The National Skills Academy

RAIL

The National Skills Academy for Rail (NSAR)
Skill, planning and productivity

NTAR
NATIONAL TRAINING ACADEMY FOR RAIL

www.nsar.co.uk

Professionalising the Workforce

SkillsiD

CONTEXT

- Skills shortages across all infrastructure sectors are putting at risk the National Infrastructure Plan – cost and schedule.

- Skills are not an end in their own right but one of the drivers of productivity

- Government has announced:
  - a productivity plan where skills is one of the principal drivers
  - a target of 3m apprenticeships
  - a levy to help pay for this
  - 30,000 transport apprentices
  - DfT transport skills strategy
  - RSG leading 'sector strategy' (productivity)

- DfT, organisations and individual business all recognise and are addressing the skills shortages. A strong collective response will require co-ordination and support.

- Not just engineering skills.

Update summary

Skills forecasting underway at national and now company level

Strategic workforce planning eg route

Procurement changes

Sector deal

Productivity scorecard and pilots

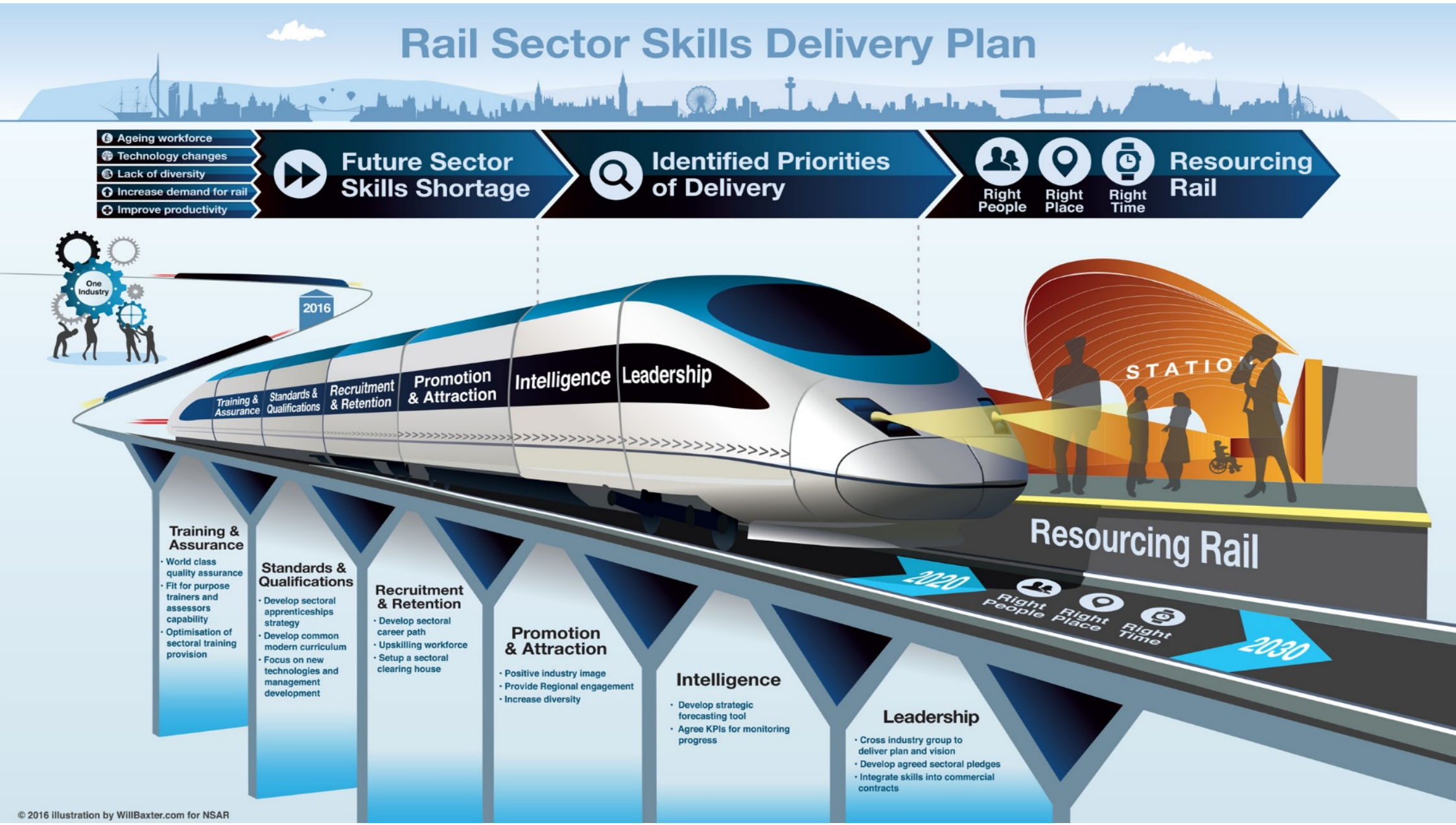
Wider economic impact - treasury

Apprenticeship levy, service and forecasts

What does this mean for me?

- **Have I got a clue about what my workforce looks like in 5 years?**
- **How can I prove I will be productive?**
- **How do I know if I am ticking the right boxes at tendering?**
- **Am I influencing the right things/people?**

Rail Sector Skills Delivery Plan



Today's Workforce (1) – Population of 223,856

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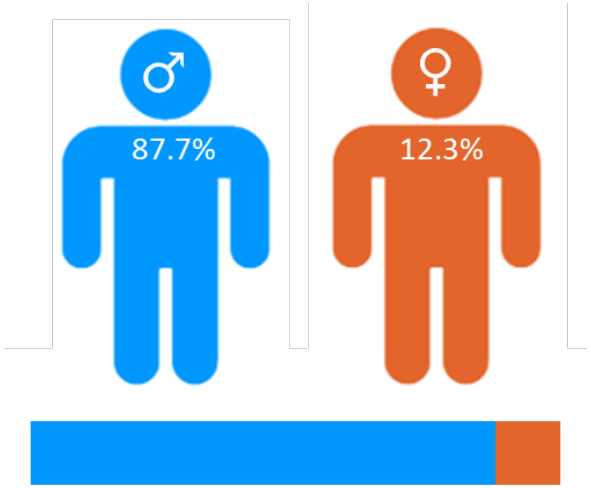

