Analyzing the Causes of Labor Shortage in the Commercial Carpentry Trades in the San Francisco Bay Area

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Skilled labor is vital to the success of any construction project, and no contractor would be able to operate without the skilled laborers that they employ. The construction industry has been subject to a shortage of skilled labor for the last two decades for many reasons, including the poor image of construction workers among the public, inadequate training measures, and an aging workforce. Reviewing the literature on the matter shows that the leading cause of shortage is low pay and increasing age of the workforce overall, while the demand for labor grows at a faster rate than the supply of labor grows. Poor worker retention practices were also identified as a cause for shortage and a reason for workers leaving the industry, and proper retention tactics are assessed, including monetary and non-monetary considerations for workers in order to foster a better employer-employee relationship. Recruiting practices among labor unions and contractors are also assessed through interviews and research, with the results suggesting that a greater emphasis should be put on improving the image of construction workers in the public eye, increasing the prestige of a job in construction and leading to increased participation in the construction industry among young people.

Key Words: Labor Force, Labor Shortage, Skilled Labor, Labor Demand, Labor Recruitment

Introduction

The construction industry in the United States constitutes a significant portion of the country's GDP. According to Federal Reserve Economic Data (FRED), the construction industry accounted for 4.2% of the US GDP in 2019. A significant amount of the US labor force is also involved in the construction industry, as 4.3% of all American workers (6,711,000 workers total) have a job in the field of construction (Kim, et al., 2020). The construction industry saw considerable and consistent growth before the Coronavirus pandemic began, with a projected growth rate of 1.2% placing it among the top of all industries in America in terms of expected rate of growth (Kim, et al., 2020).

A steady supply of skilled labor is imperative to the overall wellbeing of the construction industry, as projects cannot be completed without qualified and skilled laborers to perform the work. This supply of labor has fallen short of the demand for some time, and this has caused numerous problems whose effects can be felt both within the industry and beyond. Many causes have been cited over the past twenty years, and among the most commonly suggested are the aging current labor force, lack of training for prospective workers, poor image of the industry among younger people, and low wages. There is an abundance of documentation of these issues that spans back multiple decades, suggesting that these issues have plagued the industry and the industry's ability to recruit a sufficient amount of qualified labor for many years.

It has also been suggested that these factors limiting participation in the construction trades feed into one another and create a feedback loop that exacerbates the labor supply problem that has existed for many years on a national level. Kim lays this issue out as follows: a lack of training programs leads to a less skilled workforce, which leads to a smaller profit margin for the companies, translating to lower wages for the workers. These lower wages damage the public perception of the industry and the workers, and further leads to a shortage in overall participation. All the while, the current labor force is aging towards retirement with an insufficient number of younger workers available to take over their positions.

Literature Review

The paper "Dynamic Modeling for Analyzing Impacts of Skilled Labor Shortage on Construction Project Management" by Sungjin Kim, Soowon Chang, and Daniel Castro-Lacouture details the causes of the skilled labor shortage, as well as using a predictive computer simulation to analyze how the different factors that play into the labor shortage effect the shortage itself in an effort to understand the most promising ways to curb the shortage of labor. The authors anticipated that low wages and a poor public image of the construction industry were to blame for the shortage. The results of the labor shortage, as detailed in the paper, are cost overruns and schedule delays. This is because a lack of labor, or a lack of labor that is sufficiently skilled will increase the possibility and the frequency of rework, costing the project both time and money in the process. This is coupled with the fact that unskilled laborers typically are paid the same and work slower than skilled workers, also effecting both the schedule and budget on any projects they work on. Overall, the paper concluded that the main aspects that would help the most in stopping the shortage of labor are improving the image of the industry, as well as increasing the focus on training new field laborers in order to build a more skilled base of workers.

