The Organisational Culture of NW Engineering Workplaces: The Influence on Women Engineers

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Abstract

In England's North West, engineering continues to be a major industry: employing 90,000 workers, accounting for around a quarter of jobs in the region, and generating £13 billion of the North West's £44 billion total Gross Domestic Product. However, despite this growth and over 30 years of equality legislation, women in engineering careers in the region remain an insignificant statistical category. Whilst initiatives aimed at increasing female recruitment to the industry have had some, albeit limited effect, retention of female engineers is falling, suggesting that female encounters with organisational cultures in engineering firms may be less than encouraging. The WEWIN project team examined, analysed and contrasted the experiences of men and women working in engineering occupations in the North West, over a period of 12 months. Using participant observation, focus groups, questionnaires and in-depth interviews with engineers, technical directors and HR professionals, the research team explored the broad array of explanations for the persistence of occupational segregation in this industry; and importantly, attempted to ascertain those factors which aid the successful recruitment and retention of female engineers. Beyond palpable sex discrimination, the team identified a series of complex interactions between multifaceted phenomena - ranging from the long hours culture to the gender stereotyping of roles - which can all lead to an early exit from the engineering industry for many women. This paper presents the findings of the WEWIN research, outlines the barriers to effective female participation in the engineering industry, and, importantly, explores possible solutions to this enduring conundrum.

Introduction

Women now comprise nearly half of Britain's workforce and this proportion is growing. However, most workers continue to be concentrated in occupational sectors which are populated by virtually all men or virtually all women (Acker, 1990), and the UK has one of the highest levels of gender segregation in the European Union (Rubery & Fagan, 1995). Whilst women have been able to

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make real progress in many male-dominated areas such as law and medicine [i], the UK engineering industry remains one of the most sex segregated professions in the country. Recent figures suggest that fewer than 8 per cent of those employed in engineering work in the UK are female (EOC, 2004), and only 2.8% of chartered engineers are women. [ii] Recently, this phenomenon has scaled both the research and public agendas to become a well-documented topic of debate. There are several reasons for this; not least of which relates to the increasingly visible skills shortage observable in the scientific industries (Gale, 1994; Maskell-Pretz & Hopkins, 1997). Organizations are recognising the benefit of retaining women with increasing urgency, as female scientists may help to hasten the diversification of the sector by acting as role models for future entrants (Bagilhole et al, 2002; Devine, 1992). The government has embarked on action after recognising the genuine and persistent effect of the maintenance of segmentation by sex on gender based occupational and wage inequalities (Fielding & Glover, 1999). Indeed, it has been suggested that the concentration of women into low-paying occupations accounts for up to 50 per cent of the overall gender pay gap (Bayard et al, 1999). Yet, despite the latest attempts by the industry to redress this imbalance (Smeaton et al, 1997; Carter & Kirkup, 1990) there remains a demonstrable under-representation of women at all levels of engineering.

The limited success of intervention strategies can be partly attributed to the fact that, after "getting in", certain factors hinder women from "staying on" and "getting on" in the industry in parity with their male colleagues (Faulkner, 2001; Ramdin, 1998; Fielding & Glover, 1999). In the UK, whilst total numbers of enrolments for Higher and Further Education courses in engineering are declining (Waterworth, 2000), the number of female acceptances to engineering courses through the University and Colleges Admissions remains stable[iii]. There is evidence that these partial advancements by women in the sector are to a certain extent the product of declining interest among men; according to the Department of Trade and Industry, the number of women attaining higher educational qualifications in engineering has increased in the past ten years, compared to a decrease in the number of men.[iv] But, whilst female participation in undergraduate courses remains low, their representation in engineering occupations is lower still - implying that the route or "pipeline" for female progression through the engineering profession suffers from an increasing level of attrition at specific points after entry stage. Consequently, the emphasis of research in the

field has shifted slowly from recruitment to focusing on issues relating to retention. Early findings have confirmed the "leaky pipe" hypothesis; for example, a recent Australian enquiry found that women and men join the engineering workforce in similar proportions from University, but that female participation in the sector falls disproportionately with age (Roberts & Ayre, 2004). It has been estimated that women leave engineering careers after approximately five years of service (Maskell-Pretz & Hopkins, 1997). Elsewhere, Jensen et al (2005) have identified organizational culture as one of the contributing components of sex segmentation. To explore this idea further, a research project was conducted at the University of Salford concerned with examining and analysing the barriers to female participation in engineering firms in the North West of England, as well as collating evidence of organisational best practice related to the recruitment, retention and progression of female engineers.

Literature Review

The statistical evidence of women's lack of representation, both in the sector and at senior levels within engineering organisations is unambiguous, and there exists a generous - and growing - body of literature that has attempted to probe its causes. Research in the field has employed a number of competing and complementary approaches, including gender analysis (e.g. Ridgeway & Correll, 2004), organisational theory (e.g. Acker, 1990), identity and psychological scholarship (e.g. Lee, 1998, 2002; Schwartz, 1996), observatory and exploratory studies (e.g. Hacker, 1981), longitudinal analyses (e,g, Smeaton et al, 1997; Fielding & Glover, 1999) ethnographic enquiries (e.g. Faulkner, 2001), anecdotes and personal narratives (e.g. Bagilhole et al, 2002) and quantitative studies, amongst others. Researchers generally group the barriers to women's progression in non-traditional sectors into two broad categories. The first – well-documented - grouping indicates that women's disadvantages in the engineering industry stem from specific discriminatory practices which occur in the workplace. There is compelling empirical and statistical evidence to support these assertions. In a study of the experiences of 20 female engineers, Ramdin (2005) found that between them, these engineers could identify a total of 151 separate incidents which had impeded their job satisfaction. Several occupational studies have further highlighted the overt discrimination that women in atypical roles or occupations can face (Evetts,

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1993; 1994; EOC, 2004; Roberts & Ayre 2002; Pretz & Hopkins, 1997; Collinson, 1988; Bagihole et al, 2002, Pretz & Hopkins, 1997;Blickenstaff, 2005).

