

CIBSE JOURNAL

The official magazine of the Chartered Institution of Building Services Engineers



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January 2014

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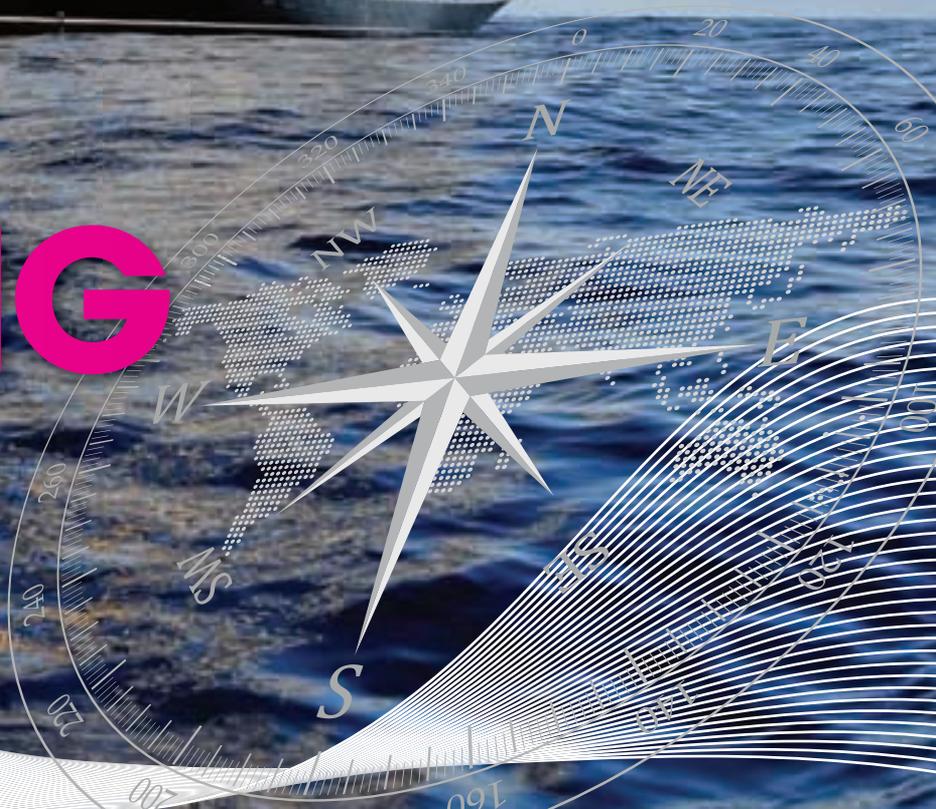
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Welcome

Every day there is more to learn, and every day we have the option to make a positive impact on society

Have you ever wanted to make an impact? Become an *engineer*. Have you ever wanted to be inspired? Become a *building engineer*. Have you ever wanted to save lives? Become a *building services engineer*.

The work of the building services engineer, simply put, is amazing. Through our work, we can make an impact on the world and save lives. Looking at what we actually do, one might say we size pipes, ducts and cables. Others may say we select boilers, chillers, fans, pumps and lighting equipment.

However, the essence of what we do is to 'create, enhance and sustain the world's built, natural and social environments', which is an important part of AECOM's purpose.

I have been very fortunate to have had many amazing mentors in my 35-year career in building services and, I must admit, it has been fun, rewarding and educational. Every day there is more to learn and every day we have the option to make a positive impact on society.

It may seem overdramatic to say we save lives but, from the well conditioned buildings that prevent heat stroke and hypothermia to the clean water supply and sanitation that ensures our good health, it can be concluded that engineers save more lives than doctors.

Services engineers have a challenge to create

comfortable and safe environments for people to live in. My children's school had a motto of 'pursuing excellence' and that is something we can all aspire to. We can be creative with integrity and we can save natural resources and reduce pollution to air, land and water. As we train people to use buildings in a more energy and water-efficient manner, we also work towards creating a cleaner environment for the future.

Building services is about applying mathematics to the built environment but, in my view, it is even more about people and communication. A career in building services comes with the rewards of team-working with other construction professionals. But more than that, it is the environmental building services engineer that can really lower the negative impact of construction.

Finally, as you read this careers guide, be inspired to help change the world for the better; you *can* create value. What we do is a balance between art and science. It is about making the world a better place and living within our natural resources. We are in a unique position to influence for the good, and to help people live longer and more comfortable lives in healthier environments.

I personally recommend that you consider a life that can have a positive impact.

Become a *building services engineer*.

Ant Wilson, Director, AECOM



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CIBSE Journal is written and produced by CPL (Cambridge Publishers Ltd) Tel: +44 (0) 1223 477411. www.cpl.co.uk 275 Newmarket Road, Cambridge CB3 8JE.

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

Printed by: Warners Midlands PLC

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

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© CIBSE Services Ltd. ISSN 1759-846X

Subscription enquiries

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

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

Cover image: Alvov / Vasilios / Shutterstock.com



ABC audited circulation:
18,558 January to
December 2012



Welcome

There has never been a better time to consider a career in building services.

The challenges of climate change, population growth and scarcity of resources requires a new generation of engineers to design buildings that use less energy and materials, but are still comfortable to occupy.

The tall ship on the cover reminds us that everything in the age of sail had to be powered using natural resources. Sailors at sea for weeks at a time had to harness the power of the wind to propel them to their destination, and the limited space on board meant that nothing could be wasted whether it be salted meat, gunpowder or rum.

No-one is more aware of the importance of resource efficiency than Dame Ellen MacArthur. A foundation in her name embraces the notion of the circular economy, which means rejecting the 'take, make, dispose' model and instead adopting a cradle-to-cradle industrial economy, where material use is optimised and earmarked for re-use at the end of the building's life. Through her work at the foundation, Dame Ellen has become an influential ambassador for energy and resource efficiency.

Those considering a career in building services will be buoyed to see an upward movement in salaries for

the first time in years (page 10). A rise in workloads, – particularly in the private commercial and housing sectors – is resulting in more recruitment activity and an uplift in pay across all UK regions and jobs roles.

For those considering a career in building services, our guide to degrees and apprenticeships will help you decide the best route into the profession. With average annual degree tuition fees rising to more than £8,500, more people are considering earning as they learn through an apprenticeship. Discover the benefits of both options on page 18.

For those in the market for a new job, it is worth noting that 90% of employers check online profiles of potential recruits. It is essential to build an attractive online profile that separates your professional and personal lives – turn to page 30 to see how social media can be used to your advantage.

Finally, our feature on STEM ambassadors shows how young engineers can give their career a boost by going back to schools to inspire the next generation of budding building services engineers.



Alex Smith, editor

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NAVIGATING *your career*

There are myriad routes into a career in building services. **Nick Jones** outlines the choices and speaks to four young engineers making their mark on our built environment

Flying the flag

All the components that make a building habitable

- Energy supply – gas, electricity and renewable sources
- Heating and ventilating
- Water, drainage and plumbing
- Lighting – natural and artificial
- Escalators and lifts
- Harnessing renewable energy, such as solar power
- Communications, telephones and IT networks
- Security and alarm systems
- Fire detection and protection
- Air conditioning and refrigeration
- Façade engineering
- Public health engineering
- Control systems

Choosing a career in building services engineering used to be the equivalent of donning an invisibility cloak. Services are essentially all of the things that make a building structure habitable – the heating, lighting, ventilation and so on – and they tend to lurk behind walls, above ceilings and below floors. If they were done well, building users barely noticed them.

But now building services engineers are stepping out of the shadows. We have to use less energy and water, which means we need to find new ways to make buildings comfortable places in which to live and work. The UK has committed to reducing its carbon emissions by 80% by 2050, and almost half of those emissions come from the construction and operation of buildings. In other words, anyone embarking on a career in building services now is in for an interesting 36 years.

Of course, saving the planet isn't the only compelling reason to get into building services. The fact that the sector's skills are in high demand means that salaries are rising (see feature) and the chances of long-term secure employment are better than in many professions. 'In the longer term there is no doubt there is going to be a massive need for more building services engineers,' says Angela Ringguth, head of careers promotion at CIBSE. 'For people who will graduate in five years' time, it will be a very positive employment situation.'

And you don't necessarily have to spend

large chunks of your salary servicing a gargantuan student debt – a degree isn't the only way into the industry. Last year, the government unveiled plans to make it easier for businesses to take on apprentices, and is set to explain how it intends to fund them in the coming months (see page 18). 'Apprenticeships are many, many thousands of pounds cheaper than degrees,' Ringguth says. 'We have to get the message out that there are lots of different ways into this profession.'

Indeed, you could start even younger. The government's new University Technical Colleges (UTCs) are intended to produce the engineers and technicians of the future, training 14- to 19-year-olds. The Department of Education plans to have 45 UTCs open across England and Wales by September 2014, with places for 27,500 students.

So, building services engineering may be an increasingly accessible career – but is it worth it once you get there? The single most compelling reason to work in the industry is the sheer range of opportunities it presents. Engineers can travel the world, solve energy-efficiency problems in their own cities, or explore virtual space – one of the most exciting developments in the industry is building information modelling (BIM), which involves creating virtual buildings down to the last gasket.

Wherever there's a building, there's a building services engineer – which means that this is not just one career but many, as the following case studies show... 

