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Women in Non-Traditional Occupations:  
A mixed methods qualitative case analysis  
of women in the U.S. concrete-construction industry

A Dissertation

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Doctor of Philosophy  
in  
Urban Studies

By

Sefla Fuhrman

B.A. University of Washington, 1996  
M.A. Syracuse University, 2001

May, 2017

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## **Dedication**

“Concrete has been around for thousands of years, yet the transformations and innovations happening now are likely to create the same exponential changes we've seen in the information technology world. We are in an amazing and unprecedented moment in history. Population shifts, innovations in concrete technology, and the integration and impact of women in the workforce are creating many opportunities.”

Kari Yuers, president and CEO of Kryton International, Vancouver, British Columbia,  
speaking at the Women in Concrete Alliance (WICA) Forum on Infrastructure,

World of Concrete 2011

My overarching goal in selecting this topic is to promote social justice by opening the dialogue on women in nontraditional occupations, specifically concrete.

This work is dedicated to all the women working in concrete, and the Women in Concrete Alliance (WICA) which celebrates them.

Kimberly and Kari, as the founders of WICA, this research is dedicated to you too, with the hope that the alliance of talented women will continue to grow, and that this research contributes to those efforts.

Mom, Dad, Eli, Dan—I love you.

## **Acknowledgments**

It has been 13 years since I started on this journey, which has included eight computers, countless software crashes, and two major natural disasters (Hurricane Katrina in 2005 and the flooding in Baton Rouge in 2016). The first natural disaster resulted in the loss of property, research, time, friends, health, dreams, employment, colleagues, instructors, and more. The very college into which I was accepted, the College of Urban and Public Affairs (CUPA) at UNO ceased to exist shortly after Hurricane Katrina. I lost several years, just trying to survive, but I always intended to return. Thanks to some amazing people, I did. The most influential person to help me make my dream a reality is my advisor, David Gladstone.

David Gladstone is the most important advocate, advisor, positive supporter, academic genius, and constant during the most tumultuous decades of my life. I would not be here if not for him. In the days immediately following Hurricane Katrina, there was no Internet or telephone communication, and it was terrifying. The craziest thing happened. It was a Wednesday, 3 days after landfall, and I was hitching a ride in the back of a pickup truck, just to get as far from New Orleans as possible. We stopped at the only gas station open for at least 50 miles, possibly near LaPlace. Guess who was in line near me? Dr. Gladstone. David has always given me the best advice in terms of my research, as well as in life. He is an extremely caring, wise, and insightful person with a wealth of experiences. David has never wavered in his leadership, support, and guidance as my faculty advisor, or in helping me to navigate this exceptionally political and strange path towards graduation.

I would also like to thank David for recommending Jeffrey Ehrenreich serve on my committee, and Jeffrey for accepting. My only regret is that I did not get to spend more time under Jeffrey's guidance, or take one of his classes. He was always extremely kind,

straightforward, and accessible. His depth and breadth of knowledge, recommendations for literature, and insights on improving my writing have been invaluable to me.

I will eternally be grateful to Bethany Stich and John Renne. They believed in me when I doubted myself. They supported me, welcomed me back to the university, and encouraged me in my research. I would not have been able to return or finish otherwise. I will always appreciate the generosity they afforded me with their time. I am also thankful for their expertise and recommendations for not only research pursuits, but community resources as well.

I want to say a special thank you to Pam Jenkins for keeping me alive.

This research would not have been possible if Kimberly Kayler and Kari Moosmann were not so generous with their time and access to information about the WICA. I have the deepest admiration for both of these amazing women. I hope to continue to work with them to advance the mission of WICA and bring more women into the industry.

I want to thank the leaders of the Alabama Summer Youth program, Dr. John Bolland and Cassie Coddington, as well as the entire team of inspirational young people with whom I worked daily. The experience that summer reminded me of my own optimism when I joined the Peace Corps, when I was about the same age as most of the volunteers. I went to Alabama with a suitcase to my name in 2011. By 2014, I bought a house! If it was not for the Alabama Youth Survey program, I do not know how I would have gotten back to this region. I also want to thank Traci Birch for coming to visit the program, presenting, and even giving me a lift to New Orleans to reconnect with professors and reorient myself with the changes at UNO since 2007.

Another constant in my life, since joining UNO, has been David Lambour. He is the most dedicated, perceptive, knowledgeable, and instrumental person I have ever known. I would not

be here without him either. His advice is always spot on and direct. I do not think he wants to see anyone fail, and I think that might be why he has stuck by me through all these years.

When I first arrived in New Orleans in 2011, I was virtually homeless. I managed to scrape up enough crumbs to buy a bicycle, which I could not bring on the streetcar. I would never have made it if not for the generosity of Melissa, Rusty, and Lani.

In 2012, I moved into an apartment near UNO. I will always call that year, “my year with the boys on Warrington Drive.” I will never forget you—Derwin, Kyle, Corey, and John.

I returned to work in New Orleans at Baker Ready Mix. The company and owners had changed a little bit since 2004, but I want to recognize the Baker family for giving me another chance, and genuinely assisting me in my return to Louisiana. I do not know if I would have had the courage to return without having a job lined up, and it was through my initial experiences at Baker Ready Mix that the concept for my research was born. I also made some wonderful friendships through that experience—Connie, Jolie, and Erin. I sincerely wish the Bakers nothing but success.

I would like to acknowledge all of the women who participated in the many different parts of this research. Without their contributions this research would not have been possible.

Last, I want to give the biggest, most heartfelt thank you to my family and friends back home who never gave up on me and have supported me in so many ways.

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## **Abstract**

The purpose of this mixed methods qualitative research study is to gain a deeper understanding about the factors that contribute to and/or hinder women's participation in the construction industry by examining women's experiences within one very industry-specific, male-dominated nontraditional occupation—the concrete industry. In this study, I utilize a combination of methods including interviews and survey research, as well as case analysis of an organization specifically involved with this population, the Women in Concrete Alliance (WICA).

This investigation identifies some of the reasons why women's participation remains low, discusses some of ways that the private, public, and educational sectors have set out to address those shortages, how women working in the field feel about those initiatives based upon their experiences, and what systems of support these women draw upon to remain active in a male-dominated profession. As women's associations within nontraditional occupations are one relatively formal potential means of support for women facing occupational isolation, this study also examines different types of organizations to which women working in nontraditional occupations belong (e.g., membership, educational, advocacy, trades). The purpose of this study is to explore ways the organizations benefit members, as well as how the organizations support themselves.

**Keywords:** women; nontraditional occupations; concrete-construction

## Preface

I have not followed a traditional path professionally or academically, but my interests have remained constant. I am passionate about social justice, learning about diverse worldviews, and experiencing different cultures. Hurricane Katrina struck New Orleans August 29, 2005, and will always be a defining moment in my life, because it changed me. It also altered the course of my research, and my graduation date by an entire decade.

The topic of my dissertation is women in the concrete industry. Many factors contributed to this topic selection. The following paragraphs outline how I arrived at this intriguing subject, including a chronology of major events starting with my acceptance into the urban studies doctoral program at the University of New Orleans (UNO).

Upon acceptance into the urban studies doctoral program in 2003, I knew that I wanted to explore gender, equal rights, anthropology, and international development. I started examining women's representation in world heritage cities as a dissertation topic and was fortunate to be able to travel to several. Although it was not an ideal point in the doctoral program for me to go, I received a scholarship to study in Guanajuato, Mexico for fall semester of 2004.<sup>1</sup> While in Mexico I befriended a group of architecture students from Chile, and during winter break I traveled to South America for the first time. I returned to UNO for spring semester 2005, and to my job as a disadvantaged business enterprises consultant for Centergy Development Group.<sup>2</sup>

The 2005 fall semester had just begun, and I was exactly halfway through completing the doctoral program when Hurricane Katrina struck. I was displaced from Louisiana to Washington State for over a year in 2006. I returned to live in a FEMA trailer (parked on my property) and a city ravaged by devastation. When I could not take it anymore—the shootings, the lack of power, the drug-infested streets, the havoc wrought by Hurricane Katrina—I moved back to Seattle after

having completed nearly all of my coursework, thinking that I would be able to finish the rest from afar.

Then the economy nosedived in 2007, and I could not find employment in anything remotely related to my education or skills set. Government workers had to take furlough days. I was desperate. I was depressed. There were no counseling services for Hurricane Katrina survivors. I was too far away, way up in Seattle. No one understood what I was going through, and repeatedly people kept saying, “Just get over it.” Not only was it a lot to “get over,” I worked hard all my life to not be homeless or unemployed. I also could not move on with my life, because I had unfinished business in New Orleans—earning my doctorate in urban studies.

Regardless, I still had bills to pay. I took any and all positions I could find: graveyard shift warehouse work for Amazon, fire watching for the welders on a dry dock, cleaning bilge from the bottom hulls of ships, wearing Tyvek suits and respirators to remove lead paint, working as a flagger in extreme weather conditions, and testing vehicles on a dynamometer to meet Washington State emissions regulations. I also took on odd jobs like delivering phone books, but all this effort still was not enough. Although these positions were nontraditional occupations, they were not well paid, temporary, seasonal, and part-time with no benefits. Additionally, the cost of living in Seattle is much higher than New Orleans. I was poorer than I had ever been, and gas for my car cost \$4 per gallon.

In 2009 I went bankrupt, mostly due to medical bills from the pneumonia I had contracted from the combination of mold, formaldehyde, and cigarette smoking while living in the FEMA trailer in New Orleans. I missed out on the class action lawsuit, because the lawyers sent it to my New Orleans address. I fully intended to finish my degree from the moment I left New Orleans in 2007, but becoming trapped in survival mode made it difficult to do anything

else. When the current moment requires all resources and attention, one neglects life plans or dreams. Until that point, I always had the next step in mind, as well as alternatives, but with the Great Recession in full swing, I could not find full-time, permanent employment.

An opportunity with the Peace Corps Response<sup>3</sup> in Haiti came available to teach Junior Achievement in 2010. I was told there were two positions available, and I was selected for one. After obtaining all the required shots, dental records, and background checks, which took several months, I quit the three part-time jobs that I had. A week later, the coordinator told me that he made a mistake, and there was only one position, which belonged to the other volunteer who was selected before me. I was completely devastated. It seemed that I could not get a break. After so many hardships and missed opportunities, I began to lose confidence in myself.

I contacted UNO in 2010. Nothing was working for me in Seattle, but I did not have the financial means to return to New Orleans. One of my professors from before Hurricane Katrina, Patrick Haughey, was still there. Patrick connected me with the Alabama Youth Survey, a voluntary summer program in Alabama. I figured if I could get closer to UNO it would help, and it was finally how I returned to the southeastern United States in the summer of 2011.

When I returned to New Orleans in 2011, I met back up with the people at Baker Ready Mix a concrete ready-mix company (owned by the same owner as Centergy, where I had worked in 2004), and began working in the concrete industry. I was disheartened that women still earned less than men for the same work, but I was intrigued to discover the pay gap was so much smaller in construction. As I learned more about concrete itself, I decided this would be an interesting topic for a degree in urban studies. If any substance exemplifies the urban form, it is concrete. To me concrete epitomizes the cityscape, but I also learned that there have been

tremendous advancements in concrete technology, green building, and decorative concrete, making it more sustainable and aesthetic.

One of the first and most memorable group discussions I had with the Women in Concrete Alliance (WICA) founders, Kimberly and Kari, occurred while I was riding in a truck to a construction site with about 6 other laborers. I do not think they were aware of my situation, as I copiously wrote down notes while bumping along, requesting that my nearest neighbor hold the phone to my ear, and demanding absolute silence of the rest of my co-workers. Some of my direct experiences in concrete included consulting for disadvantaged business enterprises, dispatching, and placing concrete orders for public and private industry. Additionally, other nontraditional occupations in which I worked in Louisiana included flagging on construction sites for pours and removal projects; non-CDL driving; assisting with sealant work, removal, and clean-up on highway projects; as the HR manager for a glass manufacturing plant; and at the UNO Transportation Institute (UNOTI). Higher pay and lower cost of living were the major differences between these positions and the ones in Seattle.

My experiences in the concrete industry specifically have granted me a deeper appreciation for the complexity of elements involved in any concrete pour. Even for simple concrete pours, a myriad of factors must be taken into consideration.<sup>4</sup> Additionally, I am fascinated by advancements in concrete science, as well as uses and applications of this ubiquitous substance for pragmatic, safety, and decorative purposes. I respect people involved in the concrete industry at all levels for their knowledge, skills, and abilities. I love hearing women's stories about how and why they work in the industry.

I have also experienced some of the discrimination and barriers that women in other research studies have expressed about their experiences in nontraditional occupations generally.

Additionally, I have experienced the hardship of losing most of my material possessions (including my home) to a natural disaster (Hurricane Katrina) and the challenges of finding gainful employment as a woman during the Great Recession.

My experiences certainly have underlined and reinforced the general, holistic understanding of the concrete industry that I developed as a student of it, including the terminology, culture, expectations, and challenges of being a woman in a male-dominated field. My experiences have allowed me to be both more sympathetic as well as critical of other women's experiences. I hope that my research will be a resource for those working in the concrete industry and in nontraditional occupations, and that it may be a jumping off point for further dialogue and research on the topic.

The years between finally returning to New Orleans in 2011 and buying a house in Baton Rouge in 2014 were filled with setbacks that eroded my confidence. I had always planned my life and nothing in my life prepared me for Hurricane Katrina and the Great Recession. Hurricane Katrina humbled me, and gave me tremendous empathy for the victims of the flooding in Baton Rouge in 2016. At least I can offer them some comfort, genuine awareness, and concern as they rebuild the city, their homes, and their lives.

## Chapter 1: Introduction

Around the world, women continue to make up a larger percentage of the paid labor force, and yet, women earn only a fraction of what men earn for similar work. In the United States, women still take home about 25% less than what men earn in terms of pay, and for women of color the statistics are even more disturbing.<sup>5</sup> In some industries, women fare much worse, while one occupational group stands out on its own—construction. In construction, according to the U.S. Bureau of Labor Statistics (BLS; 2010) women earn 92% of what men earn (see Figure 1).<sup>6</sup> No other industry comes close. In addition to other items, within this study, I

investigated possible explanations of this anomaly, exploration of the construction career path for women, and possible trade-offs for choosing this path.

Based on industry and labor statistics, the construction industry may perhaps offer at least one option for women in the pursuit of economic independence and equality of pay. Worldwide the construction industry is crucial for growing urban populations that strain local governments, societies, and economies to successfully house, educate, and transport their citizens. The construction industry is at the forefront following natural and man-made disasters, and mitigating against future threats through the building and design processes. Additionally, through advances in concrete science, several companies have developed greener technologies that reduce pollution, improve air and water quality, and enhance the quality of life for all. Nevertheless, women's participation in the industry is minimal, which limits women's abilities to contribute to these efforts.

Construction broadly encompasses a number of professions, industries, and trades.<sup>7</sup> One material that is used in nearly every large-scale building project around the globe is concrete. In fact, after water, concrete is the second most widely used substance in the world (Cement Trust, n.d.). Women's participation in the concrete industry in industrialized countries is dismally low, and construction continues to be the "most male dominated of all the major industrial groups" (Fielden et al. 2000, p. 113; Sarkar 2002). Women account for nearly half the labor force and comprise half the world population, and recent estimates indicate that more than half the global population now lives in urban environments (Hanlon, 2007). "[T]he construction industry holds a unique place in the ... labor market. It is responsible for the fabric of society, it affects our quality of life and often is at the cutting edge of development and innovation" (Fielden et al., 2000, p. 120).

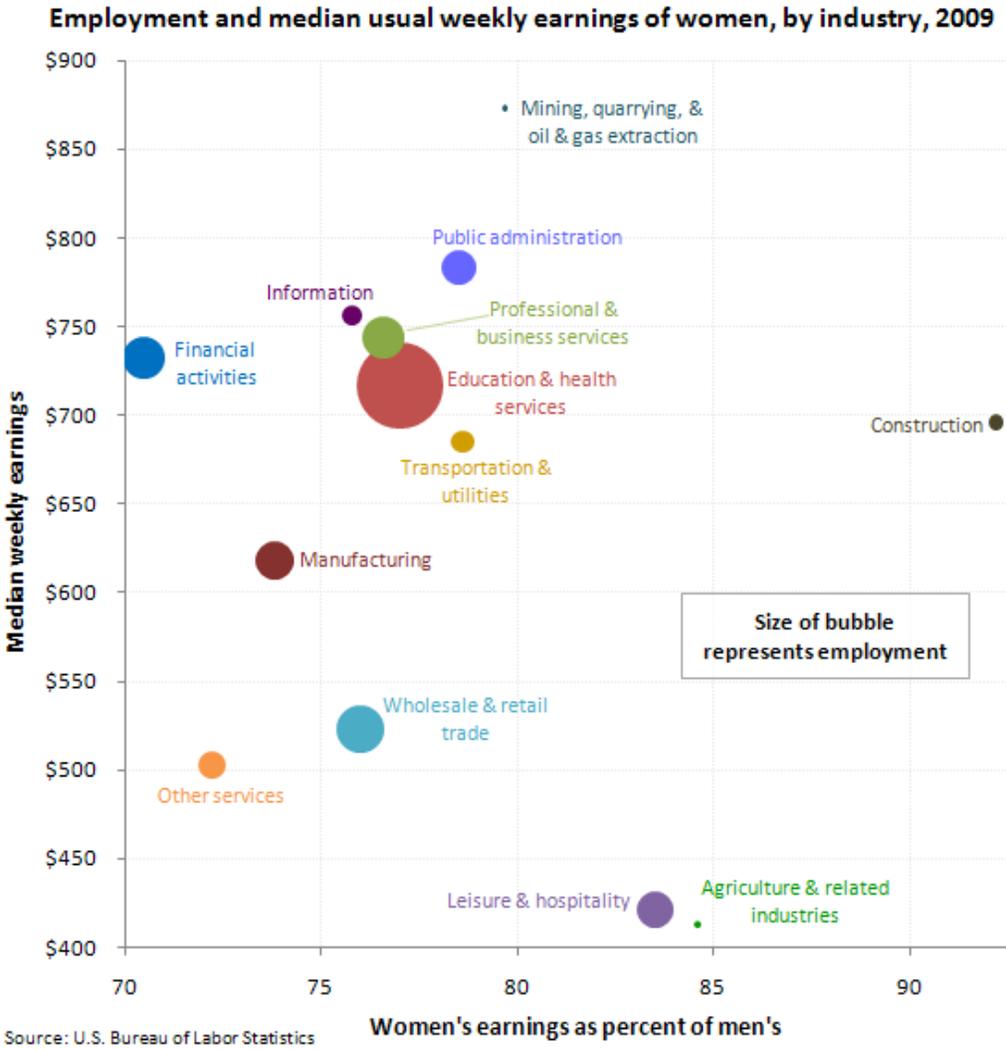
The benefits of concrete to society are immense, being used to build our schools, hospitals, apartment blocks, bridges, tunnels, dams, sewage systems, pavements, runways, roads and more. It is the foundation of homes of every design and size. It is cast into solid shapes to form blocks, bricks, panels and beams. We use it for both simple decoration and critical protection from the elements. Yet, in the international development world it hardly gets a mention, compared to water or HIV/aids or sanitation issues (Cement Trust, n.d., para. 8).

Therefore, women's low participation in an industry that is literally paving and building humanity's future living and urban environments should be of concern to all members of society.

### **Importance of Study**

There are several needs for further research about women's participation in the concrete industry. Although it appears that there is potential for women to earn high salaries in the industry in a variety of professions, there is very little data about the topic, including definitive numbers regarding how many women are actually working in the industry and in what capacities (though estimates range from 1.6%-11%). The concrete industry is growing worldwide, but as long as women remain outside of the industry, their options to not only participate, but also to help lead growth and development within their communities, and the larger society, remain limited. It is not clear from the currently available data whether women are systematically being excluded from the industry, or women are self-selecting to not participate. Additionally, the data do not provide a clear understanding of the specific types of challenges and barriers that women may face in the industry (regarding entering, as well as staying employed within the industry), or the myriad of other potentially relevant factors that are leading to women's low participation in the industry. This research investigated some of the reasons for low women participation rates.

My overarching goal in conducting this research is that it may eventually help to extend opportunities to women who may not have considered the potential that exists for them in this industry for economic independence and leadership development. Equality of pay for women in one industry in the United States should not be interpreted to be equivalent to full equity within society; however, the opportunity for women to become economically self-sufficient through occupations available in concrete is one step towards greater social justice. Additionally, while the concrete industry is by no means the only avenue through which women can make valuable contributions in infrastructure and other community development pursuits, it has been a largely unexplored opportunity for women's participation, particularly within the academic literature. Therefore, this research addresses some of the gaps in understanding about women's participation in the concrete/construction industry, bringing these industries under greater academic scrutiny.



*Figure 1.* Women’s earnings and employment by industry, 2009.<sup>8</sup> Women who worked full time in wage and salary jobs had median weekly earnings of \$657 in 2009. This represented 80% of men's median weekly earnings (\$819). Of the 45 million women who worked full time in wage and salary jobs, 17 million were employed in education and health services, and 5 million were employed in wholesale and retail trade. Financial activities and professional and business services each employed about 4 million women. Median weekly earnings of women employed in education and health services were \$717, which was 77% of men's median weekly earnings in that industry. In wholesale and retail trade, women's median weekly earnings were \$523 (76% of men's earnings). Median weekly earnings of women employed in mining, quarrying, and oil and gas extraction (\$873) and public administration (\$783) were substantially higher than the earnings of their counterparts employed in leisure and hospitality (\$421) and agriculture and related industries (\$413). Women's-to-men's earnings ratios were higher among women employed in construction (92%) and agriculture and related industries (85%) than among women employed in other services (72%) and financial activities (71%; these data are from the Current Population Survey. To learn more, see *Women in the Labor Force: A Databook (2010 Edition)*, (U.S. Bureau of Labor Statistics, 2010).

## **Gaps in the Literature**

While women's low participation in the construction industry (and by extension the concrete industry) is well documented (U.S. Labor statistics—as cited by Sarkar 2002; websites/organizations, Women in Concrete Alliance (WICA), National Association of Women in Construction (NAWIC)) it has been under-studied and there have been very few studies to date that have explored this topic explicitly. There have been a handful of studies that have explored women in construction (Adeyemi, Ojo, Aina, & Olanipekun, 2006; Clarke & Gribling, 2008; Fielden et al., 2000; Gale, 1994; Sarkar 2002), but very few within the United States. Industry specific studies that include concrete within the broader topics of construction, engineering, and architecture have generally not explored women's participation, but rather have discussed many of the scientific and technological advances that have been made in concrete itself (see also Appendix M for a list of construction organizations and online trade magazines). Organizations such as the Institute on Women's Policy Research (IWPR), National Alliance for Partnerships in Equity (NAPE), National Women's Law Center (NWLC), Girls Inc., and public sector entities are cultivating a body of literature about women in nontraditional occupations, which are defined as any field in which the minority (in this case women) comprise less than 25% of the workforce (Jurik & Halemba, 1984; Mastracci 2003; Maxwell 2009; Nihlen & Bailey 1988; Swerdlow, 1989; U.S. Bureau of Labor Statistics, 2006). While concrete is certainly a nontraditional occupation for women, there has been little written about women's experiences in the industry. The exception is the extensive body of literature created by WICA available through "Constructive Communication" that featured women and women's contributions to the industry monthly for over 10 years, but this is not a scholastic journal.

In contrast, there have been several studies that discuss the gender disparity of those pursuing higher science and math education, which is important because these subjects are often prerequisites for entering fields such as engineering (Ethington 1988; Ethington & Woffle, 1988; Raloff, 1991; Rogers & Menaghan, 1991; Ware, Steckler, & Leserman 1985). To address the shortages of women in these disciplines, several universities around the world have begun intensive recruitment of women and minorities in STEM (science, technology, engineering and math) careers and education. In large part, these efforts came from infusions of federal funding to support higher education, based upon the premise that higher education would lead to higher paying jobs and address the shortages in labor. Since girls and young women frequently do not continue to take science and math courses beyond junior high level, new methods of teaching have been developed to encourage girls to get and stay involved in math and science. Girls Inc. and the National Alliance for Partnerships in Equity (NAPE) have developed a number of research-based programs to encourage girls in STEM. Additionally, these programs are not necessarily critical for a career in the concrete industry, particularly for entry-level positions, and STEM related education tends to lead to white-collar professions, whereas support and training for blue-collar careers and skilled trades occupations has been reduced.

Due to increased scrutiny in labor laws and occupational hazard mitigation, the development of work-saving devices and machinery, and through automation and technological advances, it is also widely documented that physical strength is no longer necessarily a prerequisite for a career in construction (Concrete Industry Management, 2017; Fielden et al., 2000; U.S. Bureau of Labor Statistics, 2010). Most entry-level occupations in construction do not require education beyond the high school level and on-the-job training, and hands-on training/experience is preferred to classroom training. In order to advance within the industry,

experience in the field is crucial, and longevity carries greater weight and garners greater respect than specialized degrees, although experience coupled with a relevant, advanced degree can lead to promotions and advancement in the industry.

Hands-on training and experience, as well as on-the-job training, are often more important to hiring managers and general contractors than formal training and degree programs (U.S. Bureau of Labor Statistics, 2010). This, however, leads to several questions with regard to women's participation in the industry. Are young women aware of these opportunities, and why or why not? Are women recruited for these opportunities, and why or why not? Researchers have identified principles and strategies to recruit and maintain girls and women's participation in nontraditional occupations, and organizations have consistently been successful in programs that implement these guidelines. Few of these efforts, however, have been successful beyond localized programming or caught on nationally for numerous reasons, due in large part to the vicarious nature of political will and federal funding.

There has been very limited research on women in skilled trades/professions and nontraditional occupations that do not require college education (Dabke, Salem, Genaidy, & Daraiseh, 2008; Mastracci 2003, Maxwell, 2009). The dearth of information about women in construction and women in the concrete industry specifically is astounding. According to Sarkar,

[T]he failure to attract more women in the construction industry workforce, especially for skilled construction trade jobs, should be a concern for the construction industry... Other industries have succeeded in drawing more women into traditionally male occupations... The reasons why construction has not seen similar evolution are somewhat

understood, but with builders continuing to express concern about labor availability, the topic deserves additional scrutiny. (2002, p 9)

Additionally, Mastracci found that training women to enter nontraditional occupations provides for higher-wage, high-skilled, non-college careers, while providing “a pathway out of the low-opportunity jobs [that] non-college women tend to hold” (2003, p. 587).

Exact figures regarding the number of women reportedly working in the concrete and construction industry vary and range depending on which types of professions are included.<sup>9</sup> Mid-level management, administrative assistants, secretaries, and other more “traditional” occupations for women are often included in reported numbers, which mask the low percentage of women actually working in the field. Additionally, the government has not effectively enforced equal opportunity legislation (discussed in more depth in the literature review), so while general contractors by law are making “good faith” efforts to recruit and retain women and minorities into the field, due to lack of enforcement and other technicalities, reports about the number of women in the industry are skewed. In the field of concrete specifically, there are several types of occupations, such as dispatchers, batch operators, field technicians, quality assurance, drivers, as well as administrative, financial and support staff. Last, currently no national database specifically tracks women’s participation. Although exact numbers are not known at this time, it is abundantly clear that women’s participation is low and remains lower than in other nontraditional occupations (Sarkar, 2002).

Regardless of why the numbers are low, one issue that women overwhelmingly face in male-dominated occupations is isolation. This research will contribute to the literature by examining support systems that women draw upon to enter and remain in nontraditional occupations, including the role of women’s associations. In recognition of women as minorities

in various trades and construction overall, a couple of national organizations: National Association for Women in Construction (NAWIC), and the Professional Women in Construction (PWC), as well as numerous local organizations have been developed. Although each of these organizations has a unique mission, all act as resources for women in nontraditional occupations for skilled trades (as opposed to STEM-related organizations). Many of the localized programs arose through federal initiatives, and one international organization that is specific to women in the concrete industry is WICA.

### **Purpose of Study**

The purpose of this research study is to gain a deeper understanding about the factors that contribute to and/or hinder women's participation in the concrete-construction industry by examining women's experiences within one very industry-specific, male-dominated nontraditional occupation—the concrete industry. While this study utilizes a combination of methods, it is primarily qualitative. This investigation will identify some of the reasons why women's participation remains low, discuss some ways that the private, public, and educational sectors have set out to address those shortages, how women working in the field feel about those initiatives based upon their experiences, and what systems of support these women draw upon to remain active in a male-dominated profession. As women's associations within nontraditional occupations are one relatively formal potential means of support for women facing occupational isolation, this study will also implement a case study methodology to unpack the various roles of women's associations in nontraditional occupations, by closely and comprehensively analyzing one organization that is specifically targeted at this specific occupational group—WICA. In addition, theories and research studies that have sought to address some of these concepts tend to explore individual or societal factors, although these factors are circular and difficult to separate.

For those reasons, my research questions are somewhat delineated on those levels, with Research Question 1 focusing more on individuals and Research Question 2 on organizations.

### **Research Questions**

The following research questions helped guide this study:

1. Why do women participate in the concrete/construction industry?
  - a. To what extent is the concrete industry a viable career path for women seeking economic independence and equality of pay?
  - b. How did women initially become involved in the industry?
  - c. Why do women enter and stay in nontraditional occupations, despite the additional challenges they may face as minorities within the industry?
2. Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields?
  - a. How can those organizations remain relevant?
  - b. What, if any, additional support systems are available to women in nontraditional occupations?

Anthropologic, feminist, social, economic, and urban perspectives informed this investigation. This study contributes to these bodies of literature in several ways: clarifying the number of women in the concrete industry in the United States (and in what capacities), identifying some of the reasons why women's participation remains so low, examining the role of women's organizations for women in nontraditional occupations, and examining why their pay, as a share of what men earn, is so high relative to other industries. Academic studies, redistributive training programs, and STEM-funded initiatives have tended to overlook women in trades and/or nontraditional occupations that do not require advanced education or training. This

study investigated several topics through the lens of women's participation in a specific nontraditional occupation (women in concrete) that does not necessarily require advanced STEM education, including equality of pay, economic independence, education, direction of the economy, green technology and concrete science, and recruitment strategies. Generation, gender, and race starkly divide the current composition of the construction industry, not reflecting the diversity of the U.S. workforce. Why? What efforts, if any, are underway to challenge this lack of diversity? What will diversifying the industry contribute to the industry and society? While these last few questions are somewhat beyond the scope of this investigation, this research adds to understandings about diversity, economic equity, and social justice.

## Endnotes

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<sup>1</sup> I was funded through the Urbana program, a consortium of six universities (two each in the United States, Canada, and Mexico) in the last year of the program.

### URBANA: New Challenges to City Planners: Urban Sprawl in a Post-Modern World

This consortium project will focus on the development of a program of study in the area of urban development. Throughout Canada, Mexico, and the United States fast evolving urban lifestyles have had significant impacts on the size and form of our cities. In their wake, urban planners have been increasingly challenged to identify and apply solutions to "moving targets" or urban problems. The originality and interest of this project lies in its addressing both the natural and the human sciences which this raises, and its use of a mix of sources and technologies to identify solutions and gather data to create a trilateral database. The program will allow students from the United States, Canada, and Mexico to become knowledgeable in the area of cross-border urban studies issues. The universities in this consortium were chosen for their diverse expertise in comparative urban studies and for their geographical diversity. The location of each university provides a different context with regard urban sprawl and related solutions. (U.S. Department of Education, 2000, para. 5)

<sup>2</sup> The owner of this company also owns Baker Ready Mix, which is a concrete ready mix company.

<sup>3</sup> The Peace Corps Response, formerly the Crisis Corps, is a program for Returned Peace Corps Volunteers to volunteer for short term assignments to address immediate needs of the host country. The Peace Corps service commitment is normally two years.

<sup>4</sup> For example, once a concrete pour is started, it needs to be followed through to completion; otherwise poor results can occur, such as incorrect breaks, and cold joints. When taking and placing concrete orders, information about, and accuracy in each of the following is necessary: the slump (i.e., wateriness of the material); outside temperature; temperature of the concrete itself (cement heats up and begins to set very quickly, especially in hot weather); the mixture being used and whether or not there are any additives; the type of structure being poured (columns, pavement, ramps, and bridges); whether or not there are specifications for the pour (e.g., if it is for a governmental agency there are usually very stringent stipulations); current and immediate weather conditions (i.e., if it is going to start raining in the middle of a pour, it might be best to hold off altogether, because water dilutes the strength of the cement, while sugar will kill the active ingredients in cement altogether); and so on.

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<sup>5</sup> A number of studies have explored this topic. The following link is a recent article on the topic:  
[http://www.washingtonpost.com/blogs/capital-business/post/the-gender-wage-gap-in-the-washington-area-a-slim-difference-or-a-wide-margin/2013/04/09/4470b86e-a095-11e2-9c03-6952ff305f35\\_blog.html](http://www.washingtonpost.com/blogs/capital-business/post/the-gender-wage-gap-in-the-washington-area-a-slim-difference-or-a-wide-margin/2013/04/09/4470b86e-a095-11e2-9c03-6952ff305f35_blog.html)

<sup>6</sup> In 2010, the U.S. Bureau of Labor Statistics (BLS) produced a report that summarizes how women are faring in the job market as opposed to their male counterparts in the United States. While there have been more recent statistics collected, BLS has not presented the data as shown in Figure 1 since then, and the percentages are for the most part unchanged.

<sup>7</sup> Trades are defined throughout this research as occupations in which manual tasks and the utilization of specialized tools encompass the major performance functions within the job category, such as construction, plumbing, and welding. Typically, to become skilled through these kind of jobs one works in an apprenticeship position (often lasting 2 or more years) to develop the skills with tool handling and accuracy in techniques that are necessary to perform the relevant tasks in the industry.

<sup>8</sup> This is the most recent (and only) graph that depicts the data in this manner. Since 2009, the data has not changed much. For more recent statistics, see BLS Current Population Survey. Remember also that the majority of this research was conducted between 2012-2014.

<sup>9</sup> For example, Sarkar provides several tables, including one that breaks down employment by occupation into the following categories: managerial and professional specialists; technical, sales, and administrative support; service occupations; precision production, craft and repair; construction; operators, fabricators and laborers (from U.S. Bureau of Labor Statistics 2001, as cited by Sarkar 2002).

## **Chapter 2: Background and Literature Review**

There is a confluence of factors that result in women's low participation in the concrete-construction industry, some better understood than others. Numerous organizations and research studies have identified socio-cultural reasons that influence individual decisions by girls and women about whether or not to enter the industry, and have bearing upon whether or not they will stay.<sup>1</sup> Political will and federal financing have had a major influence on efforts to increase not only women's but all "disadvantaged" populations' abilities to participate and compete within the industry. A limited number of targeted efforts over time have attempted to improve women's participation rates in nontraditional organizations, but the landscape is perpetually changing. The story of equal opportunities for women in the concrete-construction industry is not fluid, but rather, one can better imagine it as a series of snapshots in time, or a series of case studies. Strategies that were appropriate at one time or during one administration may not be today.

In this chapter, I will describe some of the characteristics of the concrete-construction industry that make it unique from other industries and important for the U.S. economy, as well as efforts to level the playing field, which have important implications for women's participation in the industry. I will also discuss the issue of the pay gap, and whether increasing women's participation in nontraditional occupations may have an effect based upon previous studies and literature. Barriers to women's participation in the construction industry in industrialized countries are well-documented, and I will touch-upon these, as well as strategies that women utilize to overcome them. I will also explore women's organizations, and legal mechanisms to reduce those barriers. Equally important, I specifically limited this research to the culturally circumscribed roles of both construction and women in United States society over time and still

today. Last, in this chapter, I will discuss some of the theories that have emerged to explain the gender pay gap, including summarized studies that have attempted to test these theories.

### **Women and the Current U.S. Economy**

The importance of the concrete-construction industry to the economy is indisputable. Women's roles in the economy are also significant. Women's participation in the labor force has steadily been increasing over the last several decades. Some estimates indicate that women account for nearly 50% of the U.S. labor force, and are a growing number of the breadwinners of their families (The White House, 2009). Meanwhile, women still only earn between 75-80% of what men earn for similar work (depending on which indices and calculations are used; according to the U.S. Bureau of Labor Statistics the threshold is 77%; Women in Labor Force Databook indicate the threshold is 81%). According to the Institute on Women's Policy Research (IWPR), two measures are generally used to calculate the wage gap<sup>2</sup> (or the difference between men's and women's earnings): the ratio of women's to men's median annual income (77%) and the ratio of women's to men's weekly earnings for full-time employment (82.2% in 2011; Institute for Women's Policy Research, 2014). While these ratios increased tremendously starting in the 1950s, they have remained virtually unchanged since the 1990s. Additionally, the two major series that measure employment are based on payroll data provided by employers (Current Employment Statistics CES program) and a survey of households (Current Population Survey or CPS). Both the CES and CPS series only measure full-time workers. If they included part-time and/or part-year workers the ratios would most likely be even lower for women, as women tend to work alternative and reduced schedules in order to maintain care giving and childrearing functions, and comprise the majority of teachers for elementary school (Institute for Women's Policy Research, 2014).

Closing the gender wage-gap is not a zero-sum game—gains for one gender do not require losses for the other. For the gender wage gap to close, women’s real wages must rise faster than men’s, but as the economy begins to grow again, real wages should rise for both men and women... Women’s earnings have become increasingly important to family incomes. The continuing gender wage gap depresses not only women’s earnings, but has a negative effect on their families. (Institute for Women’s Policy Research, 2010, para. 9)

Women’s equal participation in the labor force in terms of earning potential and access to higher-paying jobs is important for numerous reasons, for individuals, families and the U.S. economy as a whole. According to the IWPR and the World Bank, in highly industrialized countries and less developed nations alike, the highest percentages of people living in poverty are women, and women heads of households raising children fair the worst economically.

According to The White House Council on Women and Girls,

The statistics are very clear: The success of American women is critical for the success of American families and the American economy. And in order for our nation to keep moving forward, women must be able to help provide for their families and contribute fully to our economy. (2012, p. i).

Anderson, Forth, Metcalf, and Kirby had elaborated the severity of the gender pay gap problem a decade earlier:

Differences in the patterns of employment between women and men have been identified as accounting for up to three-quarters of the gender pay gap for women working full-time and up to about 80 percent for those working part-time, i.e. pay is lower for women because they are concentrated in types of employment and have types of characteristics

which attract lower pay. The remainder will be due to pay discrimination and to, as yet, unidentified differences in employment patterns. This does not mean that the gap accounted for by differences in the patterns of employment is necessarily acceptable or fair, as both the employment pattern itself may result from discrimination or restricted opportunities, rather than choice, and the rewards paid to different types of employment may also result from discrimination or other mechanisms disadvantaging jobs primarily conducted by women. (2001, p. vi)

### **Great Recession and Construction Industry Forecasts**

The construction industry was one of the hardest hit during the Great Recession, which ran roughly from 2007-2009, depending on which analyses are used (U.S. Bureau of Labor Statistics, 2012).<sup>3</sup> The housing crisis preceded the Great Recession,<sup>4</sup> and displaced numerous families, as well as putting many small companies out of business. Although economic models indicate that the Great Recession is over, many families and individuals have yet to recover (Gjerstad & Smith, 2012). Even those who did not directly lose a job or home have experienced financial challenges. Many local governments had to request and then force employees to take “furlough” days (time off without pay), and thus, workers are expected to do more with less. During and following the Great Recession, there were extensions on unemployment benefits, but there was little in the way of job creation for many years. According to the Center on Budget and Policy Priorities, the unemployment rate did not fall to its pre-recession level of 5% until late 2015.

Several important and competing forces emerged for U.S. women in the construction industry following the Great Recession, which have different effects on women depending on what exactly they do or have done in the industry, and their longevity in the industry. It is widely

acknowledged that women first attempting to gain entrance into the construction industry may face additional challenges that their male counterparts do not. Though the exact reasons for women's low participation in the industry are not clearly understood, some barriers and challenges have been identified and will be described in more detail later in this chapter. Clearly, job opportunities became available in the industry as the U.S. economy emerged from the Great Recession, and analysts believed that men who lost jobs in the industry would most likely be among the top and first competitors for those jobs. However, according to the Associated General Contractors of America (AGC; 2016), in their 2015 Worker Shortage Survey Analysis, they found that 86% of contractors are having trouble filling key positions. There are more than 1.5 million construction jobs available, and demand for construction is increasing.

According to Hegewisch and O'Farrell (2014), the 2013 IWPR Tradeswomen Survey found that before the Great Recession, in 2006, there were more women construction workers than women doctors.<sup>5</sup> However, in 2013, women were only 2.6% of workers in construction occupations. The Associated General Contractors of America (2016) believes one of the reasons for the shortage is due to shifts in federal funding:

While the nation once had a thriving public vocational-technical educational program that provided training for a host of skills, including construction, many of those programs have been closed over the past several decades. One reason is that federal funding has largely shifted to promoting college-preparatory programs on the misguided theory that everyone should, can and wants to attend college. During the past eight years alone, federal funding for career and technical education has declined from over \$1.3 billion a year to a 2015 level of just over \$1.12 billion. That is a 29 percent decline after taking inflation into account. (p. 3)

However, the plan they proposed largely overlooks recruitment of women. Despite the downturn that the industry faced following the Great Recession and for several years after, according to the U.S. Bureau of Labor Statistics (2015), the construction industry has seen greater than average growth. The two sectors that lost the most jobs during the recession were manufacturing (nearly 60%) and construction (17%). The skilled trades declined by 13% from 2007-2009. “Yet skilled-trade professions have rebounded since the recession, with employment expanding 6.2 percent from 2010-2012” (Wright, 2013, p. 2),<sup>6</sup> and it has continued to rise.

One question that remains to be answered is if this growth is expected to reflect prior cultural practices of the industry overall, or if a genuine effort will be made to re-vamp the entire system to reflect the diversity of the U.S. workforce. Federal initiatives and support to state and local governments and agencies could potentially play a strong role in shifting views about the construction industry, but this will depend on the priorities that are set and how those are interpreted and implemented by eligible participants.

### **Efforts to Level the Playing Field in the Construction Industry/Business**

Businesses that receive federal funding for major construction, infrastructure, and development projects must allocate or subcontract a certain percentage of the work to smaller businesses, and specifically to “disadvantaged” businesses. The government agency funding the project defines the “disadvantage” which may be social (e.g., race, gender, age, etc.), economic, or geographic (e.g., superfund sites, highly polluted areas, high crime areas, etc.). The intent is to increase participation and competitiveness of small businesses that otherwise would not be able to compete with large corporations and experienced businesses in bidding for and receiving government contracts. Eligible participants (i.e., “disadvantaged” businesses) can register or certify their business with the appropriate government agencies. When general contractors are

awarded a bid, they can use the list of registered disadvantaged business enterprises to fulfill their obligations for subcontracting.

Many state and local public entities have created programs that mirror federal registers, although they all have different names. In this study, I compare Louisiana and Washington State, so for example, in New Orleans, the program is called the State and Local DBE program (SLDBE); in Seattle, the disadvantaged business enterprise program is managed by the Office of Women and Minority Business Enterprises. One of the longest standing, best well known, and well funded is the disadvantaged business enterprise program created by the U.S. Department of Transportation (DOT). For this reason and the sake of readability, throughout this manuscript businesses that are certified by any agency (federal, state, or local) will be called “disadvantaged business enterprises,” although this is not technically correct, because some programs are based upon “social disadvantage” (i.e., gender and/or race), and others upon “economic disadvantage” (gender and race neutral, but dependent on low income level, or location in a depressed or polluted area). In all cases, eligibility for disadvantaged business enterprise certification depends upon the company being owned, managed, and controlled by a socially and economically disadvantaged individual, or by majority of the owners. The overarching goals of all of the disadvantaged business enterprise programs are to assist such small businesses in competing more fairly on projects that receive public funding, more broadly outside of the disadvantaged business enterprise program, and to verify that only eligible disadvantaged business enterprises participate.<sup>7</sup> In this document when a business is identified as woman owned it will be called a WBE (woman business enterprise).

All states and agencies that receive federal funding for public transportation projects must establish annual goals for disadvantaged business enterprise participation, as well as contract-

specific disadvantaged business enterprise subcontracting goals (in Louisiana it is now the Unified Certification Program (UPC) and qualifies eligible certified disadvantaged business enterprises to participate in projects funded wholly or in part by the DOT, and includes 85 certifying agencies). Similarly, the U.S. Department of Housing and Urban Development (HUD) has established the Section 3 business program, which targets low-income individuals and locations (both race and gender neutral). Numerous state and local agencies have developed similar programs that target “socially and economically disadvantaged” individuals, businesses, and/or locations.

Section 3 is both race and gender neutral. The preferences provided under this regulation are based on income-level and location. Section 3 regulations were designed to encourage recipients of HUD funding to direct new employment, training, and contracting opportunities to low-income residents, and the businesses that employ these persons, within their community regardless of race and/or gender. (U.S. Department of Housing and Urban Development, n.d.)<sup>8</sup>

Section 3 programs are important because they deal directly with access to training and employment opportunities, whereas disadvantaged business enterprise programs make the industry itself fairer for businesses operating in it. Women’s recognition as a “disadvantaged group” has changed with the passage of various legislation, policies, and public financing (described in more detail further in this chapter).<sup>9</sup>

The disadvantaged business enterprise programs are relatively unique to the U.S. construction industry. More importantly, these programs are all designed for business owners to self-select to participate, and no legislation requires registration. Some owners choose to register, so that they will be eligible to be on the “short-list” for publicly funded projects needing

disadvantaged business enterprise participation. Some owners choose not to identify their business (i.e., register), because they are concerned about possible loss of business due to identifying that they are part of any “disadvantaged” group (i.e., discrimination). Overall, the decision to register is individual and forms part of the business strategy of the owner, in terms of whether the potential tax and other benefits outweigh the risks of proclaiming to the public that one is part of a “disadvantaged” group and therefore possibly being discriminated against. On another note, these registers are one of the only places where demographic data regarding business ownership is captured, because this is not reported in general BLS statistics, NAICS, or census data.