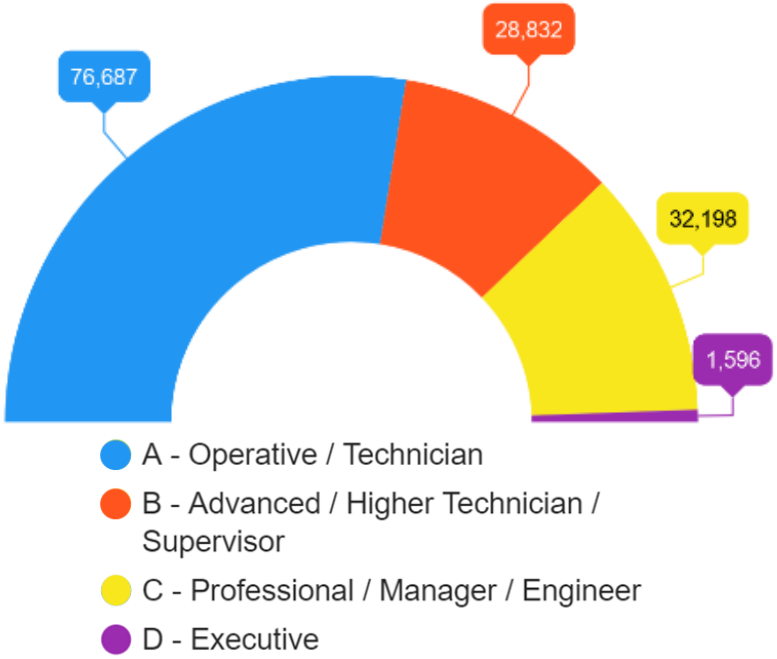

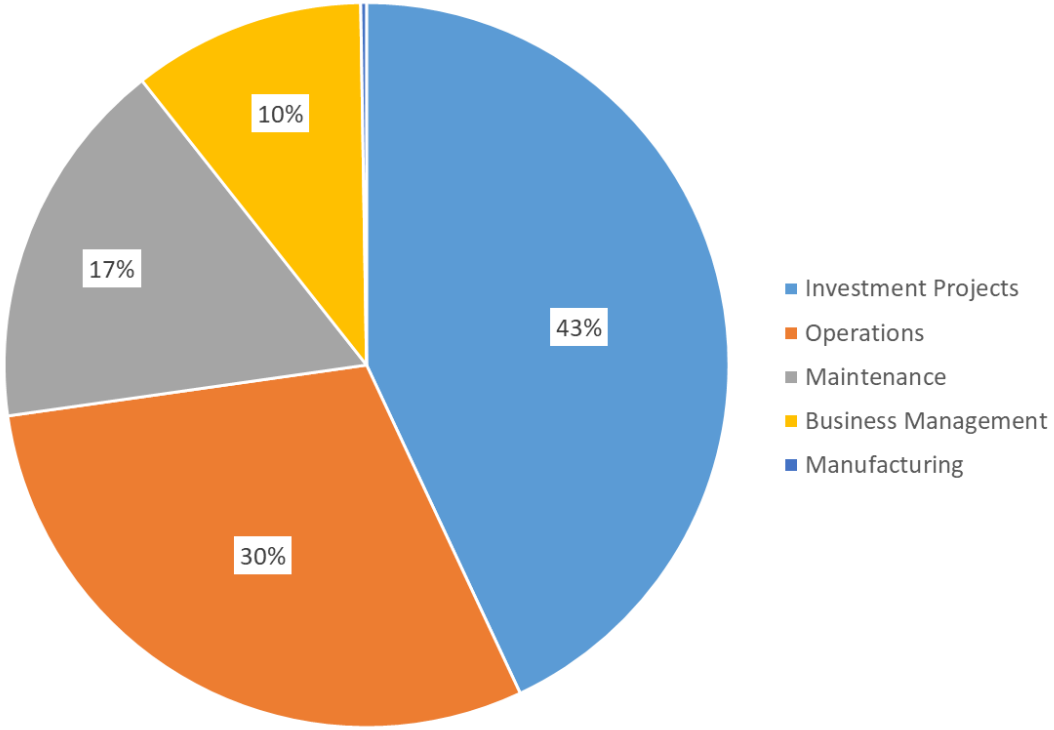

Gender imbalance is decreasing, from approximately 4% in rail engineering four years ago, the figure is now closer to 10%. More needs to be done though. Operations figures contain all TOCs. There are more staff at Level C than B, indicating multiple management layers

Today's Workforce (2) – Population of 223,856

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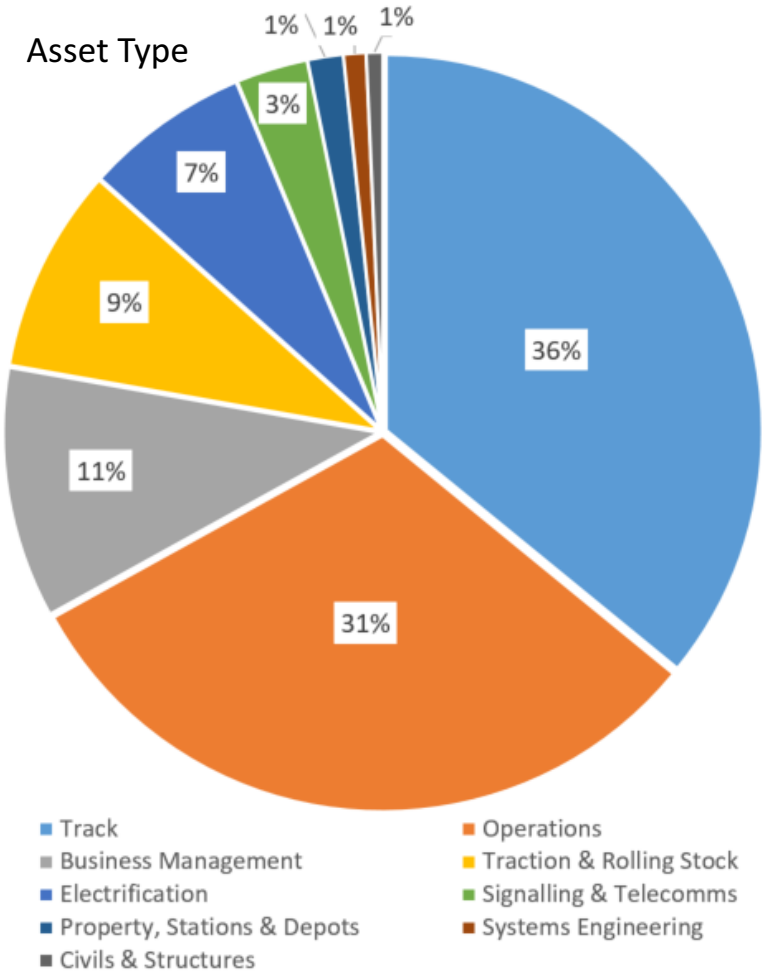
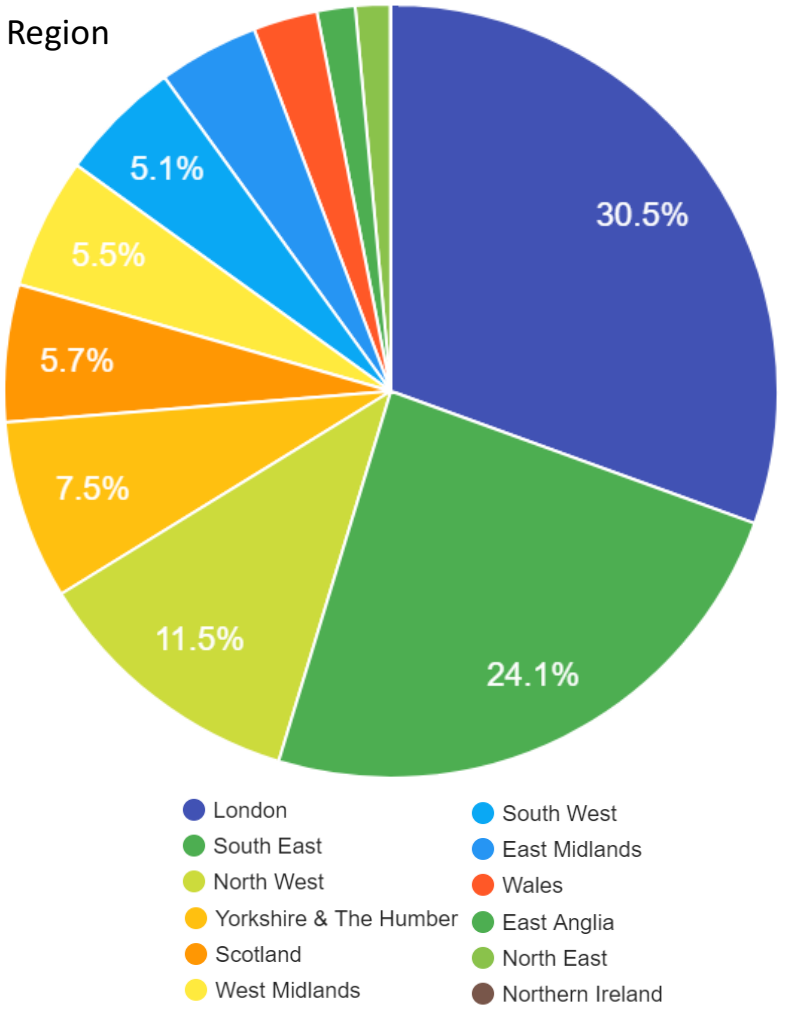
Asset Type



Region



Today's Workforce (3) – Population of 223,856

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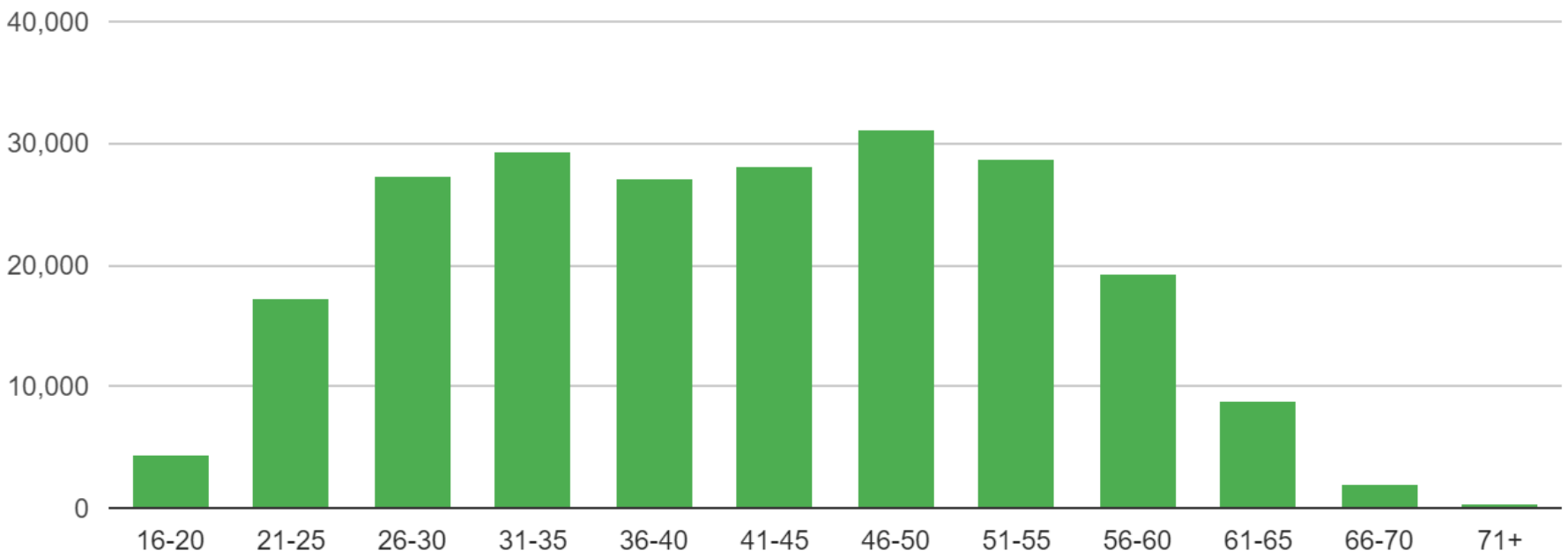

