

Workforce forecasting methodology

Overview

The data provided in the Infrastructure Pipeline outlines planned investment in infrastructure projects over the next 10 years. The skills and workforce modelling uses this data and relevant labour demand models to forecast the 2 and 5 year average workforce generated by the capital investment¹. The forecasting work is undertaken by Whole Life Consultants Limited (WLC Ltd) and a consortium of skills bodies; Construction Industry Training Board (CITB), Cogent Skills, Engineering Construction Industry Training Board (ECITB), Energy & Utility Skills and the National Skills Academy for Rail (NSAR).

The work in the pipeline is split into the proportions of the work covered by each of the skills bodies named above. For instance, some projects will be entirely rail related and covered by the workforce captured by NSAR, whereas others will be a combination of construction and engineering construction, such as in the case of a power generation project. The forecasts include the workforce required for the delivery of projects in the pipeline but exclude those engaged in manufacture of components.²

The model assumes that the capital spend associated with pipeline projects, programmes and funds are “construction/engineering” values only (i.e. tender price for a contractor covering both construction and engineering construction) and exclude land costs but include the cost of enabling works.

Steps have been taken to prevent double counting in the same way as the main Pipeline – see Pipeline methodology ([link](#)).

Each item in the pipeline will demand a different amount of construction and engineering, both in terms of the development phase (e.g. design, procurement, planning) and actual delivery. These inputs will occur at different stages of the project lifecycle.

For **projects**, assumptions have been made about the timing of early design work based on the project’s duration and value. These assumptions do not apply to **programmes**, as design activity continues throughout their duration to support individual projects. Programmes therefore assume that design and construction activity run concurrently.

¹ In the cases of HS2 and Sizewell C, a modelled approach was not used to derive a forecast, but for consistency with other data, these were based on publicly available published forecasts.

² Wind off-shore energy generation was the only exception which includes manufacture of the turbines.

The workforce profiles produced encompass designers, head office support etc. as well as skilled trades and site operatives.

Labour forecasting models

Five broad categories of labour forecasting model have been used:

- Construction (WLC Ltd & CITB)
- Engineering construction
 - Rail (NSAR)
 - Engineering construction (ECITB)
 - Energy & utilities (Energy & Utility Skills)
 - Nuclear – decommissioning and new build (Cogent Skills)

Based on the title, sector and description available in the pipeline data, each of the projects in the pipeline has been allocated to the labour forecasting model which most closely aligns to the work taking place.

The models are driven by labour coefficients which are a measure for each occupation of the number of people required to deliver £1 million worth of work. The coefficients are produced for each occupation and vary depending on the type of work taking place.

Due to the different nature of the data in each of the sectors different methodologies are used. In general terms, the construction forecast relies on published data from the Office for National Statistics (ONS) which provides clear boundaries of industrial and occupational classifications. However, the engineering construction sector is not defined in the same way. As a result, these sectors rely on employer provided data to derive labour coefficients.

Presentation of workforce forecasts

Data is presented in the skills dashboard and is available for download. The numbers presented are:

- rounded³;
- aggregated by sector **or** region⁴;
- grouped occupations.

³ Workforce numbers are rounded to the nearest 25. Any values less than 25 are suppressed. Confidence intervals are not rounded.

⁴ Due to rounding the sum by sector and region and may not be identical.

The workforce data is published as a 2-year average and a 5-year average. The 2-year average includes data for 2025/26 and 2026/27 and the 5-year average includes data for 2025/26 to 2029/30.

The workforce by region is the workforce generated by the work taking place in that region, rather than necessarily being located in that region, given elements such as offsite construction, head offices and design. Occupational groupings that have been assumed as taking place in the region for this skills modelling have been marked with an asterisk in the Annex. The dashboard has the facility to only show those occupations which are skills trades and site operatives to provide an indication of workforce which are most likely to be based in a region.

Data is presented with confidence intervals to reflect the underlying uncertainty in the data, as agreed with NISTA. The workforce modelling is based on single point labour coefficients on an occupation-by-occupation and project type basis. For construction roles, occupations are the result of the aggregation of multiple 4-digit SOC codes.

Upper and lower bounds for workforce demand in construction roles have been established using 95% confidence intervals (CI) derived from the ONS Annual Population Survey at the 4-digit SOC level. These are only available by each occupation across the whole economy and may not be specific to the construction sector. The total 5-year CI number as a proportion of the corresponding APS labour figures has been utilised. Workforce demand for engineering construction roles is assumed to have same confidence interval as the most closely aligned construction occupation.

Quality Assurance

Data is quality assured in a number of ways.