Steering a steady course

Building services cover a wide-ranging brief

- Managing the environmental performance of buildings throughout their lifecycles – the 'cradle to grave' approach
- Collaborating with world-leading clients, architects, interior designers, structural engineers and more
- Opportunities to work all over the planet
- A role at the heart of construction projects, and becoming even more integral because of the growing importance of energy efficiency
- On the frontline of the ongoing battle against global climate change
- Exciting projects such as stadiums, skyscrapers, science laboratories, music venues, schools in developing countries, multi-nationals' HQs, hospitals, art galleries and museums
- Working with cutting-edge and rapidly changing technology, including Building Information Modelling
- Membership of CIBSE – a highly respected and agenda-setting body

“In the longer term there is no doubt there is going to be a massive need for more building services engineers”

*All hands on deck.***Some of the different jobs you can do in building services**

- Air conditioning engineer
- Business manager or proprietor
- Building physics engineer
- Carbon emissions specialist
- Computer-aided design technician
- Commissioning engineer
- Consulting engineer
- Contract or project engineer
- Design engineer
- Domestic heating engineer
- Domestic plumber
- Ductwork installer
- Educator and trainer
- Electrotechnical panel builder
- Electrical repair and rewinder
- Energy inspector/adviser
- Estimator
- Facilities manager
- Fitter/welder
- Gas fitter
- Heating and ventilating engineer
- Highway electrical systems installer
- Industrial and commercial plumber
- Installation electrician
- Instrumentation installer/engineer
- Lighting expert
- Maintenance electrician
- Public health engineer
- Quantity surveyor
- Refrigeration engineer
- Satellite systems engineer
- Service and maintenance engineer
- Sheet metal weathering specialist
- Site supervisor
- Environmental engineer
- Project engineer

Jairo Jaramillo

Intermediate mechanical engineer, Hurley Palmer Flatt – graduated in 2010

What first attracted you to building services engineering?

I always wanted to be an engineer. Cars are my hobby, but there isn't much car engineering in London, where I wanted to carry on living.

What's been your career highlight so far?

The refurbishment of the Cass Business School at City University. It was the first job I took from start to finish. It was great to go from doing the calculations and justifying the numbers, to commissioning new technologies – rooflights that open and close automatically – and seeing a new space created.

What's the best thing about your job?

Interaction with other people. The building services consultant is a very social creature – we have to be. We straddle two worlds in terms of design and construction, so we have to be the most compromising, most social and most peace-making ones on the team.

Tell us a secret about building services engineering ...

Building services is a bit of a secret. There are so many of us involved in it, but most people don't know how important it is. Just as we have 'starchitects', so we should celebrate engineers. Architects rightly get recognition, but buildings would be uninhabitable without what we do.



Mary-Ann Clarke

Principal engineer, AECOM – graduated in 2002

What first attracted you to building services engineering?

I went to an all-girls' school and I didn't know what I wanted to do with my career. But then my woodwork teacher invited me to the 150th anniversary of the Mechanical Institute, and one of the presentations was on women in engineering. I sat there and thought, 'You know what? I could do that'.



What has been your career highlight so far?

One that stands out was the Quadrant 3 mixed-use development just off Regent Street in London. It had the first hydrogen fuel cell in the city. I did the design work, then went off to have two children, and came back just in time for the opening party.

What's the best thing about your job?

Engaging with other disciplines. It's good fun sitting round the table with the architects and structural engineers and just coming up with solutions to things. It might take half an hour – it might take an hour – but you usually get there in the end.

Tell us a secret about building services engineering ...

It's like a little club. There's so much knowledge out there that there's always someone that you can turn to and say, 'I don't understand this, can you talk me through it?' There's a lot of support in the industry, and I think that's a plus for young people coming in.

Chris Pountney

Senior engineer at AECOM – graduated in 2008

What first attracted you to building services engineering?

AECOM sponsored me to do engineering at university, but I didn't narrow it down until I had a gap year with the firm. A lot of people in the sustainability modelling teams and building services group had a real drive to make a better environment to work and live in, and that was really attractive.



What has been your career highlight so far?

We're currently working on the Al-Wakrah stadium in Qatar for the World Cup in 2022, which is a high-profile job and quite a tricky one. To design a stadium in such a hot climate is a real challenge in terms of thermal comfort and sustainability.

What's the best thing about your job?

The variety. There are things that make you think and require a lot of research, and there are aspects that are a bit more creative. In my gap year, for example, I worked on the insulation on the legs of the Halley VI Antarctic research station, which was another extreme climate. There wasn't an off-the-shelf solution, so the engineers were just trying to figure it out.

Where do you see yourself in 10 years' time?

A couple of years ago, I did a part-time masters degree in interdisciplinary design, so I'd like to be involved in working more closely with other professions. The Al-Wakrah stadium is a good example – it requires integration between architects and engineers to understand how the shape of the building can affect the comfort of the players and the spectators.

Sid Bandi

Engineer, Buro Happold – graduated in 2007

What first attracted you to building services engineering?

I did general mechanical engineering at university, but wasn't that aware of building services. I'm from India, where building services is not really a big part of engineering.



When I came to the UK at 17 and did my degree, I gradually found different areas of engineering to explore. I studied automotive and aerospace engineering, and they didn't excite me, but building services really appealed. I was always interested in architecture – less the art side, more the technical side – and the way that machines in buildings are put together.

What has been your career highlight so far?

Three years after I graduated, I was based on site as a resident engineer at Gibraltar International Airport, looking after all of the MEP elements. It was a big responsibility – Buro Happold really threw me in at the deep end. As a young engineer, it was great to see something go from a skeleton to a finished project.

What's the best thing about your job?

You get exposed to a lot of different projects. I might start working on a school, then halfway through the day I'm working on a stadium, and later, on a heritage building. I'm currently working on four projects that are at different stages of the design process.

Another great thing about building services is that you get to travel around the world. In a lot of jobs you're just stuck at your desk for 10 or 15 years, but at my company there's a strict policy that people should go off and experience different cultures.

There's a lot of support in the industry and I think that's a plus for young people coming in

CIBSE members

For case studies of CIBSE members working in building services go to the app at www.cibsejournal.com/app or the web/Android via cibsejournal.com

CUNDALL



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Westfield Sydney City, Sydney, Australia © Westfield/Jonathan Miller

Share in our success

Cundall is growing! We now have 20 offices in locations across Europe, MENA and Asia and Australia. We are proud of the fact that all of our growth has been organic and we are committed to remaining wholly owned and run by people who work within the business. We have ambitious targets to grow our UK and international business and this creates opportunities for talented design engineers to contribute to and share in our success.

We currently have opportunities in the UK and internationally and details are on our website: www.cundall.com/careers

So what makes a “Cundall person”?

We are driven by a passion for engineering excellence. We are committed to working with our clients to provide sustainable solutions that exceed their expectations. We continue to learn and grow, together. We support each other and work collaboratively across our offices, sharing opportunities, expertise and knowledge.

People join us from a variety of backgrounds. Some are degree-qualified, others have developed excellence through their practical experience. Most importantly, we are “people people”, able to work effectively with each other, our clients and the communities that our work touches.

We are proud of what we have built and would like to share it. Find out more about what drives us, and how you could be part of our future by visiting us online at www.cundall.com/careers. Connect with us on Twitter at @Cundall_Global or on LinkedIn.

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THE BIG THAW

After five years of stagnation, building services salaries are finally starting to increase. Data from the CIBSE/Hays Salary Survey further reveals that confidence is growing as employers are starting to recruit again. **Roxane McMeeken** reports



A year ago, the pay freeze gripping building services for the past five years had yet to thaw. Now, at last, the ice is starting to crack. In line with signs of life in the wider UK economy, a recovery in workloads for building services companies appears to be under way, and this is spurring both recruitment activity and some upward movement in salaries.

Richard Gelder, UK director for property disciplines at Hays Construction & Property, says: 'I have been talking to construction and engineering firms around the UK and everyone is saying they are busier, they're feeling more confident and they are starting to recruit.'

While this is good news for employers and employees alike, both are out of practice with markets that are on the up. Employers may want to recruit but they face competition for talent heating up. Meanwhile, employees must decide whether now is the right time to look for a new

job or ask their current employer for that long-awaited pay rise (see box). Whatever your goal, it's essential to work out a new strategy for getting the best out of a busier jobs market.

Thawing out

Our building services salary survey, compiled exclusively for *CIBSE Journal* by recruitment agents Hays Construction & Property, shows that pay levels for new roles filled have increased. However, because the survey was conducted some months ago, Gelder says that pay has increased further since: 'People have started to hire more and it's accelerated in the past two or three months, which means there has been even more upward movement than the survey suggests.'

Nonetheless, pay packets have grown over the whole year. For example, the salary of a typical mechanical or electrical contracts engineer in a Central London role in has risen from £40,000, ➤

Whatever your goal, it's essential to work out a new strategy for getting the best out of a busier jobs market

Senior mechanical/electrical contracts manager (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	48,000	49,000	44,000	55,000
South East	45,000	45,700	41,000	50,000
South West	39,000	39,500	35,500	42,500
Wales	35,000	35,500	32,500	40,500
West Midlands	38,000	38,500	36,500	45,500
East Midlands	37,000	37,500	34,500	41,500
East of England	45,000	45,500	38,500	48,500
North West	37,000	37,500	34,000	42,500
North East	37,000	37,500	34,000	44,000
Yorkshire & the Humber	37,000	37,500	34,500	44,000
Scotland	38,000	38,500	33,500	44,000
Northern Ireland	32,000	32,500	33,500	39,000
National average	39,000	39,558	36,083	44,750

Mechanical/electrical contracts engineer (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	40,000	41,000	39,000	44,000
South East	38,000	38,700	32,500	40,000
South West	34,500	35,000	31,500	36,500
Wales	32,000	32,500	29,500	34,500
West Midlands	32,000	32,500	29,500	40,500
East Midlands	31,000	31,500	28,500	34,500
East of England	35,000	35,500	32,500	38,500
North West	33,000	33,500	30,500	36,500
North East	32,500	33,000	30,500	36,500
Yorkshire & the Humber	32,500	33,000	30,500	36,500
Scotland	33,000	33,500	28,500	37,500
Northern Ireland	30,000	30,500	26,500	34,500
National average	34,000	34,183	30,792	37,500

KONSTANTIN / SHUTTERSTOCK

SAULETAS/SHUTTERSTOCK



➤ according to last year's survey, to £41,000 this year.

Similarly, the typical pay for a senior estimator in the South East was £43,000 in 2012, compared with £44,000 in 2013. For a typical principal design engineer in the West Midlands, pay was £42,000 last year and £43,000 this year.

Pay has increased for building services engineers working for contractors too. A typical operations manager in Central London, for instance, would be hired on £60,000 in 2012 but this year it has risen to £61,500.