### **Increasing Women’s Participation in Nontraditional Organizations to Influence the Pay Gap**

Across the board, statistics show that women earn less than men for similar occupations, even when accounting for years of experience and education in the profession. In general, there is a negative correlation between wages and the number/percentage of women employed in the occupation. In the United States, Boraas and Rodgers (2003) found that the percentage of women in a given occupation is the largest contributor to the earnings gap. That is, in industries where women are the least represented the wages are higher (i.e., construction and mining), and in industries where women are highly represented (i.e., education, service and hospitality) the wages are lower. Additionally, studies have shown that when men enter predominantly female occupations, such as nursing or education, they are granted more opportunities for advancement than women with longevity in the industry.<sup>10</sup> Thus, where women remain a minority, as in construction and mining (see Figure 1), their earning potential is greater, but an explanation of this outcome has yet to be fully explained and is one area on which this research focused.

Much of the existing literature about increasing women's participation in nontraditional occupations is focused on STEM-related education and careers (Anderson 1987; Bona, Kelly, & Jung, 2010; Chusmir, 1983; Ethington, 1988; Ethington & Woffle, 1988; Lufkin & Reha, 2009; McWhirter 1997; Quimby & De Santis, 2006; Ramirez & Wotipka, 2001; Robinson & McIlwee, 1989; Rogers & Menaghan, 1991; Rosser 2004; Sinkele & Mupinga, 2011; Tang 1993; VanLeuvan, 2004; Ware et al., 1985). Very little research has examined the potential for women to earn closer to what men earn by pursuing nontraditional occupations in construction and other skilled trades that do not necessarily require college education, or "blue-collar" jobs. In the handful of studies that have explicitly explored earning potential for women through pursuit of such nontraditional occupations, the findings have been positive. For example, Mastracci (2003) set out to determine if redistributive programs are truly redistributive, and she found that they are. Through a detailed legal analysis, Maxwell (2009) suggested two reasons why women's participation in nontraditional occupations remains low, as well as legal mechanisms for encouraging greater participation: women continue to be excluded from traditionally male working class jobs and those jobs can provide long-term economic security for women. Last, Leung (1987) developed an impact analysis to identify if training provided by the PREP-Ohio program through the Job Training and Partnership Act (JTPA) was successful in helping women to find higher pay employment, nontraditional jobs, and full-time employment, and found that it was. According to Maxwell,

Discrimination and the resulting exclusion of women from blue-collar jobs severely impedes women's prospects for economic equality with men. Traditionally female occupations are paid lower wages than traditionally male occupations across all socioeconomic classes...[S]ex segregation in blue-collar jobs creates a particularly

precarious circumstance for working class women by further limiting their earning power. Increasing opportunities for working class women to enter blue-collar occupations can provide long-term economic security to women who might otherwise be forced into low-wage jobs. (2009, p. 2)

Reasons why the pay gap exists between men and women for similar occupations, and why occupations in which women are highly represented tend to pay lower than those in which men are highly represented have been examined in a number of disciplines—sociology, anthropology, political economy, gender and women’s studies, and international development, to name a few. However, no disciplines or studies have definitively identified the root causes for this disparity. According to Boraas and Rodgers (2003), “Although the existence of the gender pay gap is well documented, the factors that contribute to it are still debated” (2003, p. 1).

### **Theories to Explain Gender Pay Gap & Occupational Segregation**

A number of theories have been developed to explain the gender pay gap, and occupational segregation, drawing largely from economics, psychology, and sociology, among other disciplines. The theories most relevant to this research inquiry include glass ceiling effects, human capital theory, stereotype threat, self-efficacy, attribution theory, collaboration, cohort effect, and crowding. In subsequent chapters, these theories are examined further as rival explanations and/or as to their relevance in this research study. I will discuss theories regarding discrimination at more length in the next section, and self-selection/preference is also a broad area of inquiry that is interwoven into many of these theories. Throughout this study, I will explore how self-selection/preference translates into pay gap or women’s participation in nontraditional occupations. Some of these theories are based upon individual/internal factors, whereas others are located at a broader, societal level. The limited list included here is not

exhaustive. In the following paragraphs of this section, I define these theories and provide a review of relevant studies that have tested these theories through various methods.

The term glass ceiling is well known in popular culture, the media, and academia, and it refers to invisible factors that hinder women's advancement or hold women back from promotions in the workforce. Research studies have attempted to measure or identify glass ceiling effects, but most standard research methods are not well equipped to examine unknown factors, even though it is well recognized that there are unidentified variables that have real world effects on women in the economy (Prokos & Padavic, 2005). The continued popularity of the glass ceiling theory is largely based upon its aptitude in encompassing the invisible and indirect variables that influence women's participation in the workforce.

Human capital theory combines aspects of both internal and external factors to explain the gender pay gap by proposing that there are differences in both women's and men's innate abilities, as well as their experiences, opportunities in education, and the workforce, that contribute to women's lower productivity. For example, in the report on gender pay gap, the authors identified the percentage differences this theory can explain in the British workforce.

Gender differences in human capital, particularly work experience, are an important contributor to the gender pay gap. Women have less work experience than men and more part-time experience, which is rewarded less favourably. Differences in work experience account for about two to three percentage points of the gender pay gap for female full-timers and between five and nine percentage points for part-timers. Differences in educational qualifications play a smaller role, mainly restricted to part-timers, who tend to lag behind men with respect to educational qualifications. Around two percentage

points of the part-time gender pay gap has been attributed to differences in educational qualifications. (Anderson et al., 2001, p. vii)

Cohort effect seeks to explain reasons why older women consistently earn less than younger women,<sup>11</sup> which may be due to investments in human capital and work experience overall for older women, or other unidentified factors.

Stereotype threat, self-efficacy, and attribution theory each have bearing psychologically at the individual level, but the root causes are “circularly causal and overlapping” (Lufkin & Reha, 2009, p. 29). Stereotype threat refers to “being at risk of confirming, as a self-characteristic, a negative stereotype about one’s group” (Steele & Aronson, 1995, as cited in Lufkin & Reha, 2009, p. 31). Therefore, the media can have strong influences on messages girls and boys receive that they may internalize. Conversely, self-efficacy refers to an individual’s perceptions of his or her abilities to achieve goals. The social environment deeply affects this. The social environment includes one’s upbringing, family, education, culture and society. “The strength of a female’s self-efficacy is directly related to entry and persistence in NTO” (Lufkin & Reha, 2009, p. 29). In addition, “Individuals aspire to careers based upon their perceptions of their competence at career-related tasks. However, men and women form those perceptions based upon gender-based beliefs. This is how aspirations to a nontraditional career may be constrained” (Correll, 2004, as cited in Lufkin & Reha, 2009, p. 29). Last, attribution theory (including fixed traits or innate abilities) is a complex social cognitive theory that “maintains that to what we attribute our achievements and failures effects our motivation” (AWE Project, 2005; Rotter and Heifer, and Wiener, as cited in Lufkin & Reha, 2009, p. 30). According to Lufkin and Reha,

Both the source of and lack of achievement may be attributed differently for men than for women. In a study of engineering students, women attributed their successes to hard work or sources outside themselves and their failures to lack of innate ability. Men generally had opposite opinions: successes resulted from their innate abilities and failures from lack of effort or outside sources (2009, p. 30).

Research has shown that early intervention and partnerships between educational organizations, community-based programming, and businesses have a strong effect on the “pipeline” for nontraditional careers.

Collaboration as a theory or concept is a very different way of relating to others and solving problems than competition. Studies on gender in industrialized countries as well as anthropological studies of other cultures show that competition is not the only way for societies to be successful. Interestingly, girls often play in collaborative styles, while boys tend to compete. Girls prefer learning and working in groups and environments that foster collaboration, and provide opportunities to make a direct impact on their local community (Lufkin & Reha, 2009). As urban development and infrastructure projects become more complex, the necessity to develop strong collaboration between experts from a wide range of disciplines will become increasingly important.

Crowding refers to the occupational segregation between men and women, with women being largely excluded from primarily male occupations and crowded into lower paying, lower skilled, and lower prestige occupations, which further lowers women’s wages. Collaboration and systemic changes to increase women’s participation in nontraditional occupations can play a role in the crowding effect, by possibly increasing the number of women in higher wage professions normally held by men. Conversely, the extent to which this may potentially lower wages in

male-dominated professions and/or increase wages in female-dominated professions has not been tested.

Discrimination comes into play at all levels with regard to occupational segregation and the gender pay gap. According to the 2001 final report on gender pay gap,

Women may also receive lower wages than men as a result of discrimination in the labour market. Such discrimination may be based upon the tastes of employers, other employees or customers, upon untruths regarding the abilities of women or upon imperfect information. Discrimination may impact directly on earnings through employers offering different levels of pay to otherwise similar male and female employees. However, it may also have an indirect effect upon pay levels if it plays a role in determining the employment patterns of men and women.

Thus, discrimination may affect the gender pay gap in three ways:

- through pay discrimination at an individual level, i.e. where the pay offered will be lower if the job were done by a woman rather than a man;
- through gender discrimination in employment opportunities (including in education, training and family demands and support); and
- through gender differences in pay rates consequent on the gender composition for the job or skill. (Anderson et al., 2001, p. vi)

### **Studies to Explain the Pay Gap**

A myriad of studies focused on gender, STEM, economics, and job satisfaction intended to test the aforementioned theories have manipulated variables, such as demographic variables, social economic status, family background, influencing factors (i.e., family support, and role models), career types, personal characteristics, and communication styles. In these studies, the

researchers have also set out to test other theories that have emerged, such as glass ceiling, cohort effect, stereotype threat, overcrowding, and human capital. Largely, these studies have focused on elements of job satisfaction, career or educational aspirations, and reported barriers to entry into these fields. Additionally, the methodologies utilized in each of these studies have included quantitative and qualitative methods, experiments, surveys, and interviews.

### **Higher Education Specific to the Concrete Construction Industry**

Concrete science, though an ancient art and practice, is an emerging academic field. Thus, there is very limited information about women's involvement in concrete technology, and women's participation at the university level. Currently, 72 universities and trade schools in the United States offer accredited 4-year degrees in construction management (American Council for Construction Education, 2017). Of these, only a handful offer degrees and/or specializations in concrete science and technology, and most of those that do are part of the Concrete Industry Management (CIM) program.<sup>12</sup> Women's enrollment is low in all of these programs. The CIM's strategic plan indicates that recruitment of women and minorities is a priority; however, recruitment strategies and participation goals for women and minorities are not explicitly stated (Concrete Industry Management, 2017). While this research does not focus strictly on employment within the concrete industry that requires advanced education, these questions were explored when they were relevant to the broader questions this research addresses.<sup>13</sup> For example, what were women's experiences who attended these universities (both within the programs and upon graduating and entering the field professionally)?

### **Barriers to Women's Participation in Nontraditional Organizations**

This research is action oriented in that it attempts to uncover ways to encourage more women to enter the field, and thus take advantage of the many opportunities for women, both in

terms of economic freedom and leadership development. In a review of the literature, Fielden et al. (2000) found several barriers to women's entry into the construction industry, and occupational and organizational segregation within the industry in Britain. These barriers for women included early socialization, the construction industry's image, career knowledge amongst children and adults, selection criteria and male dominated courses, recruitment practices and procedures, sexist attitudes, male-dominated culture, and the work environment. In the United States, the Women in Blue Collar Transportation Careers Task Force identified five barriers to women entering the blue-collar transportation field: lack of information about the opportunity, difficult work culture, lack of family support, lack of basic skills, and lack of reliable transportation to the job and tools (U.S. Department of Transportation, 2011). This research focused on the extent to which women encounter similar barriers within the concrete industry in the United States. Additionally, this research focused on identifying additional or specific barriers that may be unique to the United States as a whole, to particular regions within the United States, or the concrete industry, as well as what efforts, if any, are underway to reduce these barriers.

### **Federal Initiatives and Women in Trades**

While non-STEM related nontraditional occupations have generally escaped scrutiny in the academic literature, a historical analysis of federal initiatives for such programs indicates that assisting women to find employment in the trades has been a topic of debate for decades. Federal initiatives to educate, train, and employ women, as well as dislocated and disadvantaged workers, have also gone through tremendous changes over time. In fact, it is difficult to find a cohesive definition of a "disadvantaged worker" throughout the legislation, but at times women specifically have fallen under this umbrella.<sup>14</sup>

Many localized women's associations and organizations have arisen as a direct result of federal initiatives to encourage women's participation in skilled trade occupations. To analyze the plethora of individual, local, nontraditional occupation programs that have emerged across the country and for the last several years because of targeted federal initiatives is beyond the scope of this research, but background on federal initiatives aimed at women's employment in nontraditional occupations is provided. In general, since the 1970s, the policies to assist women find employment in nontraditional occupations have become more decentralized and reliant upon the private sector. Over the last decade, women have been completely removed as a target group from federally funded initiatives.

In 1978, the Comprehensive Employment and Training Act was revised and women were one of the groups protected under this act. The Women's Bureau (WB) of the Department of Labor (DOL), which was established in 1920, has been active in keeping women's issues at the forefront of Labor policy. The WB was instrumental in developing programs and setting targets for women through the Comprehensive Employment and Training Act. From the Comprehensive Employment and Training Act, emerged numerous localized, federally funded programs aimed at the specific needs of women, such as "overcoming sex stereotyping of jobs, flexible work and training schedules, services of displaced homemakers, research and evaluation, and training for nontraditional work" (Marshall, 1981, para. 3). The WB has developed several model programs, training manuals, and materials to assist women in apprenticeship programs. Additionally, a summary of policy initiatives in 1981 included the following:

1. Changing outdated perceptions about the role of women in the economy;
2. Increasing efforts to assist those whose income is below the poverty level;

3. Improving job opportunities for women in nontraditional areas such as apprenticeship and construction, in management and entrepreneurship, and in occupations that are emerging with new technology; [emphasis mine]
4. Examining job classification systems that mask wage discrimination based on sex;
5. Identifying areas for model state legislation to improve the civil and political status of women;
6. Changing retirement, social security, disability, insurance and unemployment compensation policies to meet the needs of women;
7. Increasing the availability of child care services;
8. Fostering flexible work schedules and staffing patterns while meeting the needs of workers who are also parents;
9. Designing education, training, vocational education and employment programs to meet special needs of young women and mature women;
10. Analyzing health problems associated with worker's dual role in the workplace and at home; and,
11. Ensuring that women obtain their fair share of assistance under trade adjustment and re-industrialization programs. (Marshall, 1981, para. 15)<sup>15</sup>

In 1982, the Job Training and Partnership Act superseded the Comprehensive Employment and Training Act. The Job Training and Partnership Act further decentralizes the provisions of services and funding available from the federal government to states and local governments, while also placing a much larger emphasis on the private sector to provide training and employment services. Particularly, many training programs initially created specifically for women seeking employment in nontraditional occupations have become in-house operations of

the private companies that receive funding from the federal government to increase participation by disadvantaged workers. While women were a designated group under the Comprehensive Employment and Training Act, under the Job Training and Partnership Act women fall into the much wider classification of disadvantaged worker, which may include women, youth, racial minorities, veterans, and/or members of recognized Native American tribes. The definition of disadvantaged workers varies from state to state. The shift from the Comprehensive Employment and Training Act to the Job Training and Partnership Act has resulted in marked controversy. The efficacy of the Job Training and Partnership Act programs is difficult to examine, because the target population varies, and the outcomes of such programs are not readily, nor necessarily publicly available for review, relying largely on private industry reporting. Additionally, funding specific to women (as opposed to other disadvantaged workers) has been reduced and is highly competitive. It is not clear if it is even worth the effort for small and newly-established companies to apply for the Job Training and Partnership Act funding; if such companies are aware of the opportunities; and the extent to which the Job Training and Partnership Act is actually serving the individuals (as opposed to corporations) for which it was created.

In 1998, the Workforce Investment Act superseded the Job Training and Partnership Act, and it contains the Adult Education and Family Literacy Act and the Rehabilitation Act Amendments of 1998. The purpose of the Workforce Investment Act was to create a comprehensive workforce investment system by reforming federal job training programs (U.S. Department of Labor, 1998). “The reformed system is intended to be customer-focused, to help Americans access the tools they need to manage their careers through information and high quality services, and to help the U.S. companies find skilled workers” (U.S. Department of Labor, 2006, para. 1).<sup>16</sup> According to the Department of Labor, the Workforce Investment Act

restructures the funding streams, target populations, systems of delivery, and accountability of the previous act, all of which potentially could improve upon some of the weaknesses in the Job Training and Partnership Act. While the Workforce Investment Act determines eligibility criteria for receipt of funding, it further removes women as a target group from such funding, and rather identifies the following groups: Job Corps, Native Americans, veterans, migrant and seasonal farmworkers, and youth in high-poverty areas. In addition, the Workforce Investment Act provides technical assistance to states and local areas, as well as assistance for demonstration, pilot, and other special national projects, program evaluations, and national emergency grants.<sup>17</sup>

Most recently, the Workforce Innovation and Opportunity Act has replaced the Workforce Investment Act:

WIOA, the new law, retains the basic components of the previous law (WIA)...As the Center for Law Social Policy explains, WIOA strengthens existing workforce development and adult education programs in four ways that can benefit adults and youth with barriers to economic success. The law:

- I. Increases the focus on serving the most vulnerable workers—low-income adults and youth who have limited skills, lack work experience, and face other barriers to economic success;
- II. Expands education and training options to help participants access good jobs and advance in their careers;
- III. Helps disadvantaged and unemployed adults and youth earn while they learn through support services and effective employment-based activities; and

IV. Aligns planning and accountability policies across core programs to support more unified approaches to serving low-income, low-skilled individuals.

(Johnson, 2014, para. 3)<sup>18</sup>

Nevertheless, funding specific to women has been even further removed with each revision of legislation intended to assist the U.S. workforce.

### **Women in Apprenticeship and Nontraditional Occupations (WANTO)**

The only federal Act that still specifically targets women in trades is the Women in Apprenticeship and Nontraditional Occupations (WANTO), which was signed into law in 1992. Primarily, WANTO funds specific localized programs and has strict eligibility requirements following federal guidelines. This funding is extremely limited and highly competitive, and it is more challenging for new and emerging programs and organizations to obtain than for established programs that have received WANTO funding in previous years (U.S. Department of Labor, 2012).<sup>19</sup>

WANTO is tremendously successful at placing women in nontraditional occupations that are generally higher paying than occupations held by women who do not have a four-year, post-secondary degree. In addition, WANTO has been beneficial to businesses in need of filling labor shortages for qualified and skilled workers. According to WANTO, “[M]ost working women, especially those without a four-year degree, are clustered in lower paying occupations... Nontraditional jobs increase the ability of women to obtain economic security for themselves and their families” (Wider Opportunities for Women, 2012, p. 3). Further, WANTO stipulates,

While other workforce development programs, such as the universal Workforce Investment Act (“WIA”) provide skill training, they have not been successful in

providing the kind of specialized technical assistance and training as WANTO that results in women entering high-demand, nontraditional careers. WIA trains very few men or women in occupations nontraditional for their gender, reinforcing the existing occupational and earnings structure of the workforce, including the gender pay gap. Unlike the Carl D. Perkins Career and Technical Education program, WIA does not have an accountability measure related to preparation for nontraditional careers. (Wider Opportunities for Women, 2012, p. 3)

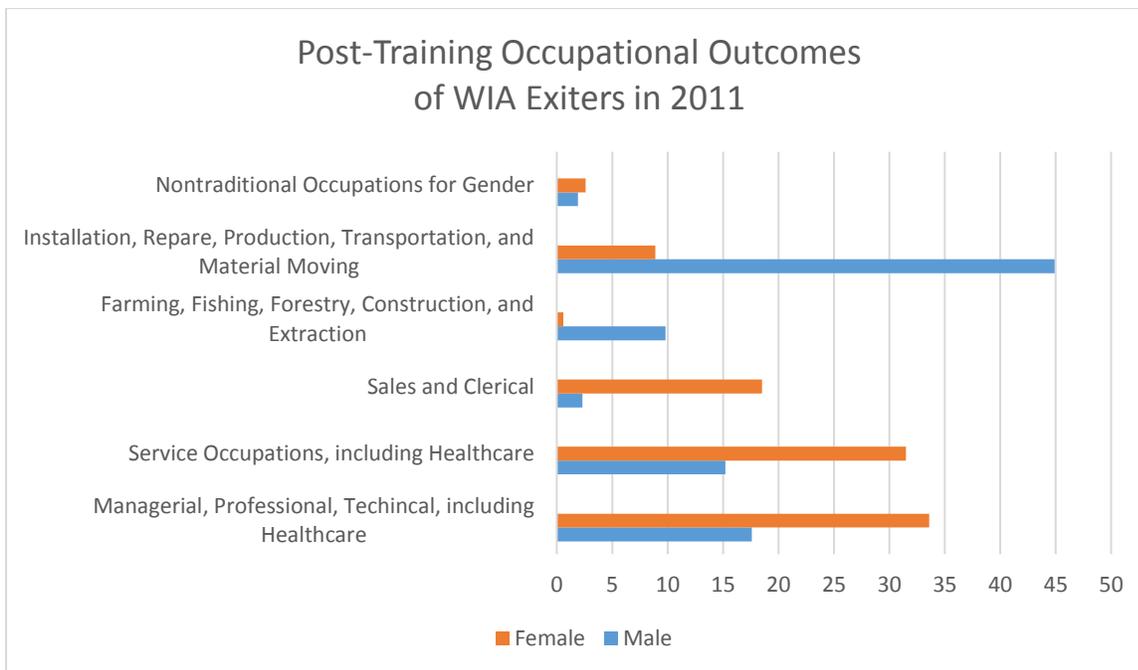


Figure 2. Post-training occupational outcomes of Workforce Information Act exiters in 2011. Average earnings in 2nd and 3rd quarters were \$15,597 for male and \$11,671 for female. The female as percent of male earnings was 74.8% (adapted from Wider Opportunities for Women, 2012).

### Women’s Participation Still Low in Nontraditional Organizations

Despite limited federal funding and/or the existence of women’s organizations in nontraditional occupations, the numbers clearly indicate that women do not, or are not choosing to enter these industries. As mentioned previously, women may encounter a variety of barriers to

entering and staying within the industry (Fielden, et al., 2000, Gale, 1994; Sarkar 2002; U.S. Bureau of Labor Statistics, 2010; U.S. Department of Transportation, 2011). Within the construction industry, and in STEM-related career and educational literature, researchers have examined why women's participation remains so low from a variety of angles, including job satisfaction, individual characteristics and personality, training (or lack of) for guidance and career counselors to provide and present information equitably, job characteristics, culture of the industry, perceived lack of skills/training, lack of information about the opportunity, and other reasons (Anderson, 1987; Betz & O'Connell, 1992; Clarke & Gribbling, 2008; Crenshaw 2006; Dabke et al., 2008; Ethington 1988; Ethington & Woffle, 1988; Fielden et al., 2000; Gale, 1994; Jurik & Halemba, 1984; Leung, 1987; Marra, Rodgers, Shen, & Bogue, 2009; Lufkin & Reha, 2009; Maxwell, 2009; Quimby & De Santis, 2006; Raloff, 1991; Robinson & McIlwee, 1989; Sarkar 2002; Swerdlow, 1989)

In the United States, many young women are not even aware of construction opportunities, let alone would even consider the possibility of working in construction. One reason for this is United States cultural values and gender stereotyping. For example, young women who may express interest in the field are often directed elsewhere because parents, social workers, peers, guidance counselors, or advisers inform them that such a profession is not suitable, and that they should look into occupations that are more "appropriate." In the United States, girls are not often socialized to examine or express interest in construction or other vocational fields. Career and guidance counselors perpetuate the socialization process, the media does not promote construction or construction-related careers for women, girls have few role models in the industry, and girls may not have had opportunities to develop skills with tools or tool handling, making them feel inferior to boys. Additionally, girls/young women may not be

aware of potential opportunities in the industry due to some of the previously mentioned and/or other reasons yet to be identified (Anderson, 1987; Betz & O'Connell, 1992; Clarke & Gribling, 2008; Crenshaw 2006; Dabke et al., 2008; Ethington 1988; Ethington & Woffle, 1988; Fielden et al., 2000; Gale, 1994; Jurik & Halemba, 1984; Leung, 1987; Lufkin & Reha, 2009; Marra, Rodgers, Shen, & Bogue, 2009; Maxwell, 2009; Quimby & De Santis, 2006; Raloff, 1991; Robinson & McIlwee, 1989; Sarkar 2002; Swerdlow, 1989).

Although Mastracci (2003), Maxwell (2003), Dabke et al. (2008), and Leung (1987) found that federally funded programs were successful in placing women (who did not necessarily have education beyond high school, or who may have been in the process of earning a GED) into higher-paying jobs, these studies have overlooked women from different backgrounds (other than eligible candidates for those programs) who are, or who might, consider working in nontraditional occupations, specifically within construction. Particularly, the question arises as to whether or not targeted funding perpetuates social class stratification, gender socialization, and/or stereotyping.<sup>20</sup> That is, these programs are designed to assist low to working-class, possibly uneducated women find blue-collar jobs that may be high paying.

In contrast, STEM-related funding for education and professional development, while casting a wide net that is supposed to include women of all backgrounds, primarily prepares graduates for white-collar careers. As such, STEM funding may not be in reality available to women of lower socioeconomic classes, because they may not have received even the minimal education in science/math to take advantage of such opportunities. Thus, these different efforts (federal initiatives versus STEM funding) to increase women's participation in nontraditional occupations and/or academic disciplines are targeting lower socioeconomic groups towards blue-collar professions, and higher socioeconomic classes towards white-collar professions. As a

result, while studies have indicated that federal initiatives and STEM funding do have an effect on women's participation in nontraditional occupations, the concrete-construction industry may be unique in ways that are not captured by those studies, and therefore there are additional factors at work. To delve into all of the intricacies of this dichotomy is beyond the scope of this research; however, this illustrates the pervasiveness of gender socialization and systemic social stratification within the United States. Additionally, in this research I investigate the issue of STEM education in construction to the extent that I uncovered some unexamined factors from previous research studies.

One of the most distinct features of the construction industry is that it is largely comprised of small-family businesses and several huge corporations. Thus, as views about women working have changed and family dynamics have changed, more women are entering family professions that once were exclusively reserved for sons. Based upon the interviews with women who had been in the industry for over 10 years, this seems to be one of the most common means by which women have entered the industry. Is this still true today? A small percentage of women have broken through the barriers to find employment in the construction industry, and have stayed there. Why? Is there something special about these individual women? What kinds of support networks or associations do they draw upon to continue to succeed?

### **Women's Associations in Construction**

Because women in nontraditional organizations experience isolation (i.e., often being the only woman on a jobsite or in a work crew), some support organizations have come into existence such as NAWIC, PWC, and WICA. The major distinction between these organizations and those funded by the federal government is that that their missions are to serve their members as opposed to meeting the changing priorities of the political agenda. To remain viable, however,

these associations must stay attuned to the political climate, as it directly affects large segments of their membership.

**The National Association of Women in Construction (NAWIC).** Sixteen women in Fort Worth, Texas in 1953 established the NAWIC, and it gained a national charter in 1955 to become the organization it is today. “Knowing that women represented only a small fraction of the construction industry, the founders organized NAWIC to create a support network... Today, NAWIC provides its members with opportunities for professional development, education, networking, leadership training, public service and more” (The National Association of Women in Construction, n.d., para. 1). According to NAWIC’s website, there are a number of benefits to women and employers who decide to become members, including professional opportunities (access to information about legislation, mentoring, networking, and job leads) and educational opportunities (training; discounts, and magazine subscription; certifications (NAWIC Education Foundation (NEF) professional certifications: Certified Construction Associate (CCA); Construction Document Specialist (CDS); Construction Industry Technician (CIT)). While much information about NAWIC is available on-line, to reap the full benefits of this organization, one must become a member, and there is an annual fee.

**Professional Women in Construction (PWC).** The distinction between NAWIC and the PWC is that NAWIC focuses on both women in construction trades and their employers, while PWC “is a nonprofit organization committed to advancing professional, entrepreneurial and managerial opportunities for women and other ‘non-traditional’ populations in construction and related industries” (Professional Women in Construction, 2017, para. 1). The mission of PWC is to encourage and advance the goals and interests of woman and minority owned businesses. The PWC is more specifically focused on women owning and operating businesses in nontraditional

occupations, as opposed to strictly working in those industries. The PWC also requires membership, and according to the website,

PWC's members represent a broad spectrum of the industry that serves real estate owners, developers, facilities & property managers and public agencies. They include general construction and specialty contractors; A & E firms, environmental services and suppliers of all kinds of goods and services. Because our core client industries have many and diverse needs, PWC also draws representatives from the services sector: law and accounting firms, insurance/surety & bonding companies, banks and financial services, graphic designers, printers, computer consultants, travel agencies, marketing specialists and more. Membership is open to business and professional women and men, private companies and public agencies in construction and allied industries. (Professional Women in Construction, 2017, para. 2)

**The Women in Concrete Alliance (WICA).** WICA is unique from both NAWIC and PWC, in several ways. WICA is a web-based and international organization, and it does not require membership dues. Although this has been proposed at various points in time, the founders (Kari Moosmann and Kimberly Kayler) want to keep the organization open, inclusive and available to all women in the concrete industry. Additionally, WICA is the only organization that specifically addresses the issues that are important to women in the concrete industry.

The objective of the Women in Concrete Alliance (WICA) is to supply information, opportunities, and mentoring to women working in the concrete construction industry.

The Advisory Board will direct the momentum of the efforts, keeping the mission centered on positive information that will help women network and be successful. The idea for an ongoing network began with Hanley Wood's Women in Concrete (WIC)

event at World of Concrete and the WIC monthly features in Concrete Construction and Concrete Producer magazines. WICA strives to go beyond these efforts and reach women on a continuous basis to create an industry alliance that serves the needs of all women in concrete. (Women in Concrete Alliance, 2017a, para. 2)

WICA began in 2010. In 2011, Kimberly and Kari started the “Woman of Distinction” Award, bestowed annually during the Haney Wood Women in Concrete event. From 2006-2012, Kari Moosmann coordinated with Hanley Wood and assisted in organizing a luncheon at the World of Concrete (WOC) Convention, which included industry leader speakers, provided opportunities for women throughout the country to meet one another face-to-face, and was the forum through which the annual “Woman of Distinction” Award was determined. According to the founders of WICA, the “Woman of Distinction” award was created to “celebrate women in the industry” (Concrete News, 2011, para 1). Moosmann believes that the award “will help reinforce that women are a valued resource in the concrete construction industry” (Concrete News, 2011, para. 1). The organization also publishes short articles in the *Concrete Producer* (available both on-line, and through subscriptions—the only source of revenue for WICA, besides contributions and donations).

### **Summary of Emergent Theories and What Sets This Research Apart**

Studies specific to the topic of women in nontraditional occupations, and women entering STEM-related education and careers, have examined variables such as demographic variables, social economic status, family background, influencing factors (i.e., family support, and role models), career types, personal characteristics, and communication styles. These studies have also set out to test other theories that have emerged, such as glass ceiling, cohort effect, stereotype threat, crowding, and human capital. Largely, these studies have focused on elements

of job satisfaction, career/educational aspirations, and reported barriers to entry into these fields. Additionally, the methodologies utilized in each of these studies have included quantitative and qualitative methods, experiments, surveys, and interviews.

From the referenced studies, what sets this research apart is two-fold: (a) it examines women's participation in one specific industry (concrete) that has not received much attention in the academic literature, though it is potentially a burgeoning economic opportunity (Concrete Industry Management, 2017; U.S. Bureau of Labor Statistics, 2010); and (b) this study's unique method—case study (no other reviewed research studies utilized this method to explore this topic). This research specifically examines women's experiences in the concrete industry, how women entered this nontraditional field, and women's feelings regarding the efficacy of targeted educational programs to recruit more women into the field (particularly since many of them did not enter the profession via a traditional educational path). Very few research studies have examined the extent to which women working in the field would encourage the next generation of women to enter the field and how they suggest they should do so. Thus, the purpose of this research is to address those questions through a mixed method case study,<sup>21</sup> primarily focusing on one organization that has been at the forefront of women's participation in concrete—WICA.<sup>22</sup> This research will use a combination of both quantitative and qualitative data, but is primarily qualitative. As the previous studies have concluded, the field is still so young that it is difficult to facilitate strictly quantitative studies that capture the myriad of variables involved in this investigation.

## **Endnotes**

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<sup>1</sup> All of the research studies are too numerous to mention; however, BLS, NAPE, and the IWPR all provide research-based information on this topic.

<sup>2</sup> Wage gap, pay gap, and earnings gap will be used interchangeably throughout this research. Each of these terms indicates the difference between men's and women's wage earnings for similar occupations when accounting for education and years of experience within the industry.

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<sup>3</sup> See the following BLS articles: [http://www.bls.gov/spotlight/2012/recession/pdf/recession\\_bls\\_spotlight.pdf](http://www.bls.gov/spotlight/2012/recession/pdf/recession_bls_spotlight.pdf)  
<http://bls.gov/opub/mlr/2011/04/art1full.pdf>

<sup>4</sup> See the following article (link) for more information about the GR, housing crisis/mortgage bubble, and the Great Depression: [http://www.chapman.edu/research-and-institutions/economic-science-institute/\\_files/WorkingPapers/gjerstad-smith-balance-sheet-crises.pdf](http://www.chapman.edu/research-and-institutions/economic-science-institute/_files/WorkingPapers/gjerstad-smith-balance-sheet-crises.pdf)

An excerpt from the article is as follows:

We propose that the severity of the Depression beginning in 1929, and that of the Great Recession starting in 2007 were twin household-bank balance sheet crises—events that were quite distinguishable from the recessions appearing between them. Each episode, we hypothesize, was preceded by unsustainable rises in expenditures on construction of new housing units and in mortgage credit for purchases of new and existing homes. In both cases housing values rapidly collapsed by over thirty percent but mortgage debt obligations fell only very slowly, so that housing equity fell sharply.

<sup>5</sup> In 2013, 185,000 women worked in construction and extraction occupations, as many or more than dental hygienists (182,000 women), pharmacists (155,000 women), and veterinarians (47,000 women).

<sup>6</sup> <http://www.economicmodeling.com/2013/02/26/emsf-finalizes-2013-1-data-release/>

<sup>7</sup> <http://certassist.net/certification-101/>  
<http://static.squarespace.com/static/515c9539e4b02ae078523e1d/t/516cf412e4b0cdd664887e9a/1366094866369/Overview-%20NOLA%20SLDBE.pdf>

<sup>8</sup> <http://portal.hud.gov/hudportal/documents/huddoc?id=11secfaqs.pdf>

<sup>9</sup>[http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/fair\\_housing\\_equal\\_opp/section3/section3](http://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp/section3/section3)

<sup>10</sup> Domnisoru (2011) disputes this theory.

<sup>11</sup> The research questions were based upon the following two hypotheses:

Hypothesis 1: Cohort membership affects the pay gap. Earnings differences between women and men will be greater in older cohorts than in younger ones because younger women and men entered the labor market in a period more favorable to women. We expect to observe the cohort pattern in every survey year.

Hypothesis 2: The glass ceiling affects the pay gap. Earnings differences between women and men within cohorts will grow over time. This widening occurs because the pay gap is smaller at early career stages, before women have had a chance to encounter a glass ceiling, and grows over time as men gain high-status jobs at a greater rate than do women. Given the overall decline in the pay gap during the 1990s (U.S. Department of Labor 2001), we would expect the pay gap among scientists and engineers over the 1990s to decline as well. Any evidence of an increase in the gaps, net of controls, would indicate a glass ceiling effect. (2005:527).

Utilizing data from four meta-surveys, the authors developed a regression equation to test for cohort and glass ceiling effects, as follows (2005:531):  $(\ln)Salary = B_0 + B_1 \text{ women} + B_2 \text{ cohort} + B_3 \text{ woman} * \text{cohort} + B_4 \text{ human capital} + B_5 \text{ employment} + B_6 \text{ demographic} + e_i$

Their research design is based upon Morgan's (1998) (as cited by the authors) multicohort longitudinal design, allowing them to assess whether earnings differences increase over time, while controlling for cohort membership and control variables. They expect to find that if gender cohort membership within each cohort is higher than in previous years there is evidence of glass ceiling effects. Additionally, they expect to find significant differences in earnings by cohort (meaning that cohort membership affects pay gap); and that older cohorts will have greater pay gaps than newer cohorts.

<sup>12</sup> The Concrete Industry Management (CIM) includes a consortium of 4 accredited university programs that specifically focus on the concrete industry, as a subset of the construction industry. The CIM also provides business management training in the concrete-construction industry (Concrete Industry Management, 2017).

<sup>13</sup> The data included in Figure 1 does not distinguish between those who have college degrees versus those who do not; however other studies by the BLS and IWPR do make these distinctions.

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<sup>14</sup> For example, currently, the Los Angeles County Metropolitan Transportation Authority (2017) defines a disadvantaged worker as follows:

Disadvantaged Worker means an individual who, prior to commencing work on the project, meets the income requirements of a Targeted Worker and faces at least two of the following barriers to employment: (1) being homeless; (2) being a custodial single parent; (3) receiving public assistance; (4) lacking a GED or high school diploma; (5) having a criminal record or other involvement with the criminal justice system; (6) suffering from chronic unemployment; (7) emancipated from the foster care system; (8) being a veteran of the Iraq/Afghanistan war; or (9) being an apprentice with less than 15% of the required graduating apprenticeship hours in a program. (para. 11)

As is evident from this definition, women are not specifically targeted, but could fall within some of the aforementioned categories.

In North Carolina, both the House (HOUSE BILL 2844\*, adopted May 2006) and Senate (DRS55430-LY-381 (5/17), 2005) agreed upon the following definitions for claiming a tax credit for hiring disadvantaged workers:

As used in this section, a 'disadvantaged worker' is a person who satisfies any of the following conditions:

- (1) The worker is a member of a family that received payments under the Temporary Assistance to Needy Families program for at least nine of the last 18 months at the time of hire.
- (2) The worker is a veteran and is a member of a family that has received benefits under the Food Stamp Program for at least three of the last 15 months at the time of hire.
- (3) The worker is between 18 and 24 years old when hired and a member of a family that has received benefits under the Food Stamp Program for the last six months at the time of hire.
- (4) The worker received benefits from the Supplemental Security Income program for any month within the last 60 days at the time of hire.

Each of the conditions listed above also have specific eligibility requirements, which vary from state to state (e.g. Food Stamps, TANF, SSI, etc.).

<sup>15</sup> <http://www.dol.gov/oasam/programs/history/carter-wb.htm>

<sup>16</sup> [www.doleta.gov/programs/factsht/wialaw.cfm](http://www.doleta.gov/programs/factsht/wialaw.cfm)

<sup>17</sup> <https://www.doleta.gov/usworkforce/wia/Runningtext.cfm>

<sup>18</sup> <https://www.socialsolutions.com/blog/what-is-the-difference-between-wia-and-wioa/>

<sup>19</sup> For example, in 2012, according to the DOL and the WB, it is anticipated that WANTO will [A]ward up to \$1,800,000 in grants through this funding opportunity. The program provides grant funds to eligible community-based organizations that provide preparatory education to help women obtain job readiness skills and industry specific training. Grantees also provide technical assistance to help employers and labor unions recruit, place and retain women in registered apprenticeship programs that lead to non-traditional occupations. Grant funds may be also be used to offset the cost of equipment, tools, child care and transportation services for apprentices. Applicants must demonstrate the establishment of a consortium consisting of a minimum of a registered apprenticeship program (RAP) sponsor, a Workforce Investment Act (WIA) local area, and a Community Based Organization (CBO), which may be faith-based organization (FBO), with demonstrated experience in providing training, placement, and support services to women for non-traditional occupations. Employers/RAP sponsors will be responsible for placing women into their apprenticeship programs. WIA partners will co-enroll participants for the purposes of tracking performance against the common measures and may also provide additional supportive and job search assistance services. This solicitation is expected to be published in the late winter of 2012. (U.S. Department of Labor, 2012, p. 2)

<sup>20</sup> For example, during numerous eras in U.S. history white women have often been deemed incapable of doing a myriad of tasks that their poorer, immigrant, slave and/or other women counterparts were performing regularly.

<sup>21</sup> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection,

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analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration. (Johnson, Onwuegbuzie, & Turner, 2007, p. 13)

<sup>22</sup> Qualitative dominant mixed methods research is the type of mixed research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects. (Johnson, Onwuegbuzie, & Turner, 2007, p. 14)

## **Chapter 3: Methodology**

### **Research Design: Mixed-method Qualitative Case Study**

The aim of this research was to gain a comprehensive understanding of a phenomenon about which very little was known—women’s participation in the U.S. concrete industry. This study utilized concurrent multiple methods to address thoroughly the research questions, culminating in a case analysis of WICA. Because I employed strategies simultaneously, describing each strategy singularly or sequentially does not convey the complexity of the study. The timeline in Figure 3 illustrates major events and the overlapping of methods. I used mixed methods to answer the first research question, and primarily developed a case study of WICA to answer the second research question. Research strategies included case analysis of WICA, surveys, interviews, and phone polls.

I conducted most of the research from 2012 to 2014. The Timeline on the next page illustrates when I began utilizing specific methods, and the phase or stage of the method (i.e. survey development, survey distribution, analysis). Additionally, I include milestones in the urban studies doctoral program and different jobs that I held during the course of the data collection. Often these different activities were occurring concurrently in my life and had an influence on the research study overall.

# TIMELINE

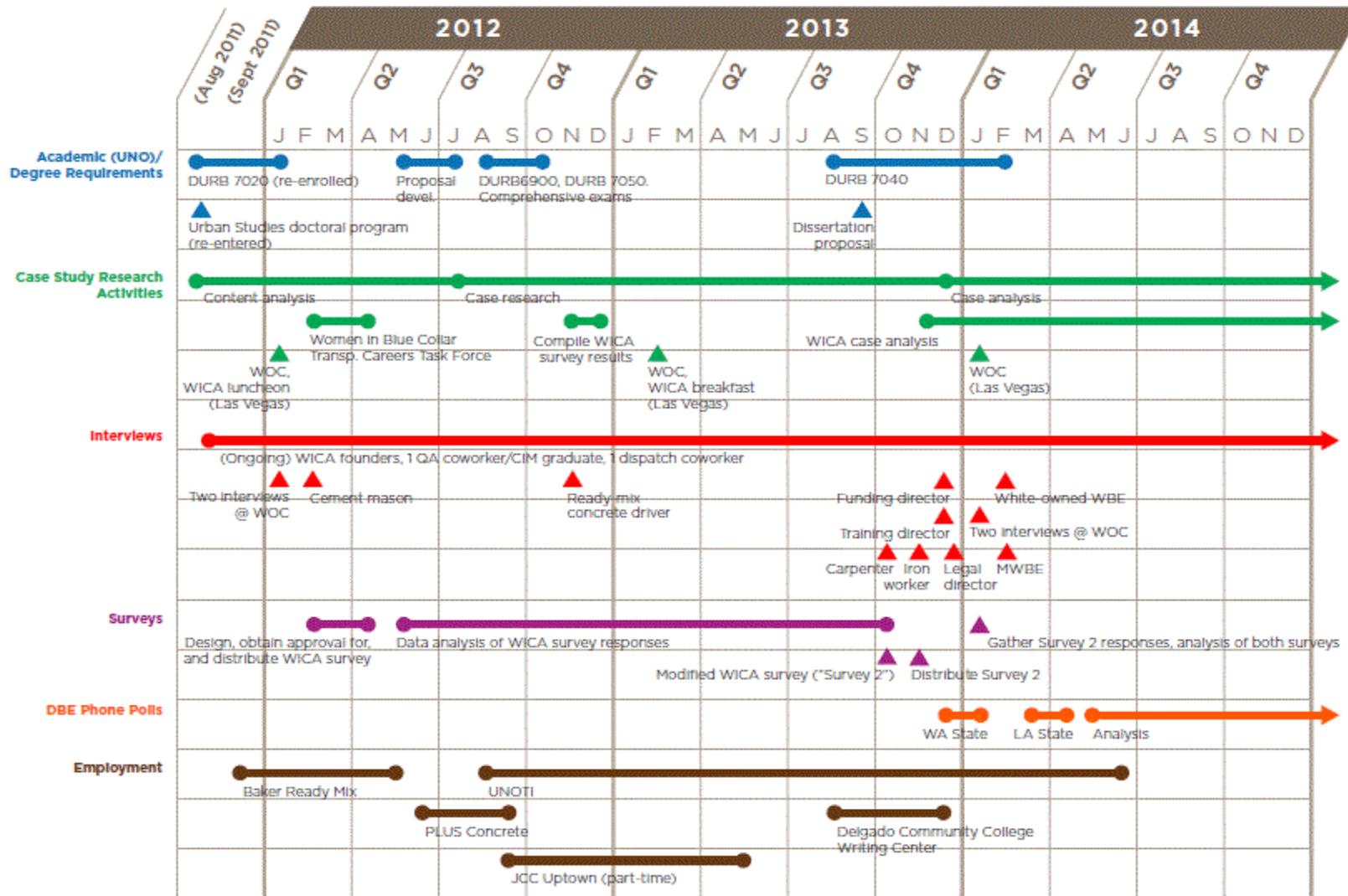


Figure 3. Case study timeline. The letter “Q” refers to “Quarter.”