Minimum Age	16
Mean Age	42
Median Age	42
Maximum Age	90
At 65+	2.7k

Percentage under 30 years

19%

Percentage over 50 years

26%

The age profile shows the mean and the median to be the same, at 42. The 46-50 age category depicts the highest proportion of the workforce, with 14%. Just over one quarter of the workforce are over 50. These workers will need to be replaced as they retire between now and the close of CP8.

Investment Plans (1)

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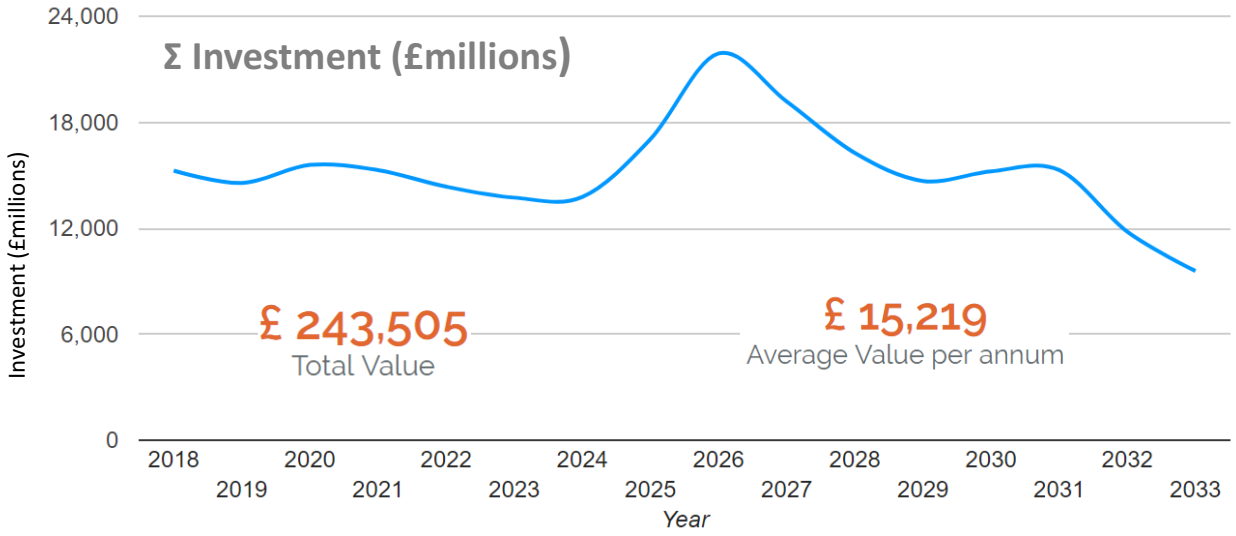

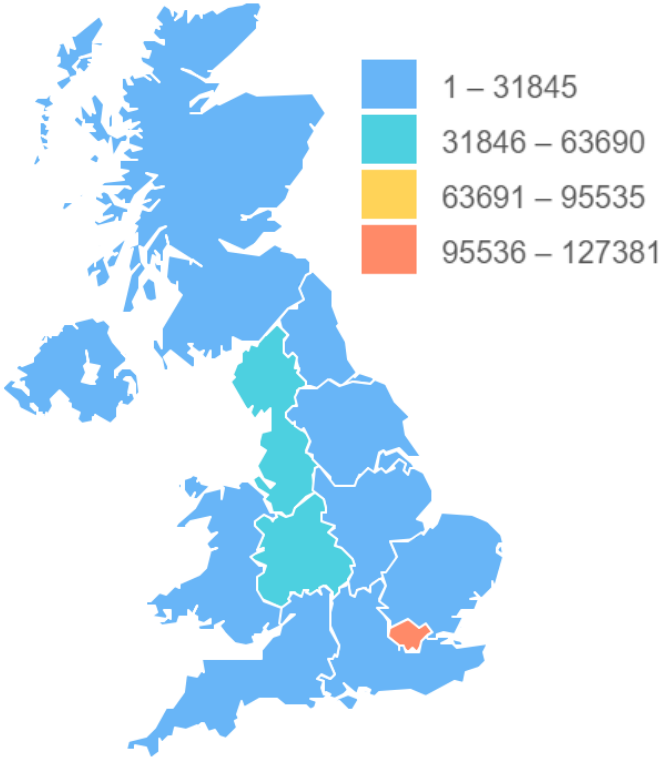

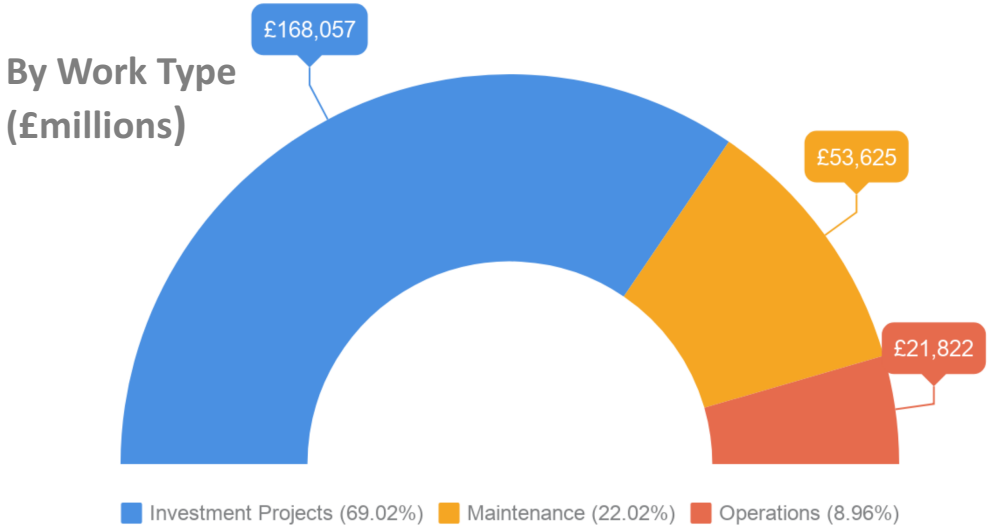

These charts show total planned investment until end of CP8 depicted over time, then proportions of investment by organisation, work type and asset. DfT is Rolling Stock

Investment Plans (2)

