

# Critical Review of Factors that Lead to the Negative Image of the Construction Industry

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**Abstract—** This study was developed to elaborate on the idea that the construction industry has adopted the reputation of having a negative image. The paper pulls together the work of several authors to strengthen the argument of the public's negative perception of the industry, while also explaining some positions taken by the construction companies. By using the main factors of being an inconvenience to the general public, accidents occurring due to construction, the prejudices that arise in the industry, and the impact it has on the environment, the data found accurately describes the problems leading to a negative image.

**Keywords—** Construction Industry, Negative Image, Blue Collar, Change Perception

## I. INTRODUCTION

In the world today the construction industry is often scrutinized by the media, public opinion, and public hearings creating a negative image towards the expansion of cities and the businesses that operate and promote growth through construction. The media often highlights the negative impacts construction has on the environment, people's day-to-day activities, and poor education of construction workers. Unfortunately, in the world today many construction incidences, mostly due to faulty negligence, have led to many environmental impacts that have caused damage to ecosystems such as marine wildlife, wetlands, and forests on a global scale. In addition to harming the environment, construction is often viewed as inconvenient due to the amount of time it takes to complete a project. For example, highway construction can take years to be completed, which in turn, creates traffic when parts of a road are closed off to complete construction. Also, construction tradespeople are often disregarded as "blue-collar workers". The phrase "blue-collar" is often used simultaneously with words like uneducated and lower-class, as opposed to its counterpart, "white-collar," which is typically associated with professionalism [1]. As a result of the environmental impacts, inconveniences, and view of construction tradespeople, the construction industry is often seen in a negative light. The purpose of this paper is to pull together the work of several authors to strengthen the argument of the public's negative perception of the industry, while also explaining some positions taken by the construction companies.

## II. FINDINGS AND DISCUSSION

One of the most underlying aspects as to why the construction industry is seen in such a negative image is the perceived notion that the industry is rampant with corruption. One common unethical practice in construction is unbalanced bidding, which is seen more commonly in the public sector. Unbalanced bidding is a practice in which the contractor changes the price on materials or services during the bidding process, the contractor can pay for the materials or services for the actual price and profit from the extra expense [2]. Another common unethical practice in the construction industry is bribery. Transparency International's Bribe Payers Index in 2005 revealed that there was more corruption in the construction industry than in any other industry in the American economy [3]. The practice of bribery and corruption can be analyzed by ethics or even by the culture of the industry, it is a problem that is continually being addressed and regulated. Government regulations can only do so much in order to address corruption from within companies [4]. In doing so, the construction industry is combating corruption from the lowest level of employment to the highest managerial level, and therefore restores credibility to the construction industry. But the most damning form of corruption is the unsafe design of construction of buildings and unsafe construction methods that are practice, which can result in fatalities [5]. The primary concern of any and all people working in construction should be the safety of construction workers and of society as a whole. Today there is less corruption in construction than a decade ago, but nevertheless there is still much work to be done [6].

The lack of technological integration in the construction industry serves to compound the negative image the industry has. The application of sensing technology in order to prevent backing accidents is one ideal way in which technology can be used to increase safety [7,8,9,10]. In today's industry, the use of technology is slowly being introduced in order to better coordinate collaborations between different specializations through the adoption of object-based modeling software during project delivery [11]. Although it may take some time to fully integrate such technology, when the industry as a whole were to adopts such software, it will be seen as a more forward progressing industry. Nuclear power plants are known for their potential hazards and difficulty of constructing, but with new construction technologies, it would be possible to begin

constructing new nuclear power plants once more [12]. Through the use of technology, the construction industry could open a new avenue of work for companies and investors alike. New innovative technology and ideas is how many industries improve productivity and enhance quality, but in the construction industry, due to its great complexity and different aspects, makes it difficult to adopt [13]. Integrating technology into the industry will always come with risks, but without doing so, the industry will never be able to grow and improve. It is not possible that some of the most iconic buildings of the modern age, such as the Burj Khalifa, were built without some highly innovative technology [14]. When it comes to mega projects, it is impossible to rely on construction methods of the past. Immigration is a huge contributor to the construction industry workforce, and according to *Immigration and Construction: Analysis of the Impact of Immigration on Construction Project Costs*, "There are an estimated 11 million illegal immigrants currently residing in the United States. Of this population, research shows that approximately 19% work in the construction industry, comprising around 14% of all construction workforces." [15] Not only is this unethical, but also corrupt. Underpayment ultimately leads to low productivity and inefficiency, and *Construction Craft Workers' Perceptions of the Factors Affecting Their Productivity* says "A statistical comparative analysis was employed to distinguish the significant factors encountered by craft workers on projects with relatively low perceived productivity. The research further examined the differences in the perceived relative magnitude of productivity factors' influence on construction productivity based on respondents' union status and trade." [16]. Underpayment is clearly demoralizing employees, and on top of that the relationship between Hispanic craft and Caucasian supervision lead to the problem of miscommunication. Differences in Perspectives regarding Labor Productivity between Spanish- and English-Speaking Craft Workers states "Specifically, in comparison with English-speaking craft workers, Spanish-speaking craft workers experienced more severe issues with communicating with their supervisors, pay and monetary bonus for good performance, and lack of training on safety, health, and skills." [17] Backing this article, *Motivational Implications of Construction Work* explains, "The qualifications of the workers appears to be more than adequate for the great majority of construction tasks. Contractors need to structure jobs to improve their motivating potential. As currently structured, construction jobs are low in motivating potential." [18].