## **Case Study Protocol**

The research questions were developed to examine women's experiences in this nontraditional occupation from multiple angles using mixed methods.<sup>1</sup> Each method<sup>2</sup> contributed to addressing the research questions, although the surveys and phone polls were aimed at Research Question 1, with the results adding to the case study. The WICA case analysis was intended to address Research Question 2. Interviews supplemented data gathered from each method. The following figure illustrates data collection strategies/sources and the research questions they were intended to address, as well as the response rate and its quality.

One method for ensuring reliability is to develop a case study protocol, which establishes the likely sources of evidence for different levels of questions employed throughout the entire research study (Yin, 2003).

DATA ADDRESSED	SURVEYS		PHONE POLLS		INTERVIEWS
	WICA and Survey2	Hanley Wood	LA DBE Poll	WA DBE Poll	
<b>Demographic Information</b>	Q1-Q12, Q24-Q30	Q1, Q3-Q5, Q7	Q1	Q1, Q6	Q1, Q2, Q8, Q9a, Q12
<b>RQ1</b>	Q13	Q2, Q6, Q8	Q4, Q5	Q4, Q5	Q3, Q3a, Q4, Q4a, Q5, Q6, Q7, Q7a, Q8, Q9, Q9a
<b>RQ1a</b>	Q6, Q9, Q14, Q15	Q8			Q3, Q4, Q4a, Q8
<b>RQ1b</b>	Q10, Q11, Q13, Q24-Q26	Q2, Q8	Q2, Q3, Q3, Q4	Q2, Q3, Q4, Q5	Q3, Q4, Q4a, Q8, Q10, Q10a, Q10b
<b>RQ1c</b>	Q14-Q17, Q24-Q26	Q6	Q3	Q3	Q3, Q7, Q7a, Q8, Q9, Q9a, Q11, Q11a, Q11b
<b>RQ2</b>	Q12, Q17, Q18-23				Q8, Q11, Q11a, Q11b
<b>RQ2a</b>	Q18-23				Q8, Q10a, Q10b, Q11, Q11a, Q11b
<b>RQ2b</b>	Q12, Q18-23	Q6			Q7, Q7a, Q8, Q9, Q9a, Q10, Q10a
<b>Total Respondents</b>	*31/112-WICA *2/Many-Survey2 *96 FB likes	17/100, 000	81/189	174/418	18
<b>Response Rate (Quality)</b>	*WICA good 28% *Survey2 poor *FB unmeasurable	Poor	Good 43%	Good 42%	100%

*Figure 4.* Question map/Research protocol. The letter “Q” refers to Question number in research instrument. Research questions, Research Question 1: Why do women participate in the concrete/construction industry? Research Question 1a: To what extent is the concrete industry a viable career path for women seeking economic independence and equality of pay? Research Question 1b: How did women initially become involved in the industry? Research Question 1c: Why do women enter and stay in nontraditional occupations, despite the additional challenges they may face as minorities within the industry? Research Question 2: Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields? Research Question 2a: How can those organizations remain relevant? Research Question 2b: What, if any, additional support systems are available to women in nontraditional occupations?

## **Definition: Case Study**

According to Yin (2003) and Creswell (2003), a case study is the appropriate research approach as this study describes a bounded system and multiple individuals who represent a unique subset (i.e., women) of the concrete industry. The case examined in this study was the WICA organization and its members.

## **Instrumental Single Case Rationale**

The rationale for including a single-case study of WICA, is that women's participation in the concrete industry is representative of women's participation in the construction industry overall. A single-case study approach may contribute to deeper understandings of women's participation in nontraditional organizations more generally (Yin, 2003). Where Yin (2003) identified a rationale for a "representative case," Stake (2003) defined an instrumental case study as follows:

In what we may call *instrumental case study*, a particular case is examined to provide insight into an issue or refinement of theory. The case is of secondary interest; it plays a supportive role, facilitating our understanding of something else. The case is often looked at in depth, its contexts scrutinized, its ordinary activities detailed, but because this helps us pursue the external interest. The case may be seen as typical of other cases, or not...The choice of case is made because it is expected to advance our understanding of that other interest. Because we simultaneously have several interests, often changing, there is no line distinguishing intrinsic case study from instrumental; rather, a zone of combined purpose separates them. (pp. 136-137)

I will examine women's earnings reported in surveys, interviews, and phone polls, because preliminary investigation indicates that women in these professions may earn close to

equivalent pay with their male counterparts, whereas in other occupations there is a much greater pay gap between the earnings of men and women in the United States. While this study was delimited to professions within the concrete industry that do not necessarily require advanced education for entry into the field, many of the respondents in this study had some college education. Data analyses of representative cases rely upon analytical generalizations, which are described in more detail in the external validity section of this chapter. Because establishing and maintaining reliability is challenging, and there are numerous threats to validity, many investigators borrow measures and procedures from previous studies that have established records of validity and reliability.

### **Data Collection**

This research study had multiple concurrent data collection phases, including (a) available data, (b) surveys, (c) phone polls, and (d) interviews. Each of these collection phases involved several components. The following sections outline these data collection phases, as well as provide rationale for each choice.

**Available data.** What distinguishes the use of available data from other types of social research (i.e., experiments, surveys, and fieldwork) is that while all those types involve the firsthand collection of data, this approach uses data that were produced by another investigator, often for different reasons than those of the original investigator. Available-data research, including the secondary analysis of existing survey data, is currently the most popular method of social research (Singleton, Straits, Straits, & McAlister, 1999). Several sources of data were used to develop the background and historical context of the case, as well as for designing survey questions:

- North American Industry Classification System (NAICS)—U.S. Census

- U.S. Bureau of Labor Statistics (BLS)
- Disadvantaged business enterprise (DBE) registers
- WICA website
- Content analysis of available data from Concrete Industry Associations and Trade Organizations, and information collected at the World of Concrete (WOC) 2012, 2013, and 2014.
- Content analysis of databases created by the Institute on Women's Policy Research (IWPR) and National Alliance for Partnerships in Equity (NAPE)

This data assisted in setting the boundaries of the case and identifying questions to be included in surveys. The WICA survey responses provided a larger list of organizations to send modified surveys (Appendix C). The WICA website was a tremendous source of information and was useful for developing survey and interview questions. For example, the data in Appendix A on tweets was compiled before launching the survey to WICA members, to identify patterns and areas of interest.

**Limitations and challenges.** Access to information about industry and trade organizations is often limited to members only, thus it is difficult to know exactly what kinds of information these organizations collect (especially about women). I analyzed Data that are publicly available (through websites and materials collected at the World of Concrete Convention in 2012, 2013, and 2014). Through networking, I also established a couple of connections with some organizations, resulting in the Hanley Wood survey.

**Response rate.** I improved the response rate on the phone polls, because I called the businesses and asked the questions directly. A live person or an incoming phone call are less

easy to ignore than a written survey. In this study, I adhered to the following guidelines regarding response rates:

The response rate of a survey is very important to the credibility of the research results. A low response rate may decrease the statistical power of the data collected and undermine the reliability of the results. It may also undermine the ability of the researcher to generalize the results to the larger target audience. The fact that a low response rate can be indicative of a nonresponse bias within the sample further complicated this.

Given the importance of the response rate, researchers will likely wonder, “What is a typical response rate? What should I expect for a return rate?” There have been many studies on survey response rates, and the results are incredibly varied. In general, the following response rates are common: Employee Surveys, 60-90%; Customer and Member Surveys, 5-40%; General Public, 1-20%. However, these percentages are simply a guideline. The rate of a response for any particular survey may depend greatly on the availability and reachability of the target audience and knowing the best way to deliver a survey to that audience. Response rates may also depend on the sensitivity of the topic in the survey as well.

Considering the importance of the response rate to the research results and the high variability of responses, researchers should spend time and effort examining ways to increase the response rate for his or her survey. In the book, *Mail and Internet Surveys—The Tailored Design Method* by Don Dillman, three issues are discussed that impact response rates. (Center for Innovation in Research and Teaching, n.d., para. 2)

**Survey research.** Survey design must ensure effective two-way communication between the researcher and respondents, assist the respondents in recalling and clarifying their

experiences, and keep the respondents interested (Singleton et al., 1999). Thus, many pitfalls can affect survey research. In the design phase of the survey, it is essential to develop questions that the respondents understand, that is, to use language that they comprehend, and not words or concepts that are unfamiliar to them. Questions should also be presented in such a way that they are not “leading” questions (i.e., telling the respondents or directing them towards the responses the researcher hopes to receive), and the questions should not be presented in a way that is boring or overly repetitive to the respondents. Additionally, several response problems can occur if a survey/questionnaire is not carefully constructed. These issues include memory problems (the inability of respondents to recall experiences, and memory distortion—when respondents do not uniformly remember events objectively); and response-bias problems (social desirability—when respondents wish to make a good impression on the researcher and/or to give “socially desirable” responses; acquiescence response set—respondents are more apt to agree; and ordinal/position bias—the tendency to mark options located in certain positions). The response rate to surveys is also important.

**WICA survey.** The WICA is an organization whose mission is to act as a resource for women involved in the industry by providing data, training, mentoring, and networking opportunities. From 2006-2012, the founders of WICA helped organize Hanley Wood’s Women in Concrete (WIC) Luncheon and Forum during the WOC, held annually in Las Vegas since 1975. WICA was formed in 2010 and married Kari’s featured articles; Hanley Wood’s Women in Concrete (WIC) luncheons at the WOC; and Kimberly and Kari’s “Woman of Distinction” Award, bestowed annually during the WIC Forum at the WOC.

**WICA survey development and design.** I developed the survey based on content and data analysis of the WICA website (i.e., articles posted, tweets, interviews, etc.). It incorporates many

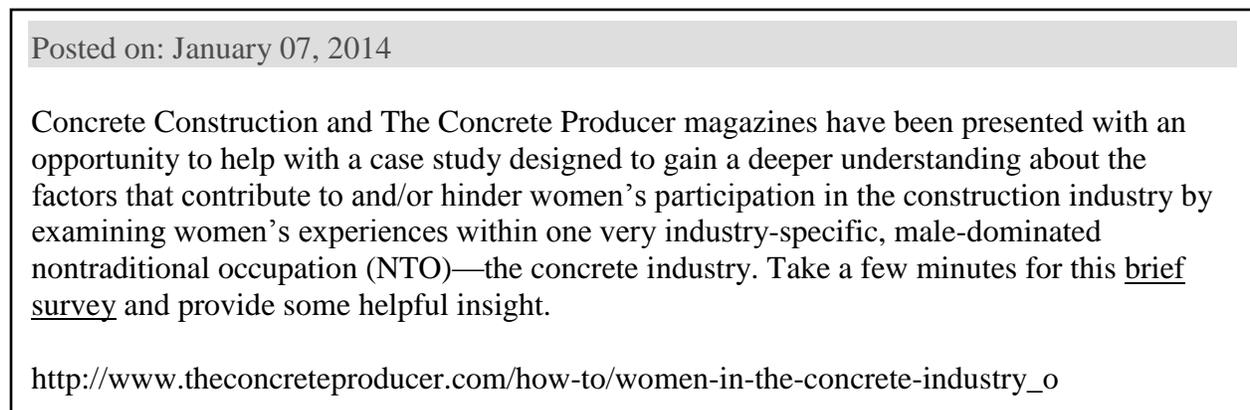
of the themes that came out of this qualitative analysis of the website to develop a demographic and thematic-based survey. My intent in using the survey was both to advance the research objectives and assist the founders of WICA in better meeting the needs and interests of WICA members (see Appendix B for survey questions). The survey was internet-based, but I made direct contact with some members at the WOC 2012. I found this useful in developing a wider network in the industry. The survey questions included multiple choice single response, multiple choice multiple response, and fill in options, to reduce response problems and ensure internal consistency.

**WICA survey results.** The number of people invited to participate in the survey was based on the WICA e-mail distribution list ( $N = 115$ , excluding the investigator and the two founders, resulting in an  $N = 112$ ). Additionally, there are numerous WICA affiliates who participate in WICA through LinkedIn, Twitter, and Facebook, but have not subscribed to the e-mail list. For this reason and population, a duplicate survey was created, which was posted on the WICA website and required a password.<sup>3</sup> There were 31 e-mail respondents (invitation only) and 5 LinkedIn/Twitter respondents (using the link and password), but only 31 respondents actually completed the survey, resulting in 31 out of 112, or a 28% response rate (see also Endnote 1), which is a good response rate for several reasons, including:

- the e-mail distribution list captures people who may have only attended one WICA function and therefore are not really involved in the organization;
- the survey itself was quite long and had numerous fill in the blank areas (which were completed with obvious care and consideration); and
- the survey was external and provided no incentives to respondents other than the knowledge that they had participated in it.

The data captured in the WICA survey was useful for me in the development of the case study analysis of WICA and Research Question 2 (role of women’s organizations). I also explored some themes that emerged from the WICA survey during interviews.

***Efforts to more widely distribute survey: Survey2 and Facebook page.*** I made an effort to more widely distribute the survey so that the results could be generalized to a larger population. I created a duplicate WICA survey, titled Survey2 in Qualtrics (the software program for survey development utilized at UNO), and the main purpose of the Facebook page was to assist in directing people to the Survey2. Instructions for how to enter the survey and respond were included on the Facebook page, on the link listed by Hanley Wood, and to all to whom the Survey2 was distributed.



*Figure 5.* Posting of Survey2 invitation.

I distributed Survey2 to numerous associations and concrete companies identified in the WICA survey, including: NAWIC, PWC, American Concrete Institute (ACI), National Ready Mix Concrete Association (NRMCA), Concrete Institute Management (CIM), LaFarge, Portland Cement, Holcim, Cemex, Oldcastle, Heidelberg, Vulcan, and smaller women in nontraditional occupations, as well as governmental entities involved with women and the trades (see Appendix M for lists of concrete and construction organizations and companies). The only variation in

survey questions for Survey2 is that questions specifically about WICA were revised to inquire about association and memberships in women's organizations more broadly. I did not receive responses from these organizations, and only received two completed Survey2s.

***Hanley Wood.*** Hanley Wood, a media company that services the housing and construction industry, initiated and managed the Women in Concrete (WIC) luncheons at the WOC convention until 2012 (see Appendix I). While representatives from Hanley Wood seemed very interested in participating in my research study, the ultimate result of the Hanley Wood poll, which was included in materials distributed to over 100,000 participants at the 2014 WOC convention, only receiving 17 responses. The Hanley Wood poll was a truncated version of Survey2, including a link to Survey2 asking if respondents wanted to go into more detail. Fourteen of 17 respondents were female. This was not a question that was tracked or asked of other respondents.<sup>4</sup> When responses to this poll supported other findings, and/or were interesting for comparative purposes, I include them in the analysis and indicate that they came from the Hanley Wood poll.

***WICA survey development and limitations.*** Data that WICA had available on-line (tweets, articles, publications, Women of Distinction Award recipients, biographies, and interviews), discussions with the founders of the organization, Kari Moosmann and Kimberly Kayler, and membership list access were used to develop a short survey (see Appendix B). The unique aspect of using the data available on WICA's website for the development of the survey questions is that it was collected largely for the benefit of women in the concrete industry, but had not yet been utilized in a research application. The data on the original website specifically included biographies of women nominated for the Women of Distinction award; interviews with recipients of the Women of Distinction award; tweets about various concrete and construction

related topics; summaries of the Women in Concrete Luncheon presentations and activities from all years in which the event was held; new developments in the concrete industry and women's involvement; and information on opportunities for participation, mentorships, and other relevant topics. Additionally, the original WICA website had a spotlight section where 9 women were highlighted. Some of the spotlight questions correspond to questions I asked in surveys and interviews. When data from the spotlight supports my findings and research, I indicate this.

While this was an appropriate utilization of secondary data, one of the shortcomings of this set of available data was that they were not originally collected following research protocols regarding sampling, reliability or validity measures. Additionally, while all the members of WICA with whom there was direct contact responded favorably to participating in the survey and research study, WICA is open to all women involved in concrete who are interested in participating, and therefore their membership pool is not necessarily representative of the true percentages of women working in various capacities within the industry (i.e., there is an overrepresentation of women involved in the financial, marketing and business sectors and fewer women actually working with their hands in the concrete industry within this organization<sup>5</sup>). Despite the limitations that the membership presents with regard to reflecting the industry overall, those who responded to the survey provided very descriptive and in-depth information on a number of issues, and it is evident that they took time to develop their responses.

*Use of survey data.* The purpose of the survey(s) was to gain general knowledge about women's participation in the concrete industry, and the importance of organizations such as WICA for women working in nontraditional occupations. I identified concrete as a subfield by disaggregating BLS and census data on construction. Next, in this research I compared those results with the results of the WICA survey to examine the extent to which WICA respondents

reflected the concrete industry overall, and the extent to which concrete reflects the pay ratio that the BLS found for women compared to men in construction (i.e., 92%). I identified patterns of participation based on region, types of jobs, salary, length of time in the industry, education, and other factors. Additionally, I determined that concrete demonstrates similar rates and types of participation by women as construction does more generally.

I conducted the survey with WICA members in 2012, and presented preliminary, descriptive-only aggregate statistics at the WOC in 2013. In addition to providing comparable information with the contextual data, the survey aids in gaining a deeper understanding of the following questions:

1. Why do women become involved in concrete?
2. Are there specific factors that led women to become involved in concrete?
3. What, if any, barriers have women faced in the industry?
4. How have women overcome these barriers?
5. Why is WICA important for women in nontraditional occupations?

Survey questions also included demographic questions to obtain data regarding geographical location, length of time in the industry, type of job/role in the industry, salary, education, specific experiences related to being a woman in the industry and why being a member of WICA was important to WICA members.

**Phone polls: The States of Washington and Louisiana, disadvantaged business enterprise lists “construction.”** In order to fully address Research Question 1 and generalize beyond WICA members, I conducted phone polls in Washington<sup>6</sup> and Louisiana. The disadvantaged business enterprises/WBE (i.e., women owned business enterprise) system is nationwide and public information, and one of the few places where public information

regarding women's ownership is accessible. Therefore, I conducted phone polls with disadvantaged business enterprises/WBE in two states. I decided to use phone polls, as opposed to surveys, because I assumed correctly that I could get a higher and faster response rate by asking the questions directly over the phone than distributing a survey and waiting for responses. I could not however, ask as many questions as were included on the survey, and so I limited the questions to focus on Research Question 1b, and I timed the calls to try to keep them under 3 minutes. I conducted the phone polls in December 2013 to January 2014 (Washington) and March/April 2014 (Louisiana) respectively. I selected businesses from the OMWBE<sup>7</sup> and the Louisiana Unified Certification Program (LAUPC)<sup>8</sup> using the search term *construction*. In Washington, the list included 224 disadvantaged business enterprises, whereas the list generated from Louisiana included 722. For Louisiana, I identified 209 as out of state and therefore eliminated them, resulting in a total of 531 calls, of which I contacted 363 (the remaining 168 had bad numbers or were no longer in business). The Washington list did not contain out of state contractors.

There are interesting reasons to compare Washington and Louisiana with regard to women's participation in construction, because in a number of important ways these two states are demographically, geographically, and politically very different. According to the U.S. Bureau of Labor Statistics (2010), Washington is among the top quarter of unionized states (4), whereas Louisiana is among the bottom quarter (47). Based upon the U.S. Census Bureau (2010) data, Louisiana is approximately 62.6% white, 32% black, 1.5% Asian, 0.7% American Indian and Alaska Native, and the rest other races (Native Hawaiian, Pacific Islander, some other race, and two or more races). In contrast, Washington is approximately 77.3% white, 3.6% black, 7.2% Asian, 1.5% American Indian and Alaska Native, and the rest other races (Native Hawaiian,

Pacific Islander, some other race, and two or more races). Additionally, Louisiana is one of the poorest states, and Washington is in the upper half of the country in terms of income-level. Last, Washington leans liberal and democratic, whereas, Louisiana leans republican, and conservative.

***Washington State phone poll.*** In terms of methodology, my purpose in comparing such different regions was to test rival theories. In Survey2, I truncated the following questions, which I asked during the phone poll conducted with Washington State disadvantaged business enterprises in December 2013 to January 2014. I identified the disadvantaged business enterprises selected for the poll using the OMWBE website, using the search term *construction*. The Washington State phone polls were conducted open-ended, meaning that I did not give the respondents answers, and I wrote down their responses. The following are the Washington State phone polls questions that I used in this study:

1. With which trades does your business primarily work?
2. Does your industry require specialized training?
3. Did you (owner) participate in specialized training before becoming an owner?
4. Did you (owner) work as a skilled tradesperson before becoming a contractor? Why/ or how did you enter the industry?
5. Does your business utilize apprenticeships or hire from apprenticeship programs? Why or why not?

***Louisiana State phone poll.*** I duplicated the phone poll study in Louisiana with some slight modifications. The Louisiana State list had numerous entities that were clearly operating out of state. The total on the list was 722, and of those, 209 were out of state. Out of state entries were immediately eliminated, bringing the total I called to 531. Second, I shortened the questions (from the Washington phone poll questions) as follows:

1. With which skilled trades does your business primarily work?
2. Does this industry require specialized education or training?
3. Describe training/education
4. Did you (owner) work in the industry before becoming an owner?
5. Why or how did you enter the industry?

For Question 5, possible answers were provided as follows: S = Studied construction in school; FR = Family/friend referral; NJ = Needed a job; GP = Good pay; I = Interesting work; EN = Economic necessity; FB = My family's business; O = Other; DK = don't know; in an attempt to obtain better results. These options correspond to questions I asked of WICA survey participants, Survey2, and Hanley Wood.

***Response from the Washington and Louisiana State phone poll.*** As for the Washington poll, there were 224 disadvantaged business enterprises on the original list. Of these, I made contact with 189 (i.e., 35 were bad numbers or no longer in service). Of the 189 I contacted, 81 participated in the poll (about 42% response rate). Sixty out of 81 required special training (special training includes certifications, higher education, apprenticeships, etc., not strictly on-the-job training). Sixty-four out of 81 worked in the industry before becoming owners. One hundred and two out of 224 were listed as WBEs (46%), and 23 out of 224 were listed as Minority Woman owned Business Enterprises (MWBEs; 10%). In many cases respondents answered on behalf of the owner (i.e., secretaries and office managers), and therefore, they were unable to state why/how the owner entered the industry, other than that they knew that the owner had worked in the industry before becoming an owner. Thus, results to Question 5 above varied, were not consistently reported, and hence I did not include them in the tabulations in Figure 11 in Chapter 5.

The disadvantaged business enterprise lists were extremely important for me in identifying women and minorities working in the concrete-construction industry, because these data were not captured in other places (i.e., NAICS, BLS, etc.). Women's organizations specific to construction (NAWIC and PWC) never responded to my numerous attempts in contacting them. Most concrete trade organizations (ACI, NRMCA, CIM) and large companies (LaFarge, Portland Cement, Holcim, Cemex, Oldcastle, Heidleburg, Vulcan, etc.) never responded either, despite my numerous attempts at contact. I utilized these disadvantaged business enterprise lists not only for answering the poll questions, but also in some cases they led to "mini-interviews." I also selected some business representatives to participate in full interviews. Some of the respondents to the polls were extremely forthcoming, and I categorized such in-depth discussions as "mini-interviews," which occurred at the conclusion of the poll questions. When these "mini-interviews" supported a finding, I indicated this in the findings section.

**Interviews.** I collected 18 interviews from 2012-2014, in various settings. Interviews<sup>9</sup> with Kimberly (mostly) and Kari had been on-going dialogues since the inception of this research study, which is appropriate for developing a case study of the organization (McLaughlin & Jordan 1999). The majority of the other interviews addressed both research questions, and were conducted at one point in time, individually with the interviewee and myself either in person or over the phone and lasted between 30 minutes to 2 hours. I used most interview data to fill in gaps in survey results.

I deliberately selected interviewees to represent a cross-section of independent contractors, students/interns, small business owners, concrete organization representatives, women in trades representatives, and tradeswomen. After compiling a report of the survey data, I conducted follow-up interviews with some of the respondents as well as with other women

involved in construction and non-traditional careers. Based on survey results, I developed more specific interview questions, which could have included some or all of the questions listed in Appendix C. The purpose of the interviews was to expand upon the following questions:

1. Why do women become involved in concrete?
2. Are there any specific factors that led women to become involved in concrete?
3. What if any barriers have women faced in the industry?
4. Why are so few women involved in the industry?
5. How do women feel about advanced education programs in concrete and construction management?
6. Is concrete a viable career path for women seeking economic independence and equality of pay?
7. What advice would long-term women in the concrete industry give to women starting out in the industry?
8. To what extent do new graduates feel their education prepared them for the demands of the field?
9. What is the importance of women's associations and/or women's organizations for women in nontraditional occupations, and how can such organizations remain relevant?

Additional questions approved by the IRB for interviews are included in the Appendix C. In addition, no interview participants were identified, except the founders of WICA (Kimberly Kayler and Kari Moosmann), which was also clearly stated in the IRB application for interview approval.

**Confidentiality.** I ensured confidentiality of interviewees regardless of whether I conducted the interview in person or over the phone. I digitally recorded most interviews, and when interviews were conducted without the use of a recording device, I took extensive notes and followed up with clarification questions via telephone conversations or e-mails. I removed all names except Kimberly and Kari, or recipients of awards listed on websites, on-line journals, or webcasts. Additionally, because some organizations and/or businesses that interviewees represent are so small that it would be possible to identify the source of the information, I renamed the organizations by their major function (i.e., legal organization, advocacy, apprenticeship).

**Selection.** I selected interviewees based upon a number of factors: some were referrals, some represented characteristics that were important to the research questions (occupation, organization, etc.), and some responded to the initial unstructured request for participants (cold calling), thus expressing interest in the research itself. Beginning in 2012, I conducted 18 interviews with a wide range of individuals. Some of the participants had worked in skilled trades industries for so long that they had done a number of activities and played a number of roles (i.e., apprentice, skilled tradesperson, advocate, representative, trainer, owner, contractor). Additionally, as one of the research questions is specific to women's organizations in nontraditional occupations, about half of the interviews were conducted with women who held positions within organizations or businesses that allowed them to provide insights about the organization as a whole. Thus, some of the interviewees are included more than once in the groups listed below, as they had the experience to talk about issues from multiple perspectives. The individual breakdown of interviews, and dates (month/date) when such occurred, is listed in Figure 6.

2 WICA Founders (ongoing since late 2011-present)
2 WBE Construction Company Owners:
1 MWBE—3/2014
1 White-Owned WBE—2/2014
2 CIM Students:
1 Currently in School—WOC 1/2014
1 Graduate who also worked as quality assurance— (ongoing for about a year 2012-2013)
2 Concrete Organization Representatives:
1 ACI—WOC 1/2014
1 NRMC—WOC 2/2012
1 Cement Mason—4/2012
1 Concrete Finisher—WOC 2/2012
1 Dispatch—12/2013
1 Ready-Mix Concrete Driver—12/2012
3 Other Skilled Tradeswomen:
1 Iron—12/2013
1 Operator—12/2013
1 Carpenter—12/2013
3 Other Directors of Skilled Trades Organizations
Legal—12/2013
1 Training—11/2013
1 Funding—11/2013
<hr/>
18 Total Interviews

*Figure 6.* List of interview subjects and dates of interviews.

As shown in Figure 6, some interviewees fall into more than one of the following groups: 7 organizational representatives (plus 2 owners); 12 concrete specific; 8 skilled trades (plus 2 students). The 7 organizational representatives and 2 owners were able to provide historical and analytical views of the landscape for women working in nontraditional occupations (economically, politically, legally), and insights into the organizational structures, successes, and failures of their respective organizations. The 12 listed as “concrete specific” were either representatives or owners of an organization/business that deals directly with concrete (concrete-construction company, NRMC, ACI, WICA), working in the industry (mason, finisher, dispatch, driver, quality assurance), or pursuing higher education in concrete-construction (students, the graduate student was in quality assurance). The 8 skilled tradeswomen included 3 who worked in

other skilled trades (iron, operator, carpenter) and 5 concrete specific occupations (mason, finisher, dispatch, driver, quality assurance).

***Limitations of interview data set.*** While I made every effort to include interviewees who could represent a broad cross-section of women working in construction nontraditional occupations, the views expressed herein still only represent the unique opinions of the individuals who I interviewed. I selected the interview candidates from a wide range of occupations in the concrete-construction industry, multiple types of organizations, and various places within a career trajectory (i.e., starting out on entry-level; studying in school; currently employed; looking to advance, and retired from the industry).

## **Data Analysis**

**Internal validity.** According to Yin (2003), internal validity techniques (pattern-matching, explanation-building, addressing rival explanations, and use of logic models) appropriate to case studies should be used to establish causal relationships and for explanatory or causal case studies (not for descriptive or exploratory studies; 2003). As the research questions in this study are all explanatory, data collected in all phases of this study were analyzed using the recommended techniques, which are explained in more detail in the following paragraphs.

**Pattern-matching.** I utilized content analysis of available data to identify patterns or themes. I identified patterns in survey responses within individual surveys (for internal consistency) and across responses to develop aggregate themes/patterns. I then compared these patterns to quantitative data, other original surveys/polls, content analysis data, and previous research studies. For example, I wanted to find out if similar patterns of participation were emerging in my data set of concrete as had been identified in the construction industry (e.g., overrepresentation in administrative functions). Had the participants in my study experienced a

“male-dominated culture,” faced similar barriers in the industry (as have previously been identified), and endured other experiences that have been expressed by women working in or considering entering nontraditional occupations?

**Qualitative content analysis.** I relied heavily on content analysis to identify consistent themes that emerged on the WICA website, twitter responses, and responses to questions that were posted on the website. I did this by analyzing the frequency of similar words, synonyms, and sentiments that I developed through coding the website and then grouping similar responses into categories.

Content analysis is widely used in qualitative studies, but is usually considered a technique rather than a method in and of itself. This technique involves identifying key words and synonyms to identify frequency of responses through the analysis of text, fill-in responses, interviews, and transcripts. This technique is used to interpret context-rich data that does not easily lend itself to quantitative analysis. There are methods for applying content analysis, some of which are more formal than others. For example, conventional content analysis typically involves the development of a coding scheme, derived directly from text (and thus requiring the transcription of all interviews verbatim). A directed approach generally uses theory to guide the categorization and/or codes. In a summative schema, comparisons (usually of keywords or content) and counting of those that arise from the data itself are then followed by an interpretation and development of themes based upon the underlying context. (Hsieh & Shannon, 2005, p. 1277).

By using the technique of content analysis, each of these general approaches was utilized. Theory and a more conventional coding scheme were used to analyze the WICA survey. As the

data grew, and the responses varied, the analysis transitioned into more of a summative technique in order to identify relevant patterns and themes (Hsieh & Shannon, 2005).

**Explanation, building, and addressing rival explanations.** Explanation-building incorporated women's stated experiences (from surveys, interviews, and polls) and involved examining the ability of theories mentioned in the literature review (glass ceiling, human capital theory, stereotype threat, self-efficacy, attribution theory, collaboration, cohort effect, crowding, discrimination, and self-selection/preference) to explain women's experiences from a theoretical perspective. This aspect also addressed rival explanations to identify the theory and/or elements of the theory that had the most utility in explaining women's experiences in the concrete industry.

### **Reliability**

Reliability is defined as the stability or consistency of an operational definition (Singleton et al.). An operational definition is a definition that can be systematically measured by independent researchers. An example applicable to this research is participation levels of women in the concrete industry, which is defined as the number of women working in different activities related to the concrete and construction industries that have been reported to and collected by the BLS and can be de-aggregated from NAICS data. While this information defines the numbers of women reportedly working in the industry and can be verified by any researcher using the same parameters, these numbers were not in and of themselves used to describe women's experiences in the industry.

A researcher may employ several methods to increase reliability (consistency), including test-retest, split-half, internal consistency, and inter-coder reliability. I tested and retested the survey instrument, and created it in UNO's Qualtrics survey software program. Questions were

included in the survey that helped in checking for internal consistency (and the survey program Qualtrics has multiple features that assist in the analysis of consistency between and among responses). Additionally, I utilized follow-up questions in interviews to ensure consistency. Inter-coder reliability was maintained because I was the only researcher who conducted the interviews and surveys. I recorded the interviews to ensure that I stated the questions in the same manner during interviews, and I analyzed those responses using consistent categories, which were further developed during the data collection phase of the research. In addition, in this research I employed each of the following steps to improve reliability: pre-testing the instrument, adding items of the same type to a scale, item-by-item analysis, and providing clear instructions to respondents. I employed these same steps when I distributed subsequent surveys to other organizations.

### **Validity**

There are several types of validity: construct, external and internal. According to Singleton et al. (1999), construct validity is defined as the congruence or “goodness of fit” between an operational definition and the concept it is purported to measure (p. 570). External validity is establishing the domain to which a study’s findings can be generalized. This research study showed that women’s experiences in the concrete industry reflect similar trends as in nontraditional occupations and the construction industry overall within the United States. Internal validity is the removal of biases or systematic errors, which in logical analysis means the adequacy of the reasoning principles (as opposed to the truth of the premises), which means that premises must be properly related to the conclusion so that the argument is logically correct (Singleton et al., 1999).

According to Creswell (2003) and Singleton et al. (1999), there are several threats to validity, including experimental procedures, treatments, experiences, and/or characteristics of the participants that threaten the researcher's ability to draw correct inferences from the data in an experiment (internal); researcher draws incorrect inferences from the sample data to other persons, other settings, and past or future situations (external); inadequate statistical power or the violation of a statistical assumption (statistical conclusion); and investigators use inadequate definitions and measures of variables (construct). Additional threats to both internal and external validity include true differences (between the concept the operation is intended to measure), systematic measurement error (factors that systematically influence either the process of measurement or the concept being measured), reactive measurement effect (respondents' reactions to participating in research effect the results), and random measurement error (temporary chance factors; Singleton et al., 1999).

According to Yin (2003), when utilizing a case study for research purposes, different methods for ensuring each type of validity (internal, external, and construct) and reliability should be employed at different phases in the research (e.g., research design-external validity, data collection-reliability and construct validity, data analysis-internal validity). Therefore, how each of these was addressed is discussed in more detail in the respective paragraphs that follow.

**Construct validity.** Three elements should be included in case studies to ensure construct validity: multiple sources of evidence, establishing a chain of evidence, and having a draft case report reviewed by key informants (Yin, 2003). The research I have presented here employed each of these in the case study protocol. I used multiple sources of evidence during the data collection phase of a case study to ensure construct validity. Throughout the data collection

and analysis phases I established a chain of evidence through pattern-matching, explanation building, addressing rival explanations.

**External validity.** According to Yin (2003), external validity (establishing the domain to which a study's findings can be generalized) should be done throughout the entire research process when utilizing a case study. He further explains that case studies rely on "analytical generalizations" to ensure external validity. "In analytical generalizations, the investigator is striving to generalize a particular set of results to some broader theory" (Yin, 2003, p. 37). In this study, I used results from previous research studies (see also literature review section), and theories about women in nontraditional occupations (specifically, theories introduced in the literature review, including cohort and glass ceiling theories, stereotype threat, etc.), as well as drawing upon research from gender, feminist, urban, and international development studies inform the development of questions to be asked of respondents, and hypotheses to be tested (see also research questions and hypotheses section of this chapter). I used results from the entire case study to determine that similar factors may affect women's participation in the concrete industry (as in other nontraditional occupations), and whether the concrete industry is a viable career path for women seeking economic independence and equality of pay.

## Endnotes

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<sup>1</sup> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration. (Johnson, Onwuegbuzie, & Turner, 2007, p. 13)

<sup>2</sup> Qualitative dominant mixed methods research is the type of mixed research in which one relies on a qualitative, constructivist-poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects. (Johnson, Onwuegbuzie, & Turner, 2007, p. 14)

<sup>3</sup> <http://ht.ly/e0VZE> password: wica2012

<sup>4</sup> Questions asked in the Hanley Wood poll questions are as follows:

- 
1. Approximately what percentage of women work at your place of employment?
  2. Why/how did you enter the concrete industry?
  3. How long have you worked in the concrete industry?
  4. What is your title/what do you do in the industry?
  5. Are you male or female?
  6. What advice would you give to someone just entering the concrete industry?

<sup>5</sup> This becomes clearer when examining the survey data regarding occupations and primary functions. Also, not included in this proposal.

<sup>6</sup> The results of the Washington poll were used to assist in developing legislation to access federal funding for training opportunities.

<sup>7</sup> <http://www.omwbe.wa.gov/>

<sup>8</sup> <http://www.laucp.org/ucp/>

<sup>9</sup> One of the first and most memorable group discussions I had with Kimberly and Kari (WICA founders) occurred while I was riding in a truck to a construction site with about 6 other laborers. I do not think they were aware of my situation, as I copiously wrote down notes while bumping along, requesting that my nearest neighbor hold the phone to my ear, and demanding absolute silence of the rest of my co-workers.

## **Chapter 4: Description of Respondents**

In this chapter I summarize and aggregate descriptive data about the research participants, specifically the respondents to the surveys, interviews, and phone polls, to give the reader a picture of who responded to the research inquiry, and from whom I gathered data to address the research questions. I did not collect the same information from all data sources (e.g. in the phone polls I did not ask about the size of the company where they worked; I did not tabulate interview responses in the same way that I collected information from the phone polls and surveys). Whenever I collected the same information from multiple sources, I put it in charts so that it could be easily compared. Information that I have included in this chapter is as follows: work schedules/environment, company size, percentage of women employed, profession and primary duties/functions, unionization, health care, children, salary range, location, length of time in the industry, and education/training (necessary for position and/or provided by company).

In total 323 unique individuals participated in my research (31 WICA survey, 2 Survey2, 17 Hanley Wood, 18 interviews, 81 Washington phone poll, 174 Louisiana phone poll). Additionally, WICA showcased 9 women in their spotlight feature and bestowed 3 Woman of Distinction awards. I included information about these additional 12 women when the data matched my own inquiry.

### **Work Schedules/Environment**

Over 90% of respondents to all data sources are full-time employees, but this does not mean that respondents work standard schedules weekly or regular hours throughout the year. The construction industry can be extremely cyclical, depending on climate, region, and funding cycles, especially for concrete and particularly when the concrete must meet certain standards in terms of strength. For example, for publicly funded projects, different phases of the project may

be approved at different times. For example, Even though funds may be released for a project, the foundation still has to be laid before the walls can be built, and so delays can occur depending on which phase is scheduled for completion. As such, depending where one works geographically, the workload, expectations, and environment may vary. For example, in hot climates, concrete sets very quickly, and if the team is not prepared, it can set before properly forming, or even inside the concrete truck itself, which is a tremendously expensive problem that can only be avoided by destroying the concrete in the truck (i.e., adding sugar, which kills the cement) or dumping it out. If concrete is not poured consistently into a form, breaks can occur that will lower the strength of the area, cause breaks to occur, or cause “cold joints” (when concrete dries and new concrete is poured over the dried area and cannot fully mix with the concrete that was already poured). If water mixes with the cement (i.e., rain, humid environment, water on the ground, etc.), it dilutes the strength.

All of the factors that can affect one’s work schedule have an influence on whether or not respondents decide to stay in the industry. It is a matter of preference, and some people like to have a set schedule, whereas many respondents like the variety that they experience in the field. In addition, depending on whether the respondents work for a large company, independently, or own their own businesses, they may or may not have health care. Seventy-six percent of survey respondents had health care, and 66% had children. I did not ask if the company provided child-care, but consistently respondents informed me that the responsibility of finding childcare falls squarely on the shoulders of women, whereas their male counterparts are not expected to make these arrangements.

For example, one interview respondent told me how she was amazed by her male coworker who simply assumed that whenever he had custody of his children that his mother

would watch them. This was a given fact for him, whereas she did not feel that women would necessarily have this option, or at least not so easily (R.L. personal communication, November 2014).

### **Size of Company & Percentage of Women Employed**

I wanted to ensure that I had a good representation of respondents working at different sized companies, because job satisfaction studies show that depending on worker values, the size of the company can be an important factor in how satisfied workers feel at their place of employment (e.g., workers who value a family dynamic tend to prefer small companies; workers who value clear progression and standardized rules tend to prefer larger companies). I combined the surveys (WICA, Survey2, and Hanley Wood) and the results were as follows: companies sized 1-30 employees comprised about 26.67%, 31-100 showed 30%, and over 200 showed 43.44%<sup>1</sup>

I did not ask the exact size of the business of disadvantaged business enterprise phone poll participants, although it could likely be located based upon public records<sup>2</sup>. Due to the qualifications required to be a disadvantaged business enterprise, it is likely that the majority of disadvantaged business enterprises included in this research were small businesses. Because respondents to the Hanley Wood poll were mostly distributors and producers, these respondents most likely represent large companies.

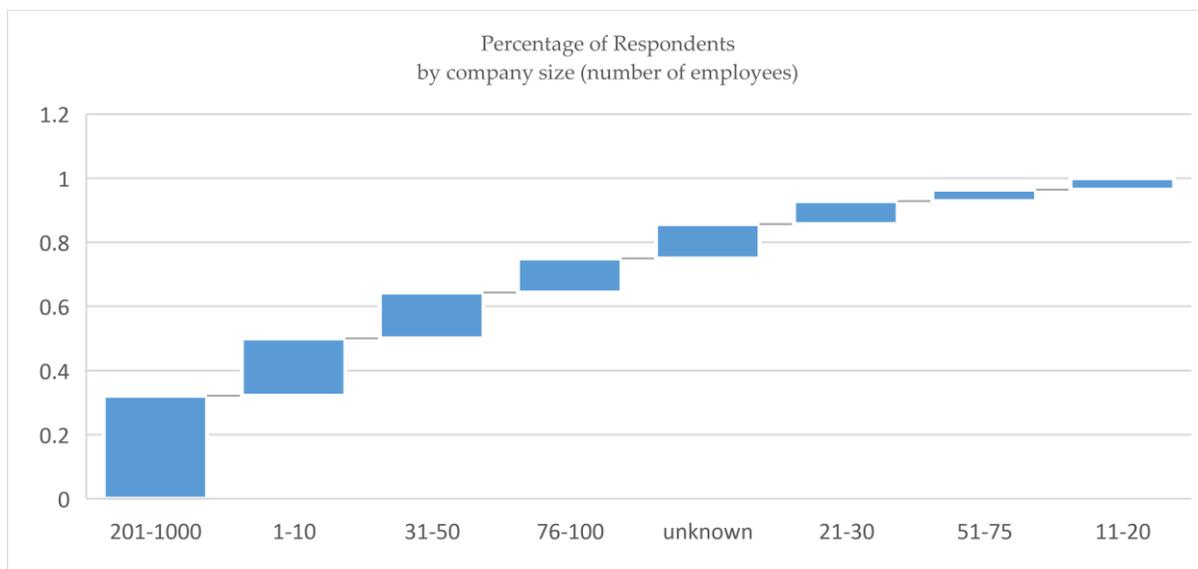
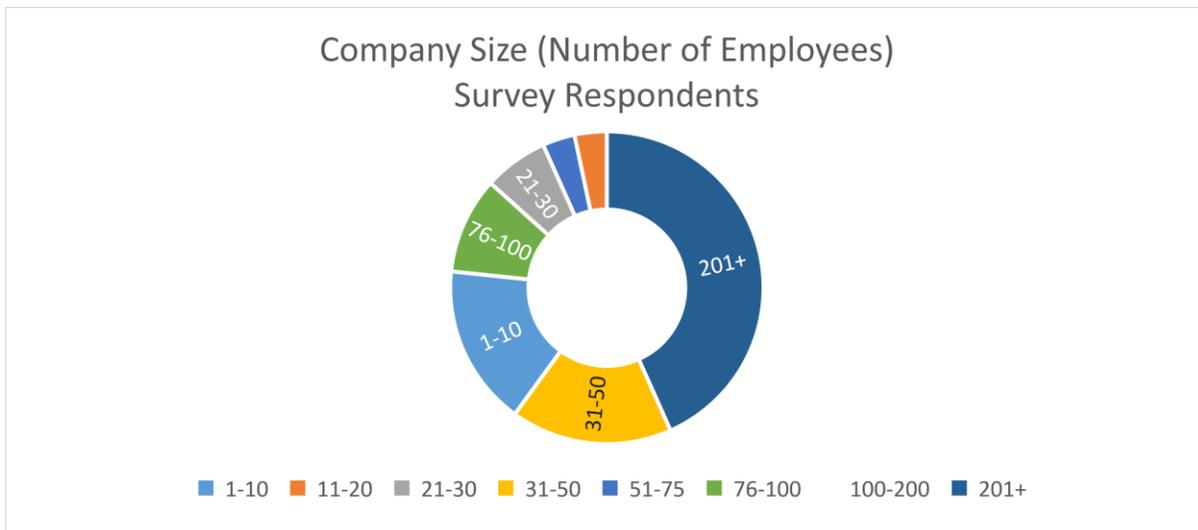


Figure 7. Company size (WICA survey).

Of the 18 people who I interviewed, 3 were independent contractors (so they had no employees or their company size was 1). The 2 WBE construction company owners had around 15 employees each. One student interned at a large corporation and the other interned at a very small family business. Three of the concrete specific employed individuals worked for small companies, and 1 employee worked for a very large company. The 2 WICA founders and the 3 directors of skilled trades organizations worked for medium-sized companies, and the 2 concrete

organization representatives worked for relatively large companies. In all, the interviews reflected a good cross-section of small, medium, and large companies.

### **Percentage Women Employed**

I was very interested in knowing the percentage of women working in the industry, for several reasons. First, in order to be a genuine nontraditional occupation, the percentage of women in the industry must be below 25%. Second, some analyses of the wage gap indicate that the greatest factor in a low pay gap is the percentage of women in the industry and that as more women enter the industry, real wages will go down.

The way I asked the question in the surveys regarding the percentage of women working at the company, made it challenging to de-aggregate this information from my data sources except in very broad terms, because I asked for ranges rather than exact numbers. For example, I asked the range in size of the company, such as 0-20 employees, and then in a separate question, the range in number of women employed, such as 1-5 women. Then I had to compare the ranges, rather than getting a hard number like 15 women out of 100 total employees. This was an error in the survey design that was not identified until well after the survey had been distributed and collected.

