

# WOMEN IN ENGINEERING

Institution of  
**MECHANICAL  
ENGINEERS**

**Engineering in the UK employs 2.3 million people, of which only 6.7% are female. UK universities produce 19,000 female STEM graduates each year, but only 15% choose to study engineering<sup>[1,2]</sup>. Less than 1 in 10 professional engineers and 1 in 20 apprentice engineers are female. This shortfall of female engineers needs to be addressed. Continents, including Asia and South America, successfully nurture talent by viewing engineering jobs as a way to make a difference<sup>[3]</sup>, resulting in a more diverse talent pipeline, which leads to a competitive advantage within the marketplace.**

A large number of companies state that diversity is important. The best-performing companies are diverse and demonstrate commitment to understanding the value that their employees provide. Companies that can nurture and look after their talent make better use of their employees' enthusiasm to deliver an improved service to their customers<sup>[1]</sup>. Women working within male-dominated professions dislike being associated with positive discrimination, as they would rather be selected on the basis of individual ability<sup>[4]</sup>.

Engineering companies can help by targeting talented women (and men) with mid-career offers such as mentoring, sponsorship, development and training<sup>[5]</sup>.

The Institution of Mechanical Engineers has reviewed the opportunities for both the employers and employees within the engineering industry, and makes the following recommendations.

- 1. All employers need to review their payment structures** to address gender pay gaps, ensuring engineering and manufacturing is seen as an fair and equal career choice for female employees
- 2. That the Department for Education works closely with industry, Higher and Further Education providers** to fill our future pipelines with a diverse selection of engineers, driven by scientific and technological innovation to develop future prosperity within the UK
- 3. Employers must establish career plans with staff**, recognising different needs and mechanisms to manage extended leave, eg Keep in Touch days. Retaining employees through these mechanisms will encourage individuals' long-term commitment to their company. By having two-way communication, employees can take responsibility for their career development and companies can sustain their talent pipeline

# WOMEN IN ENGINEERING

## THE DATA

Professional Engineering Institutions show a variety of attrition rates among their membership. The highest proportion of men lapsing their membership (26%) are aged 51 and over, compared with women where 67% leave by the age of 35. The top reason given for female Members leaving (33%) was due to family commitments, whereas for men the top answer (27%) was career opportunities elsewhere. Over half (54.9%) of female engineers prefer to work for companies with over 250 employees, compared with just 41.8% of males<sup>[6]</sup>.

FTSE 100 companies are experiencing issues with their talent pipelines supplying only men for senior positions, leading to 42% now setting measurable objectives to decrease this gender gap<sup>[7]</sup>. Women currently hold 6.1% of executive directorships in these companies, which equates to 18 female executive directors compared to 292 males<sup>[8]</sup>. This female imbalance at the top is within not just industry, but also academia, with fewer than 10% of European universities run by women<sup>[9]</sup>. Data from a study of employees in Spain shows that a father is four times more likely to be promoted to full professor than a mother<sup>[9]</sup>.

In 2010 women accounted for 23.8% of employees within the manufacturing industry, and when assessing the gender pay gap those in full-time employment earned 22.1% less than their male colleagues<sup>[10]</sup>. The largest pay gap was with female metal-working machine operatives earning barely half (52.2%) of the salary of their male colleagues<sup>[2]</sup>.

