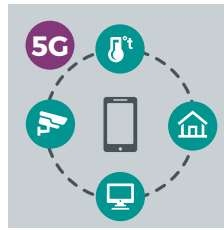




**INTERVIEW**  
ACE's new  
chairman Mike  
Haigh sets out  
his stall  
*page 10*



ISSUE 22 | January/February 2017

**2017 PREVIEW**  
You tell us your  
priority issues  
for the next  
12 months  
*page 3*



**DIGITAL**  
We take a look  
at cyber security,  
5G and smart  
infrastructure  
*page 22*

# I INFRASTRUCTURE Intelligence

*Produced for the industry by the Association for Consultancy and Engineering*

## MAKING INFRASTRUCTURE MAKE A DIFFERENCE



How can cities  
be competitive in  
the new global  
landscape?  
*pages 16-18*



# INFRASTRUCTURE Intelligence

Produced for the industry by the Association  
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**Infrastructure Intelligence**  
12 Caxton St, London SW1H 0QL  
T: 020 7222 6557  
[www.infrastructure-intelligence.com](http://www.infrastructure-intelligence.com)

Editor: Andy Walker  
07791 997602  
[awalker@infrastructure-intelligence.com](mailto:awalker@infrastructure-intelligence.com)

Associate editor: Jon Masters  
07944 642455  
[jmasters@infrastructure-intelligence.com](mailto:jmasters@infrastructure-intelligence.com)

Contributing editor: Natasha Levanti  
07983 894811  
[nlevanti@infrastructure-intelligence.com](mailto:nlevanti@infrastructure-intelligence.com)

Business development manager:  
Diane Williams 020 7654 9943  
[dwilliams@acenet.co.uk](mailto:dwilliams@acenet.co.uk)

Design and production:  
Andy Smith & Denise Bell  
07968 588729  
[info@smithplusbell.com](mailto:info@smithplusbell.com)

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T 01732 366666, [enquiries@cpg-net.co.uk](mailto:enquiries@cpg-net.co.uk)

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## MESSAGE FROM THE EDITOR

If you thought that last year was interesting and challenging then you might have to hold onto your hats in 2017, as the industry gets to grips with a shedload of issues including the continuing ramifications of the EU's vote to leave the EU, the start of the Brexit negotiations, questions over the certainty of the infrastructure pipeline and the effects of a Trump presidency on the world economy.

There's no question that any of the above could have an effect on the infrastructure sector and, whether we like it or not, political events in the UK and abroad are sure to impact on the industry and give rise to uncertainty over the next 12 months. However, there will also be opportunities and many of our contributors in this issue refer to those as they look forward to the year ahead.

We asked a series of industry leaders to highlight some of the key issues and questions facing businesses in 2017 (pages 3-5) and found a large degree of optimism about the future. Change seems certain to be an ever-present during the coming year and it's a theme referred to by both Ramboll's Mathew Riley (page 8) and Mott MacDonald's Mike Haigh (Page 10) in their interviews with us.

Despite the Brexit uncertainty, it's clear that the UK is still seen as a great place to do business, a fact underlined by US super-consultancy Louis Berger's decision to move their international HQ from Paris to London (page 14).

Investment in infrastructure will play a key role in the government's plans to rebalance the economy and increase economic prosperity and on pages 16-18 we profile a new initiative, based on industry research and opinion, which will help raise the profile and importance of economic and social infrastructure to the future of the UK.

In 2016, at long last infrastructure started to be seen by government as a potential key driver of the economy. We need to make 2017 the year when the sector – and its people – delivers on that potential by working with government, locally and nationally, to help bring about real change and show what this fantastic industry can achieve.



**Andy Walker,**  
editor, Infrastructure Intelligence

## Contents

<b>2017 preview</b>	<b>3</b>	We asked key figures from the industry to tell us their top three priority areas for the infrastructure sector in 2017
<b>News feature</b>	<b>6</b>	Mark Naysmith tells us about WSP Parsons Brinckerhoff's acquisition of Mouchel
<b>Engineering</b>	<b>7</b>	Ove Arup is profiled at a major exhibition at the V&A Museum
<b>Interview</b>	<b>8</b>	We speak to Ramboll's new UK managing director about changing the industry
<b>Interview</b>	<b>10</b>	ACE has a new chairman and he's spoken to us about his plans
<b>Opinion</b>	<b>12</b>	Engineers drive the fourth industrial revolution; prospects for contractors in 2017; Innovation and highways
<b>Interview</b>	<b>14</b>	US super consultancy Louis Berger sets up shop in London
<b>Rail</b>	<b>15</b>	Suburban rail – a significant missed opportunity by the transport secretary
<b>Cities and infrastructure</b>	<b>16</b>	We profile a new initiative that will help raise the profile and importance of economic and social infrastructure in the UK
<b>Mass transit</b>	<b>19</b>	The challenge of meeting the demand for better public transport
<b>Brexit</b>	<b>20</b>	New research says that a 'hard' Brexit could mean that construction missing out on tens of thousands of workers
<b>Digital</b>	<b>22</b>	Special feature on digital infrastructure and cyber security
<b>Water</b>	<b>25</b>	Graham Hunt of Atkins gives us a water sector health check
<b>ACE news</b>	<b>26</b>	Optimism in 2017; New ACE Agreements; Diversity and inclusion webinars
<b>EIC news</b>	<b>29</b>	The end of the Brexit phoney war is set to bring more uncertainty
<b>Flooding</b>	<b>30</b>	We take a look at the work of the Flood Advisory Service
<b>Careers</b>	<b>31</b>	Amey's Yoanna Moguel talks about her career path



# Getting to grips: Industry lays down the key issues for 2017

We asked a selection of infrastructure's key leaders to give us their top three questions for the sector in 2017. Not everyone stuck entirely to the brief, but all contributed meaningfully to give a real sense of what's important for the months ahead.



**Stephen Tarr,**  
managing director  
for major projects,  
Balfour Beatty

## Should we be optimistic?

Government's £24bn productivity fund and promise to invest 1.0-1.2% of GDP per annum in infrastructure, demonstrate an ongoing commitment to the UK's pipeline of projects. Industry still awaits royal assent for HS2, plus government's vote on Heathrow and further plans for the Northern Powerhouse and Midlands Engine. But 2016 closed with mega projects a step or two closer to being formalised. With investments made in strategic roads and nuclear new-build and decommissioning, we have good reasons to be optimistic.

## Do we have the skills to deliver?

We face unprecedented infrastructure investment in 2017 and beyond. Yet all is illusory if the industry cannot deliver efficiently. Leading companies in our sector recognise, more than ever, the importance of investing in home-grown talent and retaining skilled workforces. But we have to do more. It is imperative the UK remains an attractive place to work with access to skilled labour beyond its borders; that we promote our industry without hindering an international, targeted resourcing process through unnecessary bureaucracy and barriers.

## How can we deliver projects more efficiently?

Through innovation the infrastructure industry has the potential to deliver projects more safely, more efficiently and ultimately more productively. However, innovation can hit a ceiling as the 'new ways of thinking' become the norm. Only through open and continual collaboration can we constantly develop smarter ways of working and deliver cutting-edge infrastructure. Open forums are essential for discovering the next generation of efficient, productive and safe working methods.



**Malcom Bairstow,**  
infrastructure  
sector leader,  
EY

## Foreign investment

EY's recent UK investment attractiveness survey identified five priorities for UK trade. High on the list was improved infrastructure – obvious perhaps, but the devil is in the detail. Different sectors have specific needs. Manufacturers want roads and ports, whereas the service sector and tech companies need airports and telecoms. More than ever, to attract foreign investment, we need an integrated infrastructure plan which addresses future resilience, not just short term priorities and one which comprises solidly investible, quality programmes and projects.

## Capability and ambition

The UK hasn't embarked on an infrastructure programme of the scale of the current plan since Victorian times. Irrespective of whether all projects in the pipeline are ultimately delivered, we must fully harness the potential of advanced manufacturing and exploit innovations in digital technology. We must commit to making the biggest investment in skills, training, productivity and research and development in living memory.

## Housing

Early iterations of the UK's infrastructure plans overlooked housing, however it is encouraging to see the government now recognising this as a burning issue. Housing is at the heart of the urbanisation agenda and if infrastructure plans are to be central to the government's industrial strategy, then the right accommodation must be provided in the right place at the right cost throughout the UK.



**Chris Pike,** develop-  
ment director for  
infrastructure,  
Arcadis

## Digital railway

In 2017 we can expect to see a £450m digital railway programme gathering momentum. The benefits of digitalisation of rail operations are already being widely realised across

*continued on page 4 >>>*

>> continued from page 3

Europe. We have a fantastic chance to replicate this success in the UK. The digital railway programme has the potential to revolutionise our railways – releasing capacity and improving reliability, punctuality and safety. This will contribute substantially to increasing growth and productivity across the country.

## High Speed 2

With royal assent expected in coming months, Phase One of HS2 will move to delivery during 2017, unleashing opportunities for growth and prosperity across the country. Preparation of a hybrid bill for Phase 2 is also due to start this year, but HS2 about more than creating infrastructure. It can be a vehicle for positive change within our industry; changing the way we think about skills – education and equality, diversity and inclusion. This has to be an opportunity worth embracing.



## Unlocking potential

Economic disparity between the south east of England and the rest of the UK has been confirmed by a reported widening of the productivity gap. However, further devolution of powers to regional combined authorities should see huge potential realised. The West Midlands will be able to invest in the massive opportunity created by HS2 and the Birmingham stations. The Northern Powerhouse is also gathering momentum. We fully support Transport for the North in its ambition to become a statutory body in 2017.



**Ian Liddell,**  
UK head of  
development,  
WSP

## Can we do more to improve public perception of infrastructure?

It is vital the general public gains a clear appreciation of the value of good infrastructure. Every five years or so, they become the electorate – and are able to hold our leaders to account. It would help us greatly if infrastructure became a much bigger talking point, not just at election time. We must explain the benefits in terms that people will understand, avoiding

jargon and expressing the value of infrastructure in a way that shows what it means to people's everyday lives.

## Will Brexit uncertainty delay investment decisions?

We hope not, but can understand the temptation. We can ill afford delays to infrastructure that will boost the economy and help to deliver housing, aligned with an industrial strategy, which we hope to see soon. Of course, we cannot rush into investment decisions prematurely either. Many proposals await requisite studies, design development and business cases. So if government is tempted to hold back on investments, it should at least get to the stage where well-informed decisions can be made.

## Will we make real progress towards autonomous vehicles?

This is a rare moment in road transport planning. We can see sufficiently far ahead to predict and plan for the impacts of technology. This is not a decision for tomorrow: the transition is already underway. The easy option, but the one carrying greatest risk, is to leave the roll-out to market forces. Or we can seek a better, more collaborative transition across the public and private sector. With strong policy and strategic leadership, the overall returns for everyone should be greater.



**Richard Robinson,**  
chief executive for  
civil infrastructure,  
AECOM

## What will Article 50 mean for infrastructure?

Government's triggering of Article 50 at the end of March may cause major disruption for the infrastructure market, particularly if a 'hard' Brexit is chosen. If the UK leaves the single market, many companies will want to ensure they retain access to the best talent and skills. The focus must remain on progressing the UK's ambitious project pipeline. Schemes such as Heathrow, HS2, Crossrail 2 and the Northern Powerhouse programme are vital to the country's ability to compete on a global stage.



## How will critical schemes progress in 2017?

Industry remains hopeful that the hybrid bill for Phase One of HS2 will soon become an act of parliament, allowing construction to start this year. Last year Heathrow got a green light for a third runway, but a parliamentary vote risks delaying its progress further. The project is all the more critical as the UK prepares for post-Brexit scenarios. Pressing ahead with much-needed infrastructure programmes must be a priority in 2017.

## What prospects for disruptive technologies?

This could be a breakout year for disruptive technologies in infrastructure. Government has ambitions for the UK to be a world leader in connected and autonomous vehicles. There are also opportunities to transfer experience from other sectors. Industry 4.0 is the name given to a growing trend of automation and data exchange in manufacturing. Applying lessons learned from Industry 4.0 will bring a range of benefits. The UK must remain at the forefront of new technology if it's to remain globally competitive.



**Patricia Moore,**  
managing director  
of infrastructure,  
Turner & Townsend

## Capacity

What a difference a year makes. Twelve months ago serious questions still hung over three mega projects – Hinkley Point C, HS2 and Heathrow's third runway. But with all three "H's" now confirmed, the question mark has shifted to the industry's capacity. Does it have the skills, people and funding to simultaneously deliver such huge projects? The short answer is not yet. Government funding alone won't be enough for UK infrastructure to meet its biggest challenge in a generation. The industry must come together like never before; sharing best practice, collaborating across the supply chain and speaking with one voice. We must increase productivity, show we are capable of innovation and attract a new generation of talent if we are to succeed in the long-term.

## Attractiveness

The green light for big projects has raised the stakes for skills: a shortage threatens to severely limit the industry's ability to deliver. It's essential we make infrastructure a more attractive industry to work in, while broadening its appeal to a more diverse range of talent. The Apprenticeship Levy, which goes live in April, could make it easier to get smart young people through the door, but it's up to the industry as a whole to attract and retain the brightest and best. So we must ramp up outreach efforts, make greater play of technology and challenge ourselves to understand what is attractive to young people today. High-profile mega-projects are a platform to show what an exciting industry this is – to recruit the next generation.



**Steve Wooler,**  
chief executive  
officer, BWB  
Consulting

## Technology

This promises to be the year we see digital engineering taken a lot more seriously. It's not about buying off-the-shelf solutions – it's a whole new mindset. One of the big opportunities relates to industry's resource and cost challenges: off-site and modular construction bring efficiencies and reduce costs. Machine learning and artificial intelligence are also going to have an impact. BIM and GIS were just the start.

