

Closing the engineering gender pay gap



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01.

Introduction

Closing the engineering gender pay gap

Engineering matters. It underpins our daily lives, it plays a critical role in addressing global challenges and helps shape our future, from providing a sustainable supply of food, water and clean energy, to advancing healthcare, and developing technologies that keep us safe and secure.

It is vital that the engineering profession, which plays a crucial role in shaping the world around us and designing solutions for some of the biggest challenges our world faces, is reflective of the society it seeks to serve.

However, engineering has a significant skills shortfall - EngineeringUK estimates that

59k
more engineers are needed each year

There is also a serious diversity deficit with a workforce that is still only

12%
female

9%
black, Asian and minority ethnic (BAME)

The pace of change in the diversity of the UK engineering workforce has been disappointingly slow. The number of women studying undergraduate engineering remains low (currently only 16% of engineering graduates in the UK are women)¹ however the proportion of male and female engineering graduates entering engineering occupations is similar (56% vs 52%).² There are then challenges in retention, for example, 57% of female engineers drop off the register of professional engineers under the age of 45, compared to just 17% of male engineers.³

For those women that do continue, engineering is a great career that consistently shows higher-than-average earnings and higher-than-average levels of job satisfaction. In a 2017 survey of 7,000 UK engineers by the Royal Academy of Engineering, over 80% of women who responded said that they would recommend it as a great career to friends and family.⁴ This report shows the gender pay gap for engineers is smaller than the gender pay gap for the UK as a whole.

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The Royal Academy of Engineering (the Academy) works with partners across the engineering community to create an inclusive engineering profession that inspires, attracts and retains people from diverse backgrounds. The Academy commissioned this research to better understand the gender pay gap specific to engineering roles in the UK and to identify effective measures that engineering companies can take to improve the gender balance in their organisations. This is distinct from the issue of the gender pay gap in engineering companies/ organisations with engineers that reflects occupational segregation (such as most engineers are male, most administrative staff are female).

The report includes:

01. Datasets

The first dataset to quantify the gender pay gap specific to engineering roles.

02. Evidence

Evidence on the underlying reasons for a gender pay gap in engineering.

03. Recommendations

Practical recommendations and an action plan on how the gap can be closed.

What is the gender pay gap?

- ▶ The gender pay gap is the difference in average hourly earnings for all men and all women across an organisation, a sector, or the economy as a whole.
- ▶ It is an indicator of gender parity within a workforce; the more men in senior positions or in roles with higher pay in an organisation, the larger the gender pay gap.
- ▶ It is different to equal pay which is paying men and women the same salary for the same (or similar) work. Unequal pay has been unlawful since 1970.



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Although less than 1% of the total number of UK engineering enterprises are within the scope of the gender pay gap reporting requirement, the larger firms that are required to report account for around 40% of the total employment of engineers⁵. There is plenty of evidence that inclusion and an inclusive culture bring benefits both to individual and organisational performance.

The recommendations made in this report are therefore not just for the biggest engineering firms – they should be implemented by organisations of all sizes seeking to attract, retain and develop the talents that women bring to engineering.

Gender pay gap data provides an insight into the gender balance of an organisation. Gender balance is the equal participation in all areas of work across an organisation at all levels. Analysing the data critically is important as improvements in one area, for example increasing the number of women recruited into graduate engineering roles, could negatively impact an organisation's gender pay gap in the short term.

Understanding gender imbalances in all areas of the business, including career progression, leavers, pay and performance, will help identify potential causes of a gender pay gap and effective actions to take.

At the time of publication, the government is consulting on changes to gender pay gap reporting – this includes broadening the range of employers and the potential to look at other pay gaps (such as ethnicity). This report provides a set of evidence-based recommendations to help the engineering profession get ahead.

We need to make engineering a profession where everybody, whatever their gender, can make the best use of their abilities. Taking effective action to close the gender pay gap for engineers is critical to the success of strategies to attract and retain more women in the profession.

The business case for narrowing the gender pay gap for engineers

There is a wealth of evidence⁶ on the positive results that businesses achieve when they have a diverse pool of talent. This research found that a specific business case exists for taking action to reduce the gender pay gap in engineering.

01. Talent attraction

Young women entering the profession are checking published gender pay gap reports and are asking prospective employers what action they are taking to close the gap.

02. Trust

A credible action plan to address the underlying causes of the gender pay gap is seen by employees as a test of real commitment to diversity and inclusion.

03. Winning business

Public sector clients are asking prospective contractors about their gender pay gap and what they are doing to address it.

Gender pay gap reporting regulations

Since April 2017, employers in all sectors that employ 250 or more people in England, Scotland and Wales have been required by law to report their gender pay gap figures on an annual basis on their own website and on the government's website. The published gender⁷ pay gap reports must include the following six calculations:

- ▶ Mean gender pay gap in hourly pay
- ▶ Median gender pay gap in hourly pay
- ▶ Mean bonus gender pay gap
- ▶ Median bonus gender pay gap
- ▶ Proportion of males and females receiving a bonus payment
- ▶ Proportion of males and females in each pay quartile

The gender pay gap is calculated as the difference between the average hourly earnings (excluding overtime) of men and women, expressed relative to men's earnings. For example, if an organisation has a 10% gender pay gap it means that women across the organisation earn an average of 10% less per hour than men. A negative 10% gender pay gap would mean women earned an average of 10% more than men per hour.

Key findings from the analysis

The data analysis is based on pay data for just under 42,000 engineers from 25 companies. While it is a large data set, we recognise that it does not represent the profession as a whole.⁸

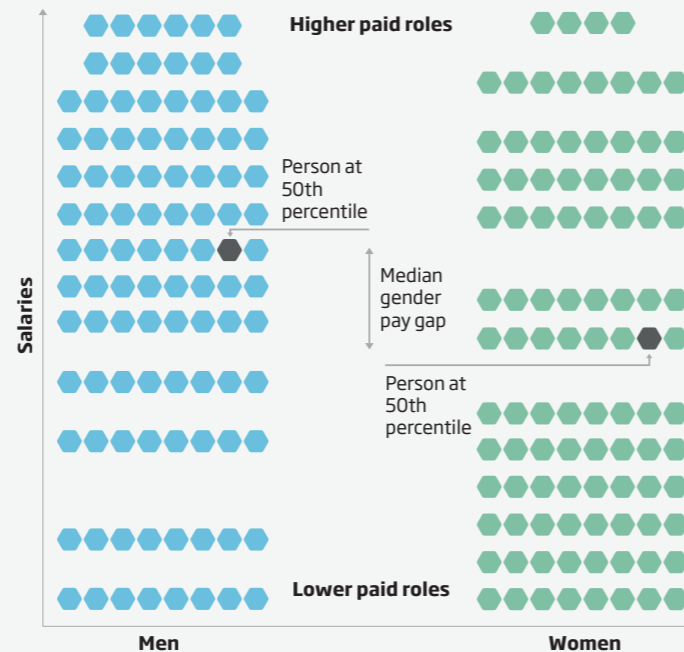
01. The topic confuses people.

What's the difference between equal pay and the gender pay gap?

The **gender pay gap** is the difference in average hourly earnings for all men and all women across an organisation, a sector, or the economy as a whole.

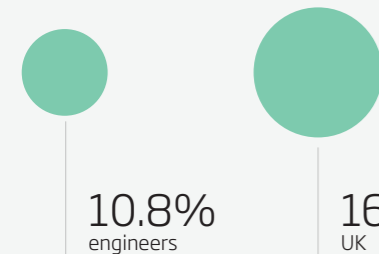
Equal pay is paying men and women the same salary for the same (or similar) work. Unequal pay has been unlawful since 1970.

This research identified widespread confusion among engineers and engineering employers about equal pay and the gender pay gap; little understanding about the underlying causes of the engineering gender pay gap; and low awareness of publicly available reports that identify measures that are proven to make the most difference to women's pay and progression.

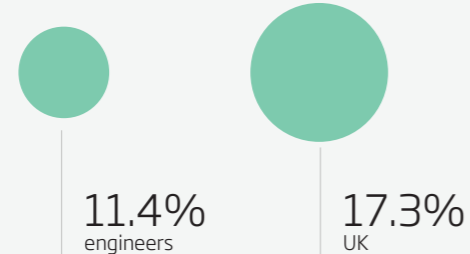


02. The gender pay gap for engineers in the sample is smaller than the gender pay gap for all UK workers.

Mean gender pay gap

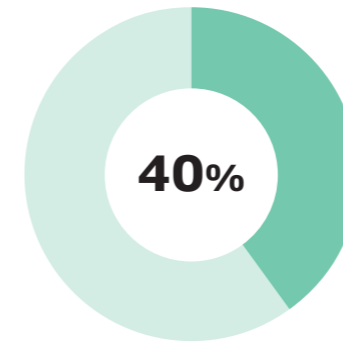


Median gender pay gap

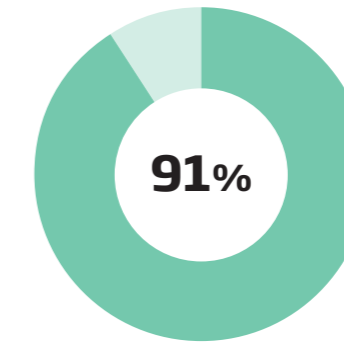


Reducing this gap entirely will take concerted effort across engineering to increase the number of women entering the profession and addressing their progression and retention.

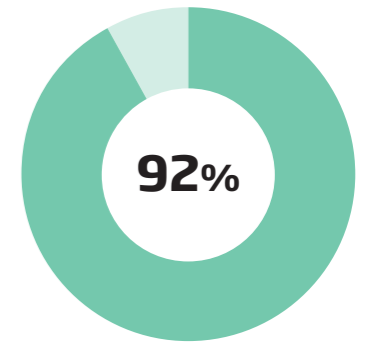
03. The gender pay gap for engineers is largely due to under representation of women in more senior and higher paid roles.



