

Women in Construction: Successes, Challenges and Opportunities – A USACE Case Study

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The US construction industry is expected to grow at a rate of change of 2.9% per year from 2010 to 2020 (United States Bureau of Labor Statistics, 2013a). Construction, a non-traditional career for women, continues to be dominated by males despite the Government efforts to legislatively increase the percentage of women included in construction. The nature, organizational structure and culture of the construction industry present several barriers and challenges to women. This research study explores the successes, challenges and opportunities for women that work within the United States Army Corps of Engineers-South Atlantic Division (USACE-SAD). The necessary data for this research were collected through structured interviews and a questionnaire survey. Descriptive and inferential statistics were used for data interpretation and deriving main findings. The top five barriers/challenges that women face at USACE-SAD are found to be: (1) work/life balance; (2) male dominance; (3) unfair perception of women's capabilities; (4) slow career progression; and (5) socio-cultural issues. The successes identified are as follows: (1) increased awareness by the public and private industry of the issues women face in construction; (2) shift in organizational policies to better address the needs of women; and (3) increase in leadership roles for women. The paper provides recommendations for increasing entrance and retention rates of women in construction.

Key Words: Women, Work force, Leadership, Gender issues, US Army Corps of Engineers

Introduction and Background

According to United States Department of Labor (2013), the number of women employed in the U.S. construction industry grew substantially, by 81.3% from 1985 to 2007. The leading reason cited for women entering the field of construction is better wages (Abaffy, 2010). Occupational employment statistics data show that the median hourly wage for construction and extraction occupations was \$18.79 in 2010, which is roughly double the median hourly wage for women-dominated occupations such as home health aides, maids, housekeepers, and child care workers (National Women's Law Center, 2012). However, as of 2012, approximately 9% of US construction workers were women which is a relatively small percentage compared to all industries average of 47% (United States Bureau of Labor Statistics, 2013b). Construction is historically described as a non-traditional occupation for women. Although women have made some gains in non-traditional careers and occupations but certain industries remain heavily gender-segregated such as construction (Hatipkarasulu and Roff, 2011). The Women's Bureau, a division of the US Bureau of Labor Statistics, defines "non-traditional occupations" as those in which women comprise 25% or less of total employed personnel (Women's Bureau, 2010). The Bureau has identified 117 occupations as "nontraditional". Of those, 33 are construction-related occupations (ibid, 2010).

Women face various forms of discrimination in the male-dominated construction industry. Bagilhole (2003) found that the most prevalent problem is sexual harassment. Amaratunga *et al.* (2005) indicated that male values are norm within the construction industry. These include long working hours, competition among staff, and autonomy. Other issues pointed out by researchers include the following: isolation on the jobsite (Dainty and Lingard, 2006); negative perceptions of women capabilities (Chun *et al.*, 2009); small representation on the jobsite (Menches and Abraham, 2007), expectations to mimic male's aggressive behaviors (Maskell-Pretz and Hopkins, 1997); lack of mentors/role models (Yates, 2001); family/work life balance (Hatipkarasulu and Roff, 2011); slow career progression (English and LeJuene, 2012); high degree of stress on the job, being repeatedly asked to do minor tasks, lack of encouragement from supervisors, being undervalued and a low potential of career advancement (Loosemore and Waters, 2004); conflicts between women's perceived societal roles and the image of the construction industry (Dainty *et al.*, 2006); unfair assessment of training needs, low performance rating compared to male counterparts,

being limited to clerical/administrative duties (Dainty *et al.*, 2000); lower salaries than male counterparts; and unique safety and health concerns (Hopkins and McManus, 1998). Dainty *et al.* (2000) mentioned that in order to survive in the male-dominated construction industry, women have three choices: (1) act like men, or (2) lower their goals and assume secondary positions, or (3) surrender and move to work elsewhere. They found that it is extremely difficult for women to reach leadership positions in their companies for two main reasons: (1) men's intentional social isolation, and (2) men's downplaying of women's contributions in order to maintain their positions in the male-dominated construction industry (Dainty *et al.*, 2000).

For this study, extensive research was performed to find out articles on challenges and successes of women in the construction industry. Many of the articles concentrated on the obstacles/challenges faced by women in different countries around the world and a few briefly discussed differences between the experiences of white females and females of another ethnicity. Some articles discussed strategies on attraction, retention and job satisfaction of women in the construction industry. A few articles were found to discuss successes that women have had in the construction industry; though, inferences of successes can also be drawn from several other articles. The first inference drawn was the fact that there now exist agencies that support the training, retraining and hiring of women. Another inference drawn was that though the numbers of women in construction is small compared to the number of males, women have actively developed organizations of their own to bring awareness to the issues that they typically face in the construction industry (Griffin, 2013).

