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Produced for the industry by the Association for Consultancy and Engineering

Green Sky thinking

Innovative timber framed buildings are
a testing ground for Sky's sustainability
ambitions

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INFRASTRUCTURE Intelligence

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MESSAGE FROM THE EDITOR

No one should mistake the evidence that this new Tory administration is setting itself out as different from the previous five years of coalition.

While the headline objective of preparing a November spending review with up to 40% savings across the public sector will come as no surprise given the manifesto objective of cutting the UK deficit, it none-the-less underlines that the next five years will not be business as usual.

Whether it will be possible to actually achieve such levels of public sector efficiency, of course, now depends more on what the state decides not to do. Continuing to scale back and make cuts will not be enough. It is clear that the future will require different thinking by all.

At the heart of the Tory economic plan is the need to boost the UK's ailing productivity across all sectors of industry. This month's "Fixing the foundations: Creating a more prosperous nation" report published alongside the summer Budget is designed to tackle this tricky issue.

The good news is that the plan retains the notion that investment in infrastructure is core to delivering a vital productivity boost across the UK. The challenge is to do this at a much lower cost.

Reforms are needed, as George Osborne puts it, that "will deliver a step change" in the way the nation invests its limited resources. Business as usual clearly will not cut it..

Infrastructure professionals already appreciate this, as witnessed by the work going on to deliver a new campus for media giant Sky (see page 20). New materials, off site fabrication, focus on the user, delighting the client – all central to embracing better not just cheaper solutions.

There is much to do, as the rail industry's recent challenges demonstrate. But the opportunity is there with planning reforms, longer term funding underpinning investment and promises by government to take hard decisions on aviation and regional fiscal devolution.

But we must also embrace new thinking, new technologies, new techniques and, critically, new skills. We must change infrastructure design, construction and management beyond recognition if we are to serve clients – public and private - of the future.



Antony Oliver,
editor, Infrastructure Intelligence

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News roundup

ROADS

Vehicle Excise Duty or road tax will be dedicated solely to building and improving the UK's highways from 2020. The tax amounts to around £6bn a year and the new system will deliver the same tax take via a new Roads Fund (see p 33).

The Highways Term Maintenance Association (HTMA) has produced an environmental training DVD, entitled Sustainable Highway Maintenance. It can be viewed at: www.htma.info.

WATER AND SEWERAGE

Thames Water has selected its preferred bidder to deliver the Thames Tideway Tunnel and kick start work to create the UK's first sewerage only utility. The newly created, special purpose company Bazalgette Tunnel Limited, whose shareholders are a consortium of investors comprising funds managed by Allianz, Amber Infrastructure Group, Dalmore Capital Limited and DIF, is in line to own, finance and deliver the landmark project. The group is expected to provide around £2.8bn of the finance with £1.4bn from Thames Water. (See p33)

SME contractors together employing more than 3,200 people with bases or locations around Scotland have been chosen to support the delivery of Scottish Water's new £3.5bn investment programme. The 58 small to medium sized businesses form a framework of rural contractors which can be used to support Scottish Water and its construction alliance partners in the delivery of construction and maintenance projects for the benefit of customers between now and 2021.



The first of four new maintenance deals on offer in Highways England's East Midland's Area 7 has gone out to tender. The company is seeking a maintenance and response contractor to do everything from grass cutting to recovering the network after accidents in a potential 15 year arrangement that could be worth up to £20M a year to the winning bidder. Three more four-year contracts for design, specialist services and construction will be bid in September and October.

HOUSING

The next Mayor of London could solve the capital's housing crisis by simply allowing developers to build higher, said former government minister Steve Norris, speaking to Infrastructure Intelligence Editor Antony Oliver at the recent Base London event in the city. "If we added one storey to every building in London we could solve the housing crisis overnight," he said. "The Mayor should be saying "this is what I want in the London Plan"

Modular off-site building could be the key to solving the UK's broken housing market, according to a new report by the Institution of Mechanical Engineers. The UK House Building: Manufacturing Affordable Quality Homes report is calling on Government to provide more incentives for the off-site construction of homes. The report also recommends that the government reverse policies which discourage the construction of quality, sustainable housing and that more work should be done to diversify UK house

building, by opening up opportunities to self-builders, local authorities and housing associations.

PEOPLE AND CAREERS

Highways England has named Jim O'Sullivan as its new chief executive. The former Heathrow airports managing director and one time Concorde chief engineer takes charge of the nation's strategic road network from Graham Dalton.

A new compulsory apprenticeship levy to force large businesses to "invest in their future" is at the heart of the government's new plan to boost productivity. The new levy is expected to apply to "large employers" and will support all post-16 apprenticeships. Details of engagement with business will be set out in the Spending Review.

The demand for higher-level skills in British industry is set to grow in the years ahead, with sectors central to future growth including construction and manufacturing particularly hard-pressed. But levies in the

Budget are unlikely to fill the gap according to this year's CBI/Pearson Education and Skills survey Inspiring Growth.

Councils in England and Wales have warned the national living wage could cost them an extra £1bn a year by 2020. The Local Government Association said about 93,000 council staff currently earned less than the £7.20 an hour wage proposed by Chancellor George Osborne in the Budget.

The number of applications to study engineering increased by 7% on the previous year for all domiciles, and were up by 9% for UK applicants according to the latest UCAS figures.

New president of the The Chartered Institution of Highways & Transportation for 2015/16 is Dr Susan Sharland. Her theme for the year is 'Intelligent Transport in a Connected World' looking at the opportunity to improve transport and mobility with technology and innovation.

Female engineers are a critical resource needed to meet the skills demand for the current tunnelling boom experts warned ahead of National Women in Engineering day.

Waterman Group has welcomed Ajaz Chaudhri as national frameworks director. Based in Manchester, Chaudhri's new appointment will see him take on a leading role in the infrastructure and environment business.

STRUCTURES

Olympic Stadium conversion costs have been confirmed at £272M, a 43% increase on the original £154M contract awarded to Balfour Beatty in January 2014. The London Development Corporation said that the costs reflect the huge scale of the works undertaken to transform the

former Olympic venue from a temporary athletics stadium into a year-round multi-use arena.

DIGITAL
INFRASTRUCTURE

A new report, developed by Arup suggests collaboration between robots and humans will be key in factories of the future. The report called Rethinking the Factory looks to a future of smart robots, 3D printing and self healing materials.

RAIL

Transport Secretary Patrick McLoughlin announced an extensive shake up at Network Rail designed to enable the company to have better control over its £38bn upgrade programme. In a statement to Parliament he said that performance of the organisation was costing more and work was taking longer than it should. He replaced chairman Richard Parry-Jones with current Transport Commissioner for London Sir Peter Hendy. Two electrification projects - the Midland mainline and the Leeds Manchester routes were “paused”.

Network Rail Consulting, the international consultancy arm of Network Rail, has been selected as part of a consultant team led by WSP Parsons Brinckerhoff to provide integration, program delivery and program management services to the California High-Speed Rail Authority in the United States.

The latest National Rail Passenger Survey revealed overall satisfaction with trains services has dropped. The latest results show poor performance, particularly in south east England which has led to a fall in overall satisfaction at 80%: down from 82% for the same period last year. Other key results include:



Charity Bridges to Prosperity which builds footbridges in remote communities around the world celebrated its official launch in the UK in July. It was founded in the USA in 2001 and has worked with communities in 18 countries to build more than 170 pedestrian bridges which serve more than 750,000 people by providing safe access over impassable rivers. Arup, Balfour Beatty, Hilti and Flint & Neill are already working with Bridges to Prosperity. Find out more at www.bridgestoprosperity.org.

satisfaction with punctuality down to 75% (from 77% in 2014) – this figure dropped to 65% for commuters; and value for money ratings remained below the half-way mark, at 45%.

BUSINESS

Balfour Beatty has issued another profit warning, this time of up to £150M on projects in the UK, US and the Middle East, with UK projects accounting for around two thirds of the total. The profit warning came ahead of the group’s half year results which will be announced on 12 August.

Mace supply chain management director Brian Moone has been named as steering group chairman of Achilles Building Confidence, a supplier prequalification and verification programme for UK construction companies. He will be responsible for over-seeing the growth and development of the community – where 19 of the country’s biggest construction firms use a single process to shortlist suppliers for work.

Capita has acquired property consultancy GL Hearn for a cash consideration of £25M on a cash free, debt free basis, plus a deferred consideration of £5M. GL Hearn reported an operating profit of £5.8M on turnover of £31.2M in its last financial year up to 31 May 2015. Capita expects to grow the business and achieve a return on capital in excess of 15%.

Sweett Group reported a £1.1M loss in the last financial year with no final dividend due to the focus on reducing debt. Turnover for the year also dropped £1.1M to £88.3M, down from £89.4M in the previous year. Net debt increased £1.5M to £9.7M.

Major global construction project disputes increased significantly in value to an average £32M in 2014 according to ARCADIS, the global natural and built asset design and consultancy firm.

Vinci’s UK construction business had a £217M pre-tax loss on turnover down 19% to £1bn in the year ending December 2014. Media reports suggest that the firm suffered major cost overruns on its Nottingham tram project and big losses in

the building business. Vinci’s civil engineering division ran up a pre-tax loss of £165M, while the building business was hit by problems on several jobs suffering a £50M pretax loss.

HERITAGE

The Forth rail bridge has become become the UK’s 29th UNESCO World Heritage Site. The bid to have the bridge recognised was put forward by the UK government following a joint project with the Scottish Government, partnering with Network Rail, Transport Scotland and Historic Scotland.

Work to upgrade and restore the historic Grade 1 listed Houses of Parliament in central London is set to cost between £3.9bn and £5.9bn, according to an independent appraisal of options published today. However, the report makes clear that, depending on how MPs and Peers decide to carry out the work and on the actual condition found when it starts, the bill could even reach £7.1bn. The work could take as long as 40 years to complete. However, under the scenario where the building is vacated the time to undertake the work is expected to fall to just 6 years.

AIRPORTS

The Airports Commission has recommended that Heathrow’s north west runway option should be built to provide additional capacity for the south east required by 2030. The commission said that the Heathrow option selected would give greater economic benefit with less local impact and that Gatwick, while credible, would provide extra inter Europe connectivity, mainly for holiday flights, that would be of far less economic benefit to UK GDP. (See John Holland-Kaye, p33)

Chancellor George Osborne has vowed to study the recently published Davies Commission airport recommendations with “the respect and detailed consideration it deserves”. While stopping short of endorsing the recommendation by Sir Howard Davies’ commission to expand Heathrow Airport with a third runway, Osborne stressed the need for government to be “ambitious and forward looking” when it comes to a decision. “We now need to give this report, which clear, reasoned and based on the evidence, the respect and detailed consideration it deserves before we act,” he said in a statement to delegates at today’s Runways UK event.

The United Kingdom could lose up to £31bn in trade by 2030 because of the failure to increase flights to the BRIC (Brazil, Russia, India and China) countries, according to new CBI research. 2030 is the earliest a new runway is expected to be built. (see interview with CBI’s Katja Hall www.infrastructure-intelligence.com/video)

ENVIRONMENT

Government needs to act fast to keep the UK’s emissions reductions on track and to adapt to climate change, the Committee on Climate Change has said. Many policies designed to reduce future emissions are due to expire over the course of this Parliament, it pointed out in a new report. This includes funding for low-carbon electricity and heat, measures to encourage low-emission vehicle use and energy efficiency.

