

Women in engineering

Trends in women in the
engineering workforce between
2010 and 2021

Overview

Though engineering continues to be a male-dominated profession, since 2010 both the percentage and number of women in engineering roles has increased.

Here we use data from the Labour Force Survey (LFS) to explore this trend in more detail, focusing on which engineering roles and industries have seen the most progress, in terms of gender balance - and which have seen the least.

Since 2010 we have seen both a proportional and absolute increase in the number of women working in engineering roles.

- **In 2010, just over 1 in 10 (10.5%) of those working in engineering roles were women. By 2021, this had risen to 16.5%.**
- **In terms of numbers, this represents an increase from 562,000 women working in engineering roles in 2010 to 936,000 in 2021.**

In general, this rise has coincided with an overall expansion of the engineering workforce (from 5.3 million workers in 2010 to 5.6 million in 2021). Notably, however, the rise of women continued in absolute terms even when the total number of people working in engineering roles fell in 2020, the first year of the Covid-19 pandemic.

The engineering footprint

Our analysis makes use of the engineering footprint, a list of standard occupational classification (SOC) and standard industrial classification (SIC) codes that has been agreed by EngineeringUK, the Royal Academy of Engineering, and the Engineering Council to constitute 'engineering'.

Those we refer to as working in **engineering roles (or the 'engineering workforce')** are the people who work in the Standard Occupational Classifications (SOC) that meet the footprint's criteria for 'engineering'. Where appropriate, we have further disaggregated this according to the footprint's definition of 'core' and 'related' engineering:

- **Core:** roles that are primarily engineering-based and require the consistent application of engineering knowledge and skills to execute the role effectively (for example, civil engineers, mechanical engineers, electrical engineers, science, engineering and production technicians, and machine operatives)
- **Related:** roles that require a mixed application of engineering knowledge and skill alongside other skill sets, which are often of greater importance to executing the role effectively (for example, quantity surveyors, architects, IT operations technicians, web designers and developers)

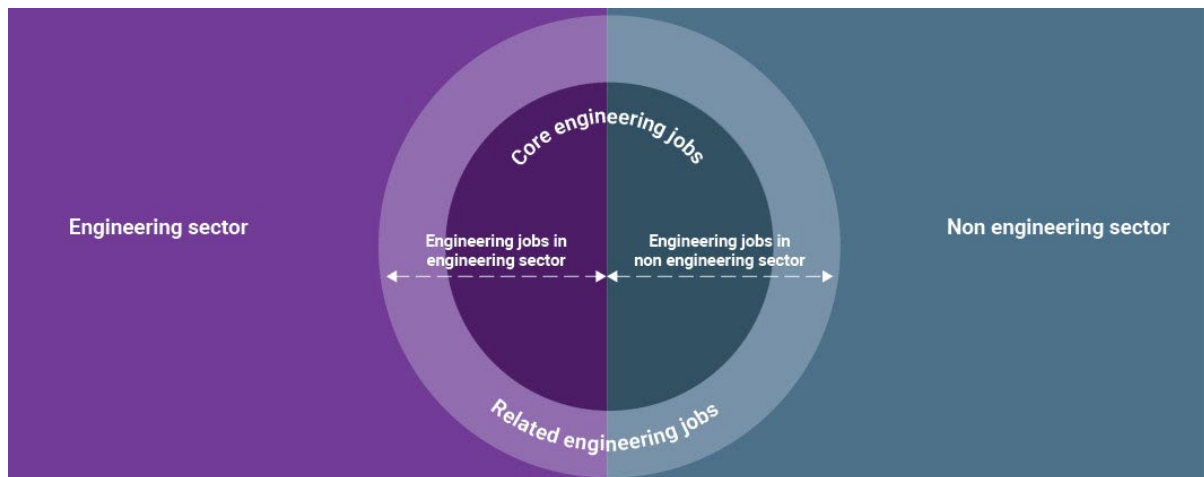
Those we refer to as working in the **engineering sector (or those 'working in engineering industries')** are the people who work in the Standard Industrial Classifications (SIC) that meet the footprint's criteria for 'engineering'.

