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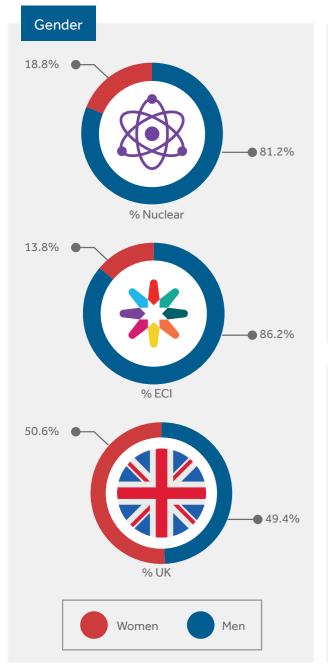
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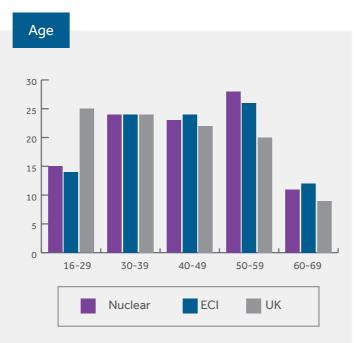
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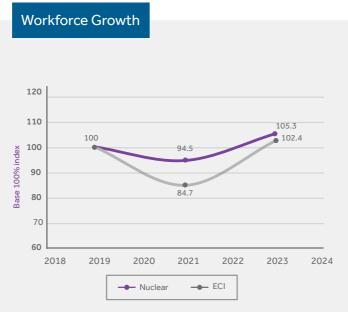
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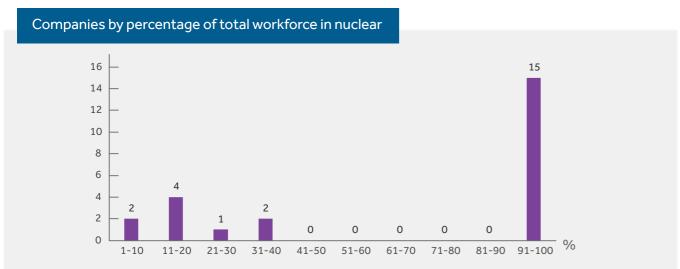
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At a glance









Executive Summary

This report is the second of the series looking at the individual sectors that make up the engineering construction industry (ECI). The general and other sectoral reports are available on the ECITB website.

The nuclear sector is the second largest in which ECI companies operate, employing 35% of the ECI workforce. This report covers 24 companies that employ 15,684 individuals for nuclear activities across 240 locations. Compared to other sectors, the nuclear sector is highly concentrated around a small number of sites and offices.

The three largest categories of workers are engineers (28%), closely followed by management and professional workers (26%), while technicians are third (17%). Two occupations clearly stand out when looking at numbers: production or process operators and mechanical engineers each represent 10% of the workforce. Furthermore, one of the features of the nuclear sector is that 2% of its workforce is made of scientists, mostly physicists.

In terms of demographics, the nuclear sector is slightly more diverse than the ECI overall when it comes to gender, with nearly 19% of the workforce being women, compared to 14% for the ECI. Much in line with what can be observed in the wider industry, the workforce is skewed towards the older end of the spectrum with 39% over the age of 50, and 15% under 30. This does not seem to impact on employers' workforce projections, as respondents for which nuclear is their main sector expect a 5.3% increase between 2019 and 2023.

However, nuclear companies struggled to fill vacancies that account for the equivalent of 5.83% of their actual workforce. This is a much higher number when compared to the ECI level of 2.6%. Whilst employers from the nuclear sector echo what can be observed for the entire ECI when mentioning the lack of qualifications as a major barrier to recruitment, they also highlight a general lack of candidates.

Findings from the ECITB 2021 Workforce
Census: An overview of the Engineering
Construction Industry showed that nuclear
is seen as a prime area of potential growth
for businesses in the industry, thus playing
an important role in the net zero transition.
Nevertheless, companies from the nuclear
sector do not identify other net zero
technologies as being of interest to them, as
they prefer to focus on their sector.