Overall, over 80% of respondents to surveys and Hanley Wood stated that less than 15% of employees in the company were women (65% respondents stated 1-20% women; 18% respondents stated 21-40% women; 12% respondents stated 41-60% women; 6% respondents stated 81-100% women).

For the disadvantaged business enterprises polls, the numbers were-also difficult to analyze. In order to qualify as a WBE, the company must have a majority percentage *ownership* of female, minority, or both, but this did not mean that the majority of *employees* were female or

minorities. Some of the listed disadvantaged business enterprises were extremely small companies. In terms of the interviews, the individual contractors comprised 100% of their companies and were female.

In general, the percentage of women working in the industry who participated in this study was consistent with the BLS data showing that women comprise around 1.1%-11% of the concrete industry, and definitely less than 25%, making it a genuine nontraditional occupation. Table 1 provides a summary of percentage of respondents by company size, and the number of women working there.

Table 1

*Percent of Respondents by Company Size*

% Respondents who work at size of company	Total Employees	Number of women
32.14%	201-1000	1-100
17.86%	1-10	1-6
14.29%	31-50	2-4
10.71%	76-100	5-12
7.14%	21-30	2-5
3.57%	51-75	10-15
3.57%	11-20	5

**Professions**

The percentage of women working in the construction industry has been difficult to measure, because in some estimates support staff and office workers have been included in the numbers. I wanted to know what the respondents to the surveys, polls, and interviews did professionally. Respondents comprised numerous professions, including, but not limited to architect, batch plant operator, cement mason, construction worker, consultant, dispatcher, estimator, engineer, financial services, finisher, general contractor, laborer, loader operator,

management, marketing/sales, office manager, order taking, owner, project engineer, quality assurance, secretary, superintendent, technician, and others.

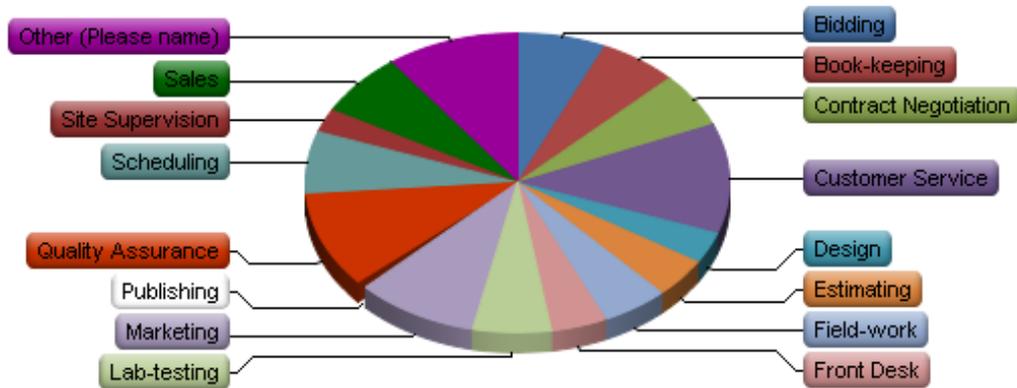
Based upon the responses to the surveys, I grouped the responses into the following categories: trade/technical skills; administrative, management and financial; and other. I put them in these categories, because they seemed to be the major groups into which the survey respondents belonged. The WICA survey respondents had the following reported percentage of professions:

- 22% (21 out of 94) Trade and Technical Skills (Batch, Dispatch, Finisher, General Contractor, Laborer, Loader Operator, Project Engineer, Quality Assurance, Technician)
- 66% (62 out of 94) Administrative, Management and Financial (Consultant, Estimator, Finance, Management, Marketing/Sales, Office, Order-taking, Owner, Secretary)
- 11% (10 out of 94) Other (Area operations manager, Research & Development Engineer, Purchasing, Operations Manager, Accountant & Safety Director, Education, CEO Global Cast Stone and nano cement science, Cement Finisher, Non-profit executive)

Hanley Wood grouped professions as follows: manufacturer/distributor (29%), concrete specialty contractor (24%), general contractor (6%), repair contractor (0%), designer (0%), and other (41%).

Answer		%
Architect		0%
Batch		7%
Consultant		7%
Dispatch		10%
Estimator		17%
Finance		21%
Finisher		0%
General Contractor		7%
Laborer		0%
Loader Operator		3%
Management		55%
Marketing/Sales		38%
Office		24%
Order-taking		10%
Owner		24%
Project Engineer		7%
Quality Assurance		24%
Secretary		21%
Superintendent		0%
Technician		14%
Other (Please name)		34%

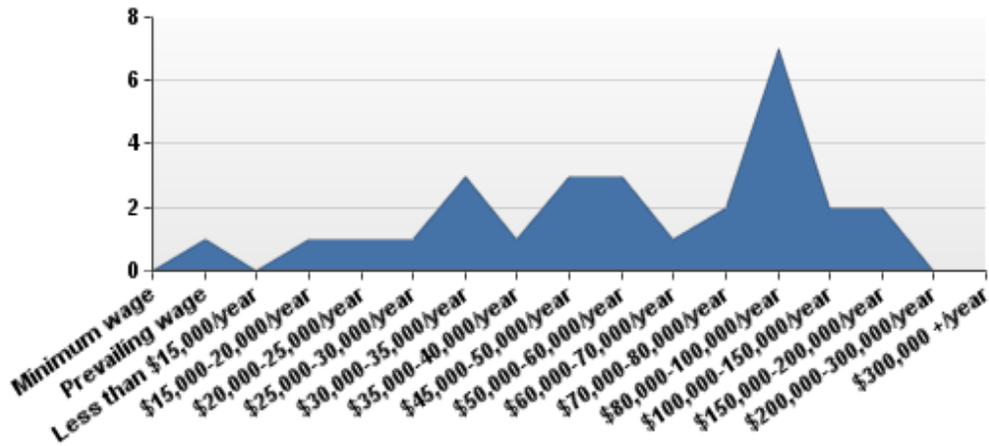
Figure 8. Primary professions of WICA survey and Survey2 respondents.



*Figure 9.* Primary duties of respondents (WICA survey and Survey2).

The Other category included the following: daily concrete manufacturing operations; research and development of new products using cementitious components; purchasing; management of staff, concrete plants, dispatch and concrete truck, and drivers; research and development and training; research and teaching; safety director; research; fiscal management; corporate strategy; research and education; and membership. I did not ask phone polled respondents this question directly, although some went into details about their functions.

## Earnings/Salary



Answer		%
Minimum wage		0%
Prevailing wage		4%
Less than \$15,000/year		0%
\$15,000-20,000/year		4%
\$20,000-25,000/year		4%
\$25,000-30,000/year		4%
\$30,000-35,000/year		11%
\$35,000-40,000/year		4%
\$45,000-50,000/year		11%
\$50,000-60,000/year		11%
\$60,000-70,000/year		4%
\$70,000-80,000/year		7%
\$80,000-100,000/year		25%
\$100,000-150,000/year		7%
\$150,000-200,000/year		7%
\$200,000-300,000/year		0%
\$300,000 +/year		0%
Total		100%

Figure 10. Salary of respondents (WICA survey and Survey2).

Salary information was important to determining if the concrete industry followed the same pattern as the BLS found, that women earn roughly 92% of what men earn for similar jobs. The WICA survey respondents show that they earn relatively high salaries. I did not ask Hanley Wood respondents or disadvantaged business enterprise phone polled respondents questions about salary. I asked Interviewees if it was economically worthwhile to pursue a career in a nontraditional occupation in the construction industry, and overwhelmingly the response was that the pay is good, especially when just starting out and if they entered the industry through an apprenticeship program they were able to earn while they were learning on the job. Interviews, survey respondents, and “mini-interviews” (following phone polls) indicated that there are other factors besides just pay that must be considered as well, such as unpredictable hours, being the only woman on a job site, and lack of respect.

### **Unionization**

I included the question about unions for a couple of reasons. First, unions tend to increase the wages of the workers in those sectors, as well as improve benefits and work conditions for workers. Even for nonunionized jobs, if those jobs are associated with unionized jobs, wages tend to rise. Additionally, companies often match union wages for non-union workers when there are mixed groups (i.e. union and nonunion workers) working on the same job site. According to available data and interviews, many of the pay rates are set by prevailing wages established by apprenticeships or unions. For positions that offer apprenticeships, the apprenticeship training sets the required minimums in terms of hours at each level and for different types of training, as well as tests for advancement and licensure.

Survey respondents were from most regions of the United States, as well as some international locations; and therefore, they represented both unionized and right to work states in

the United States. Of the survey respondents, 52% (15 of 29) employed union members, 45% (13 of 29) did not; and about 3% (1 of 29) did not know. The concrete-construction industry is not highly unionized, so it is not surprising to find that survey respondents' positions were also not highly unionized ( 7% reported Yes (2 of 29); 93% reported No (27 of 29). However, while concrete may not be unionized, concrete workers work alongside industries and workers that often are unionized, such as iron workers, engineers, general contractors.

I deliberately chose phone poll respondents from one highly unionized state (Washington) and one right to work state (Louisiana). Interviewees also represented a wide range of views regarding unions and participation within them. For some high skilled and safety sensitive trades unionization has played a large role historically, but not to a great extent in general construction or concrete. For some masonic craftsmen in Louisiana, there was a tradition of apprenticeships (i.e., plaster walls in NOLA), but many skilled crafts have been phasing out with the introduction of new materials that are cheaper and faster to install.

Overall, apprenticeships have been losing funding federally, have inconsistent state funding, and sometimes have to compete with unions for training dollars available to businesses. Thus, unions do not prove to be an access point for this group, but training programs, such as apprenticeships and other more formal training programs are sometimes an access point for women entering construction and other nontraditional occupations.

There were mixed opinions regarding unions. Most interviewees were supportive of unions, but some found that despite the benefits they had received as individuals from unions, the way that funding for training is allocated, unions and apprenticeship programs are put in competition with one another for those funds.

## **Education/Training**

Although I specifically wanted to investigate jobs that did not require higher education, the majority of survey respondents and interviewees had higher education. Several of the respondents had received 4-year degrees in other more traditional fields and later began their careers in construction. For example, two survey respondents had degrees in teaching, one had a degree in early childhood education, one had a degree in art history and English writing. Sixty-two percent of survey respondents had undergraduate degrees in a variety of disciplines.

Several survey respondents had degrees in civil engineering, one had a degree in architectural engineering, and one had a degree in construction management. The largest group of survey respondents had degrees in business, with one concentrating on accounting, one with a concentration in psychology, and another with a concentration in economics. In addition, several of the survey respondents also had advanced degrees, as follows: MBA in Marketing, PhD in Construction Management, MS in Structural Engineering, working on PhD in Civil Engineering, MSBA in Business Administration, Master's in Chemical Engineering degree, and Master's in Materials Sciences Engineering degree. The disadvantaged business enterprises phone polls also showed high percentages of positions requiring higher education. Education, training, and apprenticeship programs cannot be overlooked as access points for entry into nontraditional organizations, including the construction industry. A surprising number of respondents from all data sources had higher education degrees, even though this is not a prerequisite for a career in the concrete industry, or for entry-level positions in construction.

Of phone poll respondents, 83% in Louisiana and 74% in Washington stated that they required advanced education and/or specialized training. I drew phone poll respondents from the disadvantaged business enterprise lists in Washington and Louisiana, using the search term

*construction*, which is broader than concrete. *Concrete* was not a search option. I selected survey respondents for WICA, Survey2, and Hanley Wood from the concrete industry. Several of the interview respondents received their training through apprenticeships or on the job, except for the two students who were pursuing their undergraduate degrees, the directors of organizations, and the WICA founders, who also have degrees.

Additionally, on-the-job training from all data sources included safety training, such as OSHA 10- and 30-hour courses, and business skills training, such as sales, marketing, and negotiation training. Among concrete specific data sources (i.e., WICA survey, Survey2, Hanley Wood, and interviews), in addition to safety training, the training offered included several scientific and technical courses and training programs specific to the concrete industry. In Appendix M, I list organizations specific to the concrete industry and their websites, which include certification programs, online learning, publications, and other information. Specific trainings and certificate programs mentioned included:

- ACI courses (ACI offers a number of courses and certifications specific to the concrete industry, including field testing, DOT aggregate standards, and Portland cement technician). According to the American Concrete Institute (n.d.), Founded in 1904 and headquartered in Farmington Hills, Michigan, the American Concrete Institute is a leading authority and resource worldwide for the development and distribution of consensus-based standards, technical resources, educational & training programs, certification programs, and proven expertise for individuals and organizations involved in concrete design, construction, and materials, who share a commitment to pursuing the best use of concrete. ACI has over 95 chapters, 110 student chapters, and nearly 20,000 members spanning over 120 countries. (para. 1).

- National Ready Mix Concrete Association (NRMCA) courses (NRMCA offers a number of courses and certifications specific to the concrete industry, such as Concrete Technician Level 2, 3 and 4). According to the National Ready Mixed Association (n.d.), Founded in 1930, the National Ready Mixed Concrete Association is the leading industry advocate. Our mission is to provide exceptional value for our members by responsibly representing and serving the entire ready mixed concrete industry through leadership, promotion, education and partnering to ensure ready mixed concrete is the building material of choice. (para. 1)
- Leadership in Energy and Environmental Design (LEED), is changing the way we think about how buildings and communities are planned, constructed, maintained and operated. Leaders around the world have made LEED the most widely used third-party verification for green buildings, with around 1.85 million square feet being certified daily. (Leadership in Energy and Environmental Design, 2017, para. 1).
- “The U.S. Green Building Council (USGBC) is committed to transforming the way our buildings are designed, constructed and operated through LEED—the top third-party verification system for sustainable structures around the world” (U.S. Green Building Council, 2017).
- Command Alkon is software specific to the concrete-construction industry. The company offers training in their programs, and also can develop specialized programs for companies. According to Command Alkon (2017),  
For Producers, Haulers & Suppliers of Construction Materials . . . control, measure, integrate, and improve the performance of your operations with our suite of industry specific products. Solutions for batching, dispatching, automation, quality control,

logistics, fleet and workforce management, mobile computing, business intelligence, office and more. (para. 1).

- WOC courses are offered by various vendors, such as all phases of epoxy injection, from pump usage and maintenance, inspecting a job, and material safety (World of Concrete, 2017).

### **Association Membership**

I suggest in this research study that associations may be particularly important for women who work in nontraditional occupations, because women experience occupational isolation. I thought that women would want to expand their networks within the industry, get training, and stay up to date on the most recent research and methods, and perhaps connect with other women working in the industry. There are also many different types of membership organizations, including unions and alumni associations, as well as trade organizations, and advocacy networks. I found that many of the initial trailblazers in construction did not enter the industry to be advocates for women. They joined trade associations so that their voices and concerns were heard and recorded, but many of them just wanted to do their jobs without being harassed.

I asked respondents to the WICA survey, Survey2, and interviewees if they were members of associations. In addition, in the original WICA website, the spotlighted women were also asked about their association memberships. Last, in some of the “mini-interviews” following the phone polls, some of the respondents informed me of their memberships to different associations. Obviously, all of the disadvantaged business enterprise participants are at the very least certified disadvantaged business enterprises.

I asked this question because I wanted to know what other resources or systems of support women utilize, because they experience occupational isolation. Associations are one

important way that women can access training and network, and women's associations are particularly important for men and women, because they highlight women's accomplishments and can provide an avenue for young people in career exploration. However, associations or employers currently do not offer most forms of support that women need to be successful, which include clear career paths in the industry, opportunities to experience different occupations, and access to support systems (i.e., childcare, transportation, tools).

**Survey (WICA and Survey2) responses.** The following list shows the survey responses for association membership (see also Appendix M):

1. ACER: ACER Associates, LLC (environmental, geophysical, geotechnical consulting) <https://www.acerassociates.com>
2. ACI: American Concrete Institute <http://www.concrete.org/general/home.asp>
3. ACPA: American Concrete Pavement Association <http://www.acpa.org/>
4. ACS: Advanced Construction Services <http://www.acsconstructioninc.com/>
5. ASCC: American Society of Concrete Contractors <http://www.ascconline.org/>
6. ASCE: American Society of Civil Engineers <http://www.asce.org/>
7. CFA: Concrete Foundation Association <http://cfawalls.org/about-the-cfa/>
8. EMA: Environmental Managers Association
9. ICRI: International Concrete Repair Institute <http://www.icri.org/>
10. IRMCA: Indiana Ready-Mix Concrete Association
11. NABWIC: National Association of Black Women in Construction [nabwic.org/](http://nabwic.org/)
12. NAHB: National Association of Home Builders <http://www.nahb.org/>
13. NAPW: National Association of Professional Women  
<http://www.napw.com/Index.cfm>

14. NAWIC: National Association of Women In Construction [www.nawic.org/](http://www.nawic.org/)
15. NRMCA: National Ready-Mix Concrete Association <http://www.nrmca.org/>
16. PCI: Precast/Pre-stressed Concrete Institute <http://www.pci.org/intro.cfm>
17. Pre-cast Organizations
18. PWC: Professional Women in Construction [www.pwcusa.org/](http://www.pwcusa.org/)
19. USGBC: US Green Building Council <http://www.usgbc.org/>
20. USSD: United States Society of Dams <http://www.usdams.org>
21. WIC: Women In Construction
22. WICA: Women In Concrete Alliance [www.womeninconcrete.org/](http://www.womeninconcrete.org/)
23. Chamber of Commerce
24. Women In Trades, Tradeswomen, Inc. [www.tradeswomen.org/](http://www.tradeswomen.org/)
25. American Concrete Pipe Association [www.concretepipe.org/](http://www.concretepipe.org/)
26. Southern Interior Construction Association <https://www.sicabc.ca/>

**WICA website spotlight responses.** The following list shows the WICA website spotlight responses for association membership:

- Ready Mix Concrete Association (RMCA)
- National Precast Association (NPCA) [www.precast.org/](http://www.precast.org/)
- American Concrete Institute (ACI)
- Women in Concrete Alliance (WICA)
- Associated General Contractors (AGC)
- Association of Young Professionals
- American Marketing Association
- Toastmasters International

- Construction Writers Association
- American Society of Concrete Contractors
- American Segmental Bridge Institute
- Concrete Industry Council
- Associated Builders and Contractors (ABC)
- International Grooving & Grinding Association (IGGA)

### **Length of Time in Industry**

I wanted to know if the concrete industry offered a viable career path for women. If so, I would expect to find that women work in the industry for several years, and possibly even retire from it. I was unable to collect data on the attrition rate of women, or women who left the industry to pursue a different occupation in another sector. Therefore, the data that I collected was from women who were at the time employed in the industry, which does not provide a complete description of attrition. Additionally, I deliberately selected interview candidates who had enough experience in the industry to provide historical information about women's participation, so the interviewees were somewhat skewed representing greater time spent in the industry. I had no influence on the survey respondents.

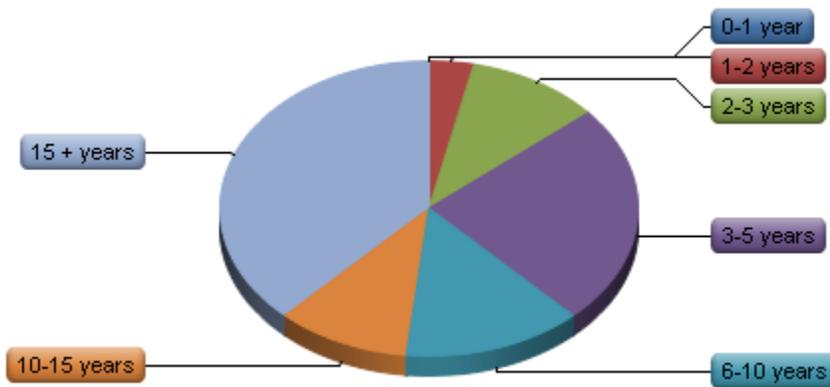
This section describes the length of time in industry of respondents. Figure 11 shows a visual representation of time in industry by data source. Table 2 shows years in industry by data source (i.e., Surveys [WICA and Survey], Hanley Wood, and Interviews).

Table 2

*Years in Industry by Data Source*

Years in Industry	Surveys (WICA and Survey2)	Hanley Wood	Interviews
0-1	0	12%	11%
1-5	37%	12%	11%
6-10	14%	6%	0
10-15	10%	18%	22%
15+	38%	53%	56%

**How long have you worked in the concrete industry?**



Answer	%
0-1 year	0%
1-2 years	3%
2-3 years	10%
3-5 years	24%
6-10 years	14%
10-15 years	10%
15 + years	38%
Total	100%

Figure 11. Visual representation of years in the concrete industry.

## **Summary: Description of Respondents**

The purpose of this chapter was to describe the participants in this mixed methods study, because the themes that I developed to address the research questions were based upon information provided by the respondents. In this study, I included different data sources: surveys, phone polls, and interviews. This chapter summarized the following information about the data sources, and why I collected it, including: work schedules/environment, company size, percentage of women employed, profession and primary duties/functions, unionization, health care, children, salary range, location, length of time in the industry, and education/training (necessary for position and/or provided by company), and association membership.

## **Endnotes**

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<sup>1</sup> I do not have exact statistics on company size from Hanley Wood respondents. As the sponsor for WOC, I know they deal with companies of all sizes, but I believe that the respondents largely came from very large companies, because of the way that they broke out professions (distributors and producers are all large corporations).

<sup>2</sup> Throughout my conversations during the polls, I would estimate that over 50% of the listed disadvantaged business enterprises have less than 30 employees, and therefore are very small businesses, but this is only an estimate.

## Chapter 5: Summary of Findings

In conducting this study, I primarily relied upon original data collected from the research instruments (surveys and polls) that I designed, as well as interview and available data. When I began this research study, I found numerous gaps in the literature that I intended to fill. Since 2014, researchers have published new studies that corroborate some of my findings. Throughout this research in order to derive findings, my process has been dependent on referring to the research questions. I developed the research questions intentionally to gain a comprehensive understanding about the topic, but gaps remain. The research questions provide boundaries for the study. In collecting data from multiple angles, perspectives, and through different levels of intimacy, I was able to obtain overlapping evidence to answer the research questions.

In this chapter, I summarize the findings from this mixed methods study into themes. Themes are categories or patterns of responses that occurred frequently and were supported by multiple sources of data. I developed the themes using pattern matching across different data sources. Many of the survey questions required the respondents to write in their responses, and the WICA website was rich in text, so I developed a coding system for this data. I used the coded data to develop categories, and then cross-referenced patterns of responses with interview and phone poll data. When multiple data sources expressed similar sentiments, I categorized this as a theme. Additionally, I use the research questions as the framework for analysis, so in developing each theme I also relate each one back to the research question(s) it addresses.

The purpose of this chapter is to provide an overview of the major findings, which I have developed into themes. As Research Question 1 (and sub-questions) focuses on individuals, Research Questions 2 focuses more on organizations. I collapsed the themes into themes for individuals and for organizations, but there is overlap. Additionally, while I introduce the themes

for organizations in this chapter, I go into more detail about those four themes in the next chapter in the case analysis of WICA. First, I will give an overview of all the themes. The rest of this chapter is organized by presenting each research question and the themes that relate to it, and then unpacking the themes with supporting data, such as direct quotes or composite responses from participants. Again, the four themes related to organizations will be discussed in more detail in the next chapter, but they are included in the list of all themes in this chapter for your reference.

### **List of Themes**

These are the individual themes:

- Theme 1: “Love” the work itself
- Theme 2: Working in the industry leads to ownership, but must have the experience and understand the industry.
- Theme 3: Longevity/Viability: This is a viable career path. If women make it through the first few years, they tend to stay for the long-term, as well as advance.
- Theme 4: Good pay
- Theme 5: Sense of accomplishment
- Theme 6: Entering the industry still relies heavily on access points. The main access points identified in this research include family/friend referral and training programs (such as education).
- Theme 7: Mentors
- Theme 8: Strategies for perseverance include gain knowledge, participate, maintain integrity, and be prepared.

- Theme 9: Women still feel they are not respected or accepted, and that they have to fight against stereotypes.
- Theme 10: Sexual harassment has been reduced, but it still exists, and women continue to experience sexual discrimination. There is a lot of frustration that laws that have been in effect for nearly 30 years now are still not being enforced.

The following are the organization themes:

- Theme 11: Funding
- Theme 12: Focus: Organizations need to focus
- Theme 13: Advocacy
- Theme 14: Increase opportunities and access

### **List of Themes by Research Question**

*Research Question 1: Why do women participate in the concrete/construction industry?*

- Theme 1: Because they find the work interesting, and love the work.
- Theme 5: Because they enjoy the sense of accomplishment for performing a job well done.

*Research Question 1a: To what extent is the concrete/construction industry a viable career path in terms of economic independence and equality of pay?*

- Theme 2: Experience in the industry can be a pathway to ownership of a company.
- Theme 3: Longevity/viability—respondents tend to stay for the long-term, or determine early on that they are not suited for it.
- Theme 4: Better pay than most positions for women just starting out.

*Research Question 1b: How did women initially become involved in the industry?*

- Theme 6: Access points—education/training, family/friend referral

*Research Question 1c: Why do women enter and stay in nontraditional occupations, despite the additional challenges they may face as minorities within the industry?*

- Themes 1, 4, and 5
- Theme 7: Having a mentor
- Theme 8: Strategies for perseverance

*Research Question 2: Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields?*

- Theme 9: Lack of respect/stereotypes
- Theme 10: Sexual discrimination/enforcement of legislation
- Theme 13: Advocacy
- Theme 14: Increase opportunities and access

*Research Question 2a: How can those organizations remain relevant? Research Question 2b: What, if any, additional support systems are available to women?*

- WICA case analysis—lessons learned
- Theme 11: Funding
- Theme 12: Focus: Organizations need to focus

### **Unpacking the Themes by Research Question**

In this section of the chapter, I will list each research question and corresponding theme separately. I provide supporting documentation as either direct quotes or composite responses and put these responses in graphical representation whenever possible to show how I arrived at that theme.

**Research Question 1: Participation.** Why do women participate in the concrete/construction industry? According to the analysis, love of the work (Theme 1) and sense of accomplishment (Theme 5) are the two themes that answer this research question.

Why/how did you enter the industry?	WICA	% rs	Hanley Wood	% rs	Survey2	% rs	LA Phone Poll	% rs	Total	Percent of total responses
Studied construction in school	7	15	3	11	1	14	7	9	18	11.25
Family/friend referral	10	21	5	18	1	14	7	9	23	14.4
Needed a job	9	19	8	29	1	14	2	3	20	12.5
Good pay	4	8	3	11	2	28.5	13	17	22	13.75
Interesting work	5	10	5	18	2	28.5	17	22	29	18.13
Economic necessity	2	4	0	0	0	0	2	3	4	2.5
My family's business	5	10	2	7	0	0	13	17	20	12.5
Total responses (rs)	48		28		7		77		160	
Total # respondents (rd)	31		17		2		71		121	

*Figure 12.* Aggregate reasons for participation in the concrete industry. Responses were to the following question: Why do women participate in the concrete industry? Includes data sources in which the question was asked in an identical fashion (i.e. WICA survey, survey 2, Hanley Wood, LA phone poll).

**Theme 1: Love the work itself.** From Figure 12, the aggregate of all of the responses shows that the number one response why women participate in the industry was because the work was interesting. All interview respondents involved specifically in concrete indicated that they found concrete fascinating and that there were many opportunities available in the industry.

Kari Moosmann (2008) summarized the sentiment nicely stating, “The one consistent theme among speakers is that they all have a cause, or a mission that they believe in. They want to let others know just what concrete can do, because they believe it can change the world” (para. 4).

Respondents to the surveys, polls and interviews consistently stated that they “like, love, enjoy” the work itself. Excerpts of some interviews include the following:

- I couldn’t imagine being stuck in an office all day.
- I couldn’t imagine going to the same place every day.
- I started doing it, was good and liked it.
- I had a knack for it, despite being insecure.

***Theme 5: Sense of accomplishment.*** Interviews reflected that the “sense of accomplishment” for a job well done is one of their favorite aspects of construction work. A consistent response from interview respondents was that they like to see the “products of their efforts.” Respondents from all sources enjoyed the sense of accomplishment they felt in completing the following:

- having a tangible finished product
- making a mark on the community
- Showing competence by producing something they may not have felt confident they could do before actually doing it.
- Being able to say, “I built that.”

Additionally, there was a great deal of pride in respondent’s answer to this question. Some of the confidence that interview respondents reflected in their answers included in Figure 13.

**Responses Showing a Sense of Accomplishment**

- I like knowing that I contributed to the creation of the [building] even if you can't see what I did. I know what I did, and I know what's there.

**Responses Showing an Exceptional Sense of Pride**

- I know it's going to hold.
- It's safe and it's pretty to look at.
- My work isn't sloppy.

Figure 13. Examples of survey responses about a sense of accomplishment and pride.

Table 3

*What are some of your favorite aspects of your job (WICA survey)?*

Answer	%
Interacting with clients/customers*	65
Interacting with co-workers	48
Solving problems*	87
Meeting new people	61
Learning about new products	61
Teaching/training people	45
Field-work	52
Finishing projects	39
Meeting deadlines	32
Other	19

Note. \* Favorite aspects of the work.

As shown in Table 3, responses from the WICA survey indicates that “solving problems” is the highest scoring area, which also ties into a sense of accomplishment.

**Research Question 1a: Viable career path.** To what extent is the concrete/construction industry a viable career path in terms of economic independence and equality of pay? According to the analysis, experience as a pathway to ownership (Theme 2), longevity/viability (Theme 3), and better pay starting out (Theme 4) are the three themes that answer this research question.

Table 4

*Comparison of Results and Raw Data for the States of Washington and Louisiana*

Category	WA state	%	LA state	%
Requires special training/education	60/81	74	144/174	83
Worked in industry before ownership	64/81	79	156/174	90
Listed as WBE	102/224	46	174/513	34
Listed as MWBE	23/224	10	64/513	12.5
Total contacts	189		418	
Total respondents (response rate)	81 (81/189)	43	174 (174/418)	42
Total Calls	224		531	

**Theme 2: Pathway to ownership.** The overarching theme that emerged from the phone polls conducted in both Louisiana and Washington is that experience in the industry is a valid and viable pathway to ownership of a company. The means by which women entered the industry initially varied, but experience in the industry is a crucial and necessary step towards entrepreneurship. This was supported by interview responses as well as survey data, for example the following are direct quotes from a variety of sources:

- “Opportunities for advancement for women are high and fast” (survey response).
- “Good women will continue to work, because contractors get their numbers” (Washington State poll participant, personal communication, November 2013).
- “A good woman is worth her weight in gold” (R.L., personal communication, November 2014).
- “[You] can rise faster than in other industries” (survey response).

Women also persevere in the industry and follow paths besides entrepreneurship or becoming independent contractors, such as advocacy, training, and mentorship.

Overwhelmingly the concrete-construction industry can be a career path for women that leads to economic independence and equality of pay, but it remains a path that is not easily

entered (for a number of reasons), not for the faint of heart (i.e., not everywoman), and may be misleading (i.e., hourly rate does not equate with living salary because the work schedule can vary so much). According to nearly all interviewees, available data, and many survey and poll respondents, the construction industry overall can provide a relatively fast route to ownership, entrepreneurship, and/or becoming a contractor, which all provide opportunities for women to independently regulate their own productivity and earnings. Additionally, the phone polls clearly indicate that working in the industry is a pathway to ownership (Washington, 79%, Louisiana, 90%).

Some of the participants (interviews and phone polls) found that they were actually better positioned after the economic downturn. For example, because so many companies had gone out of business, there were fewer contractors with whom to compete. When the economy began to rebound, the limited number of businesses that were still available made them much more competitive. This was particularly beneficial to registered disadvantaged business enterprises, because general contractors bidding on projects that have federal funding must comply with minimum levels of disadvantaged business enterprise participation, and as one of my interviewees stated, “a good woman is worth her weight in gold” (R.L. personal communication, November 2014). Nevertheless, many phone poll respondents would like less government intervention. As one interviewee stated, “Stop telling me how to run my business” (Louisiana phone poll respondent, personal communication, March 2014).

While experience in the industry can lead to ownership, this path is not fixed, direct, guaranteed, or for everyone. The most skilled craftsperson may not be interested in developing the additional skills required to become an entrepreneur, or have the working capital to do so.

**Theme 3: Longevity/Viability.** The majority of WICA respondents had been working in the industry for over 10 years (52%), and 42% for over 15 years. Eleven out of 18 of the interviewees had also worked in various capacities within the industry for at least 10 years, and two respondents even had retired. An effort was made to identify interview participants with experience, but the respondents from all data sources were fairly skewed with either having a lot of experience or very little. Figure 11 in Chapter 4 shows a visual representation of time in industry. Table 2 Chapter 4 shows years in industry by data source (i.e., Surveys [WICA and Survey2], Hanley Wood, and Interviews).

The responses from all data sources show that over 50% of all respondents had worked in the industry for over 15 years, which shows longevity. Since this nontraditional occupation can be challenging for women, if it was not a viable career path, one would not expect such longevity. The means by which respondents entered the industry varied, but the important point for this theme is that they stayed. Why they stayed also varied, but the main reasons were due to good pay, interesting work, and a sense of accomplishment.

**Theme 4: Good pay.** The phone polls indicate that one of the major reasons why respondents enter the concrete-construction industry is due to high pay. While this is not clearly evident amongst the WICA survey respondents, the majority of WICA respondents earned good salaries (higher than for other women with similar education, etc.) and almost all respondents have been in the industry for many years. Another theme that emerged strongly through the phone polls, and also is supported by interview data, is that women enter the industry because it offers better pay than other entry-level positions. As one interview respondent stated, “As a single mom it was the only way to get a living wage. It’s not the same anymore” (H.S., personal communication, November 2013).

Another factor that scored high among respondents was needed a job and economic necessity. The beginning wage in this industry is higher than traditional jobs for women and cannot be overlooked as a reason why women enter the industry. Additionally, the phone polls indicated that one of the major reasons why respondents entered the concrete-construction industry was due to high pay.

**Research Question 1b: Initial involvement in the industry.** How did women initially become involved in the industry? According to the analysis, access points, such as education/training and family/friend referrals (Theme 6), is the theme that answers this research question. Figure 14 shows the most frequent access point to entering the industry is via family or friend referrals. While needing a job scored higher than studying concrete in school, formal education cannot be overlooked as an access point for entering the industry.

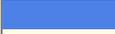
Answer		%
Studied concrete in school		24%
Family/friend referral		31%
Needed a job		31%
Good pay		10%
Interesting work		17%
Economic necessity		7%
Family business		14%
Other		17%

Figure 14. Access points to entering the concrete industry by surveys. The information is from the combined WICA survey and Survey2 results.

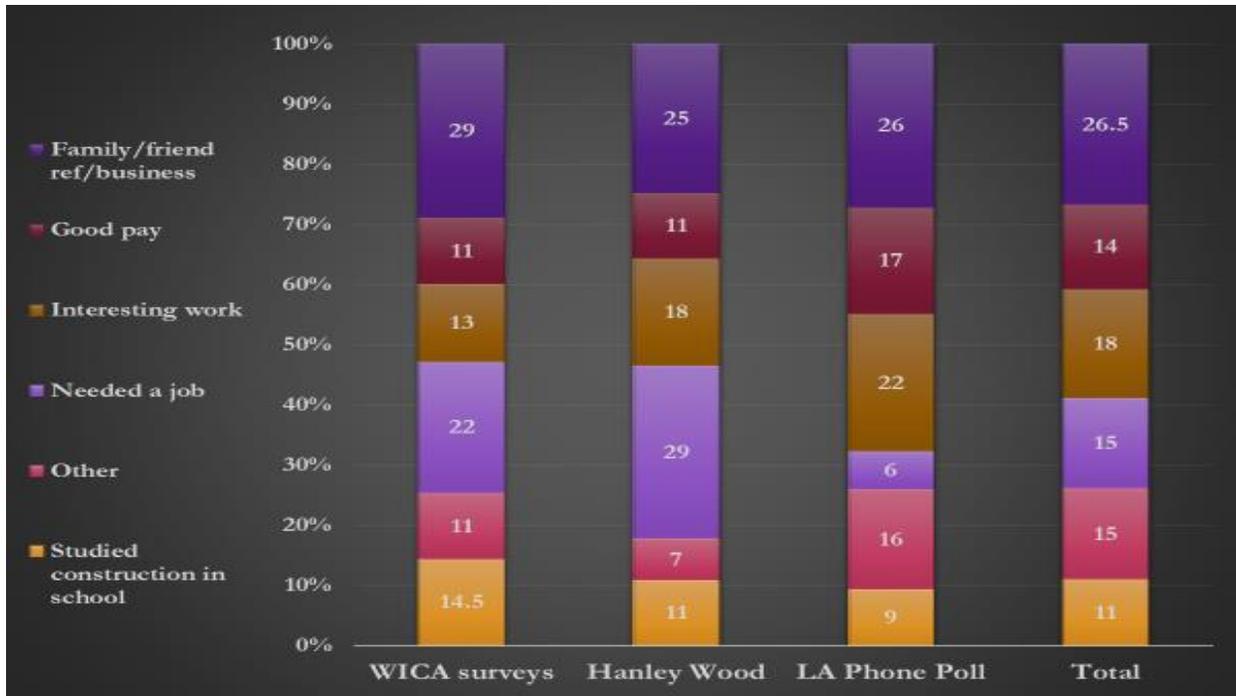


Figure 15. Access points to entering the concrete industry by surveys and LA phone poll.

**Participation and initial involvement.** Reasons why women participate and how they entered the industry are in some ways as diverse as the women who responded. Nevertheless, numerous job satisfaction surveys have been conducted over time that indicate that women score higher in certain job satisfaction categories within the skilled trades industries than others. I identified the categories utilized for the surveys using available data and content analysis of the WICA website. In order to expedite responses, potential responses were provided for the WICA survey, Hanley Wood, Survey2, and Louisiana phone poll. There are problems with providing potential answers for respondents, but this is a method that is widely used and accepted. In contrast, Washington phone poll respondents were simply asked the open-ended question, “Why or how did you enter the industry?” For this reason, the Washington phone poll responses could not be tabulated the same way as the other data sources. As such, responses were placed in each category where appropriate, but the majority of responses fell into the “other” category. In

addition, WICA showcased numerous women on the website and published their responses to a series of questions. One of the questions was “How did you get the position you currently have?” I summarize the results of all polls/surveys to Research Questions 1 and 1b in Figure 15. The two students particularly were interested in the specific degrees that they were pursuing because they focused on/provided specializations in concrete. According to one student, “any construction management career would be remiss without a clear understanding of principles of concrete and business management” (E.W., personal communication, January 2012). The following themes answer Research Question 1 and 1b: interesting work (Theme 1), sense of accomplishment (Theme 5), good pay (Theme 4), and access points—Family/friend referral, education (studied in school) (Theme 6).

Why/how did you enter the industry?	WICA	% rs	% rd	Hanley Wood	% rs	% rd	Survey2	% rs	% rd	LA PP	% rs	% rd	WA PP	% rs	% rd	Total
Studied construction in school	7	15	23	3	11	18	1	14	50	7	9	10	15	24	35	18
Family/friend referral	10	21	32	5	18	29	1	14	50	7	9	10	3	5	7	23
Needed a job	9	19	29	8	29	47	1	14	50	2	3	3	2	3	5	20
Good pay	4	8	13	3	11	18	2	28.5	100	13	17	18	3	5	7	22
Interesting work	5	10	16	5	18	29	2	28.5	100	17	22	24	6	10	14	29
Economic necessity	2	4	6	0	0	0	0	0	0	2	3	3	1	2	2	4
My family's business	5	10	16	2	7	12	0	0	0	13	17	18	4	6	9	20
Other	See list below	7	19	2	7	12	0	0	0	See list below	16	17	28	45	65	See lists
Don't know	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	5	6	0	0	0	
Total responses (rs)	48			28			7			77			62			160
Total # respondents (rd)	31			17			2			71			43			121

Figure 16. Poll/Survey summary/results for Research Question 1 and 1b. [KEY: red = #1 response; yellow = #2 response; blue = #3 response]; WICA showcase responses: 3/8: Family; 2/8: Needed a job; 3: Other (interesting work, entrepreneurial spirit, passion).

**Theme 6: Access points—family business; education.** The top two responses to how women entered the industry were through family/friend referrals, and education. Even among the women showcased by WICA, 3 out of 8 entered the industry via family connections. Some important distinctions need to be made about *when* the women under review entered the industry, because in many cases, career paths have been based upon different opportunities that have become available at different times due to changes in federal funding, locality, political will, and other reasons (family history in the industry, upbringing—patterns of gender stereotypes which include both within the immediate family, larger community environment, and culture of the society, etc.). This has had a major effect on women’s entrance into the industry and whether or not they chose to stay.

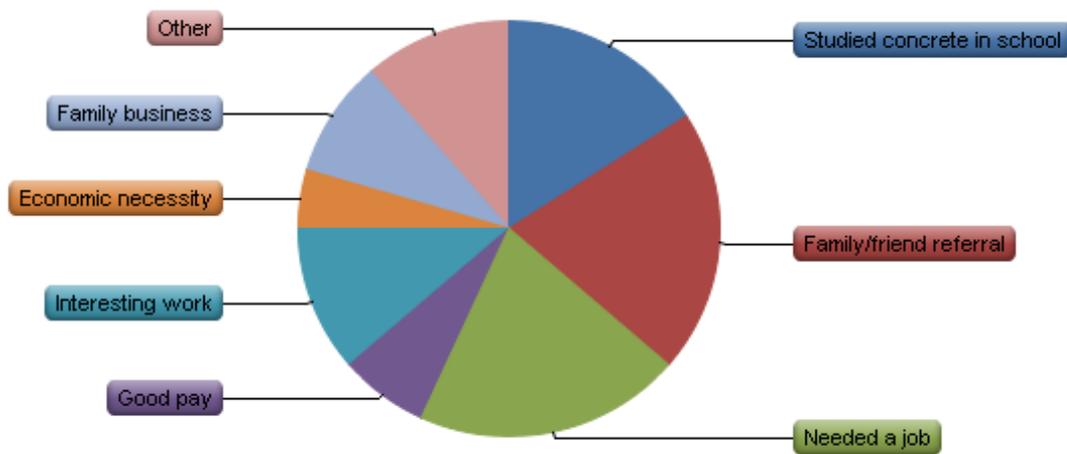


Figure 17. How/Why WICA survey respondents entered industry.

Many of the trailblazers entered when the Comprehensive Employment and Training Act was largely funding apprenticeship training and focused on women entering the workforce in the 1970s and 1980s. This meant that women could earn money while they were in training, which was very important for single mothers to earn “what men would make.” Another wave of women entering the construction industry came in the 1990s and were largely comprised of women who

were fortunate to grow up in the industry through friends or family, and thanks to some changes in legislation and cultural views, they were well positioned to take over their family businesses. Throughout each of these waves and still today, education and training play key roles as access points for women exploring or beginning careers in the construction industry.

The role of family in terms of cultural views toward the construction industry plays an important role in women's access to the industry and thus pursuing it as a career. In the "Blue Collar Transportation Careers Task Force" the term *blue collar* was hotly debated and was a deliberate choice made by participants. Skilled trades and blue-collar professions in U.S. society are not given much attention in academic literature and in some cases not highly regarded. Not only does the AGC make the claim that there is a general cultural lack of respect for blue collar professions, many of the participants in this research feel the same. For example, according to one survey respondent:

To change the minds of people who think college is for everyone. To make people aware that right brain thinkers are not ignorant. If this country would get it right and teach high school students metal, shop, wood this country could be the leading force in the world. But everyone want to sit down and invest in stock market and see money grow. Like that's a for sure thing. We can build better bridges and invent. But we as a nation think college is for everyone. And college people think people in construction are less than. My opinions are strong. And I teach at the cement mason local 600 in Los Angeles and I will change the outlook of my masons. (WICA survey respondent)

Family businesses are also extremely important for providing opportunities for early exposure to the industry, and with changes in society, businesses that were once only passed on to sons are now passed to daughters if they show interest. Respondents with family ties to the

industry were very clear that despite having grown up in the industry, they had to earn their way into their positions and worked hard for every additional level of responsibility they were granted. For example, interview respondents stated:

- “No one ever gave me anything” (N.N., personal communication, January 2014).
- “I worked my way up” (MWBE#1, personal communication, February 2013).

According to one survey respondent:

The Concrete Industry is very different from other trade industries. There aren't a lot of opportunities for women to launch a career in the industry unless she's interested in starting in the plant . . . running a machine, tying steel, pouring concrete. Management positions, especially within family businesses are few and far between and it's still a man's world out there in the rural areas. (WICA survey respondent)

Construction sites are often closed to the public, but if one has a family member or close friend in the industry one may be able to get onto the site and check things out. Entering the industry seems more natural, because people who grew up around construction have had chances to handle tools and hear/see how people and things work from the inside. The backbone of American society was built on small businesses and this remains the dream for many Americans and immigrants to this day. As one interview respondent stated, “I grew up around it and just kind of fell into it” (K.E., personal communication, January 2012). It simply feels more natural because not everything is foreign.

In the classroom setting of the pre-apprenticeship training, and even in the field for many women it is the first time they are seeing many types of machinery up close and touching the tools that will become part of their everyday lives. As one interview respondent stated, “the first time I was on a job site I was amazed to see the guys using different equipment like appendages

or extensions of their own bodies” (C.A., personal communication, October 2013). Another respondent described seeing the guys “swinging hammers like it was nothing, and I had to concentrate on doing it, just to hit the nails.” Like anything, it takes practice to become good, which takes time. Having a family legacy in the business can provide one means by which women get both exposure and practice, though not always. Oftentimes, girls with family legacies in the industry are taken away from the sites, or dressed up like dolls when they are there, so they cannot get dirty. One minority woman business owner (MWBE) of the family concrete company recounted to me, “My dad was in the business, but I was a princess, so I never got to touch anything” (MWBE#1, personal communication, February 2013). Still she was able to see things that many people never have.

