

Mapping the UK's Engineering Workforce

MERCATOR Report from
the Engineering Council

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Engineering Council

The Engineering Council is the UK regulatory body for the engineering profession, which sets and maintains the internationally recognised standards of professional competence and commitment.

We also hold the national register of over 230,000 Engineering Technicians (EngTech), Incorporated Engineers (IEng), Chartered Engineers (CEng) and Information and Communications Technology Technicians (ICTTech) who have been assessed against these standards.

This award and retention of these titles ensures that employers, government and wider society - both in the UK and overseas - can have confidence in the knowledge, experience and commitment of professionally registered engineers and technicians.

All links contained in this report are available at www.engc.org.uk/workforce

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Terminology

Engineering Council	The Engineering Council is the regulatory body for the UK engineering profession, the Engineering Council sets and maintains internationally recognised standards of professional competence and commitment. More information on the Engineering Council can be found online .
Engineering footprint	The Engineering footprint is a selection of SOC codes that represent all the occupations related to the engineering profession. This footprint was agreed by the Engineering Council, EngineeringUK and the Royal Academy of Engineering. More information on the Engineering Footprint can be found online .
Engineering/Working in Engineering	Phrases used in the report to identify those people in the ONS data who are in the engineering footprint.
Major groups	Major groups refer to ONS Standard Occupational Classification (SOC) Hierarchy. More information on this can be found online .
Non-Engineering	A phrase used to identify those people in the ONS data who are not in the engineering footprint.
Office for National Statistics (ONS)	The ONS is the UK's largest independent producer of official statistics and the recognised national statistical institute of the UK.
Registrant	Is an individual recorded on the Register, who has been awarded a professional registration title.
Standard Occupational Classification (SOC)	SOC is a common classification used by the ONS to describe the occupational information for the UK. More information on this can be found online .

Introduction

The 'Mapping the UK's Engineering Workforce' report provides data on the UK's engineering workforce, in particular the specific engineering roles and where engineers work. This reflects the reality that engineers are employed and self-employed across the private, public and not-for-profit sectors. Their work ranges from aerospace to agricultural, food packaging to pharmaceuticals, in organisations from micro-SMEs to large, multi-national companies. This report provides a benchmark of the engineering workforce, based on the most recent available Office for National Statistics data (from the 2017 Labour Force Survey), before the impact of the Covid-19 pandemic.

This data enables decision-makers, including government, employers, universities, professional engineering institutions and the public, to see the full picture of engineering in the UK and understand its overall contribution.

'Mapping the UK's engineering workforce' reports on the engineering workforce:

- as a proportion of the UK's working population
- by type of job being carried out (eg skilled, managerial)
- by age and gender, compared to the working population
- by highest educational level, compared to the working population (also analysed by gender)
- by UK region (also analysed by gender and age).

The UK's engineering workforce is over 5.5 million people, with a huge range of knowledge and skills, who are creating growth, solving complex problems and shaping our future.

Research and reporting

This report uses the most recent complete data sets available from the Office of National Statistics (ONS), from the 2017 Labour Force Survey. ONS uses Standard Occupational Classification (SOC) codes to classify jobs in terms of their skill level and skill content.

The Engineering Council, EngineeringUK and the Royal Academy of Engineering have collectively agreed the Engineering Footprint, which creates a working definition of engineering by using SOC codes to identify which jobs are "engineering" (engineering-based roles that require the consistent application of engineering knowledge and skills to execute them effectively). The resulting Engineering Footprint can be used as the basis for indicating the contribution engineering make to the UK economy, its wider impacts, the needs for and supply of skills.

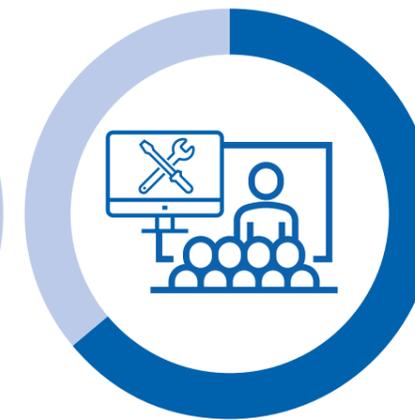
A more detailed description of the Engineering Footprint [can be found online](#)

