Impact of Leadership Strategies on Perceived Climate of Safety at the Construction Job Site

by

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Dedication

This research is dedicated to the late Hyman Estrin, a man who understood the magnitude of his responsibility to ensure worker safety long before OSHA mandated it. Mr. Estrin was recognized for eight- decades as a leader in the construction industry and a man of incomparable integrity.

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Abstract

Despite the creation of the Occupational Safety and Health Administration (OSHA) more than 30 years ago, the construction industry is in conflict with itself. It is locked in a struggle to effectively keep its workforce protected from unsafe acts, unsafe conditions, or a combination of both. According to the Bureau of Labor Statistics (BLS), nearly 6.5 million people work at approximately 252,000 construction sites across the United States every day, with the fatal injury rate for the construction industry higher than the national average when compared to all industries. There have been many studies documenting these conditions, but no study has examined leadership styles and their impact on the climate of safety.

This study examined the relationship between management's leadership style and the perception of a climate of safety; the relationship between workers' perception of leadership style and the perception of a climate of safety; and the relationship between the size of the workforce, the manager's leadership style, and the perception regarding the climate of safety. The outcomes contribute to the field of conflict resolution as they offer the ability to move from incongruities regarding perceived worker safety to discussions and solutions that are aimed at influencing those policies and procedures at the organizational level that will ensure that a construction worker can perform his or her job free from dangerous work conditions.

Chapter 1: Introduction

The construction industry has long been recognized as hazardous (Chen & Jin, 2012; Cooper, 2000; Dester & Blockley, 1995). Nearly 6.5 million people work at approximately 252,000 construction sites across the United States, and, according to the Census of Fatal Occupational Injuries (2012), approximately 17% were construction workers who became catastrophically or fatally injured because of unsafe job site conditions. This is the largest number of injuries incurred in any industry in America, reflecting a fatal injury rate that is higher than the national average across all industries (Occupational Health and Safety Administration [OSHA], 2005).

The objective of this study is to explore underlying factors that may contribute to workplace injuries by examining the leadership styles, organizational size, and whether workers and managers are in agreement regarding perceived climate of safety. While not expected to have a working knowledge of safety practices, or the ability to analyze data to ensure that the most effective and efficient safety practices are best utilized, managers do have a responsibility to protect their workers. They also should be familiar with the latest advancements in the industry.

As an example, Teo, Ling, and Chong (2005) recognized that construction companies are systemic in nature and as such, sensitive to shifts in organizational paradigms that create a continuous need to balance production deadlines and worker safety. This focus on the potential between these two organizational forces creates an ongoing conflict between the management of time and the management of job site safety.

This systemic conflict is therefore a seminal missing link in safety supervision best understood as a struggle and an obstacle that must be understood and addressed. It has historically manifested as management's inability to effectively execute safety policies and protocols as well as an unwillingness to recognize safety as a priority and emphasize it as such when interacting with the frontline worker. Walton (1989) acknowledged that management must recognize that the foundation of this organizational conflict is also rooted in the reality that they (management) holds both the power and obligation regarding worker's behaviors. Therefore, it is vital for management at every level of the construction industry to implement an unwavering dedication to the identification, prevention, and administration of jobsite hazards, risks, and accidents by guaranteeing that the correct benchmarks and goals are implemented with the sole purpose of alleviating unsafe acts, unsafe conditions, or a combination of both.

Another factor also drives organizational conflict, specifically relating to safety hazards and resource allocation (Cervo, Allen, & Dyché, 2011). While large companies have the ability to invest in the implementation of expensive safety management systems, smaller companies have limited resources, which can often lead management to assume that they lack the necessary ability to create, implement, and monitor a means of formalized safety management. This can manifest in the lack of a dedicated personnel or team devoted to worker safety. As a result, injuries and fatalities occur (Gillen, Baltz, Gassel, Kirsch, & Vaccaro, 2002). A lack of experience dealing with safety issues is also problematic for small businesses. John Mendeloff (2006), Director of the RAND Center for Health and Safety in the Workplace, argues this is the case because smaller

companies may not possess the same level of knowledge, including different options in management styles they relate to worksite safety.