40% of pay variance for engineers in the sample is accounted for by career level



91% of those engineers in the top career grade were men



92% of those in the upper pay quartile were men

The difference in pay variance between a male and female engineer in the sample is less than

1% with all other factors being equal

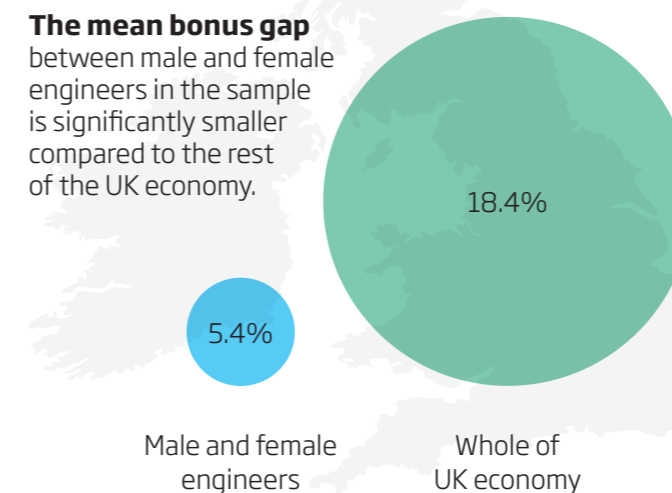


04. Engineers are more likely to receive a bonus than the average employee.

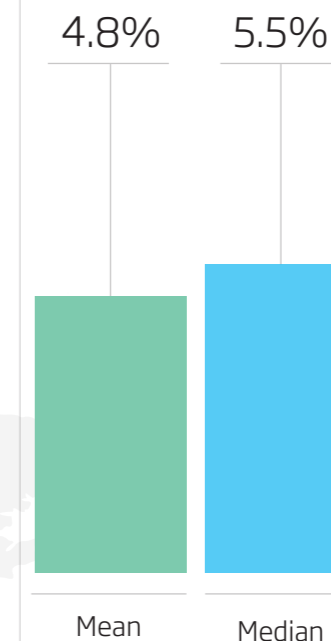
14%

more male engineers receive a bonus than women

The mean bonus gap between male and female engineers in the sample is significantly smaller compared to the rest of the UK economy.



05. Transparency of pay structures and grades has a big impact on the gender pay gap.



The engineering gender pay gap is smaller in companies in the sample with clearly defined grades or career levels with pay ranges attached to them.

However the gender pay gap for engineers starts at entry level:

18-21 year olds	5%
22-29 year olds	7.7%



02.

Methodology



Methodology

This report is based on a literature review, quantitative analysis and qualitative research.

Analysis of data from 25 engineering employers, comprising pay data for nearly 42,000 engineers.⁹ There are 2,285 UK engineering companies with 250 or more employees that are required to publish their gender pay gap (but this is only 0.32% of all engineering companies).¹⁰ The sample of 25 engineering employers therefore represents just over 1% of the total. While not claiming to be representative, the research team targeted companies from different sectors and of different sizes to reflect the UK engineering profession.

There were seven employers with 299 to 999 employees, 10 employers with 1,000 to 4,999 employees and eight employers with over 5000 employees. The majority of those who agreed to share data are involved in the Academy's Diversity and Inclusion Leadership Group and/or with WISE and are therefore assumed to be committed to good practice in terms of equality, diversity and inclusion. The data analysis, including a detailed explanation of the sampling framework and spread of companies, is published online alongside this report.

Literature review: The research team tested hypotheses about the gender pay gap against a review of published research including a sample of gender pay gap reports from engineering firms. The literature review and list of hypotheses is published online alongside this report.

Four focus groups were held to explore the literature review findings; one each with male engineers (10 participants), female engineers (12 participants), diversity and inclusion leads (8 participants), and pay and reward specialists (11 participants) from engineering employers.

A steering group gave invaluable input at each stage, helping to shape the research questions and test the findings and recommendations.



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03.

Findings



Understanding the causes of the gender pay gap for engineers

There is low awareness about the gender pay gap for engineers and widespread confusion about its causes and how to fix it.

It's not about equal pay

The gender pay gap – the difference between the average hourly earnings of all men and all women in an organisation – is sometimes confused with equal pay.¹¹ Although it is important not to conflate the two, unequal pay in an organisation can influence the gender pay gap. It is important therefore for organisations to ensure that pay systems do not create unlawful pay inequality and contribute to gender pay gaps.¹²

'We don't have a gender pay gap, what we are struggling with is recruiting/attracting and retaining women to our industry. We don't have any issues with pay.'

– Engineering employer

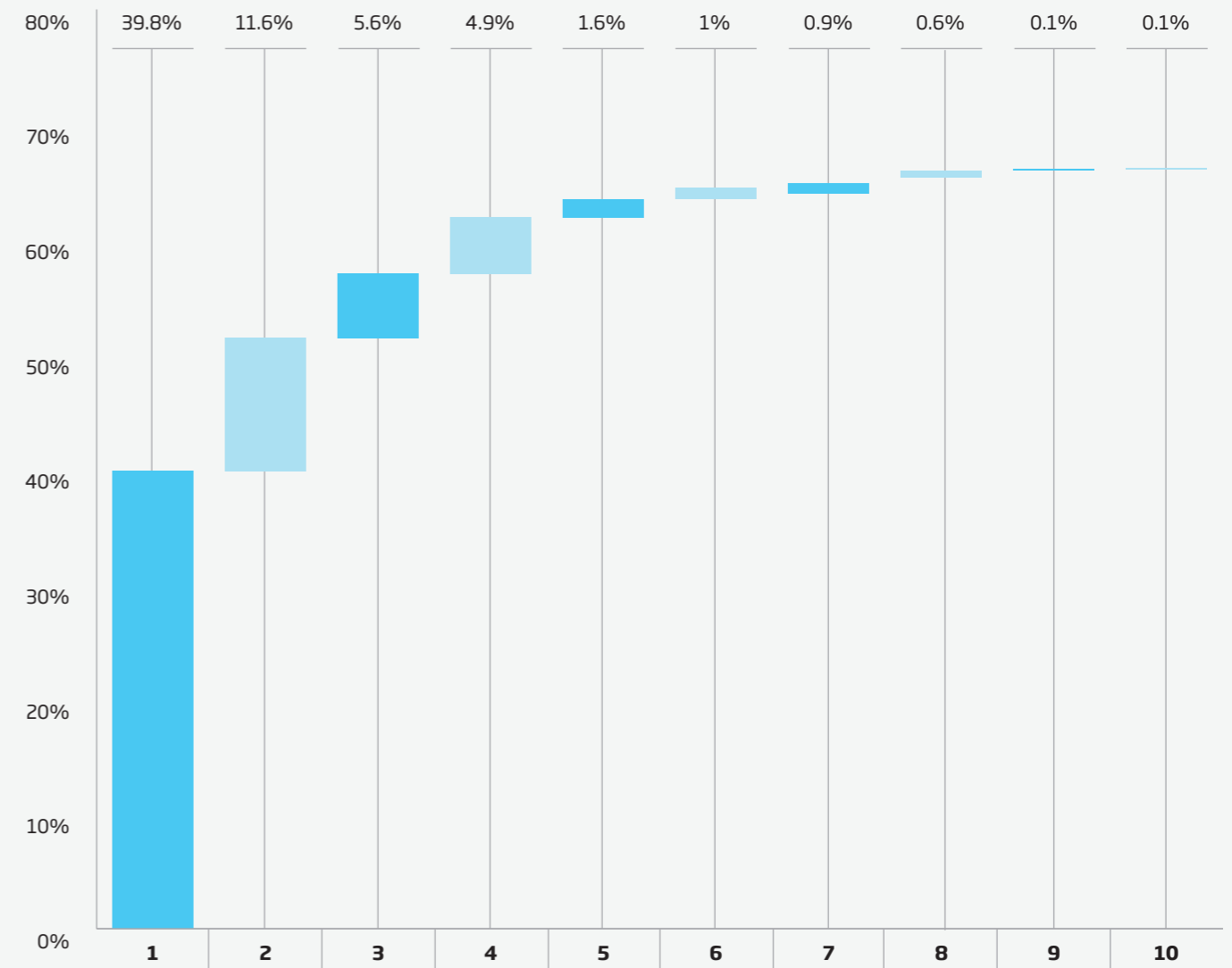
Some engineering companies did not feel that it was necessary to share their data with the research team, stating that they did not have a problem with pay in their company, seemingly failing to understand that the gender pay gap is not about equal pay but rather it is a symptom of an uneven gender balance in a company that reflects issues around women's retention and progression into higher paid roles.

An analysis of the data (**Figure 1**) found that gender itself accounted for less than 1% of pay variance between male and female engineers, with all other factors being equal (career level, role, employer, location and age). This very small percentage difference may be explained by other factors but could suggest some equal pay issues in some companies for some roles. However, the bulk of the gender pay gap for engineers is being caused by other factors such as the under-representation of women in higher paid roles.

There are effective actions companies can take now to address the gender pay gap for engineers

Participants from all four focus groups – including a majority of those in HR roles – felt that the gender pay gap for engineers was caused by under-representation of women in STEM, which in turn they attributed to what happens in schools and the stereotyped portrayal of engineers by media and in UK society. Focus group participants were much less inclined to examine factors within the workplace and what steps can be taken by organisations who employ engineers to reduce the gender pay gap for their current workforce.

Figure 1: Known contributors to the overall pay variance for the engineers in the sample
Verditer Consulting, 2019



1. Career Level | 2. SIC Code | 3. Age | 4. Annual Revenue | 5. Location | 6. Transparency To Manager | 7. Gender
8. Employee Number | 9. Full Time / Part Time | 10. Pay Ranges

It is clear from the analysis of engineers' pay that pay transparency makes a positive difference to reducing the gender pay gap, as do effective measures to support women's career progression. There is a wide range of activity within engineering companies to promote diversity and inclusion, not just for women but across the board. However, among companies sampled, there was low awareness and understanding of which measures make the most difference to reducing the gender pay gap.

Very few of those who attended the focus groups, including diversity and inclusion (D&I) leads, were aware of external reports such as *Reducing the gender pay gap and improving gender equality in organisations: Evidence-based actions for employers* published by the Government Equalities Office, which recommends interventions that are proven to make the most impact on women's pay and progression. These include using skills-based assessment tasks and structured interviews in recruitment, showing salary ranges, and having transparent promotion, pay and reward processes. Some expressed confusion about the law, assuming that positive action measures such as a mentoring scheme for women would be illegal.¹³

Many of the interventions included in gender pay gap action plans from engineering companies in their published gender pay gap reports (which were looked at in the course of this research) are activities for which the impact is unproven – such as unconscious bias training and leadership training¹⁴.

When asked for ideas on what should be done, there was a clear push for action by industry leaders:

'Get CEOs and operational people around the table, rather than those already on board.'

– D&I Lead

This research confirms that in engineering, as elsewhere in the economy, the causes of the gender pay gap are structural and cultural. They will not be fixed overnight. However, there are measures employers can take now that are proven to have a sustainable, positive impact on women's pay and progression.¹⁵ Implementing these measures more widely will help to close the pay gap not just for women, but for other groups who are under-represented in higher paid, senior roles in engineering.





