

# **Civil Engineering Profiling within the UK: Women in Engineering**

Rebecca Ford

77151737

Civil Engineering Technology Project

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## **1.0 Summary**

At 6% there are simply too few females within engineering in the UK. Civil engineering is faring a little better at 10% membership, however this still demonstrates a large gender gap within the industry.

This report collates the facts of the current situation, both specifically in civil engineering, and the wider engineering industry. Focussing on specialist and national media outlets the profiling of females in the industry is analysed. There is also a focus on social media since this can both reinforce and challenge gender imbalances. The report concludes by providing recommendations for companies and individuals who wish to address the issue.

## 2.0 Introduction

“Women represent 10% of ICE’s membership and female applications to ICE are slowly rising, with graduate numbers at 18%. But the UK still has the lowest percentage of female engineers in Europe, at less than 10% across all disciplines. Latvia, Bulgaria and Cyprus lead with nearly 30%.” (Ison, 2015)

“This compares to figures from the Institution of Engineering and Technology (IET) that show that only 6 percent of the UK’s engineering workforce is female. The IET also says that despite calls from government to raise this 43 percent of companies are failing to take specific action to improve diversity.” (Ballantyne, 2015)

Across the whole engineering discipline there is a great gap between male and female employment. “There is good econometric evidence that the demand for graduate engineers exceeds supply and the demand is pervasive across all sectors of the economy” (Harrison, 2012) so if we are to develop economically as a nation, and with engineering and technology industries being increasingly necessary for economic advancement, we clearly need females to join the industry.

These facts are further supported by the Women in Engineering report, published by the Institute for Public Policy Research (IPPR), which concluded with the following challenges facing female representation within engineering:

“Challenge 1: Too few girls acquire the prerequisite qualifications in STEM subjects  
Challenge 2: Addressing the unhelpful perception of STEM and engineering careers, among both girls and their families, as ‘masculine’ or ‘brainy’  
Challenge 3: Poor understanding of engineering careers and the engineering pathway  
Challenge 4: The STEM ecosystem is fragmented, which increases the likelihood of duplication”  
(Silim & Crosse, 2014)

Covering a variety of national campaigns and engineering profiling across media outlets; this report focuses on activities tackling “Challenge 2: Addressing the unhelpful perception of STEM and engineering careers, among both girls and their families, as ‘masculine’ or ‘brainy’.”

## 3.0 Findings

### 3.1 National Societal Support

Within the UK there are two main female supporting engineering societies:

The Women's Engineering Society was set up in 1919 to support women who wished to retain their technical engineering roles at the end of World War 1. Today the society supports and represents females within the industry and is supporting the following campaigns, amongst others:

- Returnships for women after an extended period of leave where "the employee is given a fixed term contract and follows a programme of activity designed to bring them up to speed with the work of the company, move them around so that they gain a number of experiences, and monitor and support their career progression." (WES, 2014)
- SPARXX: a campaign encouraging STEM study amongst girls through inspiring activities and challenges with. (SPARXX, 2015)
- Coordinates the National Women in Engineering Day which has now been running for two years.

In 1984 Baroness Platt and the Engineering Council launched WISE (Women into Science and Engineering) to provide girls with hands on experience of engineering. Today the society:

- Encourages girls into STEM and related engineering careers through access to role models and STEMettes. They are also currently releasing the 'People like me' career resources and app to help educate and inspire.
- Provides consultancy advice and support on recruiting and retaining females within the industry

National engineering organisations have policy with regards to diversity within the sector. This includes Transport for London; who recently ran the 100 years of Women in Transport campaign and the ICE who recently released a film "Engineering Change" which discusses the challenges faced by women and what is required to ensure a shift within the industry.