These tentative increases in salaries reflect the sector's equally hesitant recovery. According to the Office for National Statistics (ONS), UK construction output rose 1.7% in the third quarter of 2013 and 1.9% in Q2. Output for the third quarter was £9.3bn, making it the strongest growth in Q3 output since 2003.

But the recovery is not evenly spread. Gelder says: 'The recovery is UK-wide, but London is the hottest. Areas that were very depressed, such as the North East, are busier but they are coming from a very low base.'

Neither are all sectors bouncing back equally.

Private commercial projects and private housing are busier than other sectors, for example. The ONS report for the third quarter of this year said that private new housing increased by 15.6% and 'private commercial other' new work by 12.5%. Meanwhile, output for the repair and maintenance sector fell by 0.6%, while infrastructure fell by 3.7%.

Attracting talent

Gelder says the overall result is that most building services employers are seeing more work starting to come in, albeit to varying extents, so firms need to adjust their human resources policies accordingly.

The first thing many firms will need to do is add more staff. But because there is now more competition for candidates, you might need to rethink your recruitment offer. Simon Stoker, resourcing manager at Arup, says: 'We are seeing increasing competition for quality applicants, so we are aware that we have to respond accordingly.'

One way to lure candidates is to raise salaries. Gelder says: 'Our research with candidates over the years used to show that they moved to a new role based on factors like career prospects, training and great companies to work for. But as the financial downturn has dragged on, salary has become their number-one priority.'

Higher salaries will be a key recruitment tactic for Ridge Property and Construction Consultants, a multidisciplinary firm of about 300 people that has taken on 50 in the past year and plans to hire mechanical and electrical engineers in 2014. Phil Jones, senior partner, says: 'Building services engineers are scarce because not enough people go into the discipline, so we have already been paying slightly higher salaries in 2013 for their skills than for, say, civil engineers, and we expect to have to pay even more for them in 2014.'

A good training offer could also help attract candidates. Ridge plans to double roughly its training budget for 2014. Jones says: 'We have

Senior estimator (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	52,000	53,500	49,500	56,000
South East	43,000	44,000	41,000	50,000
South West	36,000	36,700	33,000	41,000
Wales	34,000	34,700	30,000	39,000
West Midlands	39,000	39,700	36,000	46,000
East Midlands	40,000	40,700	37,000	43,000
East of England	46,000	46,500	42,000	47,000
North West	37,500	38,000	34,500	41,000
North East	37,000	37,500	34,000	41,000
Yorkshire & the Humber	37,000	37,500	34,000	41,000
Scotland	38,000	38,700	35,000	46,000
Northern Ireland	35,000	35,500	33,000	43,000
National average	40,000	40,250	36,583	44,500

Estimator (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	42,000	43,000	41,000	45,000
South East	35,000	35,700	33,000	40,000
South West	29,000	29,500	26,500	32,000
Wales	28,000	28,500	25,500	30,500
West Midlands	32,000	32,500	28,500	34,500
East Midlands	32,000	32,500	30,000	36,000
East of England	35,000	35,500	32,000	38,000
North West	33,000	33,500	28,000	36,000
North East	33,000	33,500	25,500	36,000
Yorkshire & the Humber	33,000	33,500	35,500	36,000
Scotland	30,000	30,500	28,500	36,000
Northern Ireland	30,000	30,500	29,500	36,000
National average	33,000	33,225	30,292	36,333

Operations director (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	70,000	71,500	66,000	75,000
South East	65,000	66,000	63,000	67,000
South West	47,000	47,700	44,000	52,000
Wales	45,000	45,500	40,500	51,000
West Midlands	47,000	47,500	44,000	54,000
East Midlands	51,000	51,700	47,000	56,000
East of England	55,000	55,700	50,000	60,000
North West	50,000	50,500	46,000	56,000
North East	50,000	50,500	42,500	55,000
Yorkshire & the Humber	50,000	50,700	42,500	55,000
Scotland	45,000	45,500	40,500	51,000
Northern Ireland	42,000	42,500	37,000	46,000
National average	52,000	52,108	46,917	56,500

Seeing the big picture

The only growth worth having is the sustainable kind. Easy to believe – hard to secure

In our interconnected world, if you work in the built environment, you need to see the big picture. Challenges are getting more complex. Global demands need to be met within the planet's finite resources, and climate change controlled, with its effects mitigated. Nothing is predictable.

At AECOM, we think that seeing the big picture means more than being able to take a project through from beginning to end. It's about understanding how things can – and should – be changed for the better.

AECOM works in hundreds of cities around the world. We know that solving problems means making connections. It means understanding the local culture and climate and – above all – what the community needs and wants. It means using 360 ingenuity.

Our clients are commissioning some of the most exciting projects in the world. Our Europe team is helping Rio to use the 2016 Olympic Games for city development, for example. The British Antarctic Survey is researching climate change from a new station, Halley VI, which can climb above rising snow levels (one of our favourite projects). Working on Natural Vision, the striking biodome for Chester Zoo, we are helping to realise a bold ambition to create Europe's largest conservation attraction. We are building new transport connections between cities, and pioneering ways to deliver clean water, protect homes from flooding, generate clean energy and make best use of waste.

All this means exciting new opportunities for the right people.

We have more than 60 building services vacancies in the UK for both experienced professionals and exceptional graduates. Our competitive salaries and benefits packages are designed to help employees and their families to feel safe, secure and supported. We support professional development with accredited training schemes, and mentor and assist graduates with professional qualifications.

If you like the idea of helping our clients to see further and go further, please get in touch.

● Jobs.aecom.com



MUCH MORE THAN A GAME

From before the seats have been filled to long after they have emptied, sport is about much more than a game. The Al Wakrah Stadium is a proposed venue for the 2022 FIFA World Cup. The concept design, by

AECOM in association with Zaha Hadid Architects, reflects the seafaring heritage of the Al Wakrah community, and captures the essence of the traditional dhow, an Arabian pearl fishing boat.

‘It’s all about the projects’

Ella Pope joined AECOM after studying for her BEng (Hons) in Architectural Environment Engineering at the University of Nottingham. Within a few months she had gained experience of working on a range of UK and global projects, producing mechanical drawings and sizing plant equipment.

For the iconic Lusail infrastructure development project in Qatar, for instance, Ella has supported the project engineers with the final stages of tender package delivery. For Wood Wharf in east London, which will occupy



Ella Pope

a pivotal gateway position and command waterfront views of Canary Wharf, she has assisted the mechanical engineers working on the HVAC design. Ella is currently part of the team delivering the redevelopment of London's South Bank area.

Ella knows what drew

her to apply to AECOM. ‘For me it’s all about the projects – the sheer diversity of work. It means you can quickly acquire knowledge and experience. Around the office, I always see such a lot going on. Projects literally go from A to Z – Hammersmith Ark to Chester Zoo. In between are hospitals; retail; universities. I’m always intrigued see how technical skills are applied across different projects and sectors’.

Ella is on her way to professional accreditation, working with the support of a designated mentor.

noticed how important it is for people in this industry to keep up-to-date with developments in their discipline, so we're going to focus on that.'

It may also be worth revisiting benefits packages. Rob Harris, operations director at 40-strong building services firm Elementa Consulting, says: 'We dropped health and dental insurance from our range of benefits a couple of years ago because it became relatively expensive but we are now looking at reinstating these.'

Retention

Attracting talent is one thing, but a busier jobs market also means companies risk losing their own best people. Harris says: 'For all firms right now, staff leaving should be their biggest worry.'

Again, the approach to remuneration could help to retain employees. Jones says: 'We will be looking at the key people across the business to make sure that their salaries are at a level that makes it difficult for them to move. There will also be significant bonuses to top management.'

Harris agrees: 'We will try to award bonuses where we can, and we are aiming to make significant rises in salaries next year.'

But Elementa will also try to ensure its people are satisfied with other elements of their job. Harris says: 'We will be talking to people to make sure they are happy. We'll try to understand each member of staff's career ambitions and how we can make them happen. A key strategy will be ensuring people work on a diversity of projects.'

A final tactic will be to encourage members of staff to discuss plans to leave with their manager. Harris says: 'We will stress that if they receive a job offer, we want them to talk to us because we might be able to offer them something that makes them want to stay.'

Firms will also have to watch out for people in whom they have invested extensively being poached. Stoker says: 'We know that people who have five to six years' experience and have done their training here are a target for recruiters, so we'll be focusing on how to retain them.'

Employees: Is now the time to move?

With salaries rising and more vacancies appearing, now could be the perfect time to apply for a new job. For many candidates it's been half a decade since they last moved jobs, so prepare yourself for a new type of recruitment market.

Gelder says: 'For the past five years, employees have been mostly concerned about retaining their job, but now they are seriously thinking about what opportunities might be out there for them.'

The first thing to note is that spectacular pay rises might not be on offer – despite the upward movement Hays has identified and employers saying they will aim to

increase pay. Gelder says: 'Some candidates are holding out for huge salary rises but, while we are seeing increases, the recovery remains patchy and companies' margins are still under massive pressure, so we are not about to see wild salary inflation.'

Stoker at Arup confirms this: 'I don't think we will see huge salaries across the board.'

What you might find, though, is that rival firms are offering a training or benefits package that appeals to you more than that of your current employer. Arup, for example, has developed a flexible benefits package. Stoker says: 'Staff have a

suite of benefits and a sum of money, which they can either use to buy particular benefits that suit them or take in cash.' The options range from standard benefits, such as life insurance, holiday entitlement and childcare vouchers, to more unusual perks, including a scheme to buy an iPad.

However, as we have seen, your current employer is probably well aware that you might be thinking about leaving. Many employers are planning to boost benefits, training and salaries for their existing people. So, before you leave, it could be worth finding out how your boss plans to make your job more attractive.

This is a particular concern at Max Fordham, whose primary policy is to hire graduates – including many without engineering degrees – who are then trained intensively. Senior partner Alasdair Reid says the solution will be to show graduate recruits how they can progress through the firm. 'It's essential that they know they are on the road to becoming a partner four years after joining. We also let them know that – as they progress, and based on merit – we will offer substantial pay rises.'