The size of the gender pay gap for engineers

The Office for National Statistics (ONS) publish data on the gender pay gap for different occupations including engineering. The data shows some correlation between the higher average pay for a role and lower numbers of women in different engineering occupations (Table 1).

Gender pay gap for engineers in published data

ONS data is based on self-reported survey responses, with individuals asked for their job titles. This analysis is based on data from employers, who do not use the same occupational codes as ONS. The report has differentiated between professional engineers and technicians but not at a more granular occupational level within these groups.

However, the overall conclusions that can be drawn from the ONS data are limited because more than half of professional engineers are in the miscellaneous 'not elsewhere classified' group, which includes roles as diverse as materials engineer, optics engineer and safety engineer.

There was low awareness of these pay differentials in engineering occupations in the focus groups, as illustrated by the comments below:

'Interestingly those departments with more women do have lower pay. I never thought of that.'

- HR/Reward lead

'You would think the market rate is just that. That said, in areas where more women work the market rate drops.'

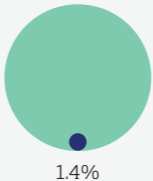
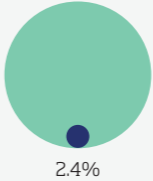
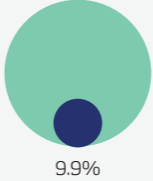
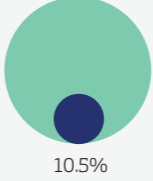
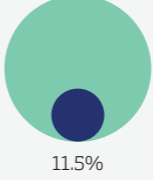
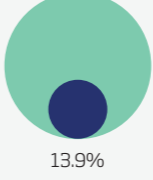
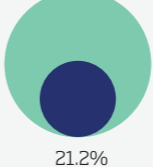
- HR/Reward lead

'I certainly didn't know my area of engineering was the highest paid one, and that wasn't the reason for choosing it'

- Male engineer

Table 1: Women as a percentage of the total numbers working in different engineering occupations compared with mean average hourly pay and mean average gender pay gaps for those occupations.

Annual Survey for Hours and Earnings (ASHE); ONS 2019.

Engineering Occupation	Woman as % of workforce	Mean average hourly pay (£)	Mean average gender pay gap (%)
Electrical engineers	 1.4%	£24.44	13.2%
Mechanical engineers	 2.4%	£22.96	-2.6%
Electronics engineers	 9.9%	£22.96	Data not available, but male mean of £22.86 implies a negative gender pay gap
Civil engineers	 10.5%	£21.08	-5.3%
Design and development engineers	 11.5%	£21.68	-5.8%
Production and process engineers	 13.9%	£20.78	5%
Engineering professionals not elsewhere classified (the largest group)	 21.2%	£21.23	8.1%



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Gender pay gap for engineers in the sample

'It's not an issue about pay, it's about gender balance.'

- HR/Reward lead

Table 2 shows that the gender pay gap for nearly 42,000 engineers in the sample (11.4% median) is smaller than the gender pay gap for all UK employees (17.3% median). This data sends a positive message to support the recruitment of women into engineering roles. However, it should be noted that although the gender pay gap is smaller, there is still a gap which, as discussed later in this report, starts early for engineering roles. This is a critical issue for the engineering profession to address.

'Ours looks good, as we have many male low-level factory workers, and some female execs. This is not necessarily a good thing.'

- D&I lead

However, the size of the gender pay gap itself doesn't tell the full story, as pointed out by HR and diversity and inclusion professionals in the focus groups:

Table 2: The mean and median gender pay gaps for engineers in the sample compared with all employees in the UK.

*Verditer Consulting, 2019; **ONS ASHE data, 2019.

Mean gender pay gap



Median gender pay gap





Company size

Medium-size companies in the sample, by number of employees and revenue, had the smallest gender pay gap for engineers (Figures 2 and 3). The largest gender pay gap was found in companies in the sample with between 250 and 1,000 employees. This finding should be treated with caution however, as more than 70% of employees in the sample work for companies with more than 5,000 employees.

Figure 2: The mean and median gender pay gaps for the companies in the sample by number of employees: 250 - 999, 1,000 - 4,999 or 5000+ employees. Verditer Consulting, 2019.

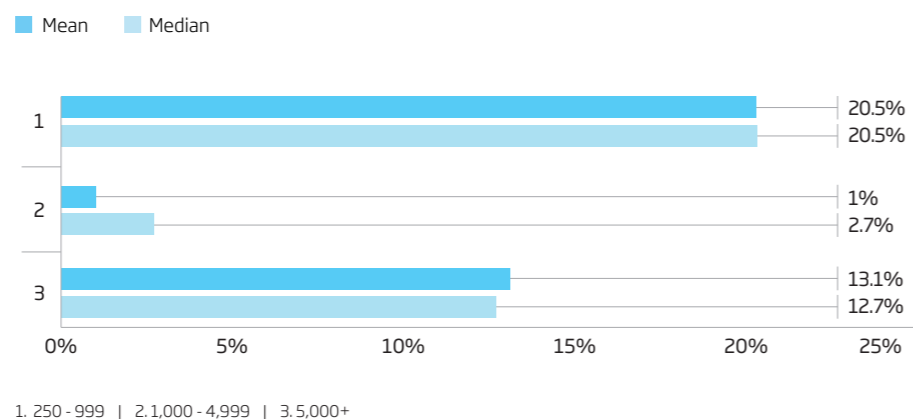
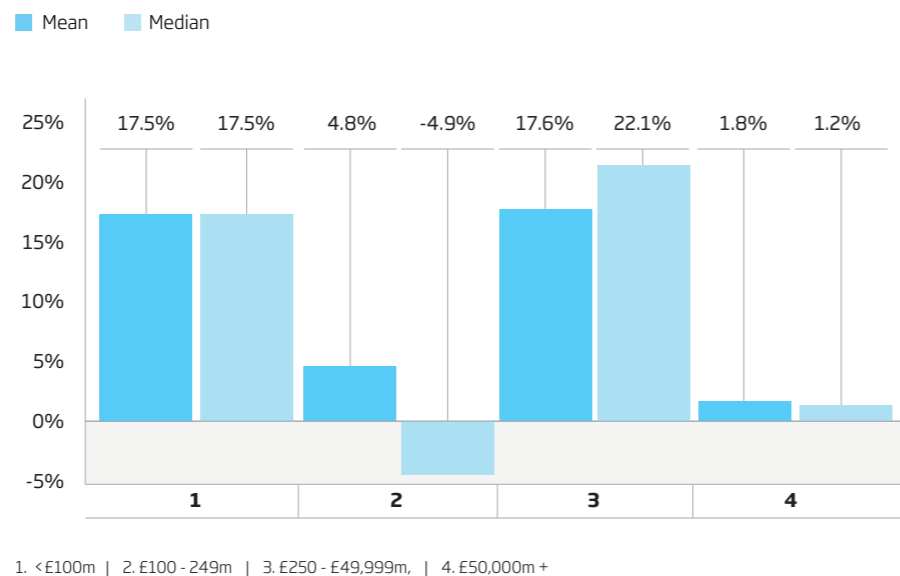


Figure 3: The mean and median gender pay gaps for the companies in the sample by company turnover: <£100m, £100 - £249m, £250 - £49,999m, £50,000m+. Verditer Consulting, 2019.



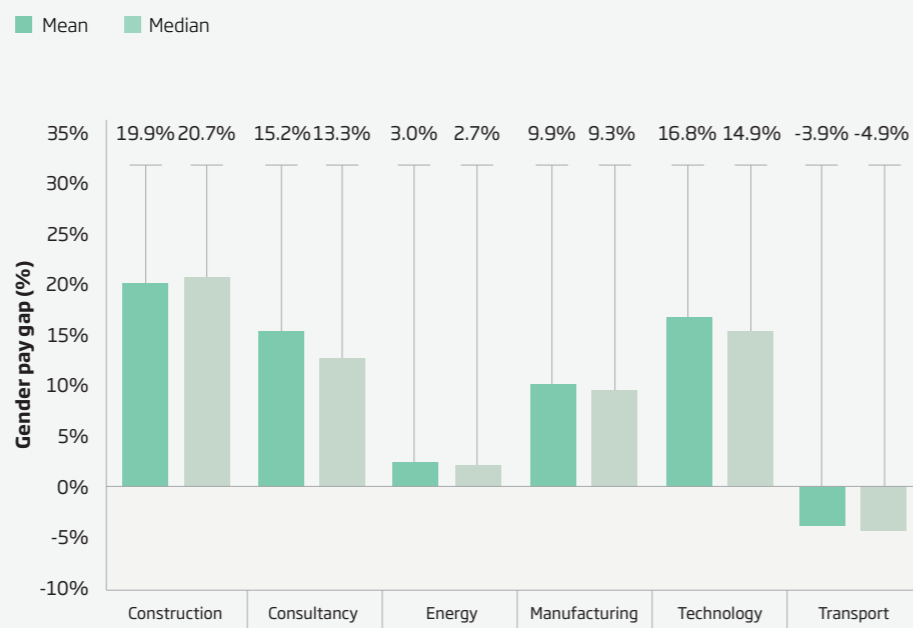
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Engineering sectors

In the sample, there were enough companies to report separately on the following sectors: construction, engineering consultancy, energy, manufacturing, technology and transport (Figure 4).

Figure 4: The mean and median gender pay gaps for companies in the sample by sector. Note some companies fell into more than one category. The threshold for reporting was 4 companies. Verditer Consulting, 2019.



Construction had the largest gender pay gap at 19.9% mean, which is also the sector in our sample with the highest representation of women (17%). Technology had the second largest gender pay gap at 16.8% mean, but a lower representation of women (9%). The smallest pay gap (3% mean) was found in energy companies.

Transport companies in the sample had a gender pay gap in favour of women - this could be due to the large number of men employed in technician roles.

However, the number of companies in each sector in the sample is too small to draw an inference about the size of the gender pay gap for engineers in those sectors more widely.



