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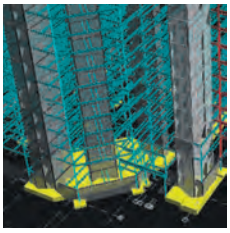

INFRASTRUCTURE Intelligence

Produced for the industry by the Association for Consultancy and Engineering

Queensferry Crossing client team's keys to success

INFRASTRUCTURE Intelligence

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MESSAGE FROM THE EDITOR

As we move ever closer towards the end of another year, it's traditional to remark on how quickly the previous 12 months has passed. That's certainly been the case in 2017 for infrastructure. I think that's a good thing because one of the things that has made the year fly by has been the fact that infrastructure has rarely been out of the headlines, with government and the public seeing it as crucial to economic and social progress.

As AECOM's Richard Robinson says in this issue (p4), the task now is to ensure that the government does not waiver from its planned infrastructure delivery programme. The industry needs to raise its game too and we report on research from Arcadis that says that UK construction needs to double its output to achieve national infrastructure targets (p8). So, some work to be done there then.

We couldn't end the year without taking another look at Brexit and we reveal the results of a new survey that shows that the consultancy and engineering sector will be hit hard if access to the European single market is not maintained after the UK leaves the EU (p7). We also examine the environmental impact of Brexit on businesses too (p15).

Elsewhere we report on a fascinating reverse mentoring pilot scheme that is addressing the skills gap in the industry (p10-11) and look at the rise and rise of BIM as the industry gets more digital. Our centre page spread celebrates the fantastic engineering marvel that is the Queensferry Crossing (p16-18) and we even take time out to recommend the ideal festive gift for anyone working in construction (p6).

As is customary in our last issue of 2017, let me be the first to wish all our readers all the best for the festive season and a prosperous, happy and peaceful 2018.

Andy Walker,
editor, Infrastructure Intelligence

Contents

Rail overtakes housing as top infrastructure priority

Results from Ipsos Mori's second *Global Infrastructure Index* show that British people now want better railways more than any other infrastructure priority. Housing comes second and flood defences third in the survey of Britons' infrastructure wish list. This is the same top three as the first Index found last year, but rail has jumped from third to top spot, Ipsos Mori says.

The results from across 28 countries also show that rail infrastructure is given much higher priority among the British public compared to other G8 countries. Rail use is higher in Britain, but the quality and value-for-money of its railways is rated lower than others in the G8, according to the Index poll.

Ipsos MORI found 46% of Britons choosing rail from a list as priorities for investment, ahead of new housing supply (43%) and flood defences (38%). In Britain, only 38% of people rate the quality of rail travel as very or fairly good, which compares to 51% in France and 60% in Japan, but ahead of Italy's 29%.

Ipsos Mori's research director for infrastructure, Ben Marshall, said: "Our second *Global Infrastructure Index* finds the British still think investment in infrastructure is vital to future economic growth and there remains a sense that not enough is being done to meet needs.

"But it also shows an uptick in the salience of rail infrastructure. This is likely to reflect British reliance on rail - we're more dependent on rail to get around than many other countries - and also the inferior rating of the quality of our tracks and stations compared to elsewhere, including Germany, the US, France and Japan."

European CEO Awards finalists line up






A high-profile line up of consultancy and engineering industry leaders from across Europe has been announced as the finalists in this year's European CEO Awards.

The awards, which will be presented at a gala dinner event during the European CEO Conference in London on 9 November, recognise and reward the outstanding leaders from the industry from the UK and across Europe.

Commenting on the list of nine finalists, judging panel member, Sarah Ingle, secretary general of ACE Ireland, said: "The quality of the entries was exceptionally high this year and each individual demonstrated outstanding leadership and best practice."

The finalists are (above, left to right):
Keith Howells, chairman, Mott MacDonald;
Patricia Moore, managing director of UK Infrastructure, Turner & Townsend;
Lizi Stewart, managing director, Arcadis;
Jens-Peter Saul, group CEO, Ramboll;
Nicolas Jachiet, chairman and CEO, EGIS;
Glyn Evans, managing director, Geo-Environmental Services Ltd; and
(below, left to right):
Alfredo Ingletti, chairman, 3TI Progetti;
Steve Wooler, chief executive, BWB; and
Gerry Carty, CEO, RPS.



Will the government borrow to invest in new homes?

Communities secretary Sajid Javid has called for a "big increase in all types of home" including social housing and shared equity homes and signalled that the government will borrow to invest heavily in new homes and associated infrastructure to tackle the housing crisis.

Speaking on the BBC's *Andrew Marr Show*, Javid hinted that there may be an announcement about the move in November's budget.

Javid said that there was an urgent need to build up to 300,000 homes a year. "We have a housing crisis in this country and there's a lot that needs to happen," he said. "I want to make sure that we're using everything that we have available to us to deal with this housing crisis. Where that means, for example, that we can sensibly borrow more to invest in the infrastructure that leads to more housing, take advantage of some of the record low interest rates that we have, I think we should be absolutely considering that," said Javid.

However, Javid's 'borrow to build' plan might not see the light of day if the chancellor Phillip Hammond has his way. Asked in the Commons only days after the communities secretary's statements if Javid's move would become government policy, the chancellor replied with a curt "no", adding "It is not responsible to make so-called hard choices by loading the price onto the next generation and the generation after that."

November's budget should be interesting then...

The government must not waiver from planned infrastructure delivery as it is key to driving economic and social wealth and building sustainable skills for domestic demand and export, says *Richard Robinson*.

Winning the argument for infrastructure investment

After what can only be described as a rollercoaster year, political change has become the new norm. However, one thing is certain and that is that all arguments for investment in infrastructure make sense. That was the overarching message in this year's CBI/AECOM infrastructure survey, published at the end of October, that measures the mood of business leaders, and shows where their pain points lie; both geographically and by topic, from road, rail and aviation to energy and connectivity.

Over the past few years much-needed momentum for infrastructure has gathered pace. This in turn has given confidence to the market and shown that the UK is open for business. There are a range of major schemes in the UK national infrastructure pipeline. Not only the headline projects such as the third runway at Heathrow Airport, HS2, Crossrail 2 and the Northern Powerhouse programme, but also local projects with social value, be that regional highway projects to fill the pot holes or build schools, hospitals and the fundamental demand for housing. The fundamentals behind these projects still need to be set out in strategies around housing reform and the focus on cities, as they are of upmost importance to driving economic and social wealth.

Despite the country's strong pipeline of projects, the report says clearly that business lacks confidence in the UK's ability to deliver, especially around housing and particularly in London. To restore this confidence, it is important that the government does not waiver from planned infrastructure delivery. Underlining the need for infrastructure investment and planning is the necessity to build sustainable skills for domestic demand and export. Perceptions of the planning system could be part of the problem. While there is business support for planning reforms such as the National Planning Policy Framework, the link between local planning decisions and national priorities is hazy.

A more integrated approach to regional growth that recognises the interdependent relationship between the UK's major cities and their regions is needed. With around one million people commuting into and out of London every day, strong economic links between industrial and learning 'clusters' both within and beyond the capital are essential. Jobs will be created in one area and homes needed in different and often distant districts. Clearly region-wide collaboration will help address the housing shortfall.

A range of major schemes are in the pipeline.

Progress made in Manchester, Birmingham and other major cities illustrates how collaboration with neighbours that share economic, social, cultural and functional relationships can drive growth. A refreshed system of governance is needed, in which government, local authorities, developers, communities and infrastructure providers work closely together. A move towards devolving and integrating transport and planning powers in England will help ensure local needs are met, with city mayors integral to decision-making.

Another way to think differently about cities meeting the multiple challenges to infrastructure, planning, transport and housing is through transport-oriented developments. Housing built in line with infrastructure investment and development is crucial to boosting the economy. Central to this will be growing the scale of the professional business services sector to create more sustainable and high value jobs to help the local economy to grow and increase exporting. This would also help to attract people to areas, making them places people want to live.

To deliver the trajectory for growth that is so desperately needed, it is a given that we need to fill the growing skills gap. This remains a key issue that extends beyond the Brexit negotiations. It can be argued that it is positive reflection on the growth of the industry which, if managed correctly, will bring exciting new talent to deliver the multitude of schemes.

That is why it is so important that the government, industry and schools work together to successfully tap into the engineers of the future. This is not just to deliver projects at home, but also oversees. An outward facing industry with domestic social and economic infrastructure will be the key to economic success.

Richard Robinson is chief executive of civil infrastructure, Europe, Middle East, India and Africa at AECOM.

Standing up for green business in turbulent times

The Environmental Industries Commission took the concerns of green businesses over Brexit into the Houses of Parliament with their recent political summit, writes *Andy Walker.*

With environmental markets never having faced the levels of uncertainty they currently do and with Brexit threatening to reshape the regulatory framework that green businesses work within, this year's EIC Political Summit could not have taken place at a more opportune time.

The summit, organised by trade body, the Environmental Industries Commission, looked at the prospects for green growth over the next few years through the thoughts and insights of a number of top speakers who gave the audience in committee room ten at the Houses of Parliament the benefit of their wisdom on environmental and business issues.

In the audience at this year's EIC Political Summit.

First to speak was London deputy mayor Shirley Rodrigues, who spoke about London mayor Sadiq Khan's new Environment Plan for London, highlighting the important role that environmental businesses can play in supporting Khan's plans. There was some discussion about the potential for push-back over the mayor's controversial proposals on diesel vehicles and the T-Charge but Rodrigues was steadfast in defending the measures, saying that they were needed to improve Londoners' quality of life and wellbeing.

Former climate change secretary Sir Ed Davey MP offered his audience a somewhat pessimistic view of the current approach to environmental policy, particularly in the aftermath of the vote to leave the European Union. Davey said he was very sceptical about environment secretary Michael Gove's commitment to his brief and he wasn't at all optimistic about the UK's trade prospects in Europe post-Brexit.

Sir Ed Davey MP: "We won't be able to influence other countries on climate change because we don't have a seat at the table."

"Brexit means that we won't be able to influence other countries on climate change because we don't have a seat at the table," said Davey. He said that the UK's influential role on climate change in persuading other countries to do the right thing would be lost and that this would have ramifications for the environment. He tried to strike a more optimistic tone in looking at the up sides of the UK being able to do some things more effectively by going it alone but on the whole he thought that Brexit would have a negative effect.

Two panel sessions looked at the effect of Brexit on environmental regulation and what businesses wanted from the environmental sector at a time of change. Green Alliance director Shaun Spiers said that the sector was still no clearer now about the outcomes of Brexit and that this was a worry. However he thought that there would be no cliff edge withdrawal from the EU and somehow the politicians and business would make it work, though the road would be uncertain and bumpy.

There was a clear view from the audience and panellists that it was never more important for environmental businesses to be arguing the case for what they do and the benefits they bring to clients and government. Given this to be the case, it was also never more important for the sector's trade body, the EIC, to be taking a strong stand on the key issues and informing and educating its members and also the government.

Finally, Mary Creagh MP, chair of the Environmental Audit Committee, gave her perspectives on environmental politics in a hung parliament. She gave a withering and often scathing assessment of the government's commitment to the environment and to green legislation, saying that there was "no strategy from government currently" on the key issues.

Matthew Farrow: EIC will continue to represent the interests of its members and those of the environment.

Creagh also said that she thought that Brexit would be used by the various factions within the Conservative party to settle political scores and that the environment and green legislation was in danger of being side-lined. "Your industry's challenge is to ensure that it doesn't die as a result of the EU withdrawal bill," said Creagh who appealed for the businesses present to help her and her committee to keep the government under scrutiny as the Brexit process wends its way through parliament.

So, much food for thought then for those environmental businesses present and much to do for the Environmental Industries Commission and its executive director Matthew Farrow, who told the audience at a reception following the summit that his organisation would continue to represent the interests of its members to government and ensure that their interests and those of the environment were paramount amidst the ongoing political turbulence.

"Your industry's challenge is to ensure that it doesn't die as a result of the EU withdrawal bill."

Mary Creagh MP, chair of the parliamentary Environmental Audit Committee

With the festive season fast approaching, *Andy Walker* offers up an ideal Christmas present idea that would suit anyone working in construction and infrastructure.

