



The Road to Growth

Skills for the Highways Sector

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Balfour Beatty



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CENTURION
Concept

Foreword



Just as an effective roads network is core to the country's economic resilience, so this in turn must be underpinned by a skilled workforce. And although the sector has been experiencing skills shortages for several years, a number of factors are now coming together to create a perfect storm to widen the skills gap even further, placing the industry – and the future of the road network - under real pressure.

Unless we address these persistent skills shortages, they will put at risk the delivery of key schemes and will ultimately act as a drag on economic growth. We must act now - but solving this goes well beyond what industry can do on its own. The challenges involved range from the need for better careers advice to the need to smooth out the famine-feast way the sector operates. This means that all the key parties must come together to agree a way forward.

Nor can we look only at a short-term fix: we must also keep our eyes on the future and become more strategic in how we tackle the skills issue. Attracting and retaining more people is only part of the answer. We recognize that companies such as Balfour Beatty must show leadership by investing in digital technologies and automation, off-site prefabrication and modularization in order to reduce our reliance on such a large workforce; and ensuring that we are developing the digitally skilled workforce today that will allow us to succeed tomorrow. We have made significant progress in our own journey towards these twin aims and are encouraging and supporting our supply chain in doing the same.

Only by taking this two-pronged approach will we future-proof the sector and ensure a 21st century roads network that can continue to act as the backbone of the economy.

Leo Quinn
Group Chief Executive

About Balfour Beatty



The UK's largest construction contractor, Balfour Beatty, was founded in 1909 and is listed on the London Stock Exchange. With 15,000 employees and over 40 offices in the UK, Balfour Beatty finances, develops, builds and maintains the increasingly complex infrastructure that underpins the UK's daily life. With a legacy of projects across transportation, power and utility systems, social and commercial buildings: from Crossrail and Heathrow T2b to the M25 and M4/M5; and Sellafield; to the Olympics Aquatic Centre, we are proud to be a British company delivering iconic structures, bold engineering feats, behind-the-scenes innovation and joined-up thinking, financing and partnerships.

Balfour Beatty has been an acknowledged leader in the transport sector for over a century. We specialise in delivering large, complex transport projects in partnership with our customers and are a leading provider of services to Highways England. Since 2009 Balfour Beatty has been working in partnership with Skanska, Atkins and Egis to deliver the £6.2 billion M25 DBFO project for the Highways England, including the widening over 100km of the motorway to four lanes and conversion to all-lane running, or 'smart' technology (the first fully operational scheme of its type in the UK).

Other schemes delivered previously include the £371 million A3 Hindhead Tunnel, the £88 million M4/M5 'smart motorway' scheme and the £360 million A46 Newark to Widmerpool Improvement Scheme.

Balfour Beatty believes that a strong and resilient construction industry needs a robust domestic skills base. We are committed to addressing the skills shortages in the UK and investing in home-grown talent. Balfour Beatty employs over 150 apprentices each year in the UK in addition to the 320 currently under training in a diverse range of roles across the business. We employ around 700 more young people on graduate and part-time higher education/degree schemes. Balfour Beatty is also a long standing member of The 5% Club, an employer led organization set up by our Chief Executive, Leo Quinn, four years ago, aiming to address the skills gap by getting more young people into earn to learn opportunities, encourage businesses to take the lead on training and promote apprenticeships as a positive career decision.

Executive summary

An effective road network is vital to the continued growth of the UK economy. Roads are the country's arteries, ensuring that people can get to their jobs rather than sitting in congestion, supporting the transfer of goods to markets and linking local economies across the country. The UK's roads are one of its most valuable national assets and for this reason, investment within the sector is ramping up and an ambitious road building and maintenance programme is underway. A number of other much-needed projects to ease congestion, are also in the pipeline. But there are obstacles that need to be addressed if the Government's plans are to be delivered. In particular, the sector is under pressure due to an ongoing – and increasing – skills shortfall.