As the recruitment market warms up, employers have an opportunity to add talent to their teams. However, it will take a combination of money, benefits and training to attract the best people – and perhaps money above all. But firms must keep an eye on the existing employees they want to retain. It's essential to check that they are getting what they want from their job, including – once again – the right level of remuneration. 

It will take money, benefits and training to attract the best people but firms must keep an eye on the existing employees they want to retain

Operations manager (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	60,000	61,500	56,000	65,000
South East	60,000	61,000	56,000	60,000
South West	40,000	40,500	35,500	46,000
Wales	40,000	40,500	33,500	43,000
West Midlands	44,000	44,500	35,500	45,000
East Midlands	45,000	45,500	40,500	49,000
East of England	45,000	45,500	42,500	49,000
North West	40,000	40,500	37,500	46,000
North East	40,000	40,500	37,500	46,000
Yorkshire & the Humber	40,000	40,500	37,500	46,000
Scotland	37,000	37,500	35,500	44,000
Northern Ireland	34,000	34,500	32,500	39,000
National Average	44,000	44,375	40,000	48,167

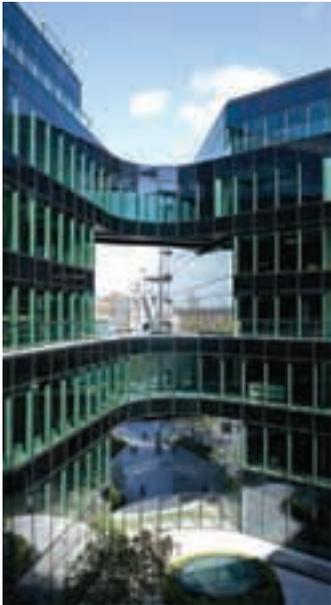
Associate, chartered (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	60,000	62,000	53,500	68,000
South East	55,000	56,500	51,500	60,000
South West	42,000	43,000	38,000	46,000
Wales	40,000	41,000	36,000	43,000
West Midlands	46,000	47,000	41,000	56,500
East Midlands	44,000	45,000	41,000	49,000
East of England	39,500	40,500	34,500	45,000
North West	41,000	42,000	40,000	47,000
North East	40,000	41,000	39,000	46,000
Yorkshire & the Humber	40,000	41,000	39,000	46,000
Scotland	44,000	45,000	45,000	51,000
Northern Ireland	36,000	37,000	35,000	41,000
National Average	44,000	45,083	41,125	49,875

Principal design engineer, chartered (£)

	Typical 2012	Typical 2013	Min	Max
Central London /M25	50,000	51,500	44,000	55,000
South East	42,000	43,000	39,000	48,000
South West	35,000	36,000	32,000	40,000
Wales	33,000	34,000	31,000	41,000
West Midlands	42,000	43,000	39,000	46,000
East Midlands	40,000	41,000	39,000	44,000
East of England	43,000	44,000	38,000	45,000
North West	39,000	40,000	37,000	43,000
North East	38,000	39,000	37,000	43,000
Yorkshire & the Humber	38,000	39,000	37,000	43,000
Scotland	36,000	37,000	37,000	44,000
Northern Ireland	32,000	32,700	29,000	34,000
National Average	39,000	40,017	36,583	43,833

Grontmij is a leading design, engineering and management consultancy, active in the growth markets of **water, energy, transportation** and **sustainable buildings**. At the core of our business is the principle of sustainability by design.



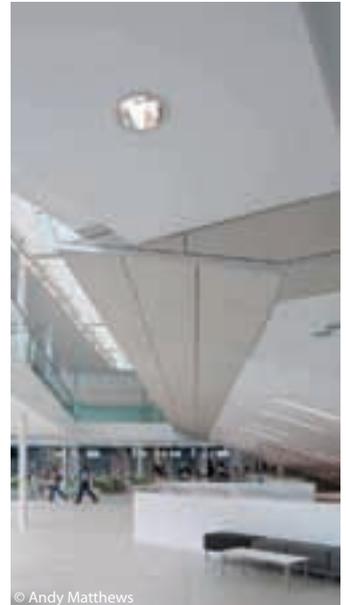
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G Live Theatre, Guildford

WHO WE ARE.

The Building Services Group is based in Maidenhead working on diverse portfolio projects ranging from high-end commercial office and residential projects to universities, schools, hotels and leisure facilities.

The Building Services Group consists of three director led design groups providing mechanical, electrical and public health expertise, with support from specialist disciplines including Environmental Modelling, IT/AV, Fire Engineering, Vertical Transportation and BMS design.

Many of the directors at Grontmij have themselves come through the graduate development scheme.

The systems we design comprise the functional elements of a building without which it would be a lifeless shell. Our work encompasses analysis and advice on the building performance as well as every type of building services equipment.

Grontmij have been shortlisted for CIBSE 'Employer of the Year' in 2 of the last 3 years and regular feature in CIBSE 'Consultancy of the Year'.



Maddie Babaei - Senior Engineer

I graduated from Nottingham University with a BEng degree in Architectural Environment Engineering. I joined Grontmij Building Services team in summer 2011. In Grontmij Building Services, graduates come from a range of backgrounds and degree courses and the training program is tailored to suit the specific needs of each graduate.

Grontmij sponsored me through the part-time MSc degree course at London South Bank University as part of the Chartered Institute of Building Services Engineers accredited Grontmij training program towards Chartership. For me "If you have the ability, Grontmij provide the opportunity."

Edmund Vaughan - Project Engineer



The route to my current building services role has not been a traditional one. I studied Chemical Engineering at Nottingham University with no knowledge of the building services industry. I joined Grontmij in 2006 as a graduate engineer and through the graduate scheme I was sponsored through Southbank University part-time to study in building services and develop my knowledge of the construction industry. If I was sum up Grontmij it would be "responsibility from day one."

Fast Track Your Career

Hulley & Kirkwood are one of the UK's leading independent M&E building services consulting engineers.

Established 60 years ago, Hulley & Kirkwood have grown to be one of the UK's leading independent M&E building services engineers. With 9 offices throughout the UK and new exciting opportunities overseas, we have an unrivalled reputation for reliability and technical expertise. We strongly believe "our people are our business" and as an owner managed company, our people, career development and succession planning are at the heart of our business strategy.

Our portfolio of services extends beyond mechanical and electrical engineering to building physics, sustainability and renewable energy design, medical and specialist gas services design, facilities management, building acoustics and fire engineering. We undertake a wide range of engineering commissions from the simplest feasibility study to large urban regeneration projects to highly complex new build schemes.

Across a range of sectors, our staff work in partnership with world famous architects and engineers on some of the most exciting and high profile projects across the UK, from the £540m new build Queen Elizabeth Hospital to the state of the art LG Arena or the vitally important Help for Heroes personal recovery centres.

"Our people are our business"

We know that the key to successful and progressive business is to recruit and retain the highest quality staff. Our aim is not just to offer a job opportunity but a career where you will receive the support and encouragement to reach your aspirations. We have a range of opportunities available, from student summer placements and industrial placements, to permanent roles for graduate engineers and experienced engineers.

As well as competitive salaries, we believe we have one of the best benefits packages in the Industry, including a non-contributory pension scheme, car allowance or company car (where applicable), private medical insurance, life assurance, 36 days holiday, flexitime and a range of flexible benefits including season ticket loans for public transport, cycle to work scheme, payment of professional fees plus shopping and leisure discounts with over 1000 retailers.

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Andrew Sturrock
Senior Engineer

"During my 6 years with Hulley & Kirkwood I have progressed from Graduate to Senior Engineer. I was presented with opportunities early in my career to take responsibility for the design and management of projects; these opportunities, along with the support received from my colleagues, helped me to achieve CEng status early in 2013. I believe that working within an organisation like Hulley & Kirkwood, which is owner managed, allows for greater opportunities for progression and development."



Rebecca Carr
Graduate Engineer

"After spending 2 years with a large FM provider, I wanted to take my career in a different direction. Taking a more technical role with Hulley & Kirkwood gave me the perfect opportunity to do this. I am based in the Plymouth office where I am surrounded by chartered engineers with a wealth of knowledge and experience. This gives me access to such a great resource and is one of the key reasons I was attracted to the role. I have been given the opportunity to be involved in a variety of different projects, while working in a fast paced environment where I am always learning."



Image: Hyposyle Architects



Image: Reich and Hall / Michael Laird Architects



hulley & kirkwood



...Making Buildings Work

CHOOSING THE RIGHT COURSE

Before starting a career in the building services industry, it is wise to explore every education and training route before deciding which will suit you best. **Roxane McMeeken** reports

Mapping your route

Some of the ways into building services and membership of CIBSE

- Degrees, including civil engineering, electrical engineering, energy, environmental engineering, design and technology, engineering, maths, mechanical engineering, physics and product design
 - Inspire Scholarship Scheme supporting full-time undergraduates studying construction degrees
 - BTEC Level 3 Certificate or Diploma in Engineering or in Construction and the Built Environment
 - National Certificate and Higher National Certificate qualifications in building services engineering
 - Arkwright Scholarship sponsored by CIBSE to support studying in school years 12 and 13
 - NVQ Diploma (England), SQVF (Scotland), or Apprenticeships
- Remember, for a building services career, you must keep up maths and science after GCSE!**

Building services engineers take an empty structure and bring it to life by adding energy, lighting, heating and ventilation, and water systems. In other words, they turn the basic shell of the building into a viable place to live or work. If this sounds like what you'd like to do, you'll need at least grade C in GCSE English, maths and science. The next step is to choose your route into the profession.

The two main paths into building services are either through doing a degree or pursuing an apprenticeship. But you might be surprised to find out exactly what each entails. For example, a 'higher apprenticeship' is equivalent to a foundation degree. To help you decide between the routes, we look at where each can lead.

Degree of difference

It could be argued that there is no substitute for a university degree. More so if you reach masters level – for example, by attaining the CIBSE-accredited MSc in Systems Engineering and Innovation at a prestigious institution such as Imperial College London.