Business Secretary, Sajid Javid has said that the government is to proceed with plans to bring private capital into the Green Investment Bank and start to move the bank into private

ownership. The intention to bring in private capital was first announced at Autumn Statement in 2013

ENERGY

David Cameron’s announcements that the UK would go all out for shale faced a huge setback this month as two planning applications for hydraulic fracturing since his announcement were rejected by Lancashire County Council. The long awaited decisions came after months of delay and were made despite advice from the council’s legal expert that refusal at one of the sites could result in an appeal by applicant energy firm Cuadrilla.

Kepler Energy is bringing forward plans for a 30MW tidal energy fence that will be located in the Bristol Channel. Subject to planning and financing, the initial £143M tidal fence, is likely to be located in the Aberthaw to Minehead stretch of water and could be operational by 2020/21.

Continued investment in offshore wind has positioned the UK as the European leader in offshore renewable market and for the first time pushed the UK renewable energy generation output to 22%, three percentage points more than nuclear power, says new analysis by the Crown Estate. Meanwhile offshore wind generation accounted for 4% of UK electricity produced in 2014.

WATERWAYS

Engineering and consulting firms Setec and Royal Haskoning DHV have been selected by VNF – the French navigable waterways authority – to jointly provide programme management assistance over 12 years for a canal link extending from France to Belgium.

INTERVIEW: Simon Diggle, strategic supplier development, Highways England



Infrastructure Intelligence talks to Simon Diggle, the man tasked with promoting excellence and collaboration throughout Highways England’s supply chain, and the organisation’s supplier awards.

Why does HE stage the awards? Our supply chain is fundamental to our business. There’s a huge amount of great work delivered by our suppliers that deserves recognition and should be celebrated, especially for smaller companies. We want to showcase those who are demonstrating excellence and share this across our supply chain.

How are the awards different to last year? Highways England is a different organisation with a huge programme of investment to deliver. We are mobilising ourselves and our supply chain to ensure that we collectively deliver services to improve journeys and underpin economic growth. Our awards have developed to focus on these future challenges. We have introduced a ‘Communities’ category this year to reflect the growing challenges of understanding communities’ needs and early engagement. We are also highlighting the importance of bringing in and growing talented people from different sources and growing their skills.

What will Highways England do with the innovations uncovered by the award?

We promote and publicise the companies that have won or achieved commendation through the scheme. The innovations and best practice are shared across Highways England and our supply chain.

Are there limits to the number of submissions allowed per supplier? No, the focus is on quality and impact. We encourage suppliers to enter all their best projects, practices and

innovations that have had a positive influence in the eight categories.

Are the awards aimed mainly at your big projects and big contractors?

No, the awards are open to the whole of our extended supply chain. We have had some notable successes from small and medium sized companies in previous years and want to build on this. Several of our direct suppliers have made joint submissions with smaller companies, or recommended them for awards. It’s great to see these collaborative efforts rewarded through our scheme.

Which winner do you particularly remember from last year and why?

A strong theme from the award submissions is the feeling of pride and passion that people have for their work, from pride in technical excellence to a passion for excellent customer service. It’s great to be able to recognise that commitment across all of our business areas each year. We are starting to see some suppliers getting to grips with the cultural challenges around equality and diversity. There is much more to do as we continue to build the skills and capabilities needed for future success

Entries to the supplier recognition scheme are open until 25 September. Full guidance and entry forms can be found on the Highways England section of GOV. UK



Alan Couzens, head of infrastructure tracking and performance, Infrastructure UK

Productivity and the infrastructure pipeline: creating the opportunity for change

Last week the government updated its National Infrastructure Plan pipeline. The value of the refreshed pipeline is £41.1bn to 2020 and beyond, comprising projects across energy, transport, waste, flood defence, communications, water and science and research sectors.

This represents annual public and private spending of over £48bn over the next five years. Add to that, the summer budget productivity plan reiterated commitment to long-term public and private investment in infrastructure - a key driver of productivity improvement.

What better platform has there ever been to address lagging productivity and skills - key issues that perennially weigh on the industry's ability to raise its game?

The productivity plan also set out ambitious measures to increase the quality and quality of apprenticeships in England to 3 million starts this parliament, alongside a raft of measures to streamline, simplify and refocus vocational provision. But how well prepared is industry to respond to the opportunities and challenges?

The skills challenges, critical to improved productivity, and the desire to do something about it are at least universally acknowledged. Interventions and strategies across industry could,

if they were more joined-up, provide the scale of impact needed to meet the challenge.

IUK has been working with industry stakeholders on a comprehensive assessment of the skills required to meet this sustained investment in infrastructure. The National Infrastructure Plan for Skills, to be published September, will provide for the first time an overarching picture of the skills needed to deliver and maintain world-class infrastructure in the UK - around 250,000 construction and 150,000 engineering construction workers by 2020. That's 100,000 additional workers by the end of the decade.

The report will set out key actions and a framework, within which key public and private sector industry leaders will be better placed to respond with their own coordinated action plans - starting with transport in the autumn.

The theme for the autumn and the 2nd Annual Infrastructure Client Group Symposium will be about accelerating the pace of industry change. The NIP for Skills will kick this off with a challenge to industry employers to make the most of this pipeline opportunity, to get organised and invest in our future skills and productivity.



Richard Price, chief executive, ORR

Securing the future sustainability of our railways and roads requires looking beyond the short-term decisions

This is an exciting time for the Office of Rail and Road (ORR) as we bring our skills and expertise as the independent economic and safety regulator for the railways, to monitoring Highways England. Both road and rail have seen significant growth in demand in recent years, and both are now undertaking substantial investment programmes to provide improved capacity for the future.

At ORR, our approach is to ensure that both Highways England and Network Rail work with their supply chains to deliver their ambitious plans. Our work on looking for ways to innovate in both sectors will focus away from short-term planning to a longer-term, stable funding outlook.

This longer-term security of funding, particularly for Highways England, will allow it to realise efficiencies alongside delivery of a five year performance specification and investment plan.

We are also looking beyond the short term challenges for the rail sector, to identify changes that may be needed to the funding and regulation of Network Rail and alignment of incentives within the sector to maximise performance and bring down overall costs. Measures to stimulate competition, innovation and drive efficiencies are already afoot.

The Chancellor's 2015 summer Budget included proposals to change the way government support is channelled to the rail industry and devolve more power to Network Rail's route managers. The reforms should improve the way that the rail network operates.

ORR's future thinking work focuses on the way regulation of Network Rail can help underpin devolution to its eight routes. This approach would require the creation of a more clearly defined national 'system operator' to deal with the network wide planning and capacity issues. While decisions on the structure of the railway are a matter for Government, ORR is exploring options for a different way of regulating Network Rail, to drive up the quality of services and increase value.

We are working closely with people across the industry as we develop our new highways monitoring function and look for more innovative ways to build a better railway. We've already given details of how we will carry out our monitoring and enforcement on our roads, and our analysis and proposals on boosting efficiency and competition in the railways will be published early in 2016. This will help stimulate an industry wide discussion on the best way forward.



Gordon Masterton, chairman, SCOSS and the ICE Panel for Historical Engineering Works

Turning hindsight into insight

I often hear the message that it's time the civil engineering industry broke free from the shackles of its history.

"The country still runs on Victorian infrastructure and we place too much reliance on our past glories and Victorian engineer-heroes like Brunel" (a somewhat overrated icon who has obscured better engineers with his shadow - a personal view!).

The Victorians did indeed build a lot of infrastructure - and they inherited a network of canals and emerging roads. But their railways were not electrified. Their water supply and sewerage systems were not computer controlled.

Their streets were lit by gas. Their machines were fuelled by coal. They had no networked electricity generation. And powered flight was a pipe dream. The Victorians might recognise many elements of our infrastructure. The rest would look like science fiction.

Just as we continuously adapt and evolve our infrastructure until it's fit for today's standards, so did our 20th century predecessors. Railway electrification, telemetry, automatic lighthouses, motorways, hydroelectricity, nuclear power, space exploration.

They're all 20th century developments. It was a highly productive century of engineering. We did not just sit on our Victorian laurels. Engineering is a continuum.

But the point is that to evolve and adapt effectively, we need to understand what we already have, why it was done that way, what materials were used, what cultural ties are bound into it. We need to understand the past so that we can better design the future.

My pitch applies to many areas of #mydayengineering (yes, there's a hashtag). Not least to safety. The fundamental aim of the Structural-Safety body is to learn from the past. The excellent database in CROSS is essential reading before embarking on any new structural design. But the principle applies to all aspects of appropriate and sympathetic design.

Every engineer should have a grounding in Heritage 101 and the starting point in every new project should be a comprehensive assessment and understanding of past decisions and choices.

It's not a dry and dusty topic. It's an essential launchpad. It's about turning hindsight into insight.



Arthur Kay, co-founder and CEO of Bio-Bean

The Opportunities of Urbanisation

Bio-bean is a green energy company that has industrialised the process of turning waste coffee grounds into two advanced biofuel products: biodiesel for transport systems and biomass pellets used for heating buildings. The idea arose from my fascination with cities, the foundation of human civilisation, hubs of economic and social power that drive development by concentrating skills, ideas, and resources. As an architecture student at The Bartlett, UCL, I began thinking about cities and the impact they have on us all.

Whilst designing a coffee shop and coffee factory, as you do at architecture school, I began looking at coffee waste, and explored how we could re-imagine the industry's supply chain. The conceptual leap here was to turn this problem on its head. I started with the circular economy premise that there is no such thing as waste, simply resources in the wrong place.

I realised that coffee was being wasted everywhere - pouring out of major urban centres: coffee shops, cafes, office blocks, transport hubs, museums, factories, airports - huge volumes of coffee grounds were being thrown away into landfills at an enormous cost. Over

500,000T of waste coffee grounds are produced each year in the UK alone.

As the first company in the world to industrialise this process we have developed and protected pioneering technology, we have built a 20000 sq ft factory capable of processing over 150 tonnes of waste coffee grounds every day, raised million pounds in financing, but most importantly we have built a fantastic team, now over twenty people.

We have launched a coffee collection service to collect coffee from 300 London locations. So if you are a restaurant, coffee shop, office block or any business that wastes coffee grounds please sign up. We've received tremendous support from the Mayor's Low Carbon Prize, from UCL, Shell, TSB, Santander, Innovate UK, Postcode Lottery Green Challenge, the Ellen MacArthur Foundation and many others.

If global growth is to be sustainable, we need to understand the pressures that rapid urbanisation will impose and that they are interconnected: from infrastructure to waste, mental wellbeing to housing, transportation to energy and from water to our economic prosperity. These are not just global challenges, but uniquely urban ones.



Michele Dix, chief executive, Crossrail 2

Crossrail 2 – Investment in transport is essential for the UK’s continued growth

“If we get this right, Crossrail 2 alone could add up to £100 billion to the UK’s GVA.”

The recent Budget announcement demonstrates that government understands how vital our roads, railways, power stations, fibre optic cables, water and other essential services are to boosting productivity and growing the economy.

Maintaining vital infrastructure investment across the whole of the UK should be a priority. In transport, investment would connect people with housing and jobs. This is essential if we are to boost the nation’s productivity and deliver the Government’s growth aspirations.

In London we are delivering one of the world’s largest capital investment programmes - modernising the Tube, rail, bus and road networks to maximise capacity and keep pace with our rapidly growing population. But like other cities, we need to do more.

Crossrail 2, a transformational infrastructure project for the South East, is needed now to cope with demand. By linking Surrey and Hertfordshire through central London, and providing new capacity for up to 270,000 trips into and across London in the morning peak, it will benefit destinations across the South East by taking pressure off the most congested mainline stations and routes, and will make the communities

it serves more attractive as places to live and work. Crossrail 2 could unlock 200,000 homes and 200,000 new jobs plus support over 60,000 construction and supply chain jobs across the UK.

