

The Use and Misuse of "Gender" and "Sex" Terminologies in Civil Engineering Literature

Cristina Poleacovschi, University of Colorado-Boulder

I am a PhD student at the University of Colorado-Boulder studying Construction Engineering in Management. My two areas of research interest are in construction global projects and gender issues in engineering. Prior to coming to Boulder I have received my MS in Civil Engineering from University of Alabama in Huntsville.

Dr. Amy Javernick-Will, University of Colorado, Boulder

Dr. Amy Javernick-Will is an Assistant Professor at the University of Colorado, Boulder in the Civil, Environmental, and Architectural Engineering Department. She received her Ph.D. from Stanford University and has focused her research efforts on knowledge mobilization in global organizations and projects, disaster recovery, and increasing the number of underrepresented minorities in engineering.

How are gender issues addressed in construction engineering and its consequences?

Abstract

The literature regarding gender in construction engineering and management is emerging, with scholars in the area split in their use and analysis of gender issues. In general, one group focuses on sex and the other on gender and sexuality. While many social scientists and humanists differentiate sex and gender and recognize gender as the social construction of biological sex, scholars in construction tend not to differentiate the two. This distinction is, however, important as it has consequences for academic studies and gender issues in industry. This paper argues that the discrepancy between these paths needs to be addressed to better understand and solve gender issues. To determine the current state of practice, this research analyzed three top engineering and management journals – Construction Engineering and Management, Construction Economics and Management and the Journal of Professional Issues in Engineering Education and Practice—from 1998 to 2012. Twenty one papers were identified using a keyword search of “gender” and “sex”. A discourse analysis of the research questions, results and recommendations was performed, using these thematic areas as the macro coding categories. The research contributes to the field of gender in construction engineering by addressing the difference between the existing research paths. To advance the field, the authors suggest that future research questions consider both gender and sex.

Introduction

Feminist and gender scholars have been debating on the issues of gender attributed to sex, sexuality and gender. Sex is a biological characteristic that assigns individuals to biological categories of male and female. Gender is a social behavior embodying the sex¹. For example, the act of wearing a specific color based on ones sex is a gendered behavior. Sexuality is expressing erotic desires, practices and identities². Generally sex, sexuality and gender have been differentiated; however there is no general consensus on how they are used. Beauvoir, who was one of the first scholars to distinguish gender from sex, stated that gender is a socially constructed identity that both women and men perform but neither are born with gender¹. This distinction implies that sex is a biological category while gender is a social category. However, the distinction of sex and gender has also been argued to be unhelpful^{3,4}. Recent feminists, starting with Butler⁵, undermine the distinction and conceptualize that sex is produced by gender which imposes cultural descriptions on the term⁵. This implies that being a “woman” or a “man” is also constructed in addition to gender. The terms of gender, sex and sexuality are being informed through this feminist discourse to create our perspective on gender issues in construction.

Point of Departure and Research Question

Women continue to be underrepresented in construction engineering⁶. Scholars who address these issues, however, rarely account for the social construction of gender in their studies, focusing instead on sex^{7, 8, 9, 10}. This research argues that this view may not address wider gender issues^{1, 11, 12} that could create more sustainable solutions for the industry. With this question in mind we first ask: ***How are gender issues currently addressed in construction engineering?*** This would validate/invalidate if existing research in construction engineering is concerned primarily with sex and the underrepresentation of women. To answer this question we coded journal articles to determine *the research questions, results and recommendations* of the current literature. We then focused on analyzing the articles that studied wider gender issues in additional depth. We present these results below and then discuss consequences of the current research focus.

This paper explores the existing literature from three journals to describe the major patterns in the field. The majority of construction engineering research related to gender issues uses the

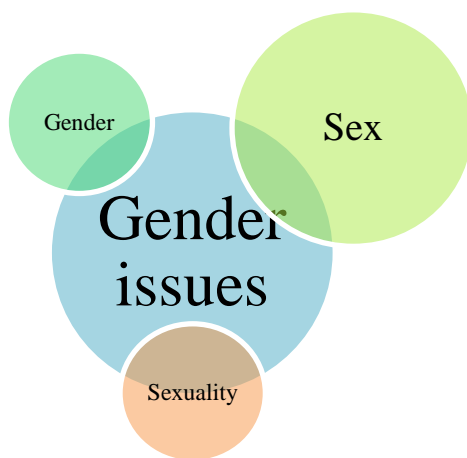


Figure 1: Gender issues program in construction engineering

perspective of sex and identifies the underrepresentation of women as essential to gender issues (Figure 1). The second perspective argues that women's underrepresentation in engineering is only a part of the gender problem and other groups' underrepresentation is also essential^{11, 12}. They also argue that recruiting women to the field might not fix the gender problem as the field assimilates women to take on masculine characteristics. This idea changes how gender is conceptualized in the field and establishes new foundations for understanding gender problems in construction engineering. These academics^{11, 13} use gender and feminist theories as lenses to understand why particular groups are