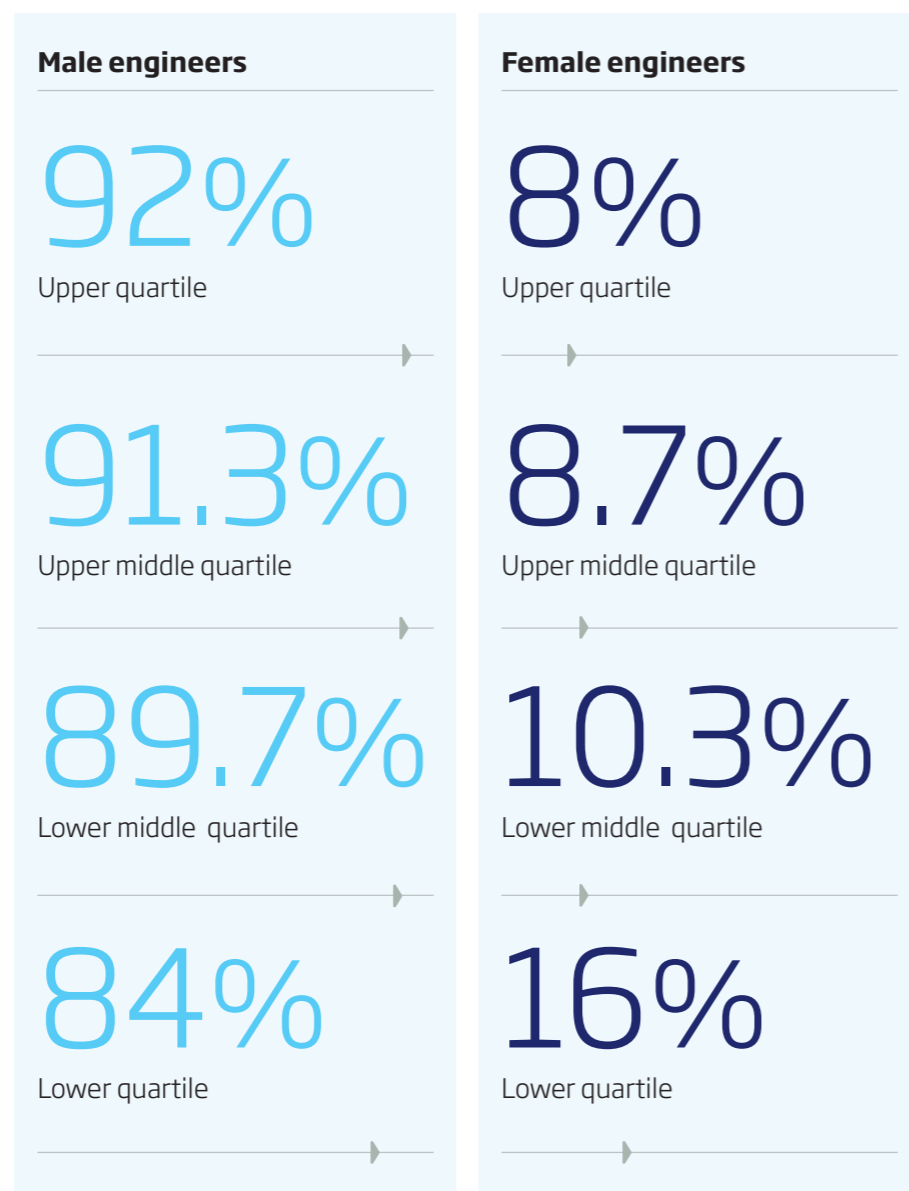
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Career level

In the sample 11% of the engineers were women, slightly under the UK figure of 12% female engineers.¹⁶ Gender pay gap regulations require companies to report the percentage of male and female employees in pay quartiles. The analysis for engineers in the sample is shown in Table 3.

Table 3: Percentage of male and female engineers in the companies in the sample by pay quartiles. Verditer Consulting, 2019.



Career level accounts for nearly 40% of the pay variance for engineers in the sample (Figure 1). 91% of those in the top career level in the sample, (defined as expert/ chief engineer/ executive, see Table 4 for definitions of career levels) were men. Other major factors include engineering occupation and age. The question of how to help more female engineers to move forward in their careers featured prominently in all focus groups. Most female engineers in the focus group pointed to a lack of transparency around what progression opportunities are available, while most HR specialists said that women are less likely to put themselves forward. Male engineers generally felt that their line managers helped them to progress their career.

'Promotions are influenced by those that people naturally gravitate towards and have things in common with.'

- D&I lead

'At graduate level and at the top there is no issue. The women in the middle quietly performing are missing out - that is a concern.'

- HR/Reward lead

Where there are systems in place to make career progression processes more transparent, they are not always understood by either female or male engineers. There was consensus between the male and female engineer focus groups that male engineers are more able to fall back on their networks to access the opportunities they want. Where systems are designed to be 'meritocratic', gender bias can be inherent in the types of behaviour associated with the concept of 'merit' - male engineers generally felt that their own actions and abilities enable them to move ahead, which female engineers in the focus group did not feel was the case.

Practical measures to improve women's career progression

Employers that are serious about the progression of women in their company and tackling causes of their gender pay gap take action to create a culture in which women can succeed. Some examples came out in the focus groups. Female engineers in the focus group, most of whom had at least 10 years' experience, highlighted a range of factors that had helped their career progression including mentoring, sponsorship, a female/supportive manager and positive role models. The discussion in the focus group with male engineers focused more on their own abilities affecting their progression.

Organisational culture came out as a key factor in women's career progression in all focus groups. This has been evidenced in previous research by the Royal Academy of Engineering (*Creating cultures*

where all engineers thrive, 2017) and others (for example, the Institution of Mechanical Engineers' *Stay or go. The experience of female engineers in early career, 2017*) as a significant enabler to women's retention and progression in engineering.

'In my new company I get supported... In my previous company people were often condescending ... and interrupting me if I spoke. It makes a massive difference to my confidence.'

- Female engineer

A couple of the male engineers felt that when it came down to a choice between candidates who met the competency requirements for a role, they would pick a woman over a man in order to improve the gender balance of their team. Employers need to take a confident and proactive approach to make a difference - using the positive action 'tie-break' provision is one way to address underrepresentation.¹⁷

Diversity and inclusion leads in the focus groups discussed the importance of ensuring posts are openly advertised and several shared examples of holding hiring managers to account:

'It was all about jobs for the boys 'I know someone, I will bring them in'. Just enforcing due process ... is making a difference.'

- D&I lead

'Promotions aren't signed off if you haven't got a woman in the pipeline. A hiring manager needs to evidence they have interviewed someone of the opposite gender.'

- D&I lead



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The impact of working patterns and career breaks

Each of the focus groups talked about the impact of career breaks on women's pay as well as their progression into senior roles. The HR group felt that lack of flexible working was the most significant cause of the gender pay gap for engineers, with unanimous agreement from participants - but female engineers focused more on the impact of career breaks and maternity leave. The HR and female engineers' focus groups noted that women on maternity leave are not always included in pay and bonus reviews. Women on maternity leave have a right to any pay review that they would normally have. The payments of bonuses while on maternity leave is complex and

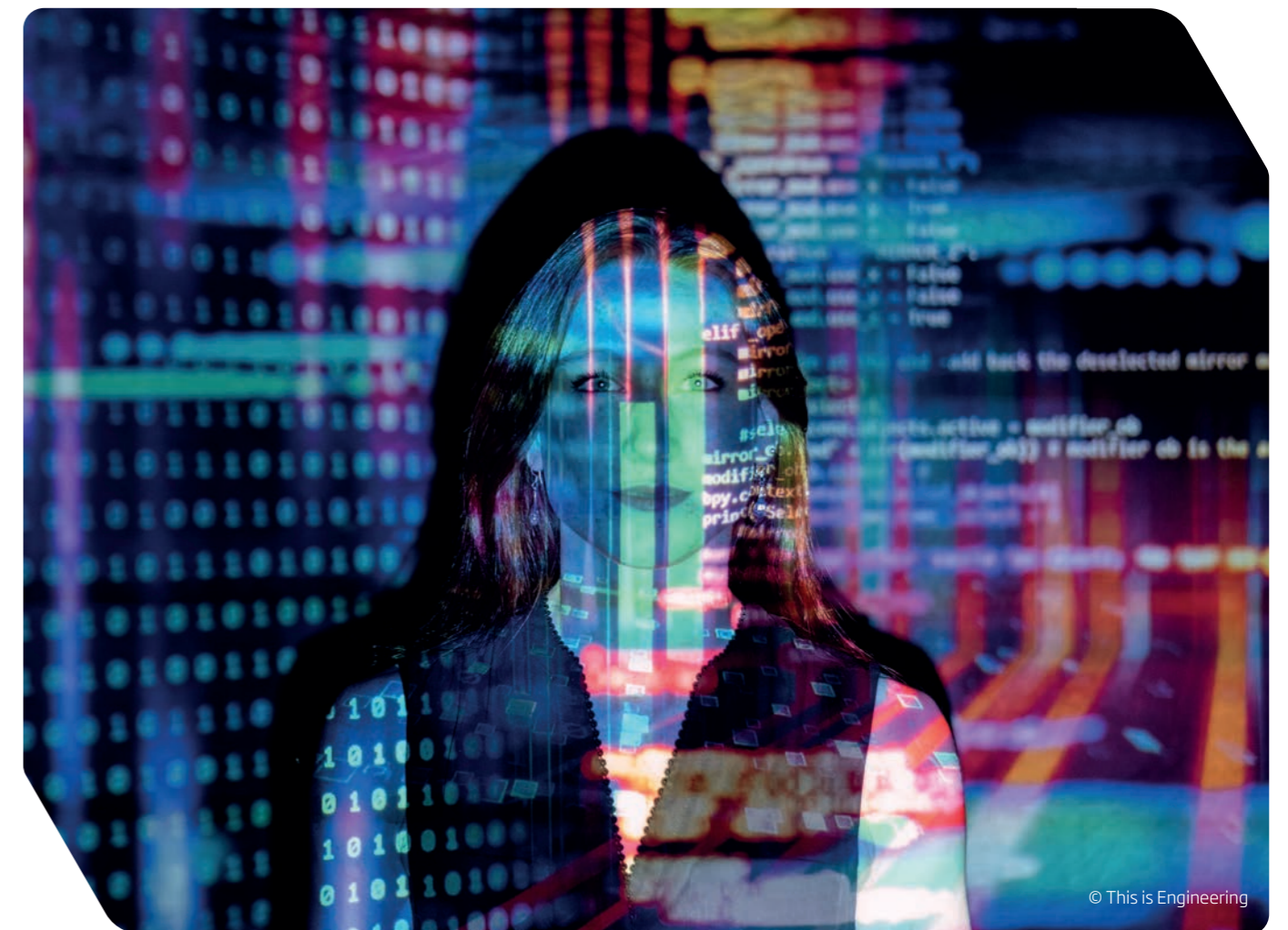
depends on what it is normally paid for. Employers should ensure that they understand their obligations to their employee and what benefits she may be entitled to while on maternity leave. The Equality and Human Rights Commission has detailed support and guidance for employers for managing maternity leave.¹⁸

Diversity and inclusion leads in the focus group expressed some misunderstanding of the requirements for qualifying as a Chartered Engineer (CEng), with some focus group participants believing that there was a time period, putting women who take career breaks at a disadvantage.