To help realise the full potential for new homes and jobs of Crossrail 2 we’ve established a Growth Commission, chaired by Sir Merrick Cockell. The Commission will work with the local authorities and other key stakeholders along the route to ensure development aspiration and plans for the railway are fully aligned. If we get this right, Crossrail 2 alone could add up to £100 billion to the UK’s GVA.

Maximising the development opportunities will help to deliver continued economic growth and create new opportunities in the construction sector. As well as the 60,000 jobs in building Crossrail 2, thousands more would be supported in house building and other local infrastructure provision along the route.

Development funding in the Government’s Comprehensive Spending Review would allow us to progress the project and secure the powers so work can start building in 2020. We need to press on and make the most of the opportunity we have to boost productivity and grow the UK’s economy.



Dame Ann Dowling, president, Royal Academy of Engineering

Promoting diversity in the engineering profession

An extended version of this comment can be read at www.infrastructure-intelligence.com

Much has been done over the last three decades to increase diversity in engineering, but it is still a major issue in the profession: in the UK, only 7% of professional engineers are women, the lowest proportion in the EU. In addition, just 6% of engineering professionals are from those backgrounds and only 4% of engineering apprentices.

I believe that everyone should be afforded the opportunity to build a career in a creative, rich and rewarding profession. We know that an additional 1.8M engineers are required by 2020 and that 39% of UK engineering employers are planning to recruit. To meet this need it is critical we continue to address the enduring poor representation of women, BME and other groups in the professional engineering workforce.

Our Academy Diversity Programme, which has been supported by the Department for Business, Innovation and Skills since 2011, aims to increase diversity across the profession. The programme encompasses other diversity characteristics as well as gender and ethnicity: age, social mobility, disability and LGBT – lesbian, gay, bisexual and transgender - people.

We undertake a number of activities: supporting stakeholder networks, encouraging collaboration, piloting new

approaches and stimulating debate to challenge the status quo.

Professional engineering institutions (PEIs) are one of our key engagement partners - 30 of our 35 PEIs have now signed-up to our Engineering Diversity Concordat and we have over 40 engineering organisations taking action on diversity and inclusion through our Diversity Leadership Group (DLG). Supporting both PEIs and employers is a dominant focus, exemplified by our Returners Project with Women’s Engineering Society (WES) this year.

Leading by example in recruitment, sponsorship and engagement should be a primary goal for organisations. The Academy is supporting the industry-led Ten Steps campaign, which is a concerted campaign for industry action. We strive to apply these principles internally: although only 5% of the Academy’s fellowship are female, we are working hard to improve this through the work of our proactive membership committee. Most of our female Fellows were elected in the last seven years.

The prevailing diversity challenge is due, at least in part, to issues in our culture and social systems. I believe that our diversity programme and projects like it will have a positive impact over time.



Dan Lewis, senior infrastructure policy adviser, Institute of Directors

Sorting out Britain’s trains

The UK Rail Industry faces a triple challenge over the next decade. The first is the massive £50bn opportunity cost of constructing HS2. The second is the still ballooning and unsustainable net debt of £39bn of Network Rail – our very own Greece on Rails. The third is facing down what I call the Rail Blob.

The Rail Blob is an amorphous cost-raising coalition of civil servants, railway unions, engineering companies, train builders, lawyers and consultancies who micromanage and over-engineer and so distort the market signalling between passengers and train operators.

To be fair, the new government has started to roll back on some of this. The move to devolve route management and payments for track to the TOCs and to set up a separate body to redevelop stations is clearly in the right direction. But chipping around the edges is not enough. No one appears to have told DfT, who still foresee a similar debt-funded rail investment programme over the next five years, that it’s as basic as this - there is not enough money.

So we need to be asking hard questions. Is the return higher from investing in inter-city agglomeration like HS2 or metropolitan agglomeration

like the London Overground line?

We can’t afford to do it all and understanding agglomeration is key. It’s almost always the case that you can move more people, more frequently at lower cost and create more growth within a city than between them.

That’s why if I had to choose, I’d go for the Northern Powerhouse over HS2 any day. And we should be wary of believing that HS2 will stick to its £50bn price tag. As Professor Flybjerg, an expert in global megaprojects at the Oxford Business School says, High Speed Trains have shown a 44.7% cost overrun and a demand shortfall of 51.4%.

If the success of Michael Portillo’s Great Railway Journeys TV programme is anything to go by, we Britons love trains. And more seriously, the passenger growth forecasts are encouraging too. But the tax-funded, debt-fuelled expansion of the railways has gone far enough. Reform will require considering tough, decisions like reverting to private vertically integrated regional monopolies of trains and tracks.

With self-driving cars and fast broadband networks just over the horizon, there is no time to waste.



Toby Ashong, director, KPMG Boxwood Group

Let’s get digital

KPMG Boxwood (www.boxwood.com) works to design and implement business transformation programmes for its clients. Boxwood was acquired by KPMG in June 2015.

At the start of this year, Boxwood published a paper entitled “Infrastructure for the next generation”. It highlighted three key trends in the future of infrastructure. One of these was the growing prominence of connected data, more fashionably referred to as digital. The vast majority of respondents told us how excited they were about this but also how unprepared they felt they were.

It’s been a busy few months since then: the UK seized victory from the jaws of defeat by emerging from the most uncertain election in modern times with not only a functioning government but a majority party. No less significantly, Apple brought its phone-based contactless payment system to the UK, transforming one of the most commonplace acts in our daily lives with nothing but simple short-range radio technology and a dose of connected data.

The scope for such transformation in Infrastructure is huge: buildings could intelligently self-regulate their heating and lighting; buildings, networks and other systems could self-diagnose, order replacement parts and direct operatives to points of failure sometimes even

predicting and pre-empting those failures to achieve new levels of reliability. Transport systems could attain previously unimagined levels of utilisation through dynamic supply/demand management. The possibilities are enormous.

So, instead of spending the next several decades converting to next generation but not-so-new signalling technology, why aren’t we exploring what the step beyond is? Instead of debating which roads to widen, why aren’t we investing more in driverless vehicles which could get more cars travelling on the same roads? Instead of prevaricating over the price of electricity and new sources of energy, why aren’t we investing more in smart homes to reduce our energy requirements? The potential in infrastructure is ultimately far greater than in payment systems and yet still seems so far away.

Delivering something like ApplePay requires leadership. It also requires industry-wide agreements on standards, interfaces, commercial liabilities and so on. But where there is a will there is a way. Infrastructure needs the visionaries that dare to lead and a far greater willingness to collaborate.

Female engineers wanted for 20 year tunnelling boom

With tunnelling work on the rise, and a skills shortage biting, the tunnelling industry is keen to encourage more women to consider a career in underground construction, despite ancient superstitions.

Female engineers are a critical resource needed to meet the skills demand for the current tunnelling boom experts said ahead of national women in engineering day in June. “We want more women in the tunnelling industry so that it represents society at large, women have been underrepresented and we want that to change,” says Martin Knights, Global Tunnel Lead at CH2M and former president of the International Tunnelling Association.

Chairman of the British Tunnelling Society Roger Bridge says that the industry is undergoing an unprecedented boom. “The next two decades is going to be the busiest that I have ever experienced,” he says. “We are looking at a 20 year boom and an ageing workforce so the jobs are there to learn the trade and the opportunities are there for people to progress.”

Like other engineering disciplines, women have traditionally formed a low proportion of professionals in the tunnelling sector, not helped in some parts of the world by a superstition that women in tunnels brought bad luck. Bridge explains that the origins of this myth come from a combination of legislative rulings and tunnel incidents in the mining industry, from which modern tunnelling originated. “The Mining and Colliers Act 1842 prohibited all females and boys under ten from working underground in coal mines,” says



Marie Ayliffe from AECOM mentors engineers in her team and says it is a great time for people to join the industry

Bridge explaining that this was a response to the exploitation of women and children in the dangerous coal mining industry of the early 19th century.

Although the law undoubtedly saved many lives, mining remained a high risk business and a great deal of superstition developed around working underground. When an incident occurred women would flock to the mines looking for their loved ones and so women near a mine were then considered a bad omen.

Perhaps the most high profile example of such superstition was former Prime Minister of New Zealand Helen Clarke, who in her

Valedictory speech of 2009 explained that when on the campaign trail in the 1970s she was prevented from entering the 9km Kaimai railway tunnel which was under construction. “I well remember a campaign visit in my support by Sir Basil Arthur, who was the Minister of Transport. He came to the Kaimai tunnel, but the superstition of the Irish and Italian tunnellers meant that I, as the candidate, was left at the tunnel head,” she said.

Today though, women are being encouraged into the industry which needs more engineers in general. “I am a tunneller through and through and very proud of my industry and how we contribute to build a better society. Women, nowadays, play a key role in this,” says Rosa Diez who began her career as a geotechnical engineer investigating tunnel failures. “My first three projects were tunnel collapses, so people were then joking with me “don’t come near my project,” she laughs. Over the past 20 years she has moved on to designing tunnels and supervising their construction working for leading consultants. “Every day is different and brings its own challenges. It is never boring,” she says.

Although she has heard of the superstitions Diez says this has never had a negative effect on her. “When I was being sent to Portugal, to work on Porto Metro, there was some consideration as to whether I was the best person to send, because

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I was a woman. My boss had to double check with the project team. After a wait I was cleared and I did go," she says. "It became my best experience. I was still relatively young and given the opportunity to lead a big team. People respected me so I started to gain more professional confidence and gained a good reputation.

From Porto she went on to work for Mott MacDonald where she remains a project manager for tunnelling schemes. This has seen her work in Norway on the Bergen light rail project, on a hydroelectric power tunnel in Peru and mines in Chile, as well as working on major projects in the UK.

Marie Ayliffe is an associate director in the tunnelling team at AECOM, based in Birmingham. She has worked on projects all over the UK and overseas including designing hard rock road tunnels in Stockholm.

Here she was impressed by the Scandinavian approach to work life balance and support for working parents. "I spent 18 months working on a project in Sweden with a local consultant and the UK certainly has a lot to catch up with in terms of the work/home balance that they have in Sweden and the make-up of the balance of male to female in the office," she says explaining that the cultural differences start at government level with a more liberal view on time off for working parents. "It is more generous. Culturally and with legislative back up they seem to have a better system."

Fortunately Ayliffe has never experienced any tunnelling superstitions but she says that among her peers there is discussion over the lack of women in senior positions across the industry. "The view we share is that a difficulty women face is that people often tend to employ people who they can relate to, so this is largely why there are a lot of men in senior positions. There is an unconscious or unintentional bias."

Looking to the future Ayliffe acts as a mentor to tunnelling engineers in her team and says that it is an exciting time to be in the industry with several major projects planned and underway from the Thames Tideway Tunnel to High Speed 2. "It is a great time for young people to get in to the industry," she says.



Rosa Diez from Mott MacDonald has been designing tunnels for 20 years and has worked on projects all over the world

Tunnelling in Hong Kong



Tiffany Chan, associate director of tunnelling, Atkins says working underground is exciting

Tiffany Chan is associate director for tunnelling at Atkins in Hong Kong. "I joined Atkins after graduation and I have stayed here for 15 years!" she says explaining that the incredible breadth of projects, challenging work, the team environment and flexibility on offer are all behind her decision to remain with the company. This year Tiffany will take a second maternity break. "In Hong Kong maternity leave depends on your company and Atkins is very good with that."

Today Tiffany's work varies between leading the design team for a range of tunnelling schemes and managing projects. "Dealing with the underground space is different every time, anything can happen," she says. From working with some of the world's largest tunnel boring machines at 17m in diameter to blasting into the rock of Hong Kong to create new transport corridors, Tiffany finds herself with an array of technical problems to solve. As a student who

chose engineering because she loved maths and physics and wanted to do something practical to benefit daily life, there could not be a more fulfilling role.

