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The perception of women engineers in the construction industry in Palestine

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The industrial and occupational distribution of women is such that women are concentrated predominately in a few occupations, mostly in the service sector, such as banking, finance, insurance, public administration, hotel, and catering. Men and women are equal in their capabilities in almost every respect, provided that women are given the same opportunities as men for training, employment, and promotion. There is a lack of research studies on women in the construction industry; therefore this field needs special consideration. The purpose of the current study is to find out working conditions of the Palestinian women civil and architect engineers in the construction industry in the Gaza Strip, Palestine. In addition, it attempts to examine their career prospects and to understand problems experienced by these women throughout their academic years as well as in their careers. Discrimination against women is still present in today's construction industry as well as in other traditional engineering cultures. In order to minimise or cope with this problem, attitudinal change by both men and women is strongly suggested.

Keywords: women; engineers; culture; construction; discrimination

1. Introduction

Construction is a relatively new professional career choice for women and they are slowly coming into the industry. The construction industry culture is in need of change if it is to escape from its current characteristics of crisis, conflict, and masculinity. The culture is characterised by male domination, conflict gallant behaviour, and traditional attitudes. The cyclical nature of construction output owing to its sensitivity to the underlying economic cycle means that the question of recruitment goes on and off the agenda and so too does the question of recruiting a higher proportion of women.

The civil and architect engineering fields are among the most important fields in helping to develop a civilised country with regard to building housing and infrastructure projects. This will lead to an improvement of socio-economical situation in the country. The majority of employers and employees in the construction industry are men, who have been actively working in this field. Few women in Gaza Strip have been employed in consulting offices and contracting companies. It has been reported that the rate of employment of women is around 12% in the scientific and

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engineering labour force in industry, but twice this number of women work in other employment sectors (Greed 2000).

Construction is a relatively new professional career choice for women and they are slowly coming into the industry. The United Nations Center for Human settlements UN-Habitat (1991) reported that there are many constraints, which discourage women participation in construction field, such as traditional perceptions of construction work being the men's work, limited access to training and education. In Scotland 53% of the total students enrolled at university were women, but below 19% of women were studying in engineering, computer studies, and physical science (Radford 1998). In Germany 48% of the students over all disciplines are women, but only 20% of the engineering students are women (Ihsen 2005, Ihsen 2006). In 1987, Bulgarian education authorities limited the proportion to women engineering students to 50%. The purpose of the current study is to reveal the working conditions of the Palestinian engineering in the construction industry in the Gaza Strip.

The Gaza Strip is an area of extreme, almost impenetrable complexity: geographic, demographic, economic, social, political, and legal. Geographically, it lies wedged between two larger, more powerful countries, Egypt and Israel, both of which have ruled over it in turn. Demographically, it is an area which one of the highest population densities in the world. Two-thirds of the residents are refugees, and nearly half are younger than fourteen years of age. Economically, Gaza remains weak and underdeveloped and at present has virtually no economic base. Socially, the residents of the Gaza Strip consist of three historic groups: urban, peasant, and bedouin (Roy 1995).

Culture reflects the pattern of life in the Palestinian society regarding education, beliefs, values, attitudes, and religion. Values and attitudes of the Middle East as well as the Palestinian people are likely to be influenced by their religious beliefs. Palestinian society seems to be overprotective of women. As a consequence, women engineers are bound by several concerns to the extent that they might not be allowed to travel or work on construction sites (Enshassi and Liska 2000).

2. Studies on women in construction

The Equal Opportunities Commission (EOC 1990) stated in their annual publication 'Women and Men in Britain': women continue to be significantly under-represented in the primary sector (agriculture, energy, and water), in most manufacturing, in transport and communications and, in particular, in the construction industry. It has been found that 7% of the full-time construction industry workforce were women (EOC 1988) and over 80% of these are estimated to have been in traditionally women's jobs, such as secretarial and clerical (Gale 1991).

The equal Opportunities Commission (1990) stated that in 1998 43% of all employees in employment in Great Britain were women, and only 26% of them have managerial position. The construction industry is demonstrably male. An analysis of the 1981 General Census data shows that only 8.4% of women in construction industry occupy managerial positions; just over 82% of them were employed in secretarial or clerical jobs (Rainbird 1987).