## Talent

Skills shortages will continue to hit the industry's ability to deliver. At BWB we've focused on recruiting the right people – ambitious, entrepreneurial new starters and experienced engineers looking for a fresh challenge. That is just the beginning: the critical difference comes from the way people are looked after and given opportunities. Our retention rate is now a key metric. The whole industry has to make recruitment and retention a priority all the way from schools to those approaching retirement.



## Certainty

Putting money into tech and talent is all very well, but consultants are often 'itchy' about these investments due to a lack of certainty surrounding project pipelines. I've been to numerous meetings about HS2 and attended seminars about the Midlands Engine and the Northern Powerhouse. All have emphasised the need to invest in infrastructure and connectivity. They now need to push the button because that is what will give the industry confidence to develop the capacity needed for delivery.



**Jason Millett,**  
chief operating  
officer for  
infrastructure, Mace

## The industrial strategy

Publication of government's industrial strategy will determine much of this year's policy developments around infrastructure. At Mace we are publishing an infrastructure charter setting out policies we believe will be needed to help kick-start Britain's industrial progress. Our recommendations include establishing new mayoral-led infrastructure enterprise zones and more devolved transport bodies similar to Transport for the North.

## Productivity in construction

The UK currently has a pipeline of over £500bn of infrastructure projects, but also a construction industry with a recognised productivity problem. With so much work in the pipeline even relatively modest improvements in output per pound spent could have a tremendous impact on the national economy. By embracing technology, upskilling workers promoting careers in construction, and better communicating the benefits of infrastructure to local residents, we can improve the value of major infrastructure schemes in the UK.

## Skills and technical training

This is a year for a renewed focus on skills. Private polling by Mace shows that 84% of the public believe we should do more to train British workers rather than rely on skills from overseas. By 2020, the UK could see a 25% decline in the construction

workforce available, as older workers retire and we exit the EU. We believe government should consider using funds generated by the Apprenticeship Levy, to create a new technical qualification in 'infrastructure delivery' equivalent in value to a degree.



**Nick Roberts,**  
chief executive  
officer, UK &  
Europe, Atkins

## How do we make Brexit an opportunity, not a burden?

The decision to leave the EU continues to cause uncertainty. However, where some see challenges, we see opportunities to transform things for the better, not least around our industrial and export strategies. Government needs to maintain private investors' confidence in its ability to deliver 'business as usual'. Decisions to be made over this next year are more vital than ever for the UK's prosperity.

## Is 2017 the year we finally solve the housing crisis?

Housebuilding remains a priority for national and local governments, but traditional approaches are not delivering enough homes fast enough. It's a market crying out for a disruptor; a different way of doing things. Off-site manufacture is gaining political traction and offers the potential to build flexible, affordable homes quickly. With financial incentives, ongoing planning reform and initiatives to unlock public land, 2017 could be the year for housing.



## How will engineers ride the digital wave to deliver infrastructure needs?

Digital technologies like BIM, automated design, drones for surveying and augmented reality are now well established. The likes of cloud computing, predictive analytics and the 'internet of things' are rapidly increasing their presence. These digital approaches to engineering and asset management are attracting new entrants to the market and driving new business models. Against a backdrop of sustainability, austerity and other challenges, our industry must quickly embrace these new ways of working.

# A new top-tier name in the making

**T**he announcement of WSP|Parsons Brinckerhoff buying Mouchel Consulting in October marked the arrival of a new Tier 1 consultant across UK infrastructure. As the UK managing director of the enlarged WSP business, Mark Naysmith told *Infrastructure Intelligence*: “On the whole our strategic plan is to create a Tier 1 highways and infrastructure consultancy. Previously we were already on the top tier of energy and property markets, while Mouchel has the same status in its own right in highways.”

The acquisition of Mouchel, for £75m from Kier, has added about another £120m of gross revenue to WSP|Parsons Brinckerhoff’s £450m annual earnings. Plus, 2,000 or so staff have joined a business that now numbers 7,100 and can boast a significantly strengthened presence in roads and transport planning, the water sector and local government.

Mouchel Consulting would appear to lock quite nicely onto the structure of WSP|Parsons Brinckerhoff, adding to the latter’s transportation and infrastructure division. “There is some overlap between the two businesses, mostly in strategic highways in England, but not much overall,” Naysmith said.

The newly merged consultancy business is now bidding as a single joined up organisation through Highways England’s Collaborative Delivery Framework – the principal area where both names previously competed.

The acquisition of Mouchel was also approached with an eye on growth through an expanded geographical footprint, Naysmith said: “Mouchel is particularly strong in the north of England and Scotland, so giving us a nice balance of locations. It also has a good client base in local government and lots of other strategic complementary fits, such as its ITS (intelligent transport systems) business, which is a renowned global skills set, plus expertise in land referencing,” he said.

The task of integration started from day one where necessary to ensure clients continued to receive support without conflict of interest, Naysmith said. But the two businesses continue to run in parallel due to their differing financial years. The new combined consultancy will be formally created from the middle of 2017. A new company structure and leadership



WSP|Parsons Brinckerhoff has merged with another major industry name after its acquisition of Mouchel. So what’s the plan?

Jon Masters asked the MD of the newly forming business, Mark Naysmith.



group will be revealed from January 2017, followed by a rebranding exercise.

Naysmith acknowledged that the lengthened company title was somewhat cumbersome as it stood. By June this year, both the Parsons Brinckerhoff and Mouchel names will be dropped as the whole business begins operating as WSP. “We very much value the Mouchel brand though, so we will continue as it is for now while the rebranding remains a work in progress,” Naysmith said.

He also gave reassurances when asked about the possibility of job cuts as the two

businesses are combined: “Acquiring Mouchel forms part of our growth strategy, in terms of people, clients and sectors we work in. Given the complimentary fit of skills and the shortage of new talent coming through in the UK, particularly in the infrastructure sector, we’re not anticipating a redundancy programme to be necessary,” Naysmith said.

“This is helped by the fact that the majority of Mouchel’s support services have remained with Kier. So we’re welcoming new colleagues and consolidating our breadth of technical expertise, which becomes increasingly apparent the more I talk to people at Mouchel,” he said.

Office moves and closures are not ruled out. The integration plan will bring teams together where they’re working in close proximity. “But we’ll only do this where it encourages co-working and collaboration to support our projects and clients,” Naysmith said.

He also pointed out that WSP has done this all before as reason to be optimistic that the merger will go smoothly. It’s now just over two years since the acquisition of Parsons Brinckerhoff was completed. “What we’re doing now is similar, very much a merger. We have the success of bringing the WSP and PB teams together to build on. I’m very pleased so far with how it’s going,” Naysmith said.

“These are exciting times. For infrastructure there is the big uplift in highways investment, plus HS2, aviation and other major projects coming. And in housing too the market for planning, assessments and supporting infrastructure is picking up again after the Brexit fallout, particularly in London, and it’s looking good for next year. The whole Brexit piece has been about uncertainty. Government’s recent announcements on infrastructure have given the industry more confidence,” said Naysmith.



“Acquiring Mouchel forms part of our growth strategy, in terms of people, clients and sectors we work in.”

Mark Naysmith

# Building the unbuildable

**W**hile many marvel how gravity was defied for a new roof type, how the light plays just so, or how transport is seamlessly integrated into communities, it is usually only in the construction industry that the strategic role of the engineer in those achievements is recognised. The recent exhibition at the V&A, *Engineering the world exhibition: Ove Arup and the Philosophy of Total Design*, brought engineering to a national and public stage.

Seeking to return to what curator Zofia Trafas-White refers to as the V&A's founding identity of being a showcase of art, design and sciences, the museum established a season celebrating engineering. At its heart this stripped away visitors' lingering stereotypes to reveal the layers of wonder that engineers give to society, bridging both the creative and realistic part of designs and infrastructure that create our world.

Highlighting the story of one engineer, while exploring the impact of total design and technology integration over time, last November saw a special exhibition focused on Ove Arup, founder of Arup, an early proponent of total design and engineer on projects evoking worldwide wonder, from the Sydney Opera House to Centre Pompidou.

*Engineering the World* utilised items loaned from over 20 organisations to create a visitor experience which told the story of not just one man but that of engineers. It featured total design concepts ranging from the revolutionary to the mainstream, while highlighting the innovative prowess of technology which again and again has revolutionised the field pushing the limits of engineering to create tomorrow's infrastructure.

The exhibition took the visitor on a journey that revealed the true prowess of the engineer, stripping away misperceptions about how infrastructure is created, portraying engineers as those who turn ideas into reality, taking a project from concept to a structure that stands the tests of times.

Visitors begin their journey by experiencing engineering as told through drafts of designs, calculation sheets, slide rulers, complex models and documented testing of models for structural viability or the impact of new innovations on design feel prior to construction. In the example of Ove Arup, this demonstrated the deep level of thought going into structures, not just as



A recent exhibition at the Victoria and Albert Museum in London highlighted the untold story and legacy of engineers. *Natasha Levanti* went along for a look.



**Ove Arup, founder of Arup, and (below) some of his projects.**



a structure but as a concept of total design that fulfils the current as well as future needs of the space.

In continuing their journey visitors experienced how the introduction of the computer revolutionised the discipline of engineering, expanding what could be anticipated within the total design of a project prior to construction. From early forms of computer modelling to the current practice of anticipating noise impact on local communities and the complexities of route planning, the exhibition continues to follow Ove Arup's concept of total design past his life and into the present day.

Allowing augmented reality to demonstrate yet more layers to the story of the engineer, the exhibit concludes with many innovations of the future, exposed to reveal the inner workings and the complexities intrinsic within modern engineering innovation.

Through the visitor journey, the exhibition succeeds in stripping back misperceptions to reveal the unseen hand of the engineer in building the structures that create people's lives in modern society, structures that make people's lives better every day. By tracing the incorporation of both total design and technology into the field, visitors develop a deeper appreciation for the care and time taken by engineers in thinking of all the factors that make a structure not just a structure, but a joy.

While for more than the 65,000 visitors to *Engineering the World*, the specifics of the exhibit may fade in time, the journey they undertook is certain to give a greater appreciation for the daily work of engineers that outlasts any one engineer.

The exhibition is now finished but you can read Arup's design book, *Total Design Over Time*, at: <http://arupdesignbook.wardourdigital.co.uk/>



**M**athew Riley strikes me as someone who sees the positives in any given situation. That's not to say that he is oblivious to the challenges that the industry faces, on the contrary, he's keen to tackle those head on and he's not afraid to speak his mind. He's also an enthusiast. When I meet him he tells me about his helter-skelter round of Ramboll office visits, meeting more than 700 people in his first four and a half weeks to get to know his new company.

He proudly shows me the photos he's taken on his phone on his visits which include the Queensferry Crossing, the stunning twin sails bridge in Poole and the keel laying ceremony for the Sir David Attenborough boat for the British Antarctic Survey. "When you show your kids this stuff and explain it, you realise that there's a story behind every one of these projects – and not just a technical one but a social impact story too. We need to tell those stories more," Riley tells me.

Talking up the social benefits of projects is definitely something that the industry needs to do more of to make engineering more attractive as a career. Riley thinks the industry is more attractive than it was but still faces challenges. "The pay and conditions are a lot better than they were a

decade or so ago, but the industry still has an image problem when it comes to inspiring young people. The end product is fantastic, but the process of getting there is far from inspiring at times," he says.

Riley is keen to talk about the challenges facing the industry and what needs to be done to address them. "I see three key challenges currently. Firstly, speaking with one voice. There's a separate issue around productivity and quality and then there is also the impact of digitalisation," Riley says.

He expresses frustration about the industry's ability to offer more certainty to government and other clients. "We are historically a fragmented industry and if you think about government policy stimulating activity, where do they look to for answers?" he asks. "How do they know that money is going to be well spent when they can't speak to any one organisation in the industry to get the answer? The engineering and construction industry is not good at demonstrating value or where we can genuinely improve the quality of the product or the solution that we deliver," says Riley. "Yes it can be iconic, yes it can be inspiring, yes it can be complex, but as an industry we haven't moved forward in the way that other industries have."

# Don't wait to be disrupted, make change now

Industry big-hitter Mathew Riley took over as Ramboll's UK managing director in the summer. *Andy Walker* went to see him at the firm's London offices.



The Queensferry Crossing.



Riley says this is down to the way in which the industry is set up. "We are an industry that is set up to transfer risk, which by definition leads you into a confrontational environment. We have some very clever people who can solve some of the biggest and most complex engineering problems but we have a commercial model that is designed to transfer the risk to the lowest common denominator most of the time," he says.

According to Riley, it's a process that means that at every link of the chain, somebody has to protect a margin and self-interest rules. "Rather than focusing all your energy on creating technical solutions you end up focusing it on protecting a commercial position. That is an industry-wide problem and we have a legacy of historic behaviours and an industry that hasn't changed in terms of how it contracts. Fundamentally this hasn't led to any major innovation or improvement in quality. Speaking with one voice in this area is an issue because we want government to listen to us," Riley says.

If the industry fails to change it will have change thrust upon it, Riley says. "The next five to ten years will be really interesting, because if we don't change, if we don't collaborate in its broadest sense, something will disrupt our industry to make that change," he says. "Almost certainly this will be an outside disruptive influence probably



The University of Manchester's new Sir Henry Royce Institute. Picture © NBBJ & Vyonyx.

by something or someone that doesn't exist in its current form coming into our industry because they will either use disruptive technology or some other mechanism to take what we historically do and do it more efficiently," says Riley.

Riley cites housing as a possible area where change could come from outside the industry. "We have a huge shortage of housing in the UK and we need 200,000 units a year to meet demand. This will need huge investment but at some point the size of the prize will mean that we are going to get a new market entrant; somebody will speculate and come in and disrupt things because they will find a solution or a way to deliver, probably initially a building or a residential project. We should be able to deliver the 200,000 units that are needed yet most industry observers say that we haven't got the capacity to deliver it. That's because we are trying to solve tomorrow's problems with yesterday's solutions," Riley argues.