- Verification of the models applied to individual pipeline items via peer review process
- Comparison with previous pipeline data to ensure consistency
- Labour coefficients are checked by reverse-calculating them from the outputs to confirm the correct values were used

Annex A: Occupational groups – Construction

The following report from CITB sets out the Standard Occupational Classification (SOC) codes for each of the construction occupational groups:

https://www.citb.co.uk/cwo/reports/cwo_explained.pdf

*Skilled trades & Site operatives

Occupational group name	List of job roles and occupations included
Architects	Architects
Construction civil engineers	Civil engineers
Construction project managers	Construction project managers
Construction trades supervisors*	Construction trades supervisors
Directors, executives and senior managers	Directors, executives and senior managers
Electrical & plumbing/HVAC*	Electrical installation trades Plumbing and HVAC trades
Labourers & groundworkers*	Groundworkers Labourers
Non-construction professionals and technical office-based staff	Non-construction professionals and technical office-based staff
Other construction support operatives*	Logistics Non-construction trades and operatives
Other non-construction office-based staff	Other non-construction office-based staff
Other professionals and technical staff working in construction	Other professionals and technical staff working in construction
Plant operatives & mechanics/fitters*	Plant mechanics/fitters Plant operatives
Road and rail construction operatives*	Road and rail construction operatives
Skilled construction trades*	Bricklayers and masons Carpenters and joiners Floorers and wall tilers Glaziers and window trades Other construction and building trades Painters and decorators Plasterers Roofers Scaffolders Steel erectors and metal workers
Surveyors	Surveyors

Annex B: Occupational groups – Engineering Construction

*Skilled trades & Site operatives

Occupational group name	List of job roles and occupations included
Civil and structural engineering construction	Architectural engineers Architectural supervisors Architectural technicians Civil and structural engineers Civil and structural managers Civil engineering apprentices and trainees Civil engineering engineers Civil engineering managers Civil engineering supervisors Civil, structural, and architectural engineers Civil, structural, and architectural managers Construction engineers Construction managers Construction professionals Construction semi-skilled Construction supervisors Geotechnical engineers Geotechnical professionals
Engineering construction commissioning / decommissioning*	Commissioning (electrical) engineers Commissioning (electrical) technicians Commissioning (instrumentation and control) engineers Commissioning (instrumentation) engineers Commissioning (instrumentation) technicians Commissioning (mechanical) engineers Commissioning engineers Commissioning managers Commissioning professionals Commissioning supervisors Commissioning technicians Decommissioning (subsea) technicians Decommissioning craft Decommissioning managers Decommissioning professionals
Engineering construction design	Design (architectural) technicians Design (civil and structural) technicians Design (civil) engineers Design (civil) technicians Design (civil, structural and architectural) technicians Design (electrical and instrumentation) technicians Design (electrical) engineers Design (electrical) technicians

	Design (electrical, instrumentation and control) engineers Design (electrical, instrumentation and control) technicians Design (hvac) technicians Design (instrumentation and control) engineers Design (instrumentation and control) technicians Design (instrumentation) supervisors Design (instrumentation) technicians Design (mechanical) engineers Design (mechanical) technicians Design (pipeline) technicians Design (piping) apprentices and trainees Design (piping) engineers Design (piping) supervisors Design (piping) technicians Design (safety) engineers Design (scaffolding) engineers Design (structural) supervisors Design (structural) technicians Design apprentices and trainees Design engineers Design managers Design semi-skilled Design supervisors Design technicians
Engineering construction electrical, instrumentation and control*	Electrical (rope access) supervisors Electrical (rope access) technicians Electrical and instrumentation engineers Electrical and instrumentation managers Electrical and instrumentation professionals Electrical and instrumentation supervisors Electrical and instrumentation technicians Electrical and mechanical technicians Electrical apprentices and trainees Electrical craft Electrical engineers Electrical fitters craft Electrical fitters semi-skilled Electrical maintenance supervisors Electrical maintenance technicians Electrical managers Electrical professionals Electrical semi-skilled Electrical supervisors Electrical technicians

	Electrical technicians supervisors Electrical technicians Electrical, instrumentation and control engineers Electrical, instrumentation and control technicians Instrumentation and control apprentices and trainees Instrumentation and control craft Instrumentation and control engineers Instrumentation and control managers Instrumentation and control professionals Instrumentation and control supervisors Instrumentation and control technicians Maintenance (electrical) engineers Maintenance (electrical) technicians
Engineering construction HSQE*	Corrosion engineers Environmental engineers Environmental managers Environmental professionals Health and safety apprentices and trainees Health and safety engineers Health and safety managers Health and safety professionals Health and safety supervisors Health and safety support Health and safety technicians Health physics professionals Integrity engineers Integrity managers Integrity professionals Integrity supervisors Integrity technicians Material control technicians Material controls engineers Material controls professionals Material controls supervisors Materials (piping) engineers Materials engineers Materials managers Materials professionals Materials semi-skilled Materials supervisors Materials technicians Non-destructing testing (rope access) supervisors Non-destructing testing (rope access) technicians Non-destructing testing engineers Non-destructing testing supervisors Non-destructing testing technicians