There is no prescribed time period for the development of competence and commitment for prospective

incorporated and chartered engineers. Employers and institutions have a role in ensuring that the requirements are clearly communicated.

Women who reduce their hours on return to work after maternity leave can face a progression penalty. There is evidence from the literature review for this project showing that few senior roles are available on a part-time basis, which disproportionately affects women's progression. In the sample of engineers whose pay was analysed, 17% of the female engineers worked part-time compared to just 2% of the male engineers.



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Age

In the sample, the smallest gender pay gap at 2.5% mean was for engineers in their 30s (**Figure 5**). There was a mean gender pay gap of 5% for engineers aged 18 to 21 - those just joining the workforce. The gender pay gap increases after the age of 50. At 60 (where the number of women and men in the sample was very small, at 2% and 6% respectively of the total), the gender pay gap for engineers was 31%. The data shows a correlation between age and career level that is statistically significant. However, it was not a strong correlation. The age of employees in Grade A (first career level, see **Table 4** for definitions of career levels) for example, ranged from 17 to 71 (**Figure 7**). The data is skewed by relatively few of the engineers aged over 60 being female and by a relatively high proportion of career technicians being male.

It is notable that there is a lower proportion of women over 50 in **Figure 6** - a contributing factor may be fewer women entering the profession than men.

Figure 5: The mean and median gender pay gap for engineers in the sample by age of employee. Verditer Consulting, 2019.

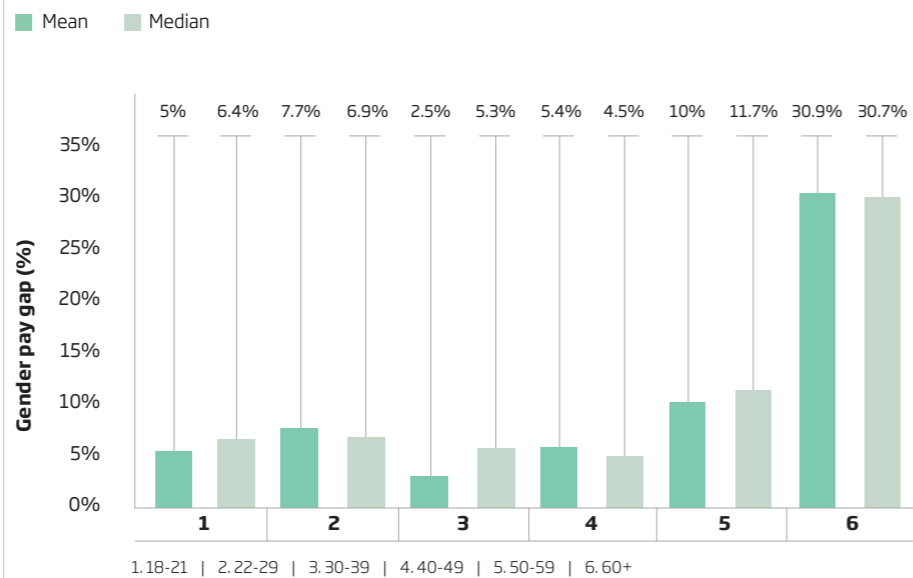


Figure 6: The number and percentage of women in the companies in the sample by age of employee. Verditer Consulting, 2019.

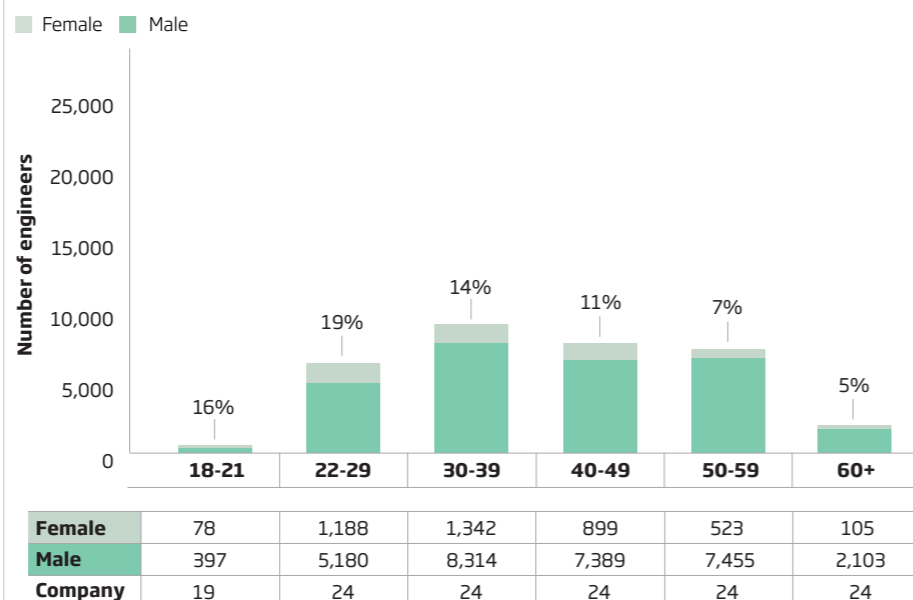


Figure 7: The mean and median gender pay gaps for employees in the sample by career level. See **Table 4** for career level definitions. Verditer Consulting, 2019.

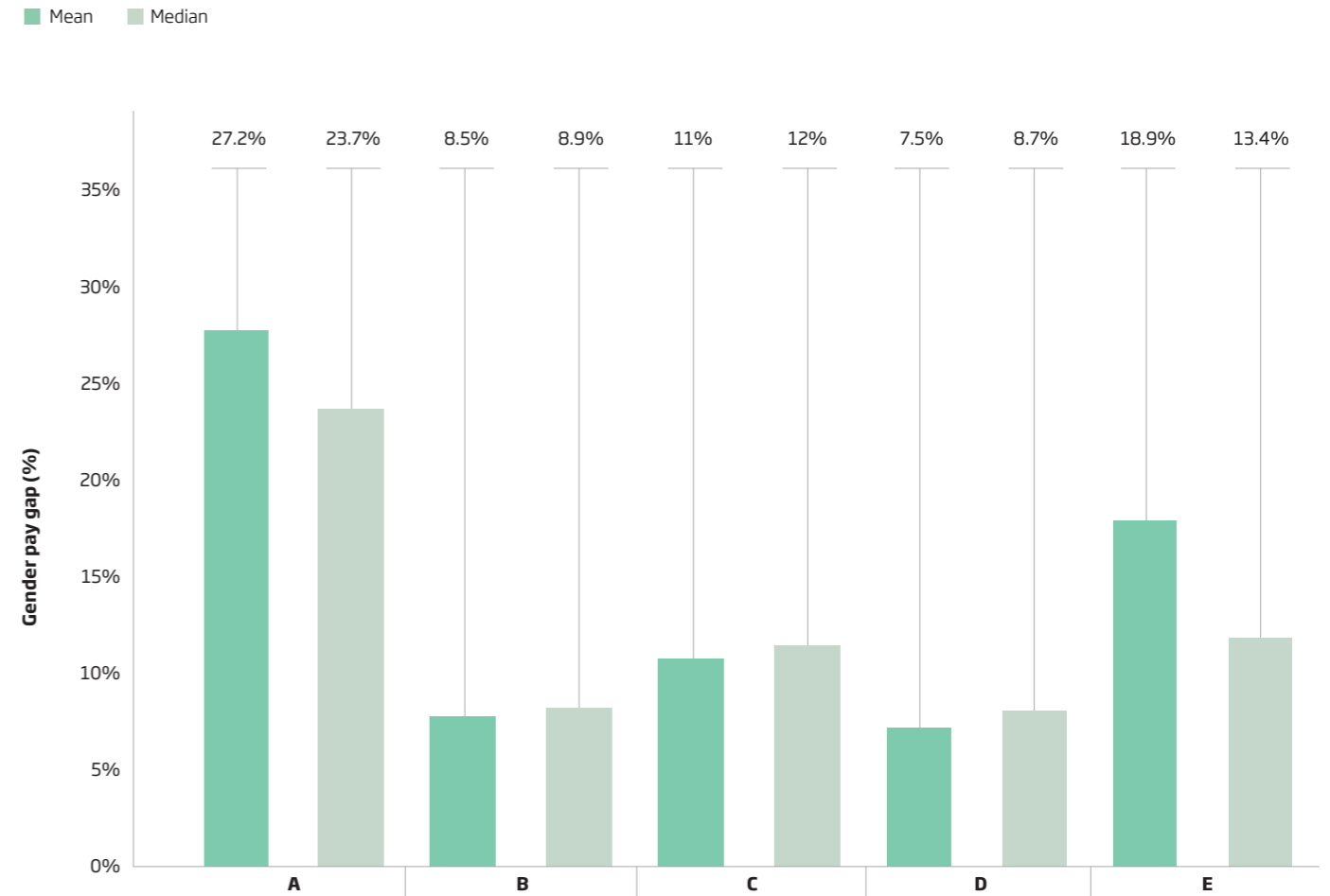


Table 4: Definitions of career levels. Verditer Consulting, 2019.

A	B	C	D	E
Technician	Graduate	Professional	Senior professional	Expert
Field technician		Engineer	Senior engineer	Chief engineer
Apprentice engineer		Manager	Senior manager	Executive

Pay differentials over time

Although many of the focus groups (including the HR group) felt that the gender pay gap facing engineers was a time lag that will fix itself, the research found evidence that the gender pay gap for engineers starts early (5% for 18- to 21-year-olds, 7.7% for 22- to 29-year-olds, see **Figure 5**). Evidence from government data shows that there are more female engineers in engineering occupations with a lower hourly rate than other engineering occupations.¹⁹ The entry-level gender pay gap for engineers may therefore be due to the women working in less highly paid types of engineering. The hardest to fill engineering roles tend to attract higher rates of pay.

Analysis by career level found the largest gender pay gap for technicians and apprentices, at 23.7% median (**Figure 7**) - although the wide age range makes it difficult to draw conclusions for young women joining the workforce. There is an 8% gap for graduates; this is despite examples from the HR focus group that suggest that some female graduates and apprentices are demanding and/or being offered a pay premium because companies want to improve their gender balance and female candidates know that they are therefore in high demand.