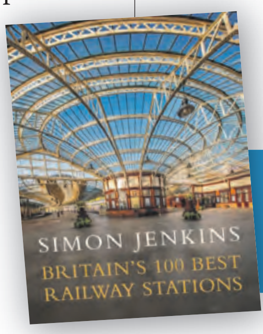
An ideal festive gift for anyone in construction

Simon Jenkins's new book, *Britain's 100 Best Railway Stations*, is a must-have for anyone with an interest in the built environment and the social and economic history of the UK. Jenkins has travelled up and down the country to select his top 100 and he uses his considerable knowledge of the nation's history and heritage to reveal the glory, splendour and cultural and economic significance of what are magnificent buildings and, in some cases, works of art.

The book is lavishly illustrated with colour photos throughout of what Jenkins considers to be the nation's best railway stations out of the 2,560 stations on Britain's main rail network. Limiting his choice to just 100 was "painful" says Jenkins and he has restricted his list to stations still in use. His top 100 will surely spark some debate but reading the book, which is separated into geographical regions of the country, you can see the affection in which he holds buildings which are often taken for granted.

Not only does the book list the stations, Jenkins also describes how and when they were built and by whom. Namechecking engineers and architects throughout the book, Jenkins is keen to credit those who have made such a lasting impact on the nation's transport network. The history of the stations he has picked out is never less than fascinating and always interesting and the imagery is often stunning.

Jenkins writes with great affection about the history of Britain's rail network and his list of the best stations is placed firmly in the context of a transport infrastructure that made and is still making people's lives better. Jenkins is a real enthusiast for the built environment and I'm somewhat surprised that our industry does not use him more at events and talks. He's certainly someone that the industry needs to get to know better.



Above and top: Wemyss Bay station in Scotland is a "work of art", says Jenkins (below).

He writes beautifully too about how he sees railway stations as "a social phenomenon, a place where people perform the timeless rituals, not just of travelling, but of congregating, working, playing, greeting and parting". "A station is a public stage of human contact," Jenkins writes, "ever more prominent in what is called the age of hypermobility. It is once again at the heart of British life," he enthuses.

As part of his assessment, Jenkins also picks out ten five-star stations which include obvious candidates such as Bristol Temple Meads, Liverpool Lime Street, London Kings Cross, St Pancras, Paddington and York. As part of his five-star selection, he also picks out Wemyss Bay station in Scotland for special attention as "one of the few stations that, in my opinion, qualify as a coherent work of art". Built in 1903 as a joint project by the engineer Donald Matheson and architect James Miller, Wemyss Bay station can only be described as beautiful. It's little wonder that its image adorns the front of Jenkins's book.

***Britain's 100 Best Railway Stations* by Simon Jenkins is published by Viking and retails at £25 but can be purchased for £17 from Amazon.**

Britain's 100 Best Railway Stations will keep anyone busy during a fascinating read through its 300-plus pages. Anyone with an interest in buildings or transport will love this book and it is sure to be on many people's wish lists for Christmas.

Brexit is casting a shadow over UK construction, with the consultancy and engineering sector set to be hit hard if access to the European single market is not maintained after the UK leaves the EU, writes *Julian Francis*.

The Brexit effect on UK consultancy and engineering firms

Continued unfettered access to EU skilled nationals is vital to consultancy and engineering firms. New research by ACE has revealed that 22% of large consultancy firms will consider moving jobs out of the UK if it becomes more difficult to move staff around Europe.

The UK construction industry as a whole could lose more than 175,000 EU workers – or 8% of the sector's workforce – if the country does not retain access to the European single market after Brexit. These figures, however, are formed from aggregate date from across the industry and do not show the true magnitude of the impact on the industry as each sector is affected differently.

That's why ACE has embarked on a piece of research, in conjunction with leading UK law firm Penningtons Manches, to clarify the contribution made to the consulting engineering sector by EU nationals.

Entitled *The Effect of EU Migration on the UK Consultancy and Engineering Sector Post Brexit* the report for the first time compiles data on the impact of EU migration on the sector. The report forms the basis of ACE's engagement with the independent Migration Advisory Committee and will help strengthen our arguments with hard data from member firms.

By working in collaboration and ascertaining the numbers of EU nationals in member firms, we can better inform government policy making and highlight the difficulties the sector will encounter in recruitment and retention in a post-Brexit world.

This report is intended to help consulting engineering firms of all sizes, policy makers, institutions and clients understand the extent to which EU nationals contribute to the sector with a view to improving workforce planning and skills development.

The report was launched on 8 November and shows that ACE members are dependent on EU workers to deliver the infrastructure pipeline of the UK.

Key highlights of the report are:

- Continued unfettered access to EU skilled nationals is of high importance to consulting engineering firms.
- The robustness of the UK infrastructure pipeline is key to staff retention in the UK following Brexit.
- 22% of large consultancy firms will consider moving jobs out of the UK if it becomes more difficult to move staff around Europe.
- On average 10% of consulting engineering firms' staff are from EU member states which is higher than the industry average of 6%.
- 67% of EU staff work in London and the south east which is higher than the industry average.
- UK workers in the sector are younger than the industry average.
- EU nationals are younger than their UK counterparts.
- 83% of EU nationals in consulting engineering firms are aged 30-39 which makes them older then the industry average.
- EU nationals have been used to help manage the UK's engineering skills gap.
- 50% of EU nationals are fee earners.
- Continued recognition of UK qualifications will be important to EU nationals' retention.

With a skills bases that is ageing and shrinking, the UK engineering sector faces a perfect storm of increasing amounts of work with a declining workforce to deliver, which will inevitably have an impact on wages going forward.

People are at the heart of our industry, without them we have no businesses. Anything that impacts on the ability of consulting engineering firms to hire the best and most talented staff will impact on the ability of the sector to compete globally and efficiently deliver the UK infrastructure pipeline.

Infrastructure is the key enabler of growth and the driver of the UK economy improving peoples' lives and our national prosperity. The government understands the link between economic growth and infrastructure investment as shown by the creation of the National Infrastructure Commission and its Industrial Strategy.

None of this will be possible, however, without a skilled and trained workforce. The UK is facing an aging workforce with a declining pipeline of new entrants into the industry with the result that skilled staff are becoming more sought after and expensive.

ACE's report highlights the crucial importance of the EU nationals to our industry and the importance of ensuring that consulting engineering firms continue to have unfettered access to EU staff following Brexit.

The report is available for download from the ACE website at www.acenet.co.uk

Julian Francis is the director of policy and external affairs at the Association for Consultancy and Engineering.

Industry must double infrastructure output or miss targets

UK construction must double its output to achieve national infrastructure ambitions, says a new report by the consultancy Arcadis.

The UK construction industry needs to significantly increase its rate of infrastructure delivery to more than £95,000 of output per minute for the next decade to come even close to meeting national ambitions, says Arcadis.

While demand for new infrastructure is creating an unprecedented opportunity to create jobs and drive growth, actually delivering the UK's ambitions will mean more than doubling historic peak output of £20bn a year. This will require a major step-change in how construction is planned and delivered in the UK.

The Arcadis Report, *Opportunity Knocks: Delivering the UK's Infrastructure Pipeline*, brings together experience taken from working on major programmes with government, asset owners, investors, and construction delivery partners. It sets out six key success factors aimed at ensuring planned infrastructure programmes are deliverable.

1. Understand the Pipeline
2. Identify what makes a project attractive
3. Align with Industrial Strategy
4. Embrace technical innovation
5. Get the basics right
6. Establish the right commercial model

Arcadis says that the opportunities for the industry are huge, with more major infrastructure programmes simultaneously underway than ever before. The Greater London region alone will see over £28bn of infrastructure investment in the next four years, including Thames Tideway Tunnel, as well as significant investment in the rail network.

Meanwhile the Northern Powerhouse region, which includes Manchester and Leeds, has more than £13bn of combined infrastructure opportunity to 2021, with schemes such as the Manchester Airport Transformation Programme and Network Rail's Transpennine Route Upgrade all coming to the fore.

Arcadis' assessment is based on the current iteration of the National Infrastructure and Construction Pipeline (NICP), which features upwards of £500bn of infrastructure spend over the next ten years. However, as Arcadis points out in its report, although the NICP represents the largest potential spend seen so far on infrastructure, it actually understates the real scale of the opportunity.

For example, the NICP currently excludes some of the UK's most important future programmes, such as Heathrow's proposed third runway and Highways England's Lower Thames Crossing. Equally, future programmes to adapt existing infrastructure related to disruptive technologies, such as autonomous vehicles or the battery storage of energy, could also come to market in the next ten years but don't feature in the pipeline.

The Opportunity Knocks report can be downloaded at https://goo.gl/vFEXyP

With construction of such a large infrastructure pipeline now underway, competition is rife for access to the best supply chain, technology, and design and delivery talent. Operating in this increasingly crowded market is putting the industry under growing pressure to meet targets, forcing new delivery approaches if the industry is to keep pace.

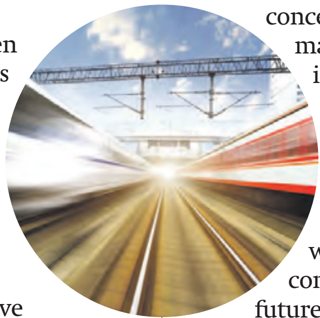
Greg Bradley, head of UK business advisory at Arcadis, commented: "With some of the most complex and technically challenging projects now underway, the industry is under more pressure and facing more competition to deliver than ever before. We have a massive opportunity here to upgrade our much-needed infrastructure networks, and to do things differently. From new roads, railways, power plants and utility networks to new technologies and Smart Cities, there has never been a more exciting opportunity to transform how we plan and deliver projects."

According to Bradley, doubling output will mean the industry investing more in innovation, skills and training and also digital technology. Put simply, the old ways of working are not going to cut it. "The need to double construction output on infrastructure is no small task, and it will force us to do things differently," said Bradley.

"The industry needs to look at innovating on a massive scale to achieve the step-change required, including upscaling digital solutions, offsite manufacture and offshore design, investment in skills and training, sharing of resources and better alignment with regional development agendas. We also need to continue to collaborate across sectors and the supply chain to help speed up the pace of delivery," he said.

The Infrastructure Client Group's Project 13 has been launched by ICE, inviting wider industry participation six months from the implementation of a new business model for project delivery. *Jon Masters* reports.

A new business model for project delivery



Infrastructure clients and leading suppliers have been frustrated by the industry's flatlining productivity and performance for at least the past 20 years. Now the Institution of Civil Engineers' influential Infrastructure Client Group (ICG) has launched what it hopes will become a productive initiative for bringing a better business model for project delivery.

Project 13 has taken its name purely by being the ICG's 13th project. It represents about three years' work gathering thoughts on a project delivery blueprint based on an enterprise relationship between clients and suppliers that maximises performance, instead of the conventional transactional deals that transfer risk.

The Infrastructure Client Group's membership includes representatives from the Infrastructure Projects Authority, the Cabinet Office, ICE and industry clients including Network Rail, Thames Tideway, Transport for London, the Environment Agency, Heathrow Airport, Anglian Water, National Grid, UK Power Networks and Highways England.

Leading figures from the Infrastructure Projects Authority, Network Rail, Anglian Water, National Grid and others know where they want industry to get to, but they need the rest of the sector to help them get there. At the Project 13 launch the ICG invited the wider infrastructure community to get involved in shaping this work. In March 2018, the project will move to the implementation phase, aiming to help clients and suppliers to move to wider use of the new delivery model with advisory support, tools, guidance and peer review.

There is wide ranging support across the industry, with a diversity of voices from business speaking up for the initiative. ICE director general Nick Baveystock said: "Our industry is often criticised for low productivity and concentrating too much on margins. Project 13 is the industry's attempt to address these issues. The initial thinking has been done, derived by practitioners and clients, and now is the time to take this forward. We want others to join the community and help shape future business models."

KPMG head of infrastructure, Richard Threlfall, said "Project 13 is a concerted effort to transform the UK construction industry. It requires us to change how we think and act, and crucially how we work together. It won't be easy but the prize is a world-class industry and better outcomes for our society."

Dale Evans, Anglian Water's @onealliance managing director said: "The traditional transactional and disaggregated approach to procurement has not only failed to deliver the levels of improvement seen in other sectors, in an increasingly digitally enabled world they are not fit for purpose. Project 13 has clearly demonstrated that we must make the shift to delivering through integrated, collaborative and highly aligned enterprises."

Mace CEO, Mark Reynolds, added: "We all know the problems faced by the construction industry: lacklustre productivity, unsustainable margins and a skills shortage which is set to get worse. Project 13 is an absolutely critical part of solving these issues as it looks to bring together the industry and asset owners in a new way of working that focus on outcomes and becoming a high performing single enterprise."