He also thinks that the profile of new entrants into the industry will change. "We are now getting graduates coming out of university with programming skills, not just engineering skills, so I can see a world where quite quickly we will be taking on as many people with computer science degrees as we do with engineering degrees," he says. "With standardised design something that has historically taken weeks has gone down to days and then through the use of algorithms



**"We need to reform and become a lot more predictable as an industry and one of the ways is to work better together. We have a peer group across the industry that is capable of doing that, we just need to make it happen."**

**Mathew Riley**

those days have gone down to minutes and hours for the same activity," he says.

As someone who has worked for both contractors and consultancy firms during his career, Riley is well placed to take on the challenge of change. "The client, contractor, consultant perspective does give you an insight into all sorts of things," Riley tells me. "It gives you an insight into what's important to a client from a business perspective or an owner/operator dynamic and what drives value for a client organisation. I learned a lot from the contractor model and what drives those businesses," he says.

He remains frustrated though at the lack of real change in the industry. "Having cut my teeth on T5 nearly 15 years ago, which at its time was quite pioneering from a collaborative environment perspective on that scale, as an industry from a wider collaboration point of view we haven't fundamentally moved. To be blunt, it's disappointing to be having the same conversations 15 years on," Riley says.

"As an industry, we could be doing a lot more, a lot quicker and a lot better quality," he says. "The Treasury is unsure about the impact of their investment in infrastructure but we should be informing that debate and effectively presenting a menu of options to government that says if you do this, this and this, then you can expect these returns," he says. "We are not that agile, we are not that well informed. If you go to other industries like manufacturing and environment, they will know exactly what they are going to get from particular investment."

"We need to reform and become a lot more predictable as an industry and one of the ways is to work better together. We have a capable peer group across the industry, we just need to make it happen," says Riley.

Riley is very optimistic about Ramboll's future, praising the firm's highly engaged staff – 95% of whom responded to a recent staff survey – for their energy and enthusiasm. "We're foundation owned so we can take a long-term view. Our role is to create a sustainable business for the next generation and we reinvest our profits in the business and our staff can see the benefits. Accelerating our technical development will be a priority next year. We are not going to wait to be disrupted; we want to take a lead in developing more efficient technical solutions," he says.

Riley says the most exciting part of his job is explaining what Ramboll does to potential as well as existing clients. "We have a capability that is much larger than the sectors in which we work. That's an exciting opportunity and is one of the reasons I'm here I guess," he says.

No stranger to thinking differently and sometimes thinking the unthinkable, you sense that Mathew Riley will be taking advantage of those opportunities and making things happen for Ramboll and the industry in 2017 and beyond.

# A strong industry voice that's really needed

ACE's new chairman, Mike Haigh, is targeting better industry integration, effective use of digital information and improving diversity and inclusion as his key priorities for his 12 months in office.

**W**ith more than 30 years' working in the infrastructure sector, Mott MacDonald managing director Mike Haigh has a wealth of knowledge that he is keen to apply in his new role as chair of the Association for Consultancy and Engineering (ACE). Haigh has responsibility for Mott MacDonald's business throughout Europe and Africa and prior to that was regional managing director for the firm's Europe and Africa operations and before that the Middle East and South Asia. So he has significant global experience to call upon.

## Working collaboratively

As befits someone who is keen to see the infrastructure sector work in a more joined up way, Haigh is a big advocate of the industry working more collaboratively. Previous roles as a member of the delivery boards for Anglian Water Special Projects, Severn Trent One Supply Chain and the Thames Water GBM (Galliford Try,

Biwater Treatment and Mott MacDonald) joint venture highlight his credentials as does being a director of Mott MacDonald Bentley, the multi-award-winning integrated joint-venture with contractor JN Bentley.

## Giving something back

"I've been involved in the infrastructure industry for 35 years in lots of different capacities and for the past couple of years I've been on the board of ACE and chair of its large consultancy group and I've seen the benefits that ACE can bring to the broader industry," says Haigh. "I also feel that it's time to be giving something back and to be able to do that in the role of ACE chair is a very worthwhile thing," he says.

In a changing industry, business and political climate, what does he see as the key benefits of ACE? "The ability of a single organisation like ACE to understand the wide ranging issues

that face our industry, whether it be from the client side, from designers or from constructors or SMEs and that ability to understand the industry is quite unique," he says. "The voice that ACE has and its power in terms of lobbying is significant and something we need to make as much of as we possibly can. Advocacy and lobbying is important but it's also the fact that we can do this from such a broad base of understanding and knowledge," Haigh says.

But what about the challenges facing ACE and its members in what are bound to be uncertain times following the turbulence of the past 12 months? Haigh tackles the question head on and is typically optimistic in his reply. "I'm not sure that I can remember a time where we have faced such uncertainty – economic and political – on the one hand, but also opportunities," he says. "I think the next year or two is actually going to be quite exciting. We will have to manage uncertainty but also some huge opportunities. The world is moving very fast. Look at the context our industry operates in, whether it's climate change, population movement, constraints on investment, resource limitations, security threats, you name it. All of this creates opportunity," says Haigh.

## Opportunities and assets

Haigh sees three main areas of opportunity for ACE and its members over the coming year. "Firstly, the importance of managing our existing assets. As a nation we've got assets that are not getting any younger and there are lots of them. Secondly, information in the digital age we are now in, and how that information is then used, is also crucial and the third area of opportunity is how we can deliver more efficiently," he says.

As a collaborator by nature, Haigh is keen to see a more joined up industry and ACE playing its part in that. "I'd like to see us start talking about ourselves as an infrastructure industry, rather than as a construction or a design industry and as an industry that is managing the best out of our infrastructure," he says. "This means providing a good product to the end user, achieving better whole life costs and being as professional as we can be in getting the

"We are already seeing a move towards much more efficient delivery, with increasing standardisation, automation in design, much more integration between all the players in the infrastructure world, offsite construction and generally greater integration across the value chain. ACE and its members needs to be at the forefront of that."



most out of our assets," he explains.

Haigh also highlights the developing digital landscape as a key priority. "We need to recognise that information more and more is a resource for us. Whether that's around enabling digital delivery for new build or in promoting smart infrastructure, we need to understand that our infrastructure world will be different because of the way that data will be used and we need to be on top of that," he says. "We also need to find different ways of delivering our services in the new digital environment," says Haigh, who includes ACE in that and the way it delivers to its members.

Haigh's third area of opportunity is delivery. "We are already seeing a move towards much more efficient delivery, with increasing standardisation, automation in design, much more integration between all the players in the infrastructure world, offsite construction and generally greater integration across the value chain," he says. "ACE and its members needs to be at the forefront of that," Haigh says.

### Integration and diversity

Haigh says he plans to work with the whole industry to try to create better integration. It's something that is close to his heart as a director of JN Bentley, which is well known for its integrated delivery in the water industry.

Haigh also highlights the continuing importance of skills as a priority, especially at a time when the industry is being called upon to deliver the government's ambitious infrastructure plans. "Underlining everything we do is the ongoing skills shortage and the potential for a severe skills shortage going forward," he says. "I'm a huge advocate of making sure we attract people into the industry at the earliest possible age, whether through the university route or apprenticeships."

### Tackling issues

Haigh sees the diversity challenge as crucial to increasing the industry's talent pool. "You can't disconnect the skills shortage from equality and diversity," he says. "If we are to attract the best and most talented people into our industry then we have to attract everyone. We still have far too few women graduating or going through the apprenticeship route to engineering and as an industry we have a lot more to do to become an inclusive workplace," says Haigh.

It's an area to which he is passionately committed. Haigh is a strong supporter of IntoUniversity, a charity supporting less advantaged children to gain access to

further education. "I've seen first-hand in my own company how you can make progress in the area of diversity by putting the effort in and tackling some of these issues head-on. I have seen it happen. We also need to work in partnership with schools and universities to ensure that the pipeline is coming through," he says.

Haigh says that ACE's profile as a vocal organisation that speaks up for its

members and the industry is a crucial one and a key benefit of membership. "We have to make sure that we have as strong a voice as we possibly can. The strength of that voice is proportionate to the people and companies that make up an organisation like ACE, so it's about strength in numbers and strength in knowledge and it is a voice that is really needed by our industry," he says.

## New board appointments at ACE

As well as announcing Mike Haigh as its new chairman, ACE has revealed a number of other new appointments to its board, including two new vice chairs.

The first vice chair is Nick Taylor, chief executive at Waterman Group and the second is Ramboll managing director Mathew Riley. Previous chairman, Gavin English of IMC Worldwide, continues as an ACE board member and is the immediate past chair.

Other new board members include Rajiv Sudan, strategy director at AMEC Foster

Wheeler, who chairs the ACE Membership Group, Tania Heap, group people director at Mott MacDonald, who chairs ACE HR Taskforce, Athena Livesey, principal engineering geologist at WSP|Parsons Brinkerhoff who chairs the ACE Progress Network Group of young professionals, Joanna Streeten, director, head of London project management at AECOM who is chair of the ACE Public Affairs Group and ACE Cymru Wales chair, Neil Sadler, a consultant at Cass Hayward.

The full list of ACE board members for 2017 is as follows:

- **ACE Chair** – Mike Haigh, managing director, Mott MacDonald
- **Immediate Past Chair** – Gavin English, IMC Worldwide
- **First Vice Chair** – Nick Taylor, chief executive, Waterman Group
- **Second Vice Chair and Chair of London Regional Group** – Mathew Riley, managing director, Ramboll
- **Chair of Technician Apprenticeship Consortium (TAC)** – Graham Nicholson, executive managing director, Tony Gee and Partners
- **Chair of ACE Best Business Practice Group** – Jeannie Edwards, human resources director, MWH
- **ACE Treasurer** – Andrew Cowell, engineering director, MWH
- **Chair of ACE Northern Ireland** – Alan Barr, technical director, RPS
- **Chair of ACE Scotland** – Simon Innes, managing director, Goodson Associates
- **Chair of ACE North** – Mike Barber, director, M W Barber Associates Limited
- **Chair of ACE Cymru Wales** – Neil Sadler, consultant, Cass Hayward
- **Chair of ACE Major Projects** – Patrick Flaherty, chief executive, UK and Ireland, AECOM
- **Chair of ACE International Business Group** – Dr Bernard Obika, chief executive, Roughton Group
- **Chair of ACE SME Forum** – Michael Brown, business development director, GEO Environmental Services
- **Chair of ACE Legal & Commercial Group** – Henry Pipe, senior partner, Max Fordham
- **Chair of ACE Membership Group** – Rajiv Sudan, strategy director, AMEC Foster Wheeler
- **Chair of ACE Progress Network Group** – Athena Livesey, principal engineering geologist, WSP|Parsons Brinkerhoff
- **Chair of ACE HR Taskforce** – Tania Heap, group people director, Mott MacDonald
- **Chair of ACE Public Affairs Group** – Joanna Streeten, director, head of London project management, AECOM
- **Board Member and Company Secretary** – Dr Nelson Ogunshakin OBE, chief executive, ACE



**Paul Jackson,**  
chief executive,  
EngineeringUK

## Engineers are driving the fourth industrial revolution

“Public perceptions of engineering are improving. We need to build on that momentum to continue to increase the proportion of people who know what engineers do.”

Knowledge, so the saying goes, is power. Improving young people's knowledge of what engineers do and how their work contributes to the world around us is key to bridging the skills gap. When people understand what our industry does they appreciate it more and (as is often the case with young people) can get really excited about the careers its different sectors can offer. Public perceptions of engineering are improving. We need to build on that momentum to continue to increase the proportion of people who know what engineers do.

Attitudes to engineering have changed dramatically over the past five years, with 65% of the UK population able to name which engineering development in the last 50 years has had the most impact on their lives. Unsurprisingly, the internet came out top, with developments in computers following closely after. This is a massive improvement since 2010, when the same question could only be answered by 38% of people.

It is engineers that are driving the ‘fourth industrial revolution’, which is transforming our daily lives on so many levels. For example, working with some retail technology experts for The Big Bang Fair recently has shown me that shopping in the future will include virtual reality changing rooms, all shop assistants and drone delivery. The application of VR may well prove universal, given it can already support retail, training train drivers and even be used to detect cracks in aging pipelines.

Many engineering jobs today would have been unimaginable 20 years ago and no doubt 20 years from now the industry will have transformed massively. If we get it

right, that transformation will include a considerably more diverse workforce.

The pace of development is unprecedented and we need to invest in supporting and developing the innovators whose R&D work will shape our world. The recent announcement of an industrial strategy fund to support areas like artificial intelligence, biotech and robotics reflects the UK's huge potential and ensuring the workforce has the requisite skills is fundamental to ensure we are “stepping up, not stepping back” as the prime minister says.

To achieve that, more needs to be done to open up engineering to young people of all backgrounds. The young people that have taken part in both Big Bang and Tomorrow's Engineers agree that a “career in engineering is desirable” to a much larger extent than the national average. That comes from hands-on activities and the all-important direct contact with industry professionals, who talk about their work, their interests and how they got into engineering.

That's what I mean when I talk about careers inspiration. Without that input from employers and working professionals the chances of inspiring a future engineer are greatly reduced.

Many of you are already working with schools and the good news is that independent research says we can triple the impact of that kind of activity by working together in a coordinated way. We owe it to the potential engineers of the future to give them every opportunity to understand what the industry has to offer them and encourage them to start that journey.



**Nick Smee,** chief executive  
officer of asset management  
software and services  
specialist Yotta

## Why innovation is coming to highway networks

Historically, the UK highways industry has not generated a great reputation for innovation, especially so when it comes to the way it manages and maintains road structures. The introduction of polymer-modified bitumen to improve road surfaces and analytical pavement design both took decades to move from concept to practical application. Other sectors such as telecoms and consumer electronics have been much more attuned to change.