The Federal Government has assisted women in entering the construction industry through legislations such as Executive Order 11246, Civil Rights Act of 1964, and the Equal Employment Opportunity Act of 1972 (EEOA). Through these laws, the Federal Government has prohibited employment discrimination on the basis of sex, race, color, religion, or national origin and has encouraged the employment of women with a goal of 6.9 percent women in the workforce on federally funded projects (Griffin, 2013). The United States Army Corps of Engineers (USACE) has approximately 37,000 civilians and soldiers who deliver engineering services to its worldwide customers (USACE, 2013). The USACE is responsible for managing the construction of most facilities on US military installations, the US civil works construction program and the flood control program (USACE, 2013). The USACE employs females in the Engineering and Construction Divisions and endeavors to retain the percentage of female employees to meet the requirements of both the Executive Order and the EEOA (USACE, 2013). Women can be found in many capacities on USACE construction projects including but not limited to being the lead project engineer, resident engineer, contract administrator or construction inspector. This research study was conducted to determine the successes and challenges faced by women in the construction industry and the female construction employees who have worked on contracts within the South Atlantic Division (SAD) of the United States Army Corps of Engineers (USACE).

Research Aim, Objectives and Scope

The aim of this research is to determine the successes, challenges, and opportunities for women in the construction industry. The objectives are as follows: (1) determine from women's perspective the challenges/barriers and successes women have experienced; (2) determine the barriers that have hindered women's success; and (3) determine the factors that have helped women to be successful. The scope of this research is limited to federal female employees of the South Atlantic Division (SAD) of the United States Army Corps of Engineers (USACE) and the female contractors who were working on the SAD construction projects.

Research Design

Since the study was based on the opinions and perceptions of women in the construction industry, a qualitative research approach was adopted. The preliminary data was gathered by performing extensive literature searches and collecting statistics and case studies that were published in technical journals, conference proceedings and women's advocacy groups' websites. The purpose of the literature review was to identify known challenges and successes of women in the construction industry. After that, a test audience of ten women who work within the South Atlantic Construction division of the USACE and were from various age groups, career fields and years of experience were given a structured interview which contained ten questions (see Appendix A). The purpose of these interviews was

to elicit additional information on the top of the information gathered from the literature review. Based on the results of literature review and structured interviews, a comprehensive questionnaire was developed (see Appendix B). Its purpose was to gather detailed information about research objectives from a wide spread audience. Purposive sampling method was chosen to select appropriate sample for the questionnaire survey. The numbers of employees in the Construction Division of the USACE-SAD at the time of this research were 256, out of which 86 were women. In addition, there were 5 female contractors (i.e. company owners) that were working on USACE-SAD construction projects. The questionnaire was sent to this entire group of 91 females using a web-based service *Survey Monkey*. After data collection, descriptive and inferential statistics were used for data analysis and interpretation of results. The results are also compared with the information collected from the literature review to find out similarities and differences.

Results and Discussion

Test Audience Analysis (Structured Interviews Results)

The interview questions were emailed to each interviewee in January 2013 with a return expected in 3 weeks. Of the ten women in the test audience, five provided responses to the all of the interview questions, two gave partial responses, and three did not respond. Only full responses are reported in this paper to avoid any potential bias. The interviewees had experience in the construction industry ranging from three (3) years to twenty-nine (29) years. Their job responsibilities range from contract administration, construction representative, electrical project engineer, construction project engineer, to an actual construction company owner. With this extensive and wide range of experience, each interviewee's response was considered to represent her unique subset within the group of females in the USACE-SAD construction division. Table 1 outlines their summary of responses.

Table 1

Summary of responses of test audience

Question	Responses Summary
3. How did you get started in the construction industry?	Job announcement, Career fair, Interest from childhood
4. What challenges do you believe women face in getting started in the construction? And what challenges have you personally faced?	Male dominated field, lower pay than male counterparts for the same level of work, No role models, Discrimination, Sexual harassment, Limited training, Unfair performance evaluation, Received more clerical tasks, Fewer leadership opportunities Discrimination, Unfair performance evaluation, Male dominated attitude, Perceived as incapable, Clerical duties, Sexually harassed
5. How can women overcome those challenges?	More women in top management, More female role models, Seek training for the needed skills, Hard work, Become mentor to the newcomers
6. How do you believe women are perceived by their male co-workers in the construction industry?	Lack knowledge/capability , Always in competition for fair recognition, Not as smart or as educated as the males, Generally respected
7. What factors do you believe will positively affect retention of women in the construction industry?	More women role models, Equal salary, Education/training, Increased awareness about construction careers, Money, Career mobility, Diversity training
8. What factors do you believe will negatively affect retention of women in the construction industry?	Unequal pay, Sexual harassment, Harshness of job conditions, Having to perform clerical duties, Long work hours, unstable work climate, Not being respected