However, recent academic attention has focussed on a second, broader, more discrete group of cultural barriers which are both difficult to detect and eliminate (Benschop & Doorewaard, 1998; Martin, 2001). It is this latter grouping that we will focus on in this study. Benschop and Doorewaard refer to these subtle, cultural conditions as the 'gender subtext of organisations' (see also Acker, 1990; 1992; Tienari et al, 2002). Benschop and Doorewaard categorise the 'subtext' into four sets of norms or arrangements that serve to manufacture and reproduce gender distinctions and ultimately contribute to the composition and culture of workplaces. *Structural arrangements* refer to the composition of work, the allocation of tasks and the division of labor. *Cultural arrangements* refer to the implicit and underlying rules, regulations, customs and conventions of the organization. *Interactional arrangements* are expressed in the status characteristics and information patterns shaping gender relations. Finally, *identity arrangements* refer to personal gender and professional identities. Whilst these may seem like distinct categories, it is important to remember that these arrangements are irrevocably linked and may overlap, produce or inform each other. In this paper, we examine the nature of these arrangements and the way in which they affect women's opportunities in the engineering sector in the North West of England.

Research Methodology

The research employed a mixture of quantitative and qualitative methods for the collection of data including questionnaire surveys, individual interviews and focus groups. The questionnaires were designed to identify good practices, problem areas and barriers to attracting and retaining engineers. Two sets of questionnaires were designed; the first was aimed at employees in engineering industries and the second at managerial personnel in firm employing engineers including human resources managers and directors. Postal surveys were used alongside online versions. The employee questionnaire explored the employee's career expectations, priorities, experiences and progressions. Subsections of the questionnaire addressed a number of areas including: 1) employee details 2) current employment and employment history 3) organisational

commitment to equality and diversity 4) perception of the company and organisational culture and 5) image of the engineering industry and gender segregation. The employee questionnaire was sent to the University of Salford's engineering alumni from previous years. Further questionnaires were mailed to companies who had expressed interest in participating in the study. Those companies had been initially contacted via a press release and website describing the project and inviting participants. The managerial version of the questionnaires explored company policies and work practices. Again, the questionnaire was divided into subsections addressing 1) equal opportunities, diversity policies and practices 2) working arrangements including flexible working, retention levels and health and safety and 3) perceptions of engineering, gender stereotyping and segregation. Whilst responses were anonymous, respondents were invited to include their contact details in order to facilitate follow-up interviews. Therefore, the research process involved a high degree of self-selection, as only volunteers were contacted for interview.

A variety of sources were used to identify possible project participants. Companies were identified using a number of local and national databases including the Campaign for the Promotion of the University of Salford (CAMPUS) members' database, the Finance and Accounting Made Easy (FAME) database which provides financial information on all public and private companies in the UK and Ireland and the Applegate Directory – a comprehensive database of industry, manufacturing and technology companies. The aim was to recruit a sample that was representative of the engineering sector prevalent in the region (i.e. civil, manufacturing, chemical and electrical engineering), taking into account representation of firms of all sizes. In total, 165 companies were contacted. From this, responses were received from 10 firms who wished to distribute questionnaires amongst their staff. In addition, the research team received details of all of the University's engineering graduates from 1972 to 2005 through the alumni database. A total of 359 graduates were selected and contacted. Whilst the aim was to survey equal numbers of females and males, in reality, as a result of the sheer under-representation of females in some graduate cohorts, 261 males and 98 females were contacted. With the aim of boosting total returns and increasing the randomness of the sample, all alumni were mailed 2 copies of the employee questionnaire and asked to give the additional copy to a colleague to complete. In total, 1558 paper questionnaires were mailed, and 104 were returned (a return rate of 6.7 per cent). In

addition, 65 questionnaires were submitted online. Approximately 140 questionnaires were distributed to engineering companies for the attention of technical and human resources managers and directors. 23 wee returned, of which 7 were submitted online. Of the 169 employee questionnaires that were returned, 52.1 per cent (88 questionnaires) came from men, and 46.2 per cent (78 questionnaires) were completed by women. 1.7 per cent (3) of the respondents preferred not to state their gender. 26 interviews were carried out with individuals who had indicated their willingness to participate further in the research on the questionnaire. 13 interviews were carried out with engineering employees (12 female, 1 male) and a further 13 with managers, directors and human resources personnel (8 female, 5 male). Additionally, six focus groups were carried out with a total of 32 participants (19 male and 13 female) based in six engineering companies. Two focus groups were all-female, one was all male, two were mixed, and one comprised two female Human Resources managers. The questionnaire responses were analysed using the statistical software program SPSS for Windows. Any comments that could not easily be made to fit the SPSS variables were coded into the qualitative research software Nvivo. Nvivo was also used to analyse the transcriptions from the interviews and focus groups.