By 2020, the year the second Road Investment Strategy begins, the sector will need an extra 15,000 road-building professionals¹. Recruiting and retaining this many people will be a significant challenge, especially since little progress has been made in the past few years in increasing the flow of people into the sector. The entire construction and infrastructure industry is facing the same issue, with not enough young people studying the right subjects or choosing careers in the sector. However, highways has a particular challenge in addition to this, in that other areas looking for people with the same skills can offer higher salaries and the cachet of working on high-profile schemes, such as HS2 and Hinkley Point C. Similarly, in terms of those already working within the sector, there is growing competition for skilled individuals from other engineering fields, as significant investment in national infrastructure and an unprecedented number of high-profile schemes puts pressure on a talent pool that is already too small.

Given the competitive market, and the scale of the skills shortage, we need to take action now to ensure we can deliver the ambitious £15bn highways investment programme. There must be increased outreach to young people; an image-change for the industry as a whole and the highways element specifically; delivery partners must be brought in earlier; remaining planning issues must be addressed; and the peaks and troughs must be ironed out of the pipeline. We must work together, as an industry, with Government and commissioning authorities, to signpost careers in construction and industry to children from an early age, ensuring excellent careers advice and an effective transition into

work by encouraging them to study relevant subjects, take up apprenticeships and pursue their careers in the sector. Specifically, we must create the same kind of excitement around the significant investment in highways as has been achieved in the investment in the UK's railways, to make this the sector of choice for talented, skilled people.

However, although these steps are necessary, they are a short-term approach which is no longer good enough for such an important sector. We must become more strategic in meeting this challenge and do more as a sector to invest in innovation and techniques that will structurally reduce our reliance on such a large workforce.

Balfour Beatty takes seriously its role as an industry leader and understands how important it is that we, along with other Tier 1 companies, show leadership in this area. We have made significant progress in the past few years towards our vision to become a truly digitally empowered business. Investment in and development of internal expert capabilities such as the training of new Drone Pilots, a digital surveying team with full laser scanning service, a high-end visualisation team and a significant increase in BIM related skills are starting to drive an increase in quality, a leaner approach and a safer working environment. As other companies begin to do the same, we believe the impact on the way the sector operates will be immeasurable and we are now encouraging and supporting our supply chain to adopt these measures themselves.

Conversely, failing to address the skills gap in the highways sector will hold the industry back and put at risk the delivery of the roads network the country needs and deserves, and by direct consequence, hamper its future economic growth. We must take strategic, coordinated steps to ensure that this does not happen.

¹ <https://www.gov.uk/government/speeches/investment-in-transport>

Key points

- 1.** The funding certainty provided by the Road Investment Strategy (RIS) has not yet fully addressed the stop-start nature of contracting.
- 2.** Establishing a smoother delivery profile over the five-year period should be a priority for RIS 2.
- 3.** The delivery of a consistent, smooth pipeline is dependent to an extent on planning: while the development consent order (DCO) process itself is well-defined, the length of time pre-application takes is, in some cases, negating some of the benefits of the fast-track DCO process.
- 4.** As an industry, we must find better ways of ensuring we have the workforce we need, other than simply looking to recruit more people. We need a more strategic long-term approach.
- 5.** Embracing new technologies, increased automation, off-site prefabrication and modularization offers the sector the best way of tackling the skills shortfall on a structural basis.
- 6.** In the highways construction sector, our experience is there are shortages in varying degrees across most roles, from Senior Quantity Surveyors to Project Directors and Quality Engineers.
- 7.** The skills gap also covers all levels: it is not just a lack of young people joining the industry, but in particular, a shortage of managers and of those with several years' experience to guide and develop the next generation.
- 8.** Skills shortages in the sector are both likely to get worse and be unlikely to be solved by the Apprenticeship Levy in the short-term.
- 9.** Skills shortages are already leading to wage inflation across the industry as those skilled in certain roles become scarce and the industry comes into competition with prestigious schemes such as HS2 and Hinkley.
- 10.** As the skills required by the industry become more technical and digitally focused, companies across a broad spectrum of sectors will increasingly compete with each other to recruit those who possess them.
- 11.** Given the pace of digital change, it is not possible to predict with any accuracy exactly which skills will be required in years to come. This means that we must create a resilient workforce, equipped with the necessary skills and a mindset of lifelong learning, to help the sector continue to adapt and thrive in the digital economy.
- 12.** Employers must continuously invest in their existing workers to ensure they are up to date with the latest digital developments, while employees must engage and embrace the opportunity to continuously refresh their skills.
- 13.** The skills gap is not an issue that can be dealt with by individual companies on their own. We need a strategic, sector-wide response with business, Government, and commissioning authorities all pulling in the same direction.
- 14.** The continued focus on financially-led competitive tendering, which can result in contracts being won on unsustainable margins, can have a direct and damaging correlation with underinvestment in skills and innovation.