**Research Question 1c: Entering and staying in nontraditional occupations.** Why do women enter and stay in nontraditional occupations, despite the additional challenges they may face as minorities within the industry? According to the analysis, love of the work (Theme 1), better pay starting out (Theme 4), sense of accomplishment (Theme 5), having a mentor (Theme 7), and strategies for perseverance (Theme 8) are the themes that answer this research question.

Reasons why women persevere in this nontraditional occupations varied, but there were some patterns of responses. In addition to loving the work itself, receiving good pay, and the sense of accomplishment that the majority of respondents receive from their jobs, they stuck with it by utilizing similar strategies. Two themes that emerged were mentors and strategies for perseverance.

**Theme 7: Mentors.** Women who successfully stayed in the industry frequently stated they did so because they found a mentor early in their career. Examples of these responses are shown in Figure 17.

### **Survey respondents**

- Choose someone in your part of the industry who is highly skilled and a decent human being and develop a student/teacher relationship with them if at all possible. Choosing the right mentor is important. Let them teach you, make them teach you, approach everything as a learning opportunity, even mistakes.
- Study the product you are specifying, manufacturing, delivering or placing. Attempt to find a mentor and mentor others.
- More women working and mentoring in the industry so it isn't so difficult for women to start working in the industry.

### **WICA Spotlight**

- Find a good mentor (they don't even have to know they are your mentor), work in the most non-traditional female jobs, and work for yourself if you can.—Kitty Hoyle
- I recommend that all those new to the field work hard and find good teachers and mentors along the way. I've been fortunate to have had some supportive mentors who have taken the time to teach me and encourage me. For that I will always be grateful.—Kari Moosmann

*Figure 18.* Examples of interview responses about mentoring.

***Theme 8: Strategies for perseverance.*** Construction can be challenging for anyone. In order to persevere in such a heavily male-dominated field, successful women often share certain similar characteristics and employ various strategies. The following are four strategies repeated by respondents: have a willingness to learn and become the most knowledgeable about the product and the industry, participate in networking and learning opportunities, build your reputation by maintaining your integrity, and be prepared. In the next paragraphs, I will illustrate each of these subthemes as strategies for perseverance.

In the combined surveys (WICA survey and survey2) the responses to goals and ambition for your position reflected that being an advocate for women was not the most important, but rather, becoming the best and most informed in the industry and learning about new technologies (such as green construction) were more important. The respondents goals and ambitions are shown in Figure 18.

**What are your goals and ambitions for your position? (check all that apply)**

Answer		%
To be the first woman (or among the first women) in my field		31%
To expand the company		31%
To recruit young women into the field		24%
To increase women's participation in the field		34%
To improve "green" technologies		34%
To encourage greater use of "green" technologies and products		38%
To encourage and improve diversity within the industry		45%
Other		31%
<b>Other</b>		
To be successful and increase my direct responsibility		
To be the first female in an executive position in my company.		
to promote the use of precast concrete products		
To prove women deserve as much appreciation/salary as men		
to be a role model for my daughters, letting them see first hand that a woman is not limited in her choice of professions and that you can run a company and a home at the same time.		
To great an international set standard of certification for the cement masonsand		
To be a journey person and to be the best at what I do. Not having to look for a job, but to have companies look for me.		
To take the company from a family business to a true corporation		
To help contractors be successful through the efforts of the CPAA		

Figure 19. Respondents goals and ambitions.

*Subtheme: Knowledge.* Knowledge is one strategy for perseverance. Examples of these responses are shown in Figure 19.

**Hanley Wood respondents**

- Having knowledge of whatever aspect of concrete is key, or at least the willingness to learn. Most men today would be accepting to educate as long as the woman shows that she wants to take the initiative in learning the field. Confidence and passion for the concrete industry are why the women of today excel.
- Knowledge is key.

**WICA Spotlight**

- Try to learn about as many aspects of the business as possible. Not only does it give you a better understanding of the practices and products, but it will help you figure out what areas you are most interested in pursuing in the long-run.—Shelby Mitchell
- If you are entering the concrete industry, it's important to get out there and see first-hand exactly what your products or services do to gain a greater appreciation and understanding of your company. It's great to go out on jobsites and see our products in action and talk with contractors using them to find out why they choose your company over competing products.—Diana Sanicki
- Knowledge gives you confidence. It's important to ask lots of questions, participate in product training classes, visit jobsites to see your products in action, and read construction publications to learn about the construction industry.—Diana Sanicki

Figure 20. Examples of interview responses about the strategy of knowledge.

*Subtheme: Participate.* Participating is one strategy for perseverance. Examples of these responses are shown in Figure 20.

**WICA Spotlight**

- Also, be on top of trends and strategies not only in your industry, but also in your field. I participate in marketing seminars throughout the year, and read marketing books on a variety of topics. This helps me to incorporate new strategies into my workplace and our industry. Consolidating the information gained in both the field and in our industry helps set an action plan for success.—Diana Sanicki
- Know your business! In order to get respect in this industry, contractors expect you to know your services down to the very details of specifications and plans. Get out and join associations where you will have opportunities to meet other contractors. Join a business roundtable to help you better understand how to run a business, and that all businesses technically run on the same core principles and values—it's the services that differ. Put your big girl panties on, it's not a time to play damsel in distress. Attitude is everything! I play like a Champion everyday!—Cheryl Sment
- Attending the World of Concrete tradeshow is a great opportunity to see all companies involved in concrete all under one roof. Also, there are many concrete organizations out there to help you network and gain knowledge about the industry.—Diana Sanicki
- Get involved in concrete associations and tradeshows—survey respondent

Figure 21. Examples of interview responses about the strategy of participating.

*Subtheme: Maintain integrity.* As shown in Figure 21, having a good reputation is essential for women in nontraditional occupations. Multiple interviewees stressed the importance of having a good reputation. A retired tradeswomen who currently does trainings throughout the country told me how critical it is to keep a good reputation, and how easy it is to lose it. She expressed to me that she had rarely had problems. People became aware of her work—she was reliable, so on the odd time when she was hassled, she had support in the field and people to back her up. A solid reputation is built on integrity. Therefore, respondents hold integrity as one of their most important values.

**Hanley Wood respondents**

- Be honest and know where to go [make sure you know] who to ask when you don't know something. Don't pretend you know something when you don't.
- Bid accurately, make site visits, document your work, have sign off sheets for completed and approved work. Read all contracts carefully in regards to your scope of work and responsibilities and payment.
- I think my one single piece of advice would be; if you honestly do not have the answer to a question, do not dance around the answer or even remotely try to come up with something, instead seek out someone who can assist you in answering the question correctly. One wrong or BS answer could ultimately hinder your career. I did this once a very long time ago and the contractor pretty much let me have it. Fortunately, I learned from that one mistake and never repeated again.

*Figure 22.* Examples of survey responses about the strategy of maintaining integrity.

*Subtheme: Be prepared.* Being prepared is one strategy for perseverance. Examples of these responses are shown in Figure 22.

### **Hanley Wood respondents**

- Show up every day with a great attitude and desire to learn, prepared in every way to give 8 hours of work for 8 hours of pay. Listen more than talk, especially in the beginning. Develop a somewhat thick skin, believe you deserve to be there as much as anyone else. Learn your craft and become the most highly skilled craft person you can be.
- I started in 1983 as a bookkeeper for a ready mix producer and am now the general manager of a block plant and ready mix plant. There seems to be a perception in the industry that women are more emotional and don't understand equipment. For a woman just starting out I would suggest studying the differences between the way men and women think. Also have a down to earth attitude, don't expect special treatment, have good overall people skills and avoid tears.
- Be prepared for long hours and dirty work, but good compensation for your time and effort. Wear protective gear when ever possible, i.e., hard hat, safety glasses or shield, respirator, long sleeves, pants, spare gloves (a change of clothes), and water proof boots. Keep a bottle of vinegar close at hand (for Shotcreters) to counter act chemical burns. Slather yourself in protective body lotion, butter or oil. Be prepared to spend long hours away from home because Concrete is time and element sensitive so u never know when

*Figure 23.* Examples of survey responses about the strategy of being prepared.

**Research Question 2: Organizations, women, and nontraditional occupations.** Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields? According to the analysis, lack of respect/stereotypes (Theme 9), sexual discrimination/enforcement of legislation (Theme 10), advocacy (Theme 13), and increase opportunities and access (Theme 14) are the themes that answer this research question.

Despite years of legislation and societal changes, women are still not accepted in the construction culture in the United States. Due to challenges that women continue to face in the industry, organizations that support women in nontraditional occupations remain important. The next two themes discuss two major challenges that women continue to experience in the concrete-construction industry: lack of respect and stereotypes (theme 9), and sexual discrimination (theme 10).

**Theme 9: Respect/Stereotypes.** Those who are new to the industry are often shocked at some of the attitudes that remain, prevail, and are considered the “norm” on job sites. For example, in 2011, while hiring two participants in this study, the owner of a construction company said, “I have owned this company for 40 years and I never had to hire a woman. I don’t know what you are going to do, but I have to hire you to fulfill contract obligations” (N.K., personal communication, June 2013).

One of the interview participants was highly educated, had graduated from CIM and was doing highly technical quality assurance work in the concrete industry. Regardless, she faced a myriad of obstacles that were not apparent while she was doing her successful internships and training as a part of her degree requirements. She felt prepared in terms of her knowledge of the subject matter, but was continually exasperated by the lack of respect that she received on job sites and the persistent catcalls whenever she was running a crew. All the interviewees, WICA respondents, and phone poll respondents who participated in mini-interviews expressed frustration about the “lack of respect” that they encounter regularly.

The women with longevity in the industry and the women with less than five years of experience in nontraditional occupations encounter similar challenges and obstacles, although for the women just entering the industry overt discrimination is less pronounced. Those who entered through an apprenticeship program in the height of the Comprehensive Employment and Training Act are extremely disheartened that funding for apprenticeship programs has decreased so drastically and that women’s participation has gone down or remained the same since the 1980s. Figure 23 shows survey examples of the lack of respect or not being taken seriously theme.

### **Survey Responses**

- When I first started in the business with my husband men didn't take me seriously enough. Now that I have over 16 years experience I can use my experience to explain how things were done on different projects that work successfully. Luckily my husband realizes what an asset I am to the company and keeps me involved with all aspects of the business as much as possible.
- Walking into a meeting or onto a jobsite and being the only women is still a reality. there are still many occasions where we are sort of dismissed or ignored, even if you are the most knowledgeable in the room. To overcome this it is extremely important to be assertive and speak up. I think when I present myself as a strong smart woman I can actually get better treatment and responses than my male counterparts.
- Not being taken seriously - making great suggestions that are ignored only later to be adopted by a man who suggests the same, getting paid a lower amount, working harder and achieving less incentive
- For me it has been the learning to deal with the attitudes of the men I encounter daily. We do a mix of residential and industrial work, male homeowners are very reluctant at first (until the repair is made) to have a woman doing their repair. In the industrial capacity I have to deal with being dismissed in conversations as they direct their comments toward my husband or male employees
- Still think like a woman after 5yrs. / The desire to learn more about how the ready mix plant functions but treated like I am not capable of handling it. / Being treated more as a Secretary instead of the Asst Manager. / Not being taken seriously when I tell Management of issues in the field. / I do not feel that I am taken seriously by supervisors regarding problems with the trucks or the plant. /
- Contractors and co workers not taking you seriously or thinking you cannot perform well at the job.

*Figure 24.* Examples of survey responses about lack of respect and not being taken seriously.

In addition to the lack of respect that the majority of respondents feel regularly, many of them also were frustrated by stereotypes held by their coworkers and clients.

### Surveys

- Despite being a professional in the industry, I am sometimes relegated to "administrative" roles in certain instances, such as at conferences, when additional help is needed, such as at registration, while my male peers are never asked (nor do they offer) to assist in such roles/tasks.
- The mentality of the industry is slowly changing that women do know what they are talking about but it is still difficult.
- Being seen as an equal, and being treated as an equal
- Still a male dominated industry with a lot of prejudice. Feel you must know more than a man in the same position.
- Today, not nearly as many issues as I faced 25 years ago when I began working in the industry. There are many more women in construction and concrete. in the late 1980's there were very, very few of us. Men were not comfortable having a woman at meetings, on jobsites, running machinery.
- Difficult being the only woman on a jobsite, especially where the[re] are absolutely NON [sic], like in the Arab world.
- Overcoming stereotypes is the biggest.

Figure 25. Examples of stereotypes.

**Theme 10: Sexual discrimination/legal enforcement.** Although many sources stated that they earn higher salaries starting in the industry than they could in more traditional occupations, many women still feel that they do not earn as much as their male counterparts. Some respondents still encounter outright discrimination and harassment. Figure 24 shows examples of interview response on sexual discrimination/legal enforcement.

### Surveys

- Women are still sometimes objectified within the industry so I am hopeful that will decrease.
- It's very frustrating to have government bodies claim they are supporting women-owned businesses, but in reality, the screening process to verify "legitimate" women owned companies is flawed with stereotypical reasoning.
- Be respected for doing a good job. Not having people stealing your tools, when you make a mistake that's all it is and not make a big deal about it. Help me if you see me doing something wrong and don't watch me fuck up and think it's a joke!!!
- A lot of women who run concrete businesses seem to only be figure heads for tax and minority contract purposes, so regardless of impressive number of women in the industry men are not use to having them on the job site actually doing field work.
- Prejudice, stereo types, and the under valuation of expertise in the industry. I have mostly male staff and some of them don't like the fact that as their boss I am a women.
- Mysogyny as a societal norm, a "boy's club" attitude; though this can, in sales, be turned on its head to sometimes work to one's benefit.
- Discrimination as a female with the assumption that there is not enough hands on knowledge along with the schooled knowledge to accurate and true in discussions. / Lack of structured Concrete finishers program for with male or female. / Physical fitness plays a strong roll in this field.
- Acceptance by men, both younger and older.
- Prejudice, stereo types, and the under valuation of expertise in the industry
- Difficult being the only woman on a jobsite, especially where there are absolutely NON, like in the Arab world.
- To be treated and paid equally. Equal pay. Really being treated as an equal and getting equal pay. Being seen as an equal, and being treated as an equal
- There is a lot of "good ole boy" stuff and "we always did it that way" deals and procedures that refuse to take on new materials, admixtures, jobsite procedures and green solutions. This needs to stop, but this is an old staid industry which is so globally necessary and yet so backward in many ways.
- More work people have families to take care of.

*Figure 26.* Examples of interview responses about sexual discrimination/legal enforcement.

In the WICA Spotlight, several women have provided additional examples of types of enforcement important to the concrete industry. As Shelby Mitchell stated, “I’d like to see more producers and contractors embracing new technologies and environmentally friendly practices because it’s the right thing to do – not just after they are required to by law. More opportunities to network with other contractors” (Women in Concrete Alliance, 2017c, para. 7). Another woman from the WICA Spotlight, Cheryl Sment, stated,

Our state does a fabulous job of hosting an annual WI Department of Transportation DBE Conference that brings together Prime Contractors and DBEs through classes, networking sessions and panel discussions. The more you know about the other contractors in your area, the better resources you have to make every project a success. Over the past 12 years I have been in this industry, I have seen positive changes related to contractors accepting women and minorities into this industry. States are taking a more proactive stance on enforcing DBE goals and increasing opportunities for disadvantaged businesses. It wasn't always this friendly and I welcome the state's enforcement and encouragement of contractors working together to make all projects successful. (Women in Concrete Alliance, 2017d, para. 7)

***Summary of Research Question 2 findings.*** Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields? Organizations that support women in nontraditional occupations provide one of the few networking opportunities for women to interact with other women who work in the industry, to share experiences, compare notes, and identify strategies to persevere. All of the data sources show women still comprise a very small percentage of the industry, especially in large concrete-construction corporations. While individual female contractors and small business owners may employ large percentages of females in their businesses, they still comprise a relatively small percentage of the construction industry overall. Organizations can play important roles in the themes of advocacy (Theme 13) and improving opportunities and access (Theme 14); however, I will describe these themes in more detail in the next chapter, which provides a case analysis of WICA to expand upon the organizational themes.

## **Chapter Summary**

The purpose of this chapter was to describe the major findings from the research study. The data sources were extremely rich and included data collected from surveys, polls, interviews and content analysis of the WICA website. The findings were provided as themes, which is an accepted practice in describing qualitative data. In total 14 themes were identified, 10 related to individuals and four related to organizations. This chapter primarily provided supporting data for the first 10 themes related to individuals. In the next chapter, the four themes related to organizations will be described in more detail.

## Chapter 6: WICA Case Study

In this chapter, I elaborate on the organizational themes identified in Chapter 5 and how they address Research Question 2 (and sub-questions). Additionally, I respond to the second research question (and sub-questions) that guided this study through a case analysis of the Women in Concrete Alliance (WICA). Specifically, in this chapter, I address these questions and provide detailed explanations of the organizational themes through a case analysis of WICA, to illustrate lessons that can be learned from analyzing this organization in detail and for organizations that aim to serve women in nontraditional occupations.

*Research Question 2: Why are organizations targeted at women in nontraditional occupations still important today and for women who persevere in male-dominated fields? 2a: How can those organizations remain relevant? 2b: What, if any, additional support systems are available to women?*

- Theme 11: Funding
- Theme 12: Focus: Organizations need to focus
- Theme 13: Advocacy
- Theme 14: Increase opportunities and access

The rationale for including a single-case study of WICA, is that women's participation in the concrete industry is representative of women's participation in the construction industry overall. A single-case study approach may contribute to deeper understandings of women's participation in nontraditional organizations more generally (Yin, 2003). The analysis for this case study utilized strategies such as pattern matching, triangulation, and addressing rival explanations through content analysis of the original WICA website ([www.womeninconcrete.org](http://www.womeninconcrete.org)), which went off line in late 2012 and new WICA website

([www.womeninconcretealliance.org](http://www.womeninconcretealliance.org)); on-going interviews and correspondence with the founders; surveys of members (WICA survey); review of articles; and WICA events.

### **The Women in Concrete Alliance (WICA).**

WICA is a web-based and international organization that is open, inclusive and available to everyone in the concrete industry. Additionally, WICA is the only organization that specifically addresses the issues that are important to women in the concrete industry. The objective of the Women in Concrete Alliance (WICA) is to supply information, opportunities, and mentoring to women working in the concrete construction industry. The founders, Kimberly Kayler and Kari Moosmann always keep “the mission centered on positive information to help women network and be successful.”<sup>1</sup> The idea for an ongoing network began with Hanley Wood’s Women in Concrete (WIC) event at World of Concrete and the WIC monthly features in *Concrete Construction* and *Concrete Producer* magazines, primarily written by Kari Moosmann. WICA strives to go beyond these efforts and reach women on a continuous basis “to create an industry alliance that serves the needs of all women in concrete” (Women in Concrete Alliance, 2017a, para. 2).

WICA’s mission is to act as a resource for women involved in the industry by providing data, training, mentoring, and networking opportunities. From 2006-2012, Hanley Wood managed the WIC luncheons at the WOC, with Kari and Kimberly’s technical expertise in developing enriching forums. The founders of WICA assisted Hanley Wood identify industry leader speakers, provide opportunities for women throughout the country to meet one another face-to-face, and facilitate a forum through which to determine the annual “Woman of Distinction” Award. According to the founders of WICA, the “‘Woman of Distinction’ award was created to “celebrate women in the industry” (Concrete News, 2011, para 1). Moosmann

believes that the award “will help reinforce that women are a valued resource in the concrete construction industry” (Concrete News, 2011, para. 1). The organization also publishes short articles in the *Concrete Producer* (available both on-line, and through subscriptions—the only source of revenue for WICA, besides contributions and donations).

### WICA Case Study

I have simplified and conceptualized the WICA organization in Figure 26. In this chapter, I will show how changes in inputs and activities have affected WICA over time, and in its ability to achieve its intended outcomes. The themes that emerge are related to each of these as well: Funding—Inputs; Focus—Activities; Advocacy—Participation; Increase opportunities—Outcomes.



Figure 27. Women in Concrete Alliance inputs, outputs, and outcomes.

### WICA Resources (inputs)

The greatest inputs to WICA have always been the founders' dedication and commitment to the vision of the organization. Kimberly Kayler and Kari Moosmann are extremely accomplished and well respected in the concrete industry. Kimberly Kayler is the president and

founder of Constructive Communication (CCI). Kari Moosmann is the senior editorial director for CCI. I have included full bios and their resumes in Appendix I.

Hanley Wood's Women in Concrete (WIC) events at the WOC were the catalyst for WICA to envision hosting events outside of the WOC, and expanding its influence. Hanley Wood also obtained the original women in concrete domain, and hosted the first website.

### **History of Women in Concrete Alliance**

The founders of WICA often describe the organization a "labor of love." The organization came into being based upon interests and needs that were identified at WOC conventions, and gained traction in the early 2000s. Many women realized that they were in the minority in attending the WOC conventions, but eventually they began to recognize that there were other women who attended the WOC, at least others who were not "bikini girls" or wives of attendees. They found that there were other women who actually worked in the industry! They began to discover that their experiences in the male-dominated culture of the concrete-construction world were not necessarily unique or "just me." Other women were facing similar issues in terms of being respected, having legitimacy, and facing glass ceilings, oftentimes being relegated to menial tasks such as making coffee. Many times, women would be expected to perform strictly administrative functions, despite sometimes having much more experience and education in the industry than their male counterparts. They encountered this stereotypical behavior at safety meetings, in their home shop, out in the field as the only finisher, or having grown up doing it their whole lives.

In 2005, a brainstorming session about women in the concrete industry was discussed with several of the key players (several advisory board members and the founders) during lunch at the WOC. Kari Moosmann had regularly written articles featuring women in the industry, and

there was discussion about growing this activity into something bigger. At the time, Kari worked for Hanley Wood. The informal meeting became the catalyst for the development of the WICA organization and Hanley Wood began the planning for the first women's forum. The first women's forum was held in 2006, and it was a tremendous success (see Appendix J).

Kimberly and Kari, the founders of WICA (see Appendix I), realized that they had an audience in the concrete industry and that women and men were interested in learning how to cast a wider net to attract more people into the industry. The founders maintain an online publication *Constructive Communication*, which showcases trends in the concrete-construction industry. The topic of women in the industry was of growing interest for employers seeking employees, and for women looking to enter the industry /or advance within it. Through both the online magazine and the increasing enthusiasm for women's participation at the WOC, the WICA took off. Hanley Wood, a media company that services the housing and construction industry (see Appendix I), maintained ownership rights to the WIC events at WOC, and the founders contributed significantly to the organization and management of the events. Additionally, Hanley Wood owned the original website ([www.womeninconcrete.org](http://www.womeninconcrete.org)) and hosted the domain until 2012.

**The luncheons: Prosperity and decline.** The first event was so popular that in 2007, attendees clamored for even more WIC events, in addition to the luncheon. Again, all of the events were sold out before the WOC even started. According to Hanley Wood, more than 300 women met at the WOC at the second annual Women in Concrete Forum, increasing the attendance by 100 more than the first year's event. In addition to the luncheon, two women's seminars were added: "Steps to Success for Women in the Construction Industry," providing women with a blueprint to success in construction; and "Women Improving Profitability"

addressing the corporate culture affecting women and the specific strengths of women (see Appendix K for additional information on the timeline of events).

‘This kind of event is what the industry needs,’ said Kitty Hoyle, owner of Wellington Hamrick Inc., Boiling Springs, N.C. ‘This is the kind of validation that the women need. I’d even like to see more men here to see the kind of contributions that women make to this industry.’ (Concrete Construction Staff, 2007, para. 5)

During boom construction times and with the infusion of energy that Kimberly and Kari were able to dedicate to the project; they concentrated on tailoring events to industry trends and sought out diverse experts to present. With and secured funding WICA was also able to widely promote events at the WOC. These events initially started as an opportunity for women to connect with one another on a professional level. As the events grew increasingly popular, they found speakers to create awareness about women’s experiences and challenges in the industry, trends facing the industry and those that may have been of particular interest to women, studies and research about increasing diversity in the industry, and other important topics. Many organizations are event driven and WICA was no exception, even though Hanley Wood owned and managed the WIC events at the WOC.

Table 5 lists the topic of each of the forums at the WOC. In 2015 through 2017, the forums were not held at the WOC, but in 2018, WICA will be returning to the WOC with full management and oversight of the event now that Hanley Wood has stepped out of the exhibition business.

Table 5

*Timeline of Major Events for Women in the Concrete Industry (Topic of Forums)*

2005	Regularly featured articles by Kari Mossman in the <i>Concrete Producer</i> Conceptualization of Women in Concrete (WIC) luncheons at the WOC
2006	First Women's Forum at WOC
2007	Communication Also 2 workshops
2008	Hot Industry Trends
2009	Sustainability
2010	Breaking Down Barriers
2011	Infrastructure First Woman of Distinction Award granted
2012	Employment Trends Second Woman of Distinction Award granted
2013	No luncheon Third Woman of Distinction Award granted
2014	New website comes online
2015	International Concrete Sustainability Conference and Introduce a Girl to Engineering Day—not affiliated with WOC
2016	Reunion del Concreto in Columbia—not affiliated with WOC
2017	ACI Convention Workforce Innovation—not affiliated with WOC

Hanley Wood and WOC sponsored the events, but WIC forums were self-sustaining and a draw for some participants (especially CIM students). These events were moneymakers in some years, but making money was never the intent of the Women in Concrete Alliance (WICA). Providing opportunities for women to meet one another, network, and discuss issues that the industry as a whole confronted, as well as some that may be more significant for women, were the purposes and focuses of the events. After several successful luncheons, WICA expanded upon Hanley Wood's WIC luncheons to include a breakfast and a Woman of Distinction award, which was presented during the luncheon at the WOC and an exciting way to encourage participation leading up to the event by requesting submissions from members (for a list of awardees see Appendix L).

Descriptions of all luncheons, including speakers and topics were listed on the original WICA website hosted by Hanley Wood (see Appendix K; [www.womeninconcrete.org](http://www.womeninconcrete.org)), but when it went offline this information became much more difficult to retrieve. Unfortunately, I was not able to locate attendance records for the events, but some of the write-ups about the events give general figures. The descriptions in Appendix K came from the archived WICA site, some from the *Concrete Producer*, and some from archived World of Concrete announcements.

Hanley Wood stopped hosting the original WICA website in late 2012, but some of the articles can be retrieved through the web archive, and many are available on the new website. The new website [www.womeninconcretealliance.org](http://www.womeninconcretealliance.org) went online in November 2014. Communication with members is currently primarily conducted through the Women in Concrete Alliance (2017b) Facebook page. Kari Moosmann continues to write monthly articles for WICA, as she has done since the organization came into being.

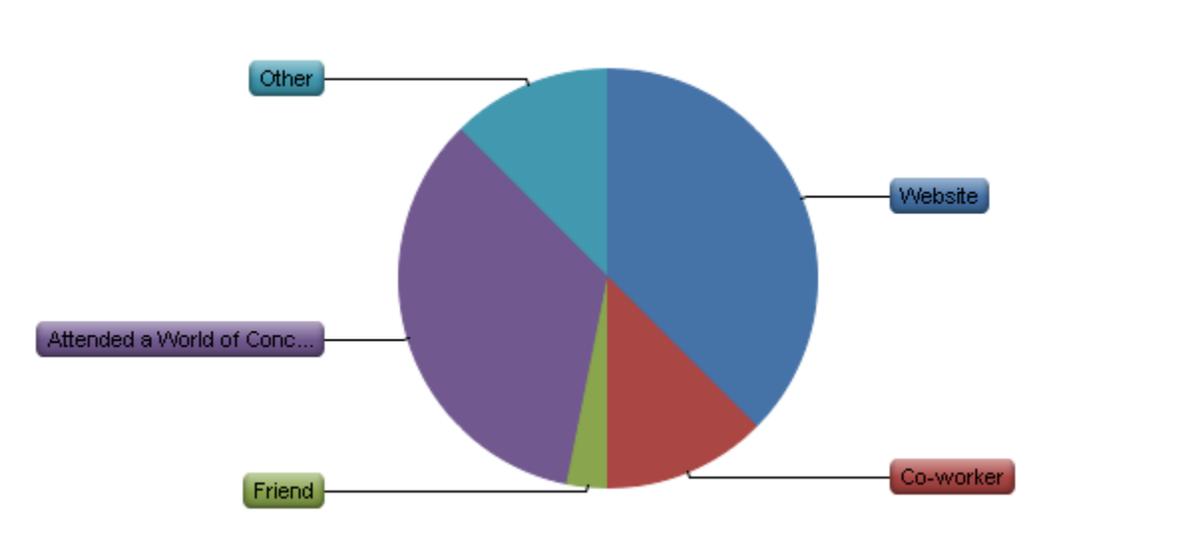
One of the biggest challenges that WICA faced was that the intended outcomes of the organization were never fully operationalized. In some ways, this was an intentional decision. The founders did not want to create a hierarchically structured organization. While construction was booming and participants at all levels were successfully making money, the lack of direction and targeted outcomes were not issues that affected the growth and positivity of the organization. When the economy began to change and the organization lost financial support for its key activities, is when the organization's weaknesses became apparent.

Two simultaneous and competing forces emerged when the housing crash and Great Recession hit the construction industry; meanwhile WICA had recently met a pinnacle of participation, driving the founders and members to explore expanding services of the organization. Funding and support from Hanley Wood at the WOC started to dry up and without

having ever required anything of members, the founders were left shouldering the burden of doing everything to maintain the organization. Hanley Wood was negotiating the sale of its exhibitions business, finalizing the sale to Informa in 2014. The WICA was primarily an event at the WOC under the Hanley Wood umbrella, and following this transaction, support to maintain the website was no longer available.

The founders continue to maintain the online publication and email distribution membership list, but when the main recurring event at the WOC was scrapped, opportunities for recruitment and support began to diminish. Additionally, they lost funding for the website and moved everything over to a Facebook page, but many data were lost and many members were discouraged when they could no longer access the website. They launched a new website [www.womeninconcretealliance.org](http://www.womeninconcretealliance.org) in November 2014, but the organization was without a website for over a year. According to the WICA survey respondents, the two main ways that members learned about WICA was through the website and/or by attending a WICA event at the WOC. This is shown in Figure 28.

## How did you learn about WICA?



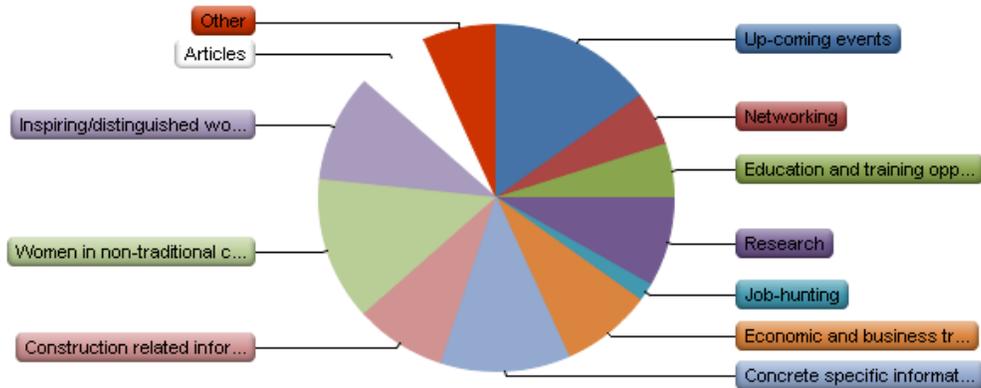
Answer	%
Website	43%
Co-worker	14%
Friend	4%
Attended a World of Concrete WICA luncheon	39%
Other	14%

Other
The Concrete Producer
ACI
ACI
Linked in

Figure 28. How the survey respondents heard about WICA.

Additionally, as shown in Figure 28, respondents stated that one of their main reasons for using the website was to learn about upcoming events.

## I use the WICA website for the following types of information.



Answer	%
Up-coming events	43%
Networking	14%
Education and training opportunities	14%
Research	24%
Job-hunting	5%
Economic and business trends information	24%
Concrete specific information	33%
Construction related information	24%
Women in non-traditional careers	38%
Inspiring/distinguished women	29%
Articles	19%
Other	19%

Other
I actually did not know about the website
i only go to the website when they send something to me.
I do not use WICA web site, do not have time. Perhaps a newsletter may help

Figure 29. Why the survey respondents used the WICA website.

WICA as an organization was already stretched thin when they lost support from Hanley Wood to host the website and as their partner at the WOC. In addition, there was not enough awareness of the organization. They wanted to offer a number of services and programs that even at maximum capacity of the membership would have been a stretch given the diverse geographical locations of members and the variety of roles these women have within the industry. For example, a couple of survey respondents stated that they were unaware of the organization/membership, and one said with regard to WICA, “I don't find a lot of value. I would love to participate more but am not sure of the activities, if any, are available”<sup>2</sup> (WICA survey respondent).

A higher level of correspondence between attendees is common following meaningful events. While everyone is still excited about interactions, news, new connections, etc., they want to share their experiences and invite new friends and colleagues to local events. This was clearly illustrated in the number of tweets posted and captured, with most starting to level off about 3 months after the event (see Appendix A). This is one of the reasons that the Woman of Distinction Award was such a terrific idea—it kept the enthusiasm alive. Usually, the founders would cast a call for submissions for the award 3, 6, and 9 months before the subsequent WOC event. The submissions were listed in *Constructive Communication* leading up to the actual vote. This is an excellent strategy for keeping the organization in people’s minds and keeping people excited about the upcoming events. Just when the tweeting and new relationships forged through the previous event are starting to wane, a new and fun project was introduced to keep members involved and pique their interests for the next event to come. As an interesting side note, I am not sure if this was an actual strategy for recruitment utilized by the founders, or rather a fantastic outcome of their tremendous marketing acumen.

WICA also features a “spotlight on women” on both the original website and the new website that highlights numerous women by publishing participants’ responses to the following questions:

1. What is your background? Education? Previous jobs?
2. What did you do before getting involved in the concrete industry?
3. How did you get the position you currently have?
4. What is your favorite aspect of your position?
5. What associations are you involved with?
6. What are your goals and ambitions for your position?
7. What types of changes would you like to see in the industry?
8. What is your advice for other women just entering the concrete industry? (Women in Concrete, n.d., para. 1).

The founders also offered opportunities for participation in various activities outside of the WOC, such as the Blue Collar Careers in Transportation Task Force, my survey, and developing a mentoring program.

**The post-luncheon era.** When the luncheon was canceled in 2013, most people who had been involved in WICA knew the organization was having problems. The economy was still not fully recovered and the construction industry was still reeling from the effects of the Great Recession, despite “rebounding.” Additionally, many WICA members and the industry as a whole were facing so many challenges that people were forced to fend for themselves and their own organizations to keep themselves solvent. Attendance at WOC was lower than in previous years for this very reason (though not the lowest). It is extremely difficult to keep an event driven organization going, when its main event is canceled. Then to make matters worse, they lost

support to maintain the website. Aside from the WOC women's forums, the website was the best way to maintain networks. Figures 28, 29, and 30 provide insights into survey respondents' perceptions about WICA, the WICA website, and future WICA events.

With the loss of organizing an event at WOC, there were many unanswered questions. These questions remain as a foundation for rebuilding the culture that surrounded the events. For example, who goes to trade shows? Who is sent by their employers (how are they chosen, can they afford the time off, and is it a sound investment by the company for the individual, etc.) and when (in their career are they sent, in terms of the economy and strategy for the business)? These questions are important for a number of reasons, and particularly for WICA. Is the WOC the appropriate venue for the organization? Are there other events that may garner additional support, and/or may be better geared towards the audience of WICA members and member interests?

WICA has a number of strengths. As it was structured through its event at the WOC, there were nevertheless some strengths that ultimately backfired: no dues, no requirements of members, non-hierarchical structure, and a focus on positives in the industry and women's experiences. In contrast, they could have found barriers and problems and tasked members to find solutions, or addressed legislation, but this ties back to what kind of organization WICA wants to be, which is a question that the founders are still actively defining. Because there was no structure, when the events that were the hallmark of the organization were no longer supported, there was little means to increase awareness of and participation in the organization. In addition, the lack of structure meant that the outputs for the organization were never fully developed and defined. A couple of task forces and activities that the organization participated in were very helpful in keeping members engaged, but this did little to expand the organization.

WICA could have used additional support in three primary areas: (a) funding, (b) organizational structure, and (c) awareness of the organization—both to promote the organizations goals, as well as to recruit stakeholders to share in the workload. The founders largely shouldered all burdens, including maintaining financial support for their efforts. The founders were not only trying to do too much; they were also trying to make the organization do too much, and lost focus, particularly given the size of the organization, and its financial structure. They wrote the articles, solicited speakers, sought out space, sought out sponsorship, etc. While the organization never sought 501(c)(3) status, it was always for all intents and purposes a nonprofit, because every cent contributed went back into the organization. In addition, the founders, as well as numerous members, contributed their time and effort to keep it going. Support was needed in the following areas: financial resources; requesting strategic participation of members (e.g. recruitment of more members, task/project oriented); and clear-cut expectations of members (e.g. asking members to encourage more membership and promote the organization).

Due to the high level of organizational success achieved over the several years, members and the founders wanted to expand the services WICA offered, to include services such as mentoring. The synergy at the WOC events was so powerful it was difficult to believe that it would not continue to reverberate after each event. As the construction industry began to reel from economic hardships, however, WICA found that it was spread too thin to truly achieve the dreams it conceived during such highly charged and meaningful events. WICA was, in actuality, comprised of tiny islands throughout the United States and internationally, and while it could have asked members to recruit more and get more participation (e.g., ask every member to recruit two more members before the next WOC, or something along those lines), it never did.

Mentorship is an extremely intensive program objective, and there simply was not enough infrastructure in WICA to develop such an activity. Recruitment could have worked to achieve some goals, and would have been more successful with continued financial support; however, without a clear vision for the outcomes of the organization there was no structure for locating outside sources of funding.

The founders tried to develop some piggyback opportunities that were tied to more stable funding streams, such as the Blue Collar Careers in Transportation Task Force. This was a highly successful effort to keep members engaged, but ultimately task forces deliberately work themselves out of their position. If the founders could have identified another steady source of funding and/or support, they might have been able to keep the organization going. The founders were never paid, and they only did it out of love and belief in the mission. They discussed possibly putting together a collection of all of the articles written, as either a commemorative collection, and book, or a CD of videos. It would be less expensive to burn CDs with all articles and stories of women, but while books are delightful, publishing is expensive. This is an even more daunting task now that the webpage has been archived. The domain name was for sale when I conducted this research. I would like to know how much it garnered.

WICA has not ended, but its flagship event at the WOC was gone for several years.<sup>3</sup> Instead, it has shifted gears and broadened its scope. The WICA lost its seat at the table at the WOC, so the major activities to which sponsored by the organization for nearly a decade no longer exist and are no longer available as a catalyst for the outcomes they hoped would come to fruition. *Constructive Communication* lives on, and both Kimberly and Kari are still instrumental and well connected in the concrete-construction industry. They have reached out and branched out to embrace trends they see in the industry, such as green technology and

diversity. For example, WICA has hosted a women's forum at a number of events since 2013: International Concrete Sustainability Conference on May 11, 2015, in Miami, Florida; 16th Annual Reunión del Concreto in Cartagena de Indias, Colombia; Introduce a Girl to Engineering Day; and most recently they partnered with ACI and Mercer to offer a Workforce Innovation Summit.

WICA is trying to be flexible and adapting its strategies to become even more inclusive, as well as developing partnerships with other potential sponsors such as ACI. This shift towards diversity mirrors changes in federal funding, such as the Workforce Innovation and Opportunity Act, and may prove to be successful. The next event already occurred. In a partnership with ACI, WICA hosted a session at the Concrete Convention and Exposition in Detroit, Michigan, on March 29, 2017. The session was entitled-Workforce Innovation and asked the question, "Do we have the right labor force for the jobs that will exist in 10 years?"

### **Themes for Organizations/Lessons Learned from WICA**

**Theme 11: Funding.** Funding will continue to be a problem for WICA, because it is a strictly volunteer organization. If WICA sought 501(c)(3) status, it would be eligible for certain funds. It is not a governmental organization, although it has partnered with various governing bodies, such as the DOT for the Blue Collar Task Force. The way that WICA has managed so far has been through sponsorships at events. If WICA truly wants to expand, the founders may consider developing partnerships with governmental agencies. For example,

Under Section 504(e), State Transportation Agencies may obligate funds from the four primary highway funding programs—the National Highway Performance Program (NHPP), the Surface Transportation Program (STP), the Highway Safety Improvement

Program (HSIP), and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program—for surface transportation workforce development, training, and education.

Through Section 504(e), funds may be used to support a broad range of training and education activities, including training for state and local transportation agency employees (excluding salaries), university or community college support, and outreach to promote surface transportation career awareness, among others. While there was previously a limitation on the portion of Surface Transportation Program funds that a State Transportation Agency could spend on OJT/SS (one half of one percent of their Surface Transportation Program funding allocation), Section 504(e) does not place a limit on the amount of funding that an STA can apply toward surface transportation workforce development activities from its core program funding, including STP. It is important to note that the application of the 504(e) funds for training, education, or workforce development is at the discretion of the state, with Federal Highway Administration approval. Any decision to use core funds through the 504(e) provision for these activities is influenced by a state's capital investment interests for its highways. (Hegewisch, Henrici, Shaw, & Hooper, 2014)

**Theme 12: Focus.** I think this is one area where WICA could improve. WICA is really good at what it does—providing “information, opportunities, and mentoring to women working in the concrete construction industry” (Women in Concrete Alliance, 2017a, para. 2). Mentoring is actually somewhat beyond the scope of the organization's resources and membership base at this time. True mentorship programs are very labor intensive and work best when there is a large membership group from which to draw and when the participants are in the same geographical area (although with social media and use of the internet this is becoming less so). Nevertheless,

WICA provides ever expanding assemblages of women role models in diverse professions in concrete. These women creatively tackle relevant issues in the industry and share their wisdom through WICA activities. Role models are of paramount importance for increasing awareness about opportunities and career paths in concrete and ultimately increasing women's participation.

WICA is effective at bringing women together, providing opportunities for networking, showcasing women's contributions, and celebrating women's accomplishments in the concrete industry. WICA should concentrate on its strengths while it is small, and gradually look into expanding services. Currently, as a voluntary club, it is not equipped to offer some of the services that larger and more well-funded counterparts can. WICA could benefit from learning about other organizations and their operations. This would improve WICA's ability to act as a resource for members, as well as further develop its mission to "create an industry alliance that serves the needs of all women in concrete" (Women in Concrete Alliance, 2017a, para. 2). Additionally, this would assist WICA to broaden its membership base. WICA could look into developing a referral program with its partners in the industry.

**Theme 13: Advocacy.** In addition to increasing the number of women in the industry, and recognizing their contributions, women's organizations are important for women who experience isolation in the field. Therefore, they need advocates to ensure that their voices are heard. Some of the reasons why women stated it is important for them to be involved in WICA, in addition to trade-specific organizations, include those listed in Figure 29.

### Surveys

- It is important because I think being in a male dominated field, we as women need to stick together. It also is helpful know that there are other women perhaps going through some of the same things that I am.
- I believe it is important to support associations within my industry that promote women in leadership and business positions.
- It helps to be taken seriously by the women in my field as well as the men. Even women in a man's field are difficult to impress.
- It provides special support for issues women face that traditional organizations in the industry don't.
- I feel alone in this industry. Being a part of WICA makes me realize that there are other women out there facing the same issues as I am.
- To add knowledge and opinion for the goodness of all.
- I feel like I'm a part of a group of women that have a lot in common with me and can relate to the experiences I deal with on a daily basis.
- As with many companies the economy has lessened the groups we can participate with

*Figure 30.* Examples of survey responses about advocacy.

Kimberly Kayler explained,

I think it is crucial to understand that while the majority of people in this industry are men, they are for the most part very accepting of woman. I have always been treated with the utmost respect by male and female colleagues alike in the concrete industry. You'll earn respect in the same manner as your male colleagues – through hard work, knowledge and a true passion for the concrete industry. Reach out to potential mentors – both men and women – and share your excitement and ideas for concrete. (Women in Concrete Alliance, 2017e, para. 9)

WICA exemplifies advocacy, giving women platforms to be seen and heard in a very male-dominated industry. Women working in concrete are always included as experts on their panels, forums, and showcased in articles and awards. The only area where WICA could improve in terms of advocacy is to get more exposure for the organization, and the founders are perpetually working on this endeavor.

At the WICA forum on Infrastructure at the WOC 2011, one of the guest speakers was Kelly Page, executive/technical director for the International Concrete Repair Institute, Rosemont, Ill. Page provided further reasons why it is important for women to be involved in associations, so that they can influence politicians to invest in the development goals they find the most urgent.

**Theme 14: Improving opportunities and access.** Strategies to improve some of these issues include increasing access points for women. Changes that respondents would like to see in the industry include those listed in Figure 30.

## Surveys

- More women in the industry.
- Would like women to know what jobs are available for them in the industry.
- More women involved in actual field work. Training specifically for women on how to overcome male prejudices and be taken seriously in the industry. More professional organizations to help small business owners in the first years from start up to marketing to networking.
- I want to see more women working in the industry. I would like for women to be taken more seriously in the Concrete Industry. I would like to see more opportunities for women to be promoted. I would like more educational opportunities for women.
- More younger people (Men and Women) to come on board. Industry is aging and we need younger people to come in.
- The industry now includes women in all aspects of the working business. Women are owners, machine operators, negotiators, designers. I don't know that we need changes . . . just more women doing a good job in their field
- More recognition for women working in the industry. It would be nice to see a woman in a position higher than my current one within a corporation.
- Education that recognizes that the concrete placing and finishing sector is larger than the cement masons with its combined data and teaching platform. The published data provided for certification is weak in keeping up with the decorative and grinding portion of the concrete installations. Establish a separate sector for the sole purpose of connecting the ready mix suppliers representatives and the concrete installation companies to create a data base as the industry goes through changes in market place demand.