With regards to the effectiveness of training new employees, Johari's study on the effect of worker aptitude on production sheds light on the role of aptitude and training on the workforce. Aptitude is defined as the "potential to demonstrate the ability of a certain kind of work at a certain level." This study was conducted by assessing workers on multiple sites in India, surveying the aptitude and productivity of 112 workers on four different sites. The workers' aptitude was tested by administration of the General Aptitude Battery Test, which was created by the United States Employment Service. The test measures aptitude using nine different variables, which the study defines in the following ways: intelligence (ability to take and follow directions and make judgements using logical reasoning), verbal aptitude (understanding of language, words, meanings of sentences and paragraphs), numerical aptitude (understanding and solving of numerical problems in a timely manner), spatial aptitude (ability to visualize a 3D object from a 2D image), form perception (understand and comprehend details of an object or graphical material), clerical perception (ability to perceive any difference in words or numbers in a tabular form), motor coordination (coordination

between the eyes, hands, and fingers), finger dexterity (ability to make rapid and accurate finger movements, and manual dexterity (ability to make frequent and accurate hand movements). The study determines that age has little to do with the aptitude of construction workers. Another main takeaway from this paper is the suggestion that the longer a worker was at a particular site, the lower their aptitude became. Of the nine aptitude variables, the most impactful on performance were found to be the physical measures: finger dexterity, motor coordination, and manual dexterity. It is recommended in the study that training programs should focus on the development of those physical aptitude measures in order to make workers more efficient in their performance on the jobsite.

Many studies and articles have covered the trend of skilled labor shortage over the last 20 years, including the ASC Conference Proceedings paper from 1999 by Abdol R. Chini, Brisbane H. Brown, and Eric G. Drummond titled "Causes of the Construction Skilled Labor Shortage and Proposed Solutions." In their paper, the authors discuss the shortage, citing that 92% of all national construction firms were having trouble finding enough labor to meet demand, and 85% of those firms stated that their current workforce is not skilled enough. Moving forward to 2004, a paper by Dean T. Kashiwagi and Scott Massner titled "Solving the Construction Craftperson Skill Shortage Problem Through Construction Undergraduate and Graduate Education" states that 75% of contractors surveyed are having issues finding enough workers to fill labor positions. Additionally, the paper also states that there is an annual need of 240,000 workers to replace workers that are aging out of the workforce. Union membership was also stated by the authors to have decreased from 40% in 1980 to 18.3% in 2000, meaning that workers were receiving less training than before, leading to a less skilled labor force. In an ENR article titled "Labor Gaps Bring Steady Pay Raises", authors Bruce Buckley, Mary B. Powers, and Debra K. Rubin state that between July 2015 and July 2016, the construction labor demand increased in 239 out of 358 metro areas in the United States. In addition, 69% of contractors were having issues finding workers to fill labor positions. Mohammed Azeez, John Gambatese, Salvador Hernandez in the paper "What Do Construction Workers Really Want? A Study about Representation, Importance, and Perception of US Construction Occupational Rewards" state that while 70% of contractors were having trouble filling hourly craft positions, only 35% of the contractors surveyed were having trouble filling salaried roles that were typical of management and supervisory jobs.

According to Chini, et al. (1999), the main reasons for labor shortage are thought to be economic changes, technological changes, union and open shop changes, and educational and image changes. Chini, et al. describes these reasons as follows. Economic change constitutes the poor economic circumstances that kept older workers in the industry for longer than anticipated, so there was no room for newer, younger employees. When those employees finally aged out of the industry, there was a void left to fill, and nobody to fill it based on poor participation rates among younger people. Technological changes involve the training programs of the laborers lagging behind technological advances, leaving the prospective employees not sufficiently trained in the current means and methods of the construction industry. A downturn in union participation is also thought to have contributed to the shortage of skilled labor, since unions typically provide the bulk of the occupational training for construction workers. Without this influence, workers are beginning their careers with insufficient knowledge of key aspects of their respective trades. Finally, the degradation of the image of the construction worker is also thought to have played a role in the labor shortage. As the number of high school students choosing college as their next step rose, the number of those students choosing a construction career path declined, and that career path began to be looked down upon as labor intensive and low paying.

Looking abroad, there are similar issues with labor supply. “Review of the Construction Labour Demand and Shortages in the EU”, a paper by Juricic, et al. cites two main suspected causes of labor shortage: population decline and an aging workforce. Other unique factors that were considered by other papers include construction labor not paying enough for the physical labor in Hong Kong (Ho, 2016), and the lack of investment in training programs in South Africa (Aiyetan & Dillip, 2018).