As a whole, companies from the nuclear sector saw their productivity lowered by the Covid-19 pandemic, but were less likely to use furlough than the ECI as a whole. Respondents did not compromise on training.



he Engineering Construction Industry Training Board (ECITB) is the statutory skills body for the Engineering Construction Industry (ECI) in Great Britain. A non-departmental public body sponsored by the Department for Education (DfE) and accountable to Parliament, the ECITB works with employers, governments and many others to attract, develop and qualify personnel across a wide range of craft, technical and managerial disciplines in the industry.



Employers which are mainly engaged in engineering construction work fall within the scope of the ECITB. If such 'in-scope' employers are over a certain size, they are required by law to pay an industrial training levy to the ECITB. However, all in-scope employers, regardless of size, are eligible to receive grants for training undertaken by their workers.

Engineering construction is a complex industry made up of a series of sectors specialising in the processing, maintenance and decommissioning of heavy industry, including the following:















Pharmaceuticals









· Other (for example steel processing, fabrication).

In September 2021, the Engineering
Construction Industry Training Board (ECITB)
published its ECITB 2021 Workforce Census:
An Overview of the Engineering Construction
Industry. The Census asked engineering
construction industry (ECI) employers to
provide information about their workforce
numbers, locations and roles. Data collected
between 1st March 2021 and 30th April 2021
included demographic information and
respondents were also asked for views on
workforce growth, Net Zero, Covid-19 and
Brexit.

This sector-focused report provides more detailed analysis of the data provided by companies operating in the nuclear sector.

Our analysis looks at key workforce aspects, employer confidence and perceptions, and the external factors that affect the sector. This report should be read in conjunction with the aforementioned industry overview.

This focus on an important sector for the engineering construction industry (ECI) allows for comparison not only with other sectors, but also with the ECI as a whole. Sectoral analysis allows for better understanding of trends and whether they affect the industry as a whole, or are exacerbated in certain sectors. For more details regarding the methodology and how the data was collected, please refer to our main report: ECITB 2021 Workforce Census: An Overview of the Engineering Construction Industry.

Readers should note that the census was conducted with employers in-scope to the ECITB. It is therefore not possible to say that all employers working in the industry are covered in our report. We are, however, confident that the analysis in our overview report is representative of industry. Sample sizes for particular sectors are significantly smaller than for the industry overall. We would therefore urge caution in making generalisations with regards to individual sectors.

Employers surveyed as part of this report include a mix of supply chain companies providing services into the sector and subsidiary companies to asset owners.

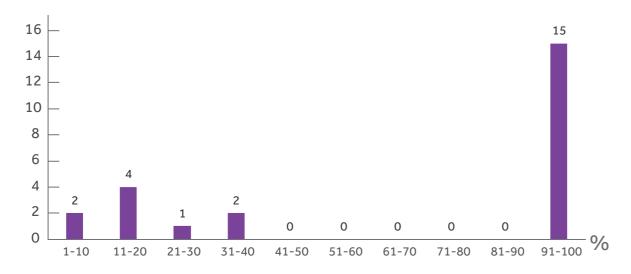


Sectoral Overview

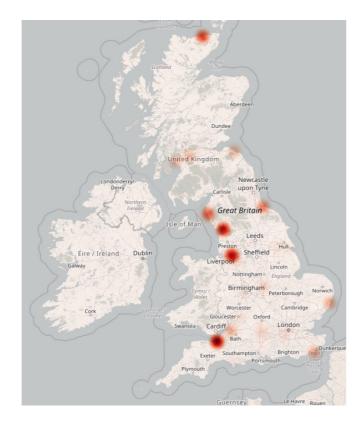
A total of 45,351 workers from 153 in-scope establishments (representing 50% of ECITB's in-scope establishments), covering 1,360 locations are captured in the Census¹. The nuclear sector is the second largest (following oil and gas) in terms of distribution of the workforce, with 35% engaged in the sector.

Twenty-four companies (16%) are involved in the nuclear sector (or have some activity in nuclear). Nuclear is the main sector for 15 of these companies (18 if we add companies working equally in several sectors). Ten of these 24 companies work exclusively in nuclear.

Nuclear companies by perc. of workforce in the sector



The 24 companies (those with at least some activity in the Nuclear sector) employ 15,684 individuals for Nuclear activities across 240 locations. The map below shows the concentration of the nuclear workforce geographically, demonstrating where relevant hotspots for the industry lie. In depth geographical analysis will follow in subsequent regional reports.





Hinkley Point C. Photo courtesy of EDF.