Question	Responses Summary
9. Do you believe that race/ethnicity plays a role in the challenges faced by women in the construction industry? Why or Why not?	Yes (3, I don't know of any non-Caucasians at higher level positions, It does as in any other field, It can be depending on Location), No (2)
10. What have you personally done to influence another female to become involved in the construction industry?	Told other women about construction opportunities, Mentor other women, Taught construction skills related workshops for women, Volunteer to speak at summer camps about construction industry, Taught my daughter

Note: The responses in bold are triangulated.

Most of these responses support the findings of earlier researchers such as Amaratunga et al. (2005), Chun et al., (2009), English and LeJuene (2012) and Menches and Abraham (2007). Discussion on these results is made in the following section.

Target Audience Analysis (Questionnaire Survey Results)

The survey questionnaire was sent to the entire target population via email. Of the 86 female personnel and 5 female construction company owners within USACE-SAD Construction Division, 66 responded yielding a response rate of 72.5%. Using *Creative Research Systems' Sample Size Calculator*, it was determined that the data collected represented a confidence level of 95% with a confidence interval of 5.68% for the population size of 91. The majority of the respondents were Caucasian (58%), 30-59 years of age (78%) and had 15 years or less of experience in the industry (62%). The respondents' career categories were classified as project/site engineer (30.8%), contract administration (19.6%), construction representatives (19.6%), clerical (18%), project manager (7.5%), architect (1.5%), general contractor (1.5%) and budget analyst (1.5%). The respondents were asked to indicate how they became aware of the career opportunities in the construction industry. The top two responses were, informed by a family member (19%) and informed by a college professors/career counselor (18%). These findings match with the findings of Dainty *et al.* (2000) and Hatipkarasulu and Roff (2011).

In the next section, a list of barriers/challenges that were identified through literature review and structured interviews was provided to the respondents. They were asked to choose the critical barriers/challenges they believe women in the construction industry typically face. The top five barriers/challenges chosen were, *work/life balance* (64.3%), *unfair perception of women's capabilities* (62.5%), *male dominated culture* (60.7%), *slow career progression* (51.8%), and *sexual harassment* (41.1%). The survey audience was also inquired to rank barriers/challenges (from 1 to 17 with 1 as the most important barrier), which they personally faced in their career. The results are shown in Table 2. These results are also compared by a similar study conducted by Menches and Abraham (2007). Both studies indicate that work/life balance and the male dominance in the industry are the top two career barriers for women. Since the majority of the target audience was within the child-bearing age that's why the work/life balance was considered as the top barrier by the survey respondents. As found by English and LeJuene (2012), women want the opportunity to take breaks in their careers to raise a family without their career being penalized.

Table 2

Barriers/Challenges: Comparison of Survey Results and Literature Review

Questionnaire Survey Results			Menches and Abraham's (2007) Results	
Barrier/Challenge	Mean	Rank	Rank	Barrier/Challenge
Work/life balance	5.95	1	1	Difficult work-family balancing act
Male Dominance	6.39	2	2	Male dominance
Unfair perception of women's capabilities	6.52	3	3	Slow career progression
Slow career progression	6.71	4	4	Overtly masculine culture
Socio-cultural factors	7.66	5	5	Job Hopping

A t-test was performed on the women's barriers/challenges results with survey audience being broken into two ethnic groups - Caucasian and Non-Caucasian. This division of the ethnic groups was chosen because the number of Caucasians in the target audience represented over half of the target population – i.e. 58%. The results of the t-test are depicted in Table 3. The p-value for each barrier/challenge is greater than .05, which indicates that there are significant differences in the ranking of barriers/challenges between Caucasian and the Non-Caucasian women. For Non-Caucasian group, “male dominance” and “socio-cultural factors” were found to be more dominated issues as compared to “Work/life balance” and “slow career progression” chosen by Caucasian women.