As an example, Company A has 15 employees; 3 are in a supervisory position with safety related responsibilities and the remaining 12 are skilled workers (carpenters, plumbers, electricians, etc.) and general laborers. While this company recognizes safety as a priority, only the 3 supervisors actively engage in trainings focused on keeping the worker safe. In comparison, Company B also recognizes safety as a priority but has 150 employees, with 30 of them holding supervisory positions with safety related responsibilities. The remaining 120 are skilled workers (carpenters, plumbers, electricians, etc.) and general laborers. Understanding that safety must be a priority, 30 employees actively engage in trainings focused on keeping the worker safe.

In this scenario, both companies prioritize safety; both have supervisors actively engaged in safety trainings used to increase their ability to keep the worker safe; but, as articulated by Mendeloff (2011), Company B has 10 times the opportunities to learn, implement, reinforce, and assess acquired safety related knowledge, whereas Company A has only 3 times that amount. To this end, construction safety management and the ability to keep the worker safe is impacted by company size.

Therefore, recent studies on workplace construction safety have emphasized the need for an integrated safety management approach, which demands a recognition that at the highest level of the systemic paradigm, (the construction industry), a recognition must be made that the organizational conflict is real and based in a historical inability to integrate macro-level directives such as policies and procedures into mezzo- and micro-

level initiatives that keep the worker safe. For instance, Choudhry, Fang, and Mohamed (2007) advocated for a multi-faceted paradigm, one that focused not only on the reaction to accidents after they have occurred, but also strong proactive approaches such as hazard identification and observation. These approaches are all rooted in a quantifiable percentage of safety policies, protocols, and behaviors and have been instrumental for bringing about the necessary organizational changes to support an enduring commitment to safety.

Current Challenges to Worker Safety

Micro, mezzo, and macro levels and safety challenges

Recent studies on workplace construction safety have emphasized the need for an integrated safety management approach involving macro, mezzo, and micro-level directives. These studies all reflect a common theme of construction being an industry in both crisis and conflict with a need to see the systemic disconnect not only mirrored in the interdependent relationship between managers and workers, but also between the industry as whole and those specifically tasked with keeping the worker safe. Caldwell and Mays (2012) understood this and expressed it as a need to start at the broadest level, the macro level, including policies and procedures that are found in the construction contracts and subcontracts. When discussing the macro-level, it is important to note that these forces are established at the highest level of the management hierarchy as a means of creating a clear and concise blueprint upon which all safety decisions are implemented, reinforced, and monitored. When operationalized correctly, these initiatives create a

strong systemic culture and climate of safety, thereby establishing an information loop between management and the worker. Much like interpersonal interactions, macro-level relationships are based on communication. This communication becomes the foundation upon which expectations are prioritized, as they are codified in writing with clearly delineated outcomes, leaving no room for interpretation (Parboteeah and Kappa, 2008).

In turn, the mezzo level can be best understood as a framework where broad macro level policies begin to take focus in an effort to manifest as explicit programs and practices. At this level, construction safety practices are communicated to management professionals with a specific range of expected deliverables. As a transitional stage, this framework is often at risk for the greatest level of misunderstandings or misinterpretations, leaving the worker at greater risk (Caldwell & Mays, 2012).

The micro level involves the worker who is at the greatest risk of harm and who is impacted by this industry in organizational conflict. To that end, it must be built upon strong macro and mezzo levels. All prior levels of safety initiatives are translated to the worker at this level. In other words, the policy (macro) is expressed as a program (mezzo) into day-to-day work tasks (micro). This progression is shaped by an organizational structure that must be driven by a cohesive and codified approach that is unilaterally adopted by the construction industry and is ultimately the best proactive approach, that of a shared safety narrative that involves both a top down and bottom up approach, giving the worker a voice (perception of safety) in the process, while still acknowledging that safety must be codified, communicated, and enforced from the top down as it relates to job site safety (Clarke, 2013).

The complexity of construction safety management and the inclusion of multiple trades and multi-organizational collaboration in the construction industry continue to exist and, as a result, the presence of a high potential to systemically impede the creation of an effective means of understanding the impact of management styles on the day-to-day activities that comprise climate of safety is also evident (Rowlinson, 2004). This can be overcome with a commitment by the industry to encourage both managers and workers to engage in simple surveys designed to better understand how the safety information loop, that of a top down, bottom up approach is instituted, communicated, and arguably most importantly perceived by the frontline worker (Zohar, 1980a; Mohamed, 2003; Ng, Roger, & Yip, 2009; Lunt, Bates, Bennett, & Hopkinson, 2008).