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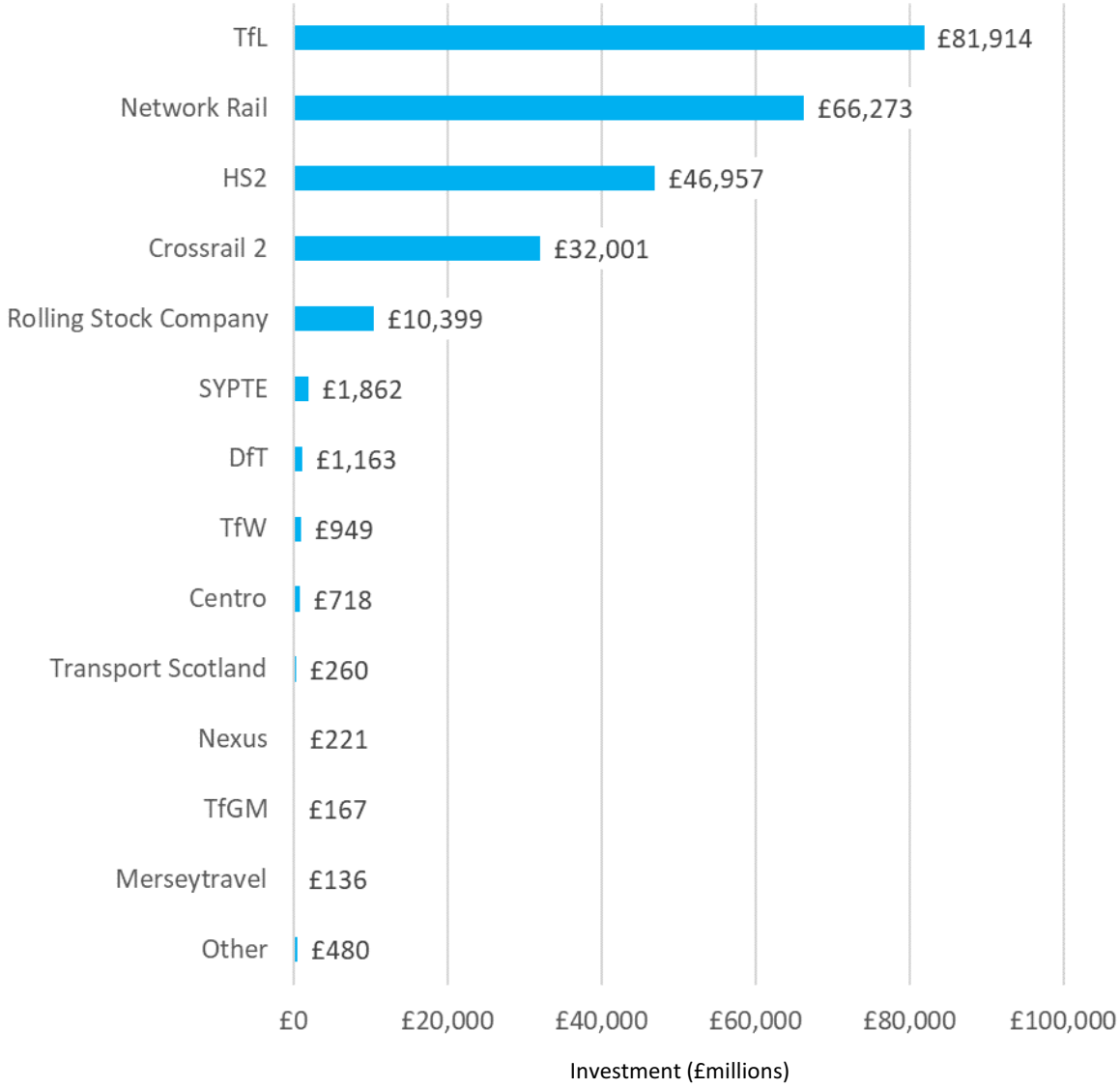
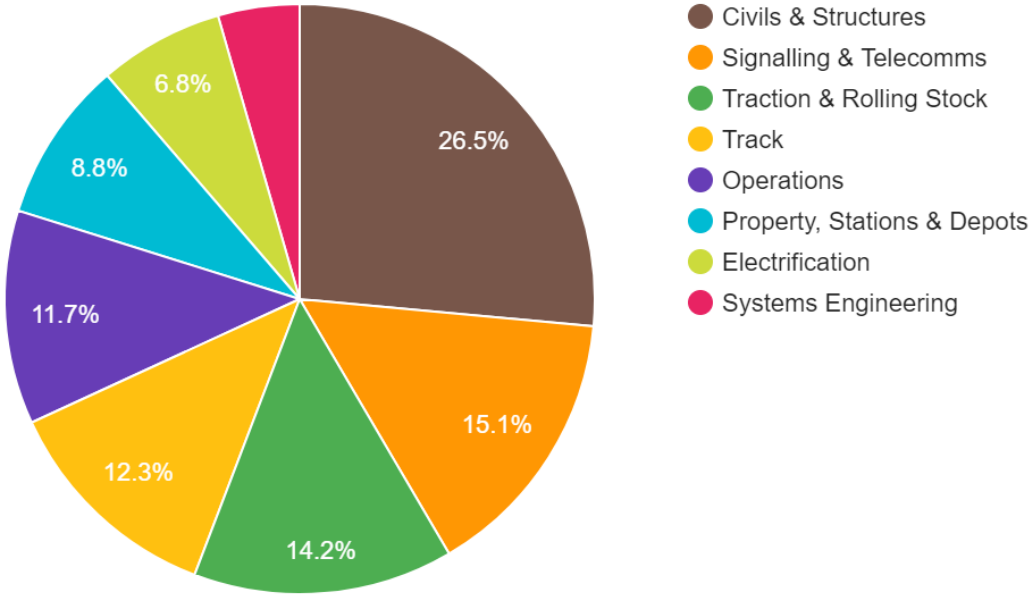
By Investor (£millions)



By Asset Type



Future Workforce (1) : Outputs : 2020 = 226,563; and 2024 = 203,038

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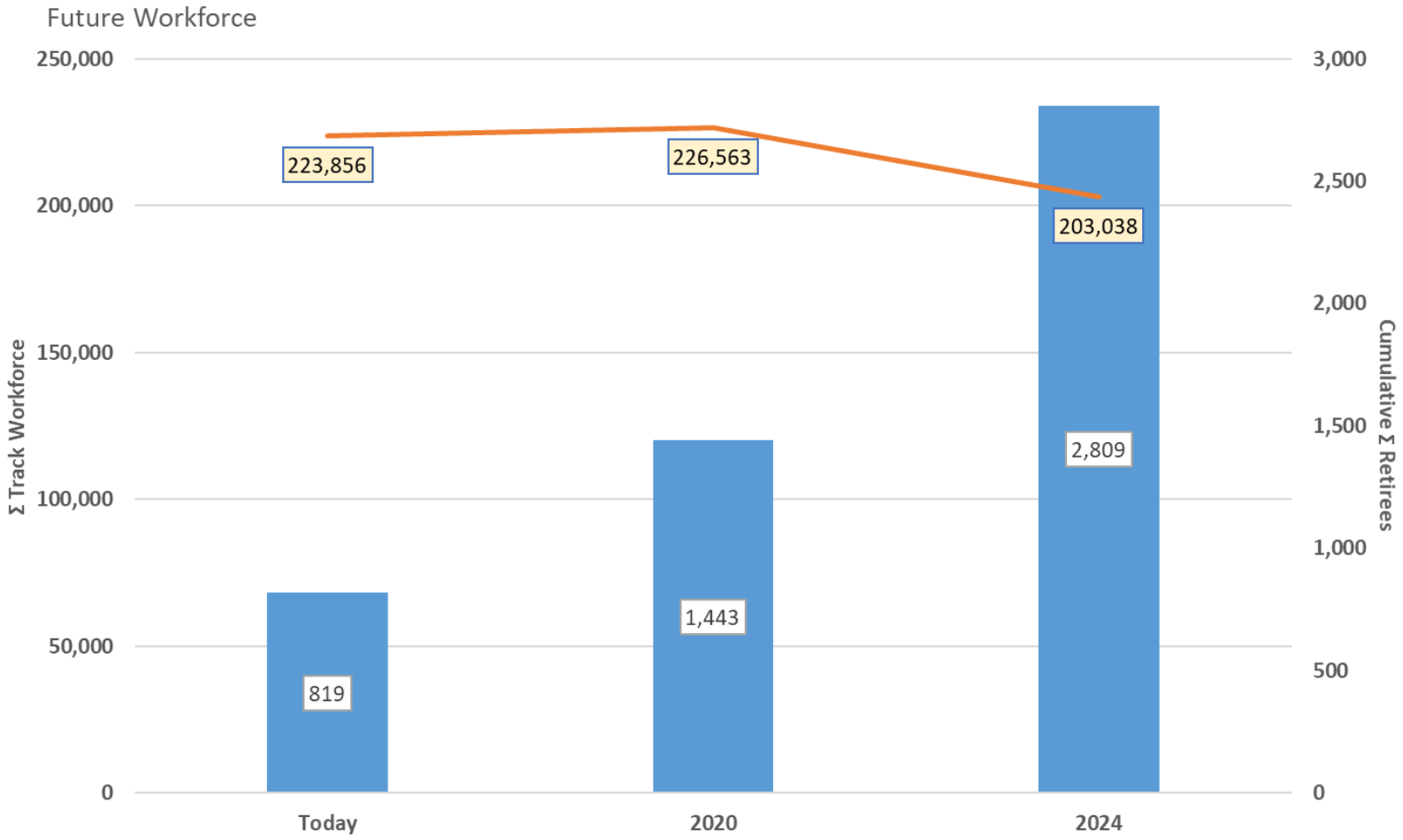

Graph showing the total future workforce required in 2020 & 2024 factoring in the cumulative number of retirees in these years also. Over these years, an average of 217,819 will be required.