However, ten years ago Tiffany encountered a situation where a contractor asked her to remain outside a tunnel as male engineers went inside. Fortunately she says that attitudes have changed a lot since then, helped by engineering societies in Hong Kong who have been promoting the image of the industry in society. "There are more women coming into the industry. Recently when we interviewed graduates this year we found more females and when you ask about course numbers there are 30 or 40 percent female students, compared to 10 percent when I was at university."

- Read the full article in Atkins Angles: <http://angles.atkinsglobal.com>



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Increasing market confidence, strong project growth, working overseas and the importance of good data to support profitability were all topics for discussion by SMEs at the round table

Driving growth and maximising opportunity in the new political climate

The industry debates future prospects in the new political climate and finds that although risks remain the outlook is positive

At the first Deltek/Infrastructure Intelligence round table discussion since the Conservative Party won the General Election, small and medium sized consulting firms were feeling confident about the future. Projects are moving ahead, clients are spending and opportunities are knocking they said. “We are much more confident than we were 12 months ago,” said Paul Jackson, director at NG Bailey, explaining that the firm was forecasting turnover to grow 25 per cent over the next three years. “The investment community is more optimistic and in particular, in the rail sector, with Crossrail 2 starting in 2020 and HS2 commencing in 2017 through to 2033, we are able to forecast possible workloads significantly into the future.”

Political consistency bodes well for major projects said firms with participants expecting to see HS2 Northern Powerhouse investments and other schemes outlined in the National Infrastructure Plan move ahead, alongside spending from regulated industries. The long awaited Airport Commission review into airport capacity has finally made firm recommendations about a third runway at Heathrow giving more certainty to the aviation

sector and firms also reported a return to the market by private developers.

Although firms expect some major projects will favour large consultants, participants said that this then opens up new opportunities elsewhere. “For me the Olympics was the start of the recovery for the UK, first in building the infrastructure and then the feel good factor from hosting the games” said Mark Ingram, managing director at GHA Livigunn. “In the same way as the Olympics did HS2 will pull in the big firms leaving other substantial work to be done by SMEs like us.”

Yet risks remain with Claire Gordon, director of stakeholder engagement firm Copper Consultancy warning that the government needed to engage more with the public. “Government has to wake up to the fact that people are interested in infrastructure. The NIP could be another Olympics but this has to be captured and the government is in a position to encourage our enthusiasm through improved communication and dialogue. The NIP presents a significant opportunity but a gung-ho and bombastic approach could backfire.”, she said.

Others were more concerned about European issues. “There is a confidence in the market but it could evaporate if

the Conservative Party tear themselves apart over an EU referendum. For all of us BREXIT is bad news because with that will go inward investment and confidence in the UK,” said David Dryden, managing partner at Cundall.

Balancing risk and reward

Looking to the future firms discussed working overseas with Cundall, which has 12 overseas offices, remarking that SME culture was a valuable export. However there was some wariness about the opportunities. Most firms said they preferred to work with existing clients in new markets. “There are some amazing projects but the rewards have to be weighed against the risks,” said Neil Smith, senior partner at Max Fordham who said that working with a local partner was often a good way to engage in projects overseas. However some consultants that had done this referred to instances where local partners had failed to live up to expectations simply using the international reputation of UK firms to win work and then ignoring them. Other issues included challenges of repatriating funds, exchange rate fluctuations, the cost of disputes and in some markets low hourly rates.

Back in home markets firms reported

that rising demand meant that contracts have to be renegotiated to reflect current conditions which are vastly different from the post crisis years. “We live on existing clients but it is time to say ‘you need to pay us more’” said Smith. “We have got to have hard conversations with clients,” agreed Ingram.

This makes having good data about clients and projects more important than ever. “Firms often assume returning clients are beneficial but we work with clients who tell us that they may not have received the level of profitability that they expected to when they signed the contract. They want to know whether they should work with that client again,” said Chris Duddridge, senior business director, Deltek.

Managing client expectations is another challenge said firms pointing out that budgets are more constrained than ever and yet expectations remain high, even in some cases grandiose, leading to fears that whatever firms deliver, clients won’t be happy. It also means being careful about which clients to target. “Knowing the clients that respond to the sort of work that we do is important,” said Adam Sewell, partner at Alan Baxter and Associates. “You have to take the cost, quality, programme triangle. Some clients are driven by quality, others by cost or programme. We have to be focussed in targeting clients that respond to the high quality work we produce. There is little point in us competing for projects where this is not part of what the client is looking for.”

Sustainable growth

At the same time firms are also feeling the pressure to grow so that they can offer new and exciting work to their staff. For most that means organic growth and selecting the right opportunities, for others it means diversification. “We are about a 120 strong structural engineer and we feel this is the right size for us and we are not looking to expand in size but we are looking to expand the fields that we are involved in and the contribution that we can make to the built environment,” said Sewell.

Rod Burton of Pick Everard explained that securing a position on the government procurement service (GPS) framework had enabled major growth at the company and prompted the establishment of a bid hub to track and monitor opportunities. “Getting on to the GPS framework alongside major firms gave us access to markets that we hadn’t been able to access work with before. We started winning work in a

“There is a confidence in the market but it could evaporate if the Conservative Party tear themselves apart over an EU referendum.”

David Dryden, managing partner at Cundall.

lot of areas which allowed us to look at ourselves more as a national business and led to us opening new offices in Manchester and Cardiff so frameworks are very important to us.”

But alongside growth comes the ever present spectre of resourcing. “The skills shortage is the biggest fear that we hear about,” said Blair Pringle, business development director at Deltek, which too is under pressure to serve the increasingly busy market. “We’re a supplier to the engineering and architecture industry amongst the PS business and we are winning clients that we have been wanting to work with from 2008. This is putting the same pressure on us to secure the best talent to support our customers,” said

Duddridge

For firms the pressure to grow is a welcome challenge that can be met through investment in the right people, technology that supports profitable growth and strong client relationships. Against a backdrop of political stability and economic growth, UK firms are well positioned to achieve their targets both at home and overseas.

Participants

Chair: Antony Oliver, editor, Infrastructure Intelligence
Rod Burton, partner, Pick Everard
Steve Capel-Davies, former chairman, Peter Brett Associates LLP
David Dryden, managing partner, Cundall
Chris Duddridge, senior business director, Deltek
Claire Gordon, director, Copper Consultancy
Mark Ingram, managing director, GHA Livigunn
Paul Jackson, director, N G Bailey
Blair Pringle, new business director, Deltek
Adam Sewell, partner, Alan Baxter & Associates LLP
Neil Smith, senior partner, Max Fordham



Top: SMEs from leading infrastructure practices mingle at the Walkie Talkie in London ahead of the Infrastructure Intelligence/Deltek round table.
Bottom left: Mark Ingram, GHA Livigunn; Adam Sewell, Alan Baxter & Associates LLP; and Paul Jackson, N G Bailey. Bottom right: Steve Capel-Davis, Peter Brett Associates LLP; Bottom right: David Dryden, Cundall and Claire Gordon, Copper Consultancy



Client organisations such as TfL and Highways England discussed key trends in asset management with leading infrastructure service providers and contractors

Meeting the infrastructure asset management challenge

As pressures on budgets intensify the industry is working harder to find more cost effective ways to manage assets through closer integration and promotion of data led innovation

A mood of cautious optimism pervaded among participants at the Amey/Infrastructure Intelligence discussion in London last month. Political consistency, economic growth, longer term planning and clarity from clients, complimented by innovative approaches and new technical developments from the supply chain were all cited as reasons for positivity. Yet challenges remain, said participants with resources under pressure, bureaucracy stifling procurement processes, key infrastructure policy decisions outstanding and a pressing need for cultural change to encourage more collaborative approaches. “There is a sense that the economy is moving in the right direction and there are elements of optimism in the industry across the board. We have seen some flagship projects move on a number of fronts; there are still lots of challenges ahead but ones we like to solve,” said David Spencer, managing director of Amey’s consulting business.

Geographically participants said there were big differences in workload across the UK. Devolution in cities

In Manchester devolution will see a significant element of the budget devolved and that has transformative potential,”

Mark Brown, business development director, Amey

such as Manchester is being viewed with great excitement. “In Manchester devolution will see a significant element of the budget devolved and that has transformative potential,” said Mark Brown, business development director, Amey. However firms also pointed to a north south divide with Scotland and the north static compared to a booming South East. “London is a hot spot. Demand for concrete is at the highest level for some time,” said Nick Shires, regional director southern for Lafarge Tarmac, highlighting that demand for all product areas is strong in the south.

“We are generally very positive,” said Nick Burman, business development

director for London based infrastructure maintenance provider FM Conway. “There are certain challenges and we are under pressure to make investment go further.”

Director of asset management for one of London’s biggest infrastructure owners and operators Transport for London, Dana Skelley, pointed to the city’s growth as being a key driver behind maximising efficiency and capital investment. “We must constantly adapt to how London is growing. That means a huge amount of investment in new assets,” she said explaining that as a client the organisation was also seeking to manage existing assets more efficiently. “For the first time the surface transport, rail and underground teams are working together developing common strategies and demonstrating efficiencies.”

At the same time the organisation is looking long term said London Underground head of asset strategy and investment Andy Jinks. “We have a strong 10 year asset management plan, so we know where we are going. We cannot turn our services off so we have to sustain investment in maintenance

alongside managing capacity growth. Transport keeps London growing and the rest of the UK depends on London fulfilling its potential.”

New ways of working

Added to the growth challenge is the increased political aspect of infrastructure provision with customers having more influence on assets than ever before. “Regulatory models have matured. In the water industry the focus used to be around delivering a five year programme, now we have a 25 year strategic plan and clear customer outcomes, and then a five year plan that then fits within that longer term framework,” said Dale Evans, alliance director, Anglian Water and a member of the influential Infrastructure Client Group (ICG). Effectively delivering these outcomes is the current challenge he said, and requires a much more integrated approach. “Collaboration is sometimes misinterpreted as just developing better relationships. Alignment and Integration are the real aims, ensuring that all parties are working towards a common set of outcomes and that integrated teams can deliver the changes required. This is easy to say, but hard to achieve as it requires underlying and complex culture change.”

For some clients this may mean changing delivery models, and some are further along with this than others. “In the past couple of years we have seen changes where as a Tier 2 supplier we were brought in through the early contractor involvement model and we have helped to drive more cost effective solutions,” said Shires. “But in some cases we’re brought in too late for the



David Spencer, Amey sees elements of optimism in the industry across the board

“Clients get the supply chain they deserve”

Dale Evans, alliance director, Anglian Water

client to get efficiencies,” he said noting that Highways England has led on this and some Local Authorities, taking this approach have found that it delivers real value.

“If clients give the supply chain the opportunity they will get greater value. The barrier to working more effectively is not the contractors, it starts with the clients,” said Evans. “Clients get the supply chain they deserve.”

Others agreed. “Suppliers have to be followers as other people write the rules. It can only be changed from within the clients and we are stuck within these rules of engagement,” said Steve Fox, chief executive of BAM.

If clients want more efficient asset management then decisions must be made on value not cost said participants pointing to procurement processes as being one of the biggest issues holding back the industry. However others said it was too easy to blame client procurement departments. “The industry has a lot to answer for, we haven’t always helped ourselves,” remarked Yogesh Patel, process and improvement director, Eurovia UK (previously of Ringway Jacobs).

One area where industry could help itself is in standardising areas of procurement which are the same for all parties however this is challenging with contractors reluctant to relinquish

any competitive advantage. “We should align where we can to concentrate on efficiency, but it is difficult to get commonality of approach. I have suggested to a group of contractors that we take one approach to health and safety as every employer has a different version of it, even though we are completely aligned on wanting to eliminate accidents. I have not seen much desire to support this,” said Fox. “Waste is a huge issue,” agreed Burman. “We are getting more into design to help clients reuse more materials.”