An unequal starting point can mean a growing disparity over time between male and female engineers, as pay rises are often calculated on a percentage of existing salary.

'I work in the same industry as my husband. I started on £18,000 and my husband on £25,000 - it took me 10 years to catch up.'

- Female engineer

Impact of mobility

The focus groups also suggested that female engineers are less likely to move between organisations during their career and often incur a 'loyalty penalty' as a result.

This could explain the pay gap growing through successive age ranges - male engineers are more likely to move to a higher paid role in another organisation as they gain experience.

'Men come more often from external, and are then more aware of market rates so are more capable of negotiating.'

- D&I lead

'Pay rises are given when people feel there is a high chance someone might be leaving, rather than on performance.'

- Hiring manager



Pay policies

Organisations' pay policies have a significant impact on the gender pay gap. Recent research published by the Government Equalities Office shows that changes that make the processes for promotion and progression standardised and transparent are linked with improved career outcomes for women.²⁰

Transparent pay policies

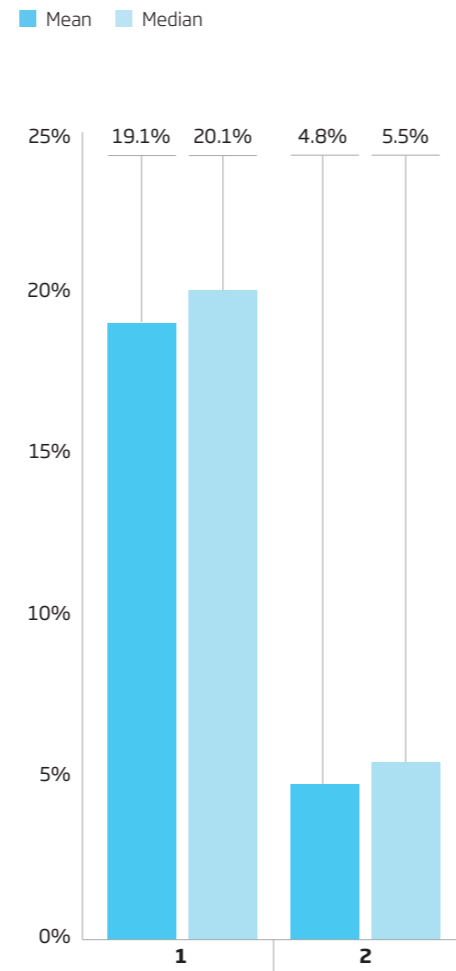
In the sample, where organisations used salary ranges as well as pay grades, their engineering gender pay gap was 75% smaller than those that used pay grades without salary ranges (Figure 8). The evidence also shows that transparency in how salary ranges are explained within organisations helps to reduce the gender pay gap for engineers, as shown in Figures 8 and 9.

'I hire people and do pay reviews. It's in the interest of me as a hiring manager to keep my budget low. So if I know you will be happy with what you are being offered, and will not kick up a stink, that's good for me. I am under financial pressure to keep the wages down.'

- Hiring manager

Research shows that women are less likely to negotiate their pay, partly because women are put off if they are not sure about what a reasonable offer is.²¹ Transparency therefore has a positive impact on the gender pay gap because it removes the pressure on women to negotiate their own pay by setting out principles that are understood by everyone and open to scrutiny. Cultural aversion to discussing pay came out strongly in the focus group with female

Figure 8: The mean and median gender pay gaps for companies in the sample by whether the company has pay grades but no pay ranges or both pay grades and pay ranges. Verditer Consulting, 2019.



1. Grades but no ranges
2. Grades and ranges

engineers, and a number, even in the 'safe space' of the focus group, were apologetic about raising pay issues. Half of the female engineers did not know if there was a gap between their own pay and that of their male colleagues. They expressed a lack of confidence in negotiating pay, which wasn't mentioned at all by the male engineers.

'I work more hours now that I am more senior, I have received an award externally, but I still find it very hard to ask for a pay rise. How do you do this?'

- Female engineer

'I am embarrassed to talk about pay, it's more something to be discussed with friends not with colleagues. It's cultural.'

- Female engineer

Pressure to drive down costs can exacerbate a gender pay gap if a hiring manager is judged on total salary spend without considering the demographic of those being hired. Greater transparency about pay ranges for roles can reduce gender pay gaps.

Performance-related pay

Performance-related pay systems can introduce subjective judgements. While individual pay decisions can be explained, organisations may miss patterns in those decisions. The following observations from female engineers illustrate the problems that arise when the criteria for measuring performance are unclear:

'There is no mechanism to challenge your pay. My manager says, 'This is your performance score, and here is your associated pay rise.'

- Female engineer

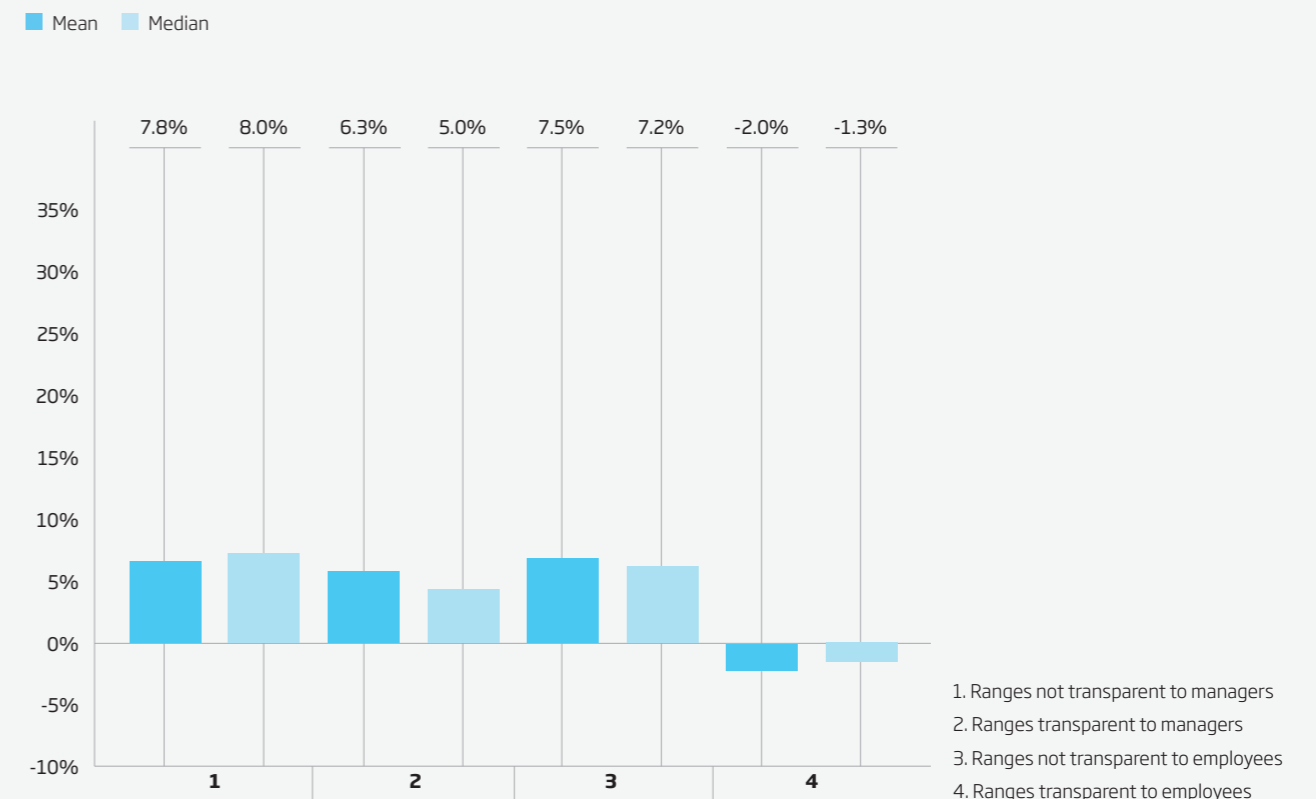
'We have a transparent system and I know which zone I am in, but it's totally unclear how I can move to the next zone.'

- Female engineer

'There are standard processes. I worry about how people will perceive me if I do make a fuss.'

- Female engineer

Figure 9: The mean and median gender pay gaps for companies in the sample by whether pay ranges in the companies are transparent to managers and employees. Verditer Consulting, 2019.



1. Ranges not transparent to managers
2. Ranges transparent to managers
3. Ranges not transparent to employees
4. Ranges transparent to employees



Bonus payments

Because the companies in the sample pay bonuses on different bases, it is more difficult to draw meaningful conclusions from the bonus data analysed than the pay data. However, for organisations that do pay a bonus, it is important to monitor who is eligible to receive a bonus, who receives one in practice and the size of the bonuses paid, because the data may reveal a disparity for women and other under-represented groups.