Snapshot



18%

of the UK working population work in engineering



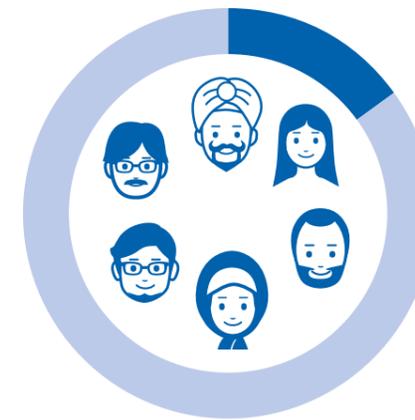
64%

of people in engineering work in professional and skilled occupations



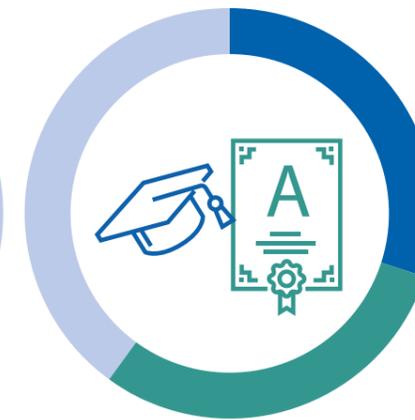
14%

of people working in engineering are female



At least **15%**

of the workforce in every UK region works in engineering



30%

of people working in engineering have a degree and another

30%

have A levels as their highest education level



25%

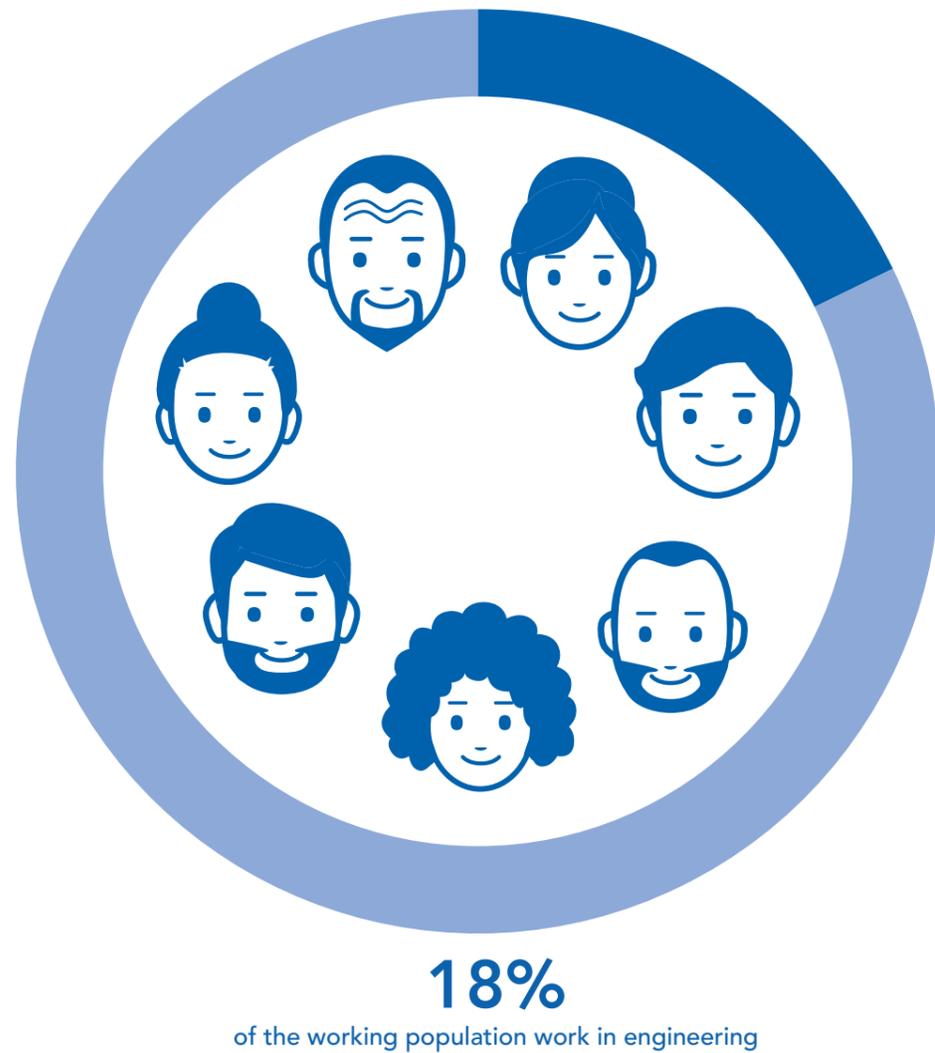
more females than males in engineering have a degree

Engineering workforce

In 2017 the ONS reported the estimated total population of the UK at 64m. It also estimated the total working population of the UK was 32m, based on its own surveyed population data.

In Chart 1 you can see that this translates into an estimated 18% of the UK working population who work in engineering roles.