## WHAT CAN A TALENTED DIVERSE WORKFORCE OFFER?

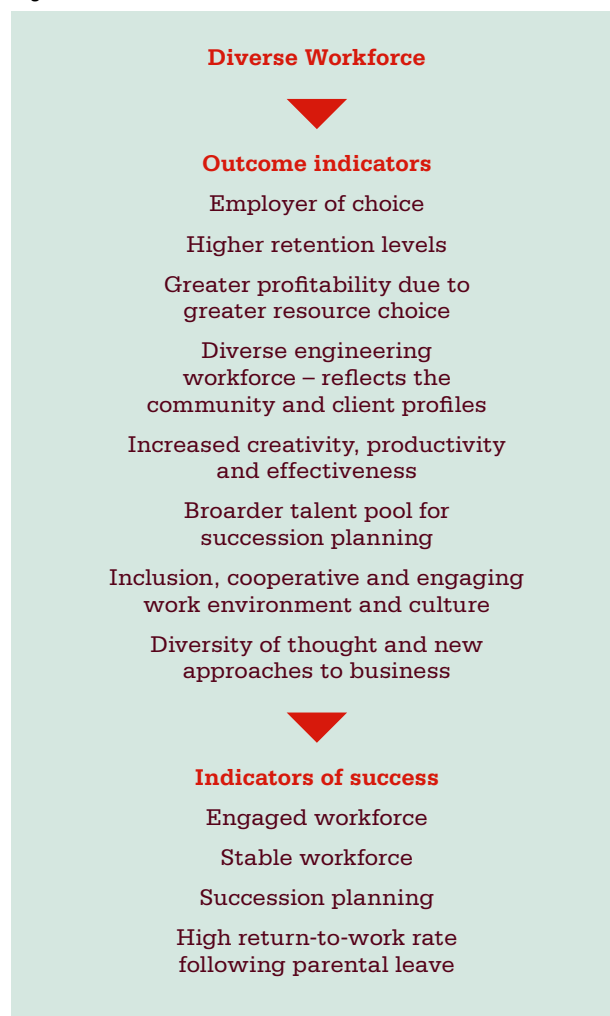
An interesting anecdote from the 1960s relates to female engineers who worked on aerospace production lines. When issued with toolboxes, the women quickly modified them by fixing wheels to the underneath, aiding movement. Initially the men reacted with humour. After a few months they had adopted the women's approach and all the toolboxes were on wheels. What was initially seen as a sign of a weakness was afterwards accepted as a practical solution to a problem<sup>[11]</sup>. With companies now reporting difficulties recruiting skilled workers, they are missing a solution by not focusing their attention on women.

Increasing gender diversity within engineering companies will help develop new products and improve methods of analysis. Within engineering design, products are typically designed for men, with women being analysed as an afterthought and often considered as a deviation from the standard. This means that the needs of women are left out of the research and development phases and as a result, many devices are adapted to women retrospectively if at all<sup>[12]</sup>. Having an engineering workforce that reflects the demographic of the community can better fulfil the needs of customers.

Research from IBM's Kenexa High Performance Institute shows that organisations with a strong diverse and inclusion culture reduce average employee turnover by half, quadruple workforce innovation, and double customer engagement<sup>[13]</sup>. A diverse set of views encourages a healthier debate, as women tend to challenge questions differently. Companies need to engage actively with and seek the views of their staff, and then put into action the insights gained from this information<sup>[1]</sup>.

A summary of the benefits that companies can experience from a diverse workforce is detailed in **Figure 1**.

**Figure 1:** The benefits of a diverse workforce<sup>[14]</sup>



## CHANGING TIMES

Engineering companies tend to be male-dominated organisations. This may mean that they will not be prepared for the changing legislation for parental leave being introduced in 2015. UK engineering firms need to prepare for these changes which will allow the man to be the primary carer of a newborn, or for both parents to share the childcare responsibility. This matters to all male-dominated industries, as within Britain 44% of couples now have the woman earning the higher income<sup>[15]</sup> and in 2010 a 'Women in work' survey conducted by Grazia magazine (targeted at 30-something women with a readership of 432,000) found that four in ten young women now say in future it will be who earns more rather than gender that determines whose career takes precedence in the family<sup>[11]</sup>. Diverse companies will be better prepared for these eventualities.