### 3.2 National Specialist Media

In June this year there was research to show that although there is poor representation of females across all engineering disciplines, it is Civil Engineering that has the best proportions. In response to this report The Engineer interviewed a few individuals within the industry to find out why. Lana Tan stated that there is a clear social or ethical viewpoint for civil engineering: "Water supply and sanitation mean better health; building schools means better education; better transportation links improve quality of life ... Other disciplines may not be perceived to be directly helping people in this way." (Adams, 2015)

Last month IStructE's magazine The Structural Engineer profiled Claire Gott. She is a graduate member of the institution and alongside her work "she is the founder of charity Cameroon Catalyst, sits on the Institution of Civil Engineers (ICE) Council as a graduate member and is on the promotions working group of the Green Construction Board." (Whitelaw, 2015) Seeing profiles such as Claire's within leading journals are inspiring for those currently within the industry. If she can do it, why can't I?

### 3.3 National Mainstream Media

Much of the report so far details the support that is provided and campaigns for women who are already in the industry. In order to create a shift in perspective from members of the general public, and therefore attract young people into the industry or attract career changers, there must be work to challenge assumptions through mainstream media outlets.

The coverage of women within engineering focuses around key calendar dates. Articles this year coincided with National Women in Engineering Day (Sanghani, 2015) and Ada Lovelace Day (Kleinman, 2015). This means articles, especially focussing on females within the industries, are only being written two or three times a year. The only exception to this are job related articles, such as those on recruitment websites.

Rather than focussing specifically on females within engineering and instead looking more broadly at any article about engineering, the only time a female is profiled, interviewed, or appears in the photo or video is when the article is solely about her, or her work. For example when the fast circuit maker won the Dyson award BBC News featured an article about the product. There were four members of the creation team; Jesus Zozaya, Alroy Ameida, James Pickard and Katarina Ilic, however they only featured comments by Alroy Ameida and James Pickard. (BBC, 2015)

Encouragingly there is now better profiling of women within engineering in female fashion magazines. Given that these magazines are specifically aimed at women, aged 13 to 35+ this is a really exciting development. Articles have appeared in Elle (Hoff, 2015), Vogue (Heller, 2014) and Marie Claire (Redfern, 2015) magazine.

### 3.4 Television and Film

Within films released in 2013 The Center for the Study of Women in Television and Film (Lauzen, 2014) found that 61% of males and 34% of female roles were identified by their occupation and that 58% of females and 31% of males were identified by their relationship, eg mother, father, wife, husband etc. Although not strictly relating to engineering there is still a portrayal of gender stereotyping within the film industry. This is simply reinforcing the gender stereotypes of which occupations males and females should focus on.

There are some exceptions though. John Lewis had a positive response for its Man on the Moon Christmas advert as it was a girl who was using the telescope. Alongside this she "is seen wearing football kit, being active, and receives Lego as a Christmas present." (Wallop, 2015) This is starting to challenge the stereotypes.



Image 3.4.1 *Lily and her telescope* (Wallop, 2015)

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Martian was released in 2015 and although the film's main lead role is male there are prominent female astronauts within the film, most notably Melissa Lewis (Jessica Chastain) who is the commander of the Mars mission and leads the rescue of Mark Watney (Matt Damon).



Image 3.4.2 *Melissa Lewis (Lewis, 2015)*

## 3.5 Social Media

Social media can both enforce and can also challenge gender stereotyping. It's very easy to come across images such as this and reinforced by comments such as those below:

# Girls and engineering schools



**BEFORE**



**AFTER A FEW MONTHS**

Image 3.5.1 *Female Engineering Meme* (<https://www.pinterest.com/pin/164099980148675529>)



**Laurie** □ • 42 weeks ago

Never have I seen something so accurate.



**Becky Ford**

Add a comment...

Image 3.5.2 *Female Engineering Comment* (<https://www.pinterest.com/pin/164099980148675529>)

Social media however is also a great vehicle for challenging such stereotypes. Jared Mauldin's letter to his University newspaper went viral when he wrote in to explain how females were not equal to him in his mechanical engineering classes because they had already overcome many barriers to get on the course and that males will always be hired for their intellectual merit, rather than having to prove they weren't the 'diversity hire'.