Identity Arrangements

The literature review had suggested that the observable low levels of female entry to engineering programmes of study could largely be attributed to historical and sociocultural reasons associated with gender stereotypes (Mills, 1988; Ridgeway & Correll, 2004, Blickenstaff, 2005; Acker, 1992a; Keller, 1982; Hacker, 1981, Lohan, 2000; Wajcman, 1991; Faulkner, 2001). Specifically, in childhood and later, individuals are unconsciously attributed a social and cultural gender that is expected to correspond to their biological sex. Once classified, individuals are expected to behave in accordance with gender roles as defined by their social and cultural context (Mills, 1988). Gender can be expressed in physical appearance, dress, mannerisms, speech patterns, social behaviours and interactions and defines the type of work that is socially acceptable for men and women:

> "The sexual/social division of labor is the cause of the distinctive cognitive/affective structures that constitute women's nature, and these structures are at least a partial cause of a variety of personality traits and behaviour distinctive of women, including the sorts of labor that they do"
>
> (Holmstrom, 1984: 466)

Such stereotypical classifications have been confirmed and elaborated everyday in society for thousands of years. For example, early sex-based intelligence tests (using, as some have argued, technically unsound methodologies) which revealed a male proficiency for mathematical and spatial abilities and a female talent for verbal abilities have been used to justify sex divisions in school subjects (Blickenstaff, 2005). However, the ability for the female to conceive and bear children is responsible for forming the basis of most gender-role stereotypes. The female is idealised as a caring, nurturing mother, whereas the male is seen as primarily occupying an economic role. Those qualities associated with reproduction and the domestic sphere of life - including emotionality - have become associated with femininity. The opposite set of qualities – those associated with reason, science and the public sphere of life have become synonymous with masculinity:

> "While we socialise our men to aspire to feats of mastery, we socialize our women to aspire to feats of submission. Men are hard; women are soft. Men are meant to conquer nature; women are meant to commune with it. Men are rational, women irrational; men are practical, women impractical. Boys play with blocks; girls play with dolls. Men build; women inhabit. Men are active; women are passive. Men are good at mathematics; women are good at literature. We have trained our women to opt out of the technological order as much as we have trained our men to opt into it."
> (Schwarz-Cowan, 1979; cited in Evetts, 1998)

The result of this 'gendering' process is that, excepting periods of war, when women were employed in all manner of roles across heavy industry, work in engineering has tended to be considered a male preserve. Where women have entered the workplace, they have been crowded into a narrow range of low status positions. In fact, the work that women do for wages tends to be related to their traditional and subordinate social role, and reflects the work which they undertake in the home (Mills, 1988). Today, most women cook, assist, nurse, teach, serve, care for and clean up after others (EOC, 2004; Holmstrom, 1984).

The research findings would seem to confirm the hypothesis that engineering has traditionally been considered a 'natural' employment choice for males. Despite considerable evidence to the contrary, the myth that females do not have the same natural ability as males in the sciences seems not yet to have been

dispelled. Male interviewees were more likely to cite a proficiency in mathematics or science at school as a reason for entering engineering. Whilst females may have been equally capable in these subjects, they did not seem ready to admit it, or that they were encouraged to take up such disciplines:

> "… I went to see the careers teacher and she said… 'Well, have you considered being a nursery nurse?' and I thought 'Right'…"
> (Female Aeronautical Engineer, 26-30)

In modern times, it seems that what is considered technological is also considered masculine and vice versa; by contrast, women's everyday encounters with technologies are rarely recognised as such (Cockburn, 1997). Indeed, girls and women are expected to shy away from technology and machinery. For these reasons, it has been suggested that women feel less confident in technical roles than men, and female engineers have commonly reported feeling that they must work harder than they male colleagues to be accepted in their work (Kvande & Rasmussen, 1994; Roberts & Ayre, 2002).

Figure 1: I am confident enough in my skills, knowledge and abilities to meet the demands of my current job
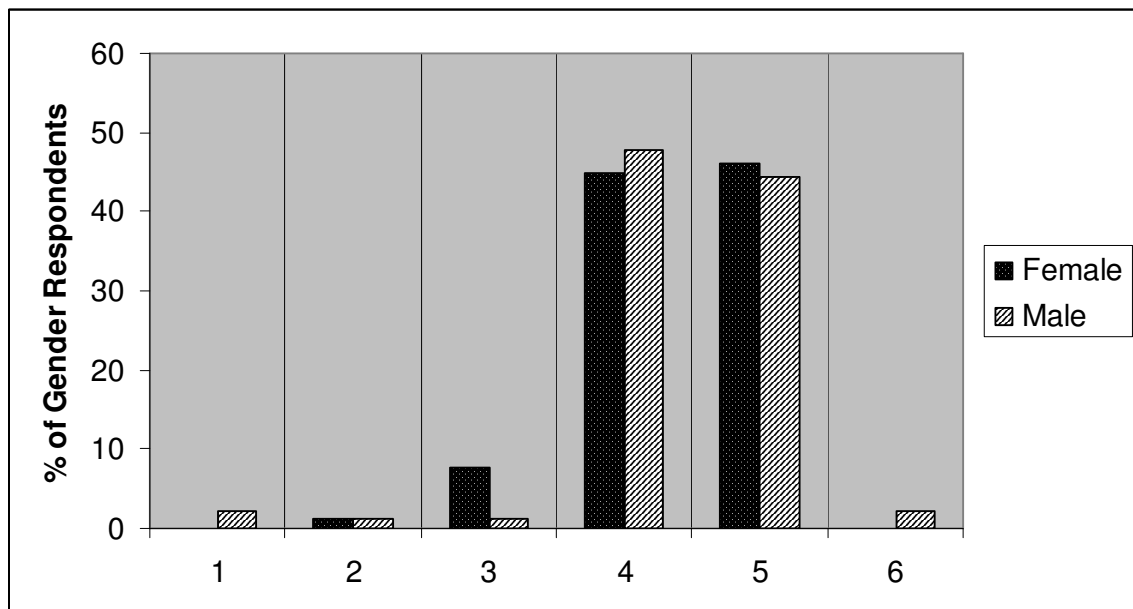
Notes: N=165 (78 female, and 87 male). Respondents were asked to rate the statement on a Likert scale where 1=strongly disagree and 5= strongly agree, 6= not applicable