These frameworks are instrumental for bringing about the necessary organizational changes that support an enduring commitment to safety and the day-to-day operationalization necessary to protect the worker. It is for these reasons that Choudhry et al. (2007) advocate for a multi-faceted paradigm focusing on the strong proactive approaches such as hazard identification and observation. Each of these is rooted in a quantifiable percentage of safety policies, protocols, and behaviors from the macro to the mezzo and ultimately in the day-to-day jobs carried out by the worker at the micro-level. Therefore, the first step is to identify key personnel characteristics and attributes including observable behaviors that promote safety, judicious responses to safety issues, approaching safety proactively, and effective communication skills allowing each to serve individually and collectively to enhance and support a strong climate of safety. This is accomplished by a commitment by management to integrate reliable

scales and measures as part of emerging construction safety management research (Le Coze, 2013; Flin, Mearns, O'Connor, & Bryden, 2000).

The 2007-2010 Recession and Safety Violations

Another factor that has impacted the climate and culture of safety is the most recent economic downturn. The nationwide recession in the United States spanning the period of 2007 to 2010 had a strong impact on the construction industry. Since the construction industry is a cyclical process with episodic expansions and marked contractions, the recession was an important factor impacting how the industry reacted to worker safety. During this period, the immense decrease in overall construction projects was often overlooked, leading to a distorted version of injuries, lost time, and worker deaths. This distortion was driven by a focus on the frequency of accidents without fully taking into account the severity of injuries, a misrepresentation of the safety narrative that continues to persist in present day, creating a gap in understanding the true impact on the lives on those injured at the job site (Mendeloff, 2006).

This is important since the industry uses the decrease in lost time injuries as a benchmark to prove that it is adequately addressing safety issues. Unfortunately, this logic is flawed since the loss of over 1.5 million jobs would offer a more realistic reason for the decrease (Bureau of Labor Statistics, 2015).

The construction industry is not getting safer, as is apparent in the most recent report of The Bureau of Labor Statistics (2015) documenting increases in the number of fatal work injuries, the highest annual total since 2008. As such, the industry and those at

the highest levels of the managerial hierarchy should not approach safety management using preexisting models, but rather the focus should be on those that support new research and insights that promote worker safety.

To that end, safety has been the focus of the industry, but acknowledgement as an organization is not enough to address and solve the conflict as it has only been shown to be a small part of the larger solution (Gillen et. al, 2002). Instead, macro and mezzo level entities—specifically general contractors, sub-contractors, and safety supervisors—must be supported by the industry to offer tangible means of operationalizing policy and protocol at the executive level so that it may be put into day-to-day practice regarding safety management (Bureau of Labor Statistics, 2016).

Management Styles and Safety Challenges

There are three general leadership styles that have been recognized across the continuum of all areas of Occupational Safety and Health but have rarely been applied to the construction industry. Guldenmund, (2007); Zohar, (1980a); Katz & Kahn, (1978); Hammer, (1989); Gillen et. al., (2002); Demirkesen & Arditi, (2015); and Cooper (2000) all agree that these are best reflected in the precepts of the autocratic leadership style, participatory leadership style, and free rein leadership style.

Autocratic Leadership Style

The aforementioned researchers each found that in this model, there is one leader who has complete command over his/her employees/team. Individual input is not part of this model, nor is criticism of the way in which the person in charge decides is best to

"get the job done". While some have argued that the advantage of this style is the ability to make quick decisions leading to greater productivity, safety on the construction job site can be greatly undermined if decisions are not well thought out and driven by pre-planning strategies, especially those safety policies mandated by the contract.

Participatory Leadership Style

The researchers each found that in this model, those in charge foster an environment that encourages a sense of teamwork, with each member from the top down and bottom up having the ability and responsibility to take part in the decision-making process, with the ultimate decisions made by the leader after all opinions and ideas are considered. Those in charge direct the workers regarding job tasks and expectations and workers have the freedom to communicate any concerns or suggestions without fear of negative repercussions. The advantages of this leadership style are reflected in an increase in worker motivation and a willingness to accept top down decisions as they feel they reflect their input. Critics argue it is too time-consuming. Yet, when worker safety is the priority, this form of input from the worker has proven integral and in the event that a decision needs to be made quickly to avoid immediate hazards, leadership still has the ultimate power to do so.