Image 3.5.3 *Letters to the Editor* (Carilli, 2015)



#ilooklikeanengineer has been trending on twitter since early August in response to negative comments Isis Anchalee received having featured in a company advert on the underground system in San Francisco. Remarks were made about her apparent 'sexy smirk' and whether anyone could 'buy this image of what a female software engineer looks like'. (Anchalee, 2015)

The responses have travelled far further round the world that the original negativity and #ilooklikeanengineer continues to be used on twitter. What has also been really positive is the wider profiling of what engineering involves, be it software, civil, mechanical, electrical, every discipline has featured. The government is also using Twitter to help promote its campaigns using #notjustforboys to help encourage women into industries where they are currently still under-represented.

Although the social media campaigns are not industry specific to civil engineering they are still promoting the wider realms of engineering, which can only have a positive effect.

## 4.0 Discussions

The profiling of women in the industry can be summarised as:

- Activities encouraging girls in school to take STEM A Levels and consider further training and work within STEM, or specifically civil engineering depending on the organisation
- Workshops and trainings supporting women already in the profession
- Promoting females in civil engineering within specialist and national print media including newspapers and women's magazines.
- Profiling women within television and film
- Grassroots action from individuals on social media

All of these campaigns directly or indirectly challenging female representation within civil engineering, however much of this is focussed on those who are already within the industry. This self-promoting can help support existing females, who wish to progress within a company, and can challenge existing misconceptions colleagues may have, however, to have a wider appeal surely campaigns must market to individuals who are not yet in the industry.

To target those outside the industry we must focus on local and national news outlets: Upon the completion of projects send press releases, featuring the female engineers who worked on the project. You could also focus on fashion retailers; perhaps Levis might be interested to feature you if the durability of their jeans means you wear them on site every day, or North Face might feature you if their waterproof coats ensure you stay dry? The articles do not need to be obviously focused on encouraging women into the industry but just needs to profile them. Simply seeing women do their job as engineers is the key. This work not only supports females within civil engineering but can also promote the companies you work for.

The biggest campaign area everyone can get involved in is on social media. Blogs, Facebook, Twitter, Pinterest and Instagram are used every day by members of the public. Utilising these to profile women can further widen the audience your campaigns reach.

Personally I have found Twitter can be very effective. When I attended a CPD session describing a product as 'big boy's meccano' I tweeted the company that girls play with meccano too. In response they apologised and sent out a national communication to remind employees to avoid using gendered language. "Reviewing policies and procedures to remove language and practices that might have a negative impact on the participation of women" (Royal Academy of Engineering, 2014) is also part of Chartered Institute of Building Services Engineers' campaign work as it can alienate women from the industry.

Secondly, I tweeted about whether I should respond to an email sent to me titled 'gents'. Another twitter user patronisingly asked "Well did you have anything important to say?" My quick quip back of 'yes I did, do you?' appeared to embarrass him since he then proceeded to delete the conversation. Using social media to advertise inequalities in actions and language and to challenge the assumptions people might make is as important as the wider goals as it is only when the inequalities are noticed, that action can be taken to mitigate them in the future.

## 5.0 Conclusion

There is a definite lack of women within the industry and although there are current campaigns that are encouraging women into the industry, many of these campaigns are simply marketing the issue to those already within the industry, and have very little national media coverage that would result in a genuine increase in female engineering numbers.

I have three recommendations:

Every company within civil engineering should use marketing and public relations to raise the profile of females in their workforce. Small and medium sized businesses often don't have a marketing budget, but simply having a blog or news stream on their website, which is updated by the engineers involved, is enough to help promote both the business and female profiling. This can then be easily linked for press releases to local media outlets.

Individually people should point out injustices, however minor. Make a personal effort to challenge your unconscious bias, confront colleagues if they are not appropriately supporting females at work and take to social media if you think that will help change others' behaviours too.

Female engineers who wish to have a more public profile should blog, tweet, and talk about the issues. Roma Agwaral is a good example of this. She tweets (@Romatheengineer), has her own website (<http://www.romatheengineer.com>), is an author (Building Storeys to be released 2017) and regularly speaks to the media and at conferences.

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