The construction labour market is clearly segmented along gender lines. In all countries skilled and supervisory tasks are undertaken more often than not exclusively by men. In some countries women undertake clerical jobs; in others they are employed as unskilled labourers, helping out in the most menial of tasks. While in many countries educated women are beginning to break into higher professional jobs of architect, engineer, surveyor, there is still considerable resistance to the entry of women into the vast mass of middle-level, skilled, and semi-skilled jobs in the construction trades. In European countries such resistance would appear to stem from deeply ingrained prejudices on the part of employers and other (male) workers about the suitability of women for construction work (Wells 1990).

Sirvastava (1992) has carried out an investigation into access programs in which she is attempting to identify specific barriers to women entering construction-related higher education and the nature of the image and culture of the construction industry portrayed by schools, careers advisers, teachers, and parents and the role of higher education in enhancing the recruitment of women into the construction industry. She argued that equal opportunities policies are not always translated into practice with lecturing staff often indicating a lack of understanding and a degree of apprehension towards widening access. Construction higher education was one of the last areas to respond to opportunities for widening access and says this problem is endemic to construction departments throughout higher education.

Sirvastava (1992) stated that female construction students as well as female construction engineers revealed traditional attitudes towards male and female roles, abilities, aspirations which result in women being steered away from construction even when they show an early interest in the industry. She explained that women are not given the adequate experience and they often lack confidence to apply for courses for which they are qualified. Women often do not want a traditional female career but advice given frequently omits to mention construction and related areas of work and study. Female students feel excluded by terminology and language of tutors. These points are all supported by the work carried out and published by Farish (1987) (cited in Langford *et al.* 2000) in which she cited specific responses to the question asked of built environment academics.

West (1982) concluded from her study that although many interviewed had drifted into construction careers they would choose the same careers if they had their time again. She argued that professional careers in construction should be promoted as worthwhile and satisfying but that the image of the professions must be improved by promoting the intrinsic satisfaction in these occupations. Wilkinson (1992) reported on a survey in which she questioned contractors, consultants, and local authorities attempting to investigate attitudes to the employment of women, child care and women's career paths in the construction industry. She reports that a low proportion of employers questioned had overtly discriminatory attitudes towards women. However, about 20% thought that women had a distraction on site and that supervision was a 'man's job'. She argued that employers differentiate between various different construction process functions with respect to the suitability of women workers.

Rodgers (1991) argued that women are not encouraged to enter the construction industry because of a lack of knowledge in schools and because of the poor image of the industry held by the general public. She said that although female and male students have a good basic knowledge of engineering they do not have the specific knowledge required for a civil engineering career or the construction profession in general. This based on an inadequate career advice in schools. The career advisers themselves have a fundamental lack of objective knowledge about the construction and its professional careers as well as about the female minority situation.

In their study, Dana-Picard *et al.* (2005) showed that, about the first year performance that single gender teaching and learning develops new aspects also for a professional career for female students in engineering. A major study of women in civil engineering in Thailand was carried out by Ogulana *et al.* (1993). The study as well found the women civil engineers in Thailand seem to have a unanimous opinion regarding their careers prospect, when compared with male civil engineers. The women generally look at civil work as being divided into two types, offices work and site work. In office work, the majority of female civil engineers have equal or even better opportunities to progress in the career. However, some women civil engineers have less opportunity to progress in the site work because it is hard work, requires going to sites, being in a male dominated atmosphere and try to organise travelling with the duties of motherhood. Women civil engineers are believed to be motivated by financial rewards as most of them think that they can make more money than other female professionals. In addition, the prospect of being in the office or being a designer, which will not require regular time on site, is still viewed as suitable for women.

Women employees are found to be particularly vulnerable to disadvantage and discrimination if they are in non-traditional, male-oriented occupations (Bagilhole 2002). Dainty *et al.* (2004) stated that, the construction workplace presents a challenging and hostile environment for non-traditional entrants, and women and ethnic minority employees face both similar and different challenges and attitudinal barriers. They argued that addressing a broad range of equal opportunities in an integrated and strategic manner would enhance opportunities for women, ethnic minorities, and for the workforce as a whole. English *et al.* (2006) studied women, construction, health and safety in South Africa and Tanzania. They concluded from their study that endeavours are necessary to change attitudes, promote participation by women, accommodate women, and improve conditions, particularly health and safety.