Project 13 – the key points

- ICE has been actively working with all parts of the profession to better understand what works, and what doesn't, in the industry's business model.
- Research suggests that low margins and investment, coupled with low levels of innovation, have a negative impact on both private and public works.
- One of the biggest drivers is the need for water, transport and energy providers to perform better. Customers demand more, from lower prices to better service and infrastructure.
- There is compelling evidence that 'digital transformation' will help organisations and the wider industry to grow and improve.
- The construction industry's productivity level has been consistently low at around 8% for decades. Without improvement, it will be impossible to deliver the step change in asset performance that is now required.
- Project 13 outlines a new approach to delivering high performing infrastructure, through a different business model for client and supply chain relationships.
- Drawing heavily on the experience of regulated utilities in delivering both projects and programmes, the Project 13 model aims to turn a series of disparate relationships between owners and suppliers into long term, value driven, enterprises.
- Such enterprises are much more effective in bringing through the skills and technologies needed to provide the right infrastructure and the right outcomes for customers.

Role reversal – closing

A reverse mentoring pilot scheme is helping to close the growing skills gap in the industry. *Rebecca Wooding* caught up with two of the participants to find out how they were getting on.

ACE Progress Network's reverse mentoring pilot scheme, which was successfully launched on 21 June 2017 with 11 mentor-mentee pairs from seven ACE companies participating, is now half-way through its eight-month programme and is proving to be a key asset to businesses.

The innovative pilot was developed as an answer to an industry-wide need to close the growing skills gap, improve business resilience in a fast-pace technological environment and enhance retention.

To catch up on how the pairs were progressing, we spoke to **Vincent Hurley (VH)** (mentor) and **Phil Armitage (PH)** (mentee), who both work at Max Fordham LPP, a mechanical and electrical building services consultancy.

The pair have met three times so far, each for a two-hour reverse mentoring session. During each session, the two have held discussions from different perspectives on the challenges and usefulness of work-efficiency generating technologies for individuals and project teams. As well as building key technological competencies, part of the sessions have been focused on building Vincent's (junior engineer) commercial awareness and business knowledge, capitalising on two-way learning. The two shared their experiences on their new relationship to date.

What's your 'day job'?

VH: I'm an electrical engineer with just under three years' experience from graduation. I'm currently working on a unique student accommodation PassivHaus refurbishment at the University of Oxford with Max Fordham.

PA: As senior partner of Max Fordham I wear many hats. I still maintain an engineering role, drawing on my 30 years' experience within the industry, but I also have management responsibilities sitting on the equivalent of our board of directors and managing our Cambridge office.

Why did you get involved in the reverse mentoring pilot?

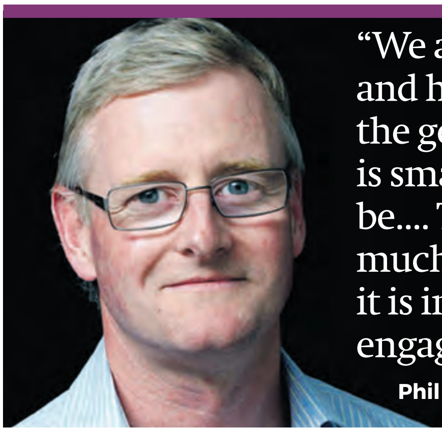
PA: I am enthusiastic about the potential of IT to improve the quality of working life and I'm also interested in the evolution of working practices. The pilot seemed like a very good opportunity to understand the extent of the generation gap in our practice and to develop an insight into the working practices of other organisations.

VH: I have found that there can sometimes be communication barriers between junior employees and senior employees. I wanted to investigate a way for both juniors and seniors to improve their communication and capitalise on the use of new online tools for this purpose.

Do you think you have benefitted from reverse mentoring? If so how?

PA: Definitely. We are half way through the pilot and have understood the reality of the generation gap, which, for us, is smaller than we thought it might be. We have decided to focus more on evolving working practices, particularly in the areas of collaborative working and improving efficiency, and to tackle some more extreme commercial challenges.

VH: Yes, I believe I have gained an insight into how senior management works and



"We are half way through the pilot and have understood the reality of the generation gap, which, for us, is smaller than we thought it might be.... Technology underpins so much of how we work already that it is important for everyone to engage, not just junior staff. "

Phil Armitage (mentee)

the industry skills gap

the development of a business alongside its IT strategies. It is rewarding to know that my opinions on certain topics are valuable to a senior member of Max Fordham. Furthermore, the relationship has eliminated my fear of the unknown and made me more comfortable when speaking to seniors.

What do you think are the key challenges facing consultancy and engineering companies in the future?

VH: Ensuring that more senior staff actually take the time to learn how to use new technologies and applications as they become more commonplace in work environments. This is particularly important as any technology that juniors use, but that seniors refuse to learn, only increases the divide between junior and senior staff.

PA: The trend is that we are expected to do more for less and quicker. Understanding how to attract and keep good people, maintain the quality of the work while spending less time, and the effect that increasing automation will have on the nature of our role as designers are all issues that have long term effects on the success of organisations.

What advice can you give to companies struggling with the fast-paced changes in technology?

PA: Maintaining the right balance between stability and change is really tricky. At Max Fordham we have found that allowing individual enthusiasts to experiment with new technology helps us to understand what is valuable. Having a broadly representative group of people involved in agreeing strategic changes has also allowed us to make reasonably good progress with our systems and functionality. I think that a really interesting question to ask yourself is "If we started up today, how would we work and what would our IT look like"?.

VH: I don't think there is a hard and fast solution. However, it should be part of a business strategy to actively invest time in learning how to use new software and applications as they come out, at least on a trial or pilot basis, to determine if the technology is suitable for their company early on.

How important is it for senior staff not rely on junior staff for technology know-how?

PA: Technology underpins so much of how we work already that it is important for everyone to engage, not just junior staff. Technology holds the promise of improving the quality of work and our working life, but that promise can only be delivered by embracing change. The rate of technological change in the outside world only ever seems to increase and people's expectations are now driven by the functionality they can experience at home.

VH: Very. Failure for all generations to develop simultaneously increase divides in competency, communication and overall understanding and therefore is an unsustainable business model.

Can you see reverse mentoring as the norm one day?

VH: Yes. I can see the benefits as a learning tool for both the senior and junior staff. Now that I have had the insight into its advantages, I think it would be a shame if reverse mentoring is not widely practiced.

PA: Ideally the contact between people at all levels of experience in organisations should be good enough that reverse mentoring isn't seen as a need.

If your company is interested in finding out more about the Progress Network reverse mentoring pilot scheme, please contact Anil Iyer at **aiyer@acenet.co.uk**

"I have found that there can be communication barriers between junior employees and senior employees.... Failure for all generations to develop simultaneously increase divides in competency, communication and overall understanding. "

Vincent Hurley (mentor)

Rebecca Wooding is the national vice-chair of the Progress Network for young engineers and a hydropower engineer with Mott MacDonald.

Zak Deakin, junior consultant at Iceni Engagement

Housebuilders need more than rhetoric and money to deliver results

"As Theresa May acknowledged herself during her conference speech, home ownership among 25-34 year olds has fallen from 59% to 38% in just over a decade."

With much of the aftermath of Theresa May's conference appearance focused on comedic stunts and unfortunate coughing fits, you could be forgiven for missing the message – her commitment to renewing the 'British Dream'. It would seem as though May has decided to tie the future of her premiership on her ability to make homeownership a realistic ambition once again.

So, on 17 October she hosted a special summit with housebuilders at Number 10, in the knowledge that failing to deliver on her promise to fix Britain's housing market could have wide-reaching consequences on not only her own career but also on her party's electoral chances.

With Labour waiting in the wings, senior Tories within the cabinet, including communities secretary Sajid Javid, are understood to be pushing for a radical rethink on housing policy and speculation is growing that chancellor Philip Hammond will offer tax breaks to young people to help them onto the housing ladder.

Having always prided themselves on being the party of homeowners, the Conservatives seem to have awoken to the danger of 'generation rent'. As Theresa May acknowledged herself during her conference speech, home ownership among 25-34 year olds has fallen from 59% to 38% in just over a decade – the same demographic who were in part behind Jeremy Corbyn's late surge to strip the government of its majority.

The summit was supposed to be about the prime minister laying down a challenge to housebuilders to construct additional homes. Yet housebuilders are likely to have used the meeting to make clear that, whilst they welcome the extra £2bn funding already announced for new affordable homes, the success of the plan will depend on the government's willingness to remove other obstacles to building. As we await the chancellor's budget on 22 November, housebuilders are going to need more than just rhetoric and money – significant changes to Britain's planning and construction policy will be necessary too.

Key to this will be whether the government is prepared to accept the need for a bold set of reforms across the sector, including green belt, planning, land and finance. In the past, fear of a backlash in middle England has prevented Conservatives from making such significant reforms, but if she is serious about reigniting the dream of home ownership among Britain's younger generation Theresa May will have to take a much braver and bolder stance on housebuilding than any other recent prime minister.

The cumulative effect of years of rhetoric rather than delivery on housebuilding means it is now a political necessity for Theresa May to unlock the shackles that have, for too long, prevented housebuilders from building the homes that Britain needs.

Martyn Ingram, group director for Morgan GRP, parent company of Envico Engineering and Morgan

Keeping staff happy in engineering

Those of us who work in engineering and manufacturing and who love the field are accustomed to doomy predictions about the UK's output, and if I had a pound for every time someone has said to me: "But nothing is actually made in Britain anymore", I would have the bank balance of Roman Abramovich.

However, we are used to pressing forward and doing what we can to make our business and our sector thrive. But it can't be denied that one fundamental weak spot that threatens to undermine the health of UK engineering is the shortage of skilled staff.

The most recent EEF (Engineering Employers Federation) Skills Report lays things out in clear terms – engineers' and manufacturers' intentions to drive up productivity faces a major obstacle when it comes to getting the right people with the right skills.

Any employer serious about steadying the foundations of their business is doing what they can to give their staff meaningful training so they can upskill. For Morgan GRP, having a sound apprenticeship scheme is invaluable too.

As well as finding the best staff, retaining talent is key to a healthy business. Here are some tips to help employers retain quality staff:

Lifestyle perks

Don't underestimate the value of simple perks. If you can offer things that make your employees' lives easier and more rewarding you foster the kind of goodwill that makes for a great working environment for everyone. The perks might include childcare vouchers, cycle to work schemes,

Richard Shennan, digital business development director, Mott MacDonald

The appliance of data science

Data science brings together many people with different kinds of skills and is increasingly important in the infrastructure sector.

As a concept, data science has been around for some time, but is becoming more pervasive as connected data in infrastructure is driving smarter cities, asset optimisation, carbon reduction and asset sweating.

Trying to connect data through all the way to the outcomes and the purpose for which data science is intended – everything we do in the built environment, transport, energy, water and other sector – is about making lives better, whether it's in developed or developing countries.

Wherever people live, the fundamental point of the built infrastructure is to improve lives – to enable people to live better, more-fulfilled, happier, healthier lives. That always has been the starting point and the reason behind investment in infrastructure ever since we started living in villages.

What we're beginning to see is the need to connect the potential that's offered by the digital revolution – and data in general – to those enhanced outcomes. Making the connection is the key.

For me, data science is an overall proposition that brings together lots of different capabilities, skills and experience. The definition that we adopt for data science is that it's about actionable knowledge. This means understanding our clients' organisations and key roles and how people can make better decisions based on better information – that will make a difference in terms of enhanced outcomes, whether they be social, economic or environmental. Putting data to work means getting close to the sweet spot of sustainability, where these three are compatible.

Data science as a proposition brings together a whole lot of people with different kinds of skills. It's not just people who are good at analytics or programming, or people who might consider themselves to be data scientists. The key element that we are connecting and hard-wiring into our data science proposition at Mott MacDonald is what is known in the data information business as 'domain knowledge'.

Our business has deep roots in infrastructure. As engineering, management and development consultants we understand the ultimate purpose of our endeavours whether in hard infrastructure or international development and healthcare. If you put that in the context of a data science proposition, it becomes the absolute key to bringing value to our clients on the principle that their activities and business objectives also ultimately connect through to actual and social outcomes.

It's knowing about the infrastructure and the end-point of the activity that enables us to put the data into service and connect it through to enhanced outcomes. Our proposition is founded on our domain expertise and it's the thing that we've got in spades.