Future Workforce (2) : Outputs : 2020 = 226,563; and 2024 = 203,038

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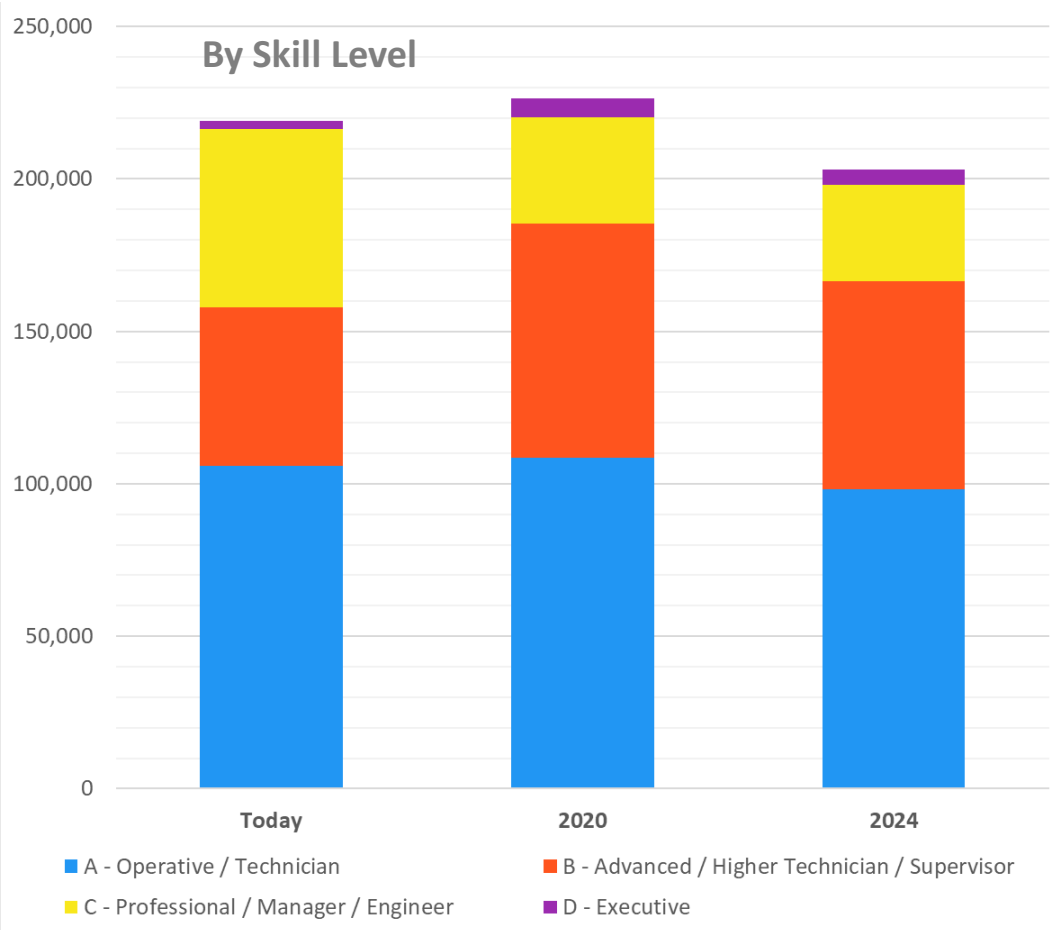
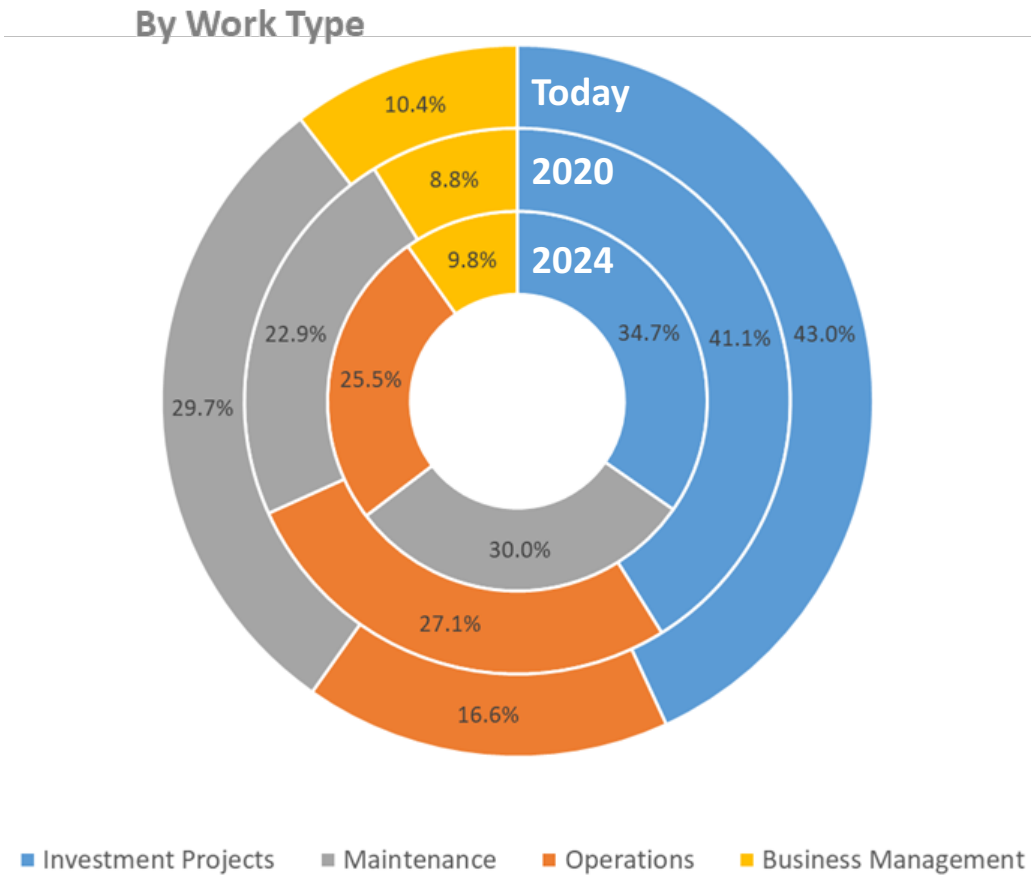


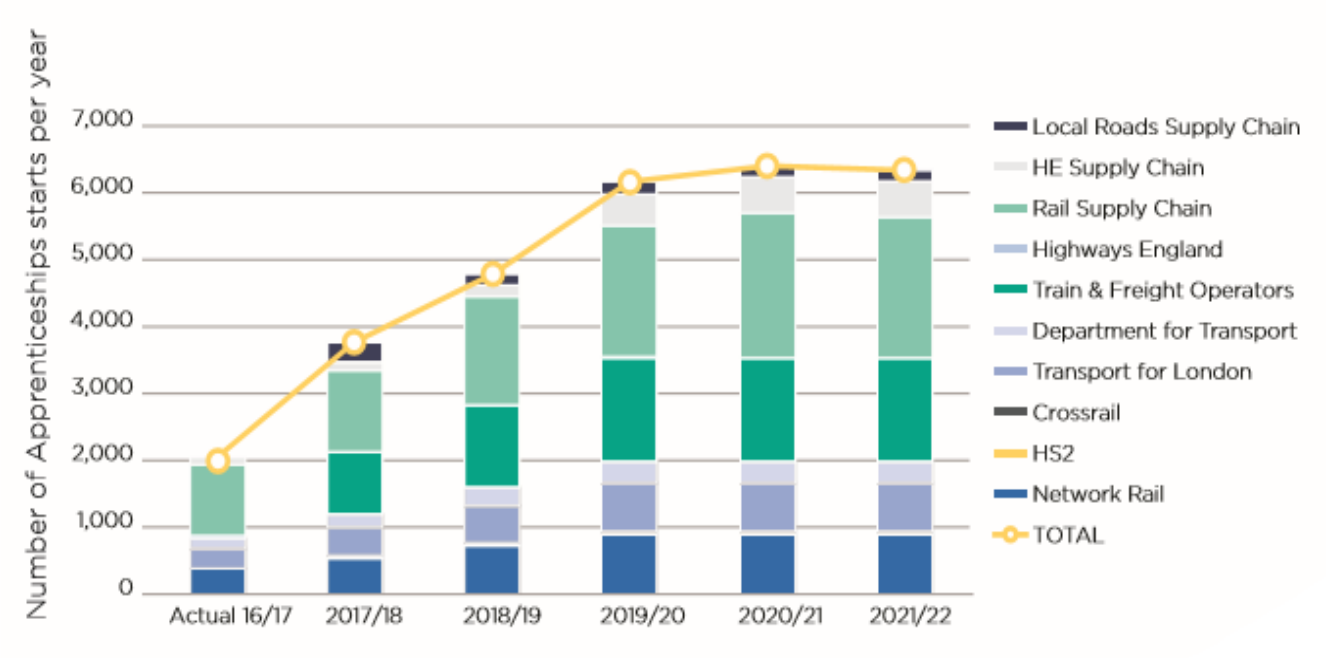


Charts showing the total predicted workforce for 2020 and 2024 compared to today's workforce presented by skill level (left), and proportionally by work type (right).

