob.org.uk SCOTLAND BRANCH Careers in Construction: 10 March, 10am, City Chamfered. Contact: lckmy@ciob.org.uk SOUTHEAST Forked in Construction: 10 March, 7pm, wn University, Wrexham Contact: kpercival@ciob.org.uk AGM & talk ‘Passiv Haus – a Self-Builders Experience’ 22 April, 5.30pm, Bournemouth & Poole College Contact: sholborn@ciob.org.uk

**WALES**
- North Wales Centre Fire Safety on Construction: 11 March, 6.30pm, Glyndwr University, Wrexham Contact: kpercival@ciob.org.uk Weston: 19 March 2015, 2pm, Kent Library Site Visit – University of Kent Library: 19 March, 2015, 9.30am, University of Kent Contact: blawrence@ciob.org.uk Sussex AGM and CPO Claiming Time and Associated Costs under Construction: 19 March, 6pm, Pelham House Hotel, Lewes Contact: ageorge@ciob.org.uk Novus in Hampshire: Getting Ahead with LinkedIn and Coffee Date: 25 March, 6pm, Portsmouth University Contact: phael@ciob.org.uk Building Regulations: 31 March, 6pm, Holiday Inn, Oxford Contact: blawrence@ciob.org.uk

**YORKSHIRE**
- Sheffield & South Yorkshire Centre AGM: 4 March, 6pm, Sheffield Hallam University Contact: fevans@ciob.org.uk Humber, York & North Yorkshire Centre AGM & BIM: 11 March, 6.30pm, Buckleys Inn, York Contact: fevans@ciob.org.uk York: 24 March, evening, Hepworth Gallery, Wakefield Contact: fevans@ciob.org.uk

**YORKSHIRE**
- Professional Review: 24 March, evening, Hepworth Gallery, Wakefield Contact: fevans@ciob.org.uk

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To view Senior Architectural System’s BIM Objects please visit:
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Project of the month
South Glasgow University Hospital and Royal Hospital for Sick Children, Glasgow

COMPLETED UNDER BUDGET and five weeks ahead of schedule, Australian contractor Brookfield Multiplex handed over the £842m publicly funded South Glasgow University Hospital and Royal Hospital for Sick Children to the NHS earlier this year.

Under its profit-sharing contract Brookfield Multiplex will now be rewarded a percentage of the money saved from the construction of the biggest single NHS hospital project ever undertaken in Scotland. Designed by architect IBI Group, the hospital is expected to be built with 750,000 patient episodes – including 110,000 accident and emergency patients – every year.

The campus is built around the 14-storey tower of the adult acute care hospital. This high-rise main hospital is cross-shaped in plan, so that each of the 1,109 single en suite rooms in the general wards can have a window. None of the rooms overlooks another. The building also contains 30 modern operating theatres and is topped with a helipad.

Attached to the adult hospital, but with a separate entrance and identity, a five-storey children’s block contains more than 256 beds and a covered roof garden.

Work is now under way to fit out the hospitals, ready to receive the staff and the first patients in May.

Scottish health secretary Shona Robison said: “The Scottish government has invested £842m in this project, which will provide patients with access to services for all ages on a single site.”

A separate laboratory block that provides biochemistry, haematology and blood transfusion services was completed by Brookfield Multiplex in 2012 and is linked to the main hospital by a series of underground tunnels.

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