Figure 2: Women engineers have to achieve more than men to receive the same degree of recognition in my company
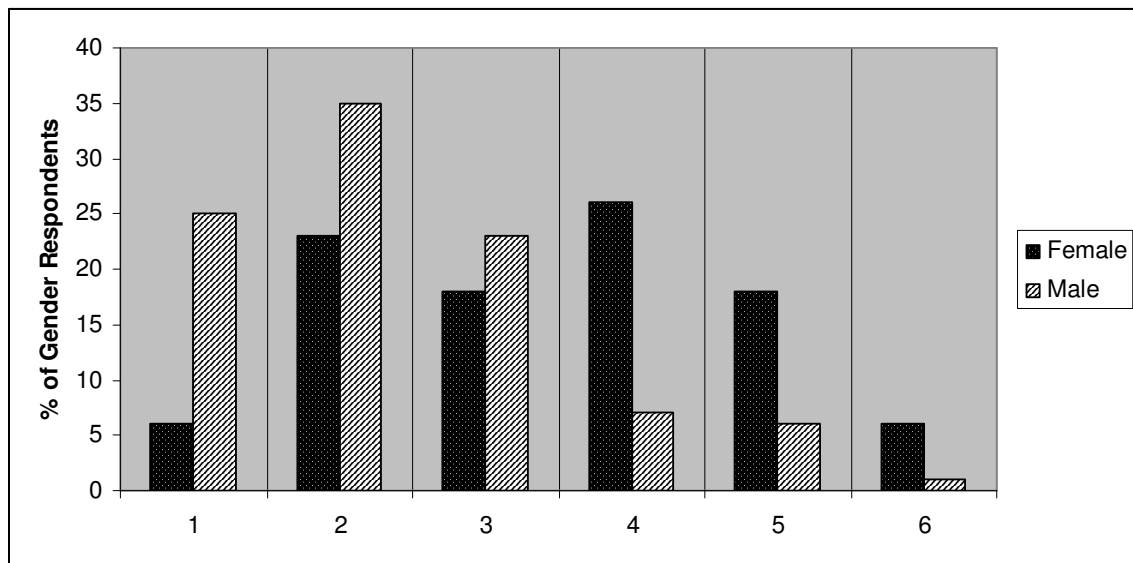
Notes: N=161 (76 female, and 85 male). Respondents were asked to rate the statement on a Likert scale where 1=strongly disagree and 5=strongly agree 6=not applicable.

Whilst there was little gender difference in responses to the statement about confidence (Figure 1), more male engineers disagreed with the statement that women have to achieve more than men in order to gain equal recognition for work (Figure 2), indicating a perceptual difference between the sexes. Interviews with engineers were even more revealing. Male interviewees were far more likely to express confidence in their abilities; with females frequently pointing out areas where they felt under-qualified, inexperienced, or a lack of confidence:

"I think my role suits me very well…. I know the proves very well… and yes, I've got the experience and the qualifications to be able to do that job well"
(Male, Chemical Engineer, 31-45

"I think I'm *quite* a good engineer; I just think I'm quite honest… Whereas a lot of the men that I've worked with are not necessarily that great, they just… its all bravado really I suppose"
(Female, Highways Design Engineer, 26-30

Females' lack of confidence and encouragement in pursuing their technical abilities may help to explain why males tend to follow the traditional university or vocational entry routes, whereas many of the female engineers interviewed had entered engineering via unconventional routes.

"Well I sort of fell into it by mistake really. I actually, oddly enough never really thought about what made me go into a technical function…I think it was probably my Dad oddly enough; he is not somebody who I would normally consider to be a role model for anything…."

Female, Automotive/Manufacturing Director, 31-45yrs

Indeed, whilst the figures showed a relatively healthy balance between males and female in terms of possession of a first degree, no female questionnaire respondents has gained either a Higher national Diploma or Certificate (HND/HNC) – the main vocational qualifications for entry into the industry. This evidence supports earlier research showing that males have greater opportunities to learn the practical, rather than academic skills associated with engineering (Cockburn, 1997; Evetts, 1998). This phenomenon is once again related to the cultural association of males technological mastery, and females with people-skills. One female engineer interviewed suggested that it was the application of "…*applied science to people-based work"* that facilitated her interest in the profession. The stereotypes surrounding the expected roles of men and women also seem to materialise in the form of intra-disciplinary segregation. In a survey of engineering faculty in a higher education institute, Hacker (1981) found that disciplines within engineering were hierarchically ordered. Electrical engineering was judged to be the most 'scientific', and therefore most difficult field, whereas civil engineering was regarded as too concerned with social and political affairs. Amongst our sample, there is also evidence that males and females consider those 'clean' engineering sectors with fewer associations with heavy machinery or greater focus on the quality of life to be more acceptable to, or appropriate for female engineers:

"Not in pure engineering, but there are [female managers] in related fields, so Landscape Practice and the Planning side of it which are generally the softer side…"
(Female Highways Design Engineer, 26-30)

"Certainly on the consulting side, [the company] is predominately male…. Our sister company, which tends to do more studies, it's not hard engineering, it's the softer type of business consulting, I think they've probably got a higher proportion of female staff"
(Male, Consultant, Communications Firm, 31-45 yrs)

Furthermore, it was often reported that where female engineers have been able to scale the corporate ladder, the administrative element of their work can take over the technical element.

Figure 3: What proportion of your job would you rate as technical/administrative?
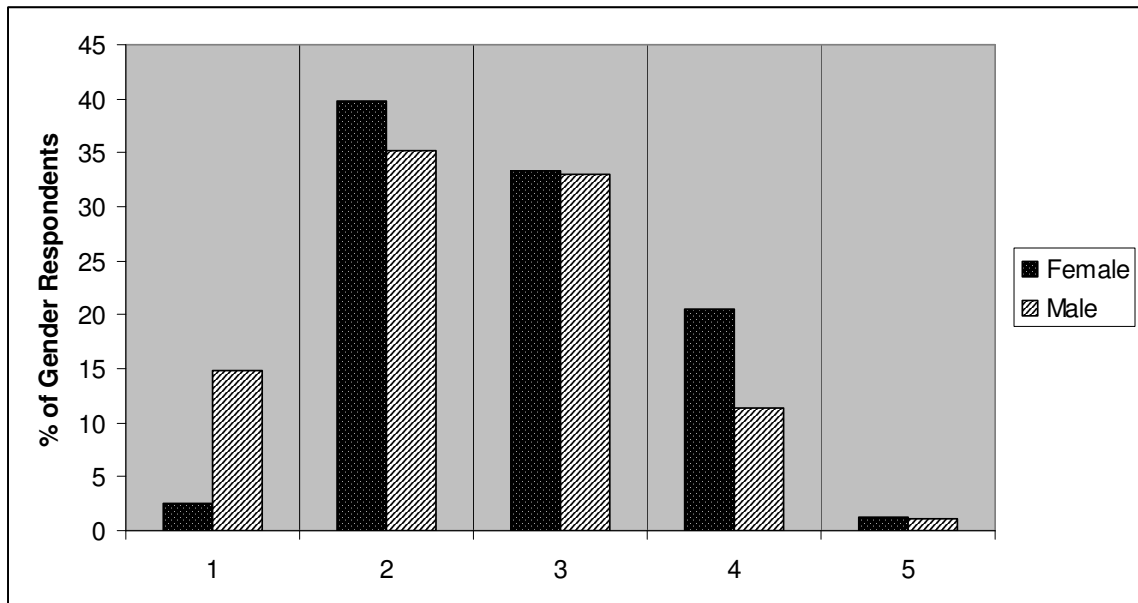
Notes: N=160 (76 female 84 male). Respondents were asked to rate on a scale 1=purely technical to 5=purely administrative

"…it isn't that I can't do what they do, it's just that its…it just morphs that way"
(Female, Managing Director, Industrial Engineering Firm, 31-45)

"As associates, we didn't even sit with the engineers, you sat with the directors and so we were managers, and we were responsible for finding staff, interviewing staff and going out and getting projects, so suddenly at 33 years of age my engineering abilities were not being used and I was simply managing people and writing project submissions,,, and so all my education and experience.. wasn't being used… well, that's not what I want to do, I want to be an engineer!"
(Female, Mechanical Engineer, 31-45)

"What I do tend to find even now is a lot of the women that are in engineering are on the 'less technical' side shall I say? For instance, we've got two (I think) environmental engineers that are women... that's looking at nice plants and verges. I'm not decrying what they do but it's not the structural side, 'let's got and build a bridge'
(Female, Highways Maintenance Engineer, 31-45)

One reason repeatedly given for this phenomenon was that women are better than men at interaction, communication and empathising with the needs of staff. The sidelining of women into project management work may also be a function of standard work practices – arguably, individuals are able to work most flexibly in the office environment, compared to onsite. Whilst this may be the choice of the individual concerned, it raises a question as to whether this may have an adverse

effect on their opportunities for progression, as technical skills maintained on an ongoing basis are essential if an engineer is to achieve Chartered status.

Interactional Arrangements

Much of the literature on women in engineering suggests that women's disadvantages in the industry must at least partly stem from specific discriminatory practices which occur in the workplace. There is compelling empirical and statistical evidence to support these assertions. Several occupational studies have shown that female engineers tend to be concentrated in lower status positions than their male colleagues (Evetts, 1993; 1994), receive lower pay and benefits packages (EOC, 2004; Roberts & Ayre 2002), may be expected to tolerate offensive visual material and scatological comments and jokes (Pretz & Hopkins, 1997; Collinson, 1988), and can often be subject to sexual harassment, bullying and other forms of discrimination (Bagihole et al, 2002; Pretz & Hopkins, 1997). Organisations and industries that are populated by virtually all men are expected to be hostile environments in which to work, characterised by male bravado, and banter that seeks to exclude and denigrate women.