Free Rein Leadership Style

The researchers each found that this model is built upon complete trust that the worker will perform the job with little to no supervision. In traditional corporate settings, this leadership style works only when the employees are skilled, loyal, experienced, and

intellectual. While the construction worker can be all of these things, safety is not something that can be left solely to the worker, as top down, bottom up leadership often includes certain expertise and access to high-level policies and procedures as well as the construction contract that the worker does not possess.

While every worker deserves a work environment free of unsafe acts, unsafe conditions, or a combination of both, the construction industry, unlike a traditional office setting, poses greater safety related challenges (Wamuziri, 2007). The relationship between culture and climate of safety and the role leadership styles play can be a powerful analytical tool; yet to date, the exploration of relationships between leadership style and a worker's perceived notion of his/her climate of safety has been sorely underutilized.

Significance of Study

For decades, the construction industry, as reflected in organizational systemics, has failed to see itself as the key stakeholder and the agent of change regarding worker safety. The industry has focused on applying technologies that support outcomes regarding the estimating and overseeing of projects; yet in an attempt to fully integrate these mechanisms, it has failed to address one of the most significant aspects of the industry, worker safety (Niskanen, 1994). Project management continues to impact the success or failure of a project, but if success is to be defined by the industry as well as by individual construction companies only on the basis of time, cost, or quality performance without making worker safety the first

priority, the true impact of the completion of any project lacks an integral dimension, that of the relationship between leadership styles and climate of safety.

This research takes a unique approach insofar as it endeavors to highlight new ways in which to approach construction safety management by exploring the construction industry's need to realize it is both in crisis and conflict. This systemic dissonance impacts management's approach to worker safety based on perceived notions of climate of safety by not only management, but also the worker. Therefore, by recognizing the industry as part of ongoing organizational conflict, this holds it responsible not only for the problem/conflict but more importantly as a key contributor to the facilitation of potential solutions. This innovative approach fills the gap in the study of construction safety by connecting the missing dots revealed in past research; specifically, by focusing on the need for a proactive approach that includes the analysis of primary data, notably that of those in charge of keeping the construction job site safe at the managerial level, as well as those performing the daily work tasks (Smith, Foklard, Tucker, & Macdonald.1998; Shapira & Lyachin, 2009; Parboteeah & Kapp, 2008; Niskanen, 1994).

This cannot be done from a strictly retroactive approach using broad strokes to explain specific catastrophic and fatal injuries (Mohamed, 2003; Mattila, Rantanen, & Hyttinen,1994). Instead, the important role both worker and management play in safety outcomes is the ultimate goal; and while in no way predictive in nature, this research led to increasing awareness and in turn offered greater options when deciding upon the most effective and efficient means and methods to be utilized by management to protect the worker from unsafe acts, unsafe conditions, or a combination of both.

Managerial leadership styles are key to propelling the industry forward into a new age of construction safety management. Management has a multi-faceted role, and as such, while there has been no lack of research focused on the goals of how those in charge can utilize time and cost-saving methods, far less exists regarding proactive safety approaches based on leading rather than lagging indicators (Tsui, A.S., Zhang, Z.X., Wang, H., Xin, K.R., & Wu, J.B. 2006)

The research regarding the relationship between leadership styles and climate of safety is still in its infancy, but it remains integral to the future of construction safety management and the systemic approach to keeping the worker safe. There is no doubt that by keeping safety systems healthy and responsive, they can appropriately adapt to the changing needs of both the workplace and the workforce they are created to protect (Clarke, 2013; Checkland,1997; Flin et al., 2000). To that end, the industry has an organizational and systemic choice to make as it endeavors to offer more than simply awareness of the need for worker safety, but also an active commitment to making safety not merely an afterthought, but a driving force in all decisions across the construction management continuum. This opportunity is in concert with those forces that drive the field of Conflict Analysis and Resolution, allowing for the emergence of an informed industry that recognizes and values worker safety that acknowledges not enough is being done to keep the worker safe. As the highest tier of the organizational hierarchy, it has the greatest responsibility to establish and empower leaders/managers who are better equipped to understand the needs of workers. This in turn allows for the creation of a much-needed bridge between an industry focused on production driven outcomes that

cannot supersede the appreciation that with a clearer comprehension of workers' perception of climate of safety comes the potential for a reduction in workplace conflict(s) as well as an overall diminution of safety related anxieties.

