Staying on track
How the right funding model can drive skills and technology in the rail industry

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Balfour Beatty is a leading international infrastructure group. With 15,000 employees across the UK, Balfour Beatty finances, develops, delivers and maintains the increasingly complex infrastructure that underpins the UK’s daily life. Delivering projects across transportation, power and utility systems, social and commercial buildings, from Crossrail and the Channel Tunnel Rail Link, Heathrow T2b to the M25, M60, M3 and M4/M5, Sellafield and soon Hinkley C nuclear facilities, to the Olympic Aquatics Centre and Olympic Stadium Transformation.

Our rail business is one of the leading rail infrastructure suppliers in the UK. From feasibility studies, planning and design through to implementation and asset management, we provide multi-disciplinary rail infrastructure services across the lifecycle of rail assets. Our expertise covers electrification, track, power, civils, specialist rail plant, railway systems and technologies.

Our expertise owes a significant amount to our decades of experience in the industry and to our continued commitment to investing and innovating. For example, our track construction machine, which is unique to Balfour Beatty, lays rails 50% quicker than conventional methods and automates the whole process. To see it in action, please visit http://bit.ly/2kpKUDI

About Balfour Beatty
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1. Delivery of the Government’s commitment to improve UK railways is critically dependent on the industry having the right skills and technology, both immediately and over the medium term.

2. For the rail industry, the need to create certainty of a project pipeline is pressing. The current funding (debt) restrictions on Network Rail are driving unintended consequences (exemplified by the delay of CP5 projects into CP6). The resulting stop-go pattern of rail contracts exacerbates not only the haemorrhage of skilled engineers to other industries but also destroys the investment case for suppliers contemplating R&D, critical equipment and training programmes.

3. Given the central position of infrastructure in the Government’s industrial strategy, this requirement for continuity of funding represents an opportunity. Against a backdrop of low-cost borrowing and the (private) finance community’s appetite for infrastructure assets, the proven immediate take-up on successful projects – passenger and freight – demonstrates the demand drivers which underpin the investment proposition for funding.

4. Where Network Rail has used a supplier-partnership model with clear accountabilities for overall project delivery (Abbey Wood/ West London; Maidenhead electrification are examples where Balfour Beatty have been involved) the resulting delivery on time and to agreed budget delivery demonstrate a route to greater efficiencies which will reassure potential investors.

5. Continuity of project flow is also essential to retention of existing skills (e.g. the preservation of the successful Maidenhead electrification team). It is critical to future delivery to prevent high calibre engineers drifting into other, more stable industries in the 2018-2020 “gap”, when the industry needs to be building capability for such programmes as the Digital Railway, Brighton Mainline upgrade, Crossrail 2 and HS2.

6. The pausing/un-pausing of large schemes discourages contractors from recruiting and training new workers (apprentices, graduate engineers). This stream of new talent not only takes time to come on stream, but needs the invaluable handover interface with experienced workers.

7. Retirements are forecast to peak during CP6 and should be addressed proactively by deferment schemes, which in turn require continuity of project flow to justify.

8. The current significant reliance on non-British EU skilled workers and recruits must be assured over the short to medium-term by Government commitment to an efficient and effective VISA scheme or equivalent.

9. In competing for both investors and talent, the rail industry urgently needs to tackle its image problems head-on in terms of poor perception of performance, diversity and career development within cutting-edge disciplines e.g. asset management using the latest digital technology, improved design productivity through the development of new software and the latest BIM techniques across the asset lifecycle.
Introduction

Rail travel in the UK is at historically high levels, with over twice as many passenger kilometres being travelled today as in 1995 and forecasts showing that growth will continue at similar if not greater rates.

To ensure the UK has the infrastructure required to deal with this surge in passenger journeys, the Government is undertaking the most ambitious modernisation of the railways for over a century. Over £38bn is being spent in Control Period (CP) 5 (2014-19) to maintain and improve the network. This investment will continue in CP6 (2019-2024), including more lines being electrified, an east-west link between the Manchester and Leeds arms of High Speed 2 (HS2) as well as Crossrail 2. Balfour Beatty welcomes the Government’s commitment to improving the nation’s railways.