misrepresented in the field by focusing on the gender dichotomy of masculinities and femininities. Masculinities and femininities, are behaviors that one performs based on repetitive stylized acts⁵. Often, dominant masculinities are regarded as the reason for women (and other groups) exclusion in the field. Lastly, some research focuses on the exclusion of individuals who practice "non-traditional" sexual norms¹².

Research Method

This paper uses discourse analysis to describe five years of research related to gender issues in three top construction engineering journals. Discourse analysis is concerned with language which is used to obtain meaning and value¹⁴. The idea behind using discourse analysis is that texts are

powerful as they create significant meanings. We identify the meanings authors create by interpreting their texts. We identified 21 articles from keyword searches of “gender” and “sex” from 1998 through 2013 in three journals—two from the ASCE database—Journal of Construction Engineering and Management (JCEM) and Journal of Professional Issues in Engineering Education and Practice (JPIEEP)—and one in the Taylor Francis Online database—Construction Management and Economics (CME). We excluded papers that referred to gender and sex as demographics since they are not relevant to the goal of this paper. Ultimately, 21 articles were identified for coding and analysis. These articles were imported into NVivo software, which helps to manage qualitative data¹⁵. We coded each of the 21 articles iteratively. Initially, we coded into three macro categories—the research question, results and recommendations. We subsequently coded within each macro category, allowing subcategories to emerge from the analysis. These were constantly updated into a coding dictionary, and the articles analyzed iteratively until we reached the point of theoretical saturation and a final coding framework was established. The major subcategories were grouped (Table 1) and described based on the sex, sexuality and gender perspectives. Examples of each coded subcategory and their frequency is presented in Table 1. A more detailed description of the individual papers is represented in the Appendix in Table 2.

Table 1: Gender, Sex and Sexuality Categories

Categories	Codes/Categories	Frequency	Gender	Sex	Sexuality
Question	Why there are so few women in the field? <i>“Only 5% of the managers in the Swedish construction industry are women.”¹⁶</i>	67 %		x	
	Why there are so few other groups (e.g LGB) in the field? <i>“While women’s sexuality soon becomes a focus of interest when they enter male-dominated work, little research has discussed how sexual minorities-and particular lesbians-fare in such environments.”¹²</i>	10%			x
	What are other exclusion characteristics? <i>“Rather , a variety of masculinities was detected through queering a range of interactions, including the acceptance of one’s own sexual identity, what ‘good’ work meant, and what constituted acceptable social relationships both inside and outside the workplace.”¹¹</i>	14%	x		
Results	Exclusion based on sexes’ intellectual capacities <i>“Most studies conclude that women’s exclusion from the industry is mostly due to the industry’s male-dominated culture, but no study ever attempted to find out whether women are excluded from project management positions in construction because they are deficient in managerial competencies.”¹⁶</i>	5%		x	
		62%			x

Exclusion based on sex

“Female construction workers I spoke to regularly encountered sexual harassment in their workplace by male co-workers.”⁷

Exclusion based on gender

“The highly sexualized environment of male-dominated work means that all women have to decide how to present themselves in relation to conceptions of femininity or masculinity and are likely to face questioning about their sexual availability and sexual orientation.”¹²

14% x

Exclusion based on sexuality

“By examining the experiences of both heterosexual women and lesbians the article has shown how forms of gendered and sexualized interaction that would be unacceptable nowadays in other workplace persist in the construction industry.”¹²

10% x

Recommendations	Change women <i>“Ensuring ... with adequate training for skilled work in the construction sector are but a few options that can ameliorate women’s material position.”⁷</i>	10%		x		
	Change the culture <i>“If the passions women had for skilled trades were embraced by workplaces, the case studies examined here suggest that there would be scope for transforming workplace cultures defined by hegemonic masculinity. Some women indicated that this could be done by reinforcing the usefulness of feminine value such as care and patience, to trades and construction, similar to Le Feuvre’s (1999) feminitude version of feminization.”¹⁷</i>	14%	x		x	x
	Change work conditions <i>“Personal protection equipment and work clothing need to be specifically designed for women.”⁸</i>	57%			x	

Results

Below, we present results from the analysis of the 21 articles for three subquestions, including the research questions posed in the construction engineering literature, the results, and the recommendations from each article.