In the meantime, we can determine four main hotspots, collectively hosting 47.8% of the nuclear workforce:

Area	Reason for concentration	No. of workers ²	% of the nuclear workforce in the data
Bridgwater	Hinkley Point C nuclear power station	2,165	13.8%
Warrington	Headquarters of some of the largest nuclear sector contractors	2,060	13.1%
Morecambe/ Heysham	Heysham nuclear power station	1,910	12.2%
Thurso	Dounreay nuclear reactors decommissioning	1,363	8.7%

¹ ECITB 2021 Workforce Census: An Overview of the Engineering Construction Industry

² Number of declared in-scope workers in this area.

Occupational Data

The Census asked employers to provide data for their workforce by occupation and by location. We were further able to break this down by sector.

In total, the Census registered 800 occupations, which have been consolidated for the purposes of analysis³.

Category Occupation Count % Craft-689 **Electrical Fitters** 104 15.1% individuals **Pipefitters** 99 14.4% Mechanical Fitters 80 11.6% Steel Erectors 52 7.5% Pipe Welders 7.3% 50 **TOTAL** 55.9% Decommissioning Semi-210 41.8% skilled – 502 Labourers 59 11.8% individuals General Mates 54 10.8% Blaster / Painter 42 8.4% TOTAL 365 72.8% **Technicians** Production or 1.556 58% -2,682**Process Operators** individuals Design/ 12.1% 327 Draughtpersons Safety Technicians 265 9.8% TOTAL 2,148 79.9% Supervisors Mechanical 120 30.8% -389 General Foreman / 9.5% individuals Superintendent Radiation 31 7.9% Protection / Health Physics **TOTAL** 188 48.2% Occupations were split into the following general categories, which were made up of specific occupations (for example, within craft, occupations such as welding, pipefitting etc.).

Whilst these figures are representative of the ECITB in-scope nuclear workforce, it cannot be concluded at this point that these figures are representative of the wider occupational pools or indeed the entirety of the nuclear workforce.

Category	Occupation	Count	%
Engineers	Mechanical	1551	35%
- 4,407 individuals	Engineer		
	Civil & Structural	435	9.8%
	Instrument and	415	9.4%
	Control		
	Environmental	386	8.7%
	Engineer		
	Electrical Engineer	323	7.3%
	TOTAL	3,110	70.2%
Management	Project Managers	947	23.2%
and Professional	Project Controllers	323	7.9%
-	Directors &	321	7.8%
4,079	Managers		
individuals	Procurement	314	7.6%
	Specialists		
	TOTAL	1,905	46.5%
Scientists	Physicists	227	73.2%
-310 individuals	Chemists	45	15.5%
individuais	Technical Assistant	38	12.2%
	TOTAL	310	100%
Support	Health and Safety	531	27.5%
Staff – 1,929 individuals	Admin	517	26.8%
	Human Resources + Learning and Develop.	275	14.2%
	TOTAL	1,323	68.5%

³ For a full list of all occupations in the ECI please see Annex B in our main report ECITB 2021 Workforce Census: Overview of the Engineering Construction Industry. For a full list of all occupations including count referring only to the nuclear sector, please see Annex A in this report.

Perhaps unsurprisingly, the largest categories in terms of workforce are engineers (29%), management and professionals (27%) and technicians (18%).

Occupations that are particularly interesting to note are Production or Process Operators, which make up 58% of all technician roles. This could be company or site specific, but is likely still a high prevalent occupation in the sector. This appears to be a common trend within the nuclear sector, with one occupation dominating an occupational category.

Mechanical supervisors make up 30.8% of all supervisor roles (followed by general foremen at just 9.5%), and 40.9% of semi-skilled workers are in decommissioning roles. 35% of engineers are mechanical followed by only 9.8% in civil and structural engineering. Project managers make up the majority of those in management and professional roles at 23.2%, and finally, physicists make up 73.2% of all scientists. The only categories that are more thinly distributed are craft and support staff.