In this study, relatively few instances of such behaviour were reported by survey respondents and interviewees. Both male and female participants largely agreed that engineering offices are supportive and comfortable places to work. Older participants noted that modern workplaces were much more appealing than those that had been prevalent when they first started working in the industry:

> "I can remember when I first started in the industry… the men there, they used to have their calendars up and… the team leader, no, the director… I mean the things he used to say! Nowadays he just would not get away with. But things have changed, haven't they?"
> (Female, Highways Engineer, 31-45)

There were, however, a few provisos. Interviewees who had experience of different industries noted that some environments were more welcoming than others:

> "I was in the water industry to start and that was… there were more female engineers on site and therefore it wasn't too bad"

(Female, Aeronautical Engineer, 26-30)

I think that the chemical industry is generally a pretty – not a particularly pleasant environment to work in. Particularly where you're dealing with the shop floor guys. It's still got this ancient fifties machismo. You know, it's a lot of swearing, a lot of… you know, pretty disgusting photos everywhere, and all of this sort of thing."
(Male, Chemical Engineer, 31-45)

Many female participants indicated that there can be a difference to working in an office environment to working on site:

"I had to go on site… and I wasn't comfortable….because you know you're the mate on one hand, but have to go in and snag the work they've done; on the other hand, it was a bit awkward. I think if I'd been a stronger person, it would probably have been easier, but that's partly why I have it up, because I just couldn't cope with all of it really."
(Female, Former Civil Engineer, 31-45)

"On the shop floor, it's quite a tough environment anyway, there's a lot of banter than goes on and it would mean a whole mind shift for everybody. I think in the offices it's easier as a woman in some ways on a day to day basis"
(Female, Aeronautical Engineer, 26-30)

"It is all right in the office, but maybe because I have to go on site sometimes… I find it… not easy because there are so many men, the tall men on site and I am so short. I think they are all right, jut maybe I am a bit shy or… not enough confidence"
(Female, Building Services Engineer, 18-25)

One reason for this difference between site and office environments may be due to the fact that there may be a larger female presence – albeit females not engaged in engineering – in the office environment. This may help to reduce the sense of isolation that women in non-traditional occupations feel.

"In the electrical engineering department…. I think there was one other female engineer in the wider department [but] I never really worked with her. So my female contact was with the secretaries and the clerical assistants"
(Female, Former Electrical Engineer, 31-45)

As well as reducing the sense of isolation that women may feel whilst working in a non-traditional role, the open plan office allows administrators and non-technical staff to work alongside engineers, possibly helping to eliminate popular myths about what engineers actually do. In the open plan office

environment, one desk 'plot' looks very similar to the next; a factor which may support organisational equality strategies and flat management structures where there is no discernible hierarchy. Open environments may also help to set protocols for acceptable behaviour, reducing incidents of sex discrimination, harassment and bullying. Finally, open environments may promote discussion between workers on subjects including salary and staff development – potentially helping employees learn about gender pay or training gaps. Similarly, because public sector organisations tend to have greater numbers of female staff, the cultures in these workplaces were often reported to be more welcoming to females than those in the private sector.

In general, diverse working environments seemed to be popular with the sample of engineers we surveyed. Many of the older respondents noted that there are now more women in their teams, they feel less isolated, and male engineers have become accustomed to them being around. However, despite the increased movement of women into engineering workplaces, certain assumptions about the expected roles and men and women seem to persist. Indeed, whilst some interviewees displayed progressive attitudes and behaviours towards breaking down occupational segregation, their language seemed to show gender stereotypical undertones:

"Lady site managers tend to run a very clean and tidy ship"
(Male, Managing Director, Construction Firm, 45+)

"I started as a *tradesma*n…."
(Female, Former Civil Engineer, 31-45)

"What I liked about the job was… it had some *man* management responsibility"
(Male, Chemical Engineer, 31-45)

Structural Arrangements

Typical working hours are perhaps the structural feature of the engineering profession which may potentially have the greatest impact on women's opportunities for retention and progression. Of course, a long-hours culture is a phenomenon which is not unique to the engineering industry; the Equal Opportunities Commission points out that the average number of working hours for men in Britain far outstrips the UK

average (Francesconi & Gosling, 2005). However, the continued association of the scientific industries with men, combined with the popular notion that women will assume primary care responsibility for children may mean that male-dominated sectors like engineering tend to offer fewer opportunities for flexible working arrangements than those sectors which employ predominantly women. At the same time, where part-time working hours are common mainly to women, it may inadvertently communicate the message amongst employees and managers that these workers are less committed to their jobs and to the organisation. Women with domestic responsibilities may therefore be doubly disadvantaged in male environments where the inability to work long unsociable hours and make personal sacrifice is interpreted as a lack of commitment to their work, compared to their male colleagues.