Chart 1 Total UK working population, by engineering and non-engineering jobs

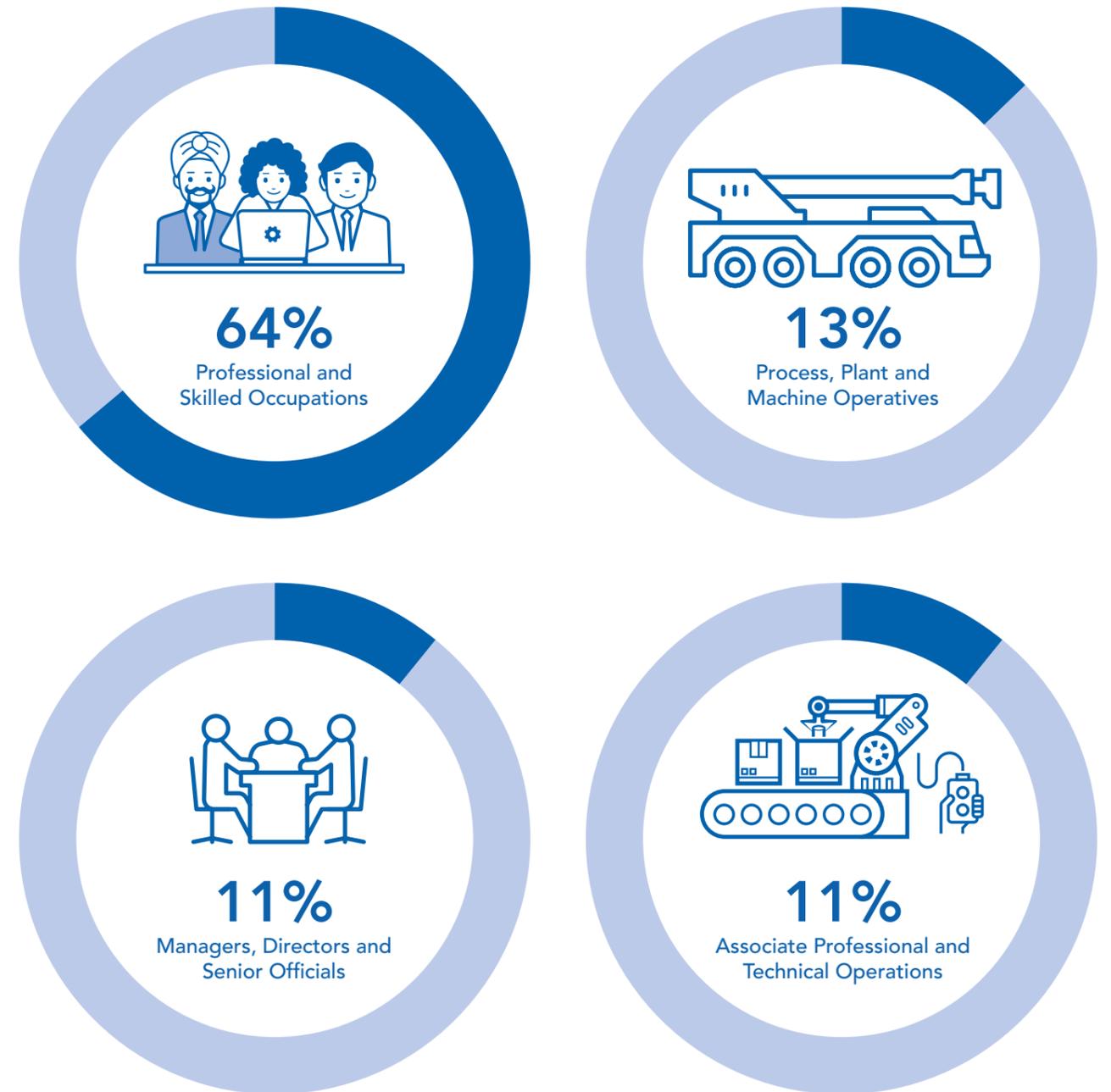


This shows that almost a fifth of the UK's working population - 5.8m people – are in engineering jobs, which may or may not be in engineering organisations. Engineers work in all sectors and for a huge range of different types of employers.

In Chart 2 you can see an overview of the types of job that make up this 18% of the working population, based on the ONS major groups used to categorise different roles.