It is well documented that infrastructure is crucial to strong, sustainable, long-term economic growth. In recent decades, governments around the world have recognised that by investing public money in infrastructure, they can better underpin and rebalance the economy, with unprecedented levels of public money going into new projects such as HS2.

However, as rail projects become ever larger and more complex, the demand for highly skilled workers continues to increase. This is in addition to an existing skills shortage in the rail industry, which is a result of the continued increase in passenger journeys and freight. This shortage has reached critical levels, particularly in areas such as signalling and electrification.

For signalling and telecommunications, the National Skills Academy for Railway Engineering (NSARE) forecasts a need for between 1,600 and 2,000 new people in the next five years, with over 30 per cent of these people being at technician level or above. And the National Infrastructure Plan for Skills projects that the number of engineering and technical workers will need to grow by 7,200 by 2020, while in conventional rail the number of engineering and technical workers will need to grow by 900 by 2020.

The skills shortage is important for a number of reasons, not least because a shortage of skilled labour can cause major delay and cost overruns to projects. The shortage of critical resources such as linesmen, signalling designers, and test and commissioning engineers, for example, is predicted to lead to wage inflation over the next five years of between 25% – 40%. Failure to effectively address the skills shortage could leave rail employers facing estimated costs of £316 million a year by the end of CP6, while costs to government are estimated to be £381 million per year by the end of 2024. As the costs of government funded construction projects increase, taxpayers will carry the burden and pressure will build to demonstrate value for money.

Balfour Beatty welcomes moves such as the publication of the Transport Infrastructure Skills Strategy, which sets stretching targets to attract and retain a more diverse workforce. It also sets out how the Government aims to create 30,000 apprenticeships in the road and rail sectors by 2020 as well as how it will attract more women and people from diverse backgrounds. As a British company with a hundred year legacy in the UK, Balfour Beatty is homegrown. We believe it is important that industry steps up to the plate and plays its role. 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 organisation set up by our Chief Executive, Leo Quinn, three years ago, aiming to address the skills gap by getting more young people into earn and learn opportunities, encouraging businesses to take the lead on training and promoting apprenticeships as a positive career decision. Leo Quinn also leads the skills work stream of the Government’s Construction Leadership Council (CLC) which is setting targets and recommendations for the construction industry to build momentum and commitment in tackling the skills shortage.

In addition to these moves, we have identified a particular skills issue relating to the beginning of CP6, which exemplifies the urgency and magnitude of the issue, and which this paper addresses.
The rail skills landscape

It is well documented that the demand for engineers in the UK exceeds supply. This directly impacts on the rail infrastructure industry, where the existing skills shortage is further exacerbated by a number of key issues, including:

1. **An ageing workforce:** A large number of higher level qualified and experienced people will retire in the coming decade and will need to be replaced. Indicatively, the average age of a registered engineer in the UK is 56 years. Engineers working in the rail industry represent a wide range of engineering disciplines, including civil, electronic, electrical, mechanical, industrial and production engineering. The nature of the specialist work in the rail sector means that engineers often need to develop skillsets combining several of these disciplines, making retiring staff particularly difficult to replace. This means that further skills shortages will occur during CP6, when retirements are likely to peak.

2. **Competition with other industries:** There is also an increase in demand for engineers in other UK sectors such as telecoms, manufacturing, power and nuclear, which are all competing with the rail industry for the same skilled workers. The rail infrastructure industry’s image, which is of largely manual roles in laying track and so on, is not helping here: competition from other industries, particularly the energy sector, is therefore hampering its ability to attract the engineers it needs. The reality, which must be better communicated, is that a career in rail can take any number of different forms, with roles spanning a variety of different disciplines including those requiring cutting-edge skills such as use of CAD design, programming and hi-tech manufacturing.