Statement of Problem

The construction industry can be hazardous (Chen and Jin, 2012; Cooper, 2000; Dester and Blockley,1995). However, management has historically approached the issue of safety assessment from a reactive nature such as safety updates, retraining, and re-certifications. These assessments are a response to an accident rather than a means of trying to prevent a new one from occurring (Celik & Cebi, 2009).

While there has been a small shift away from the reactive measures, the new policies and standards, including OSHA's confined spaces, fall prevention campaign, and investigation and reporting reflect a historical focus on retrospective information or data conventionally referred to as "lagging indicators" (Demirkesen & Arditi, 2015). This is inadequate because historical data can only offer a snapshot into the climate of safety, and in turn, accident causation as it relates to the worker, the construction milieu, and the context surrounding the particularly hazardous environment (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002; Celik & Cebi, 2009; Diaz & Cabrera,1997).

While the construction industry may not always agree regarding the means and methods to effectively measure safety, for nearly two decades, setting safety goals and measuring safety performance has continued to engender controversy and varying opinions regarding the way in which safety outcomes should be expressed empirically.

To that end, it is important to point out that prior to the creation of OSHA, American Nation Standards Institute (ANSI) Z16.1 put forth three distinct measures of injury experience: disabling industry frequency rate, disabling injury severity rate (essentially a weighted frequency rate), and average days associated for disabling injury (a measurement of the ratio of severity to frequency rates). In their simplest form, these afforded the BLS the ability to collect, record, and code work injuries within each of the categories. The goal was one that focused on creating a system based on uniformity. Unfortunately, since reporting was voluntary, unlike mandatory reporting imposed by OSHA, ANSI data was unable to produce an accurate accounting of both the quality and degree of workplace injuries (Grayson, Althouse, Winn, & Klishis, 1998).

With the emergence of OSHA, many safety and health professionals have adopted measures based on statistically driven formulas that in their simplest form are generated by an empirical foundation that uses a base formula of 100 full-time employees per year or 200,000 work hours to measure safety outcomes. This is simply not effective because it does not take into account the frequency of accidents on a specific job site in comparison to the severity of injuries that resulted. Trying to show that a company is working more safely simply due to a decrease in frequency without taking into consideration severity is misleading at best.

Take the fatality rates of two hypothetical companies. Company A reported 250 broken arms and 3 deaths for a particular year, while Company B reported 900 broken arms with 0 deaths for that same time period. The following year, Company A reported 100 broken arms (a decrease of 150 broken arm incidents) and 15 deaths, while Company

B reported 925 broken arms (an increase of 25 broken arm incidents) and 0 deaths. The industry would report, based on frequency, that Company A has recognized greater success in keeping the workers safe due the overall decrease in accidents. Yet, OSHA incident rates were never intended to be utilized so exclusively. Time and again, OSHA experts have explained that the United States government created OSHA for many reasons, one of which was to build a very narrow window or "snapshot" of occupational safety and health as it related to injuries in the workplace. Still, these guidelines were never meant to give an accurate accounting of safety to the exclusion of all other data sources. The industry would report and recognize that company A has recognized greater success in keeping the worker safe due the overall decrease in accidents.

The study of any mass data reveals that the type of accidents, specifically ones that results in temporary total disabilities, are far different from those that result in permanent partial disabilities, permanent total disabilities, or death. This is the challenge faced by construction safety management professionals today and in the future. It is also the challenge faced by educators, as those entering into the workforce charged with the responsibility of worker safety need to have a far greater understanding of lagging and leading indicators and their relationship to the evaluative process of construction safety management. Therefore, lagging indicators tend to be highly ineffective as they only address the root cause after the injury has occurred rather than focusing on the leading indicators or those that keep the worker safe (Shapira, A., and Lyachin, B. 2009).