Welding is often cited as a shortage occupation in the sector. The Census categorised welding occupations across several sectors including craft, supervisor and engineer, to reflect the diversity of the occupation. Individually, welding occupations were not amongst the most prevalent in their respective categories. The table demonstrates the different welding occupations in their respective category along with the percentage of workers this number represents in each category:

Category	Occupation	Number	%
Craft	Pipe Welder	50	7.3%
Semi- Skilled	Welding	20	3.8%
Supervisor	Welding supervisor	16	4.1%
Engineer	Welding Engineer (Metallurgist)	16	0.36%
Total		102	0.65%

Fewer than 10 high plate welders were registered as working in the nuclear sector, however, their exact count has not been included in the table for GDPR reasons. Collectively, all welding occupations across all categories make up 0.65% of the total workforce registered in the nuclear sector. As a comparison, welders made up 1% of the total workforce from the oil and gas sector according to census data.

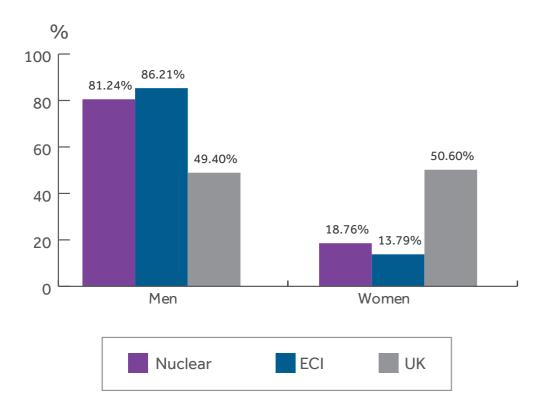
It would be safe to suggest that, if the demand for welders grows, several sectors would be impacted.

ECITB Workforce Census 2021 | Nuclear www.ecitb.org.uk 13

Gender

15 companies mainly working in the nuclear sector replied to our question about gender:

Gender profile in the nuclear sector compared to wider ECI and active UK population:

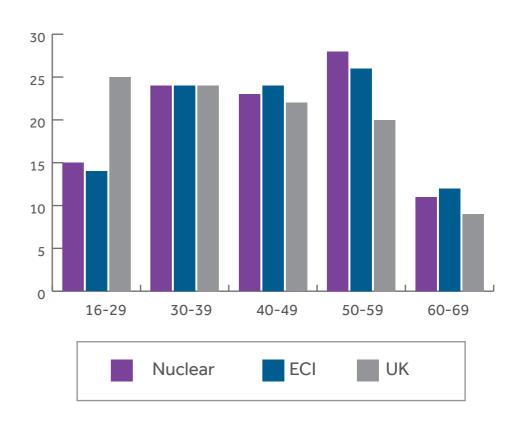


The gender split in the nuclear sector does not differ greatly from the wider ECI, and is similar to that of the oil and gas sector (13.66% women). Given the target set by the Nuclear Sector Deal of achieving a workforce that is 40% women by 2030, it is clear that the sector has much to do to achieve this aim. The Nuclear Skills Strategy Group estimates the workforce to be 23% women⁴, suggesting that the Census analysis is at least indicative of the wider nuclear sector.

Age

A total of 12 companies mainly working in the nuclear sector replied to our question regarding age:

Age profile in the nuclear sector compared to wider ECI and active UK population:



The age profile in the nuclear sector mimics the trend that was observed in the wider ECI. This is unsurprising as the nuclear sector is the second largest in the industry. The age profile is very similar to that of the oil and gas sector, and we expect the same issues to prevail.

Only 15% of the workforce is under 30 years old, whilst 39% is over 50. This is only slightly less than the bulk of the workforce in the middle age bracket of 30-49 years old (46%). We would expect an acute skills shortage if this trend continues and as more of the older age categories move into retirement.

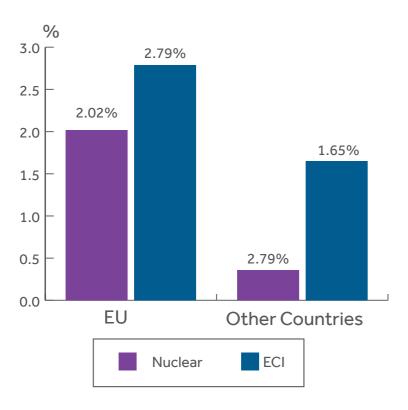
Whilst no further demographic data of note was collected, we can infer from the above that nuclear workforce is somewhat homogenous, skewed towards the older man.

9 companies working in the nuclear sector provided data on ethnicity. This figure represents 2,244 workers, of which 94.21% declared their ethnicity as white. Whilst we cannot say that this is representative, it is certainly indicative.