Future trends

Looking ahead models for managing assets are changing said firms, partially driven by the increasing amounts of data now available and technology such as BIM that is driving more collaboration between parties. “We are all starting to share more, we are moving into the Google realm but there are other industries out there that are much better at it,” said Shires.

The drive to share is also being pushed forward by young professionals. “The next generation collaborate naturally,” said Fox explaining that ideas that might traditionally have been patented are now simply shared. Information will ultimately be visible to everyone breaking down some of the traditional boundaries agreed participants.

Again this means more collaboration between clients and the supply chain which used to happen naturally noted Brown. “Needing more collaboration seems to me to be the sign of a problem not the solution. This used to happen naturally twenty years ago so what has changed? There is much more



Top: Dana Skelley, TfL
Bottom: Andy Jinks, London Underground

“We are taking a customer focused vision. We want to remove the pain and delight our customers”

Dana Skelley, director of asset management, TfL

emphasis now on rules, procurement and contracts, we are trying to pin more down than ever. Do all the clever people go into the contracts side now? Have we lost trust?”

Some agreed this was the case with so much pressure on the bottom line that many of the compelling arguments to drive value in asset management are being lost. Others pointed to the importance of ensuring that the best investments are made for the long term. “We have to hold our nerve. £1 spent now can save £5 later,” said Jinks. “The best outcome is the best whole life cost option and clients should be more concerned about the cost of not delivering that.”

An example of this was given by Shires who pointed to trials of a

new high friction coloured surfacing material, Ultigrip, on the A6 in Leicestershire. The material aids skid resistance in areas of heavy braking and according to Lafarge Tarmac its 12 year life expectancy outperforms traditional anti-skid hot laid asphalt by up to 9 years greatly reducing the operational and whole life costs. A new colourless version of the product is soon to be used on the M25. “These products have been developed to meet the needs of our clients,” said Shires.

Transferring maintenance risk to the supply chain is another strategy being employed by some clients. “We have worked closely with the lift and escalator supply chain and made it clear that we want more standard products. A 30 year design, manufacture, install and maintain arrangement has been put in place for these new products, meaning the supplier is more able to manage risk, which in turn has helped drive innovation,” said Jinks.

Such developments are a far cry from some past approaches where a lack of maintenance investment has ended in disaster. Amey’s Mark Brown pointed to US road bridges as a prime example. “There was no maintenance because the government planned just to replace them at the end of their design life but now there are too many, 60,000 structures. Government squeezed operational spend but now have to spend billions on new assets.”

Infrastructure politicised

Another critical dimension affecting assets of the future is the increased public awareness related to the services that infrastructure delivers. Users are able to highlight problems directly and immediately to asset owners, often in a public environment such as social media. Potholes, rail services, power supply and road availability are just some of the hot topics with users demanding better performance. “The industry is making a huge leap from being engineers to being customer service providers,” said Patel. “Customer feedback is becoming more dynamic by the day,” pointed out Evans. “If we’re going to be part of the ever increasing flow of information around customer experience and assets then we need to develop really joined up and integrated teams that are able to deliver continuous innovation. As clients we need to give partners the opportunity to deliver customer outcomes, not just ask them to build stuff.”

Such challenges, along with the increasing amounts of data means more

analysis is needed said Brown pointing to a need to recreate operational research departments in companies as was once commonplace. “We need to spend less time on mechanics and more on analysis”. At the same time clients are also battling with technology change which is too fast to predict. “We don’t know what we want infrastructure to do in 20 years time. There is not enough future proofing happening,” said Fox.

This is coupled with customers and investors demanding that their infrastructure does more, something that other sectors are moving ahead on. “Airlines really focus on their customers, which means that an airport is also a place where customers can shop, eat and relax,” said Patel. Skelley agreed that influences from other industries were finding their way into transport. “We are taking a customer focused vision. We want to remove the pain and delight our customers,” she said.

To do this infrastructure asset owners must therefore create a culture and a delivery model that promotes innovation and efficiency. Bringing forward the best technologies from suppliers means engaging with them early enough to benefit. Understanding the most efficient maintenance approach means analysing asset performance and planning the most cost effective strategy. Delighting customers might mean providing services before users even know that they need them. If the industry can do all of these things in an integrated, data rich environment, then asset owners and users alike are set to benefit long into the future.

Participants

Chair: Antony Oliver, editor, Infrastructure Intelligence
Dr Mark Brown, business development director, Amey
Nick Burman, business development director, FM Conway
Dale Evans, alliance director, Anglian Water
Steve Fox, chief executive, BAM
Andy Jinks, head of asset strategy & investment, London Underground
Yogesh Patel, process & improvement director, Eurovia UK
Nick Shires, regional director southern, Lafarge Tarmac
Dana Skelley, director of asset management, Transport for London
David Spencer, managing director, Amey

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Believe in Better: glulam and cross laminated timber framed structures in London are testing ground for Sky's sustainability aspirations.

Mapping Sky's sustainable journey in timber

Sky's Health and Fitness Centre is the latest cross-laminated timber structure to open on its west London campus, following on from the award winning "Believe in Better" timber building. *Antony Oliver* tracks the media firm's sustainable journey.

The radical glulam and cross-laminated timber framed structures at Sky sit at the heart of the firm's global ambitions to develop a low carbon highly sustainable development that delivers new levels of corporate social responsibility. "It really is a testing ground for Sky's sustainability aspirations and use of spaces," explains Kristina Arsenievich, sustainability manager at Sky. While the building design is critical, so is the way its space is planned and utilised.

As home to Sky's Academy Careers Lab - a programme to engage 16-19 years olds with work experience, a training suite and an office for over 200 staff, the "Believe in Better" building is designed to be highly flexible and highly interactive to function as a community front door to the firm's activity.

The "Believe in Better" building

which opened in 2014 features a glulam structural frame with cross-laminated timber walls and floors which, of course, contribute significantly to the building's reduced carbon footprint. Through careful architectural design, the resulting space features so much exposed wood crying out to be touched, high floor to ceiling heights and an abundance of natural light and is entirely focused on the needs of its users.

The choice of material revolutionised the construction process. It meant that the entire structure could be built by contractor Mace in under a year with off-site fabrication accelerating the project design to site time to just three months after getting the go ahead.

Arup has been central to helping Sky through the often challenging process to deliver its bold

sustainability strategy, but also highly useable and flexible campus buildings as the Sky headquarters expands.

As Adrian Campbell, associate director at Arup, points out, it is all part of a longer journey for Sky to change the way that it approaches the construction and management of its building stock.

"Sky has pushed Arup and pushed at the boundaries of what is possible with timber," he says, highlighting that the learning from Believe in Better has gone into the design of the Health and Fitness centre which opened last month. And learning from that building is built into the design and delivery of the much larger Sky 2 building which will open next year.

"Believe in Better sets a precedent in terms of the use of timber as a building material and gave us the confidence to press ahead with the

gym," he adds, emphasising that Sky's objective of halving its carbon emissions relative to revenue by 2020 has been a critical driver in the use of timber.

Campbell also points out that it is not simply about using timber for timber's sake, but an exercise of using the most appropriate material possible at all times.

"We have been debating to what degree we can use timber in construction but also what the right application in terms of cost, value and durability is," he said, reflecting on the fact that the main campus car park could technically have been constructed in timber but remained as steelwork and concrete for other deliverability reasons. "The decision is driven ultimately by cost of delivery and overall performance of the building," he says.

"So while the Health and Fitness centre designed with architect dRMM is certainly a tour de force when it comes to the use of glulam and cross-laminated timber, the material choice was as much to do with deliverability as it was sustainability," says Campbell.

Put bluntly, to design and construct the three storey gym in just 17 months - including the erection of the entire two storey timber frame in just 26 days - just would not have been possible without the off-site fabrication and modular processes that the material enabled.

There are many technical firsts on show at the Health and Fitness project, such as the ultra-flat reinforced glulam "super beams" enabling the 7.6m spans to be achieved with drop-in CLT slabs. Also there is the way that the dynamic performance of the timber floors has been managed to challenge the perception that such a lightweight material cannot be used for a gymnasium."

However, the real win is the ability to build faster, build safer and packaging up the work to enable multiple trades to follow on easily and fit out the mechanical and electrical works, façade and finishes," explains Campbell. "It is not really about the structure but about the way the timber construction enables the interface of the trades," he says. "The industry is learning from this example of how to deliver faster."

Next in the programme is the Sky 2 building - now known as Sky Central - which in terms of scale, takes the use

of timber to a new level in a building measuring some 160m by 90m and with three 5.5m floor to ceiling height storeys. However, for this building the timber journey, while still challenging and significant, has taken a different track with glulam featuring simply in the roof structure.

Simple is perhaps an understatement given the spans achieved and that there are almost 10km of glulam beams in the roof structure spanning up to 21m - some of it for architectural reasons. But the choice of a concrete and steel main frame with infill steel and timber mezzanine levels demonstrates the sustainable journey that Sky has been on.

On Sky Central again the driver is clearly speed of delivery. The use of steel gave the speed benefits of off-site fabrication but also met the flexibility and future proofing of usage needs

required by the client, not to mention the visual demands of AL_A and PLP Architecture which followed.

Importantly, feedback from Sky staff has been very positive. "Occupier engagement has been the greatest learning experience - staff love the building," says Arsenievich.

With the building set to open next year to complete a two year construction programme, there is clear evidence that its goals are being achieved. Without question the roof with its timber and skylight infills has driven down carbon but it also looks stunning.

Cross laminated timber explained - see an exclusive video interview with Andrew Waugh of Waugh Thistleton, produced in association with Trada at www.infrastructure-intelligence.com



Top: Some 10km of glulam beams spanning up to 21m form the roof of Sky Central

Bottom left: Glulam and CLT are mixed with steel and concrete structures

Bottom right: The impressive timber roof with skylight infills has driven down the carbon footprint

Facing up to disruption

Information technology and digital devices are changing the design and management of infrastructure. For business across the sector, embracing this new world is vital but comes with vast challenges. Infrastructure Intelligence and software firm BST Global gathered together some forward thinking minds to discuss these challenges.



Participants discussed how to negotiate the challenges to drive business success

What are the emerging technology trends across infrastructure and how are they driving business of the future? How will the design of future infrastructure need to change to benefit from these trends?

More specifically, do you have the talent your business needs to take advantage of the opportunities and serve the changing demands of clients?

These are just a few of the critical questions that currently exercise company bosses across the industry as the margins between physical and digital demands on infrastructure rapidly narrow.

Identifying the challenge

According to Jon White, Turner & Townsend UK managing director, the traditional technology challenges facing the sector still fall into discrete areas of the internal systems needed to manage your business and the external systems needed to support clients.

"But there is now a third area of data analytics," he explained. "And while there are lots of ways to capture data the question is can you actually use it? Can you help your clients to make use of it to run their businesses better?"

Focus on client need, of course, remains the driver when it comes to setting up firms for business success. However, as White pointed out, the changing digital landscape means some rethinking around how best to meet the challenge.

"Technology should enable us to add more value to our clients," explained White. "We are early in the journey and it is about explaining the benefits of technology to clients so they understand how we can use technology to drive more value into services."

This underlines the clear feeling that the greatest emerging value of technology lies less with building business efficiencies – although that is, of course, a fundamental benefit – more around the use of the data analytics to inform the way decisions are made and so deliver more value for clients.

Andrew Comer, partner at Buro Happold was forthright in his view that the industry was still slow to grasp this difference, remaining somewhat rooted in technology as a simply a tool for speeding existing traditional processes.