Research Questions: Why are there so few women (and other groups) in construction?

All of the papers analyzed departed from one common problem – the underrepresentation of women in the industry. The low ratio of women to men in construction, low entrance of women

in the field, and low retention of women in the field were considered most problematic. This commonly stated problem established the foundation for the most commonly asked question: Why are there so few women in construction? Out of the 21 articles, 15 articles addressed this question, validating that the underrepresentation of women based upon sex is a dominant topic in construction engineering literature. However, while this question was covered most frequently, the lack of representation of women in the field is not perceived as the only existing gender problem. Exclusion of groups can be based on other gendered behaviors and assumptions such as sexuality. For instance, Wright's¹² research departed from the low representation of the Lesbian, Gay, Bisexual, and Transexual (LGBT) community in construction and searched for solutions to this problem.

While these research papers ask different questions, they all seek to understand the phenomena of group exclusion in the industry. However, one focuses on behavioral characteristics, and studies exclusion based on gender and sexuality, while the second focuses on physical characteristics and studies exclusion based on sex. This suggests that the gender problem in construction is perceived as a problem of exclusion. Dominant masculinities, heteronormative sexuality and male sex representation are the particular group characteristics found to exclude, while femininities, non-heteronormative sexually and female sex are characteristics which are excluded. As a result, sex exclusion is perceived as the most problematic in the field and the question is covered by the majority of the literature.

Results: Exclusion based on Sex, Sexuality and Gender

As mentioned before, the research data exhibited one major result: gender issues in construction are defined by the exclusion of particular groups in the field. However, the results depart from different questions and thus are split into three main categories: exclusion based on sex, sexuality, and gender (feminine characteristics).

Similar to the research questions, 13 papers results pertained to exclusion and discrimination based on sex. Again, this research program asks "Why there are so few women in construction?" and determines cause-effect relationships to sex exclusion. Papers cited reasons for underrepresentation of women to include a hostile environment and discrimination, sexual harassment, verbal abuse, foul language and bad attitude, and unequal work conditions⁷. An experience of women in Bangladesh is represented in Choudhury's⁷ paper:

"Sarders [leaders] and male co-workers always try to hire young women. They even say if we hire your workers, they will serve two purposes (work and sex) [...] we are old; my skin is not tight enough so we are not on the list of favorites"

A second category for exclusion was based on sexuality and the idea was covered by two scholars^{11,12}. Their research shows the dominant heteronormative nature of the field with limited tolerance for other expressions of sexuality. Wright¹² focused on self-identified lesbians and found that they were not given promotion at work and were judged negatively based on their

sexuality. Similarly, Chan¹¹ interviewed self-identified homosexuals, lesbians and bisexuals who confirmed experiencing a hostile environment towards these groups. The two papers complement each other in describing the exclusionary culture of construction based on sexuality. For example, an interviewee from Chan's article reported:

“So, Francis recalled how there was a change in senior management at his workplace, and that the new leadership was very ‘alpha-male’. Francis had come out to a number of his work colleagues, and when it came to the company making redundancies [layoffs] as part of their cost-cutting initiative, Francis and a number of other homosexual colleagues scored very poorly”

The third category of exclusion is based on gender. Gender is dichotomized into masculine and feminine and is manifested by socially constructed behaviors and acts. Compared to other research groups, exclusion is based on a larger set of behaviors and characteristics, mostly described as masculine. Dominant masculinities are often considered as the reason for the exclusion of women in the field. Chan¹¹ focuses on this specific problem and identifies attributes of masculinity by searching beyond universal definitions. The typical idea of masculinity is expressed by violent and risky behavior, while he discovers that there are alternative forms such as accepting one's sexual identity, what “good” work meant and what constituted acceptable social relationships at work and outside work. Similarly, Styhre¹³ brings the importance of gender theory to understand norms and behavior that are masculine and create inequalities. He finds that site managers have to be involved in all activities, be “heroic” and foresee future upcoming events and have the virtues of overworking. These norms, assumptions and beliefs constitute the masculine ideology. Most importantly, Chan¹¹ notices that masculinity is embodied both in men and women and is used to exclude other men and women. These research papers suggest two main findings different from the research focusing on sex. Gender issues are a problem of a culture that excludes groups based on particular feminine attributes. Also, there are no universal masculine and feminine characteristics¹¹ and more in depth research is required to understand gender dynamics.