⁴ https://www.nssguk.com/gender-commitment/diversity/

Nationality

Eight companies replied to our question concerning nationality:



The nuclear sector employs fewer non-British workers than the wider ECI, as well as fewer than the oil and gas sector (3.48% EU workers and 1.57% workers from other non-EU countries).

There are several reasons for that: First, restrictions around security clearance are in place for roles in nuclear. Then, the ability of the UK supply chain to bid for work often depends on the availability of UK nationals. Additionally, project conditions imply that non-British workers are sometimes seconded to rather than employed by the UK, and therefore might not appear on the census data. Finally, the longevity of the work, and often Government funding, mean that companies can plan more effectively for future UK workforces than they might in other sectors.

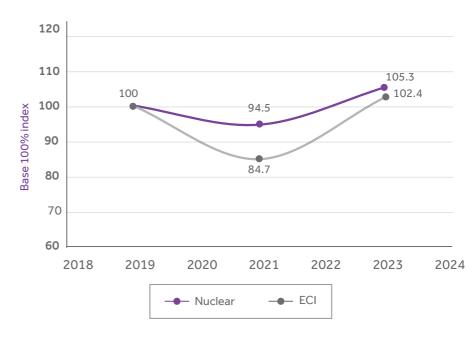
Workforce Growth

This section focusses on employer workforce growth expectations. It should be noted that this analysis is based on employer inference and expectation rather than economic modelling or forecasting.

Eleven companies working in the nuclear sector responded to our questions

surrounding workforce growth projections over the next 3 years. The graph below uses a base 100 index, equating the 2019 workforce to 100. This enables a comparison with the current situation in 2021, as well as to employer expectations for 2023. This has been compared in the graph, to the growth projections for the ECI in general.

Employer workforce growth expectations:



There are two main observations of note in this graph. The first is that the estimated drop in workforce numbers from 2019 to 2021 is not as stark as that of the wider ECI, dropping only 5.5% from 2019 figures. This is partly due to the fact that the nuclear sector was not affected by the drop in the oil price. The second is the projected growth by 2023. Whilst this may seem more optimistic than

the wider ECI (105.27% compared to 102.4%), the rate of growth is slower from the recorded 2021 figure. Employers in the wider ECI expect a workforce growth of 2.4% compared to 2019 figures and nuclear employers expect a workforce growth of 5.27% compared to 2019 figures.

16 ECITB Workforce Census 2021 | Nuclear www.ecitb.org.uk 17



However, the wider ECI is expecting a recovery of 20.8% compared to 2021, whilst the nuclear sector is expecting a recovery of 10.8% from 2021 figures. This is a cautious projection also when compared to the oil and gas sector which was looking at a 2023 figure of 109.35% compared to a 2021 figure of 95.88.

It is impossible to say from the data why the nuclear sector has more cautious projections in terms of workforce growth. However, it has to be mentioned that significant announcements were made since the data was collected in March and April 2021, such as the Government announcements on Small Modular Reactors investment, probably driving up growth expectations. Nevertheless, efforts will need to be made to attract more young people into the sector as the projected work, in both decommissioning and new build, is forecast to increase. With the wider ECI experiencing similar problems, the competition for skills will likely be very high, creating problems not only for the nuclear sector, but across the industry.

Hiring difficulties

Linked to workforce growth, this section looks at hiring difficulties, and, specifically, hard to fill vacancies.

Twelve companies replied to our questions concerning hiring difficulties, of which 50% reported experiencing difficulties hiring employees. As a whole, nuclear companies struggle to fill vacancies which account for the equivalent of 5.83% of their current workforce. This is somewhat higher than for the wider ECI, where the figure is 2.6%.

Six employers provided reasons explaining why they face difficulties. Please note that this is a very small number of respondents and is not indicative or representative of the sector.