The effects of skilled labor shortage in the construction industry can be widespread, and are seen both within the industry and outside of it. One possible effect brought up by Buckley, et al. is the reduction in competition due to inability to staff jobs; if contractors do not have the skilled labor to adequately perform the work, they may forgo bidding on those jobs. This, the authors state, will lead to increased construction prices for the customer. Aiyetan and Dillip bring up another possible effect of a shortage, which is the loss of productivity of a crew, whether there are not enough workers to effectively and efficiently get the job done or if the workers on that crew are not trained to an acceptable degree. This can also lead to high rates of rework and diminished quality of work, state the authors. In a further-reaching issue, there is also the possibility that a decrease in the number of skilled construction workers can cause housing prices to rise; if there are not enough workers to supply sufficient housing or if the construction is more costly and time consuming due to the shortage of labor (Obando, 2019). On the jobsite, labor shortages can lead to overruns and schedule delays when projects are short-staffed or staffed with inadequately skilled labor. These issues caused by labor shortage can be present in 25% of projects (Chini, et al., 1999).

Construction companies around the world have attempted to curb the shortage of skilled labor in a variety of ways. The most common responses companies have to this crisis is to simply offer higher hourly wages or improve their incentive and bonus structure (Buckley, et al., 2016). This has some basis in logic, as financial rewards are thought to be the most attractive type of rewards to construction workers (Azeez, et al., 2019). In addition to offering financial compensation, another suggestion is to increase the training requirements for construction workers, and offer on-site training for new employees (Ho, 2016). Aiyetan and Dillip also bring up a similar point in their paper on the matter, stating that more emphasis should be put on the training of new employees, as well as the talent management of current employees. According to Juricic, et al., one of the main ways that labor shortages are dealt with in the European Union is through importing labor from other member states of the EU for the project, and then having them return to their countries of origin after work has concluded. Among the solutions proposed by Chini, et al., is the sharing of workers, allowing workers to move temporarily to another company in order to complete a job amidst a labor shortage, and then all of those workers will be available to help the original company with their projects. It is noted in the paper that this is only a short-term solution, and it is only viable on a small scale. The paper also suggests an increased investment in vocational education for incoming workers to allow them to have a better base of skills when they enter their position in the field. The authors also cite a need to increase interest in the construction trades among younger people, suggesting a “school-to-work” approach where contractors will be linked to construction-based classes at the high school level, and will offer site visits and instruction to better inform the students about all aspects of the construction project. In addition to these approaches, the paper also suggests an emphasis on retaining employees through benefits and incentives. The need for employee retention is highlighted by Azeez, et al., it is stated in that paper that 20% of construction companies lost hourly craft workers to other industries, and 14% of construction companies lost salaried workers to other industries.

Methodology

For this paper, the methodology consists of having conversations with industry professionals to gain a better insight on the issue of labor shortages from the perspective of companies and organizations that

are affected. Attitudinal research will be conducted using semi-structured personal interviews over the phone. This method was chosen because of the nature of the problem at hand being one of qualitative nature rather than quantitative. Statistics on the issue of labor shortage are available, but the insight and knowledge of professionals in their fields with an abundance of experience will also be valuable in shedding light on the issue and the actions being taken currently to combat the shortage of labor in construction. These interviews will create a clearer picture of the labor supply pertaining to carpentry trades in the Bay Area, which is the main focus of this paper.

Data Collection

The first interview that was conducted was with Brandon Crayne, President of West Coast Acoustical, a subcontractor that specializes in acoustical ceilings. The company is based in Rohnert Park, CA and performs nearly all of its work in the San Francisco Bay Area. The company employs only union labor. The company experiences labor shortages with some frequency, on average about once a month according to the president. The main solution that West Coast turns to in times of a labor shortage is to share workers with other shops in the area that specialize in the same trade. There exists a strong working relationship between ceiling contractors in the area with regards to pooling labor, since it is somewhat common to run into an issue of labor shortage. Another alternative stated in the interview was turning to the local union for out of work members of the union, but that is rarely a solution WCA pursues since there is usually enough labor between the shops themselves. In terms of trends, Crayne says that the situation seems to be worsening somewhat, stating that "a lot of people my age and a little older are getting ready to retire here in the next five to ten years, and there's not a lot of people lining up to fill those spots." There seems to be a trend of people who are not considering the construction trades a viable option for a career. Instead, it is viewed as a somewhat lowly profession with a high physical toll and low compensation. Crayne suggests that those opinions are misconceptions, and that the pay for a union carpenter is quite comfortable.