Table 3

Barriers/Challenges Rankings: Comparison of Caucasian v. Non-Caucasian Groups

Ethnic Group Barrier /Challenge	Caucasian		Non-Caucasian		p value
	Mean	Standard Deviation	Mean	Standard Deviation	
Work/life balance	5.65	4.33	5.77	3.73	.909
Male Dominance	7.09	5.14	5.45	5.09	.242
Unfair perception of women's capabilities	8.28	3.56	9.25	3.84	.335
Slow career progression	6.56	3.66	6.56	4.39	.998
Socio- cultural factors	8.40	4.43	7.32	3.18	.306

The majority (81.8%) of the target audience agreed that women whether they have a technical degree or not are given more administrative/clerical duties than their male counterparts. This perception was prevalent among all of the ethnic groups of the women surveyed. The survey audience indicated that the top five positive retention factors for women in the industry are *women being given more training options, improved perceptions of the value of women's work, women being given leadership opportunities, better work schedule options* and *telework* (work from home). It is interesting to note that two of the top five positive retention factors chosen by the survey audience surrounds work schedule although the majority of them indicated the work/life balance as being one of the major barriers. This contrast indicates that although work life/balance is still a major issue perceived by women, the employers are giving due consideration to it and trying to solve it. A stalled career was chosen by 76% of the survey audience as a negative retention factor.

The survey responses indicated that 45.2% of Caucasian females and 29.1% of females from other ethnicities are very satisfied with their career choice. The percentage of very satisfied respondents for job satisfaction is lower than career satisfaction for both groups with Caucasian female's percentage at 33.3% and other ethnicities at 25%. When it comes to improving job satisfaction, 58% of the survey respondents indicated that having more training options is the greatest contributing factor. Training or the lack of it is often linked to women's ability to perform which also speaks to their ability to advance in their career (Maskell and Hopkins, 1997). The responses from the survey respondents revealed that women recognize the need for training and are willing to participate in the training programs if such opportunities are made available to them.

The respondents were asked to choose from a list of successes for women in the construction industry and were allowed to enter additional choices. Since the published literature provides very limited direct information on the women's successes in the construction industry, the list was made based upon inferences from the literature review and interview results. Over 50% of the respondents perceived that increase in women support organizations and groups, an increased awareness of the issues women face in the construction industry are two important successes (See Table 4). Both ideas are based upon the public and the private sectors becoming more aware of and addressing women's issues in construction. Although the majority of the survey audience viewed having more women-centric organizations is a success, only 14 of the 66 (21%) respondents are members of any such organization and only 30 (45%) were aware that such organizations exist. When asked about personal successes, being given a leadership role in the organization and mentoring a fellow female were the top two choices with a response rate of 56% and 49% respectively. This response is in alignment with the women's desire for career progression. In order for the women to increase their career progression, they must be given leadership roles within the organization. As the women succeed at these roles, the stereotypes about them not being capable can be torn down.

Table 4

Women's Success/Gains Most Often Chosen by Target Audience

Successes/gains of women in construction	Frequency	Percentage
More organizations that cater to women's needs	30	54.5%
Increased awareness by public & professionals of women's issues	33	60.0%
Progressive career advancement	24	43.6%
Exceeded career progression	22	40.0%
Outperform male co-workers	1	1.81%
Women managers making a difference	1	1.81%
Other	1	1.81%

Conclusions and Recommendations

The females within the Construction Division of the USACE-SAD are a diverse group with a mixture of ethnicities, years of experience in the construction industry, career classifications and ages. The top barrier/challenge this group faces was similar to those faced by women around the world – i.e. work/life balance. This research determined that there are significant differences between the ethnic groups and the barriers they typically face. The majority of the women are of an age where they would have a young family. Any kind of policy that would allow them to have flexible work hours, breaks in service without penalties or mobility within a career field that will accommodate their family life would have a positive effect on their retention. Providing women more training options would allow them more opportunities for leadership roles and career advancement which are important factors for job satisfaction. Being a leader will allow women an opportunity to become a mentor to a fellow female worker, which was seen as a personal success by many women. The women believe that having more organizations that bring public and private awareness of the issues that women in construction face and serving as a mentor to another female in the industry are successes. The increase of women mentors and the participation of women in the women advocacy organizations should increase the participation of women in the construction industry, which is the ultimate goal. However only a small percentage of the women in the survey population were aware of such women advocacy organizations. The USACE-SAD should extend efforts to partner with women advocacy organizations to increase their female workforce awareness of the opportunities that these organizations offer. The women advocacy organizations should also try to tap into the experience and technical capabilities of USACE's female workforce to increase their exposure to their target audience.