Reason	Percentage of employers	
	Nuclear	ECI
Candidates don't have the necessary qualifications	50.00%	46.58%
Lack of candidates	50.00%	16.44%
Salary or career progression offered by companies are under expectations	16.67%	16.44%
Candidates don't have the necessary experience	16.67%	17.81%
The occupation is niche	0.00%	9.59%
Competition among companies to attract employees	0.00%	9.59%
There is a lack of awareness about the ECI among the young people	0.00%	2.73%
Location	16.67%	21.92%

Thirteen employers told us how they usually fill vacancies:

Items	Percentage of employers	
	Nuclear	ECI
Agencies	61.54%	62.41%
Recruitment website / social media	23.08%	37.59%
Word of mouth	46.15%	56.74%
Advertising	36.11%	34.75%
Own company/agency/ team	7.69%	11.35%
Own website	15.38%	12.06%
Former workers / train workers	7.69%	11.35%
Local colleges	15.38%	4.26%
Headhunting	23.08%	4.96%
From Gov / local authority schemes	0.00%	2.13%

As with the wider ECI, the majority of companies that answered this question use agencies to advertise their vacancies, followed by word of mouth and advertising. Local colleges play a significant role in the nuclear sector recruitment process, due to the emphasis being put on recruiting local labour. Further research would be needed to determine if there is a relationship between hiring methods, demographics and workforce numbers. Given the similarity in trends across the largest of the 2 ECI sectors, and the wider ECI itself, there are potentially indications that this is an area that requires further research.

Hard to fill vacancies

Of the companies that declared they face difficulties hiring employees, 9 quantified the number of vacancies they struggle to fill. The vacancies are distributed as following across the occupational categories:

Category	Nuclear	ECI
Management and Professional	12.26%	19.4%
Engineers	81.13%	50%
Technicians	1.57%	8.3%
Craft	4.72%	19.6%
Semi-skilled	0.31%	0.6%



Net Zero Activity

The Census sought to determine which net zero activities were viewed as potential growth areas, and opportunities to diversify the activities of a company.

This section focusses on the 15 companies that declared the nuclear sector to be the one that they mainly engage their workforce in of these 15, 12 replied to questions surrounding net zero.

Only 2 companies mentioned an interest in a sector that was not nuclear. This suggests that, potentially, there is less of an interest in diversifying activities from nuclear companies, or less of a need to do so. However, the main Census report looking at the ECI⁵ notes that there is a strong interest from non-nuclear companies in entering the sector. In this analysis, companies who expected to see nuclear activities as having the greatest increase in terms of share of their business represented 38% of the overall ECI workforce⁶. This was the highest ranked area by companies outside of the nuclear sector.

Covid-19

In light of the global pandemic, the ECITB was interested in understanding how the different sectors were affected by Covid-19. It was expected that areas such as workforce numbers, turnover and project timelines would be particularly affected.

The Census asked questions surrounding the impact of the Covid-19 crisis; 12 companies working mainly in nuclear responded.

The impact of Covid-19 on the nuclear sector:

Items	Percentage of employers	
	Nuclear	ECI
Furlough	58.33%	68.57%
Redundancies	25.00%	28.57%
Delays and downturn in work	25.00%	30.00%
Turnover decreased	25.00%	26.43%
Smaller workforce (no hiring or people leaving, or redundancies not linked with covid)	0.00%	13.57%
Change in working pattern, WFH	0.00%	17.14%
Reduced training	0.00%	15.71%
Lower productivity	25.00%	12.14%
Increased hours	0.00%	2.14%
Reduced hours	0.00%	2.14%
Increase training	0.00%	4.29%

The majority (58%) of these 12 companies made use of furlough, around 10% less than the ECI in general. The nuclear sector appears to have fared equally, or slightly better, than the rest of the ECI in terms of redundancies, delays and downturn in work, and turnover decrease.

However, productivity in the nuclear sector appears to have dropped significantly more in the nuclear sector than the rest of the ECI (25% and 12.14%, respectively). The reduction in productivity was mainly due to limitations regarding the number of people allowed on site. The lower rates of productivity do not appear to have resulted in longer working hours or in changes to working patterns as a means to mitigate these lower productivity ratings.

Another area of interest is training. The companies that responded did not compromise training, nor did they increase training. This suggests that there were perhaps not particularly stark shifts in workforce numbers or the need to diversify retention methods (for instance, training to avoid redundancies).

Caution is, however, urged, as this is a small sample size.

⁵ ECITB 2021 Workforce Census: An Overview of the Engineering Construction Industry

⁶ ECITB 2021 Workforce Census: An Overview of the Engineering Construction Industry



Occupations with less than 10 workers are omitted to maintain anonymity.