There is a fourth research agenda covered by one article. To answer why there are so few women in construction, Arditi and Balci¹⁶ studied women's managerial competencies. They conclude that women's managerial competencies are similar to men's and thus other causes determine their exclusion. However, their approach to the problem opens a different area of thought in gender issues - the assumption of differences in men's and women's intellectual capacities, which impede the assimilation of women within a culture.

Recommendations: Change the work conditions, change the culture and change women

There are three main patterns that are observed as recommendations for gender issues: changing the culture of construction, changing the work conditions, and changing women so they better fit within the culture.

Changing work conditions includes providing equal rights to women and other groups. Providing a similar and equal environment was recommended as a result of women experiencing unequal rights in construction. Paying women equally⁷, and providing proper clothing that fits women⁸ were some of the changes proposed to help women become part of the construction industry. This research recommends that women will continue to be discriminated and excluded unless they are offered the same work privileges as men.

The gender research focuses on the industry from a cultural perspective. It describes the construction culture as masculine, which can exclude both men and women. Chan¹¹ speaks of the idea of hegemonic masculinities but proposes to “move beyond the categorization of masculine and understanding the dynamics of alternative masculinities”. Masculinities are not universal; therefore, it is important to explore alternative expressions in order to understand gender dynamics. Wright¹² proposes to create a tolerant environment towards different sexualities. Wright¹² and Chan¹¹ show how exclusion based on sexuality occurs for both men and women and suggest looking at a research problem that moves beyond the discrimination of women. Smith¹⁷ proposes that addressing gender and feminizing the environment may help eliminate hegemonic masculinities through values such as care and patience.

These two research approaches—one which suggests changing work conditions and the other that suggests changing the culture—are different. The first argues that the construction culture excludes based on sex while the second argues that exclusion occurs based on gender and sexuality among both sexes. In order to fix exclusion based on sex, the first research proposes equal rights and privileges for women in the field. The second research suggests that attracting women to the field only partially changes the problem and further notes that merely including the other sex will not change the culture, since the culture is constructed around hegemonic masculinities to which women may be forced to adapt.

Finally, a third approach to gender issues looks at how women may be better able to fit within the field. This research proposes providing resources to change women so they fit better within the environment. Choudhury⁷ suggests providing women with training for skilled work⁷. However, this argument requires additional data. For example, Laefer¹⁸ recommends increasing exposure and interest of women to advanced Physics and Mathematics classes so decide to enroll in these classes. Similar to the Choudhury⁷ paper, this research assumes certain qualifications and interests of women that need to be changed so they fix the sex balance in the field.

Gender issues in construction engineering: Gender, Sex and Sexuality

The research results were grouped based on questions, results, and recommendations used in the literature. There are three main areas of focus that were observed in the papers: gender, sex and sexuality. The most important observation from these research results is the gender research, which opposes only studying the sex perspective. The gender research focuses on exclusion based on particular characteristics that are embraced by both sexes, while sex-focused research

focuses on exclusion based on sex only. This shows a large gap in the perception of gender issues in construction. It is important, however, to understand how this gap affects the evolution of gender issues in construction and consequences from the perspective taken. As a result, we propose a future research agenda to address this gap. If we followed the sex research solutions and employed women to construction while assuming that women take over masculine attributes, then the gender problem may always remain. This is a strong statement, which disagrees that recruiting women to the field solves the gender problem. Conversely, we can argue that an increase in women representation can feminize the construction environment; however this is a different debate rooted to the question of how much agency women have compared to a historically masculine construction culture and requires further research. We propose addressing the discrepancy between these research programs, as we believe that we can gain a better understanding from diverse perspectives that may help to create more efficient solutions.

Conclusion and future work

This research discursively analyzed five years of three top construction engineering and management journals to answer how gender issues are addressed in construction. The research coded and analyzed these journal articles for three major categories: research questions, results and recommendations. We observed that gender issues are addressed differently in construction engineering literature. The majority of the research perceived gender issues as a problem of sex inequalities, while another focused on a gendered culture that marginalizes feminine and non-heteronormative behaviors. An understanding of the diversified programs in the literature maps the current state of gender issues in the field as perceived by academia. Most importantly, it emphasized the difference among gender programs in the field, which raises new research questions. Unless we understand the core of the gender problem, solutions to gender issues might not be effective. We propose focusing on this gap first, and then propose solutions to a better-understood concept.