Engineering workforce continued

Chart 2 Types of jobs within the engineering workforce

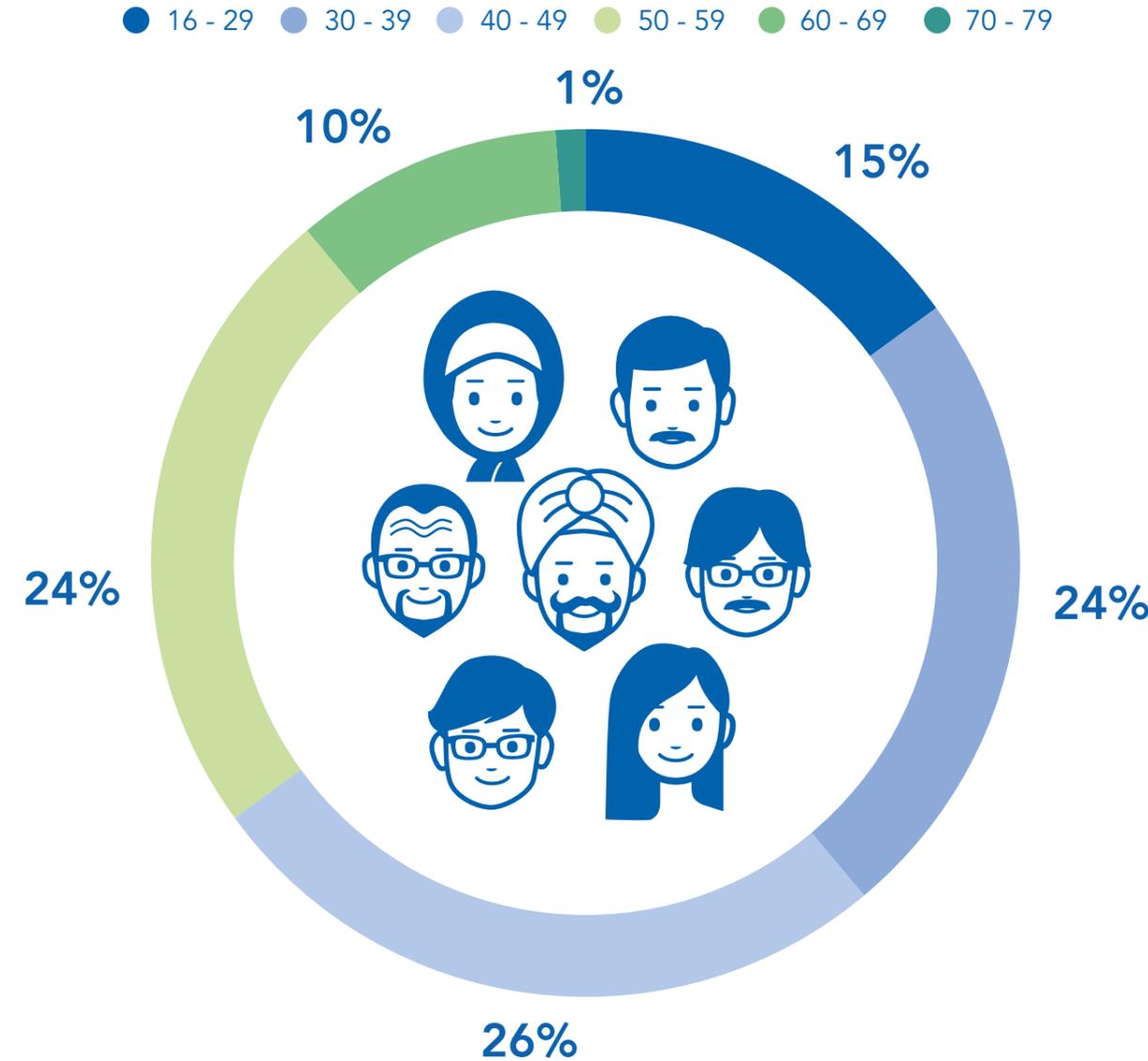


The largest of these major groups is professional and skilled trades occupations, which makes up 64% of the total. This group includes welding trades, IT engineers, electrical and electronic trades and plumbing and heating engineers. A further 11% of people in the engineering workforce have roles as Managers, Directors or Senior Officials.

Age and gender of the engineering workforce

To explore some of the characteristics of people working in engineering, Chart 3 analyses the engineering workforce by age group, from 16 to 79.

Chart 3 Age profile of the engineering workforce

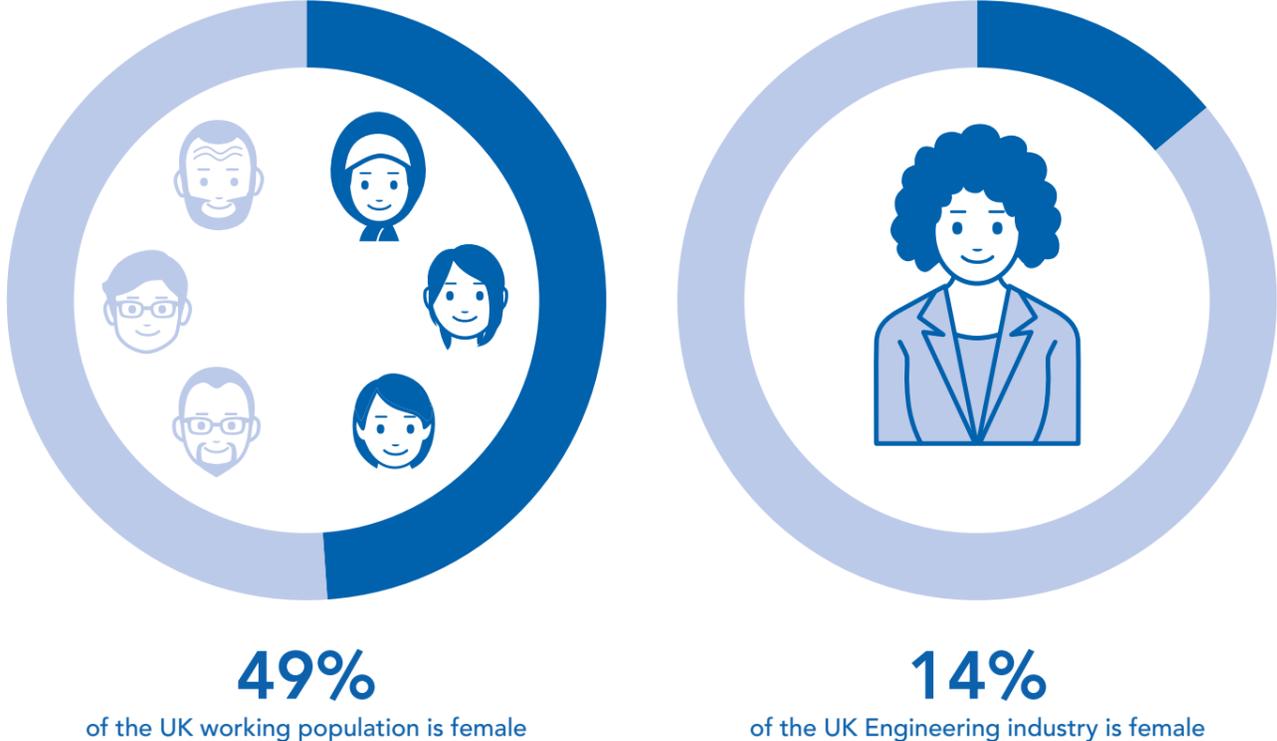


74% of the engineering workforce are aged 30-59, with 15% (870,000 people) aged 16-29. The focus on apprenticeships offers opportunities to combine work and study as a route into careers in engineering, potentially making these accessible to a wider range of people.