"I do think the whole industry is not alive to the challenges of technology and the changes that are going to take place over the next 5 to 10 years," said Comer.

"For me there are huge opportunities and huge risks. I really do believe the industry has to grip technology more deeply," he added.

So yes, internally the challenge is about how technology is made to work harder to enable individuals to be better designers, engineers or planners and to deliver better products more efficiently and with better value to clients, he said.

But the next generation of professionals, he insisted, will also have an even greater challenge to work out how to use technology to improve the sustainable credentials of projects so as to holistically deliver, for example, much more effective and sustainable cities.

"For engineers it is tough enough to get through the traditional technical training required," he said. "So when we try to add on a more in depth understanding of the technology – not least given the pace at which it changes – there are currently very few engineers in the profession with the bandwidth to fully grasp the opportunities."

Understanding how you are going to use the data

This means there is a real and growing challenge around understanding how firms are going to use data to get some sort of competitive advantage, said Eduardo Niebles, BST Global managing director, international business.

"Your next generation of employees understand and gets it – the question is how do you prepare for that and entice people to come and work with you," he said. "Technology and disruption is really about the next generation of people."

And it is clearly this people factor that continues to exercise business leaders as they rush to take advantage of the technology revolution. That most likely means finding new and different skills.

"We have been thinking about our digital strategy and we realise that to attract the next generation we must

really embrace new technology," explained Caroline Brown, chief operating officer at Penspen Group.

"We are coming around to the realisation that, particularly in the oil and gas parts of our business, we are facing a demographic time bomb with so many of our senior staff about to retire," she said "We have got to bring in new people and those new people think and work very differently."

Yet the question remains how deep the knowledge of technology should be amongst infrastructure professionals, said Brown, asking whether anyone around the table could code – and whether it was in fact necessary.

And while BST's Niebles agreed that built environment professionals would have to lift their gaze towards the data driven future, he was not convinced the new skills would necessarily take professionals that far from their traditional skills.

"I don't think you necessarily need to know how to code but you are going to have to have new skills sets developing within the sector," he said, suggesting titles such as "certified BIM designer" or "certified engineering developer" would start to emerge.

"I definitely see new skill sets being developed in response to this disruptive technology," he said. "The firm that figures out how to take data, combine it with new talent and create new skill sets will be the one that ends up leading. The ones that don't will be left behind."

Winning the "War on Talent"

Jon White agreed, pointing out that to win the current war on talent it was crucial that this challenge was seen as an opportunity.

"We have an opportunity with the technology that we are introducing to actually draw new people into engineering and infrastructure," he said. "As an industry we have to show young people how we can draw them in."

Often, the discussion heard, that simply means using technology to help young people be better professionals – more creative and more able to respond to a challenge.

"The challenge is always about having enough of the right staff – people who are intelligent, personable and bright," said Jonathan Hall, director of architect Allford Hall Monaghan Morris (AHMM)

"They don't necessarily need to know the technology when they arrive as they will quickly get up to speed – the key is that they are bright enough to know



Top: Caroline Brown and Eduardo Niebles
Centre: Jonathan Hall, Jon White,
Bottom: Stuart Mustow

when to use it," he added.

This ability to use and benefit from technology while still remaining focused on the core task of design and management of infrastructure was echoed elsewhere.

"The one thing that most commonly comes out among staff is the desire for professional development and becoming better professionals," said Adrian Marsh, director at RSK, highlighting that this didn't necessarily mean they would be driven toward IT skills at the expense of engineering skills.

"As new software becomes available we will introduce it and train people but they are also keen to develop their underlying skills," he added. "But the trend with IT should be to be able to gather and analyse more and more data with less and less staff input time."

Standardisation globally

Steve Mustow, director, WYG highlighted that as digital applications became increasingly embedded into life, the spread and adoption of technology had started to affect all areas of business with, social media now central to recruitment and marketing activity.

"We are in a very exciting place," he said. "We are now employing the first

generation who have had computers at their fingertips all their lives. I don't think that we as businesses have really worked it out yet. As an industry we have got to get there as fast as we can."

One of the challenges, he said, has been to standardise business processes internationally so as to maximise the benefits of technology and data.

"Ultimately everything comes back to clients and the ability to support our clients – that means giving the staff the right tools and technologies," he added.

Scot Parkhurst, managing director of the UK arm of Swedish consultancy Tyrens agreed pointing out the challenge of a firm with 30 offices in Sweden but four offices across the rest of Europe.

"We are perhaps not really that well integrated with the core business and all the benefits that this brings," he explained.

"It is quite a challenge – how do you take that good practice from Sweden and incorporate it in the European," he said. "How can I maximise the knowledge base – the technology isn't currently set up for a global business."

Systems that are easy to use will be the key to success, he added, pointing out the link between good information and the ability to make decisions.

"The key thing is the need for businesses to remain flexible," said Peter Campbell, senior policy manager at ACE. "Today we are talking about BIM. In five years it will be something else and in 20 years it will be a wholly different territory. You need agility and the ability to move quickly and embrace young people and their knowledge of digital technology."

Around the table

Ben Ashmore, regional director, BST Global

Caroline Brown, chief operating officer, Penspen Group

Peter Campbell, senior policy manager, ACE

Andrew Comer, partner, Buro Happold

Jonathan Hall, director, AHMM

Adrian Marsh, director, RSK Group Plc

Steve Mustow, director, WYG

Eduardo Niebles, managing director, international business, BST Global

Antony Oliver, editor, Infrastructure Intelligence

Scot Parkhurst, director, Tyrens

Jon White, managing director, UK, Turner & Townsend Plc

From machine control to data management

Managing data is the key to driving efficiency across the future infrastructure lifecycle. *Antony Oliver* speaks to Topcon's *David Bennett* about how the world of global positioning is evolving.

The future of surveying and positioning technology in the infrastructure world rests squarely on the ability of professionals to manage data to embrace the new workflows and processes required to really maximise value for clients.

It is, says David Bennett, business manager at Topcon, really about changing the way that design, construction and asset management professionals work – spending less time in the field to capture more data and having the ability to analyse and use the information later.

That process increasingly sees the use of technologies such as unmanned aircraft and miniature helicopters but is also based around increasingly sophisticated developments in machine control – now capable of guiding grading and material laying and compaction equipment to millimetre accuracy.

“One of the key things when trying to drive the industry towards this new way of thinking is to pull together the key stakeholders to explain the benefits of better managed data,” explains Bennett.

“It is often as simple as putting the designers behind a machine to help them to understand the process of what can now be achieved using this technology.”

Key markets for Topcon right now are road and rail, not only because of the vast amounts now being invested in these sectors but also because these sectors are changing rapidly towards data driven maintenance regimes

“We are increasingly now seeing clients on road projects actually specifying the use of machine control technologies.”

David Bennett, Topcon

to help drive efficiency into the management and operation of assets.

Not least as Network Rail moves towards its ambitious goal of a digital railway – Topcon recently took part in a rail innovation day to help the industry to understand how machine control and digital mobile mapping can transform processes.

And in the roads sector Topcon is part of the engagement forum set up by Highways England to help to drive forward the take up of new technology as well as working on research projects in Germany.

Through the Highways England construction plant community meetings the organisation is engaging with the supply chain in innovative ways to ensure that new developments are incorporated where appropriate. For example on the junction 19

improvement of the M1 contractor Skanska has used machine controlled equipment.

“We are increasingly now seeing clients on road projects actually specifying the use of machine control technologies,” he concludes pointing out that there is a clear shift in drivers - today it is more likely that use of new technology will be driven top down by the client rather than upwards by the earthwork subcontractor.

“In many ways it is easier for these decisions to come down from the top,” explains Bennett.

Clients like Highways England and Network Rail are, explains Bennett, now increasingly understanding the value of 3D modelling tools and progressing from initial machine control technologies to more embrace more innovative mobile mapping to boost efficiency in operation and maintenance of assets.

But it is also now filtering into smaller specialist client such as Scottish housing contractor Gavin Brown Contracts, which is embracing the use of laser and robotic total station technologies, to simplify the measurement and recording of work carried out on site.

“It starts by introducing the concept,” explains Bennett.

“By saying here is what we can do today then working together to understand where we can go in the future. We are trying to do a great deal to help educate clients to what is possible.”

That might include programmes such as Topcon's operator academies which give hands on practical experience to help both drivers and designers to make better use of the technology.

Of course the use of aerial surveying equipment – both automated fixed wing for mapping and remote controlled helicopters for inspection – are becoming increasing the norm in the sector.

But as technology evolves with laser scanning merging with photogrammetry and software to create models from digital images, the whole field is rapidly changing to become less about the machines and more about managing and manipulating the data that they collect.

For Topcon that that means there will inevitably be a great deal more focus in future on helping clients to develop systems that perhaps start in the planning and surveying phase then progress to the construction phase and beyond.

For example on Crossrail the firm is working with BBMV, a joint venture comprising of leading construction companies Balfour Beatty, ALPINE BeMo Tunnelling, Morgan Sindall and VINCI Construction, to build the station tunnels at Whitechapel and Liverpool Street station.

Topcon's remote sensor system for the tunnels and compensation grouting has evolved as the project has grown. Embedding the technology into the finished works is the next step to help to continue to deliver value throughout the operation and maintenance of assets.

Similarly on major projects that are in the planning stages, Topcon is involved in the design and construction of new corridors, gathering topographical data and providing the software solution to optimise the earthworks.

The future, says Bennett, is one where professionals will increasingly be hardware agnostic. “Increasingly it is all about the data and how you manage the software – people are less bothered about who makes the hardware.”

Collaboration with firms such as Autodesk underlines this strategy to drilling deep into digital, yet Bennett also points out that with standardised data protocols now underpinning BIM, even the data is starting to become software agnostic.

“The key is to find how you can extract greater value for clients from the data that is gathered,” he says.

Case Study: Crossrail



Crossrail – working with BBMV to build the station tunnels at Whitechapel and Liverpool Street station. Topcon has been working with the contractor on the £250M project to first establish a baseline against which any surface movement could be compared and then set up a system which enables all surface movements to

be continuously compared throughout four years of construction. Data from measurements is taken every 15 minutes and if any movement has been detected, established trigger values are consulted and the construction process altered accordingly.

For details visit www.infrastructure-intelligence.com/innovation

Case Study: 3D Layout Navigation



3D Layout Navigation – with Gavin Brown Contracts, using of laser and robotic total station technologies, to simplify the measurement and recording of work carried out on site. The LN-100 uses a wireless connection to a hand-held touch screen tablet controller allowing one person to operate the instrument, locking on to a hand-held prism to instruct the user

which way to move to locate the point to be set out. For small contractors like Gavin Brown the simplicity of operation means that little operator experience or specialist skills are required to embrace the power of technology and access the benefits of Building Information Modelling. For details visit www.infrastructure-intelligence.com/innovation

Case Study: A11 Resurfacing



A11 resurfacing – working with Balfour Beatty's to use mmGPS machine control. Having trialled the Topcon precision GPS navigation equipment on conventional pavers to lay subgrade material on a section of the A46 dual carriageway near Newark, Nottinghamshire, Balfour Beatty is now using the system on the £102M contract to upgrade the A11 north east of Cambridge. Advanced works began

in June 2012 to prepare the A11 site and full construction commenced on the 24 January 2013. Topcon's mmGPS is a laser enhanced GNSS (Global Navigation Satellite System) to give a more versatile and accurate positioning solution for fine grading, layout, paving as well as curb & gutter and finish elevation staking.