The movement away from what has been traditionally deemed a "feedback" model in construction safety management to that of a "feed-forward" still remains

misunderstood. Furthermore, the "feed-forward" model has been applied incorrectly. For example, an electrocution of a worker would be a lagging indicator as it has already occurred, whereas an inspection of the jobsite for hazards related to electrocution would be a leading indicator, reflecting a pre-incident measurement. Subsequently, safety management initiatives must be laser focused and built upon outcome-oriented tasks, which can be easily integrated into an already existing management structure. Equally important, workers must be involved in safety management in order for the system to function properly. This integrated safety management or programs are based on proven outcomes that work because they involve the worker in the problem-solving processes, thus allowing for an increase in safety behaviors which support a top down/bottom up approach to safety (Zohar, 1980a; Zohar, 1980b).

Need for Study

The importance of this study is in its focus on indicators that transcend decades of awareness building regarding job site safety on the part of the construction industry as well as macro-level systemic rhetoric that alludes to the need for management to have the information to employ effective and efficient proactive safety monitoring strategies, rather than relying on lagging indicators to predict workplace safety that does nothing to further the necessary safety narrative to make this a reality. As discussed, this is accomplished by examining the potential impact of the relationship between management's leadership styles and their perception of the climate of safety as well as those of the worker. While previous studies have demonstrated a strong connection between leadership styles and performance outcomes, no one in the construction industry

has taken the initiative to look specifically at the perception of both management and the worker by applying the same quantitative scales and measures (Bogdanov, 1980; Brown & Holmes, 1986; Cervo, Allen, & Dyché, 2011; Diaz & Cabrera,1997).

By examining these factors, construction safety management is taken in a new and necessary direction with the focus of finding the relationships between proactive approaches and keeping the worker safe. Owing to the multi-faceted nature of the construction industry and the polycentric construct especially found on the multi-employer worksite, research must focus on the interplay between the various entities responsible for safety.

To that end, it is important to understand the basic underpinning of The Multi-Employer Doctrine governing the construction worksite (Fonte & Griffin, 2012). It is defined as any jobsite consisting of more than one employer and as such, on these jobsites the Prime Contractor, General Contractor or any other employer or a mixture thereof can be cited for a hazardous condition that violates an OSHA standard. Under the law, “General contractors can be held liable for OSH Act violations even if they did not create or expose their own employees to the hazard” (OSHA, 2016) 29 C.F.R. §1910.12(a)). This provides in part, that “each employer shall protect the employment of each of his employees engaged in construction work by complying with the appropriated standards’" (Fonte & Griffin, para. 5).

The construction industry has not ignored worker safety, but it has relied upon outdated modes of measuring the efficacy of models of intervention, training, and an overall change across the continuum of occupational safety and health regarding primary

data sources, leading indicators, and the construction job site being systemic in nature (Jackson, 2001), leaving each part highly susceptible to influence and impact by those other parts that make up the entire system.

Research Questions

This purpose of this study is to examine the relationship between the climate of safety as it relates to leadership style. Specifically, three areas of focus are of interest: management's leadership style and perception of climate of safety; worker's perception of leadership style and the climate of safety; and the interaction between size of the workforce, the manager's leadership style, and their perception regarding the climate of safety. These research questions were:

Is there a relationship between management's leadership style and perception of climate of safety?

Is there a relationship between worker's perception of leadership style and climate of safety?

Is there a relationship between the size of the workforce, the manager's leadership style, and their perception regarding the climate of safety?

The researcher hypothesized that those leaders who engage in a more participatory leadership style will be more attuned to climate of safety when compared to autocratic leaders. He also believed that those workers who perceived their supervisors to engage in a more participatory leadership style would have a perception of a stronger climate of safety than those who ascribed to either an authoritarian or free rein style.

Furthermore, he believed that company size would impact the perception of climate of safety on the part of both the supervisor and worker.

Definition of Terms

There are several terms utilized throughout this dissertation that are important to explain.

Culture of safety. When defining a culture of safety, specifically as it pertains to the construction jobsite, it is not a single construct, but instead a top down/bottom up approach consisting of shared organizational beliefs, policies, and procedures that have been codified at the macro level. Culture of safety is the construct that ultimately shapes management and employee behavior.

Climate of safety. While a subpart of culture of safety, climate of safety is experienced at the mezzo and macro levels, as it is the means by which management operationalizes the constructs of culture of safety.