Age and gender of the engineering workforce continued

Having looked at the age profile of the engineering workforce, Chart 4 shows self-declared gender.

Chart 4 Gender breakdown of the engineering workforce

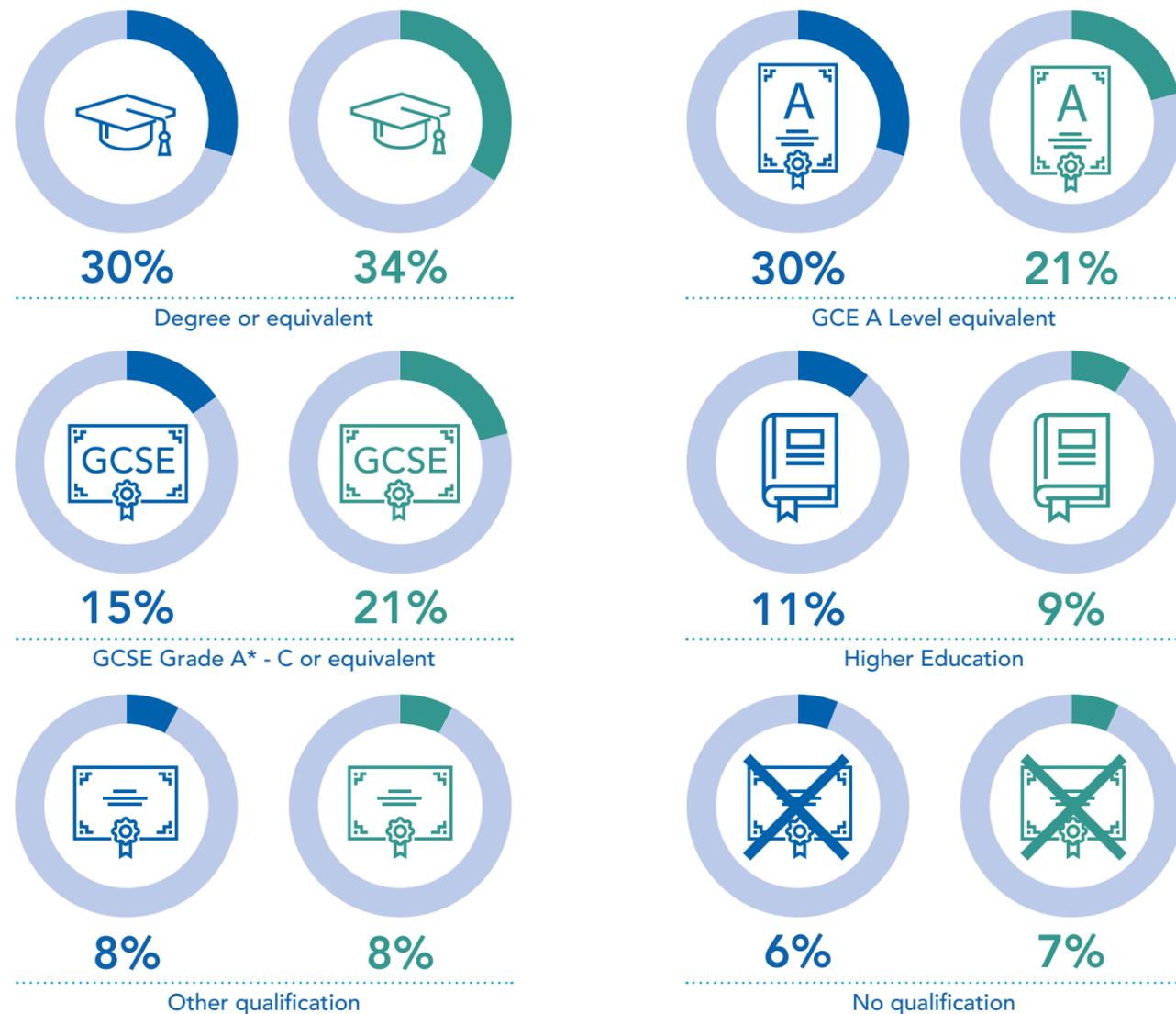


The UK working population is 49% female, but the engineering workforce shows a much lower proportion of women at 14%. Work to encourage more women and girls into engineering careers, including the 'This is Engineering' and government-led 'Engineering: Take a Closer Look' campaigns, is ongoing.

Highest education level of the engineering workforce

The educational qualifications of the UK working population are broken down in the next chart.