3. **Increasing use of technology:** The shortage of engineers is made worse by the fact that rail transport is becoming increasingly reliant on technology. Emerging technologies, such as digital communications and signalling and GPS are becoming the norm, as is ultrasonic technology, used to detect defects in tracks that could cause derailments; ethernet technologies used in signalling and communications; multimedia equipment in trains; and propulsion systems.

4. **A broader geographical spread:** As a result of Crossrail, engineering jobs within rail infrastructure have been largely based around London in recent years. This is likely to change with projects such as electrification of the Great Western Main Line and lines in the Midlands and North of England and High Speed 2. Rail engineers will therefore be needed across the whole country, which may make recruitment difficult.

5. **Concurrent infrastructure projects:** Many of the major new infrastructure and upgrade programmes in the pipeline are likely to overlap each other. This will place a further burden on the supply of skilled workers in the industry.

6. **Brexit:** Uncertainty around the free movement of labour in the EU could increase the industry’s recruitment and staffing difficulties as it may no longer be able to handpick highly skilled engineers from other EU countries as is currently the case. In November 2016, more than 10% of the Balfour Beatty workforce held non-British EU passports. Around 11% of new recruits in 2016 were non-British EU passports. This is made worse by the fact that rail transport is becoming increasingly reliant on technology. Emerging technologies, such as digital communications and signalling and GPS are becoming the norm, as is ultrasonic technology, used to detect defects in tracks that could cause derailments; ethernet technologies used in signalling and communications; multimedia equipment in trains; and propulsion systems.

In addition to these issues, the pausing and un-pausing of large schemes in GPS, for example the Network Rail Midland Mainline and Trans-Pennine projects, increase the difficulties that the rail sector faces in recruiting and investing in skills, as workers drift off to other industries with more predictable or regular work. Indeed, larger projects and smaller projects are symbiotic in more ways than one: to ensure we have the skilled workers for mega projects such as HS2, infrastructure companies like Balfour Beatty use more modest-sized schemes to recruit and train skilled workers in the short term. This keeps skilled workers up to date with the latest techniques in between working on larger projects, ensuring the expertise is available for mega projects tomorrow.

With insufficient people entering the industry, it is imperative that we retain the skilled workers we have. Taking a ‘capability holiday’, on the other hand, puts further pressure on the skills situation and undermines efforts on apprenticeships and attracting people onto degree courses. The critical skills need to be maintained.

Of course, some point to the Apprenticeship Levy as a way to resolve the skills shortage. Balfour Beatty is fully supportive of the Government’s commitment to apprenticeships, however developing the skills we need to build tomorrow’s infrastructure takes time. It can take a decade from starting an apprenticeship or training for someone to gain all the skills they need in specialist areas. With various large infrastructure projects in the pipeline, including mega projects such as HS2, our progress in addressing the skills gap needs to accelerate. If we do not do so, the result will be an increase in construction cost. This will be counter-productive and in itself will inhibit delivery.

Balfour Beatty believes that the UK’s pipeline of rail projects represents a once in a lifetime opportunity to change the face of the infrastructure workforce. These projects will create opportunities across a range of sectors to train, upskill and inspire a generation, providing existing workers and younger people with the technical skills and employment opportunities to create fulfilling careers for those of all backgrounds. These projects have the potential to drive change in the infrastructure industry, bringing in the diversity currently lacking and ensuring that the infrastructure workforce better reflects the makeup of the country. That means more women, more minorities and more young people.
Maintaining a steady course

As noted in the Office of Rail and Road’s (ORR) Periodic Review 2018 (PR18) consultation document which considers Network Rail’s outputs and funding for CP6, the fiscal environment is likely to be constrained during the next control period, for a number of reasons. In September 2014, Network Rail was reclassified as a public sector organisation and taken under direct government control. This saw the redesignation of its debts onto the Government’s balance sheet, debts which are predicted to reach £51 billion by the end of CP5. Furthermore, Network Rail now has to borrow directly from the UK government and is subject to strict borrowing limits. It can no longer raise additional debt to manage the risk of any possible overspend, for example, in response to increasing project costs or requests to change the scope of schemes. Already as a direct result, two major electrification projects on the Trans-Pennine and Midland Main Lines were delayed, while the whole CP5 programme was reconfigured to keep the £38bn CP5 spending programme in budget. Many of the electrification costs of both schemes will now fall within CP6.