"It's knowing about the infrastructure and the end-point of the activity that enables us to put the data into service and connect it through to enhanced outcomes."

flexible working, a monthly raffle, or duvet days. Be creative, and talk to your staff to find out what perks they would value most.

Credible training

The number one reason people under 35 leave an engineering firm is that they feel like they don't have a future at that company.

If your employees see you investing time and money into giving them the best possible training they are likely to feel valued and they are less likely to be left behind when processes change, as they frequently do in manufacturing.

Share incentive schemes or employee ownership schemes

Share incentive schemes, like the Enterprise Management Scheme, allows you to reward staff in a tax efficient way. Of course, they also increase your employee's sense of ownership and pride in the company.

"Any employer serious about steadying the foundations of their business is doing what they can to give their staff meaningful training so they can upskill."

Executive bonus schemes

Similarly, executive bonus schemes allow you to reward key employees when your company enjoys good results. If the past decade in finance and business has taught us anything though, it is the importance of handling bonus schemes with care – no one wants to be seen as a fat cat creaming off profits at the expense of the workforce.

Know your staff

No boss wants to be the David Brent of the industry and being friends with a long-term workforce while being at the helm can be a challenge. But if you nurture good relationships with your employees, you are in the best place to see where their strengths lie, how they feel about their job and what would make them happier at work.

English achieves international success in FIDIC election

There was international success for the UK at the recent world congress of FIDIC, the International Federation of Engineering Consultants, when Gavin English was elected to the FIDIC executive board. *Andy Walker* reports.

Gavin English's election to the FIDIC executive at the organisation's general assembly meeting in Jakarta in October is very good news for the industry in the UK, as it strengthens its position at the top table of the global consultancy and engineering profession and gives the UK a stronger voice with global decision makers, private investors, international public sector clients and funding agencies.

English, who is managing director of the consultancy IMC Worldwide and a board member of the Association for Consultancy and Engineering (ACE), was elected to FIDIC's ruling body for a four-year term. I asked English how having a UK representative on the FIDIC executive will benefit the industry in the UK.

"As a member of the FIDIC executive committee I intend to ensure the interests and concerns of the UK engineering consultancy industry are heard and given fair consideration," he said. "FIDIC provides a platform for me to represent our industry and engage with, and influence, global leaders to get the positive changes we want and need," English said.

So, what does he hope to bring to the FIDIC executive? "I believe I will bring a passion and commitment to position the engineering consultancy industry at the forefront of economic and social development and global sustainability," English said. "My broad engineering and leadership skills gained from 35 years of engineering and management with large and small consultancy companies and local authorities, plus my ACE board position and immediate past chair of ACE, equips me well to help improve the effectiveness and efficiency of FIDIC for all members," he said.

English has significant experience working internationally and it is clear that he will apply that in his newly elected role. "Having spent 25 years in international engineering consultancy and being a past chair of the ACE International Business Group, I am very familiar with the many issues and challenges facing engineering industry working in international markets. I plan to use this experience to help focus FIDIC on addressing some of these challenges in the future," English said.

What about his thoughts on international procurement and the role of the funding agencies, with whom FIDIC has such close relations? "International procurement in my view could be more streamlined, more transparent and less costly," he said. "There is too much time and resources wasted on preparing tender submissions that are too focussed on cost, are evaluated on merit and value for money, take too long to be awarded and often ultimately go nowhere.

"This is inhibiting the best international consultancy companies from getting involved and slowing innovation, best practice and high quality in international engineering solutions. The funding agencies have a role to play here in implementing fundamental changes and improvements to their procurement practices," English said.

Commenting on English's success, ACE chief executive Nelson Ogunshakin said: "As a former chairman of ACE, Gavin is a perfect candidate to represent the interests of the UK consultancy and engineering market on a world stage. Gavin has a fantastic track record over 30 years in the international consultancy market and his election is a big vote of confidence in the UK consultancy and engineering sector. I am sure that Gavin will be a very strong advocate for consultancy and engineering firms on this important international body and ACE will provide him with the maximum support to ensure that UK business interests are well positioned at the highest international decision table post Brexit," Ogunshakin said.

"FIDIC provides a platform for me to represent our industry and engage with, and influence, global leaders to get the positive changes we want and need."

Gavin English, managing director of the consultancy IMC Worldwide

The FIDIC general assembly meeting also saw Alain Bentéjac, chief executive of Artelia Group in France, elected as FIDIC president for 2017-2019, succeeding the outgoing president, Jae Wan Lee of Korea. "ACE looks forward to working with Alain Bentéjac during his tenure as president to ensure that FIDIC is well positioned to be the strongest possible voice representing its members globally," said Ogunshakin.

Elsewhere at the conference in Jakarta, Ben Freedman of MLM was given a special merit award as FIDIC Global Young Professional Consultant of the Year. Freedman also won the Young Professional Award and the Diamond 'winner of winners' Award in this year's UK Consultancy and Engineering Awards so his success marks a double celebration for UK engineers.

Brexit – the environmental impact on business

Uncertainty is always a key business risk, but it is becoming a more prevalent concern for businesses in the environmental sector as Brexit moves ever closer, say *Joanna Ketteley* and *Michael Rudd*.

Although there has been extensive comment and thinking about Brexit and its potential implications, there are still unknowns. Below, we have provided some structure to a collection of anecdotal, subjective observations that we have received from various stakeholders.

1. Investment requires stability and certainty.
Whilst the government has committed to a 25-year Environment Plan and stated that the Great Repeal Bill will ensure existing EU environment law will continue to have effect in UK law, there remains uncertainty over policy direction, particularly for energy.

Renewable Heat Incentive (RHI) projects demonstrate how detrimental uncertainty can be. There has been considerable delay in the implementation of BEIS' RHI reforms and this has stalled a number of viable projects, including those that utilise waste-based feedstock to produce biogas and bio-methane.

2. Resource efficiency is an economic necessity and a market differentiator.
There is an increasing move towards a circular economy with great appeal for businesses that focus on sustainability. The concept is progressing. In January 2017, the European Commission published three roadmaps relating to its 2015 Circular Economy Action Plan and a communication on the role of waste-to-energy in the circular economy. It is also building on initiatives such as eco-design and labelling. Government needs to be clear on how it will establish a circular economy post-Brexit if UK industry is to reap maximum economic advantage from this concept.

3. Organisations continue to strive to lower, or at least manage, costs.
Energy intensive industries (some who can choose to locate here or abroad, others who need to maintain competitiveness) look to government for fiscal and policy support. Whilst energy management is higher on BEIS' radar now, organisations are still seeking greater and coordinated policy clarity from Whitehall to further stimulate energy management solutions. One solution – among a range available – is corporate power purchase agreements. Such agreements have been used for over a decade but are gaining momentum in more recent times, allowing corporate consumers to purchase power on a long-term basis directly from renewable energy generators.

4. Participants in a free market should all operate under the same rules, on a fair playing field.
Effective and fair enforcement is key and many worry that Brexit threatens this. The UK Environmental Lawyers Association has noted that the European Commission and European Court of Justice provide a strong check on implementation by governments of environmental law (which often stems from EU legislation). It remains unclear who will fulfil this role post-Brexit. The Environment Agency is not sufficiently resourced and there is often no clear economic interest in the environment to spur legal review action. There must be a mechanism to check government action/implementation, to ensure government remains accountable and strives for environmental protection.

5. Product compliance is a key consideration for suppliers when exploring access to markets.
Export markets ideally have the same or at least equivalent requirements, otherwise compliance becomes a barrier to trade. Brexit is highlighting this. Government recognises that product compliance legislation needs to be aligned post-Brexit to avoid the economic burden of double regulation, but there remains uncertainty about future legislation and the impact on products yet to be launched. Business needs confirmation on that also, to allow investment in production cycles.

6. There is considerable value in transparent reporting of environmental and sustainability performance and risks.
Corporates report for many reasons – CSR commitments, achieving market leader advantage, supply chain pressure, assessing legislative compliance and potential efficiencies, employee recruitment and retention – and investors and shareholders are increasingly scrutinising environmental management and place pressure on companies to report.

There are also increasing legislative obligations to report. The Companies, Partnerships and Groups (Accounts and Non-Financial Reporting) Regulations 2016 implement the EU Non-Financial Reporting Directive 2014 and clarify requirements for an annual statement relating to environmental, social and employee-related matters. Whilst there are voluntary initiatives and market drivers, we hope government continues to support this progress with legislation post-Brexit.

In conclusion, our clients are ambitious and strive for transparent, efficient, compliant and sustainable production and investment. They need clear and long-term government support for that innovation and leadership, especially post-Brexit.

Joanna Ketteley is head of environment, London, and Michael Rudd is a commercial partner and co-head of international energy and utilities sector group, both at Bird & Bird LLP.

Queensferry Crossing client team's keys to success

The Queensferry Crossing over the Firth of Forth was opened in September at a cost of £1.35bn – less than half that original forecast. *Mike Glover, Paul Baralos* and *Iain Murray* of the Transport Scotland and Jacobs Arup Joint Venture delivery team, describe how the project's key challenges were overcome.

Getting the scope and budget right

When Transport Scotland commissioned the Forth Replacement Crossing Study in 2007, few foresaw the global financial crisis waiting in the wings. By 2008, funding models feasible just months earlier were off the table and Jacobs Arup JV's first task on appointment was to reduce the original project estimate by more than half.

The initial brief assumed that the existing Forth Road Bridge (completed in 1964 and unable to take the strain of 21st century traffic volumes and lorry weights), could not be used in future. But with support from Transport Scotland, the Jacobs Arup JV showed that the bridge could be adapted for public transport, pedestrians and cyclists, with potential for light rail to be added as part of an integrated 'managed crossing scheme'.

This meant the new structure could be substantially narrower. An innovative crossed cable design was introduced to reduce the size of the deck, foundations and towers, while increasing deck stiffness and controlling deflection. In addition, Intelligent Transport Systems could make better use of the existing highways, reducing the requirement for new road construction. These amendments combined got the estimated cost into the range of £1.7bn to £2.3bn, which was within the funding capability of the Scottish Government.

Forth Crossing Bridge Constructors (FCBC), the contract-winning consortium, ultimately helped deliver the bridge for even less. This was thanks in part to the competitive dialogue procurement, which enabled open discussion of risks and mitigation during the tender process. The ultimate out-turn cost was just under £1.35bn.

Winning the site

The Queensferry Crossing is adjacent to the famous Forth Bridge, completed in 1890, and the Forth Road Crossing – both listed structures. The new structure had to be designed to complement and not visually dominate the existing bridges. The proposed alignment took the route across the estuary where Beamer Rock separates the navigable Forth Deepwater Channel and Rosyth Channel. The rock was to provide the central support location for a three-tower cable-stayed bridge, with two main spans, each of 650m.

The central support was formed by blasting a rock pocket in Beamer Rock, then forming an in-situ concrete base inside a sheet-pile and precast concrete cofferdam. The north and south flanking towers were built within caisson foundations founded on bedrock in water depths up to 20m. The steel caissons were twin-hulled, typically 30m internal diameter, up to 41m in height and weighing in excess of 1,200 tonnes.

Excavation within the flooded caissons enabled them to be sunk to the required level, followed by underwater jet-grout base-sealing prior to the large underwater concrete pours. The south tower holds the world record for the largest continuous underwater concrete pour by marine supply, at 16,869m3 over 15 days supplied by a flotilla of barges. Final dewatering of the completed caissons allowed construction of the foundations for the superstructure above.

continued on page 18 >>>

>> continued from page 17

Designing for durability

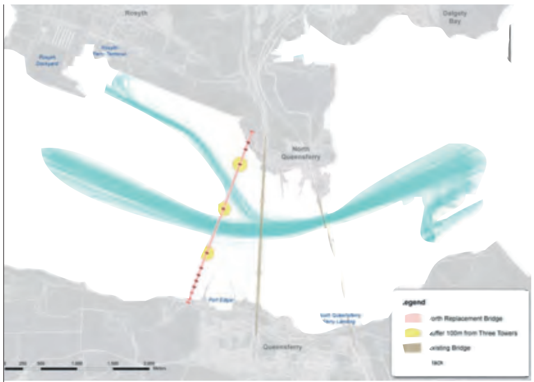
Ease of maintenance and long-term durability were high priorities. Design features included a parallel strand stay cable system that permits replacement of individual strands as part of routine maintenance. The road surface was laid by plant in echelon formation to remove longitudinal joints and reduce maintenance. A dehumidification system inside the deck prevents condensation, so eliminating corrosion.