A more robust skills pipeline

The skills shortage in the construction and infrastructure industry is well-documented. The projections are for over 250,000 construction and over 150,000 engineering construction workers by 2020, driving a need to recruit and train nearly 100,000 additional skilled workers by the end of the decade², before the possible impacts of a “hard Brexit” are taken into account. In the highways construction sector, our experience is there are shortages in varying degrees across most roles, from Senior Quantity Surveyors to Project Directors and Quality Engineers. The skills gap also covers all levels: it is not just a lack of young people joining the industry, but in particular, a shortage of managers and of those with several years’ experience. Other factors, such as the uncertainty surrounding Brexit, the market picking up elsewhere in the EU and the weakness of the pound resulting in migrant workers returning home, and an ageing demographic are making these shortages worse. Furthermore, new entrants to the workforce understandably want a better work-life balance and are less tolerant of the sector’s traditional culture of long working hours, weekend work and frequent relocation to follow the schemes.

While we welcome the Transport Infrastructure Skills Strategy³, which included a commitment to 30,000 apprenticeships, we believe that skills shortages in the sector are both likely to get worse and be unlikely to be solved by the Apprenticeship Levy in the short-term, due both to the large numbers of people needed compared to the numbers being attracted into the industry; and the levels of experience required in some of the positions.

Skills shortages are already leading to wage inflation across the industry as those skilled in certain roles become scarce and the industry comes into competition not only with other sectors, such as management consultancy, but also with prestigious schemes within the construction sector, such as HS2 and Hinkley. With much of the money being spent on highways being Government and therefore taxpayer money, the imperative is of course to keep costs down.

This is not an issue that can be dealt with by individual companies on their own. We need a strategic, sector-wide response with business, Government and commissioning authorities all pulling in the same direction. There are a number of things that must happen, from continued outreach in schools to highlight the rewarding jobs on offer and inspire more children and young people to pursue careers in the highways sector, to profile-raising of the variety of exciting roles available. Businesses should be taking the initiative to help schools close the skills gap, but we also need a joined-up approach across Government to ensure other measures are in place, such as STEM (Science, Technology, Engineering and Maths) subject teachers knowledge or experience of engineering, and a strong careers advice offering in schools. More innovative solutions are needed to help attract people into the industry: more skill-based apprenticeships and greater promotion STEM subjects with younger generations are vital and we welcome initiative which are already underway. We must take steps to ensure a diverse workforce, more representative of society.

However, other factors have an impact on how many people the industry is training. For example, the continued focus on financially-led competitive tendering, which can result in contracts being won on unsustainable margins, in an industry where overall profit margins are often between 1-3% and have been for many years, leading to historic underinvestment in skills and innovation: in its 2016 CN100 report⁴, Construction News found that profit margins across the industry’s top 25 contractors were down to 1.2%, compared with 1.8% a year earlier and 2.5% in 2014. This reduces not only how many people are trained across the industry, but also limits investment in other areas, including innovation and equipment.

Balfour Beatty believes that if delivery partners were brought in earlier, and the focus was shifted away from the lowest-price-wins, a stronger, partnership approach would result in a more stable, skilled workforce and improved outcomes benefitting the customer.

² National Infrastructure Plan for Skills, HMT, September 2015

³ Transport Infrastructure Skills Strategy, DfT, January 2016

⁴ <https://www.constructionnews.co.uk/analysis/news-analysis/cn100-2016-the-top-100-contractors/10010244.article>

A consistent flow

The skills shortage is compounded by the stop-start way the funding comes through. In some cases, over-programming, where capital costs exceed available funding, results in schemes having to be delayed or cancelled. This means teams are broken up and redeployed, and individuals leave the sector, attracted by the stability of work elsewhere.