## WICA Spotlight

- It would be good to see this industry embrace diversity. It seems to be behind almost all other industries in this aspect. It will require the efforts of very few to achieve this as in the words of Malcolm X, "Power never takes a back step only in the face of more power."—Kitty Hoyle
- Better global communication where innovations can be exchanged from country to country with greater efficiency—Rosa Blancarte
- There's a part of the industry that is comfortable with the way business has always been done and is slow to adopt new or improved technology. While the familiar ways of doing things may have worked well for them, as times change and new technology becomes available to improve efficiencies, it is necessary to have an open mind to new ways of doing things. The only constant is change and those who can change with the times will have more opportunities for growth and success.—Janet Ong
- I would like to see more women get involved in the industry. Also, I would like to see seminars on concrete basics so those entering the industry with limited information can have a crash-course. Having this general course overview about the industry will help them see how your company comes into play or what your company's role is in this massive concrete industry.—Diana Sanicki

Figure 31. Examples of survey and website responses about increasing access points for women.

The founders always focus on the positives. WICA creates opportunities for women to gain access to industry experts and find mentors. Despite facing a couple of rough years transitioning to the new website and re-conceptualizing WICA's identity, WICA has survived and continues to promote opportunities for women in concrete. Additionally, when WICA was not able to present at WOC for a couple of years, Kimberly and Kari used their wide network to find other ways and other events to share women's accomplishments in the industry. Although the survey information is several years old, the founders listen to members and are keenly aware of trends in the industry. They use this information to identify the best topics and speakers for each event that they design.

**What topics are most interesting to you for future events? (These can be career or industry related.) Please list.**

Text Response
Concrete repair
Changing of the industry, How we are becoming more "environmentally friendly'
Nothing specific comes to mind.
What projects/research is being done by women
New products / Career opportuntiiies / Networking, / webminars
Learning how to communicate in a man-driven industry to be seen as an equal
How to get women interested in the concrete field. / Items focusing on on the various opportunities and aspects of the field. We do structural repairs, using injection of epoxy and urethanes which is a very specialized field.
I would be interested in finding out how many women are working in the concrete industry at lower levels. Drivers, CPI's, Batchers and dispatchers.
Women in non-traditional industries
Training seminars.
Ready-mix concrete trends
Green promotion of polished concrete and the various decorative applications.
Networking with other women in the field.
Global cement economy. How can we learn more about the fluctuating prices of cement and steel used in the industry.
I am most interested in getting to know the other members
How do I get ahead in this industry? Job training

Figure 32. Topics for future WICA events according to survey respondents.

**Endnotes**

<sup>1</sup> The role of the advisory board was on the old website. No advisory board is listed on the new website.

<sup>2</sup> Immediately following all WICA events, tweeting is extremely popular. As part of this research study, an analysis of posted tweets (3/2009-7/2012) was conducted to investigate number of tweets, topics, etc. over time (see Appendix A).

<sup>3</sup> While writing the final version of this dissertation I received news that WICA will be hosting an event at the WOC 2018.

## **Chapter 7: Linking Theories to Themes**

Anthropologic, feminist, social, economic, and urban perspectives informed this research, and I drew upon a number of theories related to the gender pay gap. In this chapter, I more sharply examine the themes in terms of the extent to which they support or refute many of the existing theories, thus contributing to several bodies of literature. I begin by presenting the major themes that arose in response to the research questions. Next, I review the major theories related to the pay gap and provide an overview of themes related to these theories. Some of the theories are more comprehensive than others, touching upon multiple themes. Last, I explore the explanatory power of different theories to the themes this research uncovered.

### **Introducing Themes and Theories**

These are the themes for individuals:

- Theme 1. Love the work
- Theme 2. Pathway to ownership
- Theme 3. Longevity
- Theme 4. Good pay
- Theme 5. Sense of accomplishment
- Theme 6. Access points
- Theme 7. Mentors
- Theme 8. Strategies for perseverance
- Theme 9. Lack of respect/Stereotypes
- Theme 10. Sexual harassment/legal enforcement

The major theories related to this research topic to explain the gender pay gap and occupational segregation included glass ceiling, crowding, self-efficacy, attribution theory,

stereotype threat, human capital, collaboration, and cohort. Table 6 simplifies how the themes are related to these theories.

Table 6

*Themes by Theory*

Theory	Themes
Glass Ceiling	T2, T3, T4
Human Capital	T2, T3
Stereotype Threat	T6, T7, T8, T9, T10
Self-efficacy	T1, T5, T7
Attribution (aspiration)	T1, T5, T6, T7
Collaboration	T6, T7
Cohort	T6, T8
Crowding	T4

**Glass ceiling**

Glass ceiling theory refers to the invisible factors that hold women back from advancing professionally, receiving promotions, and holding executive positions. In this research, I find that several factors affect women’s professional advancement and promotion that do not follow the usual glass ceiling patterns. These factors are STEM education versus blue-collar training (Theme 6: access point), fast advancement (Theme 2: ownership), economic independence (Theme 2: ownership), good pay (Theme 4), characteristics of the industry, and longevity (Theme 3).

The data showed that experience in the industry can be a pathway to ownership of a company. Women earn good salaries (on par or nearly on par with their male counterparts), and they tend to find rewarding, lifelong careers in the industry. Additionally, this was found to be true in two very different states and regions in the United States. Do these data indicate that glass ceiling effects are minimal in the concrete industry? If so, why? Are the glass ceiling effects minimized because of the industry or the type of women who persevere in this nontraditional

occupations, or most likely, some combination of these? What are the factors that reduce these effects and is this indeed an accurate assessment? In other STEM related nontraditional occupations, such as engineering studies show that women have trouble advancing professionally. What effect does higher education have on glass ceiling effects?

Research has shown that women encounter numerous barriers to advancement in STEM related fields and in higher education. In construction, it seems that one of the largest barriers women face is entering the field in the first place. Women generally lack awareness about career paths in construction and concrete, they are unclear about the kinds of jobs that are available and whether they possess the skills to succeed in those jobs, and they have few role models to even imagine themselves working in the industry.

Women still encounter challenges in the field, and in larger concrete companies, the number of women in executive positions is very small. Nevertheless, the data showed that women tend to earn good salaries and stick with concrete. Additionally, the option is always available for anyone with experience in the industry to become an independent contractor or small business owner, which in many ways is very liberating. Not every industry affords this option. Last, there are certain characteristics of the U.S. construction industry and the capitalist culture that lend themselves to business ownership. One of these is the disadvantaged business enterprises requirements for publicly financed projects. Another is the American value placed on becoming a small business owner and the myriad of types of businesses one could specialize in the concrete industry, such as residential, public, decorative, and green.

Interestingly, one significant finding contradicts glass ceiling effects that are found in many other nontraditional occupations for women, such as engineering and science, both of which are increasingly being promoted through STEM initiatives, which is that experience in the

concrete-construction industry leads to business ownership, and can be a relatively fast pathway to ownership. Successful owners need to know their industry and the culture of construction values hands-on experience. It follows that in order to be a successful concrete business owner experience in the field is crucial. However, many of the participants in this research feel that one may rise to the top more quickly in the concrete-construction industry than others. If this is true, it is likely due to characteristics of the industry, because it remains a nontraditional occupation for women and other as of yet unidentified factors.

The construction industry is largely comprised of a few huge corporations and a multitude of very small, specialized businesses. Whether or not women actually can advance more quickly in the concrete industry, or if this is simply a perception, deserves further exploration. Faster advancement by men in traditionally female occupations (nursing and education) has been documented. Is this true for women in traditionally male occupations, or just in concrete-construction? Advancement in engineering firms, higher education in the sciences, and technology and other STEM-related careers do not seem to follow this pattern, while construction may. According to the data sources, this could be a pattern, but much more research is needed to determine the extent to which this may be true and the factors that contribute to this trend. In addition to factors that lend the construction industry itself towards economic independence, characteristics of the women who decide to pursue this nontraditional occupation in the first place cannot be overlooked.

The term glass ceiling refers to invisible factors that hinder women's advancement or hold women back from promotions in the workforce. Several themes from this research directly contradict this theory. The wage gap in this industry is much smaller than other industries, which may result from having very few women in the industry. Nevertheless, respondents showed that

experience in the industry can be a pathway to ownership and that this can occur faster than in other industries. In addition, due to the structure of federal funding for public projects, listing one's company as a woman owned business can be a benefit. Conversely, it has yet to be seen the extent to which the crowding effect may begin to lower wages in the industry because of more women entering.

### **Crowding**

Fast advancement and economic independence are virtually the opposite of the crowding effect. There are still too few women in the concrete industry to determine if there may be a crowding effect and thus lower salaries. Because many concrete workers work alongside union workers and apprentices which have set pay scales, my hope is that there will be no crowding effect, even when concrete is no longer a nontraditional occupation for women (i.e., women comprise more than 25% of the workers in the industry).

### **Self-Efficacy and Attribution**

In a number of ways, the themes related to enjoying the work (Theme 1) and a sense of accomplishment (Theme 5) highlight the importance of self-efficacy in pursuing and persevering in the construction industry. "The strength of a female's self-efficacy is directly related to entry and persistence in NTO" (Lufkin & Reha, 2009, p. 29). The sense of accomplishment that women experience by doing a good job, satisfying customers and proving they can do the job in the first place directly feeds into their aspirations, feelings of confidence and competence, which in turn greatly affects motivation and perseverance. Women put significant value on their perceptions of how skilled they are at different tasks, and generally, they will not pursue a career or take classes if they do not think that they are good at them. Men generally will pursue a career title whether they have any aptitude for it or not. In my professional experience in the industry,

women in test situations are also more apt to succumb to stereotype threat, because women's perceptions of their abilities affect her output; whereas men are not generally bothered by this.

How women and men approach interviewing for open positions is also extremely different. At the Workforce Innovation Summit, Pam Jeffords explained that in general, men will apply for a position even if they only meet 20% of the qualifications; whereas, women wait until they are sure they have 80% of the listed skills. One approach is not necessarily better than the other, and there is sound reasoning behind each of them, but what the man does by applying even when he is extremely underqualified is get his name out there. Using this approach, he will have made five times more contacts than his female counterpart when she reaches 80%. This has an effect on women's promotions and advancement, because hiring managers may not even know that they are interested in the position, so they give it to the guy who has been to their office several times, even if he may be less qualified than his female coworker.

Additionally, it is fascinating that women and men tend to attribute successes and failures almost completely opposite of one another. Women attribute success to hard work or sources outside of themselves and their failures to lack of ability, while men attribute success to innate ability and failure to lack of effort or outside sources (Lufkin & Reha, 2009). This is extremely important in terms of culture, perception, and communication.

One emerging question is the extent "lack of respect" that women tend to feel in the industry can be attributed to how women and men define success/failure? For example, women internalize questions about their performance and perceive these as affronts to their capabilities, while men perceive such questions completely differently, in terms of factors that hindered them from achieving their goals. Could this tie into women's perceptions regarding not being respected or being perceived as incapable? Because lack of respect was repeated so often by

women at all levels in the industry and with all levels of experience, this is both an important topic and one that deserves additional attention. Are women really being disrespected by the men with whom they are working, or do women simply interpret men's behavior as disrespectful? It is probably a combination of both, especially when women are assigned tasks that men would never even be asked to perform (like making coffee, taking notes, etc.). In situations when women are expected to take on menial tasks, they are confronted with a conundrum, and they must "choose their battles." If a woman makes a big deal about being asked to be supportive and making coffee (instead of being asked to the negotiating table as her male counterparts likely would be), she will be perceived as "difficult to work with" or "having an attitude." If she performs the stereotypical action, she is feeding into stereotype threat, and misses the opportunity to participate at the negotiating table or in the same ways that her male counterparts are able to without question.

### **Stereotype Threat**

Stereotype threat will permeate every theme. Stereotype threat presents itself when an individual is put in a position that causes them to conform to a stereotype about their social group, as in the example of "lack of respect" that women feel when being asked to do menial tasks. It also has an influence on human capital, because one's experiences are shaped by opportunities. If one's options are reduced due to stereotype threat, so too will one's human capital be reduced. Human capital is another theory of interest for this study.

### **Human Capital**

Human capital theory combines aspects of both internal and external factors to explain the gender pay gap by proposing that there are differences in both women's and men's innate abilities, as well as their experiences, opportunities in education, and the workforce, which

contribute to women's lower productivity or earnings. Early exposure to the industry through family businesses provides women with one of the greatest opportunities to gain human capital or experience in the industry, allowing them to be successful. In order To add to women's human capital, there needs to be creation of more access points for women to enter the industry and gain experience, otherwise women's human capital in work experience will always be less than men who face fewer barriers to entering the industry. Education and organizations such as WICA can assist in creating additional access points for women in the industry by increasing awareness about women's contributions and identifying women role models.

### **Collaboration**

The fact that women identify finding a mentor as one of the most important strategies for staying in the industry reflects the importance that women place on collaboration versus competition. Additionally, WICA's determination to not become a hierarchically structured organization also illustrates a collaborative versus competitive style. Research on skills needed for the future show that the ability to communicate with diverse groups in a collaborative way will become increasingly important (Mercer University, n.d.).

### **Cohort**

Cohort theory usually refers to the tendency for older women to earn less than younger women in similar occupations and job classifications when controlling for skills and education. In my research, I found that the major cohorts of women in the concrete and construction industries align with different federal funding for training programs, and a difference between blue-collar construction trades and white-collar STEM careers. For example, under the Comprehensive Education and Training Act (CETA) many women became apprentices in construction trades, and therefore their pay is structured and set. Comprehensive Education and

Training Act (CETA) apprentices did not encounter some of the problems that more recent graduates have faced wherein formal higher education is undervalued compared to more hands-on training. Thus, in effect some of the cohorts in this study actually show a reverse cohort effect, in which older women are earning more than their younger colleagues, because of the value the industry places on experience.

The purpose of this chapter was to highlight how well theories on pay gap explain some of the findings or themes discovered in this research. Much more could be said about each of the theories, and in fact, entire research studies have been devoted to analyzing individual factors within various theories. My intent in this chapter was not to dissect any one theory, but rather to provide an overview of how well the data aligns with some of these theories.

## Chapter 8: Conclusions

The purpose of this research study was to gain a deeper understanding about the factors that contribute to and/or hinder women's participation in the concrete-construction industry by examining women's experiences within one very industry-specific, male-dominated nontraditional occupation—the concrete industry. The research questions were used to determine the extent to which the concrete-construction industry is a viable career path for women seeking economic independence and equality of pay; how and why women enter and remain in the industry despite additional challenges they may experience; and reasons why women's organizations in nontraditional occupations are still important in today's economy/society. This research investigated these topics through the lens of women's participation in a specific nontraditional occupation (women in concrete) that does not necessarily require advanced STEM education, including equality of pay, economic independence, education, and recruitment strategies.

The construction sector is interesting for women and all members of society, because it is critical for our well-being and affects our quality of life. The socio-cultural value and perception of skilled trades, and vocational occupations, as well as the availability of labor play important roles in shaping the construction workforce. Additionally, how public projects are financed and how the government participates in major building projects influence the types of professions and opportunities for advancement available to workers.

This research may eventually help to extend opportunities to women who may not have considered the potential that exists for them in this industry for economic independence and leadership development. Equality of pay for women in one industry in the United States should not be interpreted to be equivalent to full equity within society; however, the opportunity for

women to become economically self-sufficient through occupations available in concrete is one step towards greater social justice. Additionally, while the concrete industry is by no means the only avenue through which women can make valuable contributions in infrastructure and other community development pursuits, it has been a largely unexplored opportunity for women's participation, particularly within the academic literature. Therefore, this research addresses some of the gaps in understanding about women's participation in the concrete/construction industry, bringing these industries under greater academic scrutiny.

Around the globe women continue to make up a larger percentage of the paid labor force, and yet, women earn only a fraction of what men earn for similar work. In the United States women take home about three-quarters of what men bring home in terms of pay in most occupational groups. In construction not only do women earn much closer to what their male counterparts earn (92% vs. 75%), construction jobs are well paid and offer opportunities for advancement, such as becoming a contractor or small business owner. In many other parts of the world, construction does not necessarily pay well for entry-level positions that do not require advanced education. In the United States, women have not traditionally worked in construction and to date represent about 10% of the sector; whereas, in some countries women are the primary builders of construction projects, such as housing, irrigation systems for gardens, etc. For women in the United States, construction can provide an option for economic independence and equality of pay, but the extent to which this is true in other countries depends on numerous factors.

Many trailblazers became advocates and mentors for the next wave of women entering the field, but oftentimes this was not intentional, at least not at the outset. The short-term strategies many women in skilled trades used to make it on their own did not necessarily allow other women to ride on their coat tails. While many of the trailblazers paved the way for another

generation of women to follow their example, women did not and still largely have not followed them into the industry. The most frequently used strategies to gain acceptance were to be the best/most skilled and knowledgeable, not ruffle feathers, have punctuality, never ask for special favors, get along, be prepared, and pick your battles. They used these strategies to get by in the short term, because they found that they really enjoyed the work itself, as well as the sense of accomplishment they felt for doing a great job in terms of workmanship and to prove to everyone they were capable. Once women proved themselves in the early years, and gained support from their male counterparts, they could begin to demand the necessities to which they were legally entitled, like bathrooms for women. However, some of those basic needs are still not met on construction sites even today, despite such legislation being on the books for over 30 years.

Those just entering and/or with 5 years or less of experience in some ways have an easier path. They also have the energy of being fresh to the industry. Despite the passage of Title VII of the Civil Rights Act of 1964, sexual discrimination and harassment continued to run rampant in the workforce throughout the 1960s and 1970s. It was not until 1980 that the Supreme Court recognized sexual harassment as a form of sexual discrimination, and the Equal Employment Opportunity Commission (EEOC) published “Guidelines on Sexual Harassment” (Equal Employment Opportunity Commission, n.d., para. 6). Contractors are fully aware that they can get major fines for behaviors such as posting nude pictures of women in public spaces and using gender/racial slurs. Additionally, these protections are a standard part of most training curricula these days, but the construction industry remains the most male-dominated industry in the United States, as well as in other industrialized countries.

Overwhelmingly, the concrete-construction industry can be a viable and long-term career path for women that leads to economic independence and equality of pay, but it remains a path

that is not easily entered, or suitable for everyone, and does not necessarily guarantee a consistent paycheck. According to nearly all interviewees, available data, and many survey and poll respondents, the construction industry overall can provide a relatively fast route to ownership, entrepreneurship, and/or becoming a contractor, which all provide opportunities for women to independently regulate their productivity and earnings because they can contract their own work. While experience in the industry can lead to ownership, this path is not fixed, direct, guaranteed, or for everyone. The most skilled craftsperson may not be interested in developing the additional skills required to become an entrepreneur, or have the working capital to do so. Conversely, a skilled craftsperson may prefer to continue to work in his/her craft. One question that arises for me, after interviewing so many talented women, is as follows: how often are men in the same occupation asked how long they intend to stay in the profession? It is highly recognized that physical strength is no longer a prerequisite for a career in construction; however, according to women who participated in this study, women in the field are consistently interrogated by potential employers and general contractors regarding how long they intend to be in the industry, what they will do if they want children, etc., while men are rarely asked these same questions. There has been some progress and some changes have been made. A few women are being allowed into the field, and while they might not be sexually harassed the way their predecessors were, they are still asked inappropriate questions that their male counterparts are not. A blue-collar construction position is still perceived as acceptable long-term career for a man, but for a woman, it is considered a questionable career path, and rarely considered a long-term option. This means there is still clearly a double standard. This topic deserves further research.

Most women who have the temerity to proceed into a field in which they know they will experience backlash are gutsy to say the least. Particularly, before the 1980s, it was almost unheard of for women to work in construction, and there were very few external social/cultural supports or role models for women to emulate, unless they grew up in the industry. This was largely an internal decision, and depended upon the ambition of the individual woman who decided to try. Women who grew up around the industry tend to fare better, because they had more realistic expectations and knew how to communicate with the men on the site, as well as often having access to tool handling. What many of the trailblazers learned is that they enjoyed the work itself, they were good at it, and they earned enough to support themselves.

Formal higher education (as opposed to apprenticeship training) is increasingly becoming an access point for women. This reflects changes in the market overall, as well as changes in funding. It is increasingly difficult to find a job with only a high school diploma or GED, and federal labor laws throughout the United States have reduced the number of hours that minors may work. Higher education can be an access point into the industry, but the experiences of the women who were in CIM programs did not completely prepare them well for the additional challenges they would face as women in a male-dominated field, even though they were highly aware this would be the case.<sup>1</sup> Being the only female in a classroom is a different experience than being the only woman on a jobsite. White-collar professions are also much different for women when they are the only female on a team. Though women may be minorities, the culture in an architectural or engineering firm is different from the culture on a construction site. In addition, classroom learning does not prepare students for the actual work conditions, even if it provides opportunities for tool handling, and it is very difficult to earn wages while pursuing higher education in most programs in the United States.

All of the respondents who had direct experience with apprenticeship programs felt strongly those programs were one of the best approaches, and many respondents were disheartened that funding for apprenticeships seemed to be drying up. There is also a social stigma in the United States against hands-on training or blue-collar training, especially for women. In contrast, European societies generally hold high regard for skilled trades professions, and recognize that “school is not for everyone.” Determinations about one’s ultimate profession/career paths are made based upon academic performance and other factors before entering high school. There is no shame, however, for students placed in the path toward apprenticeships and skilled trades industries. While there have been some localized movements in the United States designed to encourage students of all ages to explore skilled trades and/or blue-collar professions, these are not part of the mainstream curricula or included in testing programs for placement/advancement.

There has been a tremendous increase in funding for girls and women in STEM education and careers, but these tend to focus on highly competitive white-collar professions that require higher education. To what extent do these programs target girls from all socioeconomic classes? To what extent are blue-collar professions suggested to women (or girls) outside of lower socioeconomic classes? To what extent is the current STEM funding perpetuating social class stratification, gender socialization, and/or stereotyping? These questions deserve further investigation, legislative support, and advocacy. It is still not clear why women continue to make a fraction of what men earn for similar careers, and yet now more than ever in history they are expected to contribute equally financially to the household. So why are women still being coerced to enter professions that will not sustain them and/or not being encouraged to pursue careers that provide living wages?

The Comprehensive Employment and Training Act training and apprenticeship programs that targeted women in the 1980s aimed at assisting women to find high-paying professions, and it was not expected for women to have education past high school. According to available data and interviews, many of the pay rates are established by prevailing wages established by apprenticeships and/or unions. The apprenticeship training sets the bar and requires minimums in terms of hours and types of training, as well as tests for advancement and licensure; however, it is one of the few systems in which one can earn income while training. Being able to earn while training is especially important for women with families to support. Higher education opportunities provide no guarantees whatsoever, not even necessarily employment, but more and more frequently, these are the career paths into which women are being directed for nontraditional occupations.

### **Recommendations for Further Research**

Generally, the following topics could be pursued for future research:

- lack of respect for women in the concrete/construction industry
- the role of unions in the concrete/construction industry
- attrition in the concrete/construction industry
- the extent to which stem fulfills its promise for women

Overall, the research project could have been broken into several successful projects: the WICA case analysis, survey research, disadvantaged business enterprise study, and interviews. While the data collected during this project were extremely rich, they could be interpreted in numerous ways. To narrow down the results the patterns identified followed the research questions, but alternate patterns could be found by using a different framework for analysis.

The 18 interviews could have been the entire basis of the research study. While there was overlap amongst responses to the specific research questions, there were also many interesting perspectives provided by the interview participants that I could not explore further due to time and space constraints. One of the most interesting aspects of interviewing so many different women was how intensely each of them held their individual viewpoints. For example, one director of a program felt that women who have been previously incarcerated are more likely to be encouraged to pursue a career in a blue-collar nontraditional occupation, especially construction. Why? Is she right? Construction sites sometimes have stringent background checking requirements, which would preclude anyone with certain offenses from being able to set foot on the jobsite. On the other hand, some general managers like to take advantage of the Work Opportunity Tax Credit for hiring felons. In some ways, this opinion is an outlier, but in other ways, it supports the premise that federally supported programs tend to promote the current social and economic stratification between blue collar and white-collar professions. This remains a topic for inquiry for future research.

Yet another research study could have been to utilize disadvantaged business enterprise data and compare results across multiple states, and not just two. Identifying candidates and setting up the phone polls for both the states of Washington and Louisiana was very labor intensive, but this project could have been more productive, if this had been the focus of this research. The BLS data, census data, and NAICS code data do not capture information regarding women's participation in various industries. Thus, there is extremely limited data that identifies women in construction, but the disadvantaged business enterprise system provides an avenue for self-identification for businesses, and was very helpful in providing access to and locating women owned businesses in the industry. It would be simple to reproduce the phone poll

questions in additional states (if not throughout the entire United States), and the results would be very interesting. One question that emerged was the role of unions in both women's participation in the construction industry and women's wages. A study of all disadvantaged business enterprises in construction in each state could contribute to examining this question. The role of unions and their relationship to funding streams and training dollars warrants further exploration. The data sources had mixed opinions regarding unions. Most interviewees were supportive of unions, but some found that despite the benefits they had received as individuals from unions, now they felt that unions were somewhat hijacking the apprenticeship system, because unions were set up to be in competition for funding for training dollars.

Overall, most respondents from all data sources (interviews, surveys, polls) did not enter the construction industry to prove a point for women's rights. In fact, none of the research participants set out on a mission to promote women's equality in the construction industry when they first started. Women enter the concrete-construction industry for a variety of reasons, most of which are pragmatic. They enter the industry because they can earn a decent wage (closer to equal wage as a man, and hopefully enough to support a family). In some cases, they were single parents with no financial support from the father, too proud or ineligible to apply for state assistance. In some cases, they were ambitious and wanted to get ahead, and saw no pathway to earning a living wage by pursuing traditionally female occupations, and/or they did not have the means to pursue higher education for slightly higher paying traditional occupations (teaching or nursing). In other cases, they were fortunate to grow up in the industry and had exposure to construction sites, machinery, and tool handling from a young age, as well as how to "properly comport" themselves or "gain respect" in an almost all male environment. Sometimes they married into the industry, and realized they had a knack for it (in some cases with the career

lasting longer than the marriage). Regardless of how individuals entered the industry, many have stayed for the long-term.

### **Policy Recommendations**

In addition to theoretical models that seek to explain the gender pay gap, there are a number of policy initiatives tied to funding that have had bearing upon women's participation in nontraditional occupations, and specifically within the concrete-construction industry. This investigation delved into cultural, social, political, and monetary factors that influence women's access to, and participation in, the industry, as well as the role of organizations and how they can remain relevant, by examining academic studies, redistributive training programs, and STEM-funded initiatives that have tended to overlook women in trades and/or nontraditional occupations that do not require advanced education or training.<sup>2</sup>

Funding for women in nontraditional occupations and for organizations that support women in the construction industry continues to be a problem, in part because the landscape keeps changing in terms of eligibility for funds, as well as shrinking funding streams. Most federal funding for pre-apprenticeship and apprenticeship programs has been drastically reduced, if not eliminated. Women are no longer primary targets of such funding (as in the "glory days of the CETA [Comprehensive Employment and Training Act]," as several of the interview participants called it), and rather "hard to employ" is the focus of Workforce Innovation and Opportunity Act, even though studies find that women can be very successful and become self-sufficient through these types of programs. Funding specific to training women in the trades, as well as business management should be encouraged at all levels and started early.

A new infusion of energy and political will is critical. Advocates need to shift political will and public interest to support women. Tradeswomen need to be included as experts and

enter the legal and political arena to show the importance of the issue. This is challenging because no one wants to challenge her place of employment. Other advocates (research and legal) need to unite on the common goals, and collect and disseminate information more widely.

The entire construction industry is struggling due to labor shortages. In part, this is due to changes in funding that have reduced the vocational training pipeline for workers. Additionally, construction overall is facing an aging population. Recruitment and retention of new people to the industry is a problem facing the industry as a whole, and even more so for women and minorities, because they have so many fewer resources (mentors, federal funding, etc.) than their counterparts. For those reasons, now more than ever legislation needs to be enforced, and organizations need to determine what type of organization they are. Organizations need to work together instead of inventing new organizations, utilize the expertise of and refer women to organizations that are already successful. This is challenging though, because there are so few women from which to draw, leading to overextension of resources.

All of the pieces of the puzzle need to work together. While federal initiatives provided the door for many women to get the experiences they needed, contractors have been creative in their interpretations of these laws and enforcement has been lacking. The trailblazers and those with longevity in the industry have seen many promises unfulfilled. Systemic and cultural changes need to be made. Shifts in views about women's work, and blue-collar careers in general, need to occur. Opportunities need to be created for women to get exposure to the industry, proper training, and mentors, at all stages of the career cycle, by counselors and schools getting involved in broadening exposure to different types of careers and career placement agencies broadening their scope of potential careers they suggest to all candidates. Both of these objectives can be accomplished through career fairs and inviting women in the industry to speak,

much like the events that WICA has sponsored in the past. In fact, WICA can act as a resource for counselors if they are having trouble finding speakers and women involved in the concrete industry. This is a prime example of how WICA can offer collaborative services to local community organizations to increase women's participation in the industry.

One lesson that can be learned from WICA is that in today's economy, it is necessary to be adaptive and flexible. One has to follow the money. The WICA is changing its focus to be more in line with the Workforce Innovation and Opportunity Act, which is aimed at diversity and "hard to employ" individuals. Generation, gender, and race starkly divide the current composition of the construction industry, and it does not reflect the diversity of the U.S. workforce. The question remains whether or not this shift in targeted funding will have an effect on increasing diversity in the industry overall.

## **Endnotes**

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<sup>1</sup> It should be noted that CIM is one of the only universities in the USA that offers higher education in the concrete-construction industry, and seeks to prepare graduates for success in the industry. Therefore, the fact that CIM encourages women and minorities to participate should be recognized and valued.

<sup>2</sup> It should also be noted that the funding, award, bidding and negotiation processes for construction jobs in the United States is unique.

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### Appendix A: Tweets

2009	2010	2011	2012
January	January	January	January
N/A	Total Tweets: 9	Total Tweets: 16	Total Tweets: 9
	6 tweets about the Women In Concrete Breakfast	8 tweets about the Women in Concrete luncheon	3 tweets about the Women in Concrete dance party at Cosmo
	1 tweet asking for people to share the titles of books that have help them in their careers	1 tweet about social media and job hunting in construction	2 tweets about the Woman of Distinction Award
	1 tweet announcing President: Jenne Imholte-Decker of Simplex Construction Supplies, Inc. (Minneapolis, Minn.) for the IGGA first woman to hold that position		2 tweets about the World of Concrete convention
	1 tweet announcing the new Women in concrete logo and Facebook page		
February	February	February	February
N/A	Total Tweets: 12	Total Tweets: 8	Total Tweet: 1
	4 tweets about the Women In Concrete Breakfast highlighting the speakers	1 tweet about introduce a girl to engineering day	1 tweet announcing the winner of the WICA Woman of Distinction Award
	1 tweet about the body language of leadership	1 tweet discussing "do women shun science?"	
	4 tweets about other women focused trade organizations	1 tweet about the WICA Woman of Distinction Award	
March	March	March	March
Total Tweets: 5	Total Tweets: 58	Total Tweets: 9	Total Tweets: 3
3 tweets of articles in industry publications	5 tweets about the formation of the Women In Concrete Alliance	2 tweets about Concrete Expo	2 tweets about Women in Construction Month
one article is focused on a woman lead team of engineering	1 tweet linking to a survey about women in concrete alliance	2 tweets about women building infrastructure	

students building a concrete canoe			
one article is focused on the value of social networking and its benefits in particular for women. It tells the story of one woman at the first women in concrete luncheon and forum being coached by the women at her table about how to get the job she was interviewing for in the industry.	3 tweets about health care reform	1 tweet about the first woman president of AGC of America	
	4 tweets about women's history		
	2 tweets about NAWIC crystal vision award		
	3 tweets quoting famous women		
April	April	April	April
Total Tweets: 51	Total Tweets: 22	Total Tweets: 15	Total Tweets: 3
5 articles about concrete canoe race of boats designed by engineering students	2 tweets about women and mentoring	2 tweets about the Women in Business Convention	2 tweets about photos of women working in the field
3 articles about job losses in construction	1 tweet about women in architecture	2 tweets about Chicago's Wacker Drive Pour	
4 articles about using twitter for business	2 tweets about the benefits of concrete		
8 articles about sustainable and or green trends in construction	1 tweet about a federal rule to help woman owned businesses		
May	May	May	May
Total Tweets: 25	Total Tweets: 16	Total Tweets: 14	N/A
5 related to the stimulus package	2 tweets about thinking big in business	3 tweets about the employment numbers in construction	

5 related to education	2 tweets about marketing in construction	3 tweets about recruiting women into engineering fields	
	2 tweets about women in construction	2 tweets about increasing the participation of women and minority owned businesses	
	3 tweets of inspirational quotes by famous women		
June	June	June	June
N/A	Total Tweets: 7	Total Tweets: 4	Total Tweets: 1
	1 tweet about women and minority owned business	1 tweet about an elementary school focusing on STEM	1 tweet linking to an article about using social media to engage your audience
	1 tweet about women learning to build through Habitat for Humanity	1 tweet about an online research panel made up of women business owners	
July	July	July	July
N/A	Total Tweets: 7	Total Tweets: 3	Total Tweets: 3
	2 tweets about business growth during recession	2 tweets about recruitment and retention of women in skilled blue-collar jobs	1 tweet about CCI update
	1 tweet about CIM graduates on the job market	1 tweet about safety equipment for women in construction	1 tweet about the Polished Concrete Award
			1 tweet about the 5 big ideas in the concrete industry
August	August	August	August
N/A	Total Tweets: 17	Total Tweets: 11	N/A
	4 tweets about women networking in the trades	4 tweets about the women in concrete luncheon	
	3 tweets about the WOC luncheon	1 tweet about woman owned construction businesses	
	1 tweet about safety in concrete	1 tweet about the first woman to run a Navy warship	

	2 tweets about concrete in unusual beverage production related uses		
September	September	September	September
Total Tweets: 7	Total Tweets: 10	Total Tweets: 12	N/A
2 highlight women in the industry	2 tweets about architects	2 tweets about National Tradesman Day	
2 link to a survey by women in concrete	1 tweet linking to a video about young techy women	1 tweet about the STEM gap	
	1 tweet about the EPA hearing on fly ash	1 tweet about an educational opportunity for young women in non-traditional fields	
	1 tweet about testing the concrete from BP blown-out well	2 tweets about economic policy	
	1 tweet about the Women in Concrete Luncheon		
October	October	October	October
N/A	Total Tweets: 5	Total Tweets: 5	N/A
	1 tweet linking to an article about the need to expose students to engineering earlier	2 tweets about concrete seminars	
	1 tweet about the ACI fall conference	2 tweets about job outlooks in construction	
	1 tweet about women fighting to gain ground in the trades		
	1 tweet about the Hoover Dam Bypass		
	1 tweet about the environmental benefits of tilt-up concrete		
November	November	November	November
N/A	Total Tweets: 5	Total Tweets: 10	N/A
	1 tweet about the GreenBuild conference	2 tweets about what happens when concrete freezes	
	1 tweet asking for nominations for the Woman of Distinction	2 tweets about legislation that will increase hiring in the industry	

	award for Women in Concrete		
	1 tweet about concrete design		
	1 tweet about smog-eating concrete		
	1 tweet about the launch of the American Concrete Institute's mobile website		
December	December	December	December
N/A	Total Tweets: 4	Total Tweets: 7	N/A
	2 tweets about WOC luncheon	2 tweets about the WOC Woman of Distinction Award	
	1 tweet about energy efficient building materials	2 tweets about industry growth	
	1 tweet about the gains in women owned businesses		

## Appendix B: WICA Survey

### Survey: Women In Concrete Alliance (WICA)

After reviewing everything that has been posted over the last three years on the WICA website (e.g. through tweets, articles, interviews, etc.), there has been a wide-range of interests expressed, from up-coming events, the economy, women leaders, opportunities, to using social media, and more... Are there trends over time? Are there subjects that really seem to inspire responses? How can WICA keep the fire burning on topics that fire you up? Those are the questions that led to an in-depth analysis of what's been said, and the creation of the following short survey, which includes questions about each of those topics. Additionally, I hope that your responses will assist me in my research and women in non-traditional fields in general.

Please take the time to answer the survey. Your responses are very important!

#### About You

1. Profession (click all that apply):
  - a. Architect
  - b. Batch
  - c. Consultant
  - d. Dispatch
  - e. Estimator
  - f. Finance
  - g. Finisher
  - h. General Contractor
  - i. Laborer
  - j. Loader Operator
  - k. Management
  - l. Marketing/Sales
  - m. Office
  - n. Order-taking
  - o. Owner
  - p. Project Engineer
  - q. Quality Assurance
  - r. Secretary
  - s. Superintendent
  - t. Technician
  - u. Other (please name)
2. Primary duties/functions (click all that apply):
  - a. Bidding
  - b. Book-keeping
  - c. Contract Negotiation
  - d. Customer Service
  - e. Design

- f. Estimating
  - g. Field-work
  - h. Front desk
  - i. Lab-testing
  - j. Marketing
  - k. Publishing
  - l. Quality Assurance
  - m. Scheduling
  - n. Site Supervision
  - o. Sales
  - p. Other (please name)
3. Does your company employ union members? (Yes/No)
  4. Is your position unionized? (Yes/No)
  5. How long have you worked in the concrete industry?
    - a. 0-1 year
    - b. 1-2 years
    - c. 2-3 years
    - d. 3-5 years
    - e. 6-10 years
    - f. 10-15 years
    - g. 15+ years
  6. Salary range (hourly or salary)
    - a. Minimum wage
    - b. Prevailing wage
    - c. Less than \$15,000 year
    - d. \$15,000-20,000 year
    - e. \$20,000-25,000 year
    - f. \$25,000-30,000 year
    - g. \$30,000-35,000 year
    - h. \$35,000-40,000 year
    - i. \$45,000-50,000 year
    - j. \$50,000-60,000 year
    - k. \$60,000-70,000 year
    - l. \$70,000-80,000 year
    - m. \$80,000-100,000 year
    - n. \$100,000+ year
  7. Do you work full-time or part-time? (Full-time/Part-time)
  8. Do you have children? (Yes/No)
  9. Does your company provide healthcare? (Yes/No)
  10. Have you or are you currently attending college/trade school(s)? (Yes/No) (Please list, and include degrees/certificates if applicable)
  11. Has your company provided professional/on-the-job training opportunities for you? (Yes/No)
    - a. Name training:
  12. Do you belong to any professional associations? Yes/No (Please list)
  13. Why/how did you enter the concrete industry (check all that apply)?

- a. Studied concrete in school
  - b. Family/friend referral
  - c. Needed a job
  - d. Good pay
  - e. Interesting work
  - f. Economic necessity
  - g. Family business
  - h. Other
14. What are some of your favorite aspects of your job? (click all that apply)
- a. Interacting with clients/customers
  - b. Interacting with co-workers
  - c. Solving problems
  - d. Meeting new people
  - e. Learning about new products
  - f. Teaching/training people in the field
  - g. Field-work
  - h. Finishing projects
  - i. Meeting deadlines
  - j. Other
15. What are your goals and ambitions for your position? (click all that apply)
- a. To be the first woman (or among the first women) in my field
  - b. To expand the company
  - c. To recruit young women into the field
  - d. To increase women's participation in the field
  - e. To improve "green" technologies
  - f. To encourage greater use of "green" technologies and products
  - g. To encourage and improve diversity within the industry
  - h. Other (Please list)
16. What are the key issues you face as a woman in the concrete industry? (Please list)
17. What changes would you like to see in the industry? (Please list)

#### About WICA

18. How did you learn about WICA?
- a. Website
  - b. Co-worker
  - c. Friend
  - d. Attended WOC WICA Luncheon
  - e. Other
19. Why have you attended WICA events in the past?
- a. I have never attended an event.
  - b. Interested in speakers
  - c. Networking opportunities
  - d. Distinguished Woman Awards
  - e. Other
20. What services or programs would you participate in if they were made available?

- a. Functions at other industry trade shows
  - b. Regional Events
  - c. A blog
  - d. Interactions with online social media
  - e. An e-newsletter
  - f. Mentoring
  - g. Training
  - h. Other
  - i. Please Explain
21. I use the WICA website for the following types of information:
- a. Up-coming events
  - b. Networking
  - c. Education and training opportunities
  - d. Research
  - e. Job-hunting
  - f. Economic information
  - g. Concrete specific information
  - h. Construction related information
  - i. Women in non-traditional careers
  - j. Inspiring/distinguished women
  - k. Articles
  - l. Other
22. What topics are most interesting to you for future events? (These can be career or industry related.) (Please list.)
23. Being a member of WICA is important to me. Yes/No (Why/why not?)
24. In which ways do you communicate with other WICA members? (please click all that apply)
- a. Events/in person
  - b. E-mail
  - c. Social media (Facebook, twitter, etc.)
  - d. Other
  - i. Do you have a preferred method of communication? (please explain)
25. How would you like to receive information from WICA? (please click all that apply)
- a. In person by attending events
  - b. E-mail (I would like to receive an e-mail or e-update when things are changed or added to the WICA website)
  - c. Website (I can look it up myself, I don't need an update)
  - d. Twitter
  - e. Facebook
  - f. Other (please explain)

#### About your company

26. Size of Company
- a. 1-10 employees
  - b. 11-20 employees

- c. 21-30 employees
  - d. 31-50 employees
  - e. 51-75 employees
  - f. 76-100 employees
  - g. 101-200 employees
  - h. 201+ employees
  - i. Number of women employed
27. Company's Primary type of work:
- a. Architectural
  - b. Engineering
  - c. Ready-mix producer
  - d. Finishing
  - e. Testing
  - f. Etc.
28. Does your company receive public funding for projects (Yes/No/I don't know)
29. Geographical Location where company does business (by state or region)
- a. International
  - b. Northwest U.S.A.
  - c. Southwest U.S.A.
  - d. Northeast U.S.A.
  - e. Southeast U.S.A.
  - f. Etc.
30. Additional Comments

Would you be willing and interested in participating in a more in-depth, follow-up telephone interview to assist research about women in nontraditional careers? (If so, please include contact information and the best time to reach you. This information will be kept strictly confidential.)

## Appendix C: Interview Questions

### Potential Interview Questions

1. How are you currently involved in the concrete industry (i.e. what do you do professionally in this industry?)
2. How long have you worked in the industry?
3. What inspired you to start working in the industry?
  - a. Did you pick concrete or did it pick you?
4. Did specific events lead you to the industry (name event, disaster, catastrophe, etc.)
  - a. Were you influenced by specific events (personal, local, regional, etc.) which led you to enter the field?
5. Why concrete (versus another industry)?
6. What do you enjoy/dislike about the industry?
7. What advice would you give to someone entering the field?
  - a. What, if any, additional advice would you give to women or minorities entering the field?
8. Please describe some of your most memorable experiences.
9. What do you envision for the future of the industry?
  - a. And your role in it?
10. What training and/or education have you received in the industry?
  - a. What did you find the most useful?
  - b. How would you improve the training?
11. What if any barriers have you faced in the industry?
  - a. What did you do to overcome those barriers?
  - b. What specific factors do you think were related to these barriers (i.e. environment, location, gender, race, etc.)
12. Is there anything that you would like to add, ask or tell me?