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Appendix A – Structured Interview Questions

1. How long have you been in the construction industry?
2. What is your career category?
3. How did you get started in the construction industry?
4. What challenges do you believe women face in getting started in the construction? And what challenges have you personally faced?
5. How can women overcome those challenges?
6. How do you believe women are perceived by their male co-workers in the construction industry?
7. What factors do you believe will positively affect retention of women in the construction industry?
8. What factors do you believe will negatively affect retention of women in the construction industry?
9. Do you believe that race/ethnicity plays a role in the challenges faced by women in the construction industry? Why/Why not?
10. What have you personally done to influence another female to become involved in the construction industry?

Appendix B – Questionnaire

Ethnicity

1. Ethnicity: Caucasian; Asian; African American/Black; Hispanic/Latino; Other _____

Background Info

2. Age: 18-29 ; 30-39 ; 40-49; 50-59; Over 60
3. Please choose the title that best describes your Career Classification: Clerical; Project Engineer; Project Management ; Construction Management; Contract Administration; Safety; Engineer/Intern
4. Years of Experience: 0-5; 6-10; 11-15; 16-20; 21-25; 26-30; 30-35; over 35
5. Salary (in thousands of dollars)when you began your career in construction: 21-35; 36-49; 50-63; 64-77; 78-91; 92-106; over 106
6. Current Salary (in thousands of dollars): 21-35; 36-49; 50-63; 64-77; 78-91; 92-106; over 106
7. How did you become aware of opportunities/careers in the construction industry(Check all that apply)
Through a Mentor; College Professor; Family Member; Professional Counselor; Job Fair Other _____

Barriers/Challenges Faced by Women in Construction

8. What barriers/challenges do you believe women face in the construction industry(check all that apply) Slow Career Progression; Sexual Harassment; Career limited to clerical/administration duties; Work/Life Balance; Limited Training ; No Mentor in the Construction Industry; Reverse Discrimination; Unsatisfied with Job; Paid less than male co-workers for the same work; Male dominated culture; Socio-cultural factors; Unfair Performance evaluations by male supervisors; Social Isolation at Work; Unfair Perception of your performance capabilities; Not enough female representation to make a difference in the industry; Other _____
9. What barriers/challenges have you personally faced in the construction industry (check all that apply): Slow Career Progression; Sexual Harassment; Male dominated culture; Career limited to clerical/administration duties; No Mentor in the Construction Industry; Work/Life Balance; Limited Training ; Reverse Discrimination; Unsatisfied with Job; Socio-cultural factors; Paid less than male co-workers for the same work; Social Isolation at Work; Unfair Perception of your performance capabilities; Unfair Performance evaluations by male supervisors; Not enough female representation to make a difference in the industry; Other _____

Successes made/gained by Women in Construction

10. Are you aware of organizations that cater to women's needs in the construction industry? Yes; No
11. Are you a member of an organization that caters to women's needs in the construction industry? (Check all that apply) Society of Women Engineers; National Association of Professional Women in Constructions; Other _____
12. What successes/gains do you believe women have made in the construction industry (Check all that apply): More Organizations that cater to women's needs in the industry, example Society of Women Engineers, National Association of Professional Women in Construction; Increased awareness by public and professionals of women's issues in the construction industry; Other _____
13. What successes have you personally experienced in the construction Industry? Mentored a fellow female; Encouraged Another Female to join the construction industry; Started a chapter of an organization that supports female construction workers; Exceeded expected career progression; Other _____

Retention/Job Satisfaction

14. How satisfied are you with your career choice in the construction industry? Not Satisfied; Somewhat Satisfied; Satisfied; Very Satisfied
15. How satisfied are you with your current job? Not Satisfied; Somewhat Satisfied; Satisfied; Very Satisfied
16. What factors would improve your job satisfaction? Telework; Improved Performance Rating System; Fairer Pay(Equal to men's pay of equal knowledge & experience); More Work Schedule Options; Better Work/Life Balance (Breaks in Service to take care of Family without penalties); More Training Options; Increased Awareness by public and professional of women's issues in the construction industry; Having a Mentor; Improved Perception of Value of women's Work; Leadership Opportunities; Other _____
17. What factors would positively affect your retention in the construction industry? Telework; Improved Performance Rating System; Fairer Pay (Equal to men's pay of equal knowledge & experience); More Work Schedule Options; Better Work/Life Balance (Breaks in Service to take care of Family without penalties); More Training Options; Increased Awareness by public and professional of women's issues in the construction industry; Having a Mentor; Improved Perception of Value of women's Work; Leadership Opportunities; Other _____
18. What factors would negatively affect your retention in the construction industry? Stalled Career; Negative perception of value women's work ; Other _____