The first RIS represents a significant step in establishing the clarity industry needs to prevent this. However, while the pipeline is secure, the funding certainty provided by the RIS has not yet fully addressed the stop-start nature of contracting. For example, much of the work in the first RIS has been back loaded to the end of the period i.e. 2017/18, with a significant number of project starts scheduled for the final year of RIS. Balfour Beatty believes that getting contractors involved sooner, and ensuring schemes and improvements are ready for tender earlier would help. In our view, establishing a smoother delivery profile over the five-year period should be a priority for RIS 2, which is currently under development and which will run from 2020/21 to 2024/25.

The delivery of a consistent, smooth pipeline is dependent to an extent on planning. Balfour Beatty welcomes the certainty of policy and of timescales provided by DCOs for nationally significant infrastructure, a streamlined statutory decision-making process which aims to be fairer and faster for both communities and developers in the building of major transport, water, waste and energy schemes for example.

The DCO process, which lasts an average of 12-15 months⁵, begins once an application has been formally accepted by the National Infrastructure Planning Unit. It also involves pre-application consultation and impact assessment requirements. While the DCO process itself is well-defined, the length of time pre-application takes is, in some cases, negating some of the benefits of the fast-track DCO process. For example, the requirements in terms of the depth and nature of elements such as the Environmental Impact Assessments (EIA), are applied differently by different commissioning authorities and in different sectors. While some commissioning authorities will carry out a thorough EIA, others will go beyond what might be expected, in order to ensure that it stands up to any possible future challenge. This can mean that it takes 2-3 years to compile the data for the EIA for pre-application, while any proposed changes to the scheme can see the various assessments being undertaken a second time.

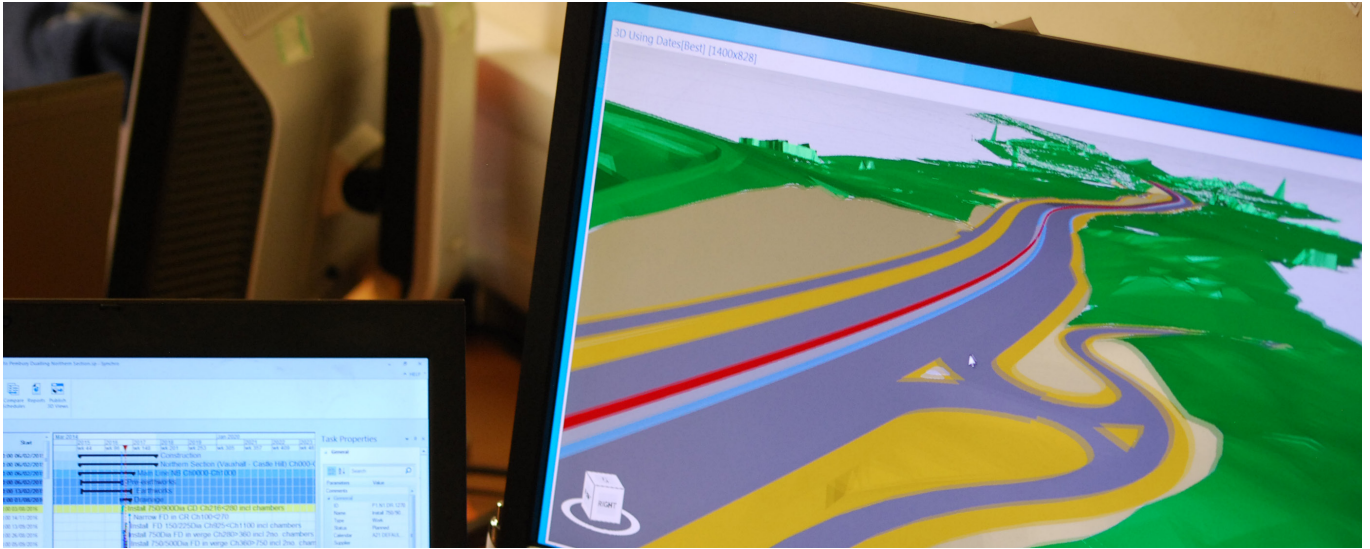
Balfour Beatty supports balance and fairness in the planning system. However we are concerned that gold-plating the requirements for elements of the pre-application process, such as the EIA, essentially undermines the purpose of the sleeker, DCO process and ultimately hold back key infrastructure development and the sector's ability to invest effectively in skills.