• Craft – 689 individuals

•	Technicians – 2,682

Craft	
Occupation	Number
Electrical Fitters	104
Pipefitters	99
Mechanical Fitters	80
Steel Erectors	52
Pipe Welders	50
Instrument and Control	42
Platers	39
Joiner	30
Riggers	19
Scaffolders	11
Safety Advisers	-
Duct	-
Plumber	-
Fencer	-
Sheet Metal Worker	-
Floor layers	-
Plate Welders	-
Thermal Insulation Technicians	-
(laggers)	
Unidentified Craft	163

Technicians	
Occupation	Number
Production or Process	1556
Operators	
Design/Draughtpersons	327
Safety Technicians	265
Mechanical Maintenance	78
Instrument and Control	75
Field Service Technician	70
Electrical Maintenance	59
Commissioning Technicians	58
Project Controls	37
Radioactive Waste	35
General Technicians	28
Non Destructive Testing	13
RPI	11
Rope Access Technician	10
Construction	-
ROV Technician / Pilot	-
Logistics	-
Inspector	-
Metering Technicians	-
Surveyors	-
Wind Turbine Technicians	-
Civil Technicians	-
Decommissioning	-
Turbine Technicians	-
Winders	-
Unidentified Technicians	60

• Semi-skilled - 502

Semi-Skilled		
Occupation	Number	
Decommissioning	210	
Labourers	59	
General Mates	54	
Blaster / Painter	42	
Storeman	33	
Welding	20	
Mechanical fitting	13	
Electrical	12	
Joiner	10	
Bricklayers	-	
Slinger/Banksman/Rigger	-	
Expeditors / Shipping	-	
Pipefitting	-	
Unidentified Semi-Skilled	49	

• Supervisors - 389

Supervisors	
Occupation	Number
Mechanical	120
General Foreman /	37
Superintendent	
Radiation Protection / Health Physics	31
Electrical	26
Lifting (Rigging/Erecting)	21
Welding	16
Appointed Person	12
Instrumentation	-
Decommissioning	-
Scaffolding	-
LOLER / Lifting Focal Point	-
Joiner	-
Pipefitters	-
Inspection	-
Logistics	-
Riggers	-
Unidentified Supervisors	126

Engineers – 4,407

Engineers	
Occupation	Number
Mechanical Engineer	1551
Civil & Structural	435
Instrument and Control	415
Environmental Engineer	386
Electrical Engineer	323
Commissioning Engineer	213
Process Engineers	188
Nuclear Engineers	183
Design Engineer	171
Nuclear Safety Case Engineer	129
Safety Engineers	112
IT / Telecom / Cybersecurity	94
Chemical Engineer	78
Materials Engineers	43
Pipeline Engineer	43
Stress & Test Engineers	25
Welding (Metallurgist) Engineer	16
Field Engineers	15
Technologist	14
Non Destructive Testing	12
Remote and Robotic Engineer	-
Mining Engineers	-
Configuration Engineers	-
Improvement Engineers	-
Unidentified Engineers	144

• Management and professional – 4,079

Management and Professiona	al Workers
Occupation	Number
Project Managers	947
Project Controllers	323
Directors & Managers	321
Procurement Specialists	314
Quality Control / QA staff	295
Project Engineers	271
Construction Manager	270
Safety, Health, Environment	200
and Quality	
Cost Engineer / Quantity	198
Surveyor	
Commercial Support	197
Consultants	175
Planners	164
Document Controllers	98
Site Managers	74
Analysts	66
Estimators	38
Logistics	24
Area Manager	12
Operations	-
Business Development	-
Installation Managers (OIM)	-
Risk Assessment	-
Data Controllers	-
Industrial Relation Manager	-
(OIM)	
Technical Specialists	-
Unidentified M&P	96

Scientists - 310

Scientists	
Occupation	Number
Physicists	227
Chemists	45
Technical Assistant	38
Technologist	-
Geologist	-
Health Physics	-
Environmental Scientists	-
Mathematicians	-
Unidentified Scientist	-

• Support staff – 1,929

Support Staff		
Occupation	Number	
Health and Safety	531	
Admin	517	
Human Ressources + Learning and Develop.	275	
inance	221	
Communications	68	
Marketing	16	
_egal	14	
Authors	-	
Canteen Workers and Cleaners	-	
Competence Assessors /	-	
Supervisors		
-acilities	-	
Trade Controls	-	
T / Telecom / Cybersecurity	-	
Translators	-	