The stay-cable corrosion-protection system specified for the Queensferry Crossing consists of a multi-layer barrier of high-density polyethylene (HDPE) on the outer stay pipe and HDPE coated strands consisting of seven galvanized and waxed wires. The anchorage, the most vulnerable part of a modern stay-cable in terms of durability, was put through rigorous water tightness testing. Corrosion protection within the anchorage is additionally maintained by an injected flexible gel filler.

Keeping the bridge open, whatever the weather

Traffic restrictions and closures due to strong winds have frequently affected the Forth Road Bridge over the years. To avoid similar disruption on the new bridge, wind shielding was developed for the edges of the deck to protect vehicles without unreasonably increasing the forces the structure must carry.

The windshields were developed using mathematical models and wind tunnel testing in London, Italy and Denmark. The windshields were made from slats, with acrylic louvres, which act as a grille to reduce the speed and turbulence of the air passing through it, angled to encourage the wind to be substantially 'scooped' over the roadway. The use of transparent materials for the slats provides views down the Forth. By comparison a solid wind shield would have greatly increased the loading on the bridge and initiated undesirable aerodynamic effects in the bridge deck.



Above: The stunning end result of the Queensferry Crossing over the Firth of Forth. Right: The impact study map.

> "Around 1,000 sensors monitor wind, temperature, corrosion, motion and any strains on the bridge. Reports are generated automatically – providing immediate support to inspectors."

Transparent materials for the windshield ease the load on the bridge – and don't spoil the views.

Ship impact studies

The Firth of Forth is a busy seaway. Tankers, ferries, container vessels and aircraft carriers of up to 70,000 tonnes pass under the bridge. Several of the piers are in sufficient depth of water to mean the largest vessels could feasibly collide with the structure.

A probabilistic approach was used to derive ship impact loads. The probability of aberrance and its consequence was assessed in terms of the frequency of collision and the resulting load: the data set was analysed to discount vessels that would ground before reaching the support. The probability profile of the ship impact design load for each support was established this way. Acceptable level of risk to the client was determined using the widely used principles of "As Low as Reasonably Practical" (ALARP) risk.

Structural health monitoring system

A system for monitoring structural health has been designed for the Queensferry Crossing, incorporating decision support tools and approximately 1,000 sensors monitoring wind, temperature, corrosion, motion and any strains on the bridge. Reports are generated automatically – providing immediate support to the inspectors, as well as long term data that can be analysed to ensure better investment decisions are made. All the information is stored in the cloud which allows the operator to easily maintain and update records and provides Transport Scotland with detailed oversight of the condition of the bridge and its operational and maintenance budgets.

Don't get left behind by the digital revolution

A new event for chief information officers and digital managers will offer key insights on topical and emerging issues in IT innovation in the consultancy, engineering and infrastructure sectors.

Delivering large-scale projects? Don't miss this event for CIOs.

EUROPEAN CIO CONFERENCE 2017
in association with ace

Chief information officers of engineering and construction firms involved in delivering large-scale physical infrastructure projects won't want to miss the European CIO Conference 2017, a one-and-a-half-day summit from 30 November – 1 December designed to explore opportunities to drive business transformation and value through IT innovation.

The agenda for the event, entitled *Embracing the Digital Revolution*, has been developed in partnership with an advisory board of global leaders who are active in the technology and data sectors to ensure that the discussions and panel sessions are as relevant and up to date as possible and tackle the current issues facing industry professionals.

Speaking to *Infrastructure Intelligence*, the chair of the conference advisory board, Tony Scott, chief information officer for the EMEIA region at WSP, said: "I have been working with an excellent team of experts in the industry to produce an agenda full of key issues for any CIO that is involved with large infrastructure projects. Delegates will find out more about the business and financial implications of the strategic technology challenges facing our industry and be able to engage with and learn from key industry leaders currently developing and delivering cutting edge infrastructure projects."

Organisations with speakers at the event include Bentley Systems, Microsoft, Transport for London, Ramboll, BST Global, WSP, Arup, Mott MacDonald, Dar Group, Tyrens and MWH. The chair of the government's BIM Task Group Mark Bew will also address delegates on the latest developments around BIM and the need for standards, transparency and collaboration in an insecure world.

Michael Wignall, national technology officer for Microsoft, will deliver a keynote session on the cloud. Wignall is responsible for all aspects of UK technology strategy at the tech giant, including supporting the implementation and use of technology by commercial and public sector organisations and acting as a catalyst for digital transformation. His thoughts on how the infrastructure industry is flourishing under the cloud should be well worth listening to.

Bringing together the collective knowledge and experience of leading CIOs from the industry should ensure that the networking sessions, panel discussions and breakout groups are especially informative. Delegates can also engage and network by attending a drinks reception and VIP conference dinner following the first day of the conference where they will hear from Andrew Wolstenholme, chief executive of Crossrail and co-chair of the Construction Leadership Council, on his thoughts on the key issues facing the industry.

"Delegates will be able to engage with and learn from key industry leaders currently developing and delivering cutting-edge infrastructure projects."

Tony Scott, chief information officer, EMEIA region, WSP

All CIOs who register for the event will be asked to take part in a survey that will provide an industry-wide perspective on the key and emerging technology issues facing infrastructure firms. Highlights of the survey will be presented to delegates and discussed during the conference.

With key sessions on technology futures, the cloud, the client's perspective, the role of the CIO, digital transformation, strategy, digital disruption in transport, augmented reality and cutting edge digital innovation, plus a wrap-up session from Transport for London commissioner Mike Brown, the European CIO Conference promises to be a must-attend event.

Full details of all the speakers and sessions are available online together with delegate options, including discounts for ACE members.

European CIO Conference
Thursday 30 November – Friday 1 December 2017
Prince Phillip House
3 Carlton House Terrace,
London SW1Y 5DG
Full details at www.acecio.com

Seizing the initiative

Solutions to acute congestion problems are needed quickly as development pressures build in Northamptonshire, where the county council is hoping technology and collaboration will provide the answers. *Jon Masters* reports.

Northamptonshire County Council (NCC) is currently looking for ways to deliver an unusual road project. The proposed scheme will install roadside variable message signs (VMS) and camera technology similar to that commonly equipping Smart Motorways. Not much new reported there, but this isn't for one of NCC's roads.

The council is looking for around £14m for equipment it hopes Highways England will install on the A45 trunk road in Northamptonshire. The idea is for NCC and the HE to then work in partnership to operate the A45 as a defacto part of a Major Road Network (MRN).

The concept of a notional MRN for planning road investment has gained political traction since it was drawn as a map of England's busiest roads just over a year ago. David Quarmby and Phil Carey produced that MRN through a study for the Rees Jefferys Road Fund, as the 4,200 mile Strategic Road Network (SRN) added to the 3,800 busiest miles of local authority highways – effectively a map of the roads most important to regional and local economies.

Transport Secretary Chris Grayling confirmed the idea has resonated with government when he announced a consultation on how an MRN could be formed as he published his Transport Investment Strategy earlier this year. His words only went as far as suggesting the Department for Transport wants to highlight the most important local authority roads – rather than consider them and the SRN as part of a bigger network – but NCC has moved rapidly to explore the potential.

The council was already driving or supporting a number of technological initiatives aimed at improving transport in the county (see box). This year it commissioned WSP to report on how the principles of an MRN might work in practice with road management technology in the county; singling out the A45 for a potential pilot project.

"The A45 is a strategically important road for Highways England as well as Northamptonshire," says NCC's head of development, infrastructure and funding, Ian Achurch. "There are plans being worked up for adding capacity through grade separation of junctions, but during RIS2 (Roads Investment Strategy 2 for 2020-25) and the A45 may be improved as an Expressway, but as a programme that's in its infancy.

"We want something we can deploy more quickly, within three years. We've looked at the potential benefits of advisory speed limits and variable message signs (VMS) and how this technology can be used with collaborative management of the road to smooth traffic flow."

The particular road in question is a 24 mile stretch of the A45 between the M1 south west of Northampton and the A14 to the east. It's the main route to the motorway network for a large rural and urban area. It also carries a lot of commuter traffic and it's a key road for local commercial and housing development plans. Just in Northampton and its immediate surrounding area there

are hopes for more than 30,000 new homes over the next 15-20 years.

The A45 route is already heavily congested. From the M1 it goes from three to two lane dual carriageway then to single lane road, with at-grade junctions and roundabouts as it passes other urban areas including Wellingborough – another town earmarked for a lot of development. NCC is predicting a current congestion problem is going to get worse.

"The spacing of junctions is such that we get a lot of fast then slow traffic. We need to smooth it out," Achurch says. Widening the road is not part of NCC's proposal. That would be very costly and practically impossible in many places. According to WSP's report, it's not necessary either. With an investment of £14m in traffic monitoring and VMS technology – with £500,000 per annum operating costs – a benefit cost ratio (BCR) of 2.5 was achievable, without any further significant civil engineering, the report says.

If advisory speed limits can become mandatory and variable speed limits, the BCR goes up to 6.88, but that currently cannot be done on trunk roads. A new statutory instrument would be needed from parliament, which may happen for the Expressway programme but not for some years. There's also a critical assumption that what works on a Smart Motorway will automatically bring the same results on a dual and single carriageway A-road.

"The BCR numbers are derived from DfT figures," says the report's author, WSP project manager Mark Fell. "In essence there has to be an assumption that it will work. It's proven technology in a new environment, but it's the collaboration and joint-management of the road that's crucial for making this a success. After all very few drivers care or even know who's responsible for the roads they drive on."

According to Ian Achurch, NCC's report has been sent to a few different people at Highways England for comment, including

> "We've looked at the potential benefits of advisory speed limits and variable message signs and how this technology can be used to smooth traffic flow."
>
> **Ian Achurch, Northants County Council**

the head of the Smart Motorways delivery programme, Tony Turton. One avenue NCC is keen to explore is the possibility of the A45 pilot being rolled into an upcoming Smart Motorway project nearby on the M1. Another route could be applying for funds through the HE's RIS (Roads Investment Strategy) Innovation Fund.

The HE ought to be receptive to the idea in principle at least. It has previously said it's keen to do more with local authorities. Early in October the Highways England Traffic Officer service began working with the West Midlands Combined Authority and West Midlands Police for managing local authority roads, to mitigate impact from a major viaduct repair project on the M5.

The organisation has not said a lot about NCC's proposal so far, but told *Infrastructure Intelligence*: "We welcome any new ideas from our partners about how we can continue to improve the strategic road network. We will now take some time to consider in detail the idea set out by Northamptonshire County Council when we come to review our strategic road plans across the UK next year."

Achurch says: "What we want to pilot would be a new collaborative, technology-led approach to the MRN in partnership with HE. We can't do this in isolation. We've been waiting for further detail on investment from government on the A45, but we can't wait due to massive development pressures. We want to get started. The pilot would be a quick win because it could be delivered in two to three years."

There's also a wider context to the A45 pilot. Working up the concept of an MRN for targeting the planning of investment in strategically important regional and local routes is on the agenda of the England's Economic Heartland Alliance, which is hopeful of becoming a statutory transport body and of which Northamptonshire is a founding member (with Buckinghamshire and Oxfordshire and since joined by Cambridgeshire, Bedford, Milton Keynes and Peterborough city councils). The A45 project is being viewed by NCC and Economic Heartland Alliance as a crucial part of the Oxford-Milton Keynes-Cambridge transport corridor that the National Infrastructure Commission highlighted as vital for securing investment, jobs and housing.

The WSP report on *An integrated approach to the Major Road Network* summarises with three recommendations:

- Plans for the MRN are developed collaboratively with England's Economic Heartland, Highways England and those developing the Oxford/Milton Keynes/Cambridge corridor.
- An MRN pilot scheme is carried out on the A45 to test technology and the benefits of working collaboratively with Highways England.
- Lessons learnt are used to implement the MRN across Northamptonshire and the Economic Heartland region.

Technological times

Northamptonshire's Integrated approach to the Major Road Network report has been produced under the umbrella of the county council's Smart Move initiative. This includes Smart Commuter and route-focused Smart Corridor – technology projects designed to add capacity or ease travel with a combination of live information (to apps, media and on-street screens) and real-time management of roads, mostly around Northamptonshire as the most congested town and focus of much of the growth planned in the county.