## Appendix D: Survey Results

### Survey Results

(Prepared by Sefla Fuhrman, UNO Ph.D. student, for WICA)

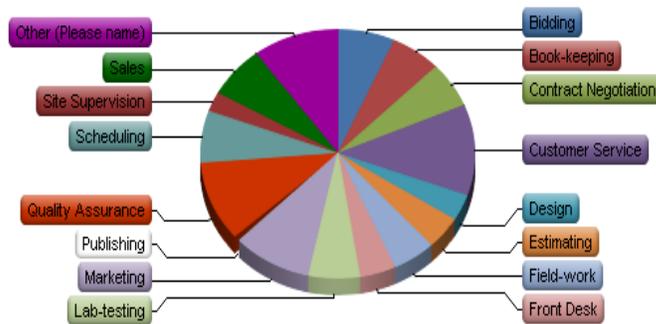
#### 1. Profession

**22% (21/94) Trade and Technical Skills** (Batch, Dispatch, Finisher, General Contractor, Laborer, Loader Operator, Project Engineer, Quality Assurance, Technician)

**66% (62/94) Administrative, Management and Financial** (Consultant, Estimator, Finance, Management, Marketing/Sales, Office, Order-taking, Owner, Secretary)

**11% (10/94) Other** (Area operations manager, R & D Engineer, Purchasing, Operations Manager, Accountant & Safety Director, Education, CEO Global Cast Stone and nano cement science, Cement Finisher, Non-profit executive)

#### 2. Primary duties/functions



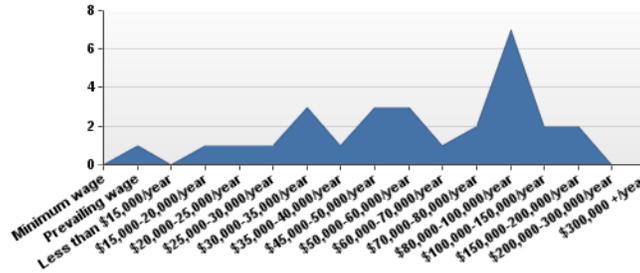
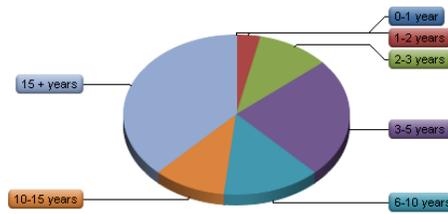
Other: Daily concrete manufacturing operations, Research and development of new products using cementitious components, Purchasing, Management of staff, concrete plants, dispatch and concrete truck, and drivers, Research and development and training, Research and teaching, Safety Director, Research, Fiscal management, Corporate Strategy, Research and education, Membership)

**3. Does your company employ union members? Yes (15/29) 52%; No (13/29) 45%; I don't know (1/29) 3%**

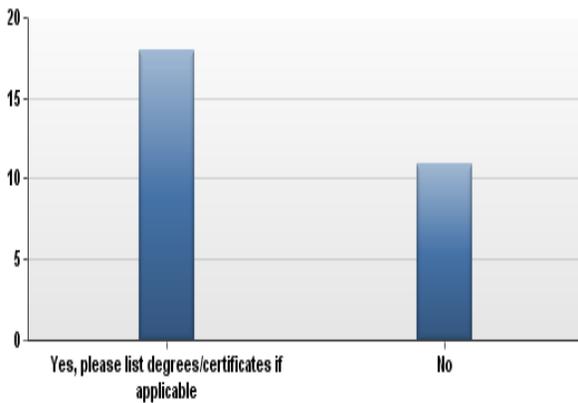
**4. Is your position unionized? Yes (2/29) 7%; No (27/29) 93%**

**5. How long have you worked in the concrete industry?**

**6. Salary Range**



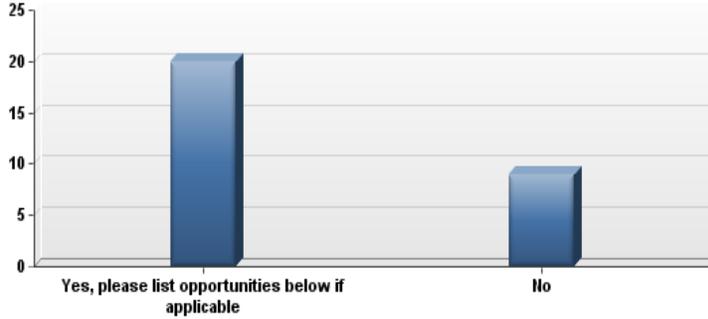
- 7. Do you work full-time or part-time? Full time 93%; Part time 7%
- 8. Do you have children? Yes 66%; No 34%
- 9. Does your company provide health care? Yes 76%; No 24%
- 10. Have you or are you currently attending college/trade school?



**Degrees/Certificates:**

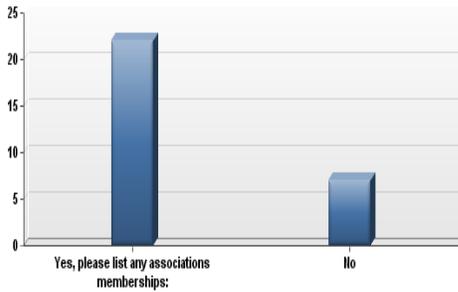
- BS in Building Construction
- BS Civil Engineering & MBA Marketing
- BS in Civil Engineering
- BS civil engineering
- BS Business Administration, MSBA Business Administration
- BA Economics with Business Concentration
- Master degree in Chmical Engineering, Master in Materials Sciences Engineering
- English Writing / Art History
- BS Architectural Engineering, MS Structural Engineering, working on PhD in Civil Engineering
- Bachelors in Business with Accounting major, Portland Cement Technician I, & OSHA 10 & 30 Hour
- PhD in Construction Management
- BS Business Administration, and Psychology Business
- BS - Early Childhood Education, University of Illinois, Urbana-Champaign
- BA

- 11. Has your company provided professional/on-the-job training opportunities for you?



ACI Field Strength Testing, NRMCA Concrete Technician Level 2,3 and 4, LEED GA, DOT Aggregates I and II, PCC I, II, and III Certification and professional courses paid including college courses  
 Sales and Marketing Training; negotiating training professional conferences Purchasing training (still qualifying classes online)  
 All phases of epoxy injection, from pump usage and maintenance, inspecting a job, material safety etc.  
 Cox Business School; Sales Management training  
 World of Concrete classes, OSHA Classes, & Portland Cement Technician Classes  
 ACI courses, NRMCA courses, World of Concrete courses, and Command Alkon batching, dispatching and finance many concrete certifications  
 apprenticeship training  
 WOC Seminars/College Coursework/Conventions

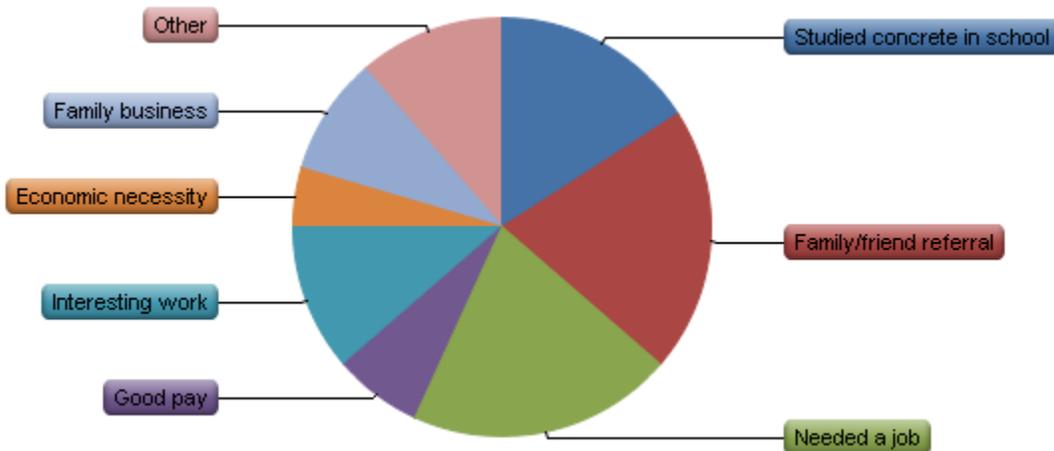
### 12. Do you belong to any professional associations?



**Association memberships:**

ICRI, NAWIC, Iowa ACI Chapter, IRMCA, NRMCA, ASCE, ACI local and national, USSD, PA Aggregate and Concrete Association, PRecast Concrete Association of Virginia, Virginia Transportation Construction Alliance, National Precast Concrete Association, American Concrete Pipe Association, Women in Concrete Alliance, ACS Am Chemical Society, ACERs Ame Ceramics Assoc, WICA, Readymix Association; EMA, Southern Interior Const. Assoc., Chamber of Commerce, PCI, American Society of Women Accountants & National Association of Women In Construction, Alliance for Women in Construction, USGBC, NAPW, Lehigh Valley Chamber of Commerce, Chicago Women in Trades, CFA / NAHB/ACPA/ASCC

### 13. Why/how did you enter the concrete industry?



Other:

- My husband worked in the industry for 20 years.
- My husband wanted to start the business because he was skilled in concrete work and is Native American

- Built the Business
- Career change
- The first position I had met my needs

#### 14. What are some of your favorite aspects of your job?



#### Other:

Research new products and their applications to safety and defense  
 Surfacing current issues and modifying methods  
 the opportunity to work with my husband and explore many new areas where we do work  
 Evolving the product to suit new applications that are marketable  
 Being able to pass my skills on to the next women in construction or men.  
 Helping others

#### 15. What are your goals and ambitions for your position?

To be the first woman (or among the first women) in my field **31%**

To expand the company **31%**

To recruit young women into the field **24%**

To increase women's participation in the field **34%**

To improve "green" technologies **34%**

To encourage greater use of "green" technologies and products **38%**

To encourage and improve diversity within the industry **45%** Other **31%**

- To be successful and increase my direct responsibility
- To be the first female in an executive position in my company.
- To promote the use of precast concrete products
- To prove women deserve as much appreciation/salary as men
- To be a role model for my daughters, letting them see first hand that a woman is not limited in her choice of professions and that you can run a company and a home at the same time.
- To great an international set standard of certification for the cement masons
- To be a journey person and to be the best at what I do. Not having to look for a job, but to have companies look for me.
- To take the company from a family business to a true corporation
- To help contractors be successful through the efforts of the CPAA

#### 16. What are some of the key issues you face as a woman in the concrete industry?

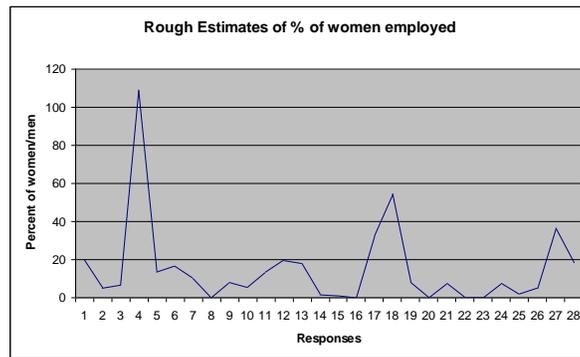
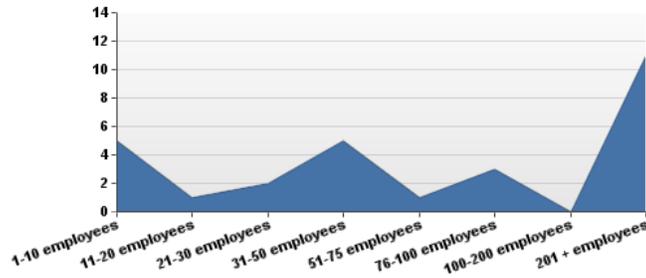
The responses are too numerous to list, however there were a few resounding themes that emerged: Women as minority (even tougher for foreigners and women of color); Respect (from colleagues, in the field, etc.)-despite often times being the most educated and/or long-standing within the profession; Aging population in the industry, and how to recruit new people.

#### 17. What changes would you like to see in the industry?

There were multiple and varied responses to this question. Some changes that were mentioned by several respondents include: more women in the industry; greater diversity in the industry; more knowledge and training available to encourage women, minorities, and young people to enter the industry; and to be treated and paid equally.

**27. Size of company**

**28. Approximately how many women are employed at your company?**



**The aim of my research is to explore women's roles in the concrete industry, and economic opportunities that may be created for women through the pursuit of non-traditional careers. I chose the Women In Concrete Alliance (WICA) as a case study organization. For more information about survey results, or to participate in my research study, please contact Sefla Fuhrman at the University of New Orleans Planning and Urban Studies Dept. 504-280-6519, or e-mail [snfuhrma@uno.edu](mailto:snfuhrma@uno.edu)**

## Appendix E: Phone Poll Business Contacts

This was compiled in preparation for WOC 2013, and distributed there.

### Washington Phone Poll OMWBE contacted

#### Business Name

1. 1 ALLIANCE GEOMATICS LLC
2. A & D QUALITY CONSTRUCTION CO LLC
3. AAA BUILDING SERVICE PLLC
4. AAA CONTRACTORS INC
5. ABR WEST CONSTRUCTION LLC
6. ACCOUNTABLE CUSTODIAL AND MAINTENANCE INC
7. ACCURATE IMPRESSIONS LANDSCAPE LLC
8. ADP CONSTRUCTION SERVICES INC
9. ALL PROJECT SOLUTIONS
10. ALL THE BASES INC
11. ANN K FARR
12. ARNOLDS COMMERCIAL CLEANING
13. ARROWHEAD SERVICES
14. ARTS TRUCKING INC
15. B B CONTRACTING INC
16. BELARDE COMPANY INC
17. BHP INC
18. BIRCH EQUIPMENT COMPANY INC
19. Black Star Construction
20. Blue Trident LLC
21. BOLA CORPORATION
22. C A GOODMAN CONSTRUCTION CO
23. C ERVIN CONSTRUCTION LLC
24. C I LOVELL INC
25. CANA CONSTRUCTION
26. CARRIE M BALDWIN
27. CAT WORKS LLC
28. CATES & ERB INC
29. CAVEMAN CARPENTRY LLC
30. CGM DIRT-WORKS
31. CHEROKEE CONSTRUCTION SERVICE LLC
32. CIR CONSTRUCTION LLC
33. CITY LIGHTS ELECTRIC SUPPLY INC
34. CIVILTECH ENGINEERING INC
35. CMG INC
36. COATES PRE-CONSTRUCTION PHOTOGRAPHY
37. COLVILLE TRIBAL SERVICES CORPORATION
38. COMPUTER CONSULTANTS INTERNATIONAL INC
39. CONTEMPORARY HOME SERVICES INC
40. COOK ENGINEERING AND DEVELOPMENT SERVICES PLLC

41. COSTIGAN INTEGRATED LLC
42. D L ASAHARA CO INC
43. DEE DEE ANN GRANT
44. DEL SOL INC
45. DEWALT COMMERCIAL L L C
46. DOG CONSTRUCTION LLC
47. DONELSON CONSULTING LLC
48. ELITE CONSTRUCTION & DEVELOPMENT LLC
49. EXELTECH CONSULTING INC
50. EXPRESS DIVING SERVICES LLC
51. F & L BUILDING MAINTENANCE LLC
52. FARROW CONSTRUCTION SPECIALTIES INC
53. FINN MADDEN INC
54. FLYRIGHT PRODUCTIONS
55. FRANKLEE PROPERTIES LLC
56. GALEANO CONSULTING LLC
57. GARNER CONSTRUCTION INC
58. GOINS CONSTRUCTION CO INC
59. GREEN CITY INC
60. GRIFFIN HILL & ASSOCIATES L L C
61. GUYLINE CONSTRUCTION COMPANY INC
62. HAPPY VALLEY LAND DEVELOPMENT LLC
63. HAWK BUILDING CONTRACTORS INC
64. HAYRE MCELROY & ASSOCIATES LLC
65. HI GRADE BARK TOPSOIL AND ROCK INC
66. Highline Pavement Maintenance, Inc.
67. ICICLE CREEK ENGINEERS INC
68. ISLANDER ROOFING LLC
69. J KRIEGH ARCHITECTS INC PS
70. J R PAINTING CO INC
71. JABEZ HOLDINGS INC
72. JANETTE ANN KEISER
73. JEANETTE BOWERS WEAVER PLLC
74. JHK CONSTRUCTION
75. JIMALE TECHNICAL SERVICES LLC
76. JKT DEVELOPMENT INC
77. JL LEASING TRANSPORTATION INC
78. JOHN WAYNE CONSTRUCTION CO INC
79. JR CONSTRUCTION
80. K BEAR CONSTRUCTION INC
81. KATHLEEN DAY LANDSCAPE CONSULTANT
82. KBA INC
83. KIWICON GENERAL CONSTRUCTORS LLC
84. KS CONSTRUCTION INC
85. LADY ELECTRIC LLC
86. LAND DEVELOPMENT CONSULTANTS INC

87. LAND DEVELOPMENT ENGINEERING & SURVEYING INC
88. LARKOR CONSTRUCTION COMPANY INC
89. LAW OFFICE OF ALICE L BLANCHARD
90. LEAJAK CONCRETE CONSTRUCTION INC
91. LEE ROSE INC
92. LIEN NISHIWAKI ARCHITECTS LLC
93. LIFT SOLUTIONS INC
94. LIN & ASSOCIATES INC
95. LKE CORPORATION
96. LONGBRANCH CONSTRUCTION SERVICES
97. LORACHE CAD/IT SERVICES LLC
98. LORILLA ENGINEERING INC PS
99. LUCERO & ASSOCIATES LLC
100. M2 INDUSTRIAL INC
101. MACNAK CONSTRUCTION LLC
102. Manuel La Rosa DDS PS
103. MARPAC CONSTRUCTION LLC
104. MARSHBANK CONSTRUCTION INC
105. MASTERCRAFT ROOFING INC
106. Matson Carlson & Associates, Inc.
107. MCGEE PLUMBING CO INC
108. MEKO CONSTRUCTION INC
109. MELISSAS CLEANING SERVICE
110. MINERGY INC
111. MJ TAKISAKI INC
112. MKM CONSTRUCTION INC
113. MOBILE ELECTRICAL DISTRIBUTORS INC
114. MOTHER NATURES CLEANING SERVICE
115. Natalie Fobes Photography, LLC
116. NEEMA CONSTRUCTION INC
117. NORTHERN RESOURCE CONSULTING INC
118. NORTHWEST CIVIL ENGINEERS PLLC
119. NORTHWEST MILLWORK INC
120. NW ARCHITECTURE LLC
121. OCEANSIDE CONSTRUCTION INC
122. OFFICIAL TRAFFIC SCHEDULER LLC
123. OJT INTERIOR CLEANING SERVICES
124. OLIVAS VALDEZ INC
125. OMA CONSTRUCTION INC
126. OSIRIS ENTERPRISES LLC
127. OWNERS PROJECT RESOURCES
128. OZUNA BARNES CONSTRUCTION LLC
129. PACIFIC GEO ENGINEERING
130. PACIFIC NORTHWEST BUILDING SERVICES
131. PARADIGM BUILDING CONSULTANTS LLC
132. PARKER KIMBALL CASEWORK INC

133. PASTAKIA & ASSOCIATES LLC
134. PATRICIA BRENNAN ARCHITECTS
135. PAUVIC LLC
136. PENNY LEE TRUCKING INC
137. PHOENIX PRESSURE WASHING LLC
138. PINNACLE CONSTRUCTION ENTERPRISES
139. PORT ORCHARD PLUMBING & HEATING INC
140. PROFESSIONAL CAD SERVICES INC
141. PROJECT MANAGEMENT SUPPORT INC
142. PSA LLC
143. QUALITY WOODWORKING & CONSTRUCTION L L C
144. R L C INC
145. RC CONSTRUCTION SERVICES INC
146. RED ARROW CONSULTING INC
147. RED CEDAR INC
148. Reece Trucking and Excavating, Inc.
149. RHC Engineering
150. RHINO ONE LLC
151. RICHARD KREIS
152. RICHARD MARTIN CONSULTING
153. RITEWAY ELECTRICAL & CONSTRUCTION INC
154. ROAD RUNNER TRANSPORTATION LLC
155. ROLLUDA ARCHITECTS INC
156. S H J ELECTRIC CO INC
157. SAEZ CONSULTING ENGINEERS INC/SCE INC
158. Sakai Industries Inc.
159. Salmi & Gillaspy, PLLC
160. SALMON RIVER ENGINEERING PLLC
161. SANDERS & ASSOCIATES INC
162. SANDO ENGINEERING LLC
163. Sanera Group LLC
164. SCHEDULING AND INFORMATION SERVICES INC
165. SCHEMATA WORKSHOP INC
166. SCOUT LAKE CONSTRUCTION INC
167. SCS CONSULTING
168. SEALASKA CONSTRUCTORS LLC
169. SHEN CONSULTING INC
170. SIMMS JANITORIAL SERVICE
171. SJ BARRETT & COMPANY INC
172. SONE L LEDUC
173. SOPHEAP HILLE
174. SOTO AND SONS CONSTRUCTION LLC
175. SOUND GEOENVIRONMENTAL PLLC
176. SPARKS MANAGEMENT INC
177. SPOKANE TRAFFIC CONTROL INC
178. SSA CONSULTING INC

179. STEELKORR LLC
180. STEPHERSON AND ASSOCIATES LLC
181. SUPER CLEANING SERVICE INC
182. SUPERB CLEANING INC
183. SWALLING WALK ARCHITECTS LLC
184. Sweek Consulting Engineers LLC
185. SWIFT COMPANY LLC
186. SYSTEMS CONSULTING LLC
187. T AND J S PLUMBING CONNECTION LLC
188. TALAKAI CONSTRUCTION LLC
189. TAURUS 3C
190. TERCOM CONSTRUCTION INC
191. TERRA DYNAMICS INC
192. TERRA FIRMA II INC
193. THAXTON PARKINSON PLLC
194. THE BAG LADY INC
195. THE FINAL TOUCH CLEANING SERVICE INC
196. THE SALCIDO CONNECTION INC
197. THE VOSK GROUP
198. TIGER-WEST INC
199. TOTAL HOME IMPROVEMENT INC
200. TRAFFIC CONTROL RESOURCES INC
201. TRAFFIC MASTERS INC
202. TRANSCON COMPANY LLC
203. TRUE NORTH LAND SURVEYING INC
204. TUNISTA CONSTRUCTION LLC
205. TWIST INC
206. UNITED PROFESSIONAL CAULKING & RESTORATION INC
207. URBAN RELATIONS INC
208. URBAN TECHNOLOGY SYSTEMS INC
209. VALDEZ CONSTRUCTION INC
210. VERACITY CONSTRUCTION & BUSINESS CONSULTING LLC
211. VIP INDUSTRIAL SUPPLY LLC
212. VIP JANITORIAL
213. W E COATES SURVEYING LLC
214. WAKEROBIN LLC
215. WASHINGTON STATE UTILITIES LLC
216. WATERSHED ENVIRONMENTAL SOLUTIONS LLC
217. WENSON CONSTRUCTION INC
218. WEST COAST GENERAL CONTRACTORS
219. WEST RAIL CONSTRUCTION CO LLC
220. Wetland Permitting Services
221. WEZEES PLUMBING INC
222. WHITE SHIELD INC
223. WOMER & ASSOCIATES INC
224. Yiasin Cynthia Lin d/b/a Block26

## Louisiana DBE Phone Call List Contacted

1. A & A ENTERPRISES, INC.
2. A R BROOKS PAINT CONTRACTING, LLC
3. A WILLIAMS ENTERPRISES, INC.
- A. LEBLANC ENTERPRISE, INC
4. AA CONTRACTING SERVICES, LLC
5. ABATEMENT CONSTRUCTION & SVC CONTRACTOR
6. ABM ENTERPRISES, INC.
7. ABSOLUTE CONTRACTORS, LLC
8. ACACIA INDUSTRIES, LLC
9. ACADIANA COMPANIES, LLC
10. ACCUSESS ENVIRONMENTAL, INC.
11. ACE SERVICES & TRANSPORTATION, LLC
12. ACE SERVICES & TRANSPORTATION, LLC
13. AFFORDABLE FENCE, INC. D/B/A TURNKEY CO\*
14. AFFORDABLE TRUCKING CONTRACTORS, LLC D/\*
15. AGE AVICON GENERAL ENTERPRISES, LLC
16. AIRCO SERVICES, LLC
17. ALFRED DAWSON & SON CONCRETE WORK
18. ALL STATE PROTECTIVE SERVICE
19. ALLIANCE TRANSPORTATION GROUP, INC.
20. ALTERNATIVE SOURCE, INC.
21. ALWAYS FANTASTIC JOB, LLC
22. AMERICAN CONSTRUCTION ENTERPRISE
23. AMERICAN TESTING LAB, LLC
24. ANDREWS CONSTRUCTION MANAGEMENT
25. APC CONSTRUCTION, LLC
26. APS DESIGN AND TESTING, LLC
27. ARK ENGINEER AND CONSULTANTS, INC.
28. ARMSTRONG N CONSTRUCTION, LLC
29. ARROW FENCE CO., LLC
30. ASHBY HVAC, LLC
31. AUGUILLARD CONSTRUCTION COMPANY
32. B & S EQUIPMENT CO. INC.
33. B.M. GRACE, INC.
34. BAKER READY MIX, LLC
35. BALTHAZAR ENTERPRISES D/B/A BALTHAZAR E\*
36. BARRIER CONSTRUCTION, INC
37. BARRISTER GLOBAL SER. NETWORK, INC
38. BARRY TECHNOLOGIES, INC.
39. BASS CONTRACTORS, INC.
40. BAYOU CAJUN ENTERPRISE, LLC
41. BBC ENGINEERING, INC.
42. BEL-CAGE CONSTRUCTION, LLC

43. BETA TESTING & INSPECTION, LLC D/B/A TH\*
44. BIG YELLOW CONSTRUCTION, LLC
45. BLACKSTAR RECOVERY GROUP, LLC
46. BLEUWATER'S TRUCKING, LLC
47. BOINES CONST. & EQUIPMENT CO., INC.
48. BONTON ASSOCIATES, LLC
49. BOSSIER FOUNDATION DRILLING COMPANY
50. BRC & ASSOCIATES, LLC
51. BRIONES CONSULTING & ENGINEERING LT
52. BROTHERHOOD WAY GENERAL CONTRACTORS, LLC
53. BROTHERS CONCR.& HARD. DESIGN, LLC
54. BRUDD CONSTRUCTION CO., LLC
55. C & M CONSTRUCTION GROUP, INC.
56. C & R CONTRACTING SERVICES, LLC
57. C-N-M CONTRACTING & DEVELOPING SVC
58. CALEB INVESTMENTS & CONTRACTING, INC.
59. CANDEAU INDUSTRIES, LLC
60. CANDICO, LLC
61. CARPET NETWORK, INC.
62. CASTLE ROCK PAVERS, LLC
63. CC & S CORPORATION
64. CCR FIRE PROTECTION, II, LLC
65. CDW SERVICES, LLC
66. CERCONTEC, LLC
67. CHAD PODY CONSTRUCTIN COMPANY, LLC
68. CHANGING LIVES CONSTRUCTION CO., LLC
69. CHARLEE LOGISTICS PLANNING, LLC
70. CHATMON CONSTRUCTION, LLC
71. CHESTER ELECTRIC, LLC
72. CIVIL DESIGN & CONSTRUCTION, INC.
73. CLARK CONSTRUCTION & MAINTENANCE LLC
74. CLARK FLOORING, LLC
75. CLH BUILDERS, LLC
76. CNC CONSTRUCTION & AIR CONDITIONING, LLC
77. COASTAL & HIGHWAY EROSION CONTROL
78. COLE CONSTRUCTION COMPANY, INC.
79. COLMEX CONSTRUCTION, LLC
80. COMMAND CONSTRUCTION INDUSTRIES, L.L.C.
81. COMMANDER CORPORATION
82. COMPLIANCE CONSULTANTS, INC.
83. CONCRETE PLACEMENT, INC.
84. CORDEIRO, LLC
85. COVENANT GENERAL CONTRACTORS, INC.
86. CREEK SERVICES LLC
87. CURTIS WRIGHT BUILDERS
88. CUZAN SERVICES, LLC

89. D. EVANS ELECTRIC, LLC
90. D. HONORE CONSTRUCTION, LLC.
91. DANNY RAY'S CONSTRUCTION
92. DBE ELECTRICAL SERVICES, LLC
93. DDS CONSTRUCTION, LLC
94. DEAN'S AIR-CONDITION & HEATING, LLC
95. DEATS DEVELOPMENT, LLC
96. DEBOSE CONSTRUCTION
97. DECUIR BRICK MASONRY LLC
98. DELL TECH AIR, LLC
99. DESTINY CONSTRUCTION COMPANY, LLC
100. DIEUDONNE ENTERPRISES, INC.
101. DILLON BROS READY MIX CONCRETE
102. DISPOSAL SERVICES, INC.
103. DORSEY BRYANT GENERAL CONTRACTORS, LLC
104. DQSI, LLC
105. DREW DEVELOPERS, LLC
106. DUPLESSIS & SONS, INC. LEON
107. DYNA-PLAY, LLC
108. DYNAMIC CONSTRUCTION & DEVELOPMENT, INC.
109. E.A. BIGGS & ASSOCIATES, INC.
110. E.T.I., INC. D/B/A EXCEPTIONAL TEMPORAR\*
111. E-1 ELECTRIC, LLC
112. E-1 ENTERGIZE, LLC
113. EDR CONSTRUCTION, LLC
114. EEC ELECTRIC, INC.
115. EFT DIVERSIFIED, INC.
116. EJES, INC.
117. EL PRESIDENTE BUILDERS, LLC D/B/A FORMA\*
118. ELECTRIC SOLUTIONS, INC.
119. ENDARA CONT& GLOBAL LOGISTICS, LLC
120. EPOXY-IT, LLC
121. EXPERT MAINTENANCE & CONST SVC LLC
122. FIRST DOWN ELECTRIC, LLC
123. FIRST IMPRESSION CONSTRUCTION LLC
124. FIRST MILLENNIUM CONSTRUCTION, LLC
125. FORTE & TABLADA, INC.
126. FREEDOM DEVELOPMENT GROUP, LLC
127. FRONT & BACK, LLC
128. GAEA CONSULTANTS, LLC
129. GENBUILT COMPANY, INC.
130. GEO CONSTRUCTION COMPANY
131. GEOSTELLAR ENGINEERING, LLC
132. GOTECH INC.
133. GREAT SOUTHERN DREDGING INC
134. GREENPOINT ENGINEERING, LLC

135. GT & ASSOCIATES OF TEXAS, INC.
136. GULF SOUTH RESEARCH CORPORATION
137. GULF STATES CONSTRUCTORS, L.L.C.
138. GULF TO GULF BRIDGE ENGINEERING
139. GUTCON, INC.
140. H & W DEMOLITION, INC
141. H CONSTRUCTION, INC.
142. H. WILLIAMS, LLC
143. HALL BUILDERS, INC.
144. HANDY MANZ, LLC
145. HARMON CONSTRUCTION, LLC
146. HAT CREEK LLC
147. HAYES MANUFACTURING CO., INC.
148. HD TRUCK & TRACTOR, LLC
149. HEBERT'S TRUCKING & EQUIP.SER., LLC
150. HENDERSON CONSTRUCTION SERVICES INC
151. HOPE CONTRACTORS
152. HORSEPOWER DEMO AND TRUCKING, LLC
153. HORTON CONSTRUCTION CO., INC.
154. INFINITY CONSTRUCTION AND TRUCKING, LLC
155. INTEGRATED LOGISTICAL SUPPORT, INC.
156. INTEGRATED MANAGEMENT PROJECT CONTROLS,\*
157. IRON TRIANGLE DEVELOPMENT, LLC
158. IRVIN TRUCKING & DEMOLITION CO., INC.
159. ITS REGIONAL, LLC
160. J & R CONCRETE PUMPING, LLC
161. J & R PLUMBING, LLC
162. J STAR ENTERPRISES, INC.
163. J.C.PATIN GROUP, LLC
164. J.E.S. CONSTRUCTION, INC.
165. JACKSON & FONTENOT CONST. CO., INC.
166. JADE'S CONCRETE AND TRUCKING SERVICES
167. JAMES L. MILES CONSULTING, LLC
168. JD'S REBAR & CONSTRUCTION INC.
169. JEFF-CO CONTRACTORS, INC.
170. JEROME'S ENTERPRISES, INC.
171. JESCO ENVIRONMENTAL & GEOTECH, INC.
172. JLE CONTRACTORS, LLC
173. JLG TRUCKING CO., LLC
174. JOHN HEIMS TRUCK AND TRANS. LLC
175. JONES BROTHERS ENTERPRISE, INC.
176. JOSEPH ELECTRIC, INC.
177. JULIE Z. LEBLANC
178. JULIEN ENTERPRISES INC
179. JUNKAROOS AND MOVEROOS FRANCHISE SYS LLC
180. JUSTICE & HUANG ENGINEERS, INC.

181. K & M COMPANY OF NORTH LA, LLC
182. K H, INC.
183. K-BELLE CONSULTANTS, LLC
184. KARMA CONTRACTORS, LLC
185. KASS BROS. INC.
186. KEILAND CONSTRUCTION, LLC
187. KEN TILLAGE CONSTRUCTION CO LLC
188. KENALL, INC
189. KENT CONTRACTORS, INC.
190. KEYMEL TECHNOLOGIES, LLC
191. KIRK LASTRAPES CONSTRUCTION CO., LLC
192. KLH TRUCKING, LLC
193. KLV OPERATIONS, LLC
194. KMAD BUSINESS SERVICE, INC.
195. KNIGHTEN CONSTRUCTION, LLC
196. KWAME BUILDING GROUP, INC.
197. LAMB CONSTRUCTION
198. LARRY MCCORKLE STEEL REINFORCEMENT, INC.
199. LATHAN CONSTRUCTION, LLC
200. LE NOUVEAU CONSTRUCTION CO., LLC
201. LEE'S CONCRETE
202. LEGETTE CONSTRUCTION, INC.
203. LEWIS, PAUL
204. LHT SERVICES, INC.
205. LLOYD'S TRANSPORTATION, TOWING & AUTO SV
206. LOUISIANA BUILDING MAINTENANCE COMPANY,\*
207. LOUISIANA ENTERGY SOLUTIONS, LLC
208. M & M ENTERPRISE GROUP, LLC
209. M & M ENTERPRISES OF BASTROP, LLC
210. M & O CONSTRUCTION LLC
211. MACK'S TRUCKING OF INDEPENDENCE LLC
212. MAGEE & SONS MASTER PLUMBERS & CONTRACT\*
213. MAJOR CONSTRUCTION, LLC
214. MALONE ELECTRICAL SERVICES, INC.
215. MARIAN'S MEDICAL SUPPLIES, LLC
216. MARK DOYLE CONSTRUCTION, LLC
217. MASON TRUCK SERVICE
218. MASONRY MASTER, LLC
219. MAX COOLING & HEATING, LLC
220. MCM ENTERPRISE CONTRACTORS LLC
221. MDM DESIGN GROUP, LLC
222. MEL, INC.
223. MELANCON CONTRACTING SERVICES, LLC
224. MEMO PAINTING COMPANY, INC.
225. METRO ELECTRIC & MAINTENANCE, INC.
226. MOORE & MOORE CONSTRUCTION TRUCKING, LLC

227. MORET PLUMBING, LLC
228. MORINE TRUCKING & CONSTRUCTION, INC
229. MOXIE CONSULTING & ASSOCIATES, LLC
230. MST ENTERPRISE , L.L.C.
231. NELSON, WILBERT
232. NEN HOLDINGS
233. NEW BEGINNINGS CONSTRUCTION, LLC
234. NEW CONCEPT DEVELOPERS, LLC
235. NEW LIMITS ENTERPRISE, LLC
236. NOLA BUILDING GROUP, LLC
237. NOLA CONCRETE & CONSTRUCTION, LLC
238. NOLMAR CONSTRUCTION, LLC
239. NOLMAR CORPORATION
240. NORTHGATE LAND DEVELOPMENT CORP.
241. NU-CRETE DESIGNS, LLC
242. OMNIBUS, INC.
243. OVERTIME IRONWORK & FENCING, LLC
244. OVERTON CONSTRUCTION CO., INC.
245. PAC UNLIMITED, INC.
246. PALMISANO TRUCKING, INC.
247. PARMS CONSTRUCTION LLC
248. PERERO COMPANIES, INC.
249. PHARR BROS., INC.
250. PHOENIX CONSTRUCTORS, LLC
251. PHOENIX GLOBAL ENG. & CONST., INC.
252. PINNACLE SERVICES
253. PLAIN DEALING TRUCKING CO., INC.
254. PONTCHARTRAIN PARTNERS, LLC
255. PORTER DEVELOPMENT UNLIMITED, LLC
256. POTT'S DISTRIBUTING, INC.
257. PRECISION INSPECTION, LLC
258. PRIDE WATERPROOFING, LLC
259. PROACTIVE FRAUD INVESTIGATIONS, LLC
260. PROGRESSIVE CONSTRUCTION CO., LLC.
261. PURNELL CONSTRUCTION CO., LLC
262. QUATERNARY RESOURCE INVESTIG., LLC
263. QUE CONSTRUCTION 1
264. R & E DIRT CONTRACTORS, LLC
265. R.K. CONSTRUCTION, INC.
266. RAHMAN AND ASSOCIATES, INC.
267. RAY-BAR CONSTRUCTION, LLC
268. RCS CONTRACTORS, INC.
269. RENAISSANCE CONSTRUCTION GROUP,LLC
270. REYNA'S TRUCKING
271. RIGHT OF WAY ACQUISITION GROUP LLC
272. RIVER CITY FIRE PROECTION, INC.

273. RLH INVESTMENTS, L.L.C.
274. ROBERT C MARTIN CONST CO, LLC
275. ROCK ENTERPRISES CONSTRUCTION, LLC
276. RODGERS & RODGERS ENTERPRISE, L.L.C.
277. ROLLINS & SONS, LLC/SUNERGY SOLAR SOLUT\*
278. ROYAL BRAND, LLC
279. RUE CONTRACTORS
280. RUFINO'S PAINTING & CONSTRUCTION, INC.
281. S. HOLT CONSTRUCTION, LLC
282. S.M. INTERIORS
283. SAH ENTERPRISES, LLC
284. SEEK YE FIRST, LLC
285. SERVICE PLUS CONTRACTING, LLC
286. SESA SUBAN WELLNESS CENTER, LLC
287. SIMMONS & SIMMONS GENERAL CONTRACTOR LLC
288. SIMON TRUCKING, INC.\WILBERT
289. SKYE ENGINEERING, LLC
290. SOFTWARE & SCANNING SERVICES
291. SOLSCAPES, LLC
292. SOUTHERN SERVICES & EQUIPMENT, INC.
293. SOUTHERN SYNERGY, L. L. C.
294. SPARK ELECTRIC A/C HEATING & GAS, LLC
295. SPECIALTY CONTRACTORS OF LA LLC
296. SPECTRA GROUP, LLC
297. STRATEGIC PLANNING ASSOCIATES, LLC
298. STRIPE FORCE 1, INC.
299. SUNSET MARINE, LLC
300. SWJ CONSTRUCTORS, LLC
301. SYLVAN CONSTRUCTION, INC.
302. T & B ELECTRIC, INC.
303. T & M FENCE COMPANY
304. T.N.T. CONSTRUCTION GROUP LLC
305. TARPAN CONSTRUCTION, LLC
306. TARVER LAND DEVELOPMENT LLC
307. TATE SERVICES, INC.
308. TDI, TATE DISTRIBUTING INC
309. TECHNICAL RESOURCE GROUP
310. TECKNOMIC, LLC
311. TG CONSULTING GROUP, LLC
312. THADDEUS VALLERY TRUCKING CO., INC.
313. THE BUILDING PERFORMANCE CENTER, LLC
314. THE DICKERSON GROUP, INC.
315. THE JW CONSTRUCTION GROUP, LLC
316. THE KEITH GROUP, LLC
317. THE LUSTER GROUP, LLC
318. THE MAP GROUP, INC.

319. THE OLYMPIC GROUP, LLC F/K/A OLYMPIC CO\*
320. THE TDS GROUP, LLC
321. THRASHER CONSTRUCTION, INC.
322. THREE C'S PROPERTIES INC
323. THUNDERBOLT CONSTRUCTION, LLC
324. TIERRA RESOURCES, LLC
325. TMB SERVICES, LLC
326. TNR, LLC
327. TRAFFIC SOLUTIONS, INC.
328. TRANSPORT SERVICES OF LOUISIANA,LLC
329. TREPAGNIER'S CONSTRUCTION CO., LLC
330. TRICHE HAULING & MATERIALS LLC
331. TRIGON ASSOCIATES, LLC
332. TRINITY CONSTRUCTION INDUSTRIES, LLC
333. TRIPLE L MANAGEMENT CORP.
334. TRIUMPH CONSTRUCTION LLC
335. TRUE WALL ENTERPRISE, L.L.C.
336. TURNER & TURNER CONTRACTING, LLC
337. TURNKEY RESIDENTIAL CONST. LLC
338. UATC & ASSOCIATES, INC.
339. UH SERVICES GROUP, LLC
340. UNLIMITED LAWN CARE
341. V. KEELER & ASSOCIATES, INC.
342. V. KEELER & ASSOCIATES, L.L.C.
343. VANDERBERG CONSTRUCTION
344. VIKING CONSTRUCTION GROUP, L.L.C.
345. VINSON CONSTRUCTION SERVICES
346. VIP CONCRETE SERVICES
347. VIRTUS ENTERPRISES, LLC
348. W & L SECURITY, INC
349. W R CONTRACTORS, LLC
350. WALKER LANDSCAPING & CONSTRUCTION
351. WARREN CONSULTANT SERVICES
352. WAYNE PLEASANT LAND CLR AND DVLPT
353. WESTCO TRUCKING AND CONT. LLC
354. WILLIE J HAMILTON CEMENT CONTRACTOR
355. WILLIS, INC. JOHN H.
356. WILSON ELECTRICAL CONTRACTOR
357. WIMBLEY CONSTRUCTION, LLC
358. WJE, LLC
359. WTAA ENGINEERS, LLC
360. ZEE CONSULTING, LLC
361. 10 STAR CONSTRUCTION, LLC
362. 2R CONSTRUCTION, LLC
363. 7EAVEN GLOBAL CONSTRUCTION, LLC

## Appendix F: IRB Approval Letter

*University Committee for the Protection  
of Human Subjects in Research  
University of New Orleans*

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*Campus Correspondence*

Principal Investigator: David Gladstone  
Co-Investigator: Sefla Fuhrman  
Date: January 14, 2014  
Protocol Title: "Women in Nontraditional Occupations (NTOs)"  
IRB#: 01Jan14

The IRB has deemed that the research and procedures described in this protocol application are exempt from federal regulations under 45 CFR 46.101 category 2, due to the fact that any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Exempt protocols do not have an expiration date; however, if there are any changes made to this protocol that may cause it to be no longer exempt from CFR 46, the IRB requires another standard application from the investigator(s) which should provide the same information that is in this application with changes that may have changed the exempt status.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best wishes on your project.  
Sincerely,



Robert D. Laird, Ph.D., Chair  
UNO Committee for the Protection of Human Subjects in Research

## Appendix G: Polls Questions

Questions asked in the Hanley Wood poll questions are as follows:

1. Approximately what percentage of women work at your place of employment?
2. Why/how did you enter the concrete industry?
3. How long have you worked in the concrete industry?
4. What is your title/what do you do in the industry?
5. Are you male or female?
6. What advice would you give to someone just entering the concrete industry?

WA state phone poll questions:

1. With which skilled trade industries/professions does your business primarily work?
2. Does this industry require specialized education and/or apprenticeship training?
3. Did you (owner) participate in an apprenticeship and/or specialized training before becoming an owner?
4. Did you (owner) work as a skilled tradesperson before becoming a contractor?
5. Why/how did you enter the industry?
6. Does your business utilize apprenticeships and/or hire from apprenticeship programs? Why/why not?

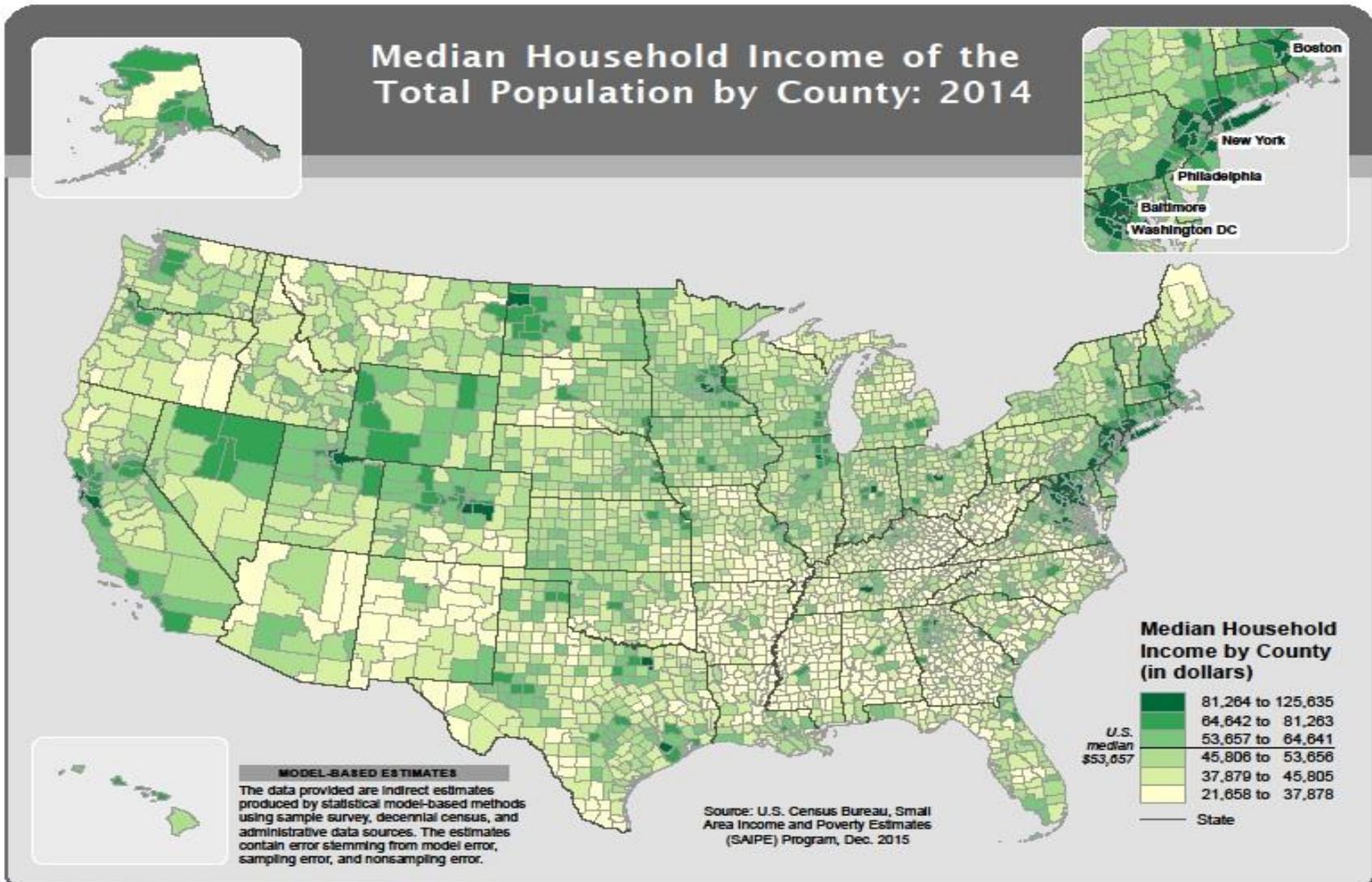
Phone poll with WA state respondents, I was shortening the questions in the following ways:

1. With which skilled trade industries/professions does your business primarily work?
2. Does this industry require specialized education or training?
3. Describe training/education
4. Did you (owner) work in the industry before becoming an owner?
5. Why/how did you enter the industry?