This research results are limited to analyzing 21 journal articles that were identified through key word searches of “gender” and “sex” over five years in three journals. Additional research is needed to analyze additional engineering literature and validate these results in engineering organizations to better understand how gender issues are perceived in the industry and how they manifest. Furthermore, we suggest that future research analyze the networks of scholars conducting research in the area to identify the most central citations and groups of scholars that form around these authors. If two different citation subgroups can be observed around the gender versus sex literature this can show how the literature speaks to different groups of scholars in the field and can validate our research observation on gender, and sex groups.

Bibliography

1. Beauvoir, S. de. *The Second Sex*. (New York, Vintage Books, 1952).
2. Jackson, S. & Scott, S. *Feminism and Sexuality: A Reader*. (Columbia University Press, 1996).
3. Moi, T. *Sex, Gender, and the Body: The Student Edition of What is a Woman?* (Oxford University Press, 2005).
4. Mikkola, M. in *Fem. Metaphys.* (Witt, C.) 67–83 (Springer Netherlands, 2011). at http://link.springer.com/chapter/10.1007/978-90-481-3783-1_5
5. Butler, J. *Gender Trouble: Tenth Anniversary Edition*. (Routledge, 1990).
6. U.S. Bureau of Labor Statistics. at <http://www.bls.gov/>
7. Choudhury, T. Experiences of women as workers: a study of construction workers in Bangladesh. *Constr. Manag. Econ.* **31**, 883–898 (2013).
8. Wagner, H., Kim, A. & Gordon, L. Relationship between Personal Protective Equipment, Self-Efficacy, and Job Satisfaction of Women in the Building Trades. *J. Constr. Eng. Manag.* **139**, 04013005 (2013).
9. Malone, E. & Issa, R. Work-Life Balance and Organizational Commitment of Women in the U.S. Construction Industry. *J. Prof. Issues Eng. Educ. Pract.* **139**, 87–98 (2013).
10. Johnson, P. State of Women in Civil Engineering in the United States and the Role of ASCE. *J. Prof. Issues Eng. Educ. Pract.* **139**, 275–280 (2013).
11. Chan, P. W. Queer eye on a ‘straight’ life: deconstructing masculinities in construction. *Constr. Manag. Econ.* **31**, 816–831 (2013).
12. Wright, T. Uncovering sexuality and gender: an intersectional examination of women’s experience in UK construction. *Constr. Manag. Econ.* **31**, 832–844 (2013).
13. Styhre, A. The overworked site manager: gendered ideologies in the construction industry. *Constr. Manag. Econ.* **29**, 943–955 (2011).
14. Gee, J. P. *An Introduction to Discourse Analysis: Theory and Method*. (Routledge, 2013).
15. Bazeley, P. *Qualitative Data Analysis with NVivo*. (SAGE, 2007).
16. Arditì, D. & Balci, G. Managerial Competencies of Female and Male Construction Managers. *J. Constr. Eng. Manag.* **135**, 1275–1278 (2009).
17. Smith, L. Trading in gender for women in trades: embodying hegemonic masculinity, femininity and being a gender hotrod. *Constr. Manag. Econ.* **31**, 861–873 (2013).
18. Laefer, D. Gender Disparity in Engineering as a Function of Physics Enrollment and Its Implications for Civil Engineering. *J. Prof. Issues Eng. Educ. Pract.* **135**, 95–101 (2009).
19. Clarke, L. & Gribbling, M. Obstacles to diversity in construction: the example of Heathrow Terminal 5. *Constr. Manag. Econ.* **26**, 1055–1065 (2008).
20. Powell, A., Hassan, T. M., Dainty, A. R. J. & Carter, C. Note: Exploring gender differences in construction research: a European perspective. *Constr. Manag. Econ.* **27**, 803–807 (2009).
21. Lu, S. & Sexton, M. Career journeys and turning points of senior female managers in small construction firms. *Constr. Manag. Econ.* **28**, 125–139 (2010).
22. Kyriakidou, O. Fitting into technical organizations? Exploring the role of gender in construction and engineering management in Greece. *Constr. Manag. Econ.* **30**, 845–856 (2012).
23. Caven, V. & Astor, E. N. The potential for gender equality in architecture: an Anglo-Spanish comparison. *Constr. Manag. Econ.* **31**, 874–882 (2013).
24. Raiden, A. B. & Räisänen, C. Striving to achieve it all: men and work-family-life balance in Sweden and the UK. *Constr. Manag. Econ.* **31**, 899–913 (2013).
25. Bhuiyan, S. N. & Abdul-Muhmin, A. G. Job Satisfaction and Organizational Commitment Among ‘Guest-Worker’ Salesforces. *J. Glob. Mark.* **10**, 27–44 (1997).
26. Kim, A. & Arditì, D. Performance of MBE/DBE/WBE Construction Firms in Transportation Projects. *J. Constr. Eng. Manag.* **136**, 768–777 (2010).
27. Leonard, K. & Nicholls, G. History and Status of Female Faculty in Civil Engineering. *J. Prof. Issues Eng. Educ. Pract.* **139**, 218–225 (2013).
28. English, J. & Le Jeune, K. Do Professional Women and Tradeswomen in the South African Construction Industry Share Common Employment Barriers despite Progressive Government Legislation? *J. Prof. Issues Eng. Educ. Pract.* **138**, 145–152 (2012).