## PARENTAL LEAVE AND RETENTION

Talented women often leave companies or are made redundant when they decide to have children or take on other family commitments<sup>[4]</sup>. Childcare in the UK is costly. In the past four years the average cost of nursery has risen 23% (with the average cost of a part-time place for a child under two being £106 a week<sup>[13]</sup>). In comparison, the average full-time wage has increased just 2.5% over the same period<sup>[16]</sup>. However, currently, only 45,000 companies in the UK (out of 2.15 million) participate in childcare vouchers schemes<sup>[13,5]</sup>. The Institution of Mechanical Engineers believes that all companies should offer the voucher schemes, as it costs them little to implement and can act as a retention incentive and valued employee benefit.

When returning to work after a career break (either full time or part time) individuals tend to get 'stuck on the ladder'. They find themselves unable to see a clear route for advancement, despite their skills and potential. This leads to some returners taking on more junior roles, believing it will give them a more balanced life<sup>[4]</sup>. The Women's Business Council estimates that one third of British women experience occupational downshifting after becoming mothers<sup>[8]</sup>. Businesses that nurture their future talent with return-to-work procedures offering training or refresher courses, make employees feel valued<sup>[16]</sup>. Tailored support during the year following return from maternity/paternity leave can assist long-term retention<sup>[17]</sup>. In addition this means that companies can hold onto the assets in which they have invested (returning employees).

There are many existing free talent-management resources available, and forward-thinking companies provide support through business networking and sponsorship programmes (eg Chartered Management Institute). These can make a huge difference to the career paths and prospects of parents<sup>[16]</sup>.

Anecdotal evidence shows that there is usually very little engagement between the employer and the employee during a career break (except perhaps for a

visit to the office to show off the new baby or a small gift to celebrate the birth). Many employees do not take advantage of 'Keep in Touch' (KIT) days offered by businesses during maternity.

Companies need to work better with employees who are embarking on maternity (or paternity) leave, to plan activities that are to be done on KIT days. This could include managing individuals, checking emails, meeting customers or attending conferences. These are all opportunities for the employee to demonstrate that they still add value to the employer and for the employer to show it is 'business as usual' with the employee is still part of the team<sup>[1]</sup>. This enables a long-term talent planning and retention scheme to be introduced to organisations.

## GETTING THE RIGHT BALANCE

Ratios between men and women working within STEM careers differ across the world, with Asia seeing the split as 60:40 and Western countries 78:22, meaning the available pool of women for promotion is much greater in Asia<sup>[3]</sup>.

Western businesses need to address their gender biases, as these can play a part in the promotion process, with the selection of candidates based on 'fit' rather than skills, knowledge and experience<sup>[8]</sup>. Future leader programmes help focus on excellent talent management<sup>[4]</sup> and include courses on topics such as unconscious bias. These programmes encourage and challenge women to apply for more senior positions<sup>[5]</sup>.

## FLEXIBLE WORKING

The last decade has seen our communication methods change significantly. Emails are now picked up continuously on smartphones or laptops, creating the expectation for immediate response<sup>[11]</sup>. A Chartered Institute of Professional Development (2012) study on flexible working provision found 76% of businesses reported that it improves staff retention, 73% of businesses reported that it improves staff motivation and 72% of businesses reported that it improves employee engagement<sup>[16]</sup>.

Senior leaders, male or female, who discuss their flexible working patterns with employees, can give examples both positive and negative of how they demonstrate both their commitment to the company and their personal success<sup>[4]</sup>. Flexible working includes the working practices flexi-time, term-time working, job sharing, working from home, arriving early or leaving late<sup>[16]</sup>. Flexible working should be seen not just as a 'women's issue' but as an option for everyone, especially as paternity rights change in 2015 and as our population ages, and there may be the need for caring responsibilities for older relatives.

Large organisations that have adopted flexible working practices sometimes struggle to implement them throughout the business, as employees (within the UK) feel reluctant to work this way. This may be due to reduced visibility in the office and many feel they are missing out on 'water cooler' discussions (the informal meetings), leading to future work or a promotion<sup>[3]</sup>. Teams that are geographically diverse can adopt a 100% dial-in approach for teleconferences, with everyone dialling in individually from their separate locations<sup>[3]</sup>. This stops distracting sub-conversations going on within a meeting when not everyone is present in the same room.