As figure 4 shows, the overwhelming majority of engineers surveyed were in full-time positions (77% of females and 88% of males). There were very few engineers working to arrangements outside of this norm. No women and only 1% of males were in temporary work, and no respondents at all classified themselves as being involved in casual work. Most interesting is the low incidence of part time work amongst engineers:

> "We do have part-time workers, but… they are admin staff the part-time workers; I don't think we have any technical people who work part-time"
> (Female, Director, Engineering Design Consultancy, 31-45)

Figure 4: Working Arrangements

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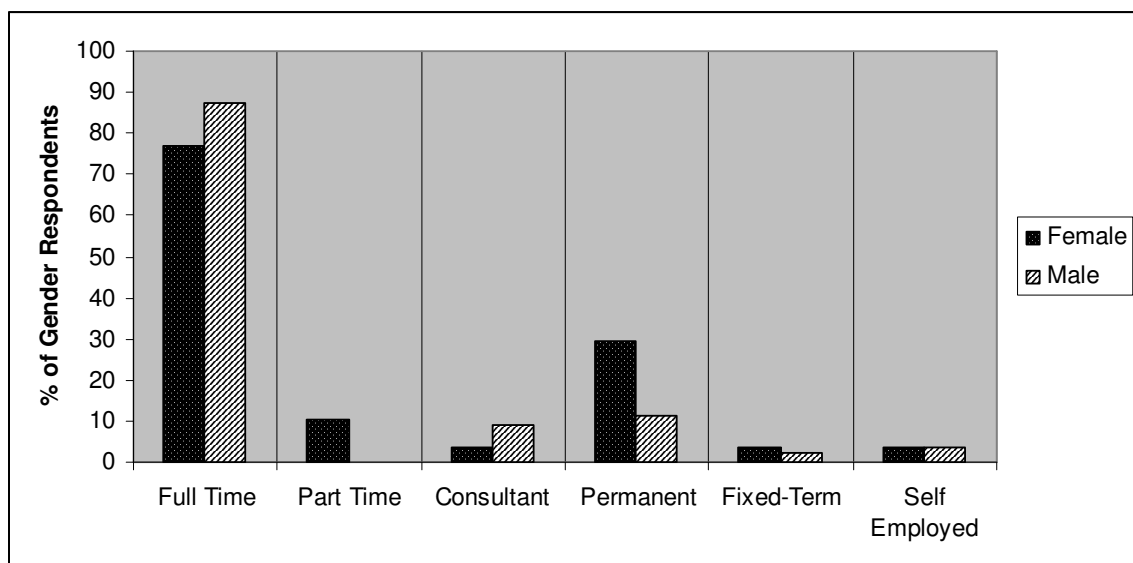
Notes: N= 166 (78 female 88 male). 3 respondents preferred not to disclose their gender and were not included in this analysis.

Since there are strong associations made between the numbers of hours a person works and his or her skill levels, a large relative take-up of part time hours for females, and a low male take-up, despite the consideration for some semblance of work-life balance, may lead women employees away from the status of "ideal" flexible employee (see Acker, 1990, 1992; Benschop & Doorewaard, 1998) – and may subsequently prevent them from penetrating intimate working and social networks.

Despite the lack of non-standard working arrangements, responses from both male and female engineers indicated that the long-hours culture is no longer a feature of engineering. Over two-thirds of respondents of both sexes felt that they were able to maintain a good work-life balance. According to the interviewees however, long hours continue to be expected in organisations which operate a 24-hour plant. This seemed to be more likely in certain engineering sub-disciplines such as chemical or mechanical engineering. Some interviewees based in these sectors mentioned working for firms which demanded 50-, 60- or even 70-hour weeks:

"They're not very family friendly. The hours, for instance, we work a 42-hour week, and that… is defined as you clock in and out… if you persisted in leaving early then you'd get slated"
(Male, Chemical Engineer, 31-45)

"I never did any more hours than I had to…. Well I wasn't really committed as such… That's partly why I didn't progress. I think if you gave more hours and more determination and stuff…"
(Female, Former Civil Engineer, 31-45)

Whilst the long-hours culture does not seem an inherent feature of all engineering organisations, atypical working patterns do exist. Engineers in certain sectors often have to work antisocial hours or spend extended periods away from home, particularly in certain sectors such as civil engineering or the petroleum industry. Such working patterns are obviously incompatible with the domestic lives of those with primary care responsibility for children or other dependants. Project participants were also asked whether their organisation operate any from a number of work-life balance policies. The quantitative data showed that engineers were aware that their organisations operate a wide variety of policies aimed at balancing

employees' work-life balance. Follow-up interviewees revealed that work-life balance policies tend to be set with the needs of employees with families in mind. For example, some firms prioritised staff with children for holidays during school breaks. However, uptake of those policies was extremely low for both males and females. Interestingly, uptake was higher amongst male than female employees. Whilst this does not support suppositions made in the literature, it is worthwhile noting that some employers seem to be recognising the fact that family friendly policies are not just aimed at female employees:

"I'm conscious that it's not just a women's situation. It's very much a families-oriented issue"
(Female, Managing Director, Oil and Gas Consultancy, 45+)

It was suggested that the higher take-up amongst male engineers is a direct result of vertical segregation; opportunities for flexible working are greater at more senior levels in organisations – levels at which fewer women are to be found. However, it would seem that the main reason for low take-up is that whilst flexible working is available in theory, it is often denied as company heads view flexibility as incompatible with the needs of the organisation:

"It's a very demanding environment and there's an expectation that certainly from middle management upwards that the company is put equal first with the family and again as you progress through the organisation you are expected to give more than, I would say, a fair share towards the company"
(Male, Head of Engineering, Motor Vehicle Manufacturing Firm, 31-45)

"I think there's just a fact women cannot complain about…business… the way it's structured isn't, you know…. if you want to excel in whatever it is you want to do understand that this is not a family friendly environment. It's not family friendly for men let alone for women."
(Female, Managing Director, 45+)