Rafay Hasan, senior engineer at Grontmij, chose the graduate route. He attained his degree in mechanical engineering in his home country, Pakistan, and topped it up with a masters in building services in the UK at Brunel in 2009. He says: 'I chose university over an apprenticeship because it's more structured and straightforward. You simply study and find a job at the end. The apprenticeship route seemed more complex, mixing up work and study.'

Industry employers believe a degree gives you a particularly good basis for working on the

DEGREE

DONSKARPO / SHUTTERSTOCK



research and development (R&D) side of building services. Steven Hale, managing director at Crofton Design, says: 'Universities – and especially Russell Group institutions – will teach you maths and science, and the technical skills you need to understand how to design systems. This gives a very good basis for working in R&D, which we really need.'

Hasan believes university prepared him better for the world of work. 'You learn soft skills, such as time management, problem-solving, doing presentations, working in a team and carrying out research.'

There is no doubt that employers appreciate



APPRENTICESHIP

these qualities. Richard Shennan, building group practice manager and building services engineer at Mott MacDonald, says: 'University graduates are often more polished. For instance, they'll have developed communication skills that you might not be able to pick up elsewhere.'

Of course, a degree has a certain status, too. Shennan says: 'Are people with degrees seen as somehow better? Well yes, often, they are.'

Yet there are considerable downsides to the graduate route. One is the cost. The government's Office for Fair Access says that the average annual tuition fee for the 2013-14 academic year is £8,499 and this is expected to

rise to £8,647 for new students starting in 2014. Although some firms may sponsor or part-sponsor students through university, this has become less common during the financial downturn of the past five years, and it's not clear whether it will return to previous levels.

Hasan admits: 'Going to university is definitely not cheap. I'm fortunate my parents were able to cover the costs, but if that's not an option for you, then you have to consider the fact that if you do an apprenticeship instead, you will actually be paid rather than accrue debts.'

Meanwhile, students get comparatively little exposure to industry. This can delay their

6 I chose university over an apprenticeship because it's more structured and straightforward

▶ progress towards chartered status, which – in building services – means becoming a member of CIBSE. Hale says: ‘Some graduates come out of university at 22 with no work experience so, by the age of 25, they have only three years’ experience. That means they’ll be 28 to 30 before they have enough experience to become chartered. They say you can do it in four years but in reality it’s very difficult to get the right depth and breadth of experience in that time.’

Interestingly, this compares unfavourably to what an apprentice can achieve. Hales says: ‘An apprentice who started at 16 will have some nine years of experience by the age of 25. So they’ll be a very strong candidate for chartership, perhaps five years sooner than a graduate.’

Work-based learning

Reaching chartership faster is just one of the benefits of the apprenticeship option. Another is that, since the introduction in 2009 of Higher Apprenticeships, one can now take you as far as level 5 – equivalent to a foundation degree – with level 6 equating to a bachelor’s degree. This way begins with an Advanced Apprenticeship and progresses to a Higher Apprenticeship, making the route worth considering as a genuine alternative to a degree.

The fact that apprentices work in industry from the start may also prepare you better for a career. Andy Ford, professor of systems engineering in the built environment at London South Bank University, started out as an apprentice. He went on to found his own engineering firm, Fulcrum, which he sold to Mott MacDonald, as well as becoming CIBSE president for the 2011-12 year. He says: ‘A university course can often entail a lot of time spent in front of a computer screen. But the majority of engineers find that, in the end, their jobs are more physical. Many find the actual point of the engineering they do is about how things fit together – the order in which they are put together – and your work on these things fits into a much wider team.’

An apprenticeship could also suit you if you are more practically-minded than academic. Hale says: ‘If you are capable of going to a Russell Group university, you should. If, on the other hand, you are going to be borderline or non-Russell Group, consider an apprenticeship.’

You will also be earning. The starting salary for an apprentice in London is about £13,000 a year, with salaries a thousand or two lower outside the capital. While this is not a huge pay packet to start life with, in a few years you will be in a much better financial position than graduate colleagues crippled by student debts, especially if you reach chartership up to five years earlier.

As for the question of whether there is a



stigma attached to apprenticeships, Shennan says: ‘The snobbery is starting to reduce.’

He attributes this to the growing role of Building Information Modelling (BIM), a data-based approach to collaborative procurement, design and construction programme management, which is increasingly being used. ‘With the advent of BIM, we are finding that people who have come through the technician route have skills that are increasingly important. They have the ability to look at a design using a computer modelling approach; they know how to collaborate; and they are good at running data back and forth through a computer model.’

Things have actually changed so much that his firm, Mott MacDonald, has altered its human resources policy: ‘To reflect the growing value we’re placing on people who have “come up through the tools”, we have reviewed the idea that you can’t progress beyond a certain level without a degree.’

It’s also worth noting that – even before BIM – apprentices have progressed to the highest ranks. Rosalind Thorpe, accreditation officer at the Chartered Institute of Building (CIOB) says: ‘Some 90% of past CIOB presidents went through the apprenticeship route.’

Ford adds that – despite the relative strengths and weakness of both apprentices and graduates – these become less relevant over the longer term: ‘Eventually the differences tend to even out.’

With both routes having advantages, it’s up to you to decide which suits you best. ■

“With the advent of BIM, we are finding that people who have come through the technician route have skills that are increasingly important”

Wider horizons

Once in the industry, the levels of professional registration you can pursue with CIBSE include chartered engineer (CEng), incorporated engineer (IEng) and engineering technician (Eng Tech) as well as several levels of professional membership. Achieving this status demonstrates your competence in the field of building services engineering and awards you letters after your name that are recognised worldwide.



DEEP GREEN ENGINEERING

Elementa Consulting is a member of Integral Group, which is an interactive global network of design professionals collaborating under a single deep green engineering umbrella. We provide a full range of building envelope, system design and energy analysis services, with a staff widely regarded as innovative leaders in their fields. Located in two offices within the UK and supported by eight offices across North America, along with an international network of affiliates, our passion for sustainable design runs deep.

Far from being ordinary, we foster a **dynamic work environment** where you can build your career or lead within your area of professional expertise. Our team is dedicated to creativity and innovation a key part of this being our staff development and **on-going career development**.

Interested in becoming part of a global deep green focused engineering consultancy delivering high quality integrated built environment and system design?

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We're looking for:

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- **Graduate Engineers**
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- **BREEAM Assessors**

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Building 2050: the cities of the **future**

How will building services engineers shape the future of our cities, dealing with the key issues of energy costs and sustainability?

Roxane McMeeken speaks to three experts for their views

If you are starting out on a career in building services, over the coming decades your work will shape the built environment of 2050 and beyond. But what exactly could you be working on?

Right now, half of the world's population lives in cities but by 2050 some 70% of us will be city dwellers, according to the World Health Organization (WHO). One thing we know, therefore, is that there'll be a lot more pressure on cities as they try to accommodate this influx.

As a result, much of the work of tomorrow's building services engineers will boil down to solving this global problem. So what solutions

can we expect to see – will we have truly cracked sustainability, or will we be zooming around in fuel-hungry jetpacks? We asked three experts for their predictions.

Responding to climate change

Miles Attenborough, director of the sustainable development group at Aecom, said: 'A key issue we'll face over the coming decades is the higher cost of energy, which is something we're already seeing with the present rising fuel bills. And with London's temperature expected to increase by 5 degrees C by 2080, more buildings will need artificial cooling, which will increase energy

demand. As a result, building services engineers will focus on how buildings can adapt to climate change and help to reduce our energy use.

'As we try to decarbonise the grid, we'll use more solar (photovoltaic) and wind power but – because neither sunshine nor wind is constant – these sources of power will be intermittent.

'This will necessitate building services engineers delivering energy demand management systems. Could it lead to buildings acting as giant batteries storing power? That approach tends to be too expensive at the moment but it could happen in future.

'Another solution might be moving away from

managing power on a building-by-building basis and instead to controlling the power needs of a group of buildings over a large area. This would mean power is used more economically.

'Building services engineers will also need to think about how photovoltaic power can be used in domestic developments where power is needed most during the evenings after the sun has gone down. Perhaps solar power could be used to charge electric vehicles?

'A lot of work has been done on reducing the energy that buildings use, but there is increasing focus on the energy used during their construction and in creating their components. ➤

“ We'll use more solar and wind power but – because neither sunshine nor wind is constant – these sources of power will be intermittent



LEUNGCHORAN / SEANPAWONPHOTO / SHUTTERSTOCK

- ▶ I expect this focus on 'embodied energy' to continue and lead to innovation. We're already doing a project for CIBSE to assess the feasibility of replacing steel ductwork with cardboard.

'Perhaps, most innovatively, our bodies could play a role in future energy strategies. We could power our smartphones via photovoltaic panels on our jumpers. We might harness energy from pedestrians walking over a panel that captures energy. And of course we'll need to get everyone cycling because public transport will be increasingly overcrowded and expensive.'

The 'humane engineer'

Volker Buscher, director and smart cities expert at Arup, said: 'Technology companies talk about future 'smart cities' where every aspect of life is digitised. They conjure up visions of vacuum cleaners that drive themselves, washing machines that switch on automatically and mirrors that tell you when your first meeting is.

'But the future doesn't have to be like Orwell's 1984. Today's young engineers will decide what the future will be like, including how Orwellian – or not – it is. I think we're going to see the age of the 'humane engineer' – engineers who think not just about functions but also about emotions.

'So building services engineers will be called upon to deliver on more than just the environmental agenda – instead, they will create great places to live and work, and cities that are competitive and economically successful.

'Engineers will have to be more than just technically brilliant, because they will be involved in a much wider agenda and working with other disciplines. They'll talk to economists about job-creation strategies and to psychologists about how to change people's behaviour.

'The result will be cities that are humane and decent. It's become clear that people don't want concrete jungles.'