Appendix

Table 2: Research Questions, Results and Recommendations

Paper	Journal Year	Question or Problem	Results	Recommendations
Obstacles to diversity in construction: the example of Heathrow Terminal 5 ¹⁹	CME 2008	“Why does the construction remain predominant white, male, able-bodied enclave despite all the efforts made to make it inclusive?”	“A third is the means of recruitment, including reliance on agencies which tend to target a traditional white male and migrant workforce rather than local and diverse labor”	“Recruitment could be carefully targeted”
Exploring gender differences in construction research: a European perspective ²⁰	CME 2009	“There is a lack of sex-disaggregated data on women in construction academia”	“An analysis of publication rates shows that gender disparities identified in academia generally persist in construction research, with women representing only 22% of authors in construction”	“Further research...should address factors that both attract and hinder women from the different spectrums of construction research
Career journeys and turning points of senior female managers in small construction firms ²¹	CME 2010	“The principal research question was: ‘what are the key agency and structure interactions and interventions which propel or hinder women in gaining senior management position in small construction firms?’	“The results indicate that while the husbands performed a central role in the business, the wives have performed dual roles: one of senior manager/company owner and one of mother/career.”	NA
The overworked site manager: gendered ideologies in the construction industry ¹³	CME 2011	“Masculine ideologies here denote the totality of norms, beliefs and assumptions that serve to enact specific images of e.g. leadership work”	“Site managers in the construction industry are enduring a work situation characterized by an involvement in virtually every activity, an emphasis on heroic problem-solving rather than more bureaucratic problem-anticipating activities, and substantial overtime testifying to a virtue of overworking. These characteristics of site managers are...partially derived from what	“Bringing gender theory and other alternative perspectives into the study of construction industry practices and managerial work is promoting critical thinking that may reveal deeply seated norms and assumptions serving to maintain the status quo in the industry”

			is here referred as masculine ideologies, a form of paternalist enactment of the site manager as an omniscient figure autocratically managing the site.”	
Fitting into technical organizations? Exploring the role of gender in construction and engineering management in Greece ²²	CME 2012	“While there is growing interest in professional identity construction, little is known about how marginalization may influence the development of professional identity of minority professionals, such as women engineers holding middle and upper management positions in construction management.”	“The results reveal that the development of professional identity for minority and marginalized women may involve the process and tasks of redefinition. The tasks in redefinition include redefining disadvantage, redefining the profession and redefining the self.”	NA
Experiences of women as workers: a study of construction workers in Bangladesh ⁷	CME 2013	“In Bangladesh, women’s mobility is culturally constrained and women need to negotiate with patriarchy in order to join the male dominated labor market outside the home.”	“Female construction workers I spoke to regularly encountered sexual harassment in their workplace by male co-workers.”	“Ensuring equal wages for equal work regardless of gender, unionizing female workers, creating support network, and providing women with adequate training for skilled work in the construction sector are but a few options that can ameliorate women’s material position.”
Managerial competencies of female and male managers in the Swedish construction industry ¹⁶	CME 2013	“Only 5% of the managers in the Swedish construction industry are women. The managerial competencies of individuals working as managers in the Swedish construction industry are researched to get clearer understanding of the situation, and to investigate if this lack of balance between male and female managers has to do with differences in managerial competence.”	“The results of the management development questionnaire (MDQ) administered to 143 managers employed by the 43 member companies of the Swedish Centre for Management of the Build Environment show that female and male managers possess equal competency in 17 of 20 competencies.”	“Thus, in line with other researchers..it is suggested that future initiatives should avoid stereotyping and should focus on creating a work environment that allows diversity and equality for all.”
Trading in gender for women	CME	“The aim of this research was to	“It seems clear that gender	“Developing active