Future Demand

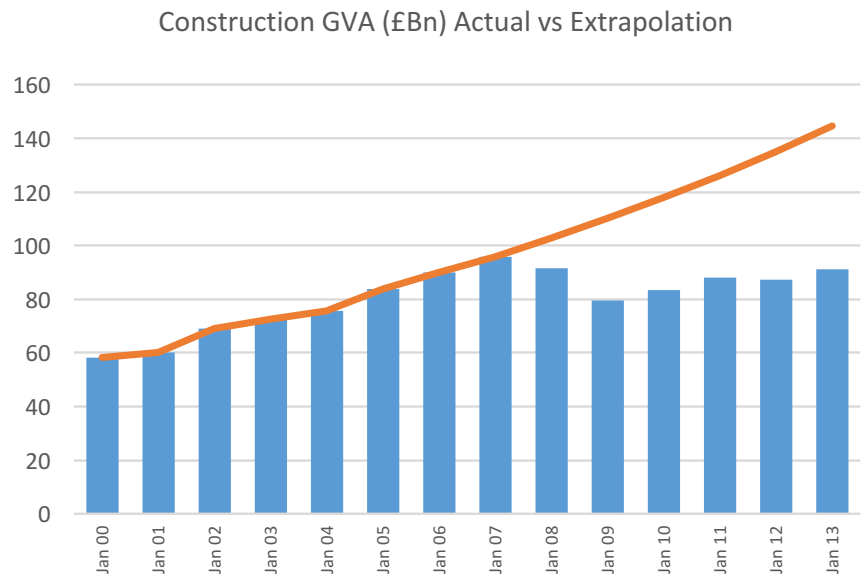
Apprenticeships

1.29 A trajectory reaching 5,000 and 8,000 apprentices are required per year in road and rail, corresponding to 27,000 to 35,000 apprentices during the years to 2022. We estimate that approximately half this number will be new joiners and half existing workforce being upskilled. The charts below show the lower end of this range.

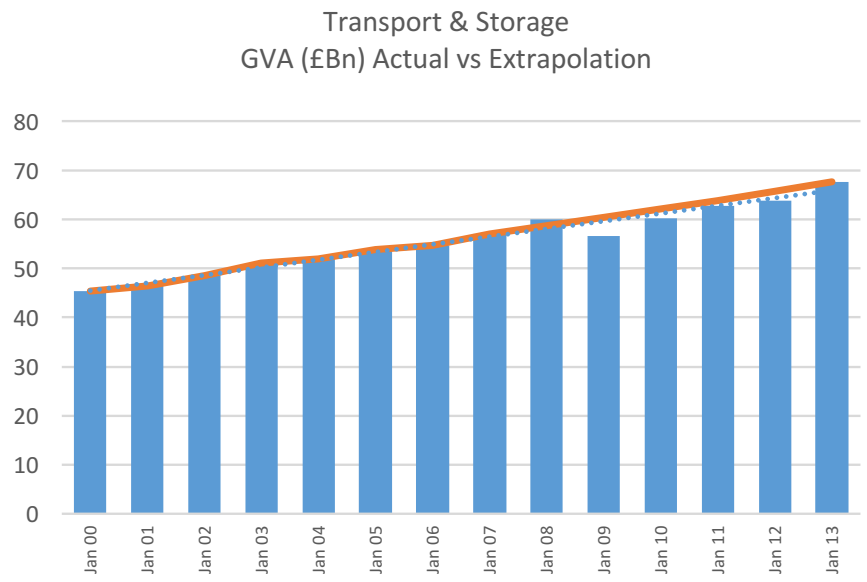


Construction unlike Transport & Storage has failed to return to trend productivity suggesting over capacity