Regarding the aspect of aptitude and training, Crayne states that the most important aspect of a productive construction worker is common sense. In his experience, it is possible to teach anyone who possesses the requisite physical abilities the necessary skills to become proficient in a trade. The main reasons new employees are not able to make a career for themselves in the construction trades are lack of work ethic and punctuality. He says that these traits are not exclusive to younger employees, that many workers of all ages suffer from a lack of punctuality, but they usually do not stay in the industry for long if they lack these traits. On jobsites that West Coast Acoustical performs at, the start time is typically 5am, which is a tough adjustment for some people, especially considering the commute to the jobsite is usually an hour or longer for most employees. When discussing the image of the construction worker, Crayne says that construction workers are looked down upon somewhat frequently by people in other professions, because of the stigma that construction workers carry. When asked how to fix the image of construction workers, he says that the best way to do that would be to dispel the misconceptions that people hold about construction workers, that they are low-paid, unintelligent, rude, and they are to be looked down upon. The truth is, he says, that those workers are well-paid, intelligent, skilled professionals, and most of them carry themselves as such. On fixing the image of construction workers among younger people, he says that construction work should be promoted in high school settings, educating the youth about the possibilities of a career in construction. He says that the main selling point of the profession should be the monetary aspect; a high school graduate can progress through the required apprenticeship program in the union and come out as a journeyman in 4 years, with the potential to be earning $100,000 per year with full benefits at around age 22. He states that not many people know how lucrative a career in construction can be, and that more people would likely choose that career path if it was more advertised in the school

setting. The main drawback to forgoing college, Crayne says, is that it closes the door on some opportunities at higher level positions in the industry. Most of the management level positions are filled by people with college degrees, and the qualifications of someone without a degree might not be sufficient for a job as a project manager, for instance.

When asked about employee retention, Crayne says that it is important to treat workers with respect, and foster good chemistry within the company, at all levels. He says that WCA does this by ensuring that its workers are well taken care of, ranging from ensuring days off when notice is given to purchasing high-quality tools and PPE for employees. When asked if monetary rewards alone were enough to retain employees, Crayne said "Money is not everything. It is a big part of keeping employees around but if you don't treat them right, someone else will pay them what you are paying them, and they'll leave."

An interview was also conducted with Dan McCulloch, the Senior Field Representative at Local 751 Carpenters Union. His opinion was that there is not a "labor shortage", since there is typically enough skilled labor to complete any jobs that are running at a given time. The workers are just not always utilized with complete efficiency. This is consistent with Crayne's interview as well, since there seems to be enough skilled labor between shops of the same discipline in the Bay Area to complete whatever work needs to be done, the shops just need to be collaborative with each other and the unions to ensure that the entire labor force is being used.

When asked about an aging workforce, McCulloch stated that there is somewhat of an aging workforce, but he also seemed optimistic about the amount of participation in the workforce among younger people, and the amount of training that is provided through the apprenticeship programs. The focus of the training is that trends are not what dictates the training, instead the training focuses on the technology that is being used in the field. The technology used in the field is ever evolving and so too is the training curriculum for the apprenticeship programs. The main concern with the aging of the workforce is the loss of knowledge that is associated with losing highly experienced and knowledgeable workers to retirement. McCulloch says that it is imperative that this knowledge does not go to waste, and that newer workers should learn from these experienced workers during the time they are working together.

Regarding the reasons for the participation in the industry, McCulloch cited high pay and medical benefits as the main drivers for people getting into the industry, and namely in union positions. This also concurs with Crayne's opinion that pay is quite high for union carpenters in the Bay Area, and this is a large influence on a prospective employee's decision to pursue a career in construction. When discussing main reasons why workers do not always have long careers in construction, McCulloch states that the work is physically hard at times, and this can discourage some workers, though for many the pay and benefits are worth the physical nature of the work.

Analysis

The most apparent aspect of the data collection is that the findings of the papers in the literature review are consistent with the experiences of industry professionals with regards to labor shortages and labor relations. Many of the problems cited in the papers were also cited by the industry professionals, such as the image of the construction worker being quite low relative to other professions. The industry also seems to have a fairly strong sense of what the best practices are regarding labor retention. Hearing the president of a construction company state that "money isn't everything" when speaking on treatment of employees serves as evidence that research in the field of

labor relations seems to be somewhat accurate. Non-monetary rewards are cited as being important both in the interviews and in the research, but both found that monetary rewards are likely the most important in keeping employee morale high. There are a high number of people aging out of their roles in the field and retiring, and this is an issue that needs to be solved by bringing in younger workers to learn from these older, highly skilled workers so as not to waste that experience and those valuable learning opportunities for younger workers. The common theme among the research and the interviews is that image must be improved, and this would be done through higher visibility of the positive aspects of a job in the construction field. For the specific situation of Carpenters in the Bay Area, the pay is high compared to many entry-level jobs, as well as having full healthcare benefits when the workers are represented by the union. As previously stated, the starting wage for a union journeyman carpenter (a title that is typically earned after a 4-year apprenticeship program is completed, in which the apprentice also receives pay increases as they work through the program) works out to nearly $100,000 per year, with full benefits. This information should be spread to young people who could be prospective employees, since there are a limited number of career paths that offer such a high wage in a short amount of time, especially among career paths that only require a high school diploma.