3. Methodology of research

This study is based on a qualitative approach by using in depth face-to-face interviews. The sample of this study consists of 10 contracting companies, and 28 women civil and architect engineers who were willing to cooperate in this study in the Gaza Strip. This approach aims at obtaining a clear understanding of the involvement of women in construction work.

Obtaining information from the two parties (companies and women engineers) will give a clear picture of women involvement in industry. It is hoped that the obtained information will provide a good basis to better understand the situation of women employees in the construction industry. The companies' directors were interviewed regarding their policies on the hiring of female civil and architect employees. In addition, these directors expressed their opinions and their preference in hiring and their role on their employees' career advancement.

4. Results and discussion

4.1. Perception of contracting companies

The results indicate that out of 294 regular employees employed by 18 contracting companies 8 (2.7%) are women engineers. The results show that only three contracting companies hired women engineers. The other fifteen companies currently do not employ any women engineer, neither have they even employed one. The three companies, who hired women engineers, hired them as office engineer, involved in designing, estimating, shop drawings, and planning the work activities. It has been observed that the directors of contracting companies are hesitating to hire women engineers in their companies owing to the following reasons as they perceived:

- (1) women engineers cannot endure hard work as men;
- (2) women engineers might have to take maternity leave for certain period of time which might delay their projects;
- (3) lack of qualified women engineers;
- (4) women engineers hesitate to introduce themselves directly to contracting firms owing to culture boundaries.

When asked about willingness in hiring women engineers, it has been noticed that some contracting companies are willing to hire women engineers. This is an interesting and encouraging response as it does reflect the tendency for future change in accepting women engineers as equal to men engineers. However, most respondents expressed their preferences to hire men engineers. The

rationale behind contracting companies' preferences to hire men over women engineers fall along the same line as cited here:

- (1) 'men are more flexible about conditions of work'.
- (2) 'men have fewer limitations, especially for travelling and working late during the night'.
- (3) 'men are more versatile'
- (4) 'the nature of construction work is more suitable for men'.
- (5) 'contracting work is tough which is not suitable for women engineers'.
- (6) 'culture and social sensitivity towards women engineers in construction projects'.

The surveyed contracting companies seem to agree that construction, fieldwork in particular, is not quite the right work for women engineers. Most believe that it is easier, safer, and more convenient for men to go to sites in different cities, to supervise male workers, and to work late at night. The construction industry in Palestine, as in many other countries of the world, is a male-dominated environment, from engineers, through foremen to labourers. Consequently, it is considered not quite appropriate for women engineers to spend too much time in such environment. In addition, the tough image of construction industry (especially, site work) also suggests the sense of inappropriateness of women. Thus, the place for women engineers, if there is any, is in office: designing, pricing, estimating, planning, scheduling, or coordinating.

The interviewees states that the career prospects of women engineers are not quite encouraging for women in the construction industry. Most of respondents think that women engineers are at disadvantaged position when they compete with men engineers, particularly in field work. However, a fair number of them express very positive viewpoints on career prospects of women civil engineers in construction offices. Regarding the low participation of women engineers in construction sector, most interviewees mentioned that, the nature of construction work is not appropriate for women. In addition, they referred to the attitude of women engineers themselves as the main cause for low participation in the construction industry.

4.2. Perception of women engineers

Most women engineers stated that the motivation to study civil and architect engineering was provided by the family enhanced by personal interest in the construction field. Other factors cited include motivation provided by friends and social values (Table 1). In Palestine, engineers are perceived to be successful people and this may have a profound effect in many families, causing them to motivate their children to select this career.

As shown in Table 2, 71.4% of the respondents received approval and support from their family to study civil and architect engineering, and 28.6% did not have family support in choosing civil and architect engineering.

It is interesting to note that the majority of respondents (85.7%) did not change their opinion regarding their engineering career despite the difficulties that women engineers may face in construction sites. Most interviewees went for training courses in different fields like construction

Table 1. Motivation to study engineering.

Reason	Frequency	Percentage
Family	11	39%
Personal interest	7	25%
Friends	4	14%
Social values	6	22%
Total	28	100%

Table 2. Family support of engineering career.