Chart 5 Highest education level of people working in engineering and non-engineering roles. ● Engineering ● Non-Engineering



60% of people working in engineering have either a degree or A level as their highest education level. 9% more people working in engineering have A level as their highest qualification, compared to those in non-engineering roles.

People working in engineering are less likely to have no qualifications, or to have GCSE grades A*-C as their highest education level, compared to people in non-engineering roles. They are also slightly less likely to have a degree as their highest qualification (30%, compared to 34% of people in non-engineering roles).

Highest education level of the engineering workforce continued

Chart 6 Highest educational level of people working in engineering, by gender. ● Male ● Female

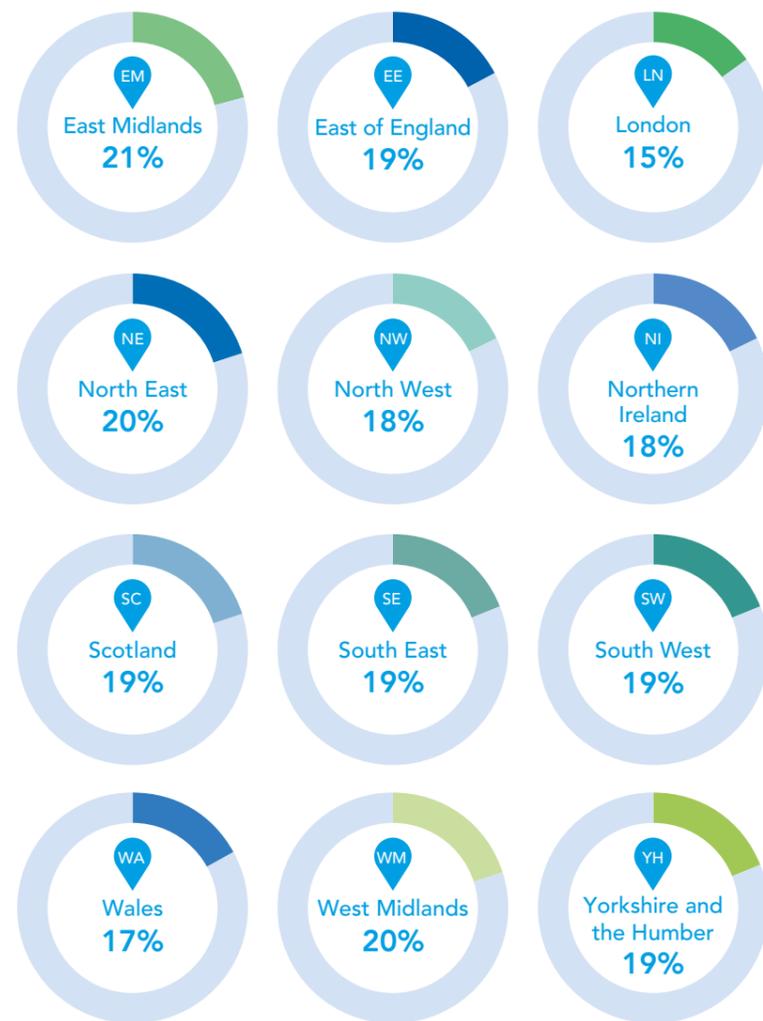


When we analyse the highest education level of people working in engineering by gender, there are clear differences. While the proportion of women in the engineering workforce is lower (see Chart 4), women working in engineering are more likely than men to have a degree or equivalent as their highest education level; over half of all women in engineering roles have a degree. Men working in engineering are more likely than their female colleagues to have A level as their highest education level and are slightly more likely to have a degree as their highest qualification (30%, compared to 34% of people in non-engineering roles).

Regional breakdown

This section looks at the regional distribution of engineers across the UK. The following chart illustrates the regional distribution of the engineering workforce across the UK. Chart 7 illustrates the proportion of people in each region working in engineering, based on an analysis of those working in the region compared to the Engineering Footprint.