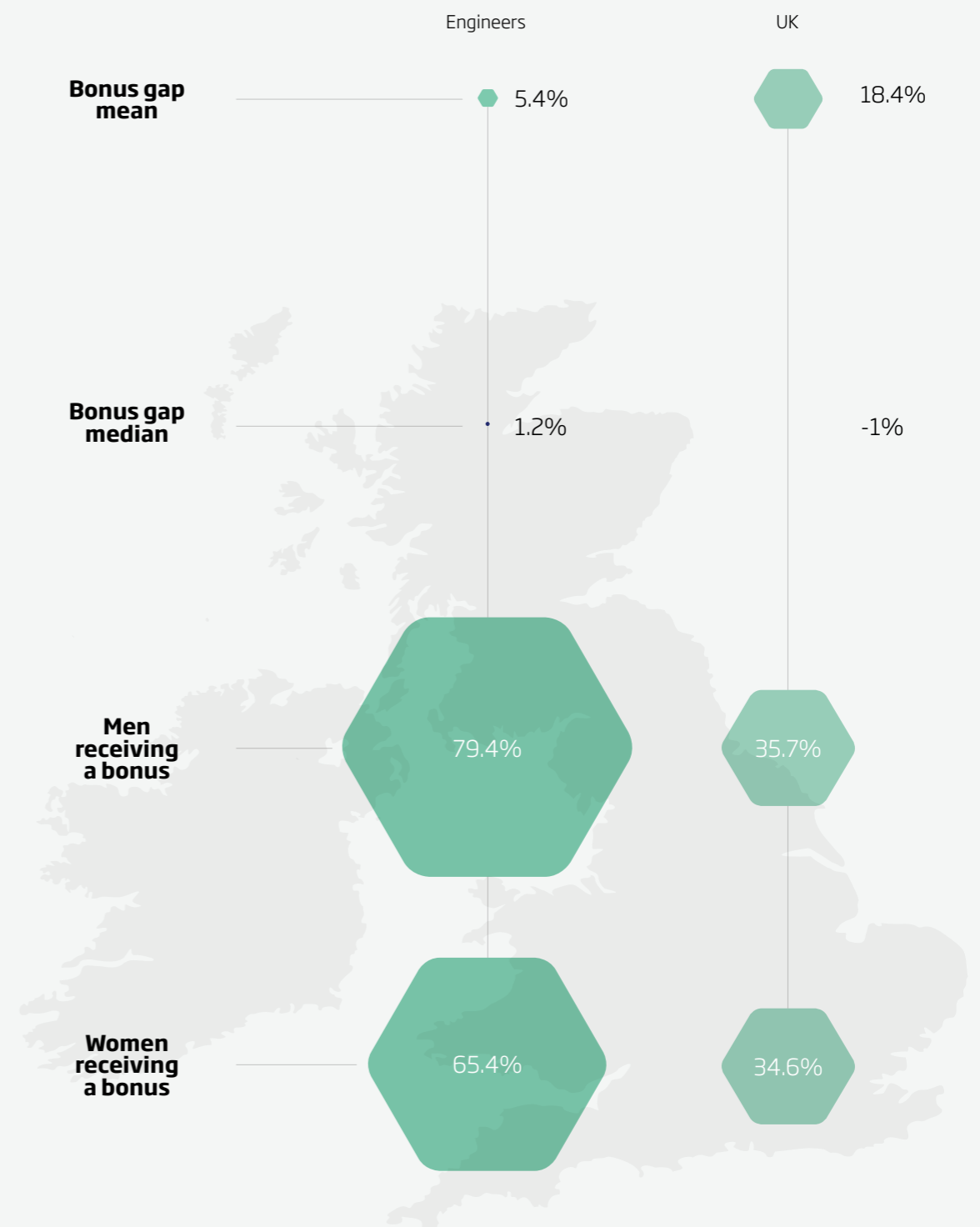
In the sample, engineers were significantly more likely to receive a bonus than the average employee.

Although more male engineers receive a bonus than women, the mean size of bonus gap between male and female engineers is significantly smaller than for the whole UK economy as illustrated in **Table 5**.

As **Table 5** shows, there is a 14-point gap in the percentage of male and female engineers in the sample receiving bonuses. The mean bonus gap at 5.4% is significantly higher than the median at 1.2%, because of larger bonuses being paid to the most senior male engineers in some companies. Although part-time female engineers are just as likely to receive a bonus as part-time male colleagues, the bonus they receive is 20% smaller on average. This may be because part-time male engineers are more senior and at a later stage of their careers.

Although there are significantly fewer women at the top career level, those that are there are more likely than their male counterparts to receive a bonus (82.4% versus 72.6%).

Table 5: The mean and median gender bonus gaps for engineers in the sample and proportion of full-time men and full-time women receiving a bonus in the sample compared with the UK workforce as a whole. Verditer Consulting, 2019; UK Government Gender Pay Gap Service, 2019





04.

Recommendations



Recommendations

There is no shortage of advice, guidance and case studies of good practice to support employers with the recruitment, retention and progression of women in engineering. In addition to recommendations listed in this report, there is a recommended reading list for more detailed advice and guidance on how to tackle the issues that contribute most to the gender pay gap, including which actions are most effective.²²

Recommendations for engineering employers



Understand the causes of the gender pay gap for engineers and which solutions are proven effective

Engineering employers will make faster progress in attracting and retaining women in engineering through a better understanding of the gender pay gap, its causes and the solutions that have been proven to make an impact.

See **page 18**.



Analyse data to understand your organisation's gender pay gap

Collect data to identify the significant factors within your organisational context.

- ▶ Start with the basics - extract pay data for engineers and other technical roles from the data set for all employees.
- ▶ Measure progression by gender and hours of work.
- ▶ Measure pay rises and performance ratings by gender and hours of work.
- ▶ Control for engineering role and age, as we found both to be significant, see **page 22 and 34**.
- ▶ Measure regularly and track changes over time so that you can spot trends.
- ▶ Analyse the data to help identify which aspects of bonus pay may be contributing to a bonus pay gap and introduce measures to reduce any gap.



Introduce a transparent pay and progression policy and publish salary ranges

A transparent pay and progression policy is the most effective measure that engineering employers can take to close the gender pay gap.

See **page 38**.



Publish a credible action plan

Only a small proportion of published gender pay gap reports include a credible action plan, see **page 20**. Engineering companies who take the opportunity to explain the contributory factors most relevant to their organisation and the actions that they are taking to address these will stand out as forward-thinking, progressive employers.

Smaller engineering employers, who are not legally required to publish a gender pay gap report, can take the same approach to identify the issues and actions that are relevant to them, which in turn will help them to attract and retain talent.

▶ Go beyond the government's mandated requirements

Report and explain the gender pay gap data for engineers as well as your overall gender pay gap.

▶ Focus on actions within your control

Many of the focus group discussions and the narratives looked at in this report explain the gender pay gap as being caused by the education system, which leads to an under-representation of women in engineering. Focus on steps that you are taking within your own organisation to reduce your gender pay gap.

▶ Report on which actions you are taking that are proven to have a positive impact




Based on evidence from this research and the recommended reading list.

This report has also drawn up specific recommendations for different groups, based on suggestions from the focus groups and the steering group.



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Recommendations for HR, pay and reward specialists

Issue	Solution
 Rates for the job and how to progress are unclear.	Publish career levels with pay ranges and transparent pay and progression principles.
 Female engineers see their pay stall during career breaks and lose out when they come back to work part-time.	Ensure women on a career break or maternity leave are included in pay and bonus reviews, and ensure part-time engineers are also included, monitoring pay gaps between part- and full-time engineers.
 A 'loyalty penalty' sees female engineers' pay falling behind if they don't move between different employers.	Review individual pay over time and consider salary uplifts where 'loyalty penalties' are identified.
 Gender differentials in starting salaries for engineers who move company.	Do not ask for current salaries when making a job offer to help break the cycle of unequal starting points.
 Manager discretion introduces bias to pay and progression decisions.	Monitor decisions by managers about who gets a pay rise and who is hired or promoted.
 Engineering roles attract different pay due to 'market rates' being applied.	Publish rates for different engineering roles so that men and women can make informed career decisions.
 Gender differentials in starting salary at entry level.	Publish salary ranges for graduate and apprenticeship programmes.
 Female engineers leave or do not return after a career break.	Conduct formal exit interviews and collection of this data to understand why people leave or do not return after a career break. Conduct regular employee engagement or culture surveys to identify organisational strengths and areas for improvement.
 Female engineers are under-represented in senior roles	Review promotion criteria and consider job sharing and other flexible working options for senior roles.

Recommendations for line managers

Issue	Solution
 Few women apply for engineering roles.	Include more visible role models and photos of female engineers in marketing material. Review job requirements, be conscious of role descriptors, and use a gender decoder to ensure gender neutral language. Publish flexible working arrangements to widen the applicant pool. Consider what criteria is absolutely essential for a role and what skills can be listed as desirable in a person specification. See the reading list for further guidance on inclusive recruitment.
 Lack of experience discourages women from applying for better-paid roles.	Test skills, competence and aptitude not defined by time. Give female engineers opportunities to work on high-profile projects, including those who work part-time and those returning from a career break.
 Gender bias in hiring process.	Anonymise applications and use skills-based assessments.
 All-men interview panels.	Offer female candidates the opportunity to directly ask a female engineer questions if you cannot find women to sit on the interview panel.
 Lack of understanding of pay systems.	Ensure transparency of pay ranges and scales for job roles that employees can easily access and discuss with you.

Recommendations for CEOs

Issue	Solution
 Organisational culture does not support women's career progression.	Prioritise action to create a more inclusive culture. Articulate the benefits of diversity and inclusion, reframe inclusion to ensure that everyone understands their role in creating more inclusive cultures and demonstrate inclusive behaviours. Ensure clear pay and progression policies and practices so that all staff are considered rather than just those who ask.
 Lack of understanding or ownership of the problems that cause a gender pay gap for engineers.	Allocate responsibility and resource within your organisation to develop an action plan and report progress to the board.
 Female engineers less likely to progress to senior roles.	Hold managers to account for the diversity of those they bring into their teams, and encourage the leadership team to support individual women to progress through the organisation, for example through sponsorship, mentoring, or career development programmes.
 Ostensibly 'transparent' systems for progression through engineering careers are not clear to employees.	Ensure that there are effective mechanisms to capture and respond to employee feedback on pay and progression systems, and that those systems are fully explained to new recruits and during performance reviews.
 Female engineers don't get pay rises as often as men when they ask for them.	Put a system in place to review pay recommendations by demographic before decisions are finalised.
 Managers feel their job is to keep down pay costs.	Articulate the benefits of gender-balanced teams and ensure that there is a senior leader with ultimate responsibility for reducing the gender pay gap for engineers.

Questions board members should ask

01.

Is the culture of the organisation one that encourages and supports diversity and inclusion? How do you know?

02.

Is closing the gender pay gap for engineers a priority for the senior executive team? How is this evidenced? For example, are senior executives' bonuses contingent on achieving diversity and inclusion goals?

03.

Does the organisation have a clear and transparent pay and progression policy with published salary ranges? If not, why not?

04.

Are female engineers progressing in the same proportion as male engineers? If not, why not?

05.

What is done to facilitate and encourage women's progression after a career break?

06.

Do you understand how female engineers in your organisation feel about pay, reward and career progression?

07.

What is the organisation doing to close the engineer gender pay gap more widely, with suppliers and partners and the profession as a whole?

Questions engineers should ask

01.

Does my organisation have a clear and transparent pay and progression policy?

02.

How serious is my new or current employer about really understanding and closing the gender pay gap?

03.

Do I have a clear career plan? Do I know where I want to be in five years and how I can get there?

04.

Do I know the market rate for my engineering role?

05.

What will be the impact of a career break or parental leave on my future pay and progression?



Tackling the engineering skills shortage

This research has sought to better understand the gender pay gap specific to engineering roles in the UK, how the career experience of female and male engineers affects the gender pay gap, and to identify effective actions that companies can take to improve the gender balance in their organisations.