For details visit www.infrastructure-intelligence.com/innovation

Treasury and transport are the focus as ACE meets new Government

ACE is building links with ministers and officials ahead of the next National Infrastructure Plan, reports *Nelson Ogunshakin*

In political terms July is normally a busier than usual month, with a slew of announcements rushed out before parliament rises and extra meetings to ensure ministers, officials, and MPs do not forget you over the summer. What with the Chancellor's emergency Budget as well as the fallout from the general election still being analysed, this July has proven to be busier still.

Rest assured, ACE has been involved in this, meeting with the likes of the new commercial secretary to the Treasury Lord Jim O'Neill and the minister of state for transport Robert Goodwill. Both were keen to meet and discuss the government's plans for the next five years, on the whole stressing the commitment to the plans already set out prior to the general election.

Lord O'Neill's role in this is particularly relevant, being as he is the key government minister with responsibility for the National Infrastructure Plan. I am happy to be able to report back that he recognises the value of the NIP and will be working to ensure its continuation as a living document that provides the strategy underpinning the UK's drive to deliver the infrastructure it requires.

His focus will be on three areas. Firstly, how infrastructure can play its part in enabling the Northern Powerhouse, the landmark project at the heart of the Chancellor's vision for rebalancing the UK economy. Secondly, the improvements to UK productivity that can be made through the provision of better infrastructure. Finally, how the UK can use infrastructure projects in the pipeline to present itself as an attractive destination for foreign investment from the likes of China.

Robert Goodwill meanwhile was keen to discover how we might work together to improve engagement between the industry and government. He recognises the importance of this as we seek to deliver the first Roads Investment



"I expect NIPSEF will continue, but modified to align with new Government priorities"

ACE chief executive Dr Nelson Ogunshakin, OBE

Strategy which the last government published in December 2014. Without collaboration as equals the plan will not become a reality.

All of this means that ACE will be very busy over the summer months. While everyone else is away, enjoying the sunshine (we hope!), travelling to far flung destinations, or watching England and Australia battle it out for the Ashes, we will be building on the discussions we have had with the new and returning ministers.

Meetings with civil servants, and in particular Infrastructure UK, to discuss the future shape and direction of the NIP are already being set up and a major part of that will obviously be how industry can engage to ensure it is as relevant to them as possible. The role of the National Infrastructure Plan Strategic Engagement Forum will form a significant part of this conversation, and I expect it will continue, but modified to align with new Government priorities, and build on the successes it enjoyed

during the last parliament.

The prospect of engagement through roundtables is also being actively explored, and all those ministers that ACE has met so far have been keen on the idea, recognising the benefits of meeting directly with members, hearing their concerns, and outlining government policies. Again, we will be contacting the offices of those concerned and arranging convenient times for such meetings which we will advertise in due course.

All this paints a positive picture for the industry over the coming months. We have not had it all our own way, with the announcement of the abolition of the post of chief construction adviser, and the changes to the Construction Leadership Council, both of which give ACE cause for concern. Our best hope of influencing these, however, is to remain at the table, discussing with government, offering constructive criticism, rather than petulantly walking away.

That is the approach that ACE will be taking in its dealings with government, and the one we will be advocating the wider industry pursue. It will not go all our own way, but we have the best chance of getting the most from government by engaging positively.

Finally, over the Summer ACE will also be working to complete its work on the EU referendum and diversity and inclusion ready for official launches. In addition, ACE recognises the challenges faced by its members operating in the Middle East and is campaigning to secure nomination for Gavin English on the FIDIC Executive Committee and is also taking a proactive role in the delivery of the FIDIC Global Infrastructure Conference in Dubai - all ACE members are encouraged to participate in the debate.

I hope all of our industry will think on all of this over the summer, and come back refreshed and ready to work. Have a good break!

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"The presentation was excellent and exactly the right areas were covered given the current challenges faced by the industry"

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Key speakers include:



Beth West
Commercial Director
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Nigel McKay
Construction Procurement
Director
HS2



Alistair Gordon
Chief Executive Officer, UK
Keolis



Andrew Went
Project Director, Crewe Hub
Network Rail



Paul Jackson
Chief Executive Officer
EngineeringUK

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ACE news

Engineering faces up to £9.5bn retention gap over next decade



Employers could halve the lost productivity impact of replacing employees finds new ACE and EngTechNow report.

New research from ACE and EngTechNow has highlighted the cost of losing and replacing staff and proposed ways to reduce the impact in a new report – The Retention Gap.

The three point plan to halve the lost productivity impact involves:

- having promotion ready staff to quickly fill the gaps,
- focusing on hanging onto new recruits after the first year which is when they are most likely to leave
- flexibility so staff can move between departments to replace lost employees.

Without action the negative productivity impact could total £9.5bn over the next decade as the aging workforce retires, people move job and new staff are sought to fill the gaps, according to analysis in the report.

Productivity lost through hand over activities and new staff getting up to speed can top £17,000 per partner or senior director and amounts to £5,128 for engineers, and £4,908 for senior technicians, said the report.

The gap is lower when replacement

of engineers happens at a more junior level. For junior and graduate engineers it is £2,912 and for technicians and trainees it amounts to £2,820.

Promoting from within at every level would therefore cut the productivity loss, the research suggests.

"There are an estimated 1.8 million engineering roles to fill over a ten year period and our figures demonstrate why industry must benchmark itself and adopt best practice," said ACE chief executive Nelson Ogunshakin.

"Engineering talent is responsible for delivering so much of our economy, and for achieving so much of government ambitions for the future, that we need to find every opportunity to improve the way we work. Industry's positive response to mitigate or minimise the cost of retention gap will go a long way towards improving productivity."

According to EngTechNow chief executive Blane Judd the case for preparing a bank of promotion-ready staff is unambiguous.

"Our report highlights some of the best practice underway at industry-leading employers. Applying those lessons across engineering has the potential to save taxpayers and clients billions of pounds – making the UK more globally competitive," he said.

Read the report on the ACE website: www.acenet.co.uk/policypapers

Productivity wins

The report found

- Across this industry, by reducing the need to replace staff by just 1% a year a productivity saving of £520M million could be made.
- 73% of staff in the industry will never serve a period of more than five years at a company.
- For every percentage increase in new employees starting at the beginning of the year (as a % of total staff) the cost of recruitment per employee increases by £34.
- Having an eight week time lag between employees can increase a productivity loss at an average of £1,510 for large companies and £1,243 for SMEs.

New Resource Hub – information at your fingertips

ACE has made vast improvements to the legal and compliance information available to its members. A new hub at acenet.co.uk/resourcehub has collected all of the key legal and commercial business benefits and stored them in one place on-line including:

- Dedicated telephone advice line for risk management advice on contractual, HR and compliance issues
- Easy click through to our growing collection of useful risk management guidance notes helping to facilitate good business practice - including limiting contractual liability, getting paid on time, BIM, procurement and health & safety.
- Specialist advice through referral to one of our legal or insurance affiliates, who will also provide some initial free advice.
- Upcoming seminars, training workshops and webinars covering those issues that are currently affecting members organised throughout ACE's regions.
- ACE member schemes - the Resource Hub will also take you through to more details of our valued ACE member schemes including the ACE PI Insurance Scheme, the highly competitive Complete Pension Trust and our Adjudicator Nominator Service.



The recently appointed ACE Legal and Compliance Director Dwight Patten, hopes the new Resource Hub will reconnect members to the valuable benefits of being engaged with ACE. If you have further ideas or suggestions for improvements please contact him at dpatten@acenet.co.uk



John Turzynski, Arup; Keith Howells, Mott MacDonald, Nelson Ogunshakin, ACE and Sir John Armitt celebrate Howell's Engineering Excellence Ambassador award.

Summer reception talks of procurement

On a warm and sunny evening hot on the tails of the launch of the latest research report 'Procurement landscape – wider, challenging and in need of reform', ACE's chair John Turzynski and CEO Nelson Ogunshakin welcomed guests to another enjoyable Summer Reception.

Bringing a wise perspective to the proceedings was Sir John Armitt who was able to share his considerable experience as Olympic Delivery Authority chairman on delivering a best practice model and fresh approach to procuring large projects. His recommendations have included suggested criteria such as sustainability, health and safety be included in the procurement process alongside time and cost, and he was heartened to note that the report had moved the debate to include understanding the client skills gap.

Ogunsakin also took the opportunity to present Keith Howells, chair of Mott MacDonald Group, with ACE's Engineering Excellence Ambassador of the Year Award recognising his outstanding contribution to the industry and his leadership in the fields of apprenticeship development and the progression of the diversity & inclusion agenda. Nelson particularly highlighted his support and commitment to ACE during its centenary year.

The Summer Reception is integral to the activities of ACE's providing an opportunity for member firms to meet and mingle in a relaxed and informal atmosphere. Networking is a key benefit of ACE membership and regular events

are organised nationwide by offices in the devolved nations and regions. All events are posted on the website acenet.co.uk/events

Public sector procurement needs to be more strategic says new research

Government ambitions to cut public sector construction costs by 33% and halve the time it takes to build projects will only happen if those doing the buying have the skills to enable them to understand the value not just of each transaction but the final outcome for the economy, according to new research by ACE.

The association says a fundamental rethink of where procurement sits in the whole process along with the language used is urgently needed.

In the report 'Procurement Landscape: wider, challenging and in need of reform' it points out that there are 40,000 procuring bodies across the public sector providing "a significant challenge in ensuring that public sector investment achieves the best social and economic outcomes".

Key findings in the report include:

- The diverse range of procurement skills and practices of public sector clients creates inconsistent results in securing supply chain innovation and value for money;
- The lack of knowledge could be costing billions of pounds through inefficient management;

- Interactions are often over-complex and under-estimated by both sides as internal processes are not understood or communicated effectively.

Celebrating excellence with the 2015 European CEO Awards

Since 2011, ACE's European CEO Awards have recognised the outstanding contribution of those business leaders who continually demonstrate excellence in the international consultancy & engineering sector.

Do you know a leader who can define and articulate a vision and innovates and encourages creative ways of developing their teams to deliver continued success?

If so, ACE would be delighted to hear from you. Nominations will be accepted until 5pm on Friday 28th August and an awards gala dinner will be held at the luxurious St Ermin's Hotel in Westminster, London on Thursday 12th November.

For further information please contact nbari@acenet.co.uk

Infrastructure must unite for a more sustainable world

The need for a greener, safer and more sustainable world is the great global challenge of our time, says ACE vice chairman Gavin English.

There is an essential and growing demand for infrastructure to address critical global issues such as climate change, energy demands, water and food shortages, mass urbanisation and economic and social development.

To satisfy this need effectively and deliver lasting economic and social development the world needs the collective leadership, experience and creativity of the infrastructure community.

There is clear evidence that Investment in infrastructure leads to

the growth of a country's economy and the improved wellbeing of its people. The McKinsey Global Institute recently estimated that over the next fifteen years the world needs to spend \$57 trillion on infrastructure to realise global economic growth ambitions. In the UK alone infrastructure spending may need to run at £40bn to £50bn each year up to 2030 to meet demand.

Infrastructure investment is needed in developing countries in all sectors and will lead to very rapid economic and social development.

Climate change is a reality and the consequences are devastating – rising sea levels, decreasing fresh water resources, extreme droughts, storms and flooding. But it is developing countries that lack the infrastructure and resources to mitigate and adapt to the impacts of climate change and it is the world's poorest people that suffer more than others when disasters hit such as the earthquakes in Nepal in 2015 and in Haiti 2010.

Appropriate sustainable infrastructure is needed to mitigate and adapt to the consequences of climate change; and to develop and deploy clean energy technologies to improve energy efficiency making substantial and long term reductions in global greenhouse gas emission.