It is worth noting, as the below illustration depicts, that these concepts are interrelated. One can work in an engineering job (SOC) within or outside of the engineering sector (SIC) - and we find the latter is more likely to be the case for women than it is for men. This

has important for our understanding of where progress is - and isn't - being made.

For the purpose of this analysis, we have focused on those in engineering roles (SOC) and their presence in and outside of engineering industries (SIC). In other words, we do not consider those women who may work in engineering sectors, but not in engineering roles (so, for example, marketing or HR roles that arise in engineering companies but are nevertheless not engineering jobs).

Figure 1. The occupational and industrial engineering footprint



Differences by occupation and industry

It is apparent that while the proportion and number of women in engineering has increased, this rise has been concentrated in certain roles and sectors. Although results vary by individual occupation and sector, in general we found that women were more likely to be in related - rather than core - engineering roles¹ and working in industries outside of what is traditionally deemed to be 'engineering'² (the 'engineering sector').

- **Differences by occupation:** In 2021, just 15.2% of those working in 'core' engineering roles were women, compared with 19.0% of those working in 'related engineering' roles.
- **Differences by industry:** There were also differences by sector, with women making up only 12.5% of those working in engineering jobs within the engineering sector, compared to 24.4% outside of the engineering sector. This suggests that industries not traditionally associated with engineering may be more successful in attracting female engineers into the workforce.

We also found that rates of change (in terms of gender balance) were higher at the associate and technical professional levels than at managerial, director and senior official level.

¹ As defined by the occupational engineering footprint agreed jointly by EngineeringUK, the Royal Academy of Engineering, and Engineering Council. See www.engineeringuk.com/media/156187/state-of-engineering-report-2018.pdf

² As defined by the industrial engineering footprint agreed jointly by EngineeringUK, the Royal Academy of Engineering, and Engineering Council. Ibid.

- For example, between 2010 and 2021 the proportion of women within the engineering workforce (core or related) who were ‘science, engineering, or technology associate professionals’ increased from 18.8% to 28.1%
- In contrast, in that time the proportion of women who were ‘corporate managers or directors’ in the engineering workforce increased from 11.2% to 15.0%

Sectoral analysis

It is important to not only consider which engineering roles have been able to attract more women over the last 10 years, but also which sectors have seen most progress in terms of women in engineering roles.

While our sectoral analysis was necessarily limited by small sample size numbers, it nevertheless clearly shows that some industries have made much more progress in terms of the gender balance of those working in engineering roles than others. For example:

- Between 2010 and 2021 the proportion of women working in engineering roles within the water supply, sewerage, waste management and remediation activities increased from 8.5% to 11.5%
- In contrast, the proportion of women working in engineering roles within construction has remained stubbornly low, rising from 2.3% in 2010 to 4.7% in 2021

Next steps

Since 2010, we have seen a rise in the number of women across the majority of engineering roles, and across both engineering and non-engineering industries. This is welcome news, and we encourage the engineering community to continue to celebrate and promote examples of women working in engineering roles and sectors, especially to the girls who could be tomorrow’s engineers.

As a community, we must ensure that progress continues and extends to the most ‘core’ of engineering roles and sectors, and at the highest levels. Identifying practices that help to increase the appeal, recruitment, retention and progression of women in engineering - and sharing this knowledge widely - will be paramount to this.

We also encourage the engineering community to be consistent in its reporting and messaging of these figures. Over the course of our analysis, we identified that different definitions and analytical approaches have been used to measure and report on the participation of women in engineering. This can undermine confidence and detract from the issue at hand. Greater consistency in approach and messaging will help us to remain clear-eyed on progress and the work required to further advance the representation of women in engineering.