These kinds of innovations have previously often been introduced in isolation by local authorities and have needed multiple instances of successful implementations to have occurred before they are recognised as standard best practice and shared across the entire sector. We often also see instances of research efforts being duplicated, with different institutes conducting similar studies in parallel but with little or no collaborative effort.

In today's complex environment of

highways asset management, it is more important than ever that this situation changes. Chancellor Phillip Hammond made an extra £1.3bn available to improve Britain's roads in his Autumn Statement but unfortunately, this capital investment cannot disguise the fact that councils' budgets for ongoing repairs and maintenance remain tight and subject to further cuts.

With an apparent crisis in social services and Brexit adding further national economic uncertainty, there is little sign of an upswing in revenue funding for local authority highway departments.

“There is little sign of an upswing in revenue funding for local authority highway departments ”



**Richard Threlfall**, head of infrastructure, building and construction at KPMG

## Contractors face a year of “feast and famine”

The coming 12 months will be a year of “feast and famine” for contractors, depending on the sector of the industry you work in, says Richard Threlfall.

2017 will divide the construction sector into winners and losers. Contractors in infrastructure will win more work as government and utilities companies continue to spend heavily on road, rail and energy investments. Contractors who depend largely on commercial demand will see a decline in demand as corporates continue to delay investment decisions pending clarity on Brexit.

We will also see significant regional variation. The West Midlands will benefit from the HS2 effect which has already seen an uptick in investment into the region, whilst worries over Brexit will continue to gently deflate the London housing bubble.

An industry divided by demand will nonetheless be united by the common challenge of rising materials prices, already responding to the fall in the value of sterling. The skills shortage will add further pricing pressure in civils, as well as playing large in the Brexit immigration debate due to possible curbs on the provision of labour from Europe.

I remain encouraged that the new government has signalled its commitment to infrastructure by embracing the three Hs – Heathrow, HS2 and Hinkley Point – despite strong lobbying in the summer to cancel all of them.

I am therefore bullish on UK infrastructure demand in 2017, but far

less confident on the longer term. I remain concerned that as the economy weakens the government’s investments in infrastructure will become less sustainable. Rising inflation and the subsequent erosion of buying power will mean less government income from taxation. I expect this to result in delay to schemes like Crossrail 2, the Trans-Pennine road tunnel, HS3 and other mega projects. And similarly I expect regulators to put downward pressure on utility investment programmes as household incomes are squeezed.

Amidst all this macro-economic uncertainty, construction industry CEOs need to keep focussed on the prize of achieving competitive advantage through offering clients greater efficiency and predictability. Whilst politics and economics may dictate the winners and losers of 2017, in the long-run this industry will be owned by those who invest in technology and skills.

**“Construction industry CEOs need to keep focussed on the prize of achieving competitive advantage through offering clients greater efficiency and predictability.”**

Coupled with this, data growth remains as much a challenge as an opportunity. Volumes accessible to councils are likely to grow, with the ‘Internet of Things’ generating huge quantities of potentially useful data. Right now, though, many authorities don’t have easy access to the data on their network or fully understand what is there. The danger is they become overwhelmed by it all.

In light of the above, there is a clear need for authorities to ‘do more with less’ and start to genuinely embrace innovation as a means of overcoming their challenges and as a driver to achieve their goals.

The good news is we are now starting to see a new more positive environment emerge across the highways infrastructure sector, making change easier to achieve. Demographics are shifting; the new generation of millennials is starting to make its voice heard, and is more accepting and demanding of waves of innovation than any previous generation has been. The

clever, braver businesses are beginning to work their way through the waves of data to pick out the golden nuggets – and we are now starting to see the results. Introduction of smart motorways and the accelerating uptake of strategic asset management software are both cases in point.

The latter, in particular, has started to pave the way for radical change within local authority departments and highways agencies, introducing a whole new way of working and making proactive planning easier to achieve. This in turn helps facilitate a more collaborative approach to highway asset management, with solutions

**“There is a clear need for authorities to ‘do more with less’ and start to genuinely embrace innovation.”**

providers, councils and contractors all coming together to achieve a common goal. It also helps support enhanced communication between stakeholders by making key data more easily accessible, especially when techniques like enhanced visualisation are proactively employed.

It’s clear that in a world where the challenges facing highways agencies are likely to persist and in some cases even worsen over time, it is crucial that these organisations start to embrace innovation and use it positively to overcome the challenges they face. Strategic asset management needs to be a key part of this, helping not only drive the way in which highways authorities take decisions, helping them secure funding and ensure all key stakeholders are kept onside and positively focused on achieving common goals.

That’s why we believe that despite all the challenges, the highways infrastructure sector will have a bright future ahead.

# Consultancy giant eyes UK market for expansion

US consultancy giant Louis Berger opened its new international headquarters in London at the end of last year. *Andy Walker* went along and spoke to the firm's CEO Jim Stamatis and international president, Tom Topolski.

**R**elocating Louis Berger's international HQ from Paris to London amidst all the uncertainty of Brexit Britain might seem like a risky move, but the company's CEO, Jim Stamatis, and international president, Tom Topolski, tell me it's a vote of confidence in a market that they have high hopes for over the coming years.

The move is part of the \$1bn global professional services corporation's three-year business strategy aimed at further expanding its international operations globally, as well as expanding its foothold in the UK and in Europe.

"One of the factors behind the move has been that as our business in the Middle East has grown – from 200 people to almost 1,000 over four years – a lot of our key project managers and programme managers have come from the UK," says Topolski, "so we have been in the UK for about 20 years and it's been a great source of high calibre engineering and management talent. We want to do more private sector work for leading international clients and many of those companies have their headquarters in London so it makes it more convenient to be here," he says.

"As we started growing the international practice it didn't make sense for us to continue to be based in Paris because our client base and our potential growth areas in the finance and natural resource sector were companies that were based in the UK, so London is a much better headquarters for our international operations," agrees Stamatis.

The firm has a limited presence in the UK currently and their offices have the capacity to grow to up to 70 people. "We have every intention of filling this office and hopefully having the enviable problem of outgrowing the space," Topolski says. Given the people that the firm has working on large rail programmes in the Middle East and other transport programmes elsewhere, Topolski says that they are looking forward to supporting UK transport initiatives like HS2, Network Rail, Transport for London and at Heathrow and Gatwick.

Topolski and Stamatis said that they weren't concerned about the Brexit vote having an effect on their business plans going forward. They see the decision to leave the EU as a process rather than a one off event. "London is a city that has been around for centuries and it will always be a

prominent world city so we feel very, very confident about our future here," says Topolski.

The pair clearly view the UK as a very strong market. They see the application of technology as an emerging area and plan to apply the expertise they've developed with Stanford University around building information modelling to bring the latest technology and systems into the UK market. "Thanks to technology, transportation is going through a seismic shift where you will have driverless vehicles very soon, there's increasing moves towards developing the hyperloop and we feel that we can support those initiatives with clients in the in the UK," Topolski says.

So, how will they look to differentiate Louis Berger in the UK market. "One of the key skills that we bring to the market as a global company with American headquarters is excellence in programme and project management," Topolski says. "American companies have always been out in front in the management of big projects and there are obviously major programmes here in the UK in the rail, aviation and housing sectors and we can bring our skills and technology to bear over here," he says.

But what about success and what will that look like for the firm from their presence in the UK? "Success will be to become a permanent player in the markets we wish to serve, which is primarily civil infrastructure, transportation, water, waste water and buildings and facilities," says Topolski. "We want to be considered amongst our peers in this industry with companies like Atkins or other US companies like Bechtel or AECOM – we want to be considered in that space," he says.

"We are absolutely looking to grow the business – organically and by acquisition – in all those sectors," Stamatis says. "Wherever we are in the world we want to be among the top three to four service providers to our customers so that those customers can say 'we are a better provider to our local community and economy because we have a consultant like Louis Berger working with us'," says Stamatis.



Louis Berger's CEO Jim Stamatis (left) and international president Tom Topolski (right) at the opening of their new international headquarters in Richmond, London.



# Grayling must reconsider his London rail devolution decision



Secretary of state for transport Chris Grayling's decision not to transfer the operation of suburban rail services to Transport for London is deeply disappointing, writes *Peter Campbell*.

**T**he decision by Chris Grayling, secretary of state for transport, not to transfer the operation of suburban rail services to Transport for London (TfL) is perhaps one of the more surprising, and disappointing, decisions that we saw last year. And that is saying a lot, given the way that 2016 has thrown us some unexpected curve balls!

Ostensibly, Grayling said that his decision was down to the lack of any clear indication that passengers will see tangible benefits from the devolution of control to city hall. He also cited democratic accountability issues, stating: "If you live in Guildford where's the democratic accountability? Why should the Mayor of London be responsible for a train from Guildford or Dorking?"

This was all on the day that Grayling also announced a new approach to the work that Network Rail and the train operating companies do in maintaining our rail infrastructure. The restored east-west rail link between Oxford and Cambridge will be built, owned, operated, and maintained by one company in a trial that it is hoped can be rolled out across the network as franchises come up for renewal.

On London, however, Grayling has, in the view of ACE, made a significant mistake. We have long called for the mayor's office and TfL to be given further control over the rail network in London.

This will give greater certainty for the infrastructure delivery companies, will allow for better planning and integration of services, and provide for more cost efficiencies through economies of scale.

We are not alone in this view. An alliance of groups from business leaders to the Labour opposition has called on Grayling to back down over the refusal to hand London's suburban rail services to the mayor. Amid fury over the recent rail strikes and train breakdowns that have inflicted misery on millions of commuters, Colin Stanbridge, chief executive of the London Chamber of Commerce and Industry, said: "These strikes are another reminder why we really think that London-bound overground trains should be run by Transport for London."

In addition, the reasons for denying the mayor the powers are also suspect. TfL already manages one London rail line in the overground, which it lets out to a private delivery contractor, while the DLR is also managed in a similar way. The overground regularly scores very highly in terms of passenger satisfaction and punctuality, demonstrating the tangible benefits that could be felt by consumers that Grayling thought lacking.

Furthermore, his assertion about accountability, although a valid concern, is not one that does not already exist. The extremities of the Metropolitan Line, for

instance, are in Hertfordshire and Buckinghamshire. It is hard to recall there ever being concerns expressed by the denizens of Amersham or Watford that their views on the tube service were not being heard.

It is also hard to see why Grayling is so keen for the Department for Transport to retain control over the franchises, when there are almost daily reports of strike action, timetable revisions, or passenger dissatisfaction. With the tribulations of Southern Rail looking set to continue for the time being at least, palming this off to the mayor might seem politically expedient. Grayling has chosen not to take this opportunity to be able to shift blame, however.

A clue to the reason for this has been seen in the events following this decision, perhaps, with a letter emerging that Grayling (when he was justice secretary) wrote to former mayor Boris Johnson in 2013. The letter outlines the former's support for devolution but expresses concern at handing that much power and responsibility to a future Labour mayor of London.

This paints the decision in a very different light, putting a more politically partisan, overtly ideological spin on Grayling's actions. In light of the question marks about his publicly stated motives outlined above, it is also easy to think that the secretary of state is being slightly disingenuous. Given that this letter led to calls for Mr Grayling's resignation from colleagues on his own benches, we have perhaps not seen the last of this!

*Peter Campbell is a senior policy manager at the Association for Consultancy and Engineering.*

A new initiative, based on industry research and opinion, will help raise the profile and importance of infrastructure in the UK.

# Making infrastructure

**I**nfrastucture Intelligence is collaborating with WSP | Parsons Brinckerhoff on a new initiative aimed at identifying infrastructure priorities to allow cities to be competitive in the new global landscape, following the EU referendum.

Towards the end of 2016, a series of three industry roundtable events, bringing together more than 30 key figures from the industry, were held in London, Manchester and Birmingham to discuss the key issues. The events also dissected the results of an industry leaders' survey held in the autumn of last year and this will all feed into the publication of a white paper in the spring to be launched at a high-profile event at parliament.

The Cities and Infrastructure initiative, which focuses on raising the profile and importance of economic and social infrastructure to the future of the UK, particularly to its cities, has already raised some very interesting talking points. Industry and local leaders at the roundtable events were keen to express an opinion on what the construction and infrastructure sector's priorities should be in making a better contribution to sustained growth and competitiveness. A number of emerging issues were raised by those taking part in the events.

Given the new approach being adopted by Theresa May's government, questions were raised about the trajectory for devolution and the government's commitment to it. Is momentum slowing and what should city regions' focus and priorities be? There was a clear desire expressed amongst industry leaders in favour of more devolved powers, a view reflected in the survey results which showed that 73% of respondents thought that cities should have greater fiscal/revenue control and decision taking powers on investment priorities.

A renewed focus on the regions,

especially outside of London, was welcomed by those taking part in the roundtables and participants were keen that the government should develop priorities for rebalancing growth across the UK and reconcile short term improvements with the costly longer term critical national infrastructure projects. The importance of developing regional 'identities' to focus collaboration and competition for investment was discussed at all the roundtable events, with participants clear that any such 'branding' needed to be city based rather than regionally focussed.

There were no easy solutions to rebalancing growth, but it was clear that the industry needed to engage better with politicians at local, regional and national level to ensure the right decisions were made. It was thought that construction and infrastructure companies have been 'backward in coming forward' for too long and it was time to proactively engage those who make decisions to influence them. It was also seen as important to put forward solutions that "benefitted people tomorrow rather than in 30 years' time". These would be seen as particularly attractive to politicians seeking short-term gains.

importance of economic and social infrastructure to the future of the UK, writes *Andy Walker*.

# re make a difference

construction are already involved in public consultation on specific projects and bringing that expertise and skill set to bear in discussions with local and national political stakeholders was also thought to be absolutely key in raising the profile of the role of the industry with influential decision makers.

Widening the focus of regional development to include social and economic infrastructure was highlighted as an important factor in winning public support. The transformative effect of local developments like hospitals, schools, housing, sports facilities and the associated transport infrastructure to make them work was nearly always welcomed by the communities that use them and it was important to highlight this too. "There's not enough emphasis on social infrastructure and too much focus on economic development," said one Birmingham roundtable participant. Communicating the value of infrastructure to the public effectively was seen as critical.