Creating a gender-balanced engineering profession also requires continued vital action throughout all stages of education to promote, encourage and enable girls to see engineering as a potential career option.

The Academy's education and skills activities are focused on addressing the UK's engineering skills challenge. It works across all phases of education to encourage the widest diversity of people to work as technicians and engineers. The Academy's work spans STEM education in schools, support in post-16 education and higher education, and research and policy to improve teaching and learning for engineering.

The Academy is a supporter of Gender Action,²³ an award programme that promotes and supports a whole-school approach to challenging stereotypes. The This is Engineering²⁴ campaign is a multi-year campaign led by the Academy in partnership with

EngineeringUK to challenge unhelpful stereotypes by showing the world what engineering and engineers really look like to encourage more young people, from all backgrounds, to consider engineering careers.

Recommended reading

Government Equalities Office – Research on the barriers to women’s progression in the workplace (2019)
<https://www.gov.uk/government/publications/gender-equality-at-work-research-on-the-barriers-to-womens-progression>

Equality and Human Rights Commission – Closing the gender pay gap (2018)
<https://www.equalityhumanrights.com/en/publication-download/closing-the-gender-pay-gap>

Government Equalities Office/ Behavioural Insights Team – Reducing the gender pay gap and improving gender equality in organisations (2018)
https://gender-pay-gap.service.gov.uk/public/assets/pdf/Evidence-based_actions_for_employers.pdf

Institute of Mechanical Engineers – The experience of female engineers in early career (2017)
www.engenderingstem.co.uk/wp-content/uploads/2018/01/Stay-or-Go-The-experience-of-female-engineers-in-early-career-IMechE.pdf

Confederation of British Industry – Mind the gap: practical ways to close your gender pay gap (2019)
<https://www.cbi.org.uk/articles/mind-the-gap-practical-ways-to-close-your-gender-pay-gap/>

CIPD – Reward management: focus on pay (2019)
<https://www.cipd.co.uk/knowledge/strategy/reward/surveys>

PricewaterhouseCoopers – The £1bn career break penalty for professional women (2016)
<https://www.pwc.co.uk/services/economics-policy/insights/women-returners.html>

WISE – The business case for diversity (2019)
<https://www.wisecampaign.org.uk/the-business-case/>

WISE – Ten Steps: A framework to improve the recruitment, retention and progression of women (2019)
<https://www.wisecampaign.org.uk/what-we-do/expertise/industry-led-ten-steps/>

Royal Academy of Engineering – Creating cultures where all engineers thrive (2017)
<https://www.raeng.org.uk/publications/reports/creating-cultures-where-all-engineers-thrive>

Royal Academy of Engineering – Creating and maintaining inclusive cultures toolkit (2017)
<https://www.raeng.org.uk/diversity-in-engineering/diversity-inclusion-toolkit-resources/a-practical-toolkit>

Royal Academy of Engineering – Inclusive Recruitment toolkit (2017)
<https://www.raeng.org.uk/diversity-in-engineering/diversity-inclusion-toolkit-resources/inclusive-recruitment>

The Steering Group

The following individuals kindly gave up their time to participate in the steering group that directed this project. Special thanks go to Jonathan Lyle CB FREng, Chair of the steering group, for his input and expertise, but every member made their own helpful contribution and was involved in providing additional context, from their own experiences and knowledge, to the research.

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Chair, Gender Pay Gap Steering Group

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This document is based on a report written by WISE using research conducted as described in the Methodology section by the research team below. This report was subsequently edited and prepared for publication by Polly Williams, Head of Diversity and Inclusion at the Academy.

Participating companies

Over 30 engineering companies contributed to the research by sharing their engineers’ pay data, taking part in a focus group and/or commenting on drafts. We are grateful for all their input, without which the project would not have been possible.

We wish to thank the following companies:

AWE
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Emerson
HS2
Imagination Technologies
MBDA
Metaswitch
Network Rail
RAF
Ricoh
Rolls-Royce plc
RWE Generation UK plc
Siemens
Sweco
Tony Gee and Partners LLP
TSP Projects
UCL Engineering
WSP UK Ltd

About the research team

Helen Wollaston
Chief Executive, WISE

Helen has over 30 years’ experience in equality, diversity and inclusion, including seven years as Chief Executive of WISE. She commissioned and managed research projects as Director of Campaigns for the Equal Opportunities Commission and for her own consultancy, Equal to the Occasion, prior to taking up her post at WISE.

Stephen Howse
Research Manager, WISE

Stephen has extensive experience of researching gender issues in engineering. Since taking up the post of Research Manager with WISE, he has managed WISE’s statistical analysis and led the WISE thought leadership topic of future skills.

Inge Woudstra
WISE Associate

Inge has an MSc in Business Management and is an experienced researcher, facilitator and consultant in the area of gender diversity. Inge previously worked for Siemens and Shell in IT, change management and training and as a consultant for Ashridge Business School.

Julia Hanna
Director, Verditer Consulting

Julia has extensive experience of all aspects of reward, having held senior consulting positions at Aon Hewitt, and Director-level roles at AstraZeneca and Standard Chartered Bank. Julia’s qualifications include an MBA. Julia is also an Associate of PMI, a Member of CIPD and a qualified Executive Coach.

Vicky Peakman
Senior Analyst, Verditer Consulting

An experienced human resources professional specialising in pay benchmarking and structures, gender pay and bonus design. Prior to working for Verditer, Vicky set up reward systems for the British Council and was a consultant for Aon Hewitt. She is a Chartered Member of the CIPD.

Endnotes

¹ Engineering UK 2018: The state of engineering, www.engineeringuk.com/media/156187/state-of-engineering-report-2018.pdf

² Royal Academy of Engineering, Employment outcomes of engineering graduates: key factors and diversity characteristics, 2016, www.raeng.org.uk/publications/reports/employment-outcomes-of-engineering-graduates-key-f

³ Women's Engineering Society, RETURN Project Final Report Career Break Support for Professional Engineering Institution (PEI) Members, 2016

⁴ Royal Academy of Engineering, Creating cultures where all engineers thrive, 2017, www.raeng.org.uk/publications/reports/creating-cultures-where-all-engineers-thrive

⁵ www.engineeringuk.com/research/data/2019-excel-resource/

⁶ <https://www.raeng.org.uk/diversity-in-engineering/business-benefits-key-facts/the-business-case-for-diversity>

⁷ The gender pay gap regulations require employers to report on male and female employees. This report therefore examines the pay gaps between men and women in engineering. The Academy is cognisant that such binary reporting is insufficient and we promote inclusivity in all aspects.

Employers should generally use the gender identification the employee has provided for HR/payroll, if this information is regularly updated. If this information is out of date or unreliable employers should have a process that enables employees to confirm or update their gender. Employers should be sensitive to the fact that the gender identification that they have on record may not

match how the employee self-identifies and that some employees may not identify as either male or female. Guidance published by ACAS and the Government Equalities Office advises that if employers have employees who do not identify as either male or female, employers can omit these employees from their gender pay gap calculation.

⁸ There just under 7.5 million people working within the engineering sector, 4.3 million of these are engineers. www.engineeringuk.com/research/data/2019-excel-resource/

⁹ See https://www.engineeringuk.com/media/1572/engineering_uk_2018_annex.pdf for a list of engineering occupational codes, which include engineering technicians as well as professional engineers.

¹⁰ www.engineeringuk.com/research/data/2019-excel-resource/

¹¹ Equal pay: men and women in the same employment performing equal work or work of equal value must receive equal pay, as set out in the Equality Act 2010. Pay includes all contractual terms and conditions of employment, such as holiday entitlement, bonuses, pay and reward schemes, pension payments and other benefits. <https://www.equalityhumanrights.com/en/advice-and-guidance/what-equal-work>

¹² www.equalityhumanrights.com/sites/default/files/closing-the-gender-pay-gap_0.pdf

¹³ Under the Equality Act 2010 employers can take positive action measures to address workplace disadvantage such as encouraging applications from under-represented groups or offering shadowing or mentoring to groups with particular needs: www.equalityhumanrights.com/en/advice-and-guidance/employers-what-positive-action-workplace

¹⁴ assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/731288/Gender-Pay-Gap-actions_.pdf

¹⁵ assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/731288/Gender-Pay-Gap-actions_.pdf

¹⁶ www.engineeringuk.com/news-media/new-summary-highlights-key-facts-and-figures-for-engineering-uk-report/

¹⁷ S.159 of the Equality Act 2010 allows employers faced with a choice of two or more equally qualified candidates for a role to take into consideration whether one is from a group that is disproportionately under-represented or otherwise disadvantaged within the workforce, but only in tightly prescribed circumstances. See assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85014/positive-action-recruitment.pdf for guidance on using this positive action provision in recruitment.

¹⁸ <https://www.equalityhumanrights.com/en/managing-pregnancy-and-maternity-workplace/managing-maternity-leave-pay-promotion-reviews-breaks-and>

¹⁹ Office for National Statistics (ONS) - Annual Survey for Hours and Earnings (ASHE), 2019 <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2019>

²⁰ assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/840849/KCL_Summary_Report.pdf

²¹ & ²² assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/731288/Gender-Pay-Gap-actions_.pdf

²³ <https://www.genderaction.co.uk/>

²⁴ <https://www.thisisengineering.org.uk/>

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About Royal Academy of Engineering

Engineering matters. It underpins our daily lives, drives economic growth, plays a critical role in addressing major societal challenges and helps ensure our readiness for the future, from providing a sustainable supply of food, water and clean energy, to advancing healthcare, and keeping us safe and secure.

As the UK's national academy for engineering and technology, the Royal Academy of Engineering brings together the most talented and successful engineers – our Fellows – to advance and promote excellence in engineering for the benefit of society.

We harness their experience and expertise to provide independent advice to government, to deliver programmes that help exceptional engineering researchers and innovators realise their potential, to engage the public with engineering, and to provide leadership for the profession.

Drawn half from business and half from academia, and from all branches of engineering including areas of emerging technology, our 1,600 Fellows give their time and expertise voluntarily.

We have three strategic priorities; make the UK the leading nation for engineering innovation and businesses; address the engineering skills and diversity challenge and position engineering at the heart of society.

We bring together engineers, policymakers, entrepreneurs, business leaders, academics, educators and the public in pursuit of these goals.

Engineering is a global profession addressing global challenges, so we work with partners across the world to advance engineering's contribution to society on an international, as well as national scale.



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www.raeng.org.uk/gender-pay-gap