Multi-use buildings

Peter Madden, chief executive of urban innovation centre Future Cities Catapult, said: 'Looking ahead 20 to 30 years, I'm afraid it won't be about jetpacks. In fact, we'll have 80% of the buildings that we have now. What will be radically different, though, is the intelligence that we will overlay onto these buildings and their surroundings, and this is hugely important.

'Everything within buildings will be controlled by digital intelligence, making the built environment more efficient and hence sustainable. So building services engineers will look at how to put sensors into buildings and develop innovations based on the results.

'For instance, an office building's heating system won't just be controlled by a simple formula of coming on at 8.30am. Instead, it will reflect the readings of the volumes of people coming in and out of the building at specific times and where in the building they are.

'Another big theme will be multi-use buildings. Often we see a building that was built to serve the needs of 100 years ago, when it was constructed, but times change so we need to think about how to adapt buildings to new uses. We'll also be creating new buildings designed to be re-shaped for different needs over time.

'The aim will be to tackle the kind of problem we see today where an elderly person doesn't want to leave their community, but is living alone in a house that is too big and too expensive to heat. In future, the building could be redesigned so part of it accommodates the original occupier

Today's young engineers will decide what the future will be like, including how Orwellian – or not – it is

while the rest is used in a new way.

'The need to adapt the built environment so that it is more efficiently used will become increasingly urgent. We already have huge demand for housing in the UK, but there will be even more extreme needs in crowded urban centres overseas – particularly in Asia where the biggest ever migrations to cities are forecast.

'Again, building services engineers will need to ensure the built environment is more flexible, because we will not be able to afford to leave buildings sitting empty for 50% of the time, as they do now. Instead, the space will have to be used for different needs, day and night.

'We will also have a more holistic approach to buildings and their relationship with the surrounding environment. We tend to treat a building in isolation at the moment but, in the future, the demands that will be placed on urban infrastructure will mean we have to think about cities in a more intelligent way.

'For instance, pressures on power infrastructure could mean we want buildings that draw down power at different times to each other and then store it. We might want to bolster a city's water supply with buildings that act together to collect rainwater. We could also reduce the use of public transport by planning developments that combine work and living space, eliminating the need to commute.

'Lastly, we could see whole cities of buildings with green roofs that provide insulation, enhance biodiversity and combat floods – because the green roofs would help to hold water and release it gradually into drains.

Excitingly for building services engineers, this means they will be involved in city-wide strategies rather than just individual buildings.' 

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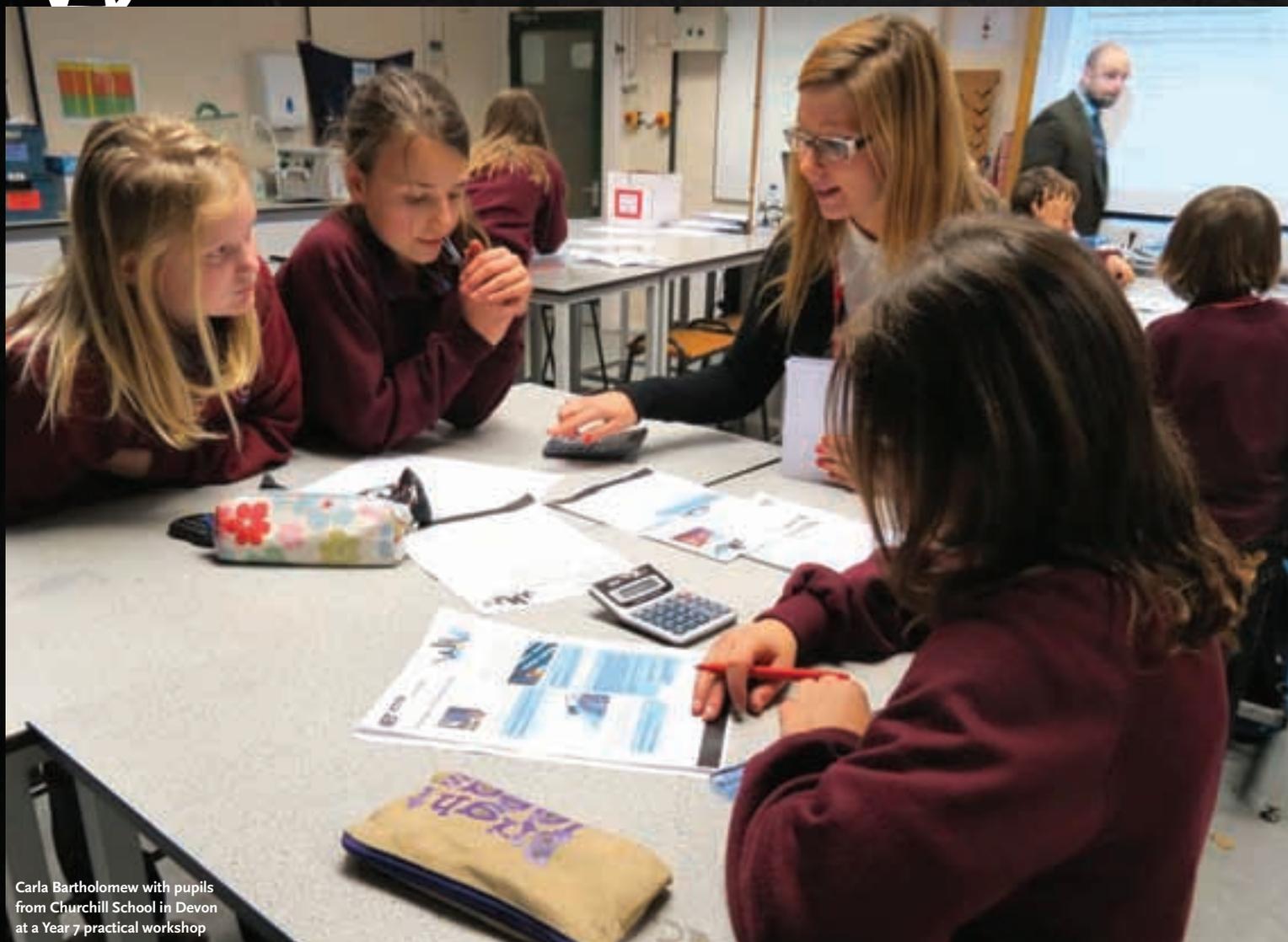
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BACK TO



Carla Bartholomew with pupils from Churchill School in Devon at a Year 7 practical workshop

CIBSE's young standard bearers reveal how they are engaging the next generation of would-be engineers through the STEM network. **Roxane McMeeken** reports

I only became a building services engineer because my dad was in the profession,' says Karen Settle. Talk to female engineers and you'll find that this is a very common scenario. While following in your father's footsteps is a perfectly valid reason for going into engineering, there are already serious skills gaps in the science, technology, engineering and mathematics-based (STEM) professions. Filling them in future will take more than simply replacing the current generation with their own children.

Settle is part of a group that aims to tackle this problem by spreading the word about STEM careers in schools and universities: the

STEM ambassadors. She says that the role is not easy but the rewards are immense. So could you join their ranks?

STEM ambassadors volunteer for the STEM Network (STEMnet), a charity that promotes science and maths-based careers with funding from government, and the Gatsby Charitable Foundation, whose activities include championing engineering. There are more than 26,000 STEM ambassadors across the UK, 40% of whom are female and 13% of whom describe themselves as from black and minority ethnic backgrounds.

Ambassadors visit schools, colleges and universities both to inspire students to pursue

SCHOOL



MINERVA STUDIO / ALAN LISTER / SHUTTERSTOCK

STEM subjects and to improve teachers' understanding of how these subjects are applied in careers. Settle, who is a senior mechanical engineer at London-based building services firm MTT Consulting, says: 'People don't know what engineers do because you don't generally see us on television or YouTube. So we meet students who are strong in maths and science – they're perfect for engineering but they don't even know it.'

Nicola Kane, a mechanical engineer at John Slater and Howard Building services consultants, based in Ipswich, Suffolk, recently decided to become a STEM

ambassador. She says: 'I want to tell young people that there are great jobs – and a variety of jobs – in engineering.'

STEM ambassadors' activities range from manning stalls at careers fairs in schools and universities to giving talks. Settle says: 'I might start a talk by saying, "I'm an engineer, what does that mean?" Children often think an engineer is someone in a boiler suit who fixes things. So I explain that I'm a building services engineer and talk about how we make buildings work and how, without building services, there would be no lighting, heating, cooling and so on.' She adds, 'I'll often talk about our role in combating climate change

➤ – that usually gets them interested.’

Volunteers also run classroom workshops to demonstrate STEM skills and activities. These could range from making cranes out of balsa wood, to giving children a go on a thermal camera or mini solar panel (see box, below).

The role is not necessarily easy. STEM ambassador Carla Bartholomew, who is a mechanical design engineer in AECOM’s Bristol office, says: ‘At careers fairs you’re often there for seven hours and you’ll find that talking to parents, is easy but their children are there too, so you need to think constantly about how to tailor your message for them. I try to take cues from how the teachers talk to the kids.’

Settle agrees: ‘It can be tough. Sometimes you’re in a hectic, stressful environment and it feels like a thankless task when people don’t want to hear what you’re saying.’

STEM activities could also take up more time than you might at first anticipate. Bartholomew says: ‘You might need a good few hours to plan what you’re going to do in a workshop, so you need to set aside more of your time than just the period you’ll be in the school.’

However, STEMnet prepares its volunteers with both an induction and training sessions that include guidance on how to interact with different age groups. There are also various resources you can draw on for materials and tips for workshops, such as the website of the Institute of Physics.

STEMnet only asks ambassadors to take part in one event a year. It sends them a monthly newsletter listing forthcoming events, and you can choose the one you would like to take part in. Plus, with most employers sympathetic to the cause, ambassadors are allowed to undertake STEMnet activities during paid working hours.

Most encouragingly for volunteers, there is credible evidence that the STEM programme has been making a difference since it was launched in 2002. A recent report – by industry body the Engineering and Technology Board – called ‘2013 Engineering UK’ says that entrants to individual GCSE science subjects, physics, chemistry and biology, have more than tripled in the years from 2003 to 2012.