Looking at solutions for the next 20 years, many thought that growth will be housing-led. Traditional places where people want to live will be places with open spaces and clean air, so there would be a need for affordable public transport and less commuting into cities. Affordable housing in the cities was still seen as important though, as younger people especially want to live in the city with all that they have to offer.

No discussion on infrastructure at the present time could ignore the effects of the Brexit vote and this was certainly discussed by the industry leaders that took part in the roundtable discussions. However, in the main they were upbeat about the future, preferring to look at the opportunities to be gained rather than

continued on page 18 >>>

While, unsurprisingly, 99% of respondents in the leaders' survey thought that government should continue to invest in major infrastructure projects, 94% believed that the industry should do more to engage political and business leadership on the importance of infrastructure and connected development. The industry has a crucial role to play in engaging business and political leadership and this recurring theme in the discussions is something that the Cities and Infrastructure white paper will cover in greater detail.

In addition to influencing the politicians, the public was also identified as a key audience that needed to be convinced about the value of infrastructure development. A significant 80% of survey respondents thought that the public didn't understand the benefits of infrastructure – a key issue that needed to be tackled. How to best engage public support for critical national infrastructure projects will be a crucial task if cities are to truly reach their potential and be able to undertake the development that they need to prosper and it is not a task that the industry can ignore.

Many organisations working in



>> continued from page 17

the problems. This was reflected in the results of the survey which revealed that UK infrastructure businesses are not big exporters to the EU, with 41% saying that less than 10% of their income and investment comes from EU sources.

That's not to say, however, that there are not concerns about the UK's decision to leave the EU. The leaders survey showed that the industry is somewhat split on the issue, with 38% saying that the vote has had a negative impact, 30% saying it is neutral and 32% saying it is too early to tell. A note of caution was raised that Brexit might lead to a weakening on the UK's environmental commitments, something most felt would be a retrograde step. In terms of confidence, the picture is a little clearer, with 40% saying that the vote has had a negative impact on orders and 36% saying Brexit has had a negative impact on investment decisions.

Overall, it was important to have a self-confident approach, with the tone and approach of local leaders being seen as an important factor in attracting investment.

In a post-Brexit landscape, the quality of Britain's cities and the public realm will be of increasing importance in increasing national competitiveness once the UK leaves the EU. Central government and city regions will need to provide the funding to develop that public realm and also resource the skills needed to enable the necessary development to take place. How can investors be brought together to fund local schemes? Can pension funds in local authorities be used for local development to aid the creation of international centres of excellence in key business areas in specific regions? Alternative funding mechanisms will

need to be found and creative thinking employed in freeing up resources to aid development. This was clearly felt to be a urgent discussion to be held with government and the treasury as a priority.

Constraints on growth and development, like the perceived gap in regional strategic planning capability and slow decision making, will also need to be overcome if growth is to be truly and fairly rebalanced. Redesigning the interfaces between organisations so that they work better for better outcomes was also necessary to be able to think and do differently.



**"The social, economic and environmental benefits of good infrastructure need to be articulated more widely."**

**Peter Sharratt, WSP | Parsons Brinckerhoff**

Infrastructure organisations will have a crucial role in reshaping the UK's regions and rebalancing economic growth. That growth cannot happen effectively without the active involvement of construction professionals and the support of the public. As Peter Sharratt, head of strategic consulting at WSP | Parsons Brinckerhoff, says: "The social, economic and environmental benefits of good infrastructure need to be articulated more widely, alongside more decisions being taken locally to facilitate the 'whole place' solution that can make a difference to economic prosperity and to people's quality of life."

The next steps for the Cities and Infrastructure initiative will be the publication of the white paper in the spring and its launch at an event in parliament with key industry, business and political figures. But that's not all. "We want to keep the debate and dialogue going," said Peter Sharratt. "We see the white paper and the discussions we are having are the start of an ongoing process of engagement with politicians, funders and the key decision makers who make things happen. That way, we can all gain a better understanding of the importance of economic and social infrastructure to the UK and how best to deliver it," he said.

# Dealing with the challenge of disruption



Consultancy and engineering firms operating in the mass transit sector will face a number of key challenges over the coming years to meet the demand for better public transport, says *Pierre Verzat*.

**O**ur world is facing major challenges, from growing population, rapid urbanisation to increasing concern for the environment, including climate change issues that are starting to be taken seriously. In this context, the demand for mobility has never been higher.

These megatrends are driving the demand for public transport, especially mass transit and rail, across the globe in emerging markets as well as in more mature ones.

As one of the world's only engineering and consulting companies focusing on mass transit and rail, SYSTRA specialises in a market worth approximately f8bn, depending on hypothesis on market openness and accessibility ratios in different countries. We forecast average growth of two to 3% annually during the next 20 years.

Throughout 2016, the global engineering market has had to face some major challenges – faltering oil prices, diminishing investment caused by the tumbling demand for raw materials, economic slowdown, and political shifts like Brexit, that affect local markets while sometimes benefitting others. This could be the first lesson we have learnt during 2016. As a global player present in all regions of the world, we need to constantly adapt and develop our capacity to reallocate our resources from one region to another, as changes can happen very quickly. We have to develop a more cross-functional and agile organisation.

The second lesson is certainly the growing trend for consolidation, with a large number of acquisitions still taking place in North America and Europe. We have been busy making five acquisitions in the last 12 months in Northern Europe, Asia and Latin America. We expect this trend to continue and spread to all regions of the world.

The third is more of a continuation of previous trends. There is a growing

awareness that private investment in infrastructure is more vital than ever, to bridge the funding gap between huge needs, and projects that cannot be entirely financed from public funds.

That is why, in addition to traditional public delivery schemes, the engineering community will certainly have to change the way we work with private contractors and manufacturers, using new delivery schemes, such as design and build, public private partnerships and alliances. We will have to brush up our contract skills and continuously refine our engineering processes.

Finally, it is increasingly obvious that our industry and our markets will have to deal with some disruptive changes in the middle and long term. Indeed, this has already started.

The engineering industry has a huge potential for improving productivity and efficiency, through digital transformation and the use of smart design, including building information modelling and other innovative solutions that are rapidly reaching maturity. Our markets and our clients' expectations will undoubtedly evolve too, with escalating demands for digital solutions, data management and a total cost of ownership approach. As asset management becomes more widespread, operation and maintenance will become strategic skills for engineering firms. These

skills are already part of SYSTRA's DNA, and we are eager to offer new comprehensive solutions to meet our clients' challenging new expectations.

We also feel that there is growing awareness of corporate social responsibility and compliance issues among our clients. We are convinced that this is a good thing for our global engineering industry. We cannot grow sustainably without being accountable for our impact on society and the planet, and without placing ethics and respect for others at the heart of our business.

And last but not least, let us not forget that our market may at any time be partly or totally disrupted by new technologies or solutions. In the transport sector, the automated vehicle, hyperloop or urban air mobility dreams could one day come true. SYSTRA welcomes these potential changes, and that's why we are at the forefront of pioneering new solutions for mobility.

We have great challenges ahead of us. As a leader in innovative and complex transport infrastructure and systems, SYSTRA is very excited to be part of the engineering and consulting community that will have the chance to address these complex challenges, in order to bring the best transport solutions to our direct clients and, ultimately, to passengers.

*Pierre Verzat is the chief executive officer of French consultancy and engineering group SYSTRA*



Dubai's Light Rail Transit system, a SYSTRA project.

# ‘Hard’ Brexit could mean construction misses out

A ‘hard’ Brexit could mean the British construction industry missing out on tens of thousands of workers according to new research by consultancy firm Arcadis.

**B**ritish construction stands to lose out on almost 215,000 workers – the equivalent of the entire population of Luton – from house building and infrastructure in the event of a ‘hard’ Brexit, warns leading design and consultancy firm Arcadis. Even with a ‘soft’ Brexit, the industry stands to miss out on as many as 135,000 workers at a time when the nation’s skills gap is becoming more acute.

Arcadis believes that a potential ‘hard’ Brexit scenario – for instance, extending the points-based system currently in place for non-EU migrants – could see the number of EU construction workers entering the UK fall at the rate of attrition. This would mean that those EU nationals leaving the industry cannot be replaced at the same rate by new EU workers. If this were to play out, Arcadis estimates that 214,000 fewer people from the EU would enter the infrastructure and house building sectors between now and 2020.

Meanwhile, even in the event of a ‘soft’ Brexit, the construction workforce could again see a steady reduction in numbers. Arcadis has estimated a scenario whereby, for instance, rigid quotas are introduced or policies implemented on a sector-by-sector basis, allowing for a degree of EU migration into the sector. Under this scenario they estimate that approximately 135,000 fewer European nationals would relocate to British construction – a number equivalent to the population of Ipswich.

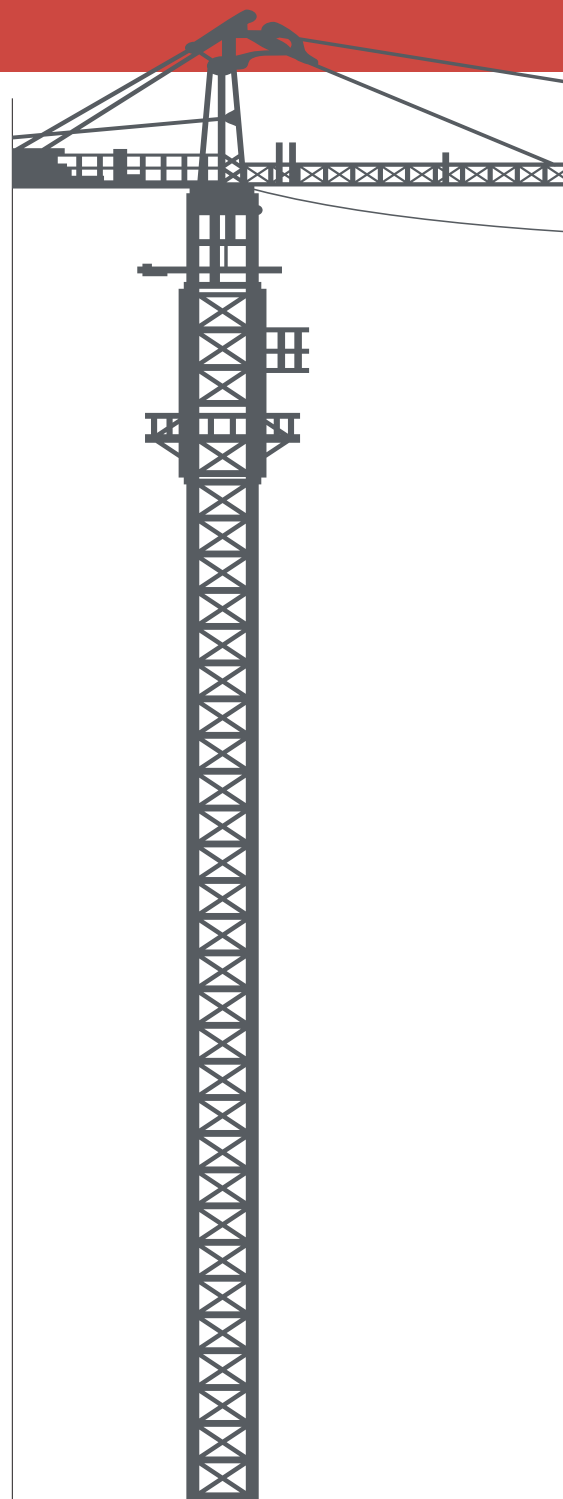
Unlike, for instance, the financial services industry, construction is heavily reliant on unskilled or semi-skilled

workers. A points-based system could, therefore, prove problematic in terms of bringing in the required labour from overseas, potentially seeing costs rise and the homes and infrastructure projects currently on the table delayed or even cancelled. Furthermore, with construction such a margin-sensitive industry, controlling post-Brexit labour and resource costs will prove critical if housebuilding and infrastructure projects are to remain viable.

Regardless of the outcome of the eventual negotiations, restricting EU migration to the UK will add significantly to the administrative burden associated with satisfying visa requirements. This will both slow the recruitment process and increase costs for construction employers, potentially seeing further lags in building the homes and infrastructure the UK needs.

Given the extremely tight timescales in which the industry now needs to adapt, if British construction is to keep its head above water in the short- to medium-term it will need to rapidly modernise and accelerate use of technology and off-site manufacturing to plug the leak. Arcadis is currently looking into the impact of the skills gap on housebuilding and infrastructure in regions across the UK and will publish their findings later this year.