Furthermore, we must ensure that the system has the resources to deal with large numbers of DCO applications simultaneously over the next few years, as the various major infrastructure schemes in the pipeline come to fruition.



⁵ Planning for Nationally Significant Infrastructure Projects, House of Commons, July 2017

The digital skills challenge



The future of the sector is of course digital. The digital economy is growing at an exponential rate. Beyond the full rollout of Smart Motorways and developments such as the autonomous vehicles which have captured the public imagination and which are likely to be on our roads in the next few years, technology will help us collect information about assets, facilitating an improved understanding of their condition. Assets will be “intelligent” and will be connected via the Internet of Things. Customers will have access to realtime information so they can make better decisions about their journeys. There will be no more gantries, as customers receive information directly to their personal devices or vehicles. Carriageways will be powered by a solar surface feeding inductive loops which charge electric vehicles. Robotics and drones will be used for highways maintenance alongside autonomous services, providing more efficient, cost-effective and safer solutions, while self-healing concrete technologies will allow roads to autonomously repair themselves without the need for human intervention. Balfour Beatty is already using the latest technology, for example, the state-of-the-art Microsoft HoloLens, to improve project delivery and safety on site and drive the next generation of highways, and 4D modelling to ensure a fuller understanding of works sequencing prior to starting on site.

The process of moving to this exciting new future is creating a range of exciting new career paths. It will increasingly call for both new skills and play a key part in changing the outdated perceptions of the industry, attracting new, dynamic people to work in the

sector. One of our observations from Balfour Beatty’s work on the M5 and M6 Smart Motorways for example, has been that the focus on incorporating technology to guide traffic flow and manage environmental impacts requires a range of new skills in addition to the more conventional design, construction and maintenance skills required for major highways projects. However, as the skills the industry requires become more technical and digitally focused, companies will increasingly compete with each other to recruit those who possess them. This is already happening across some key digital roles. The industry is at a disadvantage in that it is already now competing with other, better-resourced industries for these individuals, and is beginning to see them leaving for better pay and schemes with more cachet.

Of course, developments in new technology mean that the skills employers need are evolving. The existing workforce, trained in traditional construction skills, will need retraining to ensure their knowledge and experience keep pace and they are ready to deliver the infrastructure of the future. Given the pace of change, it is not possible to predict with any accuracy exactly which skills will be required in years to come. This means that we must create a resilient workforce, equipped with the necessary skills to help the sector continue to adapt and thrive in the digital economy. Employers and employees must both step up to the plate here: employers must invest in their workers, while employees must engage and embrace the opportunity to continuously refresh and update their skills.

An opportunity, not a threat

Although becoming digital-ready and responding to the fast-changing technological landscape is a challenge in the short term, embracing innovation and new technologies also offers the sector the best way of tackling the skills shortfall. Increased automation, off-site prefabrication and modularization will reduce the number of people required both on and offsite, driving safety, efficiency and productivity improvements.

This is why Balfour Beatty has set itself the target of ensuring that 25% of our onsite activities today are done offsite by 2025. As an industry, we must find better ways of ensuring we have the workforce we need than simply looking to recruit more people although that is of course important in the short to medium term. The industry needs a better, more strategic solution and we believe that innovation and the increasing use of offsite and new technologies provides that.





Conclusion

Record levels of investment in infrastructure including roads, rail, airports and energy including nuclear new build, mean that a new generation of skilled workers is needed to help shape the nation's future. However, this investment also pits these sectors against each other in terms of attracting the brightest, skilled workers. On top of this, the sector's ageing workforce, uncertainty surrounding Brexit and a lack of the latest digital skills amongst existing workers is making the skills shortfall even more significant.

A two-pronged approach is needed to tackle this issue. Over the short-term, we must do better at changing outdated perceptions of the industry and attracting people into it. At the same time, we must be looking to the long-term and investing in both new construction technologies and techniques which will take the pressure off the system in terms of how many people it needs to deliver large schemes; and in the skills of our workforce to ensure they are ready for the change.

Only by taking this twin-track approach will we ensure we are able to deliver a roads network that will drive the country's growth over the next decades.



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