With so many contractors continuing to have trouble finding workers, and contractors losing a high number of workers to other industries, a more concerted effort needs to be undertaken by the industry as a whole to improve the image of construction work in order to recruit new employees. There should also be more diligence in the area of employee retention, since those workers may not only be leaving the company if they are mistreated, but they could be leaving the entire industry.

In the Bay Area specifically, the problems of labor shortage are less pronounced than the research suggests, leading to a reasonable assumption that the practices of companies and organizations in this area help to curb the issue of labor shortage. The emphasis on training, along with the collaboration of the shops and unions in the area work to create an environment with less of an issue finding laborers than the research suggests exists in other areas. High pay, along with benefits for workers also contribute heavily in the participation in this specific area.

Conclusion

The construction industry is reliant on skilled labor to perform the tasks necessary to complete construction projects and make the industry operate as a whole. Without an adequate supply of skilled labor the industry will suffer, as will the country's economy. Labor shortages are harmful to the industry, and the problems that labor shortages create, such as increasing cost of construction and a decrease in labor production, end up making the shortages worse, since contractors are left with less funds to train their workers and recruit new ones. This cycle is important to break with practices such as those detailed in this paper. The retention of existing workers should be prioritized through providing fair wages and ensuring proper treatment of employees, so that the industry does not continue to lose workers at rates that may become problematic in the future. Recruitment of new labor should be accomplished through clear promotion of the construction career path. In this paper, carpentry trades in the Bay Area were assessed, though many of the principles should be applicable to a large variety of trades and locations throughout the country and beyond. These practices which are used in the Bay Area carpentry trades could provide a model for increased success in other areas and disciplines throughout the industry. Recruitment, training, and retention are key factors to the health of any labor supply, but are especially important to the construction industry.

Future Research

More research should be performed looking into other areas and trades throughout the country and the world, in order to see if the ideas and concepts from this paper are also true in these other areas. It would also be beneficial to assess the recruiting process in a more hands-on way, possibly by working with contractors, unions, or other entities to assemble a presentation on construction professions that could be shown in settings like high school job fairs, allowing young prospective employees to learn about the merits of a career in construction. In addition, a quantitative approach to this topic may also be beneficial in order to gain hard data on the issue of labor shortage. This could be done from the perspective of employers (like this paper), employees, or perhaps a hybrid approach. More information on this topic will allow for more knowledge and recommendations to the industry in an effort to curb this pertinent issue within the construction industry.

References

Aiyetan, Olatunji Ayodeji, & Dillip, Das. (2018). System Dynamics Approach to Mitigating Skilled Labour Shortages in the Construction Industry: A South Africa Context. Construction Economics and Building, 18(4), 45-63.

Buckley, B., Powers, M., Rubin, D. (2016). Labor Gaps Bring Steady Pay Raises. Engineering News-Record.

Chini, A. R., Brown, B. H., & Drummond, E. G. (1999, April). Causes of the construction skilled labor shortage and proposed solutions. In ASC Proceedings of the 35th Annual Conference (pp. 187-196).

Ho, P. H. K. (2016). Labour and skill shortages in hong Kong's construction industry. Engineering, Construction and Architectural Management, 23(4), 533-550.

Johari, S., Neeraj Jha, K. (2020). How the Aptitude of Workers Affects Construction Labor Productivity. Journal of Management in Engineering, 36(5).

Juricic, B., Galic, M., & Marenjak, S. (2021). Review of the Construction Labour Demand and Shortages in the EU. Buildings, 11(1), 17.

Kim, S., Chang, S., & Castro-Lacouture, D. (2020). Dynamic modeling for analyzing impacts of skilled labor shortage on construction project management. Journal of Management in Engineering, 36(1).

Obando, S. (2019). Construction labor shortages are forcing rent growth at class-A apartment buildings. National Real Estate Investor