in trades: embodying hegemonic masculinity, femininity and being a gender hotrod ¹⁷	2013	explore the embodied experiences of women who work in a particular area of construction, that of manual skilled trades”	segregation in manual trades is maintained around certain ideas about gender and masculinity and that these ideas are then fed into the character of the work itself.”	strategies around the doing and saying (Yancey Martin 2013) of gender in the workplace, with all the contradictions that doing and saying involves, is a useful starting point to assess gender equity.”
The potential for gender equality in architecture: an Anglo-Spanish comparison ²³	CME 2013	“The aim of this paper is to examine the quest for equality in architecture for women in the UK and Spain reporting the findings of a comparative study into women architects’ careers in the two countries.”	“Findings indicate surprising differences in women’s experiences of working as an architect.”	“Likewise more research is needed to examine why the structure of the profession is so much more gender-balanced in Eastern Europe and whether any areas of ‘good practice’ can be adopted.”
Striving to achieve it all: men and work-family-life balance in Sweden and the UK ²⁴	CME 2013	“So far little attention has been paid to how men balance their work-life situations, especially the ‘new men’ who are keen to share the family care.”	“Rather than talking about challenges in terms of a work-life dichotomy, they referred to a need to compromise between family and personal pursuits, which in turn impacted on work by generating feelings of insufficiency all around.”	“For now, especially in the UK, enabling flexible working and explicit celebration of fatherhood in the workplace as a ‘normal’ state is important (Crush, 2013)”
Queer eye on a ‘straight life’: deconstructing masculinities in construction ¹¹	CME 2013	“Yet, what constitutes masculinity in construction is rarely problematized.” “To counter this, the intention was to broaden the understanding of what ‘masculinity’ meant by exploring alternative forms of masculinity”	“Rather , a variety of masculinities was detected through queering a range of interactions, including the acceptance of one’s own sexual identity, what ‘good’ work meant, and what constituted acceptable social relationships both inside and outside the workplace”	“This work has underlined the importance of moving beyond the simple categorization of ‘masculine’ construction, and raises further questions on the implications of understanding the dynamics of alternative masculinities at play”
Uncovering sexuality and gender: an intersectional	CME 2013	“While women’s sexuality soon becomes a focus of interest when	“By examining the experiences of both heterosexual women and	“Until the industry begins openly to address the

examination of women's experience in UK construction ¹²		they enter male-dominated work, little research has discussed how sexual minorities-and particular lesbians-fare in such environments."	lesbians the article has shown how forms of gendered and sexualized interaction that would be unacceptable nowadays in other workplace persist in the construction industry."	sexual diversity of its workforce, there is a danger that strategies for tackling homophobic harassment will remain underdeveloped."
Job Satisfaction of Women in Construction Trades ²⁵	JCEM 2008	"The aim of this research is to review the literature on tradeswomen and to conduct a localized study to determine if demographic variables affect satisfaction with work, pay opportunities, supervision, and people on the job for tradeswomen."	"Women are satisfied with the nature of work in construction trades but are less satisfied with pay, benefits, job security, and availability of separate, hygienic sanitary facilities."	"Improved union and management support is required to improve the chances of women's success in trades. "
Managerial Competencies of Female and Male Construction Managers ¹⁶	JCEM 2009	"Most studies conclude that women's exclusion from the industry is mostly due to the industry's male-dominated culture, but no study ever attempted to find out whether women are excluded from project management positions in construction because they are deficient in managerial competencies."	"Based on the survey results and the statistical analysis conducted, women and men appear to have the same level of strength in managerial competencies."	"In order to increase the number of women in the industry, one should improve the industry image, its working conditions, and working hours, rather than women's managerial abilities."
Performance of MBE/DBE/WBE Construction Firms in Transportation Projects ²⁶	JCEM 2010	"The goal of this research is to conduct a comparative investigation of the performance of minority/disadvantaged/women business enterprise (MBE/DBE/WBE) versus non-MBE/DBE/WBE companies in transportation projects."	"When MBE/DBE/WBE companies were smaller and had been in business for years than non-MBE/DBE/WBE companies of similar size and age were compared, the study revealed that there are no significant differences in performance."	"This study suggests that both researchers and practitioners should acknowledge that MBE/DBE/WBE companies are equally capable of performing well in transportation projects compared to their non-MBE/DBE/WBE counterparts."
Relationship between Personal Protective Equipment, Self-Efficacy, and Job Satisfaction of Women in the Building Trades ⁸	JCEM 2013	"Within construction trades, there is a lack of personal protective equipment (PPE) and work clothing specifically designed and manufactured for women."	"The data showed clear connections between satisfaction of PPE and work clothing, self-efficacy, and overall satisfaction of trades work."	"Personal protection equipment and work clothing need to be specifically designed for women."
	JPIEEP	"Females have become less of a	"Females have become less of a	NA