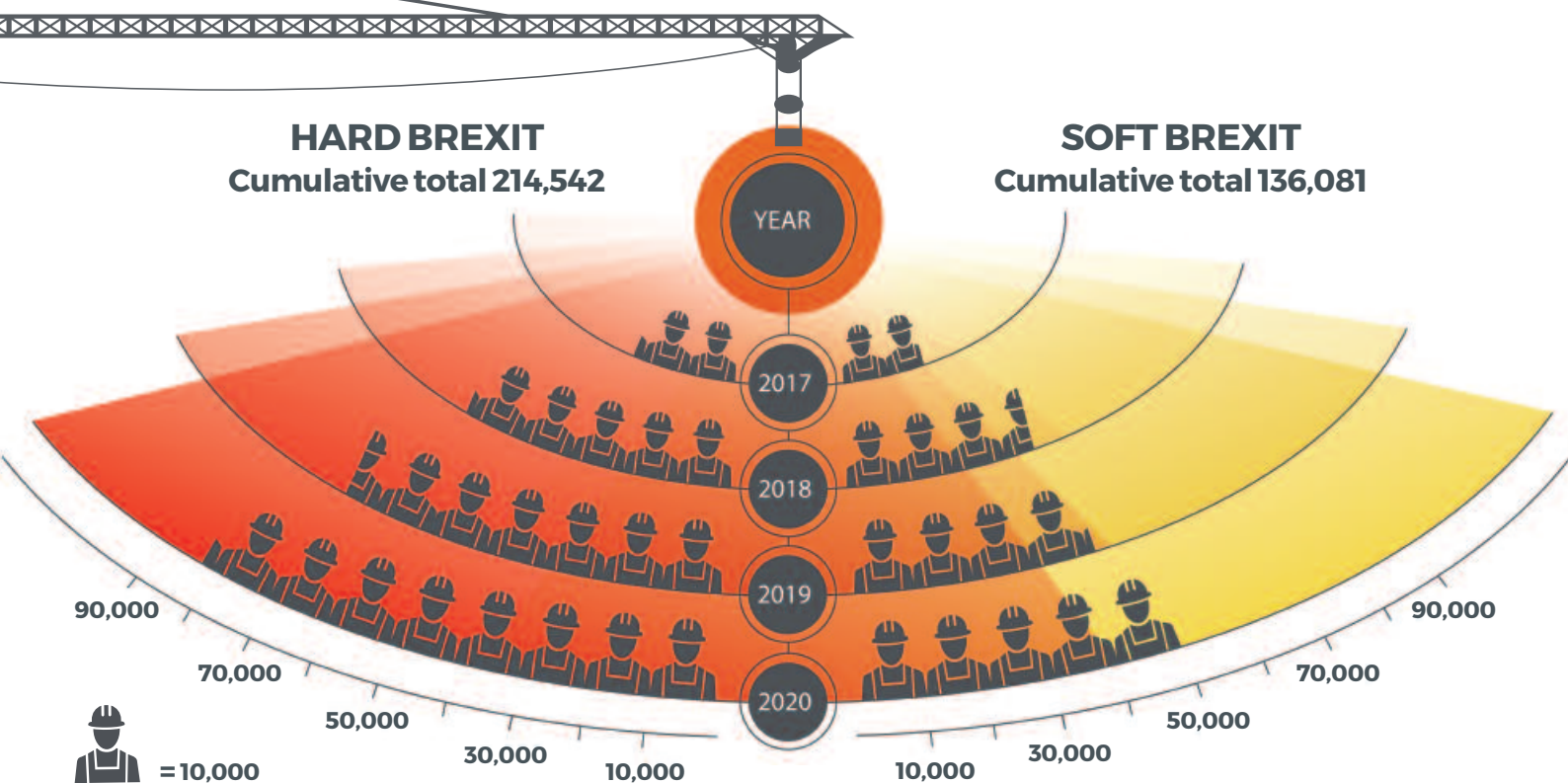
James Bryce, Arcadis director of workforce planning, said: “What started as a skills gap could soon become a skills gulf. The British construction sector has been built on overseas labour for generations, and restrictions of any sort – be it hard or



	Hard Brexit	Range	Soft Brexit
2017	23,847	5,777	18,071
2018	40,970	14,498	26,472
2019	66,708	25,174	41,534
2020	83,016	33,012	50,004
Total	214,541	78,461	136,081

## Net drop in EU migration to British housebuilding and infrastructure construction

\*Based on an assumed 2016 house building and infrastructure workforce of 1.5m.



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In the event of a 'soft' Brexit the construction workforce could again see a steady reduction in numbers. We have estimated a scenario whereby, for instance, rigid quotas are introduced or policies implemented on a sector-by-sector basis, allowing for a degree of EU migration into the sector.

soft Brexit – will hit the industry. Missing out on over 200,000 people entering the workforce could mean rising costs for business, and much needed homes and transport networks being delayed.

"In recent decades, there has been a massive push towards tertiary education which has seen a big drop in the number of British people with the specific skills we need. If we cannot import the right people, we will need to quickly ramp up training and change the way we build," he said.

Bryce said that the industry needed to be more proactive in the future. "Be it hard or soft Brexit, we need to take back control of the construction industry. The likes of robotics and off-site manufacturing have never been taken as seriously as they should, but they could well prove the difference. So, too, could training. Working with schools and colleges is one way of taking control but this takes time. In the short term retraining and turning to the unemployed and underemployed could be a significant benefit to an industry under significant pressure," said Bryce. Arcadis's estimated impact on net migration in the construction industry covers the next four years and assumes an Article 50 trigger

date of Q1 2017. Whilst the recent High Court ruling has called this into question, currently the government's stated policy is to pursue this timeline. The 'hard' and 'soft' Brexit scenarios assume that the migrant element of the construction workforce will generally change in accordance with the total construction workforce and Arcadis has estimated future changes in construction workforce numbers based upon future construction output forecasts published by the Construction Products Association.

Under the 'hard' Brexit scenario Arcadis assumes that the stock of EU workers in the construction sector decreases at the rate of



**"[It] could mean rising costs for business, and much needed homes and transport networks being delayed."**

**James Bryce, Arcadis**

attrition. That is to say that they assume that any new resource requirements will need to be mostly sourced from UK nationals (or non-EU migrants).

Under the 'soft' Brexit scenario EU workers would continue to enter the UK but at a slower rate of growth. Under this scenario it is assumed that the need for EU migrant labour is recognised and allowed for in the final Brexit deal.

The counterfactual to both the 'hard' and 'soft' Brexit scenarios is a 'no Brexit' scenario. This assumes that the referendum had never happened and that the number of EU migrants in the construction sector workforce, therefore, would have increased faster than the overall construction sector workforce; as a strong UK construction sector would have continued to absorb increasing numbers of EU migrant labour, leading to further increases in their share. The Arcadis estimates do not account for any unpredictable events such as a potential surge in migration from the EU prior to conclusion of the Brexit negotiations and the UK's formal exit.

*The research was conducted for Arcadis by the Centre for Economics and Business Research.*



# Cyber security in a nuclear world

What can be done to reduce the risk of a cyber-attack causing significant damage to the nation's nuclear power infrastructure? *Ian Buffey* shares some insights based on a new report he helped develop.

In December 2016, the Nuclear Threat Initiative launched a new report entitled *Outpacing Cyber Threats: Priorities for Cyber Security at Nuclear Facilities*.

The development of the report was driven by the fear that we're heading for a world where a cyber-attack on a nuclear facility could have devastating effects and that the increased digitalisation of nuclear facilities makes such an attack more likely.

Another key factor is the fear that potential attackers are increasingly at an advantage. The threat landscape is evolving rapidly both technically and in terms of potential aggressors. Attacks which would have taken nation state-level resources a few years ago are now within the reach of smaller, less well-resourced groups or even individuals.

The brief to the authors of the report was as simple as the problem statement – given a free hand, what can be done to reduce this risk over and above what is already being done? What could we do better or faster to reduce the likelihood of a cyber-attack causing a devastating incident?

Four key ideas became the basis of the report. These were:

**Institutionalise cyber security** – treat cyber security in the same way that safety is treated in the nuclear industry

**Mount an Active Defence** – be able to detect and respond to an attack quickly rather than relying on static defences (such as firewalls and anti-malware) to keep you safe

**Reduce complexity** – limit the digital footprint in the most critical areas of the plant, avoiding digital technology entirely in some areas e.g. in favour of purely electromechanical devices

**Pursue transformation** – devise innovative approaches in both technology and in developing human resource to drive a step change reduction in the cyber risk to nuclear facilities.

Institutionalising cyber security is a fairly obvious and attractive objective. Although there have been high profile nuclear accidents such as Three Mile Island, Chernobyl and Fukushima, the nuclear industry has an enviable safety record. In fact, you are probably safer on a nuclear plant than in a normal office environment.

The approach to physical and information security is also very obvious to anyone who has visited a nuclear facility. That can give the impression that everything is covered but until comparatively recently the approach to cyber security has been almost totally focused on avoiding the loss of Sensitive Nuclear Information. It seems paradoxical that the cyber security of critical control systems is not afforded the same importance. How can an insecure system be regarded as safe?

A malicious cyber-attack needs to be considered in the same way as any other event which may befall a nuclear facility. Many cyber-attacks have had consequences that the perpetrators did not intend e.g. early malware such as Sasser. The worry here is that we will have to wait for a series of incidents before we say enough is enough and give cyber security the same level of importance as safety.

The idea of Active Defence was also

readily accepted in the development of the report. The same concept is expressed in the UK's National Cyber Security Strategy 2016 to 2021, published in November. Active Defence does not mean returning fire. Rather it means that you cannot rely on protective technology such as firewalls (or data diodes or even air gaps), anti-virus software etc to protect against attacks. It refers to an ability to detect threats and respond intelligently and quickly as required, limiting the effects of an attack.

Reducing complexity was probably the most difficult idea to accept. Everyone has gotten used to the benefits of digitalisation in the industrial arena and in their personal lives. Many times in my career I've heard comments along the lines of: "Over my dead body will you bring X onto my plant," where X is connectivity to the enterprise network, the use of Windows etc. Every time the change has eventually come, so while resisting it is going to be hard, in some cases it may be the right choice.

Pursuing transformation is perhaps the vaguest recommendation but it may turn out to be the most important. Good cyber security of nuclear installations is hard enough to achieve in countries with a long established nuclear industry. Global warming is driving us to pursue nuclear power and renewables as our main energy sources so many states are now building nuclear facilities for the first time. We need a better, clearer way to ensure that such countries can ensure that they are as cyber secure as possible and this may need approaches which are radically different from the ones currently in use.

It's always difficult to talk about the cyber security of control systems in any sector in a way which does not seem pessimistic but the above discussion and the report itself should not be seen as all doom and gloom. For those of us that have been involved in the quest for better control system cyber security for a long time there are encouraging signs of change. Indeed, in the UK the changes which the nuclear sector has undergone are now being used as a model for other sectors.

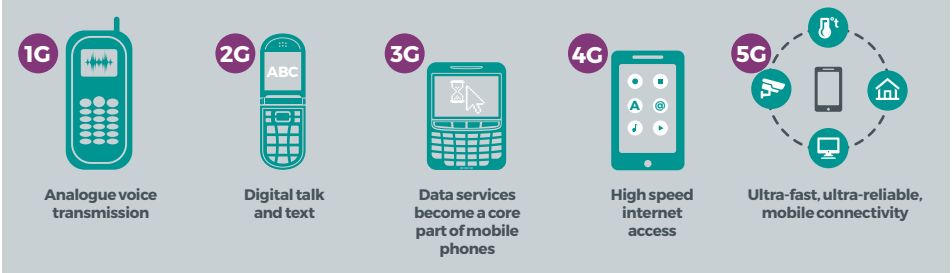
Ian Buffey is a technical director at Atkins, specialising in operational technology.



# UK needs 5G revolution

With mobile connectivity a necessity, the government must play an active role to ensure that basic services are available everywhere and make railways and city centres 5G ready as quickly as possible, writes *Peter Campbell*.

## Connected future at a glance



The UK's mobile connectivity offering puts the country in 54th place, behind such pioneers as Romania, Peru, and Morocco, and the typical user can access 4G 53% of the time. So if you are reading this in Bucharest, Lima, or Casablanca, or are the half of people in the UK who are able to, then well done!

A new report from the National Infrastructure Commission (NIC), *Connected Future*, reveals the parlous state of the UK's digital infrastructure and makes some solid recommendations, including the need for government to take a more interventionist approach to the provision of digital connectivity. This will mean forging ahead with a drive to switch to 5G, described by NIC chair Lord Adonis as "...the future – ultra-fast, ultra-reliable it has the potential to change our lives and our economy in ways we cannot imagine today".

Despite the fact that the UK mobile market has transformed from a luxury in the 1980s to a necessity today, the UK is currently languishing in the digital slow lane. The need for the government to step in and play an active role in guaranteeing the availability of basic services can no longer be avoided. This extends to areas that are currently considered 'not-spots' or areas with low connectivity, such as roads and railways and, in some cases, even town centres.

The NIC have made seven key recommendations to address the situation. These include: -

- Appointing a dedicated government minister for digital infrastructure;
- Ensuring that our motorways are fully connected;

- Installation of trackside infrastructure to enable rail passengers to access mobile services;
- Local government to actively facilitate the deployment of mobile telecoms infrastructure;
- Introduction of a set of Ofcom-backed metrics to guarantee the level of digital coverage people actually receive;
- An Ofcom review of the existing regulatory regime by the end of 2017, to ensure it supports sharing of telecoms infrastructure;
- The review to ensure that spectrum allocation and regulatory decisions support a growth model to encourage greater shared access and interoperability.

The recommendations, say the NIC, will improve the UK's standing and competitiveness in the world, while increasing productivity as working becomes easier on hitherto unconnected train and car journeys. It is hoped stronger governmental and regulatory oversight will also mean future development of a reliable 5G network will be done in a consistent and overarching way.

However, it is unclear, for instance, whether connections will be reliable through trackside infrastructure on train journeys where speeds of up to 140mph can be reached at the moment, more when High Speed Rail comes online. Upgrading existing rolling stock will also be costly and disruptive, and with many new sets only at the start of their operational lives, it will be years before new ones with integrated infrastructure can be procured.

# Making the case for smarter infrastructure

While effective and sustainable infrastructure is vital for the future growth of the UK, the sector faces challenges (investment, resources) and uncertainty (changing governments, climate change). However, developments in science and technology, particularly the revolution in the ability to sense materials, buildings and structures, offer prospective solutions to these challenges.

Infrastructure is an information-driven industry and we are living in a digitally abundant age. While digital proliferation has brought opportunity and challenges in equal measure to all sectors of the economy, the response has not been uniform.

Automotive and aerospace have met this change with smart solutions, quick to exploit the evolution of sensors and data analytics, but the infrastructure and construction industry has been less dynamic. This may, in part, be due to historical constraints within the sector, including long lead-times, lack of choice in the supply chain and outdated finance and contract models. Challenges exist, but the call for change cannot be ignored.