Ambassadors certainly feel that their work is worthwhile. Bartholomew says: ‘There is a STEM skills shortage and ambassadors can benefit industry by helping to close the gap. But also building services engineering is a hidden gem of a career so I really believe it’s worth shouting about.’



Carla Bartholomew spreads the word at a careers fair

Building services engineering is a hidden gem of a career so I really believe it’s worth shouting about’
– Carla Bartholomew



AMBASSADOR AT LARGE

Carla Bartholomew took part in a ‘STEM Festival’ in November at Churchill Academy & Sixth Form, in North Somerset:

‘It’s always a bit nerve-racking before you do a workshop, but preparation is what gets you through. Churchill wanted five 50-minute workshops with 11-12 year-olds. So I researched workshop plans on websites like the Institution of Engineering Technology, and decided to do one on a seaside town suffering from drought.

‘The students were asked to design a water treatment plant for the town. They had to work out how much water this town of 5,000 people needed. Then I gave them a list of equipment, including a UV filter, sediment tank, reverse osmosis machine, granular activated carbon filter and pumps. I explained what each piece of equipment

could do and the students had to decide which to use and in what order, factoring in costs and flow rates.

‘I had been told that the students would have a mix of abilities. So I made sure that while some were doing calculations, others less keen on maths could cut out cards I had made, listing the key things each bit of equipment does.

‘One group of girls was fantastic. They worked out everything perfectly and even came up with two options, a basic one and a second, more expensive one, including a redundancy option. Another group of boys really impressed me because it was clear that they had learned about distillation in another class and they understood how it could be applied to our case study.

‘On the other hand, a boy said he wasn’t interested in STEM subjects but asked if he

could draw the desalination plant, and I was amazed at what he came up with. I showed it to his teacher and she said they would look at developing his skills.

‘I could have been better prepared for the size of the groups I had to work with. I thought each would be about five students but in fact they were all around 30. So I learned that you must get as much information as possible about an upcoming STEM engagement, such as whether you’ll be working with any teachers, how long for, and so on.

‘I got so much out of the day though. I felt I had given the pupils more context around STEM subjects – basically helping them to understand why they are learning about these processes in their science lessons, and why knowing how to calculate things is important.’



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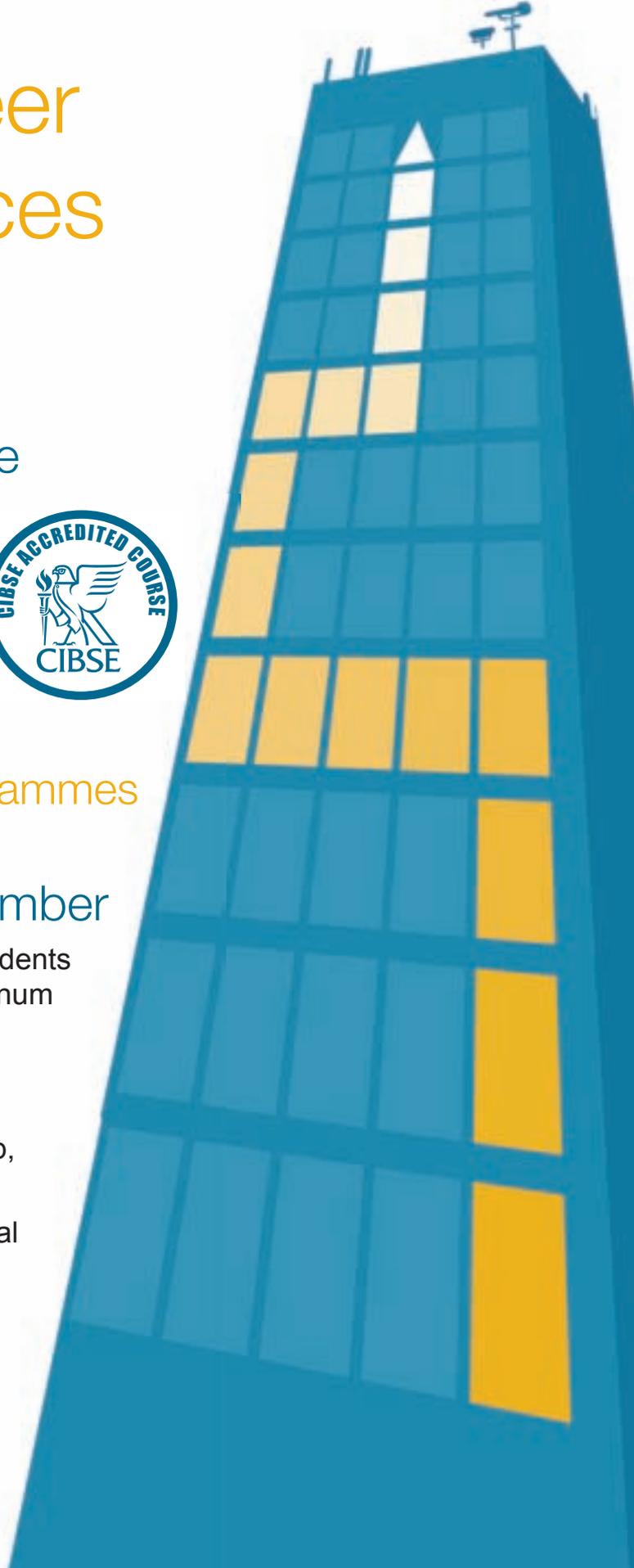
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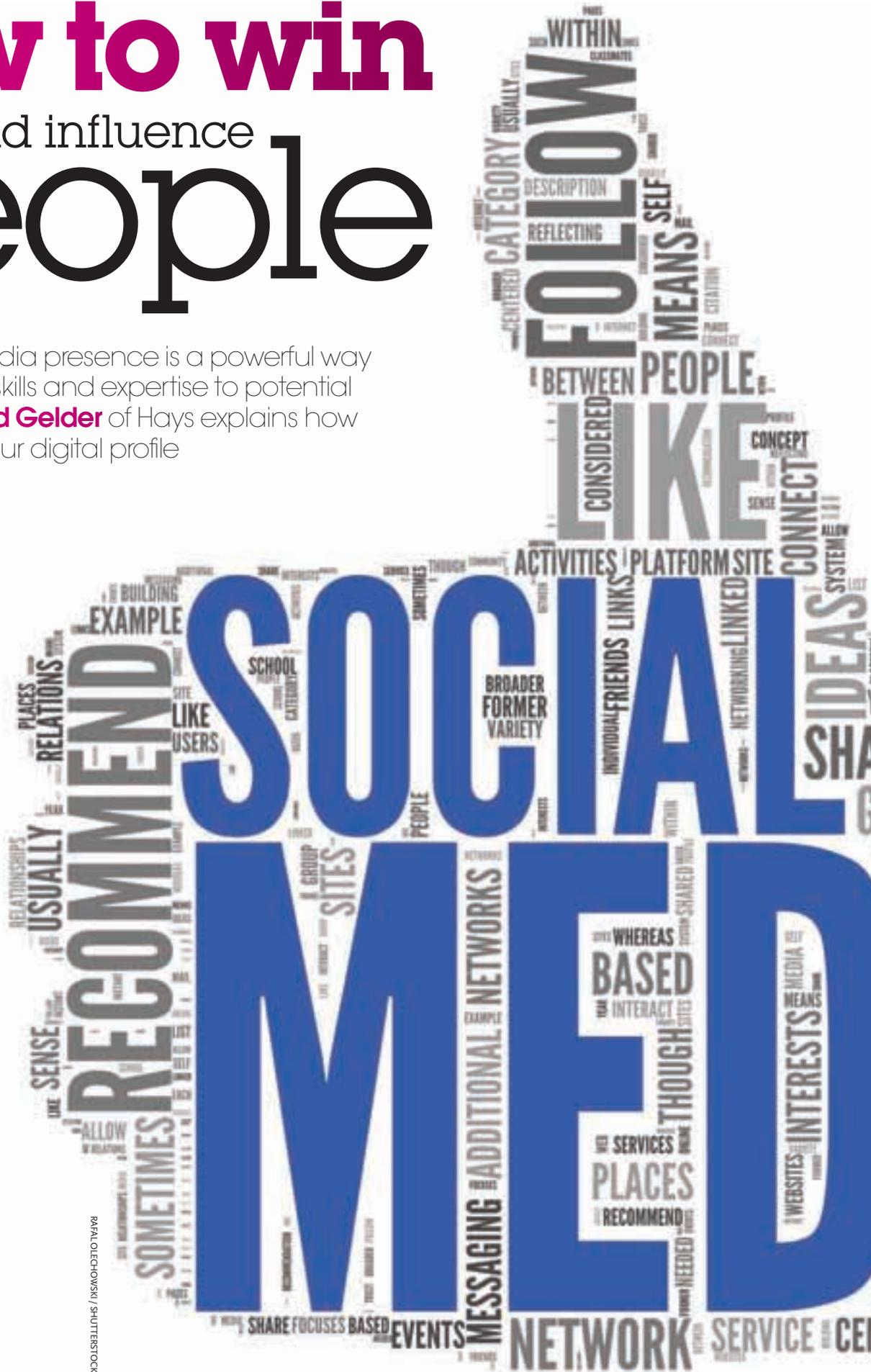
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How to win friends and influence people

A strong social media presence is a powerful way of demonstrating skills and expertise to potential employers. **Richard Gelder** of Hays explains how to add polish to your digital profile



RAFAŁ OLECHOWSKI / SHUTTERSTOCK

More than a billion people use social media channels such as Facebook, Twitter and LinkedIn, with significant consequences for the way we manage our careers. When it comes to social media recruitment, issues around privacy tend to dominate the discussion, but social media can be a very effective way to boost your career prospects.

Drawing a line between the personal and professional

Our research found that 45% of job hunters thought Twitter activity should never be taken into account by prospective employers, but the reality is that employers do look at a candidate's social media presence, whether Facebook, Twitter or LinkedIn. It is estimated that 90% of hiring professionals have viewed social networking profiles as part of their screening process.