History and Status of Female Faculty in Construction Engineering ²⁷	2013	rarity in construction engineering faculty over the past twenty years, but the numbers remain relatively low”	rarity in construction engineering faculty over the past twenty years, but the numbers remain relatively low”	
Work-Life Balance and Organizational Commitment of Women in the U.S. Construction Industry ⁹	JPIEEP 2013	“Its aim is to identify the variables that affect women’s satisfaction with their job and employer, as well as their overall intention to remain with their employer.”	“The five most commonly reported areas of dissatisfaction in the closest-ended questions (Fig. 2) were as follows: limited or no opportunities for advancement/promotion, distance from home to work (drive time cutting into time with family, rate of pay, not feeling valued as an employee, and poor balance between work time and personal time.”	“As more industry-specific research is conducted and findings are used to help companies and consulting firms better understand not only what leads to job satisfaction of different employee populations, but moreover leads to a willingness and desire to stay with that company, the more work-life balance or, better yet, work-life integration will improve”
State of Women in Construction Engineering in the United States and the Role of ASCE ¹⁰	JPIEEP 2013	“Although the job market for construction engineers is predicted to grow substantially over the next decade, women currently comprise a small percentage of the construction engineering workforce and the percentage of women graduating from undergraduate construction engineering programs across the US has stagnated”	“In the category of Member, only 6.7% are women... The problem is worse at the Fellow grade. For this high level of achievement, only 1% of the current ASCE Fellows are women and 99% of the Fellows are men.”	“Make implementation of Policy 417 a clear priority”
Do Professional Women and Tradeswomen in the South African Construction Industry Share Common Employment Barriers despite Progressive Government Legislation? ²⁸	JPIEEP 2012	“The paper aims to classify, list and discuss the common characteristics and effects of the barriers to women entering construction at all levels, professionally and in trades, or having entered the industry, retaining their employment.”	“The conclusions drawn from the research indicate that South African women in professional and trade employment in the construction industry have many common barriers, and these barriers are the same ones experienced by their counterparts	“Projecting a more appealing image requires not only diverse marketing strategies, such as disseminating knowledge and information about the industry and career

			employed in international construction industries.”	opportunities, and direct, focused female-oriented campaigns. It also requires improved communication between the industry and communities. Examples of solutions suggested include partnerships with and tertiary educational institutions, with the emphasis on female role models; provision of on-site internship opportunities to high school students; and partnerships between educational institutions, research organizations, the construction industry, professional and trade organizations, and governmental industry.”
Gender Disparity in Engineering as a Function of Physics Enrollment and Its Implications for Construction Engineering ¹⁸	JPIEEP 2009	“Gender disparities of more than 60% persist in undergraduate engineering enrollments and have recently worsened. As American female construction engineering enrollment has been flat for over 25 years, efforts must be taken to understand this stasis.”	“Despite nearly similar attitudes by junior high school students math and science, trends demonstrate a disproportionately higher female enrollment in math and science in high school courses, until they encounter what is typically considered senior level courses for college bound students, namely physics and calculus.”	“To break this deadlock, six intervention strategies are proposed ranging from increasing exposure and interest of potential students to advanced calculus and physics courses, to providing gender-equity training to instructors and role models for students, and finally by proposing a new approach for enrollment in entry-level math and science courses for bachelor’s degree, one that is akin to how a

priori foreign language
knowledge is handled at
most major universities
and colleges.”