	Quality assurance/quality controls (electrical) technicians Quality assurance/quality controls (mechanical) professionals Quality assurance/quality controls (rope access) engineers Quality assurance/quality controls (rope access) professionals Quality assurance/quality controls (welding) technicians Quality assurance/quality controls apprentices and trainees Quality assurance/quality controls engineers Quality assurance/quality controls managers Quality assurance/quality controls professionals Quality assurance/quality controls supervisors Quality assurance/quality controls technicians Radiological protection engineers Radiological protection professionals Radiological protection supervisors Safety case engineers Safety case managers Safety engineers Safety technicians Testing engineers Testing managers Testing supervisors
Engineering construction insulation*	Asbestos removal engineers Asbestos removal semi-skilled Asbestos removal supervisors Blasters and painters (rope access) craft Blasters and painters (rope access) semi-skilled Blasters and painters (rope access) supervisors Blasters and painters apprentices and trainees Blasters and painters craft Blasters and painters semi-skilled Blasters and painters supervisors Insulation (rope access) craft Insulation (rope access) engineers Insulation (rope access) supervisors Insulation craft Insulation engineers Insulation semi-skilled Insulation supervisors Insulation technicians
Engineering construction mechanical*	Drilling engineers

	HVAC engineers HVAC managers HVAC technicians Maintenance (mechanical) engineers Maintenance (mechanical) technicians Mechanical (subsea) technicians Mechanical apprentices and trainees Mechanical engineers Mechanical fitting apprentices and trainees Mechanical fitting craft Mechanical fitting semi-skilled Mechanical fitting supervisors Mechanical maintenance technicians Mechanical managers Mechanical professionals Mechanical supervisors Mechanical technicians Naval engineers Naval professionals Naval supervisors Stress (piping) engineers Stress engineers Structural engineers Structural technicians Subsea engineers Subsea technicians Turbine technicians
Engineering construction operatives*	Cabling semi-skilled General operatives (rope access) semi-skilled General operatives semi-skilled General operatives supervisors General supervisors (rope access) supervisors General supervisors supervisors General technicians (rope access) technicians General technicians engineers General technicians technicians Labourers semi-skilled Maintenance supervisors Maintenance technicians Unidentified semi-skilled
Engineering construction process*	Chemicals engineers Chemicals managers Chemicals professionals Process engineers Process managers Process professionals

	Process supervisors Wells engineers Wells managers Wells supervisors
Engineering construction production and operation*	Operations engineers Operations managers Operations professionals Operations supervisors Operations support Operations technicians Operators semi-skilled Production engineers Production managers Production technicians Production technicians (operations) technicians Production technicians apprentices and trainees Production technicians supervisors
Engineering construction rigging and lifting*	Lifting engineers Lifting managers Lifting semi-skilled Lifting supervisors Rigging (deck crew) craft Rigging (steel erectors) craft Rigging apprentices and trainees Rigging craft Rigging supervisors Steel engineers Steel erecting craft Steel erecting supervisors
Engineering construction support	Administrative apprentices and trainees Administrative managers Administrative support Asset management engineers Asset management managers Asset management support Cleaning semi-skilled Cleaning supervisors Cleaning technicians Commercial apprentices and trainees Commercial engineers Commercial managers Commercial professionals Commercial support Communications managers Communications professionals Communications support

	Compliance engineers Compliance managers Compliance support Contracts engineers Contracts managers Contracts professionals Contracts support Drivers semi-skilled Finance managers Finance professionals Finance support Helicopter crew semi-skilled Helicopter crew supervisors Human resources managers Human resources professionals Human resources support Learning and development managers Learning and development professionals Learning and development support Legal and compliance managers Legal and compliance professionals Legal and compliance support Logistics managers Logistics professionals Logistics semi-skilled Logistics supervisors Logistics support Logistics technicians Marketing (design) support Marketing managers Marketing support Personal assistants support Quantity surveyors apprentices and trainees Quantity surveyors managers Quantity surveyors professionals Security managers Security professionals Security semi-skilled Security supervisors Surveyors professionals Surveyors technicians Training professionals Training support
Engineering construction systems & IT	Automation engineers Data and analysis engineers Data and analysis managers