In addition, it has been well-documented that Network Rail’s wider programme of renewals and enhancements is also running behind schedule and over budget. In June 2015, the ORR reported that renewals cost 19% more than expected in 2014-15, and that costs have increased significantly on a number of rail enhancement projects compared with Network Rail’s initial estimates, although the ORR acknowledges that this is largely due to: “...supply chain issues, delays in programmes, contractor performance, more work than expected to keep its assets in an appropriate condition, in some areas lower volumes of work than expected so higher unit rates, and the effect of severe weather.”

At the same time, it is important to note that Network Rail has successfully delivered a number of critical projects over the same period, including the Thameslink and Crossrail programmes, the re-opening of the Dawlish line, the new Reading station and the modernisation of Birmingham New Street station, as well as improvements in the safety and the reliability of railway assets. Many of these schemes have been delivered by Balfour Beatty in conjunction with Network Rail.

However, the overspend caused Sir Peter Hendy to announce in his report on the CP5 programme that, while all of the schemes would go ahead, many of them would be delayed until CP6, most with additional costs.

The three main consequences of these delays are that:

1. Network Rail will be in a worse position financially at the start of the next control period than expected, increasing the financial pressure on CP6.
2. There will be a negative impact on investment in new equipment and resources and on research and development. While Network Rail encourages suppliers to invest in equipment, temporary works innovation and material technology, in reality, suppliers are less likely to invest if there is uncertainty around the pipeline of work. For example, Balfour Beauty’s High Output Overhead Line Electrification Wiring Train, which provides a safer, more efficient method for installing overhead lines, has no activity scheduled following the completion of the Crossrail outer works. However, to ensure that we can continue to be able to operate the train in the future, the teams trained to operate it will need to be kept together, trained and occupied. The infrastructure industry needs to take a long-term view in order to plan its investments in equipment and R&D.
3. As CP5 draws to a close with many of its schemes pushed back to CP6, there is likely to be a hiatus in activity for skilled workers in the rail infrastructure industry. In contrast, the beginning of CP6 and the release of new funding will then see a significant spike in activity on schemes, which contractors and the rest of the industry will need to ensure that they and their staff are ready for.

The impact to the supply chain of such a downturn in activity followed by a projected increase at the beginning of CP6, is significant. It makes it difficult for contractors to effectively retain skilled staff and ensure that they are in place when needed. There is a risk that people will drop out of the industry at a time when it should be building rail skills and capability in advance of major schemes such as High Speed 2 and Crossrail 2.

Balfour Beauty believes that significant efforts must be made to ensure that this does not happen. The risks to the success of key schemes are too significant. We therefore believe that funding should be brought forward – or otherwise supplemented through additional sources of investment – to ensure that the pipeline of investment is maintained at a steady level to ensure that core skills in the rail infrastructure industry are preserved.

Conclusion

The ambitious upgrade and enlargement of the UK’s rail infrastructure has the potential to drive economic expansion and provide employment opportunities for thousands of people for years to come.

However, the future success of the rail industry is inextricable from the continuity of funding – and thus project flow – provided principally by Network Rail. This is because the investments required of its supply chain partners in existing and future skills, as well as in R&D and critical strategic equipment, cannot be justified without greater demand visibility and certainty.

The projected stop-go pattern of the project pipeline – a function of Network Rail’s funding model and, in a way, its perceived performance – must be addressed and resolved as a matter of urgency. This will require the examination of better partnership ways of working, which are already proving more efficient, as well as potentially more innovative sources of funding. Otherwise, skilled engineers – be they about to retire, much in demand by other industries, aspiring recruits or foreign workers – will be lost to sectors with more reliable, steady pipelines of work. The same forces will also restrict investment in new innovation and productivity.

Such loss would intensify the already serious constraints facing the rail industry and put in question the efficient delivery of the Government’s intended infrastructure enhancements, with all their benefits.