The county council is also a partner (with Hertfordshire, Oxfordshire, Buckinghamshire, Imperial College, Arup and others) in the oneTransport project. Funded by Innovate UK, oneTransport is all about gathering and sharing data on a central open platform for the partners and app and web specialists to use for developing transport services. The latest phase of the project ended in October this year. The partners are now building up to a full roll-out of a commercial 'oneTransport Open Data Marketplace', expected to launch later this year: www.onetransport.uk.net

Major infrastructure projects must be well planned if they are to have a wider significance and be a catalyst for economic growth, says *Alan Shanks*.

If you build it, they may not come

October's grand opening of the Queensferry Crossing represents a feat of modern engineering – the longest three-span cable-stayed bridge; delivered on time and under budget. It was a significant moment for Scotland with the international media spotlight shining down on the east coast as the Queen opened the bridge, providing a vital new artery between Fife and the Lothians.

However, we cannot let the spectacle of the Queensferry Crossing distract from the role such a bridge plays in the wider economy and in enabling long-term economic growth for Scotland. Certainly, in the short-term, the build project has had a significant and immediate impact on the local economy. Since work began, more than 15,000 people have been involved in the construction, with sub-contracts and supply-chain contracts valued at more than £350m.

However, as part of the bigger picture and away from the immediate build benefits, the bridge only enables economic growth, it does not create it. As with any major infrastructure project, it mustn't be seen as a silver bullet to all our challenges.

It will be the businesses and organisations around which infrastructure is built, which creates the long-term economic prosperity for the region and the country. Thus, the government, in collaboration with local and national organisations, should be working together to promote the region, using the bridge as one important selling point among many.

The strategy has to consider many elements; investment in education – ensuring we have the right skills to attract businesses, strong support networks which are crucial to advise businesses from seedling to FTSE level. Strong supply-chain networks with which to take advantage of modern infrastructure are essential. These are only some of the considerations which must be considered when investing in any infrastructure project. Without a strong generational economic plan wrapped around it to attract local, national and international business activity, modern infrastructure is merely an empty vessel.

Spain provides a stark reminder of this. As one of the largest nations within the EU, the country continues to face economic challenges, even before you consider the impact of the current constitutional upheaval. It has only recently begun to see the shoots of recovery appear within an economy that was hit hard by the global financial crisis. Even today, unemployment rates continue to hover at around one in five – nearly double the current Eurozone average.

This is despite, pre-2010, ploughing investment into its infrastructure across the country. With the third largest rail network in the world, airports sprawled across the country and modern highways linking major cities and towns, Spain consistently ranks higher than its EU neighbours in the European Commission's mobility and transport scoreboard.

However, poor long-term planning and a lack of a connected strategy to complement economic growth plans, means that projects such as the infamous Ciudad Real Central Airport, a symbol of Spain's infrastructure boom years and costing €1bn to build, lies empty, having filed for bankruptcy in 2012. A similar fate has befallen some of the country's high-speed rail lines. Over-supply and inadequate demand has resulted in the high-speed line through the Pyrenees, from Perpignan in the south of France to Figueras in northeast Spain, filing for bankruptcy proceedings in July 2015.

Thus, even a sophisticated, dense infrastructure – created as a result of huge investment from government and business – failed to help mitigate the impact of the crash, with Spain languishing in the recession doldrums for longer than its EU equivalents.

The Queensferry Crossing is a robust string for Scotland to add to its bow. However, on its own, it's benefits are limited. Only wrapped up into something much bigger can the communities in the Lothians and Fife truly unlock the potential of the new bridge. Therefore, we should be looking at the future – how can we reap the rewards modern infrastructure will bring to the region, not just today, but in 50 and 100 years' time.

Alan Shanks is head of finance and projects at Addleshaw Goddard in Scotland.

This Spanish airport cost a billion euros but was abandoned.

Financial advisers back UK infrastructure as safe investment bet

Infrastructure is increasingly seen as an attractive asset class because of its stable and predictable demand and long-term contracted revenue streams, according to a new study.

In research conducted online with 206 UK financial advisers in September and October this year, three quarters (75%) of those advisers were bullish about the investment outlook for UK infrastructure assets and the majority (59%) expect to see increasing demand amongst clients for exposure to the sector through SIPPs and ISAs over the next five years, according to a new study.

The research, conducted by Foresight Group LLP, a leading independent infrastructure and private equity manager, canvassed the views of 206 financial advisers and showed that infrastructure is poised to become an increasingly popular asset class for investors as it mitigates four of the biggest headwinds facing client portfolios. These were identified as volatility by more than half (56%) of advisers, a market correction (49%); inflation (42%) and interest rate rises (28%).

Three in ten (32%) advisers are looking to increase their clients' allocation to the asset class over the next three years. Foresight's analysis reveals that UK listed infrastructure investment companies significantly outperformed UK equity markets over five years to August 2017. The FTSE All Share grew 61% compared to 70% for UK listed infrastructure investment companies while also experiencing significantly lower volatility (4.9% against 13.1%) over the same period.

In response to growing demand from advisers and investors, Foresight is applying its experience in the energy and infrastructure sectors to launch an income fund targeting UK infrastructure later in 2017. The fund will invest in UK listed renewable energy and infrastructure investment company equities and bonds.

The launch of the new fund reflects the growth of renewable energy as an investible asset class. The UK has seen unprecedented growth in renewable energy and infrastructure investment over the last five years and in the next eight years, the UK is predicted to experience a 27% annual increase in cumulative renewable energy generation. Much of this investment has and is expected to come from UK listed renewable energy and infrastructure investment companies, of which there are over 20, with a combined market capitalisation of £17bn.

Jamie Richards, a partner at Foresight, commented: "The global and UK energy market is undergoing a generational change, opening investment opportunities across generation, transmission and distribution technologies. The global decarbonisation agenda will lead to a growing reliance on renewable energy, which is becoming cheaper to produce and easier to store. Meanwhile, the retirement of existing fossil fuel plants will drive increased demand."

> "The global decarbonisation agenda will lead to a growing reliance on renewable energy, which is becoming cheaper to produce and easier to store."
>
> **Jamie Richards, Foresight**

Richards said that the new fund should be attractive to new and existing investors. "At Foresight, we have a specialist focus on energy infrastructure combined with a tradition of innovation in creating investment solutions that respond to investors' needs," he said. " We manage funds for more than 22,000 private investors and for some of the world's leading financial institutions and we're excited to be launching an infrastructure income fund later in the year," Richards said.

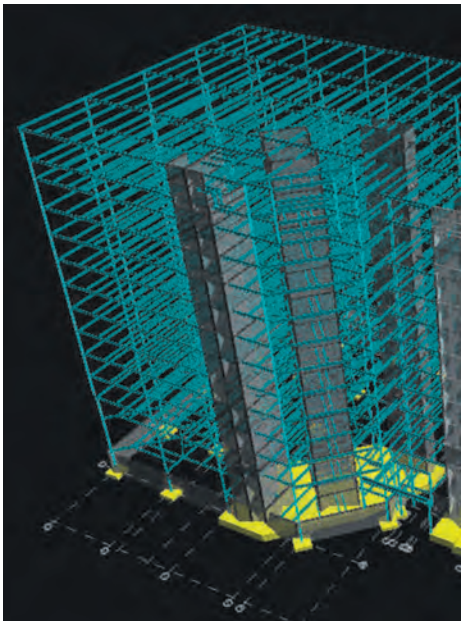
Simon Bullock, a chartered financial planner and partner at Mulberry Bow, added: "Infrastructure assets have performed tremendously well over the last few years and many of my clients expect that trend to continue. Foresight's research has shown that infrastructure has become an increasingly popular asset class for investors as it helps mitigate against investment portfolio threats such as volatility, inflation, rising interest rates and wider macroeconomic underperformance. We believe infrastructure is an exciting sector for our clients and would welcome more investment products in this space."

Renewable energy and infrastructure are seen by investors as attractive asset classes as they are characterised by stable and predictable demand, high barriers to entry and long-term contracted revenue streams. UK listed renewable energy and infrastructure investment companies frequently benefit from protection from inflation as a high proportion of underlying asset revenues are directly linked to inflation.

The Foresight Group research is further good news for UK infrastructure in presenting the sector as a safe bet for investors across many asset areas.

Let's use BIM to boost UK productivity

Increasing digitisation in the built environment and the use of BIM technologies are being seen as enablers of economic growth writes *Paul Wilkinson*, reporting from Bentley Systems' recent Year in Infrastructure conference in Singapore.



UK BIM Task Group chair Mark Bew says that the rationale for BIM was part of a deeper drive to digitise the built environment, connecting data feedback to delivery of infrastructure-based services and so improving UK productivity.

Bew has been a key figure in driving the adoption of BIM across government since 2011 through to the 'Level 2' BIM deadline in April 2016. At the Bentley event in Singapore, this programme continued to attract interest, not least because Bew sees BIM and digitisation as enablers of economic growth – attractive to developing economies as well as those which are more mature."

Speaking in Singapore, Bew cited the UK government's 'Construction 2025' targets (33% lower costs, 50% faster delivery, 50% lower greenhouse gas emissions, and a 50% improvement in exports). Published in 2013, these provide a tough macro-economic challenge to the industry, he said: "There is no way you can squash the old business model and get those results. You need to do something fundamentally different."

Bew highlighted how the UK construction industry's productivity lags behind its closest competitors (France, Germany and the US), and, adding to the challenges: "Brexit means we now have to be even more effective."

Four key numbers

He "unpacked" four key numbers. "In the UK, on CapEx, we spend about £90bn on our assets every year, about half of it public," he said. "OpEx is a bigger number, about £122bn, so we must also find some economies there. But the bigger numbers relate, first, to service provision using those assets.

"We spend around £600bn on the wages of people working in service delivery – from doctors and teachers in our hospitals and schools, to taxi drivers on our roads. If we can deliver better infrastructure, we can get more for our money or reduce that figure, getting more productivity for that spend. Finally, we have GDP: £1,869bn. We estimate that 43% of that, or £808bn, is related to the built environment, so you can start to see the size of the task we've got," said Bew.

Building the right assets

Bew says this analysis poses two major challenges: "First, how do we build better assets for our money? And second – and far more important – how do we build the right assets in the first place? This is where BIM, digitalisation and utilisation of asset data starts to come in," he said.

After outlining the Level 2 'BIM package' (and highlighting that it continues to evolve, incorporating security considerations, for example), Bew talked about the Smart Cities initiative within the UK government. "It's interesting how cities consume data – they need to use that data to see how assets work, but currently most city service providers don't understand how their systems (transport, health, education) work," he said.

"Creating forward and reverse feedback loops will help us understand how assets are really consumed by the public, or what happens when assets don't work properly."

Mark Bew, UK BIM Task Group chair

To help change, this, the Smart Cities team has created a Level 2 'City package' of guidance. "What we will be doing over the next year," said Bew, "is gluing our BIM and City standards together. The alignment of end-to-end data is not perfect by a long way, but we've taken the first step in standardising data services for the entire life cycle of assets, including service provision," Bew said.

The Digital Built Britain strategy in 2015 was a step down this road, he said, followed by £15m funding awarded in March 2016. More recently, in June 2017, Ernst & Young helped produce a 'strategic outline business case' for the substantial investment needed to help the UK move from Level 2 to Level 3.

Feedback, feedforward

"We are looking to deliver better performance across all the four key numbers, and understanding the economic impacts of poorly performing infrastructure is vital," said Bew. As an example, he highlighted traffic congestion: "It costs the UK economy £31bn – in other words, the equivalent of a third of our CapEx cost is wasted by poorly performing assets," he said.

To help improve, Bew says we need proper evidence, from current assets, not just historical data. "Creating forward and reverse feedback loops will help us understand how assets are really consumed by the public, or what happens when assets don't work properly," he said. This will help create better briefs for new infrastructure, particularly if good quality feedback data is systematically collected and it's understood how asset systems work, he said.

Paul Wilkinson runs pwcom.co.uk Ltd, a specialist PR, marketing and construction technology consultancy.

BIM can help UK lead world in infrastructure delivery

From snag-free handovers to saving thousands of work hours at Hinkley C, BIM has never been more important to the infrastructure sector, says *Ben Wallbank*.

With the UK now boasting a record construction and infrastructure pipeline worth more than £500bn, it has never been more important for clients and contractors to save time and money.

Almost two-thirds of projects (59%) are not delivered on time and almost one third of projects come in over budget (32%). With wafer-thin construction margins averaging 2.5% it is essential for all project delivery partners such as consultants, designers, contractors and sub-contractors to harness the power of BIM to work together more collaboratively and efficiently.