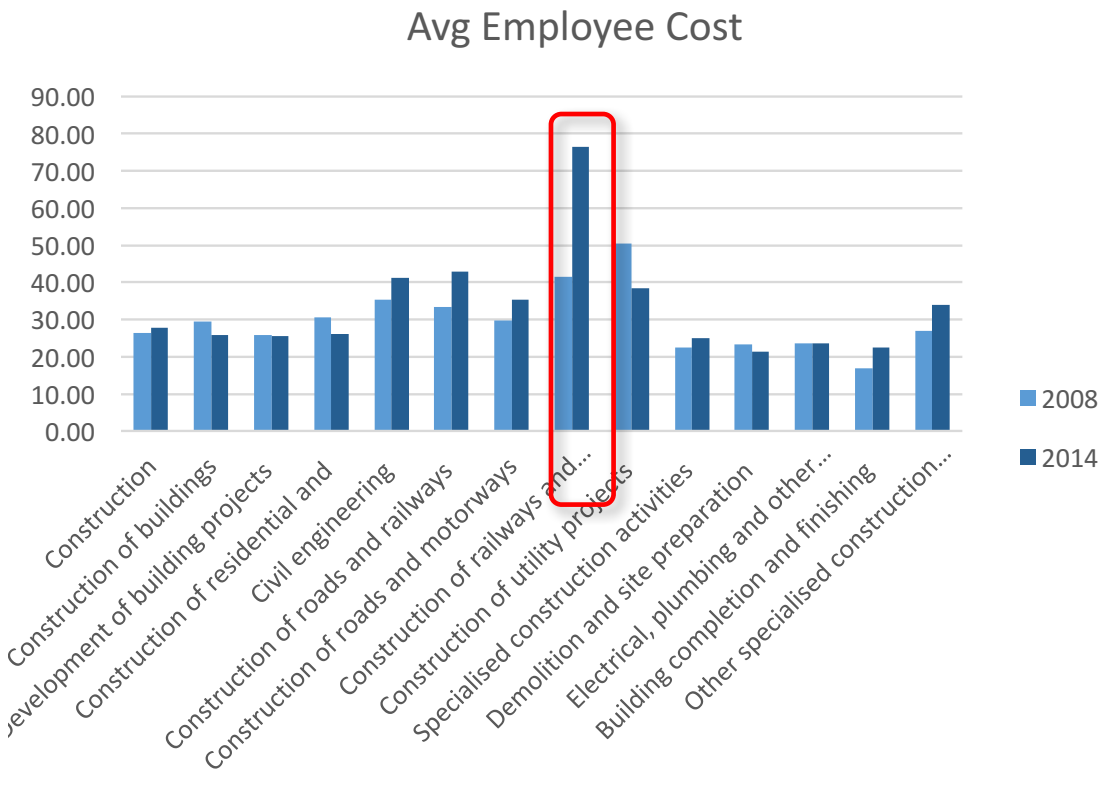
Construction



Transport & Storage



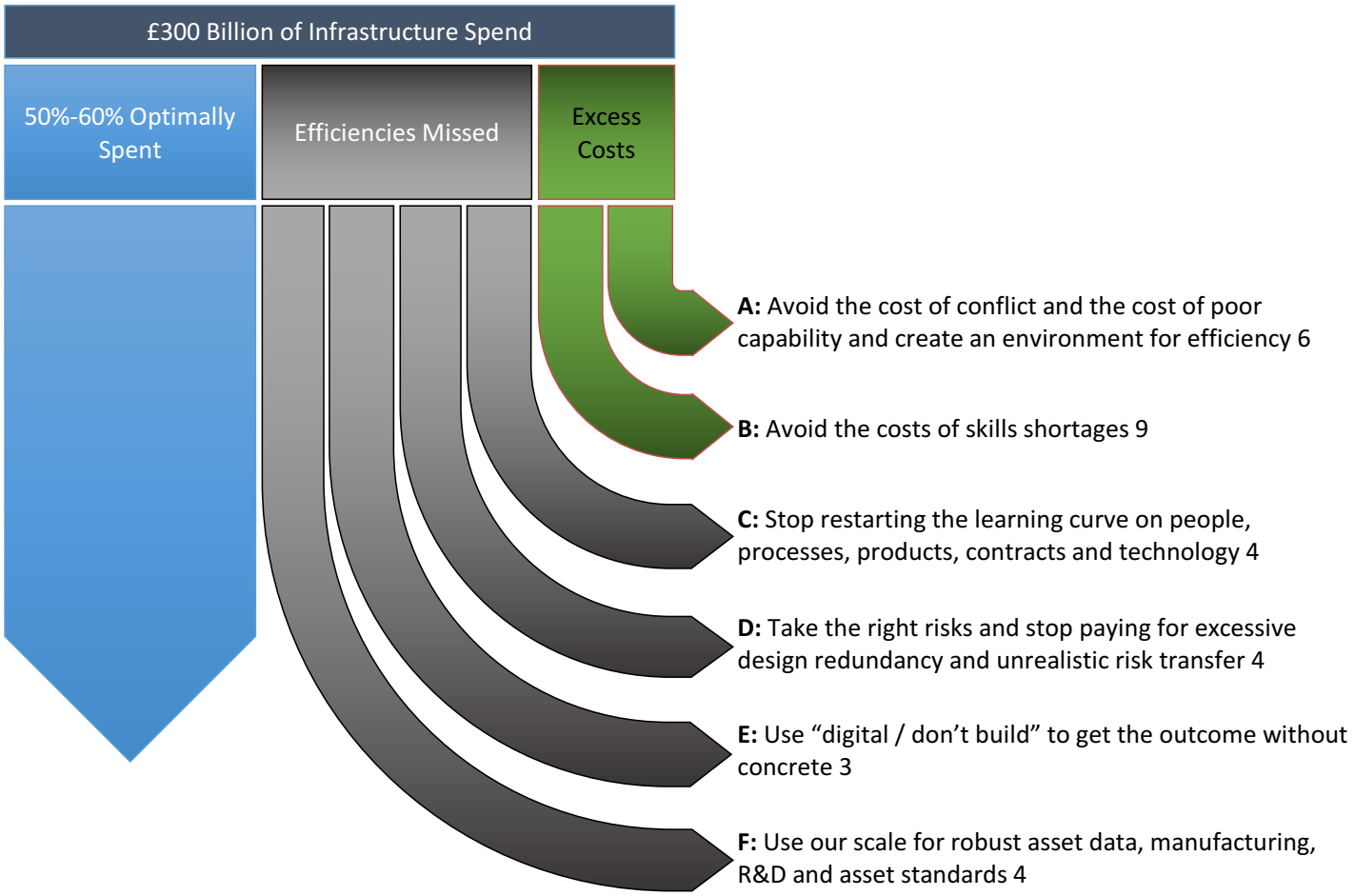
There is evidence of significant wage inflation in rail construction; a significant contrast with construction as a whole. This would be unlikely to occur if sufficient, trained resource was available.



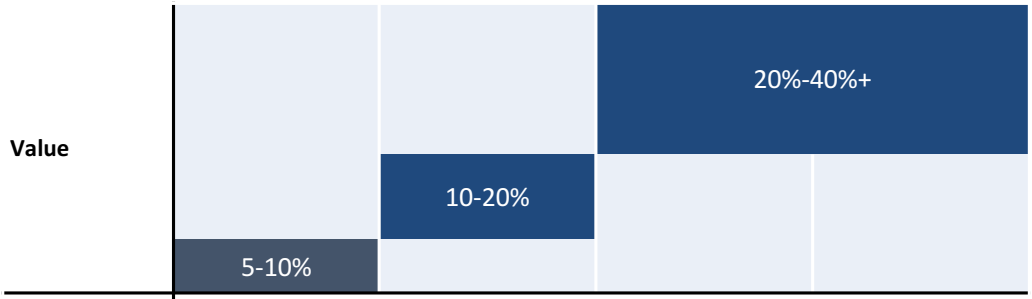
Notes:

- In the construction sector overall the cost per worker only went up by 5% between 2008 and 2014.
- In rail construction the average employee cost rose by 85% over this same timeframe.
- This could be due to a lack of skills planning (so demand exceeding supply and driving up wages) or due to outsourcing the lowest cost roles (thereby shifting up the average).
- If it were due to outsourcing lower cost roles we would expect the margin to increase, as no organization would outsource low cost roles so that they cost more.
- All things being equal, if the employee cost had stayed flat, the productivity uplift (ie the efficiency component) would only have been 15% in Rail.

The study suggests that there are opportunities to avoid significant (10-30%) over-run capital costs and deliver (10-40%) efficiencies



C: Stop restarting the learning curve on people, processes, products, contracts and technology



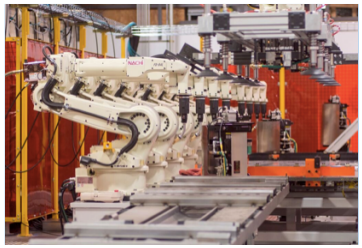
Timeframe	0-18	18-36	36-48	48+
People	Team Dynamics	Workforce leveling, Training	Long term career development	Culture change
Processes	Explicit method reuse	Documented processes	Continuous process improvement	ISO standards for continuous delivery
Designs	Design templates	Repeat building same asset	Standard Assets	DfMA Asset Standards
Contracts	Heavy lifting to document intent	Reuse / extend same framework	Small changes	Repeatable standard call off
Technology	Project tools and templates	Automated design and reporting	Whole life asset management	Digital replicas of assets
Resourcing	Consultants, contractors & sub contracts		Employees, trainees and long term-supplier relationships and talent development	

"We actually had "negative certainty" we all knew [department] would cancel the project but they and the minister were refusing to blink … so £100m was wasted." It was "their risk" [the supply chain's] but that money still needs to be recovered somewhere ."

"It is like turning up on the station every day and demanding the cheapest single … when you could have just bought a season ticket and saved a boatload."

"I remember building 5 terminals in Azerbaijan to exactly the same standard. It was hard work avoiding changes but the fifth came in 30% under budget."

F: Use our scale for robust asset data, manufacturing, R&D and asset standards




Lever	Typ. % Impact	Maturity Level					
		0	Level 1 – Initial	2	Level 3 - Developing	4	Level 5 - Mature
Standard Assets & DfMA	**10%-30%**		More than 50% of asset value is procured from a set of regional standard assets (above the base component level)		There is a national set of standard asset components and more than 50% of asset value is spent on these items. There is a Quality Management System and Product Management System in place.		The QMS is well established and the supply chain is building compliant products that are designed, assembled and commissioned efficiently.
Asset Data	**10%-20%**		Periodic attempts to systematically collect asset data for projects.		The value of asset data is defined **and** asset data is systematically collected **and** asset data quality is defined.		Collection of asset data is embedded in the organisation's processes. The data quality is assured and the organisation is confident to act on the basis of asset data. The expected value is being delivered.
Asset Standards	**5-10%**		Asset Standards are systematically collated for asset types		Asset Standards are "delayered" to provide a single coherent reference with no inconsistency for major asset types		"Principle based" asset standards are in place where designers have the mandate to innovate to provide same outcomes with different approaches.
R&D	**5-10%**		Regional or local innovation focused on 1-3 year horizon with results shared locally		National sharing of R&D results or national portfolio or national integration with horizon 3 (5yr+) innovation		R&D shared nationally, with portfolio of horizon 1 (1-3yr) and horizon 2 (3-5yr) research targets. Tight integration with sources of horizon 3 (5yr+) innovation.

C: Policy vs Reality: The erosion of the investment time horizon

A	Policy certainty	<1 yr	2-3 years	8 yrs
B	Political / Regulatory (odds of intervention)	50%	10%	1%
C	Funding uncertainty (odds of reshaping)	50%	10%	1%
D	Market share certainty (odds of coming to supplier)	15%	50%	100%

Rail company supplier on a no volume framework
Time Horizon =
5*85%*85%*25%
~ 11 months