LA state phone poll questions:

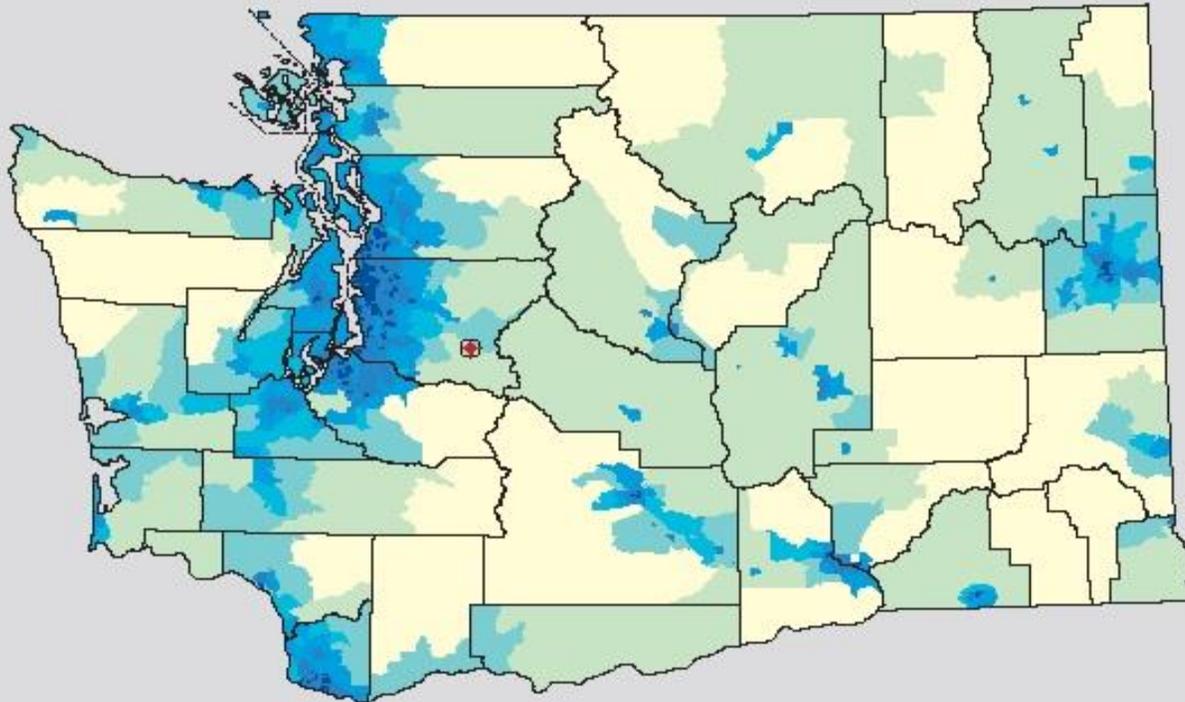
1. With which skilled trade industries/professions does your business primarily work?
2. Does this industry require specialized education or training?
3. Describe training/education
4. Did you (owner) work in the industry before becoming an owner?
5. Why/how did you enter the industry?

## Appendix H: U.S. Census Information



# 2010 Census: Washington Profile

## Population Density by Census Tract

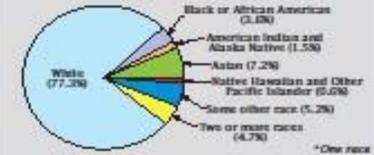


Washington Population 1970 to 2010	
2010	6,724,540
2000	5,894,121
1990	4,866,692
1980	4,132,156
1970	3,409,169



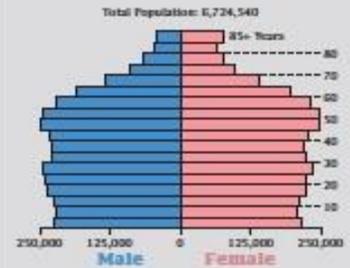
U.S. Department of Commerce Economics and Statistics Administration U.S. CENSUS BUREAU

## State Race\* Breakdown



Hispanic or Latino (of any race) makes up 11.2% of the state population.

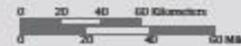
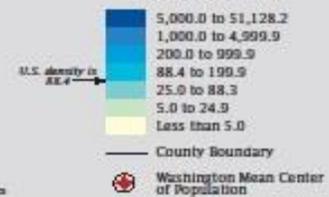
## Population by Sex and Age



## Housing Tenure

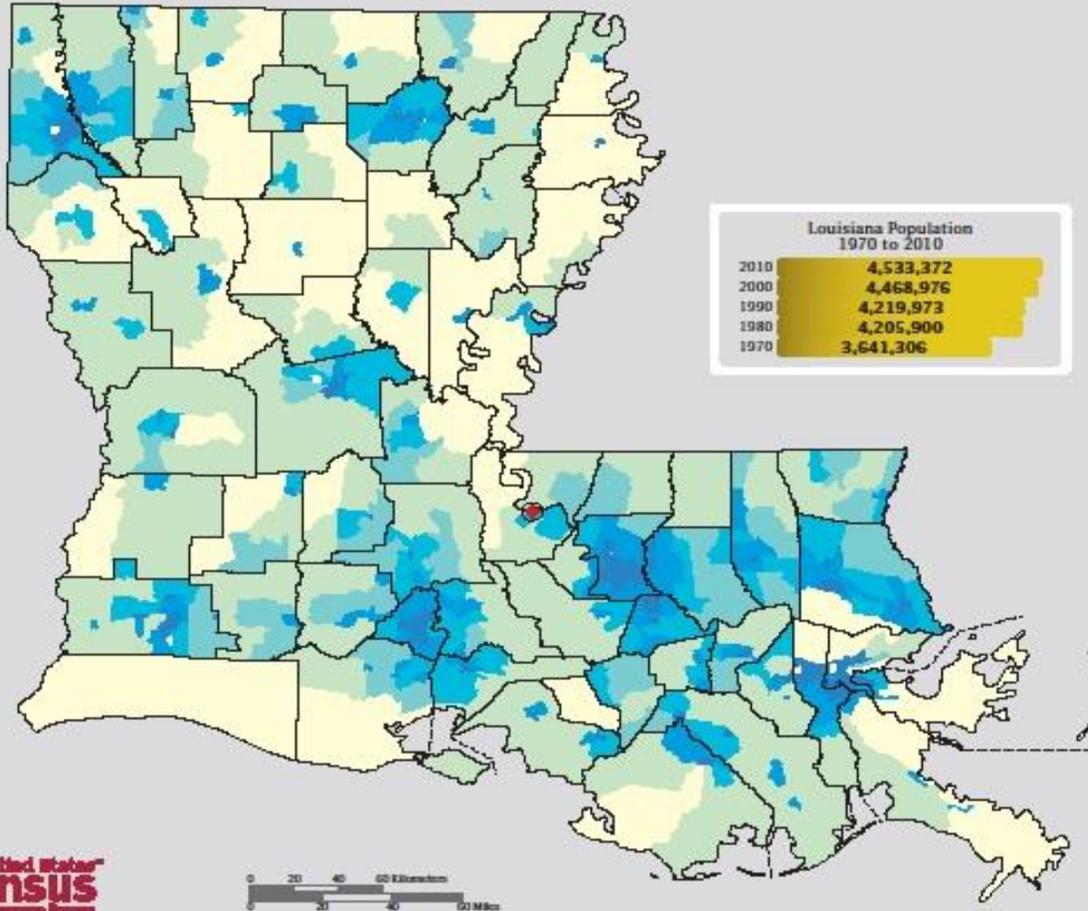


## People per Square Mile by Census Tract



# 2010 Census: Louisiana Profile

## Population Density by Census Tract

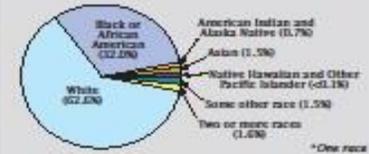


United States  
**Census**

0 20 40 60 Kilometers  
0 20 40 Miles

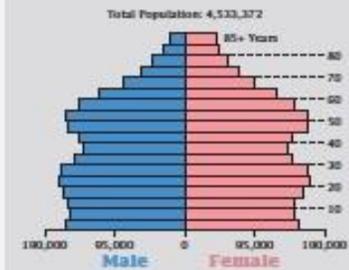
U.S. Department of Commerce Economics and Statistics Administration U.S. CENSUS BUREAU

## State Race\* Breakdown



Hispanic or Latino (of any race) makes up **4.2%** of the state population.

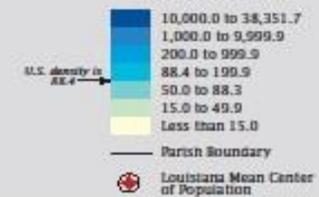
## Population by Sex and Age



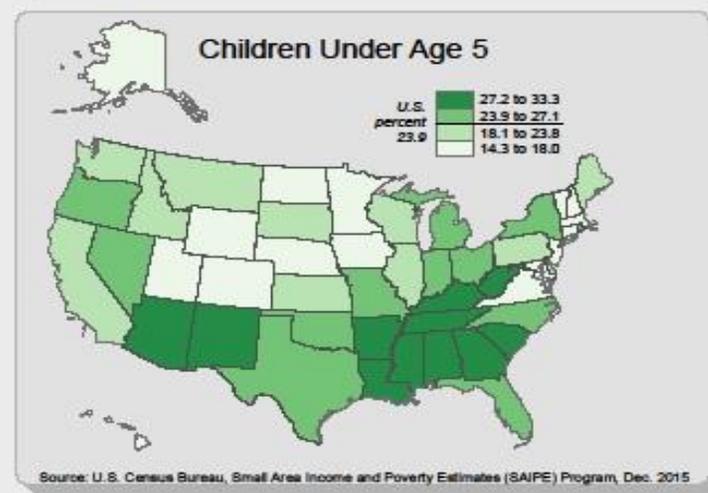
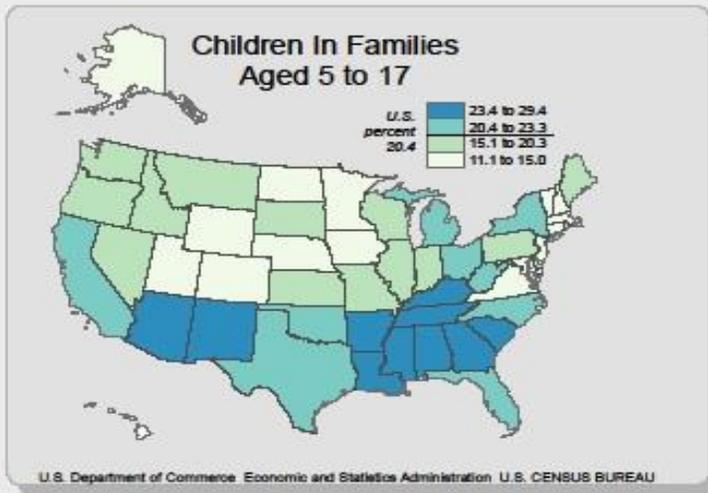
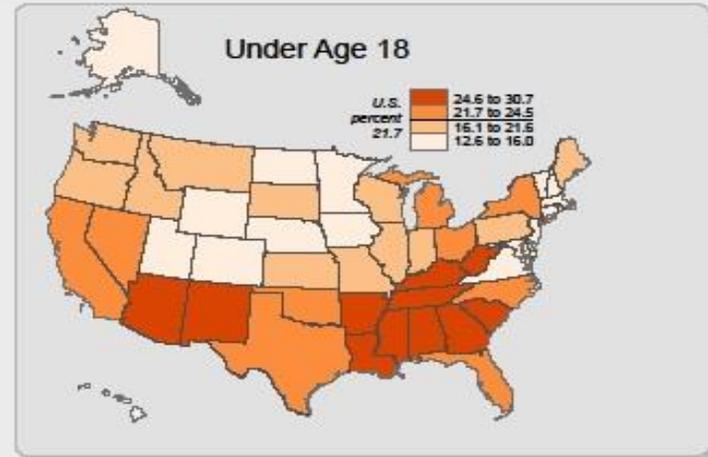
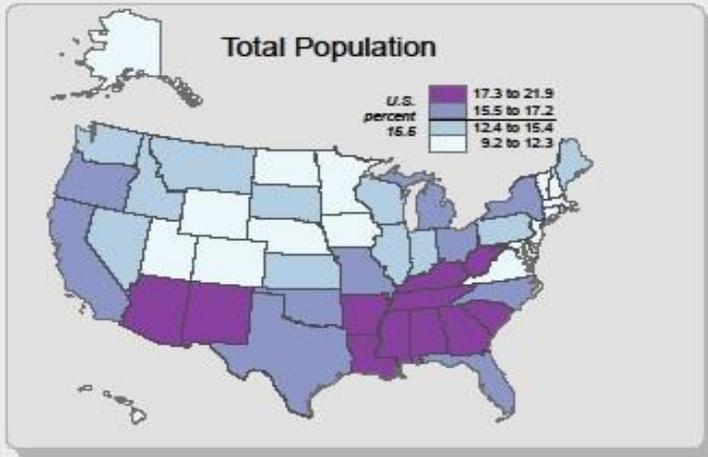
## Housing Tenure



## People per Square Mile by Census Tract



# Poverty Rates By State: 2014



U.S. Department of Commerce Economic and Statistics Administration U.S. CENSUS BUREAU

Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, Dec. 2015

## **Appendix I: Women in Concrete Alliance (WICA) Information**

What is the Women in Concrete Alliance (WICA)?

Women in Concrete began in 2005 as a networking luncheon and forum at the World of Concrete. Since its inception, more than 1,000 women have shared their experiences at Women in Concrete events.

The objective of the Women in Concrete Alliance (WICA) is to supply information, opportunities, and mentoring to women working in the concrete construction industry. The Advisory Board will direct the momentum of the efforts, keeping the mission centered on positive information that will help women network and be successful. The idea for an ongoing network began with Hanley Wood's Women in Concrete (WIC) event at World of Concrete and the WIC monthly features in Concrete Construction and Concrete Producer magazines. WICA strives to go beyond these initial efforts and reach more women to create an industry alliance that serves the needs of all women in concrete. <http://www.womeninconcretealliance.org/about-us.html>

The Advisory Board of WICA helps to ensure that all meetings are a success and that the program provides its members with information, networking and useful content to help them succeed. The WICA advisors meet every other month to plan and discuss ways to improve WICA.

About the Founders

The bios included here came from the Constructive Communication website ([www.constructivecommunication.com](http://www.constructivecommunication.com)) and the spotlights from the archived WICA website.

Kimberly Kayler  
President, Constructive Communication, Inc.

With a journalism degree and a decade of high-level experience serving engineering, architecture and construction firms as a corporate marketing executive, as well as experience working for a full-service advertising/marketing communications agency, I started Constructive Communication, Inc. in 2001 to serve the needs of technical and professional service firms. We are dedicated to learning your business and your industry in order to provide you with the service you deserve. My belief in truly understanding the industries I service is evidenced by my professional designation (Certified Professional Services Marketer – CPSM) from the Society for Marketing Professional Services. I was the first person in Ohio to earn the designation.

My passion for writing and communicating technical material is evidenced by my portfolio of more than 2,000 published articles in a variety of newspapers, magazines, websites and technical journals. Further, I am the author of *Leading with Marketing* – a handbook for marketing and business professionals. I invite you to take advantage of the

power of public relations and let words tell your story. Send me a note and I promise to explore some ideas for building your business.

My interest in the design and construction industry dates back to a college internship with the Univ. of Arizona College of Engineering and Mines. I loved writing about the neat projects these students were working on and while my fellow journalism students all wanted to read their byline in a daily newspaper, I got the bug to head in a different direction. Simply, I found a hidden talent for helping people understand and respond to technical topics.

After graduation, I worked for Wright-Patterson Air Force Base editing a book for Armstrong Laboratory and then joined a regional consulting engineering firm as their marketing director. In 1996, I joined the CON/STEEL Tilt-Up Systems team as their marketing director and had the pleasure of becoming entrenched in the concrete industry on a global scale – working with contractors throughout North, Central and South America. In this role, I became heavily involved with the Tilt-Up Concrete Association (TCA) as a volunteer. I will always be thankful for the opportunities afforded me both through TCA and CON/STEEL. Further, I was able to become entrenched in the concrete industry by watching and learning from some of its pioneers like Bob Foley, Mike Sugrue and Shawn Hickey.

In 2001, I started Constructive Communication, Inc. – a marketing communications and public relations firm that specializes in the architecture/engineering/construction (AEC) industry. We have a special niche in the concrete industry and work with several associations including TCA, the American Concrete Institute (ACI), the Post-Tensioning Institute, the International Grooving & Grinding Association, the Concrete Foundations Association, the Concrete Industry Management program and more.

Although the aforementioned concrete associations are technically clients, I consider myself an advocate for each of them and strongly believe in their mission. I feel very fortunate to be so involved in each of these entities and my entire staff does our best to not simply serve these concrete associations, but truly help them succeed. I am also a member of ACI's Marketing Committee and I am a long-time member of the Construction Specifications Institute (CSI).

Another way in which I am involved in our industry's associations is through speaking engagements. A registered provider with the American Institute of Architects (AIA), I have made presentations on a wide variety of marketing topics specific to the concrete industry on a national and regional basis through AIA, CSI, ACI, the National Ready-Mixed Concrete Association, the World of Concrete, and more.

One of my greatest joys is building on the unique expertise of the CCI team and helping others in the concrete industry succeed using integrated marketing communications and public relations. To this end, fellow concrete industry veteran Brian Gallagher and I recently published *Leading with Marketing* ([www.leadingwithmarketing.com](http://www.leadingwithmarketing.com)).

Another passion is launching the Women in Concrete Alliance with co-chair Kari Moosmann. It is our goal to help create a forum for sharing and networking that will help more women succeed in this great industry.

Kari Moosmann  
AEC Editorial Manager, Constructive Communication, Inc.

With more than 20 years as an editor at a major construction industry publisher, I understand what an editor is looking for and know how to craft a targeted article. With a degree in journalism, I am seasoned in interviewing, writing and editing technical topics. My specialty is the construction industry, particularly the concrete segment. I have attended numerous major industry trade shows, visited job sites and toured manufacturer's facilities. But my experience doesn't stop with magazines. I have also launched luncheons, books and social networking sites for the concrete industry. Additionally, I co-chair Women in Concrete Alliance, an online networking organization for women in the concrete industry. Finding new ways to promote a client or product is a challenge I constantly enjoy. I can assist you in reaching out to your audience with a clear and accurate message.

I have a degree in journalism and have worked in publishing ever since I graduated. I have produced both books and magazines for the construction industry. I enjoy providing educational services for people in the industry. It gives me great joy when I have been part of a project that helps people do their job better.

I began the Women in Concrete events at World of Concrete five years ago, followed by writing regular columns about women in the industry. Before entering the concrete industry, I produced a magazine for the electronics industry.

Currently, I am working with Kimberly Kayler at Constructive Communication, Inc., her public relations firm for the construction industry. I was offered the position after I left the magazine industry. We are working together on building the Women in Concrete Alliance into a strong, online networking resource.

I am looking forward to seeing the Women in Concrete Alliance grow to an online community of women who support and mentor each other.

Hanley Wood, LLC

Hanley Wood, LLC, is the premier media company serving housing and construction. Through five operating divisions, the company produces award-winning magazines and Web sites, marquee trade shows and events, rich data and custom marketing solutions. The company also is North America's leading provider of home plans. Founded in 1976, Hanley Wood is a \$225 million company owned by JPMorgan Partners, LLC, a private equity affiliate of JPMorgan Chase & Co.

Hanley Wood publishes both the Concrete Construction magazine and the Concrete Producer magazine.

### World of Concrete

Since 1975, World of Concrete is the industry's only annual international event dedicated to the commercial concrete and masonry construction industries showcasing leading industry suppliers featuring innovative products, construction machinery, construction equipment, safety training courses, new technologies and unlimited networking opportunities to give you new ways to sustain and grow your business.

To give you an idea of the scale, in 2017 this international event for the concrete and masonry industries drew 50,770 registered professionals and featured more than 1,455 companies exhibiting across more than 681,196 net square feet of space.

### Las Vegas Convention Center (Las Vegas Convention and Visitors Authority, 2017)

The Las Vegas Convention Center (LVCC), located adjacent to the Las Vegas Strip, encompasses approximately 3.2 million square feet with exhibit space of 2 million square feet and meeting space of nearly 250,000 square feet. The facility is one of the busiest centers in the world - centrally located within three miles of over 100,000 guest rooms.

AIPC Gold Certification Logo Operated by the Las Vegas Convention and Visitors Authority (LVCVA), the center is well known for its versatility, size, and amenities. In addition to exhibit and convention space, 144 meeting rooms handle seating capacities ranging from 20 to 2,500. A grand lobby and registration area efficiently link existing exhibit halls with new exhibit and meeting rooms, and allow simultaneous set-up, break-down and exhibiting of multiple events.

Source: <http://www.womeninconcretealliance.org/about-us.html>

The information in this section was primarily retrieved from the Women in Concrete Alliance (2017a) website except where cited.

## **Appendix J: News Release: First-ever Women in Concrete Forum**

### **First-Ever Women in Concrete Forum Sells Out at World of Concrete 2006**

WASHINGTON, DC -- (MARKET WIRE) -- February 21, 2006 -- Concrete Construction and The Concrete Producer magazines, published by Hanley Wood, LLC, hosted more than 200 women working in concrete construction at last month's World of Concrete 2006.

Sold-out weeks in advance, the inaugural Women in Concrete luncheon and forum was designed to bring together women working in the concrete construction industry to network, learn and identify issues important to them. With hundreds of professional women present -- representing all aspects of concrete construction -- the mood during lunch was lively as attendees shared work experiences and identified the next steps for the industry.

"We are proud to recognize women working in concrete construction," says Patrick J. Carroll, Commercial Group Publisher, Hanley Wood Magazines. "As the industry grows, we are dedicated to providing first-class editorial products and in-person events for everyone in the industry."

World of Concrete shattered all previous registration and exhibit space records with the 2006 event. More than 1,800 exhibitors occupied over 800,000 net square feet, and with registrants in excess of 80,000, WOC 2006 was the largest show in its 32-year history. With next year's event promising to be even bigger than 2006, Women in Concrete 2007, back in Las Vegas, will once again deliver everything attendees have come to expect from this high-quality industry event.

Source: <http://www.marketwired.com/press-release/first-ever-women-in-concrete-forum-sells-out-at-world-of-concrete-2006-679874.htm>

## Appendix K: Detailed Descriptions of Major Events

Please note: Descriptions of all luncheons, including speakers and topics were listed on the original WICA website, but when it went offline, this information became much more difficult to retrieve. Unfortunately, I was not able to locate attendance records for the events, but some of the write-ups about the events give general figures. The descriptions in this appendix came from the archived WICA site, some from the *Concrete Producer*, and some from archived World of Concrete announcements. Kari Moosmann wrote most of these descriptions, both for the *Concrete Producer* or for features listed on the WICA site.

### Timeline of Major Events

#### 2006 First luncheon

Women in Concrete luncheon. The fact that over 200 women (and a few men) attended the first ever Women in Concrete luncheon at the World of Concrete points to the changing makeup of the workforce in the concrete industry. Speakers included Deborah Henry, the director of special programs, Continuing Education/College of Arts and Sciences at the University of Missouri, St. Louis; Joan Blecha, chairperson of the National Precast Concrete Association and president of Hanson Pipe and Products Southeast; and Susan Hollingsworth, president of the Concrete Sawing and Drilling Association and CEO of Holes, Inc. They spoke about the changing nature of women's involvement in the industry and encouraged women to be more involved in associations that lead industry advances.

All three offered advice for attendees, anecdotes from their industry experience and a call to action for the women of concrete construction. Dr. Henry spoke to combating workplace discrimination, in all forms, while stressing education as the key to advancement in the tight-knit construction industry. Blecha and Hollingsworth stressed networking and the need to cultivate face-to-face events for women in concrete. All three agreed that participation in industry associations had given them an edge on the competition as well as a place to institute change -- in both attitudes and practice.

"The positive response we've had for this event has been incredible. We're excited to be part of creating this ongoing networking opportunity for women," says Kari Moosmann, Managing Editor and Women in Concrete conference organizer. "We plan to continue and expand the program next year."

#### 2007

The following is an excerpt from Kari Moosmann's "These Women Get It" (which describes the WICA events held at the WOC in 2007).

Dr. Ann Phillips talked to Women in Concrete Luncheon attendees about new ways of communicating and expanding their skills to improve their relationships in the workplace.

...[W]ith more than 300 women attending the luncheon and listening to Dr. Ann Phillips talk about learning and experimenting with new ways of communicating and expanding skills to improve relationships in the work-place. Women know that they communicate differently than men, so these women were listening and trying to learn how to be better communicators with the men and women with whom they work.

“To be a strong, effective communicator, you have to know yourself, know your fellow team members, and have an understanding of the work/task involved,” said Phillips, a veteran speaker on communications, team building, and stress management.

“People don't leave jobs—they leave relationships,” said Dr. Ann Phillips, a veteran speaker on communications, team building, and stress management. She went on to say “to be a strong, effective communicator, you have to know yourself, know your fellow team members, and have an understanding of the work/task involved.”

Traditionally a male-dominated industry, the concrete business has seen an increasing number of women join the ranks, bringing with them new management methods and communication skills. Attendees had the opportunity to interact with their peers and take a hard-eyed look at how to succeed in the workplace. Throughout the session, attendees had the chance to swap stories, chat about their jobs, and exchange ideas on commonly occurring challenges.

2008

"I'm excited to see so many faces—and a crowded room of women at our third annual event," said Kari Moosmann, managing editor for Concrete Construction magazine, welcoming all in attendance.

The 2008 program consisted of a panel of women discussing hot industry trends. After enjoying their lunch, the panel presentations was kicked off by Shana Young of Smith's Ready Mix, Hot Springs, Ark., who explained the many benefits and advantages of pervious concrete.

One major problem facing the industry is handling runoff from asphalt parking lots and roads. "Pollutants from cars run off and pollute our waterways," she said. "Pervious concrete helps us to keep the world a little cleaner, a little greener, for those coming after us." She continued to discuss not only the environmental advantages of pervious, but also the cost savings benefits such as eliminating the need for retention ponds.

Continuing the discussion, Kristen Cooper Carter from California State University, Chico, expounded on the sustainability and durability of concrete, specifically emphasizing what we can do as an industry. "I think the green building movement is here to stay, and we as women can play a key role," says Carter. "One of the tools we have—one that we should all become more familiar with—is LEED."

She went on to say that the old ways of constructing buildings is out and that we need to find more efficient ways and better technologies to make structures last for more than 50 years.

Michelle Wilson at the Portland Cement Association (Booth C4113) summed up the presentations with a forecast of what to expect in 2008, and 10, 20, and 30 years down the road. "It's true we're coming into a recession period, especially for the residential segment," said Wilson. "However, the thing you need to look at is the long-term impact of concrete. We need concrete, and will continue to need concrete, to keep up with your growing population."

2009

Tanya Wattenburg Komas of California State University, Chico, had a captive audience as she described how her Concrete Industry Management students are investigating the concrete at the site of the D-Day landings at Pointe du Hoc in Normandy, France.

The students are evaluating World War II concrete bunkers using onsite in situ testing methods and non-destructive testing equipment. Their goal is to stabilize the eroded D-Day landing site on the English Channel so it is safe enough for veterans to visit the cliffside monument.

"For our younger people preserving a site like this, there is no better way to communicate what really happened and to understand the tragic events," she explained.

Komas was the first speaker at the fourth annual Women in Concrete Luncheon and Forum at World of Concrete in February.

The next speaker, Shellie Rigsby, owner of Acanthus/Concrete Stain Designs, Plano, Texas, talked about the many opportunities available in decorative concrete. "The technology has changed so much in the last 11 years, it's so exciting," she said.

Rigsby provided a step-by-step account of the techniques and materials she used to create a downsized version of the Alamo, which included insulating concrete forms, stamped vertical overlays, stencils, and hand carvings. "It's a lot more fun if you go outside the box to explore what you can do," Rigsby said of decorative concrete projects.

She went on to say the recession does not have to be bad news for decorative concrete contractors. A key, she said, is to provide cost-effective options to architects who want artistic elements in scaled-back budgets. "There's still a lot of business out there, but we have to tell the architects what's available," Rigsby explained.

Julie Babb Smith of the FIGG Engineering Group, Tallahassee, Fla., detailed how the new I-35W bridge in Minneapolis incorporated sustainability into every aspect of its design.

“When I talk about sustainable design for this bridge, I refer to protecting the environment with eco-friendly materials and practices, and creating a lasting design for the future with quality, innovation, and planning,” said Smith.

With an expected 100-year service life, the bridge opened in September 2008—11 months after the project began, three months ahead of schedule, and a little more than a year after the collapse killed 13 people.

Eco-friendly materials used in the project include recycled aggregate and photocatalytic cement products that reduces airborne pollutants, thereby cleaning the air. “They clean the air and they are also self-cleaning. It was the first use of this cement in North America,” said Smith.

Smith also explained how this was truly a community project, down to the children making decorative tiles to adorn a permanent part of the new bridge.

2010

The fifth annual Women in Concrete Breakfast includes key industry leaders providing a woman's perspective on "Breaking Down Barriers." Speakers will explain how they got involved in the concrete industry, their motivating moments, and how to be a leader in difficult times. Featured speakers include Susan Lane, program manager of bridges and transportation structures, Portland Cement Association; Kathy Reissig, marketing manager, Stone Construction Equipment; and Erin Williams Christie, environmental director, Ready Mix USA LLC.

2011

The sixth annual Women in Concrete Luncheon & Forum's topic was Infrastructure. This was also the first year the Woman of Distinction Award, honoring a woman of influence in the concrete industry, was presented.

Kelly Page, executive/technical director for the International Concrete Repair Institute, Rosemont, Ill., identified two prime repair areas that contractors should concentrate on — the bridge market, with an estimated \$9 billion of needed repairs, and the wastewater segment, on the brink to spend around \$390 billion over the next 20 years while trying to bring the existing systems to capacity. Page stressed that the women get involved in associations, stay educated about the issues, and use those resources to urge politicians to increase infrastructure investment. She strongly encouraged involvement to keep the politicians zeroed on infrastructure needs, "Get your association members to write to their local congressmen," said Paige.

Kelly Page is a key woman to know in the arena of concrete infrastructure and repair. Before accepting her current position in 2001, Page served as secretary on the ICRI board of directors. She was named an ICRI Fellow in 2000 and an ACI Fellow in 2002. In her many years in the concrete repair industry, Page was an independent sales representative for several materials companies, engineering editor for Concrete International magazine,

and a training coordinator for the Portland Cement Association, Skokie, Ill. She holds a degree in civil engineering from Marquette University, Milwaukee, Wis.

“Infrastructure is key to the economic recovery of our nation, and the construction industry,” says Page. “Concrete is at the core of this work and will only continue to be more prevalent.”

Diana Sanicki, marketing manager for Doka, Little Ferry, N.J., addressed the issues she faces in trying to promote efficiency and new ideas to concrete contractors as they look to specialized infrastructure areas, such as bridges, which is a new source for growth. “We have to adapt our formwork specifically for infrastructure projects,” said Sanicki. “We’ve had to change our strategy and provide custom solutions.” For infrastructure, this involves developing forms for different types of structures, such as towers and bridges.

“Speaking at the Women in Concrete luncheon is a chance to connect with other women in the industry in an intimate setting. I’m looking forward to sharing my experiences and my enthusiasm for concrete construction,” says Diana Sanicki, marketing manager for Doka USA Ltd., Little Ferry, N.J.

Sanicki has experienced the industry from many perspectives. One day she is filming a construction jobsite video and interacting with customers, and the next day she is organizing and setting up a tradeshow. Seeing her company’s work in action and talking to customers gives Sanicki a sense of the industry’s future.

Kari Yuers, president and CEO of Kryton International, Vancouver, British Columbia, Canada, runs a company that produces waterproofing solutions for contractors. “Concrete has been around for thousands of years, yet the transformations and innovations happening now are likely to create the same exponential changes we’ve seen in the information technology world,” said Yuers. “We are in an amazing and unprecedented moment in history. Population shifts, innovations in concrete technology, and the integration and impact of women in the workforce are creating many opportunities.”

Kari Yuers doesn’t feel it’s enough to run a company. She believes to be successful you must be involved; you must know what’s going on in your industry and try to make a difference. Through ACI, she serves on several committees that help establish industry standards, and promotes training and mentoring activities.

Although Yuers comes from a concrete family—her father founded Kryton in 1973—she wasn’t immediately sold on the industry. She studied psychology at the University of British Columbia and tried her hand at several jobs before returning to Kryton in 1991. Her hands-on work in every department of the company made her what she is today: an informed leader who is involved in the industry from the ground up.

The seventh annual event targeted the hot issue of employment trends — discussing the ongoing efforts to support women in traditionally male fields and how to take advantage of new career opportunities. The speakers this year concentrated on how to create job growth for women in the concrete construction industry. Important insights were provided into the challenges specific to women in the concrete industry, and how women can poise themselves for success in an uncertain economy.

This year's topic is “What can we do to create Job Growth for Women in the Concrete Construction Industry.” Industry leaders will discuss what can be done to foster the growth of jobs for women and the steps needed to ensure these new jobs offer greater opportunities in our industry.

The first speaker, Sara Andon, is a graduate assistant in the Concrete Industry Management (CIM) Program at Middle Tennessee State University. Andon discussed the new Executive MBA program in concrete and construction management and how this development opportunity benefits women in all stages of their concrete industry careers. Andon is a graduate of the CIM bachelor's program and is currently pursuing her Executive MBA through the new program. Andon spoke about how CIM can help the female population excel in their concrete careers. “CIM can be the source for women to further themselves in their career,” said Andon. “There's not a single other MBA that concentrates on concrete and construction.”

Next, Ed Sullivan, chief economist for the Portland Concrete Association (PCA) provided an outlook on industry job growth, employment trends, and offered insights to help attendees best position themselves for success. He explained that one in four women in the construction industry lost their job during the recession, yet the industry has kept a constant percentage of 9% women in the construction field. Additionally, he finds that women are stronger in the environmental area, where women make up 1% of the jobs. He expects the environmental field to be a future strong area for job growth.

“This whole movement of sustainability will be fueled not by ‘I want to be nice,’ but by ‘I'm cheap,’” said Sullivan, as he explained how sustainable/environmental solutions will save money. Sullivan predicts, “We won't see an improvement in the construction job market until late 2013 to 2014.”

Kimberly Kayler, president, Constructive Communication, Inc., rounded up the speakers by representing the U.S. Department of Transportation Roundtable on Women in Blue Collar Transportation Careers. She explained how government-sponsored efforts to create opportunities can benefit women in concrete careers. As co-chair of a task force targeted at young women and girls focused on conducting outreach and awareness about blue-collar transportation careers, many key challenges were discussed that exist for women in the industry. Kayler shared research from an online dialogue held over a four week period this past summer, which outlined a plan of action to build a stronger network for women in and interested in the transportation industry.

“Several barriers exist for women entering the industry such as difficult work culture, lack of basic skills and information about opportunities,” said Kayler. “As women in the concrete industry, we know that there is a tremendous opportunity for blue- and white-collar jobs in our market. That is why an industry-wide effort is needed.”

The luncheon crowd provided many spirited questions during the final Q & A. In particular, attendees were interested in how they can target their business to respond to the economy and how they can get involved in Roundtable on Women in Blue Collar Transportation Careers.

At the end of the luncheon, attendees were asked to vote for the 2012 Woman of Distinction Award winner, which honors a woman of influence in the concrete industry. Last year’s winner, Rosa Olivia Becerra Blancarte, was recognized at the luncheon. The award was established by the Women in Concrete Alliance (WICA) — a networking organization for women in the concrete industry.

2013—No luncheon! The third Woman of Distinction Award was granted, and it was broadcast on the WOC news channel. (<https://www.youtube.com/watch?v=gvNQJ8nKeuY>)

*Posted on: February 13, 2014*

Women in Concrete Alliance at CC Live! WOC 2013

The Women in Concrete Alliance brings up Sefla Fuhrman, a student at the University of New Orleans studying women in concrete at the CC Live! Booth at 2013 World of Concrete. Part I, the presenting of the Woman of Distinction award, can be found here: <http://bit.ly/16f72mL>

<http://www.theconcreteproducer.com/videos/women-in-concrete-alliance-at-cc-live-woc-2013> and [https://www.youtube.com/watch?v=JGyck\\_DJy3o](https://www.youtube.com/watch?v=JGyck_DJy3o)

## Appendix L: Women of Distinction Awardees

The Woman of Distinction Award was presented 3 years. The recipients are as follows:

2011—Rosa Olivia Becerra, owner/president of Cortamex, a diamond blade supplier in Tijuana, Mexico, was voted the winner of the first award for her dedication to her customers. "This is a touching and proud moment in my career," said Becerra, "The success I have had is founded on the beliefs that if you work hard and are passionate about what you do, you will be rewarded regardless of gender. Combine this thinking with exceeding customer expectations and you have my formula for running my company."

Becerra began her construction career as a bookkeeper for her brother's concrete cutting company and eventually took over when he left. Her tireless devotion to her company and her clients make her a Woman of Distinction. When asked about her success in construction industry, Becerra responded, "Take the time to find out where your customer feels he or she needs improvement. Then go out and find a way to help that situation. Resolve the issue one time and they will be happy. Do it a second time and they will be surprised. Do it a third time and you have a loyal customer."

2012—Kilah Engelke, apprenticeship coordinator for Milwaukee OPCMIA Local 599, was voted the winner of the award for her dedication to her craft and her commitment to her crew. She has been a cement finisher with the Operative Plasterers' and Cement Masons' International Association for the past 11 years. "Winning this award is truly an honor for me, as it is proof that hard work and determination does not go unrecognized," said Engelke.

Prior to completing her apprenticeship as a finisher, Engelke also spent three years as a laborer on a slipform concrete paving crew, which is where she began her career in concrete.

"For well over a decade, I have literally shed blood, sweat, and even sometimes tears in my ongoing quest to gain and maintain the respect of my crew and to be successful in this nontraditional position," said Engelke. "Part of the beauty of the construction industry is that a little heart goes a long way, and I am so thankful that I have had the chance to prove myself and what's in my heart through my passion for concrete."

In her nomination, it was noted that, as a woman in a predominantly male industry, Engelke exemplifies what it means to work and succeed in construction and that quality is proven by her day-to-day commitment to her crew and to her trade. She is highly respected by the people she works with and for, as she has worked very hard to be a valuable and important part of her crew.

In October 2011, Engelke was hired as the first ever apprenticeship coordinator for the Milwaukee OPCMIA Local 599. Her passion for concrete and for her job was recognized as a needed catalyst for the future success of the growing and respected program.

"I look forward to continuing to share my love for my work through my position as apprenticeship coordinator in Milwaukee," said Engelke. "I am truly excited for the challenge I have ahead of me now to uphold the title of Woman of Distinction in Concrete 2012, and to continue to prove that women can succeed in the world of concrete."

2013—Sheryl Meyers, operations manager with KutRite, has been awarded the prestigious Women of Distinction award for her “can-do” spirit and never-ending desire to please the customer.

“Since beginning her career with KutRite in the summer of 2004, two words have summarized everything about Sheryl and those two words are world class,” said Rick Sollars, a partner in KRMC LLC, the owners and operators of KutRite. “Sheryl has been challenged with new product launches, product branding, and complete customer satisfaction. She has always exceeded what was expected of her.”

“I have had the privilege to work with Sheryl for several years now and one of the more impressive skills she has is the way she can communicate with the predominantly male industry,” said Bryon Bruington, Technical Sales Director for KutRite. “Sometimes dealing with the customer in this industry can be tough, especially with the rapid schedules that have been placed on the contractors. Sheryl has the calming ability to talk the customer through the situation and yet have the fierce passion to protect herself and KutRite at any given time. I am really glad Sheryl is on my team.”

In her nine years with the KutRite, Meyers has held various positions and was elevated to operations manager in 2011. She is a key member of a team that transformed the company into a major player in the concrete polishing and scarifying market. To this day, Meyers remains the voice of KutRite when it comes to the scarifying line of equipment.

## Appendix M: Online Trade Magazines & Organizations

### Concrete Associations and Organizations

1. ACER: ACER Associates, LLC (environmental, geophysical, geotechnical consulting) <https://www.acerassociates.com>
2. ACI: American Concrete Institute <http://www.concrete.org/general/home.asp>
3. ACPA: American Concrete Pavement Association <http://www.acpa.org/>
4. ACS: Advanced Construction Services <http://www.acsconstructioninc.com/>
5. ASCC: American Society of Concrete Contractors <http://www.asconline.org/>
6. ASCE: American Society of Civil Engineers <http://www.asce.org/>
7. CFA: Concrete Foundation Association <http://cfawalls.org/about-the-cfa/>
8. EMA: Environmental Managers Association
9. ICRI: International Concrete Repair Institute <http://www.icri.org/>
10. IRMCA: Indiana Ready-Mix Concrete Association
11. NABWIC: National Association of Black Women in Construction [nabwic.org/](http://nabwic.org/)
12. NAHB: National Association of Home Builders <http://www.nahb.org/>
13. NAPW: National Association of Professional Women  
<http://www.napw.com/Index.cfm>
14. NAWIC: National Association of Women In Construction [www.nawic.org/](http://www.nawic.org/)
15. NRMCA: National Ready-Mix Concrete Association <http://www.nrmca.org/>
16. PCI: Precast/Pre-stressed Concrete Institute <http://www.pci.org/intro.cfm>
17. Pre-cast Organizations
18. PWC: Professional Women in Construction [www.pwcusa.org/](http://www.pwcusa.org/)
19. USGBC: US Green Building Council <http://www.usgbc.org/>
20. USSD: United States Society of Dams <http://www.usdams.org>
21. WIC: Women In Construction
22. WICA: Women In Concrete Alliance [www.womeninconcrete.org/](http://www.womeninconcrete.org/)
23. Chamber of Commerce
24. Women In Trades, Tradeswomen, Inc. [www.tradeswomen.org/](http://www.tradeswomen.org/)
25. American Concrete Pipe Association [www.concretepipe.org/](http://www.concretepipe.org/)
26. Southern Interior Construction Association <https://www.sicabc.ca/>

### WICA Spotlight Responses:

- RMCA
- NPCA [www.precast.org/](http://www.precast.org/)
- ACI
- WICA
- Associated General Contractors
- Association of Young Professionals
- American Marketing Association
- Toastmasters International
- Construction Writers Association
- American Society of Concrete Contractors
- American Segmental Bridge Institute
- Concrete Industry Council
- Beavers
- Moles
- ABC, the Associated Builders and Contractors
- IGGA, the International Grooving & Grinding Association

## **Concrete Producers**

- LaFarge
- Portland Cement
- Holcim
- Cemex
- Oldcastle
- Heidleburg
- Vulcan

## **Research & Policy Organizations**

- NAPE
- IWPR
- NWLC
- ACI
- NRMCA

## **Concrete Certifying Bodies**

- CIM
- Cement Trust
- CPAA

## **Online Concrete Magazines**

Concrete Construction| Concrete Construction Magazine

[www.concreteconstruction.net/magazine/](http://www.concreteconstruction.net/magazine/)

Concrete Construction: Resources for contractors and specifiers including construction methods, materials and practices.

Construction-Trade-Magazine| ForConstructionPros.com

[www.forconstructionpros.com/magazine/conc](http://www.forconstructionpros.com/magazine/conc)

Magazine publications include Equipment Today, Rental, Pavement Maintenance ... Planning and Management Software for Concrete Contractors.

Concrete Decor Magazine | Decorative Concrete

<https://www.concretedecor.net/>

Concrete Decor, decorative concrete magazine, how-to information, ideas, products and training for the decorative concrete contractor.

The Concrete Producer Home Page| Concrete Producer

[www.theconcreteproducer.com/](http://www.theconcreteproducer.com/)

News, advice, and technical information to help concrete producers run their businesses more efficiently and profitably. Topics include materials, plants, fleets, ...

Concrete Products - is the Leading Publication for Managers in Ready ...

[www.concreteproducts.com/](http://www.concreteproducts.com/)

Concrete Products focuses on the ready mixed, precast, prestressed and unit masonry for the concrete industry.

Concrete Magazine

[www.concrete.org.uk/magazine.asp](http://www.concrete.org.uk/magazine.asp)

Global Magazine for The Concrete Society incorporating Concrete Engineering.

Free Concrete Contractor Magazine - Free Trade Magazines ...

[www.freetrademagazines.com](http://www.freetrademagazines.com) > Construction Magazines

Concrete Contractor delivers information to help cast-in-place concrete contractors build their projects and run their businesses more profitably. Technology ...

American Concrete Pipe Association

[www.concretepipe.org/](http://www.concretepipe.org/)

Masonry Magazine | The Heart of the Industry

[www.masonrymagazine.com/](http://www.masonrymagazine.com/)

Masonry Magazine · Magazine ... All you need and want to be at the top of the trade. ... I thought the World of Concrete was a large show, but this one.

NRMCA | News & Features | Concrete InFocus Magazine

<https://www.nrmca.org/news/connections/>

### **Other Sponsors and Events**

Hanley Wood

World of Concrete

## **Vita**

The author was born in Seattle, Washington. She received her bachelor of arts in anthropology from the University of Washington. She joined the Peace Corps and volunteered in Guinea, West Africa from 1996-1998, where her primary duty was teaching English as a Foreign Language. She received her master's in public administration from Syracuse University. In 2003, she entered the urban studies doctoral program at the University of New Orleans. Due to Hurricane Katrina, her studies halted for several years, but she returned to the program in 2011, and graduated in 2017.