Chart 7 Percentage of working population in engineering, by region



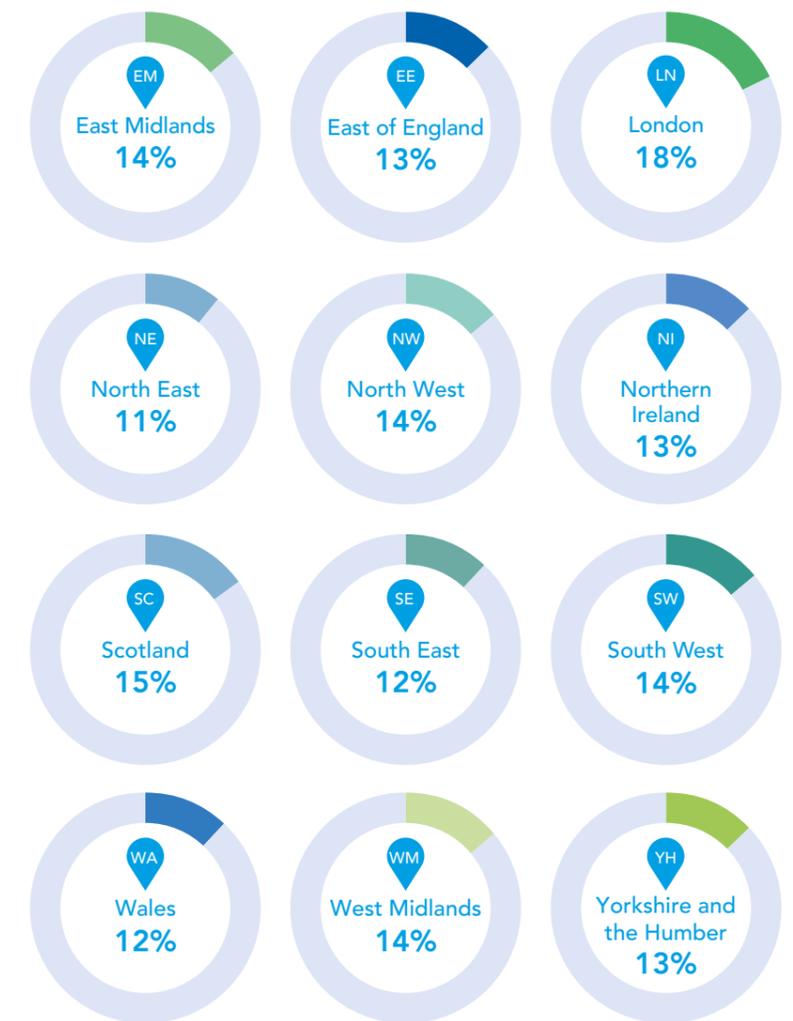
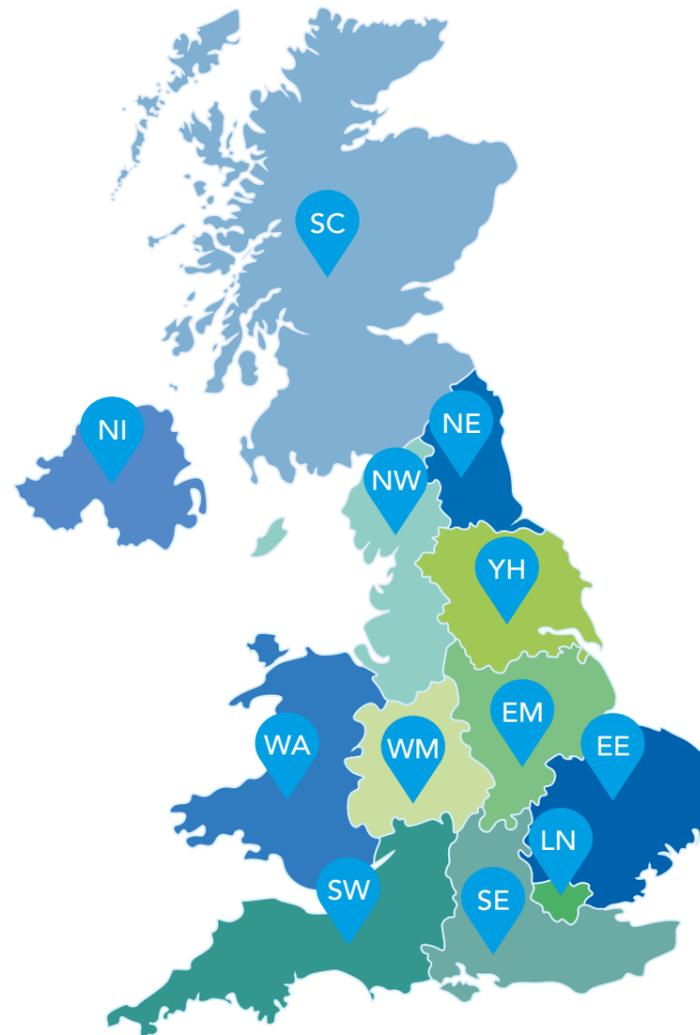
The percentage of people working in engineering is remarkably consistent across the UK regions, with only 6% difference between the lowest and highest regions.

A fifth of people working in the North East and the West Midlands work in engineering, but at least 15% of the working population of every region are in engineering jobs.

Regional breakdown continued

To understand whether the gender of the engineering workforce varies geographically, the following chart gives a regional breakdown by gender.