Businesses that have grasped the opportunity of BIM are reaping significant cost and time savings for themselves and their clients. This has been enhanced by using effective IT and management information systems. With the ability to deliver real-time project information from across all project delivery partners, it is increasing the professional standing of the different disciplines in providing clients with accurate, timely and informative data.

By introducing mandatory BIM Level 2 compliance on centrally procured public projects last year, the government established legally binding requirements estimated to save 20% across construction and lifetime costs. However, BIM-led projects are effective only when all delivery partners come together and embrace the technology. So, BIM must become an enabler to break down the silos of different trades and services within the supply chain.

A real example of this is shown at Hinkley C where using BIM, EDF Energy has made savings of £2m and 30,000 hours by marrying its protocols with the right IT and management systems. Achieving success like this starts with the client's procurement procedure. This should outline a common set of classifications and working practices it expects during the project.

The client's Employers Information Requirement is becoming a key driver for collaborative working and breaks down supply chain silos project by project. Its clearly defined objectives outlined during procurement become the contractual requirements and working practices of all partners.

Best practice dictates that there needs to be a common communication platform so all project partners agree ways of working, reporting and sharing information. Sharing a technology program drives consistent standards and provides greater transparency of data across the supply chain. This also provides one central, secure repository which parties access to upload, share and extract information in real-time.

As all parties need to work together effectively throughout the project it is important to have a cross-party kick-off meeting to set out consistent ways of working, reporting and sharing information so that all parties understand the terms on how to engage with each other.

Also, by establishing regular monthly/quarterly progress meetings all parties can collaboratively work together to create the best solution to issues through all project milestones. Clients and consultants can also work together to create incentives to encourage all parties to collaborate and reward them all for meeting milestones ahead of schedule.

When a company moves to adopting BIM it usually requires an element of change, adaptation and support. This is just like any other change management process where some firms will be taken out of their comfort zones, but with the right investment in people, new IT and information management systems, there will be a significant reduction in project errors, duplication, and rework so increasing productivity.

This reduction in rework was evidenced by our client Willmott Dixon. By using Viewpoint they were able to hand over the new £21m National College for High Speed Rail in Doncaster (pictured below), totally snag free, two days ahead of schedule.

The standardisation and modelling of BIM processes has a client benefit beyond the delivery phase. With an estimated 80% of an asset's costs lying beyond the construction phase, having BIM generated models with easily available information on every element of a building or infrastructure project saves time and lifetime maintenance costs.

So, for example, information on road side light about what bulb it takes, how much it costs, best method of replacements can be identified with a few clicks rather spending time searching out paper records.

Increasingly, Tier 1 contractors are implementing BIM principles in areas such as costing and time across their business. This is helping to strengthen their margins and improve efficiencies.

In a world which is digitising in every way, the idea that built assets don't have supporting digital information is unthinkable. By working together to refine and improve BIM implementation we can help Britain become a world leader in infrastructure delivery.

Ben Wallbank is a BIM strategy manager at construction software provider Viewpoint.

UK consultancy's key voice on the international stage

Despite economic and political change, the consultancy and engineering sector is still well regarded globally and should look to the future with confidence, writes *Nelson Ogunshakin.*

Recent trips overseas – to the UAE to visit ACE members there, to Indonesia for the 2017 FIDIC conference (see picture, right) and to Singapore for Bentley Systems annual infrastructure event – have offered an opportunity to reflect on 2017 and to look forward to 2018 and what events might have in store for the industry over the next 12 months.

Consultancy and engineering businesses are facing a period of change, structurally, politically and economically, as 2017 nears its end. The market drivers I identified last year – China, energy, industry consolidation, technology and politics – are all still relevant with the effects currently being worked through.

During my annual visit to the Middle East, I found a challenging and not uniform market situation, with firms grappling with demanding clients and a somewhat uncertain payments and contracts regime. The market in Qatar is very difficult, Abu Dhabi is quiet while Dubai is busy along with Saudi Arabia, with its usual difficult working conditions and environment. Firms need a good bankable business case to continue future operations in the region and companies need to review the way they work, adapt where necessary or exit the market, as other markets are more attractive with better returns and manageable risk profiles.

It was heartening to see the excellent work being done in the region by ACE's Progress Network for young professionals. They are averaging around 70 people at their well-attended events which are involving firms of all sizes, under the leadership of newly elected chair, Noor Hajir from WSP Group. The success here means that ACE is seriously considering establishing a formal 'chapter' in the UAE to better represent its members working in the region.

The FIDIC general assembly in Indonesia was, as ever, an important event for the global consultancy and engineering sector. The conference theme, *Resilient Infrastructure*, was especially relevant given the natural disasters that have befallen the region in recent times. The role of engineering consultancy in making the world's infrastructure more resilient and people and communities safer cannot be overstressed and delegates in Jakarta were keen to highlight this at every opportunity.

The event was also a success for the UK, with ACE board member and immediate past chairman Gavin English being elected to the FIDIC executive committee and our Young Professional of the Year Ben Freedman being recognised with a special merit award as FIDIC Global Young Professional Consultant of the Year. Gavin's election is very good news for the industry in the UK as it strengthens our position at the top table of the global consultancy and engineering profession and gives us a key voice with global decision makers, private investors, international public sector clients and multilateral funding agencies.

Presentations at the congress by UK representatives were very well received and we are clearly viewed as a market internationally that is attractive and worth investing in, with many major infrastructure projects on the agenda going forward.

> "Embracing digital technology will be a game changer for industry productivity and consolidation will become an integral part of companies' growth strategies."

My visit to Bentley Systems' Year in Infrastructure conference in Singapore was an eye-opener in revealing the progress being made by the infrastructure sector in 'going digital'. This is another area where the UK is leading the way, especially on BIM, where projects like Thames Tideway and Crossrail are seen as fantastic exemplars of the new and innovative approach to infrastructure asset development, delivery and management.

The event saw ACE enhance its excellent relationship with Bentley Systems, who as an ACE Affiliate organisation are an important strategic partner for the industry. We look forward to working even more closely with Bentley during the coming year and more immediately during our forthcoming CIO conference in London in December.

Looking ahead, the market drivers previously mentioned will continue to shape the economic and business landscape facing the construction and infrastructure sector. Embracing digital technology will be a game changer for industry productivity and consolidation will become an integral part of companies' growth strategies. Politics will also be a constant influencer as the Brexit negotiations continue to pan out and international events, some unexpected, affect global markets.

In the UK, I see major projects like HS2, Hinkley and Thames Tideway being used to position the industry as a world leader in infrastructure delivery. It is therefore very heartening to see the government's willingness to highlight the skills of UK engineering and consultancy in targeting countries that need infrastructure support. This is just what the industry needs and is exactly the kind of strategic approach required to showcase UK plc's capability ahead of Brexit.

Initial previews of the 2017 ACE European Industry benchmarking study to be published at the CEO conference in early November are promising, with productivity on the up and a steady increase in profitability, which should enhance investment in staff development and increasing future pipelines. Therefore, the UK built environment and infrastructure sector enters 2018 with confidence.

Finally, on behalf of the ACE board and staff, I would like to thank our outgoing chairman Mike Haigh from Mott MacDonald for his sterling leadership during the year. Similar thanks go to all our members, large and SME firms, strategic affiliates and wider industry stakeholders for all their support to ACE in representing and delivering value-added services to members during 2017.

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

A global voice for ACE

To keep abreast of global issues affecting the industry and to assist member firms working overseas, ACE's International Business Group plays a key role and is responsible for developing international strategy.

Many of ACE's member firms work internationally, reflecting the significant reputation of UK consultancy and engineering firms for providing world-class consultancy services to clients across the globe. ACE's International Business Group meets four times a year and its main objectives are to engage with key international associations, direct ACE's dealings with international groupings including FIDIC, maintain a dialogue with key international funding agencies, influence the international procurement process and, importantly, to raise ACE members' profile in the international arena.

The group, which is currently chaired by Bernard Obika of Roughton, unsurprisingly addressed the impact of Brexit at its most recent meeting and heard reports of nervousness in the markets over access to future tenders and concerns that firms could be excluded from EU projects. Working closely with ACE's policy team, the group is developing a Brexit briefing paper for members.

On the positive side, the group also heard an update from Michael Lunn, director of policy and public Affairs at the Environmental Industries Commission, on the government's plans to expand infrastructure exports in a post-Brexit economy. A new initiative, Infrastructure Exports, has been launched and sets out five key objectives to increase exports.

Group members expressed some concerns about the Department for Business, Energy and Industrial Strategy acting as the lead liaison for the communication of project opportunities, the validation process and how projects were identified, reviewed and included in an industry work plan. Those concerns are being fed back to the Department for International Trade.

The group is keen to promote its work more widely and to that end is working closely with ACE's marketing and communications team to improve the IBG's communications. A key part of this work will be the development and launch of a new IBG page on the ACE website which should go live early in 2018.

● **For further information about the work of ACE's International Business Group contact Kate Buranska at kburanska@acenet.co.uk**

Festive advice for those out of office events

A forthcoming ACE health and safety seminar in Glasgow will examine employers' responsibilities towards employees at out of office events. *Lynn Livesey* offers some topical advice for December's festive events.

Christmas party season is nearly upon us and it's not just your employees that need to remember the Christmas party is an "extension of the work place". As employers, your responsibility for the health and safety of your employees doesn't stop when the Christmas songs start. So, here are my top tips for a fun, accident-free Christmas party.

1. All I want for Christmas is a good venue

Whether you choose to stay in the office or head out, employers will be responsible for ensuring the venue is safe and appropriate for their staff. Consider the risks and choose the venue carefully.

2. Deck the halls with risk assessments

Employers need to think about known and reasonably foreseeable hazards and take appropriate steps before the party starts, to avoid injuries where possible.

3. Have yourself a (moderately) merry Christmas

Overconsumption of alcohol will lead to accidents so don't encourage heavy drinking and make sure employees know before the big event that it won't be tolerated.

4. I'm dreaming of an incident-free Christmas party

Appoint an appropriate person to be responsible during the party; someone who is familiar with health and safety policies and who has authority to take action if needed.

5. Safely driving home for Christmas

Where an event has been arranged for staff it is wise to offer transport (e.g. buses or the number for local taxi services) to safely get people home.

Lynn Livesey is an associate in the insurance and risk team at Brodies LLP. A fuller version of this article can be found at **www.infrastructure-intelligence.com**

ACE Health and Safety Training
Wednesday 6 December 2017
4pm-6.30pm Brodies LLP, Monteith House, George Square, 110 Queen Street, Glasgow G1 3BX
Book online at www.acenet.co.uk

Keeping the industry on top of the key issues

ACE's Sector Interest Groups (SIG) enable the organisation to keep abreast of the key issues facing consultancy and engineering businesses and influence the industry, writes *James Robertson*.

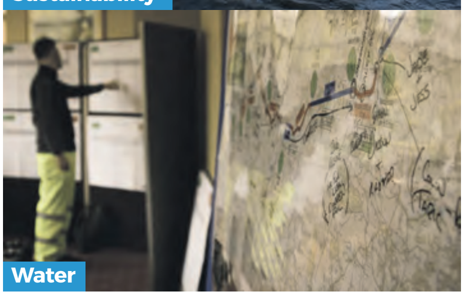

Rail


Roads


Property


Major Projects


Sustainability


Water

ACE is forever pushing for the continued success of its members across all sectors of our industry. The SIGs provide thought leadership through research, they regularly respond to consultations on relevant topics and provide a platform for the sector to engage constructively with government at every level. Not content simply with lobbying on project pipeline and winning business, the SIGs are also concerned with the sustainability of work programmes, skills, and public perception in their sector.

SIGs meet four times a year to discuss, address and pre-empt issues of strategic importance to their businesses and sectors. Spanning rail, roads, property, major projects, sustainability and water, the groups also engage with key stakeholders at all levels of government and the wider industry sectors they cover.

Outputs from the groups are used to influence key stakeholders and to help to direct ACE's policy agenda. Current and ongoing activities of the SIG groups are summarised below.

Rail
The Rail Group, chaired by Alan Price of Jacobs, has been monitoring the government's and Network Rail's planning for the next five-year investment period for the rail sector (Control Period 6) commencing in 2019. As part of this work, the group recently responded to an Office of Rail and Road consultation on improving renewals efficiency at Network Rail.

Roads
The Roads Group, chaired by Dave Beddell from AECOM, is working on publishing a new report on funding roads in the UK. The report will focus on outstanding issues from a similar ACE report in 2013 and more recent topics such as the uptake of technology to improve the productivity of infrastructure.