Construction safety management. Construction management in its simplest terms is a safety profession specifically targeted to address the multi-faceted issues reflected in the planning, design, and overall process at the construction work site. Those professionals in the field are charged with addressing safety policies and protocols by supplying management support and specific knowledge and proficiencies necessary to keep the worker and workplace free from unsafe acts, unsafe conditions, or a combination of both. While a set of systematic project checks and balances are utilized to manage the business side of a construction project, specifically those of cost, scope of work, quality of work, and time management, workplace and worker safety are meant to

be of equal priority and a cohesive component of all safety and health related facets of the process.

Outline of Dissertation

This dissertation is separated into six distinct chapters plus appendices. The first chapter offers a short overview of the construction industry as highly hazardous and as such, requiring further exploration, specifically regarding workplace safety and its relationship to climate of safety as seen through the lenses of management's leadership styles and perception of climate of safety at both the macro and micro levels, the research methodology, the problem statement, and the research questions.

Chapter Two provides a historical context regarding labor relations in the United States as a means of creating a better understanding of the emergence of construction safety and the role of both management and the front-line worker in keeping the jobsite free of unsafe acts, unsafe conditions, or a combination of both. Chapter Three outlines a comprehensive review of established literature on the topic and also highlights notable disparities in the breadth and scope of the research. This chapter also advances two theoretical frameworks: Marxism and Systems Theory. These theories provide a deeper insight into the important role construction management plays, the need for it to be looked at in its totality, the socio-political and economic paradigm, and finally the systemic construct operating from a top down and bottom communication loop.

To that end, Marxist ideology as a philosophical, socio-economic, and political paradigm is an amalgamation of the ideas of founders Karl Marx and Friedrich Engels. For the purposes of this research, Marxism allows for an opportunity to explore an

industry in conflict with itself as it strives to keep the worker safe while still realizing a profit. (Elling, 1989).

Equally important is that of systems theory, which is also applicable to this research. Systems theory is based on the premise that information is to be understood in the context of the totality of all the parts and not a process of segmentation (Jackson, 2001). This is especially relevant today within the construction industry as it looks at ways to integrate the whole versus the parts challenge manifested during the last century (Meadows, 2008). Chapter Four outlines the research methodology for this study. This also includes a thorough explanation of the means and methods by which the researcher performed the quantitative study, including how the data was collected and analyzed as well as any ethical issues resulting from the research. The analysis was conducted with the aid of SPSS to calculate statistical data, including both descriptive and inferential statistics. Equally important, it allowed for the analysis of inferential statistics by means of the Chi-Square and, where applicable, Cramer's *V*. The researcher also explored any statistically relevant outcomes based on the demographical information acquired as a means of verifying if this information has any bearing on leadership styles and perceived climate of safety.

Chapter Five advances the results from the surveys allowing for an understanding of the significance of my hypothesis and also discussed results in detail as they relate to the research, with Chapter six offering a broader overview of these outcomes to include any proposed limitations as well as offering recommendations for future research and the possible impact on construction safety policies.

Chapter 2: Context of Labor Movement

This research endeavored to explore the impact of leadership styles on the perceived climate of safety in the construction industry. Therefore, it was necessary to investigate from a historical perspective the interaction of labor and management in America. Understanding the past as it relates to the present conflict within the construction industry to keep the worker safe underscores that this century-old issue continues to impact the industry today.

The phenomenon of organized labor in the United States is an amalgamation of workplace safety, workplace conditions, labor laws, and socio-political paradigms. Organized unions, as well as more loosely formed federations and worker groups, have historically emerged, evolved, disagreed, and competed for a position in the marketplace against the backdrop of an ever-changing society that was constantly looking to balance profits versus safety.

While there exist variations on the theme, the majority of the research on labor's history in the United States, and the ensuing union movement, has included the concept of solidarity as a common thread. Dionne (2010) noted that the values of the emerging sense of solidarity within the workforce became increasingly alien to the American culture. Fraser and Gerstle (1990) echoed these sentiments, recognizing the enigmatic nature of labor culture in the Americas. While most industrialized nations had labor movements that reflected sponsorship by their own unique and distinct political entities, the U.S. remained a noticeable exception. In this country, labor unions acted as the

epicenter of what came to be known as the New Deal Coalition, remaining at the forefront of national politics from the 1930's well into the 1960's (Littler, 1982).

As early as 1890, scholarly literature regarding organized labor tended to place great importance on the emergence of structure within the workforce. By 1960, the social sciences had garnished a great deal of interest within academic circles. As such, a movement away from organizational structure and towards that of the lived experiences of the worker, including that of gender and race, was termed "the new labor history" (Brody, 1993, pp. 111-126).