Chart 8 Percentage of women working in engineering, by region

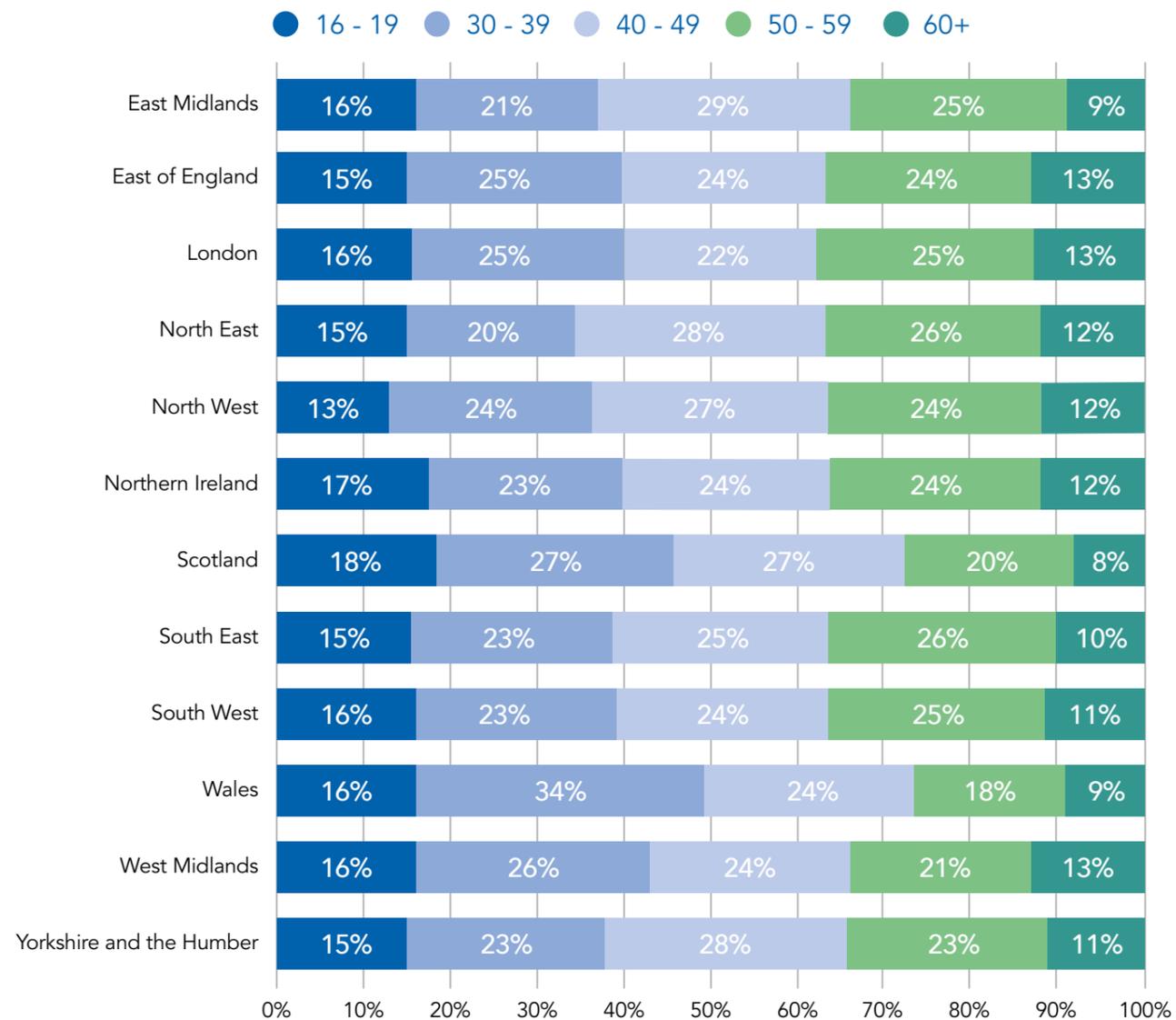


The percentage of women working in engineering is also relatively consistent across all regions, but interestingly the regions with the highest percentage of women are London and Scotland with 18% and 15% respectively.

The age profile of the engineering workforce is shown in Chart 3 and Chart 9 shows a regional breakdown of age profile.

Regional breakdown continued

Chart 9 Age profile of people working in engineering, by region



When the age profile of people working in engineering is analysed by region, the proportion of people in each age group is broadly consistent across the country. However, both the lowest percentage of people aged 50 and over and the highest percentage of 30-39 year-olds working in engineering is in Wales.

Annex

Data

Office for National Statistics (ONS):

Labour Force Survey (LFS):

The only survey data used from the ONS was the Labour Force Survey (LFS). Further information on the LFS and a detailed view of how the data is built is [available online](#).

Measuring the data

An extrapolation factor for each LFS year was calculated by dividing the ONS's estimate of the UK's population for the year by the number of respondents in each LFS return. This extrapolation factor was used to extrapolate the survey responses to numbers representing the UK population:

- The UK working population was estimated through extrapolating the number of LFS respondents who had any SOC code assigned as their current occupation.
- The UK's overall Engineering Footprint was estimated through extrapolating the number of LFS respondents whose current occupation SOC code matched any of the selected engineering SOC codes.
- Age, Education and Gender group numbers were estimated through extrapolating the numbers for those LFS surveyed respondents who had SOC codes allocated and matched our research criteria. Low numbers in the raw data not recorded due to data quality and privacy issues involved with reporting on low numbers.
- Regional numbers were estimated through extrapolating the numbers for those LFS surveyed respondents. The report on the top SOC codes were limited due to low numbers in the raw data and privacy issues involved with reporting on them.

To select the Engineering SOC codes, the Engineering Council, EngineeringUK and the Royal Academy of Engineering agreed the Engineering Footprint which breaks down the SOC codes into occupations that are core and related to the engineering profession. More information on the Engineering Footprint can be found [is available online](#).

Outputs

This work was produced using statistical data from ONS. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.



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