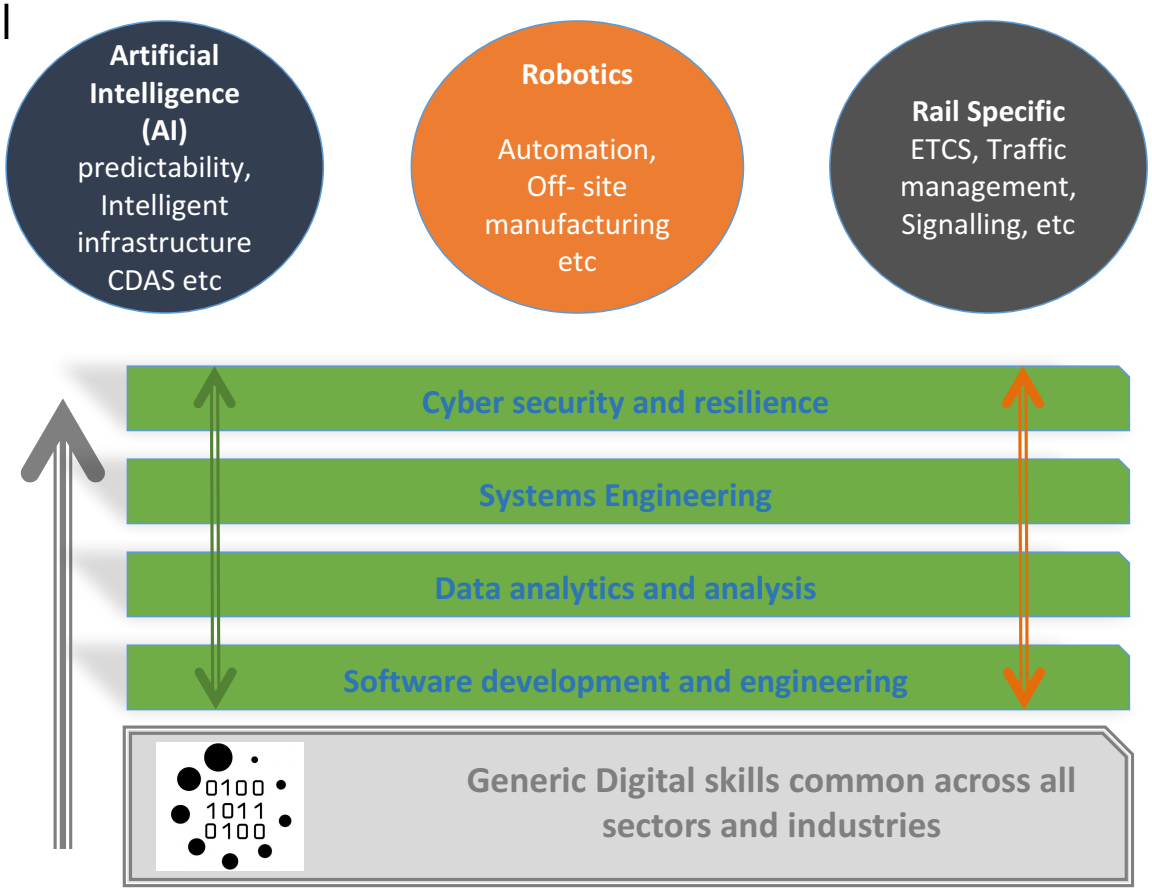
Water company supplier appointed before AMP starts.
Time Horizon =
5*99%*99%*100%
~ 5years

the global situation *(research from McKinsey Global Institute in May 2018)*

- **Automation will accelerate the shift in** required **workforce skills** we have seen over the past 15 years.
- Research finds that the **strongest growth** in demand **will be for technological skills**.
- This surge will affect **demand for basic digital skills as well as advanced technological skills** such as programming.
- Demand for **social and emotional skills such as leadership and managing others will rise by 24 percent**
- **Basic cognitive skills**, which include basic data input and processing, **will decline by 15 percent**
- **Demand for physical and manual skills**, which include general equipment operation, **will also drop, by 14 percent**
- **Companies will need to make significant organisational changes** at the same time as addressing these skill shifts to stay competitive
- **Competition for high-skill workers will increase**
- **All stakeholders will need to work together** to manage the large-scale retraining and other transition challenges ahead. **Firms can collaborate with educators** to reshape school and college curricula. **Industry associations can help build talent pipelines**, while labour unions can help with cross-sector mobility.

the rail industry demand

- The rail industry, and particularly the Digital Railway, will need everything from basic digital skills to cyber security and resilience capabilities
- These skills are largely sector agnostic and are increasing in their demand across the economy
- In addition, there are some other specific areas in AI (such as CDAS and Intelligent) infrastructure) where the applicability of technology will be critical.
- Finally there will be the rail specific requirements – Traffic Management, ETCS, etc that will require heavy sector and operational knowledge



what type of jobs and skills do and will we need?

- New jobs, in the areas of:
  - Software development and engineering
  - Data analytics and analysis
  - Systems engineering
  - Cyber security and resilience
  - Diagnostics and monitoring

- However, almost every existing role in the railway will require new skills:
  - Better IT skills
  - Better analytical skills
  - Better communication skills
  - Skills on the application of digital information to customers
  - Better and more agile management and leadership skills

current digital apprenticeships

Apprenticeship Title (Approved)	Level
Cyber Intrusion Analyst	4
Cyber Security Technologist	4
Data Analyst	4
Digital and Technology Solutions Degree	6
Digital Marketer	3
Infrastructure Technician	3
IS Business Analyst	4
IT Technical Salesperson	3
Network Engineer	4
Software Developer	4
Software Development Technician	3
Software Tester	4
Unified Communications Technician	3

Digital Apprenticeship Title (in development)	Level
Community Coordinator/Associate Community Manager	4
Cyber Security Technical Professional Degree	6
Data Scientist Degree	6
Digital Technology Solutions Specialist Degree	7
Digital Applications Technician	3
Digital Marketer Degree	6
Digital User Experience (UX) Professional Degree	6
IT Solution Technician	3
Network Cable Installer	3

What's the scale of the challenge?

- How many people will be affected?
- In excess of **200,000 workers** (Includes operations (both train and infrastructure), asset maintenance, and relevant parts of corporate services and renewals / enhancements)
- Assume all need either:
  - Upskilling (modest training - 55% of the requirement) or
  - Reskilling (more training - 40% of the requirement) or
  - As a new entrants (apprenticeships - 5% of the requirement)
- So 110,000 need upskilling, 80,000 need re-skilling and **10,000 new Apprenticeships**
- Which equates to approximately **£600m** of training and education cost to the industry, however up to £200m could be recoverable through the Apprenticeship Levy

The train driver academy and the digital rail academy

- Both virtual – no more bricks and mortar!!
- Both operate using a virtual hub and spoke model
- Both use existing training facilities ('spokes') for delivery
- Both are looking at virtual learning environment software as part of the 'hub'
- Both use technology in a way that controls, standardises and delivers training materials
- Both enable online resource utilisation – centres, room, trainers, kit etc
- Both look at novel ways of training delivery – Virtual Reality, Augmented Reality etc
- Both link training to common competency management frameworks

so what is NSAR doing?

- We are actively supporting RDG with their thinking and development of the Train Drivers Academy with the TOCs and FOCs
- We are actively working with Network Rail on the development of their future workforce numbers and skills requirements
- We are actively working with the Digital Railway team to understand what skills will be needed, where and when to support the programme
- We have Skills Live – a programme with TfL designed to support NEETs to secure new digital based roles in rail
- We are reviewing existing Apprenticeship Standards in Digital Skills to determine what is applicable in rail
- Our role is to support industry – please use us!!

HMT – as predicted

Budget Nov 2017

Procuring for Value

In the months ahead the sector and the government will work to ensure construction projects across the public and private sectors are procured and built based on their whole life value, rather than just initial capital cost. The sector will aim to develop a procurement standard and work with the Infrastructure and Projects Authority to develop cost and performance benchmarks for assets and contractors and monitor outcomes including increased housing capacity, productivity and pre-manufactured value among other initiatives.

Industry-led Innovation

A joint commitment to invest in a transformative programme which brings together the construction, digital technology, manufacturing, materials and energy sectors to develop and commercialise digital and offsite manufacturing technologies. This will accelerate change in the infrastructure and construction sector, ensuring new technologies that can help deliver the government's planned investments in infrastructure and its 2015 commitment to deliver a million homes by the end of 2020 and half a million more by the end of 2022 are commercialised as quickly as possible.

Skills for the Future

The construction sector, with support from the government, will work closely in the coming months to drive increased investment in skills development, whilst adopting a more strategic and coordinated approach to recruitment, and equipping workers with the skills that they will need for the future. This will be achieved through a joint commitment to implement reforms to the Construction Industry Training Board to make it more strategic and industry led, and to enable the sector to make best use of funding from the Apprenticeship Levy.

Policy 2017

1. TISS one year on - June
2. SoS letter to regulator - july
3. Sofa - October
4. Budget - November
5. Industrial strategy - November
6. SoS strategic vision – November
7. TIES – December
8. TIP - December

1. More apprenticeships and more quality
2. Productivity and efficiency
3. Efficiency and skills
4. Productivity and apprenticeships
5. Productivity and apprenticeships
6. Efficiency and skills
7. Efficiency
8. Productivity and a little skills

Future

Alignment of skills and other rsg strands into scorecard

Strategic workforce planning at project level

Procurement changes

Sector deal

Productivity scorecard and pilots

Wider economic impact - treasury

Social inclusion and brexit

- **How do we backfill after brexit?**
- **How do we get 20% productivity gains in 5 years?**
- **Is 2.5% apprenticeships in the workforce enough?**
- **Is it 50/50 upskilling / new right?**
- **How can tier 1s help their supply chain?**
- **How can I use nsar connect?**