For a better, greener, safer and more sustainable world the infrastructure community must unite at national, regional and global level to deliver the global sustainable infrastructure we need. We must all collaborate and take a lead in the financing, planning, designing, construction, operating, managing and maintenance of major future global infrastructure programmes.



- Gavin English is managing director of IMC Worldwide and a vice chairman of ACE

UK leaders are behind the curve on carbon



Short term horizons in the UK mean other parts of the world are taking the lead on emissions, writes *Matthew Farrow*.

OECD Secretary General Angel Gurría was in London recently to give a speech promoting a new OECD report on the need to embed low carbon objectives into all areas of government policy making. The speech wasn't a grand affair, perhaps 60-80 people in the audience in a smallish room in the City near the Bank of England, but it was hardhitting stuff: a passionate call to arms aimed at business people and politicians everywhere.

There were some striking turns of phrase – he spoke of the 'cheerful recklessness' with which we are burning through the earth's carbon budget, described the fossil fuel/carbon intensive elements of many investment portfolios as 'carbon entanglements' and (in a phrase he attributed to Bank of England Governor Mark Carney) referred to the 'tragedy of horizons' – the unwitting damage done by political and business leaders whose goals and incentives are shaped by the short term, unable to see the environmental calamities being wrought in a future just beyond the metaphorical horizon.

Of course there are other speakers who are passionate on our environment challenges, and who (or whose speech writers) can conjure up a sparkling phrase or two when needed. But these tend to be green campaigners or those who have spent their careers working on environmental issues. Gurría is an economist and banker who was Mexican Finance Minister before taking up the reins at the hard-headed OECD.

Gurría's speech made me wonder whether there isn't a risk of the UK, so long a leader in climate policy, ending up behind the curve. Certainly it's hard to imagine say, George Osborne, or indeed any member of the Cabinet, making a speech like this. And debates such as

Don't miss

EIC Annual Conference 2015, 19 November, London. Includes former Number 10 chief adviser on energy and environment Michael Jacobs on what to expect from climate talks in Paris. Find out more at www.eic-conference.co.uk

those over airport expansion seem to revolve more around local impacts than climate change considerations.

Yet if the Paris climate talks in December do make real progress, mainstream businesses, whether in infrastructure or elsewhere, will need to ensure they have factored a renewed focus on carbon constraint into their planning.

Gurría said he was increasingly optimistic about the prospects for real progress at the December Paris climate talks and gave three reasons for this:

“If the Paris climate talks in December do make real progress, mainstream businesses, will need to ensure they have factored a renewed focus on carbon constraint into their planning.”

the announcement by the Chinese government that Chinese emissions are expected to peak in 2025, the fact that in many developing countries air pollution is now such a concern that burning coal is seen as unacceptable on public health as much as climate change grounds, and the emergence of what he called 'waves of innovation' in low carbon technology.

It's certainly true that optimism seems fairly widespread at the moment among other seasoned observers of the international climate negotiation saga.

EIC's Annual Conference this year is on 19 November, just a few days before the Paris talks commence. Michael Jacobs, formerly Gordon Brown's Chief Adviser in No 10 on energy/environment issues and now advising the French Government in the run up to Paris, will be briefing attendees on what to expect from the talks.

Matthew Farrow is director general of the Environmental Industries Commission, the leading trade body for environmental firms. www.eic-uk.co.uk

Thames Tideway picks preferred bidder, Network Rail shake up and Heathrow prepares 3rd runway plans

All articles can be read in full at www.infrastructure-intelligence.com

TOP STORY: Thames picks preferred bidder to finance, build and own Tideway

This month’s best read story was the news that Thames Water has selected its preferred bidder to deliver the Thames Tideway Tunnel and kick start work to create the UK’s first sewerage only utility.



The infrastructure provider is expected to raise £2.8bn in finance

Thames Tideway Tunnel took a step closer to construction with the news that special purpose company Bazalgette Tunnel Limited (BTL) is in line to own, finance and deliver the landmark £4.2bn project. Shareholders in BTL are a consortium of investors comprising funds managed by Allianz, Amber Infrastructure Group, Dalmore Capital Limited and DIF.

The group is expected to finance around £2.8bn of the project with £1.4bn from Thames Water.

Bazalgette Tunnel will be the first sewerage only utility in the UK with customers in the Thames region paying it direct for the service it will provide.

Appointment of the Infrastructure Provider will be subject to formal designation and licensing by regulator, Ofwat. CEO will be current Thames Tideway Tunnels chief executive Andy Mitchell with Tideway chairman Sir Neville Simms chairing the new organisation.

There has been global interest in the project and following competition 12 parties were invited to tender culminating in two competitive bids received in the final ‘revise and confirm’ round.

The delivery model, developed by Thames Water, Government and Ofwat, forms a potential blueprint for other major infrastructure projects, according to Thames Water.

As well as managing the procurement for the Infrastructure Provider, Thames Water has also run the tender process to select the contractors who will build the project.

It says that “the highly competitive nature of both of these processes has paved the way for a substantial reduction in the maximum impact the project is expected to have on customers’ bills”. The figure will be announced later in the summer, once all the contracts have been signed.

The Infrastructure Provider will be independent of Thames Water and have its own licence from Ofwat. The Infrastructure Provider’s responsibilities will include managing the contractors which will construct the Thames Tideway Tunnel 25 km largely beneath the bed of the River Thames, from Acton in the west to Abbey Mills near Stratford in the east. There it will join up with the Lee Tunnel, currently under construction by Thames Water.

Top ten future technologies



Eighteen experts at the World Economic Forum have come up with a list of tech to watch.

1. **Fuel cell hydrogen vehicles** – are ready to launch to consumers with initial prices likely to be \$70,000.
2. **Next generation robotics** - moving from manufacturing assembly lines into a wide variety of tasks, using GPS technology.
3. **A new kind of plastic to cut landfill waste** - recyclable PHT plastics to replace unrecyclable thermosets within five years.
4. **Precise genetic-engineering techniques** - that allow direct “editing” of the genetic code of plants.
5. **Additive manufacturing** - liquids or powders that can be built into a 3D shape using a digital template so goods can be highly customized.
6. **Emergent artificial intelligence** - machines can learn automatically by assimilating large volumes of information and leading to significant productivity advances.
7. **Distributed manufacturing** – sending digital information to make products locally disrupting traditional labour markets and economics of manufacturing.
8. **‘Sense and avoid’ drones** – can begin to take on dangerous tasks such as checking electric power lines.
9. **Neuromorphic technology** - computer chips that mimic the human brain to deliver a huge increase in a computer’s power.
10. **Digital genome** - healthcare for an age when your genetic code is on a USB stick.

Network Rail: make up or break up?



Major upheaval in the way Britain’s rail tracks and stations are run.

An announcement in background papers to the Summer Budget reported that funding for Network Rail will now be channeled through train operators and that a dedicated body is to be established to realise value from regeneration round stations.

Government also announced that it has asked High Speed 1 chief executive Nicola Shaw to advise on the longer-term future shape and financing of Network Rail. She is scheduled to report before the March 2016 Budget.

This follows up on actions already taken by Government to pause two electrification projects and install Sir Peter Hendy as chairman at the national operator.

In addition Dame Colette Bowe, has been brought into Network Rail by Transport Secretary Patrick McLoughlin and will be looking at how the control period process by which the operator is allocated its budget should work in future.

With Network Rail now back in the hands of Department for Transport, its ability to increase debt is now halted as its funds are firmly on the public books and Government is shining a strong light on how the operator is run. Issues of delivery are also high on the inspection list given that the key measure that affects public satisfaction, punctuality, is on a downward trend.

Former commissioner of Transport for London Hendy is to report in the autumn with a plan “to get the rail investment programme back onto a sustainable footing”.

Budget gives road tax cash to roads



Roads will have a revenue stream for the first time.

From the end of the decade a recalibrated system of Vehicle Excise Duty or road tax, embracing low emission vehicles as well as standard motors, will be dedicated solely to building and improving the UK’s highways.

VED amounts to around £6bn a year and the new system will deliver the same tax take though it will be put into a new Roads Fund that will “ensure that the tax paid on people’s cars will be used to improve the roads they drive on” the Chancellor said. Government will “engage with” the devolved administrations on how much money is allocated to them from the fund.

Osborne sees roads as having a vital part to play in improving the country’s productivity and highlighted that the UK’s roads are ranked behind Puerto Rico and Namibia in quality even though four fifths of all journeys are by road in Britain.

Highways England has been given a road spending plan of £15bn until 2020 but the Roads Fund has been introduced as a long term solution “if we are going to fix Britain’s poor roads,” Osborne said.

ACE welcomed the news on roads. “With funding ring-fenced like this in a roads fund, industry can have confidence and faith that schemes will be implemented, and investment can now be made in training, staffing, and plant,” said ACE chief executive Nelson Ogunshakin.

Heathrow starts on runway plans



Talks to start immediately with supply chain.

Heathrow Airport boss John Holland-Kaye announced at the Runways UK conference that he was to push ahead on plans for a third runway, building on the momentum created by the publication of Sir Howard Davies’ report which unequivocally backed the north west option at the airport. Government has promised a decision by the end of the year.

“We are calling for an early decision from the Government, with shovels in the ground by 2020 and benefits coming through to the economy by 2025,” Holland-Kaye said.

“We’ll start on planning consent and will continue to engage with the local community. Traffic surveys will begin over the summer and we are engaging now with the supply chain to establish the skills that we will need.”

Added weight to Heathrow’s case comes from the willingness of international funders to back the new runway he suggested.

“We can find a further £16bn over the next 10 years to invest in the airport, to add to the £11bn spent in last decade. It is significant that the world’s infrastructure funds want to invest” he said.

However former transport secretary Lord Adonis cautioned that the battle for Heathrow was far from won.

“Government,” he said, “has not taken a firm and decisive lead”. “It said it would firmly and decisively read the report and take many months to do it.”



Look no further

With the government's planned 2014-15 investment in infrastructure likely to support over 150,000 jobs, recruitment activity in this sector is on the up.

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New initiatives set to boost the numbers of women in major project leadership

A 12 month programme of research on women in major project leadership, to be undertaken in partnership with KPMG, was announced by visiting research fellow Sue Pritchard at the Ashridge Business School in July.

It will examine how to encourage more women into the sector and consider the impact and benefits women could have on the UK's most important projects. Using examples of best practice from leading companies which are also contributing to the research, Pritchard plans to put together a series of examples of successful initiatives that can be shared with businesses, along with a series of recommendations for government.

"We know that major and complex projects face particular delivery challenges and that improved leadership is critical to delivery. We also know that more diverse boards and more diverse teams will lead to better delivery and better outcomes," Pritchard said.

The Major Projects Association also announced that its board has unanimously agreed to provide more support to members on improving



"We know that more diverse boards and more diverse teams will lead to better delivery and better outcomes"

Sue Pritchard, Ashridge Business School

the gender balance of major projects. It's aim over the next 12 months is to create a series of practical steps for the

major projects sector that will ensure more women work and progress in the industry.

The MPA will also encourage members to contribute to the research to be undertaken at Ashridge.

The new initiatives were launched as Prime Minister David Cameron pledged to close the gender pay gap, confirming that firms with over 250 employees will be forced to publish the average salaries of male and female employees in a bid to close the pay gap between sexes. Figures from the ONS show that the pay gap between average male and female earnings is currently 9.4%, down from 17.4% in 1997. These measures were originally outlined in the Equality Act of 2010 but to date have not been enacted.

Companies interested in contributing to the research can contact Sue at sue.pritchard@ashridge.org.uk

ATKINS

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The background is a detailed blue-line technical illustration of a port or industrial facility. It shows several large gantry cranes, stacks of shipping containers, and structural elements of a pier or ship. The perspective is from an elevated position, looking down into the port area.

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