In a bid to facilitate the industry adoption of 'smart', a number of leading professionals and academics have come together to make the case for smart infrastructure, a global opportunity worth between £2-4.8 trillion. Their paper, *Smart Infrastructure – Getting more from strategic assets*, looks to establish:

- What smart infrastructure is;
- Why infrastructure must embrace its development;
- What steps the sector needs to take now to prepare for what will be fast-paced change.

Data is key to this discussion. The rapid and ongoing reduction in the unit cost of

A collaboration involving academia and industry experts is making the case for smart Infrastructure, a global opportunity worth up to £4.8 trillion, say Dr Jennifer Schooling and Mark Enzer.

collecting, communicating, processing and storing data has led to the state of digital abundance – digital solutions in infrastructure are becoming increasingly affordable. This profusion of data is boosted by a significant increase in innovations across information technology and sensor-related fields, leading to an unprecedented opportunity to allow the future of infrastructure and construction to become 'smart' – when physical and digital infrastructure converge.



Digital infrastructure may vary from sector to sector, but it shares a similar anatomy comprised of three basic layers (data management, sense making and decision making) all connected by communication, with data as the key. It is the overlay of this model onto physical infrastructure that makes it 'smart'.

Smart Infrastructure offers benefits to all stakeholders:

- Owners and operators get more out of what they already have – increasing capacity, efficiency, reliability and resilience;
- Getting more from existing assets will enable owners and operators to enhance service provision despite constrained finance, growing resource scarcity and short supply of greenfield sites;
- A better understanding of the performance of our existing infrastructure will allow new infrastructure to be designed and delivered more efficiently, providing improved whole-life value.

In addition, smart infrastructure offers a more cost-effective way of delivering better outcomes for customers (the value of digital

infrastructure is in the outcome per whole-life pound for the ultimate customer).

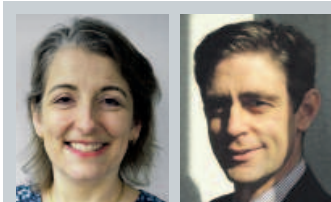
Fundamentally, that value comes from:

- Improved decisions – enabling better decisions, faster and cheaper;
- Improved intelligence – providing better information to the users and operators;
- Improved learning – providing enhanced feedback to drive systemic improvement.

While there are significant new infrastructure projects taking place in the UK, for example Crossrail and HS2, these only represent a fraction of our current infrastructure portfolio, much of which is now at an advanced stage of maturity. It will often be more cost-effective to add to the overall value of mature infrastructure via digital enhancements than by physical enhancements. Physical enhancements add 'more of the same', whereas digital enhancements can transform the existing as well.

Data, the ownership of it and, perhaps more pertinently, the ability to understand and act on it, is key to the future of smart infrastructure. Industry, organisations and professionals need to be ready to adjust in order to avoid being left behind and to take advantage of the emerging opportunities.

Early adopters stand to get the most benefit. Everyone in the infrastructure sector has a choice as to how fast they respond to the changes that smart infrastructure will bring. But everyone will be affected. While change is inevitable, progress is optional. It's time for infrastructure to choose smart.



Dr Jennifer Schooling is the director at the Centre for Smart Infrastructure and Construction (CSIC) at the University of Cambridge and Mark Enzer is global water sector leader at Mott MacDonald.

## Smart Infrastructure

Getting more from strategic assets

To read and comment on the paper *Smart Infrastructure – Getting more from strategic assets*, visit the Cambridge Centre for Smart Infrastructure and Construction's website at [www-smartinfrastucture.eng.cam.ac.uk/what-we-do-and-why/what-is-smart-infrastructure-2](http://www-smartinfrastucture.eng.cam.ac.uk/what-we-do-and-why/what-is-smart-infrastructure-2)

# Water sector exuding a more secure hue

A complex regime of targets and measures is used to keep track of the performance of water companies for their customers and shareholders. But one comment from Atkins' market director for water Graham Hunt stands out as a good reflection on how the sector is doing: "Our staff turnover, above a natural baseline level, was not impacted by the transition from the AMP5 to AMP6 (asset management programme) cycles," Hunt says.

This can be compared with the transition from AMP4 to AMP5 in 2010, which came at a time when virtually all 32 water companies were working to the same aligned AMP cycles. "We had to reduce headcount across a number of our teams as AMP4 came to a close," says Hunt. The consultant, along with all other suppliers, could only then await award of contracts for AMP5 before deciding how many heads to recruit again. Quite a lot has changed since then.

This is a sector worth £44.3bn in total expenditure – operations and capital investment – during the current AMP6 period from 2015 to 2020. According to the regulator Ofwat, the water companies have invested over £108bn since the water industry was privatised in 1989.

But over that time, the sector has also been characterised by the stop-start nature of investment programmes – hampering resource efficiency and squeezing work into the latter years of AMP periods. There will likely always be cycles of work to some extent. Framework contracts and alliances legally have to include an end point. But the industry has put significant effort into staggering procurement processes and in some cases developing longer alliances to reduce the ramping up and down of workloads.

Thames Water's eight:O Alliance members are delivering work of the current AMP6 period up to 2020 and potentially will continue onto the subsequent AMP7 through a 10-year framework. Severn Trent Water announced it would extend the contracts of all seven of its AMP5 delivery partners, while starting the planning and design of AMP6 work early to maintain a continuum of workflow.

Atkins is working as part of the eight:O Alliance and as a framework contract supplier to Severn Trent, Scottish Water and others. "Not all of these will cross over more than one regulatory period, but most are now out of step. They no longer all line up,"

A sixth five-year cycle of capital investment is now being delivered by the regulated water companies and their suppliers. For a health check on the sector, *Jon Masters* grabbed ten minutes with Atkins' market director for water Graham Hunt.



**Graham Hunt:** "The supply chain in the water sector is in a healthy condition."

Hunt says. "All are aiming for best value of delivery for the customer. The spin-off for the supply chain is a longer commitment to allow investment in innovation and the digital agenda, to deliver more efficiently at less cost," he said.

Ofwat's oversight of the water companies' performance shows some promising results. The average SIM (service incentive mechanism) score across the sector rose marginally from 81.6 out of 100 to 82.5 in 2015/16. However, only two of the leading water companies, Severn Trent and Anglian Water, have been allowed price increases through Ofwat's ODI (outcome delivery incentive) regime for strong performance on wastewater treatment and leakage rates.

A lot of further investment is needed across the water sector, which presents a promising long-term outlook for suppliers,

but it's also clear that everyone has to keep pushing for better results. Ofwat's determination on Severn Trent's 2015/16 ODI results says: 'Severn Trent Water's targets become increasingly demanding during this price control period so the company will need to perform even better if it wants to earn a similar net reward next year.'

"Procurement teams at the water companies are in business to get best value from suppliers," says Hunt. "From Atkins' point of view, we are often delivering to target cost and we're on a journey to changing the way we deliver through the digital agenda and automation. And for cost-effectiveness and dealing with fluctuations in

workload, we can provide 24 hour services from overseas locations."

Atkins would appear to be in a good position. The firm's resources can be balanced across a substantial portfolio of water contracts to take out the peaks and troughs in workload. Other suppliers will not have the same luxury. The overseas capability, Atkins' 1,500 strong global design centre in India, is also a big asset.

"The supply chain in the water sector is in a healthy condition. It's a mature market now, with a

number of different procurement approaches aimed at greater value and efficiency. It's great that the supply chain has a lot of skin in the game, incentivised and committed to making it work," says Hunt.

"People can see longer term and more secure career opportunities in this sector now. We made the transition from AMP5 to AMP6 without significant impact on staff numbers. But there is a word of caution. At some stage, as mega projects such as Hinkley Point C and HS2 get going, there is going to be a lot of pressure put on the water sector's ability to attract and retain the skills needed," he warned.

# Let's make 2017 a year of opportunity

With market shifts that defied prediction, 2016 will be remembered as a turbulent turning point for the industry and the globalisation agenda. Despite ongoing uncertainty 2017 can be a year of opportunity, writes *Nelson Ogunshakin*.

**T**he only thing certain about 2017 is uncertainty; which already has and will continue to permeate into the business landscape. Industry leaders must answer that with collective adaptability.

At the end of 2016 I identified five key challenges and market drivers for our industry. The Chinese economy, oil and energy prices, big data and digital economy, market consolidations, and Brexit as well as the US elections. These drivers were debated in London in November at the seventh European CEO Conference, attended by more than 120 leaders from over 24 countries. To meet these challenges, I intend to focus on each in turn over coming months, looking at the ramifications and actions needed for our industry to ensure that 2017 is a success.

A key issue for many is the current political turbulence worldwide.

Brexit, alongside international political events like the Italian referendum result, turbulence in Spanish politics, as well as upcoming elections in France, Germany, and the Netherlands, are all fuelling a populism that could disrupt European politics as we know it. The outcome of these could either result in a radically modified EU or even a complete breakup of the EU project. In addition, our industry will be unpredictably impacted by the arrival in office of new US president, Donald Trump.

All these political situations intertwine, with Brexit uncertainty directly impacting infrastructure investments in the UK and to some extent, across the global market.

The government is not alone in finding a solution to coming challenges. All businesses have a role to play in what is to come, concerns to voice, suggestions to make and actions to take as the prime minister triggers Article 50 and commences the UK's divorce from the EU. The government in turn must ensure that the business reality we face is understood



**“While uncertainty in politics perpetuates discord throughout the business landscape, a robust and coherent infrastructure policy remains a steady path to societal progress.”**

and addressed, to future proof UK enterprise.

Our political leaders must ensure that alongside the EU negotiations, we concentrate domestically on that which drove people to vote leave – the growing power distance between political leaders and the people. Politicians cannot lose sight of this issue which already permeates all regions, fracturing our society at its core, making the future uncertain for business.

Politicians must pursue realistic forms of devolution, where devolved powers are not merely words on paper but forms of

true political determinism, with appropriate policies and the funding to enable both national and local projects to be delivered.

Infrastructure investment, whether transport connectivity, residential capacity, broadband connectivity or otherwise presents a massive opportunity for both local and UK politicians to address regional pinch points in the UK. Each infrastructure project is an opportunity to improve local communities by enhancing the connectivity and service provision of residents – and addressing the looming threat of isolationist movements.

Within the coming uncertainty there is a strong need for talented individuals to collaborate side by side – politicians and industry – to ensure success. Not just in producing timely and investable infrastructure assets, but also in fostering societal progress aimed to heal division, ensuring that the UK is truly fit for the future – no matter what that future brings.

While uncertainty in politics perpetuates discord throughout the business landscape, a robust and coherent infrastructure policy remains a steady path to societal progress. Most social and economic infrastructure investment stays in the United Kingdom, so no matter what your political persuasion, whether politician or businessman, let's think outside of the box to seize the opportunities before us.

In 2017 we need an entrepreneurial UK drive that doesn't just think outside the box, it breaks through the confines of the box. The development and implementation of an appropriate industrial strategy for our sector will be critical and industry representatives such as the ACE and others will continue to work with government departments and the private sector to position the UK as a thriving investment destination.

Together we must establish the UK as a “multiple centre of excellences”, harnessing innovations, digital technology, fostering skills development, embracing – true diversity and inclusion across infrastructure and engineering, and expanding our thinking to invest in social and economic infrastructure to solve the wider challenges facing our industry, our country and our society.

Instead of thinking what do we *have* to do, think about what *can* we do and how can we work together to achieve it. If we do that, the possibilities are endless.

*Dr Nelson Ogunshakin OBE is the chief executive of the Association for Consultancy and Engineering.*

# New and updated ACE Agreements on the way



Former judge and engineer, *Sir Vivian Ramsey*, reviews a major update of the ACE professional services agreements due to be published this spring.

Experience in the courts and arbitration shows that many agreements between consultants and their clients are made by an exchange of letters and with little formality. This may, of course, be the very reason why a dispute has arisen. Sometimes the speed of appointment means that consideration of the detailed terms of the consultancy agreement takes second place to performing the work, particularly for small and medium sized firms.

For many years, ACE has provided the main standard forms of agreement which consultants have used. They have provided useful guidance and, when properly used, have successfully regulated the relationship between clients and consultants. The existing suite was last revised in 2009 and it has become necessary to take account of several developments since that date.

The recent announcement that ACE is launching its first major update of its professional services agreement suite in 2017 is therefore to be welcomed. The revised agreements will include a new *Professional Services Agreement* and *Sub Consultancy Agreement* as well as new *Schedules of Services* for both civil and structural and mechanical and electrical engineering. The aim of the new editions is to improve the efficiency and certainty in the way in which professional services are procured. This is assisted by detailed guidance notes which accompany the agreements.

The focus in the revised agreements has been to create a logical, user-friendly format containing a clear and fair allocation of risk between the client and the consultant. At the same time the new agreements have addressed issues which now arise from industry practice and government initiatives such as good payment practice, collaboration, risk management, BIM, dispute resolution and soft landings initiatives. The changes have taken account of wide industry consultation and the views of users.



**ACE Professional Services Agreements 2017 are coming this spring!**  
Find out more at: [www.acenet.co.uk/publications](http://www.acenet.co.uk/publications)

Issues arise in respect of the rights and liabilities of consultants. The new agreement contains comprehensive provisions including liability relating to deleterious materials, a reasonable endeavours obligation in respect of any programme for the services, consultant's responsibility for sub-consultants, timing of requests for information from the client, the authority of the consultant's representative, the ability of the consultant to act as agent and the duty for the consultant to exercise any discretion in a fair, impartial and professional manner.

Joint obligations are dealt with and include a duty of collaboration supported by a mutual early warning obligation in relation to matters that are likely to affect the provision of the services leading to discussions, actions and measures. There is also a duty to work together to analyse and manage any risks.

Variations to the brief or the services are the subject of express provisions in the new agreements and there is also provision for payment for disruption to

the consultant's work. There are clauses dealing with limitation of liability, proportionate joint liability and time limits for claims, which together with insurance deal comprehensively with these necessary topics. There are also particular rights of suspension, in addition to the familiar termination provisions.