Some articles state that despite the low wages, as a whole the industry is on the incline. *Productivity Growth in Construction* says, "Results show that labor productivity growth has been positive, and fairly substantial, in all four industries where reliable deflators now exist. Shifts of labor between construction industries reduce productivity growth by 0.4% a year. Regulation is a significant negative effect

on productivity, but reduces productivity growth by only 0.1% a year." [19] On the contrary, *Building Job Quality from the Inside-Out: Mexican Immigrants, Skills, and Jobs in the Construction Industry* states, "Common assumptions are that immigrants deemed low-skilled will experience these labor market changes in negative ways, and that they are largely conned to segments of the labor market in which jobs are low-wage and working conditions are dangerous and degrading" [20]. This coincides with *Mitigating Payment Problems in the Construction Industry of Construction Payment Disputes* states, "This study therefore suggests that the rational starting point for real solutions to the payment problem is a change in attitude of upstream construction parties, followed by adherence to provisions within payment-related legislation and contract forms." [21] Lastly, *Critical Issues and Possible Solutions for Motivating Foreign Construction Workers* explains, "Use of foreign workers has been a common practice for a country to gain laborers from nearby less-developed countries. While it can contribute to lessening the labor deficiency, foreign workers are typically less productive and often encompass diverse risks due to cultural differences, communication difficulties, and different work ethics and customs." [22]

Another perceived factor that leads to the current negative image on the construction industry is the inconvenience it places on the general public [23, 24]. One of the leading public nuisances is the increase in traffic around the construction jobsites. "Highway work zones often cause traffic congestion, resulting in increased road-user delays and vehicle emissions. These negative impacts of highway work zones can be minimized by a number of mitigating measures such as reducing the length of work zone segments, using the shoulder temporarily for traffic, and working during low-traffic nighttime hours," [25]. Although the construction crews abide by these recommendations in an attempt to decrease traffic, the human factor still permits roadway congestion to be an ongoing issue. "Congestion arises when a roadway system approaches vehicle capacity, resulting in numerous negative impacts ranging from wasted fuel and time to increases in tailpipe emissions. Multiple studies have modeled congestion in urban areas and assigned economic values to the excess fuel consumption and time wasted in traffic, concluding that congestion leads to annual economic burdens ranging from \$83 billion to \$124 billion," [26] So not only is traffic a nuisance in the fact that motorists must tolerate slow, congested roadways, but it also consumes their fuel and time leading to a financial burden on each individual. Knowing this, you would think that the government would do everything in their power to decrease the amount of traffic. However, according to a study on governments who implement Intelligent Transportation Systems to decrease the amount of time on the road, only "[a]bout 57% of the responding [Department of Transportation] said they use [Intelligent

Transportation Systems] technology in work zones,” [27].

Pollution is another leading source in the current negative view towards the construction industry. There has been a recent rise in noise-related disturbances caused by construction equipment, which not only can cause health and safety risk to residence but also project delays and cost overruns, [28] “The major nuisance associated with the nighttime construction are noise, vibration and illumination. Noise problems are normally caused by the operation of heavy equipment and specifically by vehicle and machine backup-alarms. Vibration problems are primarily a result of pile driving, blasting operations, or the use of vibratory rollers. While good illumination is necessary for the work to proceed at night and for the safety of the traveling public, proper work zone illumination can be very intrusive to project neighbors”, [29]. A 2016 study sample selected 20 construction sites and 140 residences which found the majority of construction noise originated from diesel generators, [30] “Furthermore, it has been reported that construction noise is the most common source of noise pollution, with 68% of noise complaints caused by construction noise...”, [31] Not only do the public complain about the noise pollution, but it also negatively affects the uninformed employees of a construction company. A study taken in Kuwait of over 500 construction workers showed that on a normal work day 80% of the workers did not wear hearing protection even though the workers stated that the site was noisy. That same survey found that 56% of workers were very annoyed and only 40% knew of the health impact from noise [32].