Employers shouldn't let what they see online influence recruitment decisions but, to avoid any chance of this, building services professionals should use social media responsibly and avoid sharing anything that could leave a negative impression. Think about what you share and where, and remember that everything you post online has the potential to be seen by a prospective employer.

Creating separate personal and professional

accounts is a good way to draw a line between your work and home life, as long as the appropriate privacy settings mean personal information stays that way. Think about who you are connecting with – if you want to keep your Facebook profile private, then you may not want to connect with colleagues. You should also always keep your current employer's social media policy in mind wherever you are using social media.

Don't forget that information lives online forever. If you are about to start looking for a job then search for your name and remove anything you wouldn't want an employer to see. We found that more than half of jobseekers change their privacy settings when they are looking for a job, and 10% untag pictures and edit content when they know employers might be looking.

Maintaining your online profile

All this shouldn't put you off using social media, as professional networking sites such as LinkedIn do have an important role to play in your job search when used correctly.

Both traditional CVs and professional social media profiles are your sales pitch to an employer, influencing their initial views on whether you are right for the job, so smart job hunters should make sure their online profile and offline CV match, and should keep both

☑ Tips for job hunting using social media

- Review your online footprint – Search for yourself and delete old information or content you don't want an employer to see
- Build your professional profile – Complete your LinkedIn profile with your career history and key skills, and keep it up-to-date as your career progresses
- Do your homework – Follow companies you would like to work for via their own social media channels to keep up with changes in their business
- Expand your network – Connect with relevant organisations and individuals, and interact with them by sharing interesting news
- Join groups and contribute – Join professional networking groups on LinkedIn, contribute to discussions and share your views to become known as an industry expert

Remember that everything you post online has the potential to be seen by a prospective employer



RUI SOFT / SHUTTERSTOCK



6 We found that more than half of jobseekers change their privacy settings when they are looking for a job

► up-to-date to improve their chances of standing out and securing an interview.

Our survey of more than 600 jobseekers found that at least half updated their CV more frequently than their professional social media profiles such as LinkedIn. However, a social media-savvy fifth (22%) of job hunters favoured updating their online professional profile, while an efficient quarter said they updated both at the same time.

While you should tailor your CV to individual roles, your LinkedIn profile needs to appeal to any potential employer, so you should focus more on your key skills and competencies, and less on examples specific to your current employer.

Think about the language you are using and whether it will encourage employers to find out more about you, and use keywords that are relevant to the skills and experience required for the job you are looking for. For example, many employers are looking for Revit experience so, if you have it, then make sure that's clear in your profile. If you have experience in growth areas, such as renewables, then emphasise this.

Steer clear of internal jargon on your profile, and emphasise the transferable skills and experience that will appeal to potential employers. As with your traditional CV, you should always check your grammar and spelling as mistakes can quickly let you down. A professional photograph will also improve your profile – people are seven times more

likely to connect to you if you have a picture on your profile. Don't forget to update your profile regularly with your skills and achievements, not just when you are job hunting. If you gain a new qualification or take on a new responsibility, then add it to your profile at the time. Just as your role and professional development will be constantly evolving, so should your social media profile.

The value of a positive social media presence in career planning

Once you have worked out how you will use social media in your professional life, and have completed a strong profile on LinkedIn, you can start to use these channels to develop your knowledge and grow your network.

Be selective of the companies you follow and the people you connect with. You want to be viewed as an expert in your field, so connecting with relevant companies and people in your industry will enhance your professional profile.

Connecting with CIBSE and other national and local groups is a good place to start, and start following employers you are interested in and recruiters you have worked with. Once you have developed a network, you can start sharing interesting news and articles, or commenting on what other people post.

Join professional network groups on LinkedIn and start to contribute to discussions with your ideas and opinions. There are several CIBSE groups on LinkedIn for different areas of interest and locations, and we share job opportunities and news through the Hays Building Services UK group. Even if you monitor the conversation for only a little while, you will improve your knowledge of the hot topics in the industry and find people you may want to connect with.

You should also use social media as part of your research when applying for jobs or preparing for interviews. Most companies will have a presence on LinkedIn, Facebook and Twitter, where you can find out more about their latest news.

Overlooking social media could leave you missing out on vital career development opportunities. Becoming part of the building services community online can help you improve your professional knowledge and, when the time comes to look for a new role, you'll have the contacts and profile to take advantage of new opportunities.

To read our guide to improving your social media profile visit www.hays.co.uk/socialmedia/index.htm

RICHARD GELDER is a director at Hays Building Services

Search for the CIBSE group on LinkedIn at www.linkedin.com and follow us on Twitter at @CIBSE and @CIBSEJournal



Cardiff University

Address: Cardiff School of Engineering, Queens Buildings, The Parade, Cardiff, CF24 3AA

Website: www.cardiff.ac.uk/engin

Telephone: 02920 874975

Contact: Julie Cleaver, admissions office

Email: engineering-pg@cardiff.ac.uk

Courses offered: MSc Structural Engineering; MSc Civil Engineering; MSc Geoenvironmental Engineering; MSc Hydroenvironment Engineering; MSc Sustainable Energy and Environment; MSc Professional Engineering (Distance Learning); MSc Advanced Mechanical Engineering; MSc Electrical Energy Systems; MSc Wireless and Microwave Engineering.



DIT (Dublin Institute of Technology)

Address: DIT, Bolton Street, Dublin 1

Website: www.dit.ie

Telephone: 353-1-4 023000

Contact: Chris Montague, Dr Ben Costelloe

Email: Miriam.Daly@dit.ie, Chris.Montague@dit.ie, ben.costelloe@dit.ie

Courses offered: BE Building Services Engineering (sustainable energy systems) – Four-year whole-time honours degree programme, established 1983, accredited by Engineers Ireland, reference DT026; BEng Tech Building Services Engineering – three-year whole-time ordinary level degree, established 1972, accredited by Engineers Ireland, reference DT005; Higher Certificate in Building Services Engineering – three year part-time programme, accredited by Engineers Ireland, reference DT033.



Leeds College of Building

Address: North Street, Leeds, LS2 7QT

Website: www.lcb.ac.uk

Telephone: 01132 226003

Contact: Higher education faculty

Email: info@lcb.ac.uk

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Website: www.brunel.ac.uk/sed

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Contact: Tom Kissack

Email: Thomas.Kissack@brunel.ac.uk

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Address: Old Bracknell Lane West, Bracknell, Berkshire, RG12 7AH

Website: www.bsria.co.uk/events

Telephone: 01344 465589

Contact: David Bleicher, head of training

Email: david.bleicher@bsria.co.uk

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Telephone: +44 2031 089018

Contact name: Ian Lewis, Bartlett postgraduate officer

E-mail: bartlett.pgclerk@ucl.ac.uk

Website: [www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management\(London\)](http://www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management(London)) and [www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management-singapore\(Singapore\)](http://www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management-singapore(Singapore))

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Loughborough University

Address: School of Civil and Building Engineering, Loughborough University, Loughborough, Leicestershire LE11 3TU

Website: www.lboro.ac.uk/departments/cv/pg/

Telephone: 01509 228529

Contact: Pam Allen

Email: p.j.allen@lboro.ac.uk

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University of Salford

Address: School of the Built Environment, College of Science & Technology, Maxwell Building, Salford M5 4WT, UK

Website: www.salford.ac.uk/built-environment

Telephone: 01612 954545

Contact: College enquiries team

Email: cst-enquiries@salford.ac.uk

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Faculty of Engineering and Computing, Coventry University

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Website: www.coventry.ac.uk/cab

Telephone: 02476 887688

Contact: Engineering and Computing Admissions Team

Email: admissions.ec@coventry.ac.uk

Courses offered: BSc Construction Management CIOB accredited; BSc Building Surveying RICS accredited; BSc Quantity Surveying and Commercial Management RICS accredited; BEng Building Services Engineering (2 year direct entry); MSc Construction Project and Cost Management RICS accredited; MSc Low Impact Building Performance and Evaluation; and MSc Construction Management CIOB accredited.



School of the Built Environment, Heriot-Watt University

Address: Edinburgh Campus, Edinburgh, EH14 4AS

Website: www.sbe.hw.ac.uk

Telephone: 01314 518363

Contact: SBE School office

Email: sbe-enquiries@hw.ac.uk For distance learning enquiries: sbedlenquiries@hw.ac.uk

Courses offered: CIBSE-accredited BEng Architectural Engineering, MEng Architectural Engineering and MSc Architectural Engineering.

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AECOM

Address: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER

Website: www.aecom.com/careers

Telephone: 01727 535439

Contact: Danielle Charing, talent acquisition consultant

Email: Danielle.charing@aecom.com

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Address: Head Office, Horsley House, Regent Centre, Gosforth, Newcastle upon Tyne NE3 3LU

Website: www.cundall.com

Telephone: 0191 2131515

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Address: Head Office, Watermark Business Park, Govan Road, Glasgow, G51 2SE

Website: www.hulley.co.uk

Telephone: 01413 325466

Contact: Julie Reid, HR manager

Email: jobs@hulley.co.uk

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Address: 1 Bath Road, Maidenhead, Berkshire, SL6 4AQ

Website: www.Grontmij.co.uk

Telephone: 01628 623423

Contact: Geoffrey Palmer, director – Energy, Planning & Design

Email: Geoffrey.Palmer@Grontmij.co.uk

Grontmij is a leading sustainable design, engineering and management consultancy, active in the growth markets of water, energy, transportation and sustainable planning and design. The building services group consists of three director-led design groups providing mechanical, electrical and public health expertise, with support from specialist disciplines, including Environmental Modelling, IT/AV, Fire Engineering, Vertical Transportation and BMS design. Projects range from high-end commercial office and residential projects to universities, schools, hotels and leisure facilities.



Human Capital Solutions

Address: 27 Austin Friars, London, EC2N 2QP

Website: www.humancapitalsolutions.co.uk

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Contact: Richard Federer

Email: richard.federer@humancapitalsolutions.co.uk

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