As with all standard forms the schedules allow for detailed provisions, including BIM protocols, to be chosen for the project and any bespoke arrangements. As always, the schedules require care in completion. A standard collateral warranty is included with an optional provision of beneficiary's step-in rights.

It is clear that the approach taken in the new *Professional Services Agreement*, which is also reflected in the other documents, makes this new suite of agreements an essential part of regulating obligations and avoiding disputes. It will be welcomed by consultants and clients alike.

*Sir Vivian Ramsey is a former High Court judge and a former civil engineer.*



## Webinars to help you with diversity and inclusion

**W**ith many people in the industry highlighting the need for greater diversity and inclusion in the workforce as an urgent challenge for 2017, ACE is holding a timely series of webinars on the issue over the coming year.

The events are aimed at enabling companies to embed the values of diversity and inclusion, a continuing challenge for firms working in the natural and built environment.

Through ACE's continued engagement in diversity and inclusion across the industry and the ACE research presented in their report *Diversity & Inclusion – marginal or mandatory?* it's clear that the industry still faces many hurdles in establishing a truly diverse and inclusive workforce.

It is also equally clear that diversity and inclusion should not just be considered as

a question of numbers, important though they are. The most successful efforts in this area are geared towards employers who are willing to adapt to the differences of all staff members, celebrating and fostering the skills of all on an equal basis.

ACE is holding a series of webinars on embedding the values of diversity and inclusion into the daily practices of businesses working in the natural and built environment. With tips for businesses of all sizes, these webinars will help embed diversity and inclusion within key business strategies. Current webinar topics for 2017 include benchmarking, management, procurement, flexible working and recruitment.

● *For more information on the webinars see [www.acenet.co.uk/DIwebinars](http://www.acenet.co.uk/DIwebinars)*

## Key 2017 dates for your diary

Submissions close for Consultancy and Engineering Awards.....	10 February 2017
ACE Legal Update – London.....	14 March 2017
ACE Legal Update – Glasgow.....	21 March 2017
ACE Legal Update – Birmingham.....	23 March 2017
ACE National Conference.....	7 June 2017
Consultancy and Engineering Awards Dinner.....	7 June 2017
ACE Parliamentary Reception.....	8 November 2017
European CEO Conference.....	9 & 10 November 2017
European CEO Awards.....	9 November 2017

**Consultancy  
& Engineering  
AWARDS 2017**

## Call for entries

**D**oes your company undertake extraordinary work or champion industry challenges? Do you have a young star among your staff? If so, make sure that you enter the Consultancy and Engineering Awards 2017.

With ten awards up for grabs for extraordinary work in the consultancy and engineering sector, this year could well be your time to shine. There are three exclusive award categories for ACE member companies, focusing on best business performance, five champion award categories open to submissions from across the industry wide and the Young Professional of the Year and Apprentice of the Year awards, both recognising the contribution of those under 35 across the industry.

● *The deadline for entries is 10 February 2017. Apply now at [www.ace-engineering-awards.co.uk](http://www.ace-engineering-awards.co.uk)*



## Europe's cream of the crop

**Congratulations to all the winners of the European CEO Awards 2016.**

- **Sterling Award** – sponsored by FIDIC  
Pierre Verzat (SYSTRA)
- **CEO of the Year Award: Small Firm** – sponsored by *Infrastructure Intelligence*  
Greg Hayden (Ethos Engineering)
- **CEO of the Year Award: Medium Firm** – sponsored by ACE  
Graham Nicholson (Tony Gee and Partners)
- **CEO of the Year Award: Large Firm** – sponsored by *Matchtech*  
Dr Uwe Krueger (Atkins)
- **Lifetime Achievement Award** – sponsored by *WSP|Parsons Brinckerhoff*  
Eva Nygren (BENygren AB)
- **Lifetime Achievement Award** – sponsored by *WSP|Parsons Brinckerhoff*  
Allan Cook (Atkins)

# End of Brexit phoney war means more uncertainty

As 2017 begins, Brexit is once again dominating the daily headlines and it feels as if the six-month phoney war since the referendum is coming to an end. The original phoney war of 1939-40 ended of course with the German Blitzkrieg offensive against France in May 1940. The triggering of Article 50 won't be as dramatic as that but, just as that attack was the opening chapter of five more years of conflict, it is likely that the formal start of Brexit negotiations will be followed by several years of complex negotiations and fluctuating perceptions of the ultimate impact on the UK.

In terms of our focus here at EIC – environmental markets and policies – the Brexit phoney war has already seen some emerging themes in terms of impact. As 24 June last year dawned, it's no exaggeration to say that the environmental community was in a state of shock. Eighty per cent of British green laws are decided at EU level, and the environmental twittersphere was awash with despairing predictions of Britain reverting to its old role as 'the dirty man of Europe'.

This pessimism had logic to it. For example, UK recycling rates were about 10% before the various EU waste directives began to bite; they are now over 40%. A full-scale dismantling of EU environmental regulations post-Brexit would undermine the quality of our air and water and decimate the environmental markets served by the consultancies and green technology companies which EIC represents.

The last few months of 2016 have though provided some respite from the gloom. When the UK lost a second Supreme Court case over its failure to achieve EU air quality standards, no less a figure than the prime minister pledged that ministers would do more to comply with the EU standards, rather than say, as she could have done, that they would be repealed post-Brexit. This reflects my own conversations with ministers who say that they recognise that the public expect clean air and water and the government must



The formal start of the Brexit negotiations will usher in further uncertainty for environmental businesses, says *Matthew Farrow*.



**What will Brexit mean for maintaining crucial systems of regulation such as REACH?**

meet these expectations. Indeed, recent opinion polls suggest that 80% of the public want environmental protection post-Brexit to be 'as strong or stronger' than it is now.

Other positive developments have been the announcement of a 'Great Repeal Bill' which should ensure some continuity of legislation and the Greener UK campaign run by a coalition of green NGOs led by Green Alliance, which has had 176 MPs sign a pledge to protect environmental standards post-Brexit.

But while the existential threat posed by Brexit to sustainability seems to have receded a little, the practical problems if anything have multiplied. An academic expert speaking at a recent EIC member seminar spoke of the risk of 'zombie legislation' – EU-derived green laws which remain in force but which the UK lacks the institutional capacity to properly implement once we have left the EU.

A good example would be the EU's system of chemicals regulation known as REACH – the subject of a recent

EIC/Ramboll Environ roundtable. With almost every manufacturing supply chain involving the import, export and use of chemical substances, REACH has had a very significant impact on the UK manufacturing and industrial sectors and on the consultancies which advise them on sustainability issues.

The system is administered by the European Chemicals Agency (ECA) in Helsinki. We could keep the REACH regulations, but without the ECA we could not implement them and trade with the EU. We could create our own equivalent agency, but this would be expensive and challenging in terms of assembling the expertise and integrating with the ECA's modus operandi. Switzerland wanted to pay directly to join REACH and make use of the ECA but was told it must also accept the judgements of European courts on chemicals policy implementation, something which proved too much for the Swiss and would probably be also for UK politicians.

All of this of course, means deep uncertainty for business – and that's unlikely to change even when the negotiations start.

*Matthew Farrow is director of the Environmental Industries Commission, the leading trade body for environmental firms.*

**“Recent opinion polls suggest that 80% of the public want environmental protection post-Brexit to be ‘as strong or stronger’ than it is now.”**



The Flood Advisory Service is raising awareness around best practice and the need for standards in the flood risk management sector, writes Sarah Marriott.

**F**lood defence and environmental matters are two sides of the same coin. No longer should “flood risk” be talked of in isolation, as it then becomes an apocalyptic scenario which many members of the public either feel won’t happen to them (again) or simply won’t happen in their neighbourhood.

With over 5.2 million households at risk of flooding in England alone, we should all open our eyes to “risk”. The Environmental Industries Commission (EIC) has picked up the baton and produced its own recommendations to government and its *Turning the Tide: Proposals to reform flood policy*, published earlier in 2016, neatly sums up the complex challenges that we face as a society.

With infrastructure investment a central tenet of the chancellor’s Autumn Statement, we must focus on driving growth in construction with a close eye on environmental matters and consider the implications flooding has in this arena. It is only by working more collaboratively with the construction sector that we can incorporate innovation and best practice to ensure tomorrow’s generation aren’t burdened with increased flood risk from decisions and actions taken today.

An obvious solution would be a change in building regulations (or at least adherence to best practice) to ensure that all new build properties are fitted with flood resistant measures that address water ingress via doorways, windows, airbricks and drainage. With the advent of some highly technical products such as new generation flood doors and anti-flood airbricks, this innovation is available to all. However, awareness remains pitifully low.

Speaking at last year’s EIC conference, Environment Agency chair Emma Howard-Boyd, highlighted the need for a collaborative joint venture approach. “The EA needs to innovate and collaborate in order to secure more investment and join up with external partners,” she said. Following the storms of December 2015 it is clear that there is a long way to go before we can reassure the public that we as a sector have a handle on flood risk management. Some of the EA’s plans implemented post 2015 can be likened to a sticking plaster - it makes you feel better but is of little effect.

Joint working with the military for deployment of temporary defences, Stobart employed to logistically shift barriers around the most at-need communities and natural flood management plans, are all sound initiatives, in theory, but the sad

# Setting standards for the flood sector



**The Flood Advisory Service offers free and independent advice on flood mitigation solutions at the heart of high-risk communities.**

reality is that more and more communities up and down the country will face the devastating effects of flooding this coming winter and beyond. Until the challenge of how we communicate with the public is resolved, the picture is set to become worse.

The Flood Advisory Service focuses attention on raising awareness around best practice and standards in the flood risk management sector. As an unregulated industry this is more important than ever, as there is nothing to stop untrained and uncertified operators from entering the market.

In the aftermath of storms Desmond, Eva and Frank, the Flood Resilience Grant gave affected householders and businesses the financial means to improve their property’s resistance and resilience to future flooding. Whilst well-intentioned, this has been subject to misuse as inexperienced, uncertified operators enter the market and install non-certified products, or certified products without having undertaken appropriate support training or gained any recognised installation qualification.

This leads to false peace of mind being afforded residents and business owners. Without having completed certified installation training, it is akin to having a gas boiler fitted by a non-certified installer. For the flood sector to be regarded as ‘fit for purpose’ it needs to adopt some

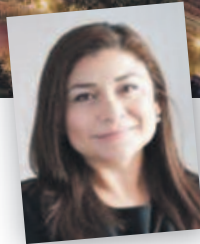
fundamental basics as mandatory. As well as being appropriately certified, products need to be suitable for application to each property and provide a holistic solution, with all points of water ingress addressed.

In the case of installation, all contractors must be appropriately certified and all installations should be subject to a water or wet test to ensure efficacy of installation and ensure no further leak paths. Currently the only certification is via BSI and their PAS 1188 for both products and installation. Adherence to this standard is, however, not mandatory. So, part of our work within the Flood Advisory Service this year has been to blow the whistle on defective or dangerous property level protection installations, particularly grant funded work in the north west.

I will finish with a sobering thought. With a potential spending pot of up to £85,000,000, and scant guidance afforded to local authorities, will the Flood Resilience Grant issued by the government become the next PPI miss-selling scandal? With the onus apparently on the householder to ensure that the products and services they are receiving are fit for purpose and appropriate, does this let government departments and local authorities off the hook when the measures fail due to lack of efficacy?

*Sarah Marriott is managing director of the Flood Advisory Service.*

# Career path: Yoanna Moguel



## What is your job?

I'm a senior consultant for Amey's consulting business working in the strategic consulting and technology team.

I have managed and delivered projects including assets life cycle cost models, performance modelling for franchise biddings and optimisation methodologies for the rail and aviation industries.

## Why did you decide to go into engineering?

My journey to becoming an engineer was a fairly natural process since I have always had an inclination for solving analytical problems and had a healthy curiosity for how things work and the mechanisms behind them. For instance, as a little girl I enjoyed spending time with my dad at the car mechanic's. I still remember his frustration at my constant stream of questions!

## What did you study? How did that lead to your career at Amey?

My academic background is varied to say the least. My first degree was in physics engineering, before completing a masters of science in quality systems and productivity at the Monterrey Institute of Technology and Higher Education (Mexico). Two years later, in an attempt to broaden and diversify my skillset, I decided to embark on a PhD in management at Kings College London. While living in London,

I went back to my roots as an engineer and gained employment as a performance analyst in the rail industry which consequently led me to my

current role at Amey.

## Who was your first employer?

After completing my masters, I worked for a couple of years for Cargill, a company that provides food, agriculture, financial and industrial products and services to the world. I was an important driver in getting the plant certified in hazard analysis and critical control points (HACCP). HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

## What is special about where you work?

For me, the most special thing is undoubtedly working within Amey's consulting business for the strategic consulting and technology team. I'm surrounded by brilliant people of the highest calibre, who all bring a unique blend of talents. It is this range of backgrounds that enables us to provide clients with unique and valuable solutions that enhance their asset management strategies.

## What is exciting?

Knowing that I am making my own contribution through delivering important infrastructure projects that will leave a lasting legacy. For example, assisting Heathrow's chief engineers in the development of asset system strategies that enable successful and sustainable operations in the airport.

## What about the work that keeps you interested?

Being constantly challenged – every project is unique in one way, shape or form. Finding the optimal way to maximise asset performance and add value for our clients.

## What is the best thing so far in your career?

To work at Amey. They care and invest in the development of their people. The opportunities that have arisen for me so far have been incredible.

## How are you able to engage with the wider industry through your role?

I'm lucky that in my role I am already engaged with some of the key industry players, such as Network Rail, DLR, Heathrow, etc. Furthermore, I like to keep abreast with developments within the industry through my memberships at the Institute of Asset Management, Women's Engineering Society and Project Management Institute.

# ACE National Conference 2017

London, 7 June 2017