"I'm a bit tough about this really because if a woman wants to work in this industry the she's go to fit within the methods of working in my opinion… if you've got to the stage of having 25 years experience then you can start to be picky but as a young graduate you've got to accept the way the system works"
(Female, Managing Director, Oil and Gas Consultancy, 45+)

There was no doubt amongst engineers that reducing working hours would have an adverse effect on opportunities for progression within the firm. This would have a far greater impact on females as they are more likely to take time out of the industry in order to have children. In fact, several female interviewees provided specific examples of times in which they felt that senior management considered them unsuitable for promotion because of their family commitments:

Cultural Arrangements

Organisations are made up of individuals, and can be described as a system of relations. Gagliardi describes organisational culture as "a coherent system of assumptions and basic values which distinguish one group from another and orient its choices [which is] a tenacious and unalterable phenomenon" (Gagliardi, 1986: 119). This observation is particularly significant if we view culture as a phenomenon which is linked to the power relations of an organization. Of course, there may be several cultures present within an organization, but it is the culture that is based on an interpretation of organizational realities, and what it means to be successful in the corporate environment, that will ultimately emerge as dominant. In order to be successful within an organisation, familiarity with the norms for action or the methods for exercising power in the company networks is essential. This means being an insider of the culture and understanding its informal rules (Aaltio-Marjosola, 1994). Due to their paucity of numbers, domestic commitments and other factors discussed here, women may to be excluded from such networks, and so miss out on the privileges available to those within them (Roberts & Ayre, 2002). In order to 'playing field' and to provide guidelines for the organisation of work, it is common for companies to establish Human Resources and related policies. However, the evidence from the sample surveyed suggested that whilst a plethora of policies were set at HR level, how and whether policies are implemented often depends on the attitudes of middle management. This was particularly the case with requests for flexible working, contrary to legislative requirements:

> "It depends. If your line manager's got children or not. It depends if your line manager likes you or not"
> (Female, Highways Engineer, 31-45)

> "Policies are a load of rubbish…. *People* do business. You can have something on paper but the reality is the policy doesn't do anything"

Since policies are not instigated equally across the organisation, interviewees suggested that, in order to be considered seriously for, say, an alteration in working practices, the individual must be extremely assertive, particularly in smaller companies, and in the private sector.

"I think you can only make change happen if you assert for it and ask for it, I don't think you should expect somebody to do you any favours, I think you have to understand what the needs of your employer is and adapt and persuade them and assert yourself in that environment."

(Female, HR Director, 45+)

However, it has been suggested that this assertiveness is more difficult to attain – and indeed more harmful – for females than males. It has certainly been well documented that, in technical environments, males are assumed to have an innate aptitude for science, and females need to work harder to reach similar levels of achievement (Kvande & Rasmussen, 1994; Roberts & Ayre, 2002). In a qualitative study of academia, Bagilhole (2002) shows that male and female academics 'collude' to perpetuate the myth of women's under-achievement. Women accept femininity instead of power, partly due to low self-esteem, and partly for fear of threatening masculine rationality. In this situation then, women are less likely to promote themselves and their achievements, particularly in an environment where they feel isolated. If they do, they risk losing their femininity, and attracting a reputation for 'pushiness'.

"Any woman who makes it on merit all credit to them. Because it's not easy; you've got to give as good as you get and you've got to be assertive. Now for a bloke to be assertive is absolutely fine but if a woman is assertive we're told we're being difficult and bolshy and obstinate; attitude problem is another one we get"

(Female, Engineer, 31-45)

Conclusion

Higher industry exit rates amongst female engineers are a serious problem. There is clearly little worth in seeking to increase levels of recruitment to engineering roles if women's human capital is under-

utilised in the labour market. Organisational cultures which are not conducive to the effective participation of women scientists, engineers and technicians are certainly contributing to declining levels of female retention. This research provides evidence that the crudest practices of workplace sex discrimination have not vanished, but mutated into just another aspect of organisational culture. As the nature of cultures are subtle, covert and unconscious, these practices have become not only tricky to recognise and eliminate, but have also attained certain levels of acceptability. Furthermore, these practices have become so entrenched within organisations that have always been – and continue to be – male dominated, and are produced, reproduced and maintained by such a multitude of processes acting simultaneously, that the elimination of any one single process seems unlikely to break down these barriers. This does not mean, however, that the situation is irretrievable. Current behaviours and attitudes exhibited towards women in engineering are based on norms established in an all-male engineering system. Inevitable structural developments - such as the move from 'heavy' to 'digital' engineering, and the repackaging of the home as workplace – coupled with best practice initiatives - such as flexible working practices, innovative office design and a move towards on-the-job training - can complement and support the increasing levels of female recruitment. These changes can provide engineering firms with greater opportunities to enact corporate culture transformation and create new, supportive gender inclusive cultures that do not obviate the acceptance of women engineers as part of the male-dominated status quo.

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[i] For example, in 2002 60.8% of those accepted into UK medical and dental schools were women. Statistics available from the Department of Health at
http://www.dh.gov.uk/PublicationsAndStatistics/Statistics/StatisticalWorkAreas/StatisticalWorkforce/fs/en
[ii] Statistics available from Engineering Council UK at
www.etechb.co.uk/pdf/Engineering%20UK%20Final%20Chart%20Source%20Data.pdf
[iii] http://www.setwomenstats.org.uk/set4statistics/04_index.htm
[iv] Statistics available from http://www.setwomenstats.org.uk/set4statistics/03_analysis.htm