Immigration and underpayment go hand in hand, however they are not the only pool of employees affected. Regulative Measures Addressing Payment Problems in the Construction Industry: A Calculative Understanding of Their Potential Outcomes Based on Geometric Models states, “Payment default is a common complaint from contractors in the construction industry. Current research primarily takes an interpretative approach for conducting semantic analysis of these measures, reporting their applications, and comparing their implementation outcomes” [33]. Additionally, British immigrants are being scrutinized. According to Migration, immigration controls and the fashioning of precarious workers says, “Immigration controls are often presented by government as a means of ensuring ‘British jobs for British workers’ and protecting migrants from exploitation. However, in practice they can undermine labor protections.” [34]. Immigrant groups from all over the spectrum are affected by either underpayment or neglect of benefits.

Construction has always been seen as a career that does not require an education to succeed in. This is a big factor the industry has faced for a long time. There is a “negative image of the construction industry by students and parents, which eliminates exceptional students from choosing a CM degree”

[35]. Another factor that leads to the current negative image seen in the construction industry is how unsafe it is. “The Hispanic workforce in construction has higher rates of injuries and fatalities than other ethnic workforces [36]. The education barrier ties in with these unsafe characteristics and only makes the construction industry gain a more negative outlook. “The characteristics of the Hispanic workforce that have been suggested as the root causes for the higher rates of injuries and fatalities include poor English skills (language barriers), lower education level, unskilled or semi-skilled workers, cultural barriers, and minimum experience (young age)”[36]. This shows that the people getting hurt is just a small group of the construction workforce and does not account for the whole industry. The education of workers in the construction industry has always been in question. There are some people who don’t think colleges should have a construction program because of the negative image it perceives. “At CSU, we have challenged those who question whether a CM program belongs at a university with very high research activity” [35]. Colorado State University has been pushing the construction management degree to students and conducting research within the field. Because of the negative image of construction students are also faced with a “lack of knowledge about career opportunities for CM graduates by teachers and K-12 counselors, which cause them to guide students who are interested in construction into more traditional disciplines, like civil engineering and architecture” [35]. With this being said, this negative image is bringing change in education. Many universities now have construction management programs and they are rapidly advancing. “Most construction programs have an industry advisory board that provides feedback to the administration and engages the students through internships and other mentoring activities” [37]. Some schools are considering putting in more technology into their program including simulations. “This simulation software used is more advanced and gives students the ability to control resources to accomplish the project more efficiently”[38] “The integration of best industry practices into construction curricula can be used to advance the knowledge base of construction graduates and better prepare them to effectively respond to industry challenges”[39]. The construction industry portrays an industry that does not require education, but it is changing and we are integrating ways through college programs to excel education into construction.

“Construction is one of the most dangerous job sectors, which annually reports tens of thousands of time-loss injuries and deaths” [40]. Safety is a major factor in why construction is looked at in such a negative image. “In 2014, construction work in the United States accounted for 908 fatalities – representing the occupation with the largest fatality rate” [41] “There is currently a distinct lack of studies that explain specific relationships between working condition- and workers’ behavior-related factors

contributing to construction accidents”[42]. Although safety has not evolved as efficiently as it probably should have, technological advancements in the safety sector have caused strive in recent decades. An example of this would include “The findings of this study can be used by practicing construction professionals to improve hazard recognition during pre-task safety meetings, and to develop a conducive climate that facilitates hazard recognition and management” [41]. Another study done showed that “To decrease the number of accidents on construction sites, several recommendations have been proposed, to encourage supervisors offering proper support to CWs, to assign tasks according to the actual ability of each CW, and to provide enhanced job security and certainty by designing long-term construction programs”[43]. Companies are starting to assess safety factors more as injuries rise, an example of this assessing would include “Once risk elements are identified, and their threat to project success is assessed, options are developed to reduce risk to levels deemed acceptable by the organization” [44]. Safety will continue to be a major factor of why there is a negative image in construction until we conduct more studies and figure out what we can do to get rid of safety hazards.