	Data and analysis professionals Data and analysis support Integration apprentices and trainees Integration engineers Integration managers It IT (cybersecurity) engineers It IT (cybersecurity) professionals It IT apprentices and trainees It IT engineers It IT managers ITit professionals ITt support Systems (subsea) engineers Systems engineers Systems managers Systems professionals Systems technicians Telecommunications engineers Telecommunications support Telecommunications technicians
Other engineering construction skilled trades and operatives*	Cabling managers Crane semi-skilled Deck crew semi-skilled Deck crew supervisors Facilities management managers Facilities management supervisors Facilities management support Grinders craft Joiners craft Joiners supervisors Laboratory technicians Maintenance engineers Maintenance managers Maintenance professionals Nuclear engineers Other apprentices and trainees Other engineers Other supervisors Physicists professionals Plumbing craft Robotics engineers Site engineers Site engineers apprentices and trainees Site management managers Site supervisors Site support

	Strategy managers Technical management managers Technologists engineers Technologists managers Technologists professionals Unidentified apprentices and trainees Unidentified craft Unidentified engineers apprentices and trainees Unidentified supervisors Waste engineers Water engineers Water technicians
Other engineering construction	Carbon professionals Engineering management managers General management managers Other consultants professionals Other directors managers Other managers Other professionals Other support Presidents managers Products engineers Products managers Products professionals Unidentified managers Unidentified other Unidentified professionals Unidentified support Waste professionals Water professionals
Piping and pipefitting*	Engineering management (piping) managers Instrument pipefitters craft Pipefitters and mechanical fitting craft Pipefitters and mechanical fitting supervisors Pipefitting (rope access) craft Pipefitting apprentices and trainees Pipefitting craft Pipefitting supervisors Pipeline (subsea) engineers Pipeline engineers Pipeline managers Piping and mechanical engineers Piping and mechanical supervisors Piping engineers Piping managers Piping supervisors

Project controls	Cost controls managers Cost controls professionals Cost engineers Document controls managers Document controls professionals Estimating engineers Estimating managers Estimating professionals Planning apprentices and trainees Planning engineers Planning managers Planning professionals Procurement managers Procurement professionals Procurement support Project (civil) managers Project (commercial) managers Project (decommissioning) engineers Project (decommissioning) managers Project (electrical) engineers Project (electrical) managers Project (electrical, instrumentation and control) engineers Project (epc) managers Project (health and safety) managers Project (instrumentation and control) managers Project (it) managers Project (logistics) managers Project (mechanical) engineers Project (piping) engineers Project (risk) managers Project (waste) engineers Project (wells) managers Project controls apprentices and trainees Project controls managers Project controls professionals Project controls support Project engineering apprentices and trainees Project engineering managers Project engineers Project management apprentices and trainees Project management support Project managers Proposals engineers Proposals managers Proposals professionals
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	- Risk managers - Risk professionals - Risk technicians - Supply chain apprentices and trainees - Supply chain managers - Supply chain professionals - Supply chain support
Scaffolding for engineering construction*	- Scaffolding (rope access) craft - Scaffolding apprentices and trainees - Scaffolding craft - Scaffolding semi-skilled - Scaffolding supervisors
Welding and Fabrication*	- Fabrication craft - Fabrication managers - Fabrication semi-skilled - Fabrication supervisors - Plating (rope access) craft - Plating (rope access) supervisors - Plating apprentices and trainees - Plating craft - Plating supervisors - Welding and fabricators craft - Welding apprentices and trainees - Welding craft - Welding engineers - Welding supervisors

Annex C: Occupational groups – Rail

*Skilled trades & Site operatives

Occupational group name	List of job roles and occupations included
Rail engineering/operative roles*	Advanced apprentice Architect Assistant engineer Director Engineer Engineering manager Fitter Head of engineering Higher apprentice Intermediate apprentice Operative Principal technical officer Supervisor Technical Officer Technician Tester Tradesperson
Rail IT/Software	Analyst Analytics manager Head of IT & Technology IT & technology assistant IT & technology manager IT & technology supervisor Systems/software engineer
Rail project/commercial management	Assistant commercial manager Assistant project manager Commercial manager Head of commercial Head of project control Head of project management Project control assistant Project control manager Project management assistant Project management supervisor Project manager Senior project manager Senior sponsor Sponsor
Rail support role/manager	Administrator Business manager Co-ordinator Trainer

Annex D: Occupational groups – Energy & Utilities

*Skilled trades & Site operatives

Occupational group name	List of job roles and occupations included
Energy & utilities operative*	Electrical fitter Mechanical fitter Operative
Energy & utilities technician*	Cable jointer Linesworker Main layer Craftsperson Technician Smart meter installers
Energy & utilities engineer*	Electrical engineer Mechanical engineer Civil engineer
Energy & utilities support role/manager	Project manager Quantity surveyor Data analyst
Energy & utilities technical manager/director	Functional team leader/manager Site manager Director

Annex E: Occupational groups – Nuclear decommissioning

*Skilled trades & Site operatives

Occupational group name	List of job roles and occupations included
Nuclear decommissioning*	Business functions Engineering Operations Project and programme management Science technical health safety & environment Trades