## ONE SIZE FITS ALL

Industry should shift from presence-driven culture to one driven by results and targets, rewarding and recognising individuals and teams who drive results regardless of when and where the work is being done<sup>[18]</sup>. This is already done within many companies through setting objectives which are SMART (Specific, Measurable, Achievable, Realistic and Tangible).

There is no need to single out women with complicated and expensive initiatives, as these can have an adverse effect. Targeting everyone can demonstrate that businesses are looking for the skills and competences required by demonstrating their practices as fair, transparent and equal<sup>[9]</sup>. When talented employees make an impact this should be communicated to the individual, whether upwards or sideways<sup>[17]</sup>. Appraisals need to be a two-way communication process based on meaningful performance indicators, with the option of providing 360° feedback. Some organisations adopt a 'reverse mentoring' scheme where senior managers are mentored by a more junior employee, so that they are up to date with the younger generation's needs. Increasing the retention of our trained engineers will assist with easing skill shortages, enabling us to make better use of staff already in the system, whether men or women<sup>[19]</sup>.

## RECOMMENDATIONS

The Institution of Mechanical Engineers has reviewed the opportunities for both the employers and employees within the engineering industry, and makes the following recommendations.

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## REFERENCES

- <sup>1</sup> Stop blaming women: prescribing a 21<sup>st</sup> century approach to gender diversity, The HayGroup, 2013
- <sup>2</sup> Engineering UK, 2013 report
- <sup>3</sup> Women in technology, Montash breakfast, 28 June 2013
- <sup>4</sup> Making the breakthrough, Women Matters 2012, McKinsey & Company
- <sup>5</sup> Women in work, session 2012–13, written evidence submitted by the WISE Campaign – [www.publications.parliament.uk/pa/cm201213/cmselect/cmbis/writev/womeninworkplace/m21.htm](http://www.publications.parliament.uk/pa/cm201213/cmselect/cmbis/writev/womeninworkplace/m21.htm)
- <sup>6</sup> Retention and lapsing membership diversity project, RAEng, 2013
- <sup>7</sup> Women on boards, benchmarking early adopters of Corporate Governance Code 2012, Cranfield University School of Management, Dr Ruth Sealy & Prof Susan Vinnicombe OBE
- <sup>8</sup> Women on boards, Equality and Human Rights Commission (EHRC) working group, 27 June 2013
- <sup>9</sup> 6 steps to gender equality – how every university can get more women to the top and why they should, Curt Rice
- <sup>10</sup> Voluntary Gender Equality Reporting: Baseline Report 2011, Government Equalities Office
- <sup>11</sup> Half a wife, Gaby Hinsliff, 2012
- <sup>12</sup> Interdisciplinary Approaches to Achieving Gendered Innovations in Science, Medicine and Engineering, Londa Schiebinger & Martina Schraudner, Interdisciplinary Science Reviews, Vol 36 No 2, June 2011, 154–67
- <sup>13</sup> The Telegraph, Are companies forgetting the real reasons for promoting women? Heather Jackson, Founder of the Women's Business Forum, 11 October 2013
- <sup>14</sup> Women in Engineering, Industry blueprint of successful in-house Professional Women's Programs, Engineers Australia, 2012
- <sup>15</sup> An anatomy of economic inequality in the UK, National Equality Panel, 2010
- <sup>16</sup> Women's Business Council report, Maximising women's contribution to future economic growth, June 2013
- <sup>17</sup> Opportunity now, Changing gear: quickening the pace of women's progression
- <sup>18</sup> Untapped resource – How manufacturers can attract, retain, and advance talented women, Deloitte & Manufacturing Institute, 2013 (USA)
- <sup>19</sup> Engineers Australia, The Engineers Australia Survey of working environment and engineering careers, 2012

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