Many contractors look for the easiest and most cost efficient way of doing things, resulting in shortcuts and unethical practices. The main reason people view green buildings negatively cost. A study conducted by Pramen Shrestha and Nitisha Pushpala compares the construction costs between thirty schools built green and thirty school built non-green. It showed that, “the construction cost for green school buildings (GSBs) is about 2% more than that for conventional, non-green school buildings (NGSBs). However, the long term financial benefits are about twenty times more than the initial investment cost, mainly because GSBs consume 30% less energy when compared to conventional schools, on average” [45]. Buildings that are built green have proven to save a substantial amount of energy. It has been a common misconception that building LEED certified buildings will cost more than conventional buildings, “the first cost only accounts for around 10 percent of all costs a building owner will spend over the life of a building. The other 90 percent comes in the form of operation and maintenance – two areas in which designing for LEED certification can save enormously” [46]. In the article “To LEED or Not to LEED” the authors, “collected construction, cost, and utility data on a sample of 160 LEED certified buildings. Using simple correlation and descriptive statistics to analyze the resulting database, we found operating costs in LEED certified buildings were \$0.70 per square foot less than non-LEED buildings, energy costs were 31% lower, and cost premiums ranged from 2.5 to 9.4% with a mean of 4.1%” [47].

There are many factors that lead to the negative image in the construction industry, but the one that seems to be a factor around the world is prejudice and towards minorities. Minorities in the

construction industry include immigrants, women, and uneducated laborers. Today in the United States, “Hispanics are the fastest growing ethnic group... On average, Hispanic immigrant have lower levels of formal education than other groups. Fifty-six percent have completed fewer than 12 years of schooling, and over half report speaking English not well or not at all,” [48]. With uneducated workers who speak little to no English, working in the construction industry can be a hazardous environment for this group in particular. Cultural diversity is seen as an advantage in some industries, but when it comes to cultural diversity in the construction industry it can be detrimental. It can “... include increase stress among the workforce, confusion, frustration and conflict which translates into lower morale, productivity, quality problems and higher accident rates,” [49].

Also included in the minority group in the construction industry around the world are women. In Britain, “it was revealed that women still constitute only 9% in the construction sector,” [50] with the other 91% being men. “Perceptions exist that women are not suited for construction, that construction work is too physical for women and that the image of the industry discourages women,” [51] Most women hold positions “in the service sector, such as wholesale, retail distribution, hotel and catering,” [52] Most of the jobs in the construction industry are physically demanding and “... of the tiny number of women in the construction trades, many are electricians and joiners,” [53] which are known to be less physically demanding trades. “Many men acknowledged that there are places for women in the industry,” [54]. These places in the industry include trades that require attention to detail. Although there are many men who believe that women belong in the industry, there are those who oppose it. “Studies of male shop-floor cultures have found that men resent the intrusion of women on the grounds that is suppresses normal conversation and takes away the pleasure of working in an all-male environment,” [55] For women who do hold jobs in the construction industry, “[h]earing sexist comments on site,” [56] is a common occurrence. Another reason women are less likely to pursue a career in the construction industry is that “Most women perceived that they had to make a choice between a career or a family oriented lifestyle. In contrast, men were more likely to attempt to combine their work and family lives,” [57]

In the article, Greening Project Management Practices for Sustainable Construction, the authors explained that the U.S. Green Building Council (USGBC) did a study in 2006 about how, “The built environment in the U.S. accounts for 30% of greenhouse gas emissions, 12% of potable water consumption, 70% of electricity consumption, and 39% of all energy use” [58]. Sustainable building practices can greatly reduce those statistics and will improve the overall environment. According to another article that conducted a “re-analysis of the USGBC’s data from 100 LEED certified commercial and institutional buildings” states, “On average, LEED

buildings used 18-39% less energy per floor area than their conventional counterparts” [59]. The Green Building Policy and School Performance states that, “There is clear and compelling evidence that schools currently built to specific green standards of indoor environmental quality, specifically lighting, result in healthier and more productive students” [60] According to the Impact of Green Building Design and Construction on Worker Safety and Health journal, “sustainable, or “green,” rating systems, such as the United States Green building Council’s Leadership in Energy and Environmental Design (LEED), are leading to changes in the way owners, designers, and contractors approach the design, construction, and operation of buildings” [61] Educating students on sustainability in construction is another way to rid the negative image of sustainable buildings, and according to the Sustainability in Construction Education article, “To prepare students with sustainability knowledge and techniques, engineering educators need to develop appropriate class contents and effective teaching techniques”[62]. “The construction industry is a constantly-changing market, thereby making suppliers direct their efforts to understanding and meeting owners’ requirements” [63] Suppliers must keep up with the different materials companies may order when building green buildings. “The construction industry’s recognition of past harmful and wasteful practices has been a major contribution for the growth of sustainable design and construction practices” [64].

### III. CONCLUSION

The negative factors that we have discussed in this paper are the main reasons that the construction industry has adapted the connotation of blue-collar and perceived as proletarian. The negative image the industry has conveyed is getting a more in-depth look through executive studies. The industry is changing rapidly and we want to help find more reasons why these factors need to be resolved in order to produce a better image.

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