The group has also been involved in the government's latest consultation on the next five-year investment period for the roads sector (Roads Investment Strategy 2) commencing in 2020.

Property
The recently formed Property Group, chaired by Tom Smith from WSP, will shortly start work developing a housing paper to contribute to the current debate around the housing crisis in the UK.

The group also recently supported an ACE response to the Old Oak and Park Royal Development Corporation's revised local plan for the area, which outlines proposed planning policies for the next 20 years.

Major Projects
The Major Projects Group recently took the lead in supporting ACE's response to a National Infrastructure Commission (NIC) consultation on how new technology can improve the productivity of infrastructure.

The group, chaired by Patrick Flaherty from AECOM, will also support ACE's response to the NIC's recently released interim National Infrastructure Assessment. This response will highlight the valuable contributions that consultancy and engineering firms provide the infrastructure sector in the UK.

Sustainability
A key current project for the Sustainability Group is the development of a Sustainability Road Map over the next year. The road map will focus on building codes and regulation, sustainability reporting and performance and sustainability projects in a post-Brexit world. The group is chaired by Natalie Cropp from Tony Gee and Partners.

Water
The Water Group, chaired by Steven Trewhella from Rivelin Bridge, has an exciting work programme over the next 18 months. The recently restructured group will focus on three broad themes: procuring world leading outcomes, future proofing the water policy framework and an economic policy for flood resilience. To support these themes, the group will be developing a Brexit paper on water policy in early 2018.

● **For further information on ACE's sector interest groups contact James Roberston at jrobertson@acenet.co.uk**

We need effective action now on energy efficiency

If the UK is serious about meeting its climate change targets and wants to cut business costs, we can't keep putting energy efficiency into the 'too difficult box', argues *Matthew Farrow.*

A few years ago, David Cameron met a number of environmental NGOs to discuss energy efficiency. After some discussion of things the NGOs wanted the government to do, the then prime minister looked up in frustration and observed: "The problem with energy efficiency is that everyone agrees that it's a good thing but no one knows how to deliver it".

No one would accuse David Cameron of being an expert in energy management (though he did make one speech on the topic, which is one more than most prime ministers), but he was making a fair point. The technical steps involved in making our buildings more energy efficient are well known and available – ranging from changes to building fabrics to better training of facilities staff who operate building systems. Yet despite an alphabet soup of energy efficiency initiatives – UKETS, CRC, CCL, CCAs, EU ETS, ESOS, MEES etc – no government has cracked the challenge of making enough companies, homeowners and landlords care enough to implement energy saving measures.

Sometimes this lack of action is because the cost of energy as a proportion of total costs is simply too low to merit focus from senior executives. Sometimes it's because of split incentives (landlords have no reason to make energy efficiency improvements if tenants pay the energy bills for example). Sometimes it's because of human factors – a new building is designed with state of the art energy management systems but the building user does not train their staff to take advantage of these.

The newly published Clean Growth Strategy – basically ministers' plan for meeting our legally binding carbon targets – includes strong statements of intent on energy efficiency. The plan talks of cutting the aggregate business spend on energy efficiency by 20% by 2030 compared to the business as usual trend. But there is almost no detail. Instead, only plans for future consultations on measures which could be taken.

So, what measures should ministers be considering? David Cameron was right in that a 'silver bullet' that would transform energy management has proved elusive. But there are several areas that EIC members believe need looking at, in terms of commercial and public sector energy use in particular.

First, we have to have a clear long-term direction on policy. In other environmental areas a long term policy has been very effective – such as the Landfill Tax escalator which galvanised investment in recycling plants. We need something similar in energy management. From April next year, it will be illegal for landlords to rent out properties with the lowest energy efficiency ratings (F and G ratings). Why not announce now (and put in law) that these standards will be steadily toughened up, so that say from 2020 the prohibition will extend the next lowest rating (E), by 2022 D as well, and so on.

> "If we remain serious about meeting our climate change targets, and want to cut business costs, we can't keep on putting energy efficiency into the 'too difficult box'."

Second, we can do better in learning from abroad. The Energy Savings Opportunity Scheme is flawed because while it requires large commercial firms to identify cost-effective energy efficiency investments they could make, it does not stipulate any further action by them. The Dutch version of the scheme requires firms to act on identified opportunities that have a short payback. Why can we not do the same?

Third, we need to maximise the potential from the smart cities agenda for energy management. The scope to use real time energy use monitoring and big data (e.g. being able to benchmark energy performance of similar buildings across different cities) is huge.

Lastly, we need to toughen up enforcement of existing policies. In theory all commercial buildings are supposed to have Energy Performance Certificates stating their energy efficiency rating, but there is a host of exemptions that building owners can use to get out of this. Likewise, air conditioning systems in commercial buildings are supposed to be regularly inspected to check they are operating efficiently, but only 5% of such systems do receive regular checks. Imaginative policies are useless without effective enforcement.

Since his meeting with those NGOs, David Cameron has been forced into an unexpected career change, and his successor has other things on her mind. But if we remain serious about meeting our climate change targets, and want to cut business costs, we can't keep on putting energy efficiency into the 'too difficult box'.

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

From potato cork to bioreactive façade panels.

Organic waste – the building materials of the future?

As cities tackle the global problem of rising waste and depleted resources, consultancy Arup predicts that organic waste will provide lower-cost, lower-CO_2 building materials such as bricks, insulation and partition boards, reports *Andy Walker*.

Organic waste from our cities and the countryside, traditionally managed through landfill, incineration and composting could be diverted – at least in part – to become a resource for the creation of construction engineering and architecture products before being fed back in the biological cycle at the end of their service life.

According to a new report by the consultancy Arup, cities could tackle the global problem of rising levels of waste and depleted resources by using organic waste, such as bananas, potatoes and maize as building materials.

Globally the construction industry is one of the largest users of raw materials – in the UK alone it accounts for 60% of all raw materials consumed. Capturing organic waste streams from cities and the countryside could provide the industry with lower-cost, lower-CO_2 building materials such as bricks, insulation and partition boards, say Arup. Their report, *The Urban Bio-loop*, envisages a completely circular system with building waste fed back into the biological cycle at the end of its service life with nutrients returned to the soil.

The potential for the bio-economy is huge. Over 40 million tonnes of dried organic waste from agriculture and forestry was produced in Europe in 2014 alone and the amount is growing year on year. A kilogram of waste incinerated for energy recovery has a value of approximately 0.85 Euros but the same material used for interior cladding could sell for up to six Euros per kilogram.

The report also points to advances in the development of alternative organic materials, including mushroom bricks grown in five days and waste potatoes used as insulation and acoustic absorbers. Arup has created the SolarLeaf, the first façade system in the world cultivating micro-algae to generate heat and biomass and BioBuild, the first self-supporting façade panel made from bio-composite materials.

Innovative manufacturing processes are a significant enabler, with 3D printing of bio-polymers becoming increasingly widespread. The Arup report highlights the following organic matter products already available:

Peanuts: shells are being used to produce low-cost materials, such as partition boards that are resistant to moisture and flame retardant.

Rice: rice husk ash can be mixed with cement to reduce the need for fillers. Rice can also be used as a raw material for the production of boards.

Banana: Banana fruit and leaves are being used to make rugged textiles. Bananas contain high strength fibre and have good acoustic absorption and durability.

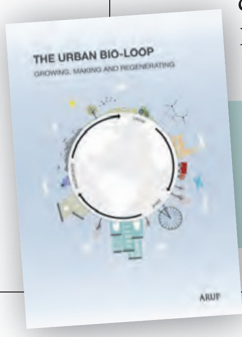
Potato: the peel from potatoes can be cleaned, pressed and dried to create a low-weight, fire resistant, water repellent, insulating material and acoustic absorber.

Guglielmo Carra, European lead for materials consulting at Arup, said: "As one of the world's largest users of resources we need to move away from our "take, use, dispose" mentality. There are already pockets of activity, with some producers making lower-CO_2 building products from organic materials. What we need now is for the industry to come together to scale up this activity so that it enters the mainstream.

"An important first step is to work with government to rethink construction codes and regulations to consider waste as a resource, opening up the opportunity to repurpose it on an industrial-scale."

Arup argue that the principles of circular economy provide a fundamental support for a shift from a linear, consumption based model, towards a circular supply chain. In this respect, the use of bio-based products in construction – particularly those designed to exploit organic waste – might well allow a number of benefits compared with traditional solutions, such as having lower CO_2 content, providing reduced health risks and cost.

At the same time, say Arup, new business models could be identified and developed to support alternative use of organic waste streams as opposed to the current value chain. This could help in enhancing local and rural economies with benefits for both existing and new potential stakeholders. *The Urban Bio-loop* demonstrates that a different paradigm in construction is possible.



You can download the report, *The Urban Bio-Loop: Growing, Making and Regenerating*, at https://goo.gl/Mh3jK1

Government publishes Clean Growth Strategy

The government has launched a new strategy that sets out the action it will take to cut emissions, increase efficiency and lower energy spend.

Download *The Clean Growth Strategy* at https://goo.gl/k5pvvU

An ambitious strategy setting out how the UK is leading the world in cutting carbon emissions to combat climate change while driving economic growth, has been published by the business and energy secretary Greg Clark.

Publication of *The Clean Growth Strategy: Leading the way to a low carbon future* is a legal requirement under the Climate Change Act and builds on the UK's progress to date. Carbon emissions in the UK have fallen and national income risen faster and further than any other nation in the G7. Since 1990, emissions are down by 42% while the economy has grown by 67%.

The government's strategy sets out how the whole country can benefit from low carbon economic opportunities through the creation of new technologies and new businesses, which creates jobs and prosperity across the UK, while at the same time meeting ambitious national targets to tackle climate change.

Business and Energy secretary Greg Clark said: "This government has put clean growth at the heart of its Industrial Strategy to increase productivity, boost people's earning power and ensure Britain continues to lead the world in efforts to tackle climate change.

"For the first time in a generation, the British government is leading the way on taking decisions on new nuclear, rolling out smart meters and investing in low carbon innovation. The world is moving from being powered by polluting fossil fuels to clean energy. It's as big a change as the move from the age of steam to the age of oil and Britain is showing the way."

The strategy sets out how the government will invest over £2.5bn to support low carbon innovation from 2015 to 2021, as part of a significant increase in public spending on science, research and innovation. This funding covers programmes delivering low carbon energy, transport, agriculture and waste. The £2.5bn of existing government spending includes up to £505m from the Department for Business, Energy and Industrial Strategy's Energy Innovation Programme, which aims to accelerate the commercialisation of innovative clean energy technologies and processes.

There are already more than 430,000 jobs in low carbon businesses and their supply chains. The government says that its strategy will provide further opportunities across the country for more jobs, higher earning power and increased productivity. The low carbon economy could grow 11% per year between 2015 and 2030, faster than the rest of the economy, it claims.

Commenting on the strategy, Environmental Industries Commission executive director Matthew Farrow said: "The level of ambition it contains and the prime minister's backing is very welcome. – Britain has a very strong and innovative environmental sector which with the right investment framework can deliver sustainable growth, jobs and exports for the UK. – The strategy's scope, including strong support for low emission vehicles, is important and the commitment to publish a waste and resources strategy will give some comfort to a sector that has suffered from a lack of policy direction.

"It's as big a change as the move from the age of steam to the age of oil and Britain is showing the way."

Greg Clark MP, business and energy secretary

"The strong commitment to improving business energy efficiency is also welcome, though the detail will not appear until consultations next year. Given energy efficiency policy has been in flux ever since the political support for the CRC scheme began to ebb nearly ten years ago it is important that ministers work with industry bodies such as EIC to develop concrete proposals quickly. – Beefing up the Energy Savings Opportunities Scheme would be a good place to start."

Shaun Spiers, executive director of Green Alliance, said: "It is certainly a welcome move in the right direction. The test now will be to embed the strategy across government and encourage investment in clean growth by giving businesses the certainty they need. By taking decisive action to reduce carbon emissions at home we can take advantage of the growing global market for low carbon technology and expertise."

Frazer Mackay, managing director of energy and industry at WSP, said: "The new Clean Growth Strategy was worth the wait. Meeting our carbon targets is a public and private commitment and the strategy provides a broad, over-arching plan of how it is going to meet them and the role the private sector has to play. We also welcome the recognition of the potential of technology, from battery storage to hydrogen and electric vehicles, and look forward to continue helping drive this agenda forward."