Family support	Frequency	Percentage
Yes	20	71.4%
No	8	28.6%
Total	28	100%

Table 3. Additional training obtained.

Training obtained	Frequency	Percentage
Yes	19	68%
No	7	25%
	2	Missing
Total	28	100%

management, water resources management and feasibility studies (Table 3). This indicates a positive attitude towards the profession and satisfaction with career choice.

Most respondents (80%) work full-time, and 20% of respondents work part-time. It has been observed that significant number of women who studied civil and architect engineering do not make a high career in the construction industry mainly because they feel disadvantaged when compared to the majority of male engineers regarding career opportunities and advancement. The survey revealed that 29% of women have their job description as civil engineer, 32% of them are architect, and 21% reported to be a middle management level (Table 4).

The most common jobs assigned to the respondents in the construction industry are designing, shop drawing, bidding, specification writing, estimating, inspection, planning and scheduling. From these women's experience, the most common job assigned to them throughout their career in the construction industry as engineer is designing. As expected, they feel disadvantaged when compared to their male counterparts. Most of them do not think they have gained more financial rewards, nor have better opportunities to be promoted and get more challenging assignments as their counterparts.

The respondents generally look at the construction work as being divided into two main lines, office work and site work. In office work, most respondents think that women engineers have equal confidence and that they have the same intellectual capacity as men. Furthermore, they suggest that women possess certain characteristics such as carefulness, good taste, thoroughness, and patience, all of which are great contributors to a successful career as office engineer. Working in this line includes designing, drawing, estimating and specification writing.

Most respondents agree that women engineers have fewer opportunities to progress in the constructions field. This is owing to several constraints faced by Palestinian woman engineers. First, it is perceived to be inappropriate for Palestinian women because it is hard work and requires going out to site and being in a male-dominated atmosphere. Second is men's reluctance to accept

Table 4. Job function of respondent.

Job function	Frequency	Percentage
Civil Engineering	8	29%
Architectural Engineering	9	32%
Middle level management	6	21%
Others	5	18%
Total	28	100%

women as their leaders or supervisors. Third is the conflict between their profession and their domestic and motherly responsibility.

5. Conclusion

This study investigated the current working conditions of Palestinian female civil and architect engineers, their career opportunities and barriers to their professional advancement. The study revealed that being a woman engineer in the Palestinian society can be very tough with several limitations. The most critical limitation is limited access to extensive site experience. The reason is cultural: the Palestinian society seems to be overprotective of women. As a consequence, women engineers are bound by several concerns to the extent that they might not be allowed to travel or work on construction sites.

Additionally, women are also highly expected to play a role of good mothers and housewives, which can jeopardise their opportunities to develop their professional skills. Discrimination against women is still present in today's construction industry. In order to minimise or cope with this problem attitudinal change by both men and women is strongly suggested. It is recommended that prospective women engineers should be well informed on both the positive and negative sides of working conditions as well as career prospects in the construction industry, women engineers should be well prepared, both mentally and physically, to face the changes of profession.

There seems to be in some parts a general engineering culture, that creates, that female engineers have very similar acceptance problems all over the world. Beside all cultural, historical, social and other differences we have to have a deep look at the part of 'common sense' in engineering.

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Professor Adnan Enshassi is a Professor of Construction Engineering and Management in the Civil Engineering Department at IUG with over 20 years of research, teaching, and consulting experience in various construction project management disciplines. He was a visiting Professor at Clemson University (USA), Bremen University, Stuttgart Technical University, Berlin Technical University, and Muenchen Technical University (Germany), Graz University (Austria) and Liverpool University (UK). He has developed and conducted many training programs in Construction Project Management for Palestinian Engineers with local institutions and International Organizations such as the WORLD BANK, UNDP, UNRWA, WHO, UNESCO and ILO. He is a Member/Fellow of a number of international professional institutions in USA and UK. He is listed in Marquis Who's Who in Science and Engineering. Professor Enshassi has published over 100 research papers in refereed International Journals and Conferences. He has been awarded the University Scientific Research Prize for Science and Engineering in 2005. He speaks Arabic, English, and German.

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Khalid Al Hallaq is a lecturer at the Civil Engineering Department in the Islamic University of Gaza. His research interests lie in the area of project and construction management and women in engineering. He has authored and co-authored several research papers.