Organized Labor and the Law

By the mid-1800's, the United States labor force was undergoing an immense change. Although the Industrial Revolution modernized the workforce, it was not until the influx of a large-scale transatlantic migration into the coastal cities created a larger population of potential laborers, which in turn allowed controllers of capital to invest in labor-intensive enterprises on a larger scale (Montgomery, 1980). Craft workers found that these changes launched them into competition with each other to a degree that they had not experienced previously, which limited their opportunities and created a substantial risk of downward mobility that had not existed prior to this time (Tomlins, 2010, p. 112).

Across the continuum of the first half of the 19th century, there was a shift in worker's rights with a common theme reflected in a newly recognized sensitivity towards that of the workforce and whether the workers would be supported in utilizing their

power collectively to obtain better working conditions, benefits, fair wages, appropriate working hours, and an overall more accommodating workplace (Bowles & Ginitis, 1976). This power, impossible to be realized on the individual level, could be obtained utilizing the construct of solidarity noted in the literature as collective bargaining power.

Therefore, prior to the history-changing decision in the case of *Commonwealth v. Hunt*, which effectively legalized the formation of unions, collective bargaining and organized labor movements had almost no power based on legal precedent and fear of legal repercussions (Nelles, 1932). The *Hunt* case changed the solidarity movement forever. The case made labor collectives legal and enabled the workforce to bind together in support of a systemic and cultural shift, specifically by recognizing the role of the worker as a part of the decision-making process regarding the work performed and the way in which tasks were operationalized. This was appropriately summarized in a statement made by economist Edwin Witte (1926), who indicated that "the doctrine that a combination to raise wages is illegal was allowed to die by common consent. No leading case was required for its overthrow" (p. 827). While *Hunt* was not the first case to recognize labor collectives and labor unions as legal entities, the case was in fact the first to do so with a sense of unrivaled clarity by creating a platform for legal precedent, allowing for arguments to be upheld by the courts in support of the creation of labor unions (Brody, 1993).

The Rise of Federations and Labor Unions

Founded in 1866, The National Labor Union (NLU) is recognized as the first national labor federation in the United States. In direct competition with the National Labor Union, the more inclusive and forward-thinking Order of Knights of St. Crispin, founded in 1867, documents more than 50,000 members by 1870, making it the largest union of its time in the country. This organization was also unique insofar as it recognized women in its membership under the auspices of Daughters of St. Crispin, which was recognized statistically as comprising 10 percent of the union's total membership by 1886 (Kessler, 2003).

These early efforts by the workforce to find strength in an organizational structure were often unsuccessful because of infighting and an inability on the part of coworkers to transcend the mindset of tradesmen. They were also unable to move forward to a more macro-level thought process, which would be categorized today as upper and middle management. While many of the early federations did not realize their organizational goals, the Knights of Labor in 1869 became the first representation of effective labor organizations to embrace a regional model of membership. The core manifesto focused on the unity and best interest of all involved in the production of goods, and the organization reflected a unique change in the focus of such groups by realizing not only laborers, but anyone who fell under the broader umbrella of producer (Cohen, 1979).

The Federation of Organized Trade and Labor Unions was established in 1881 under the direction of Samuel Gompers. Like its predecessor, it was a cooperative of

multiple unions that did not have a membership. Instead, it utilized the power of organized strikes to improve worker conditions and the uniformity of wage scales (Montgomery, 1980). Whereas this Federation made some strides in realizing favorable legislation, the degree of success in organizing and creating new unions was minimal. In 1886, an already tenuous relationship between the trade union movement and the Knights of Labor became so strained, a convention was called on December 8th of the same year, focusing on the realization that their collective power far outweighed their individual means. As such, they formed a new organization known as the American Federation of Labor (AFL) (Gildemeister, 1981).

Organized Labor Between 1900 -1920

Although the standard of living between 1900 and 1920 for the American workforce was higher in comparison to Europe during the same period, there was still social unrest. Australian historian Peter Shergold (1982) confirmed these findings in a study in which he compared wages and standard of living in Pittsburgh with Birmingham, England. His findings revealed that:

> After taking into account the cost of living (which was 65% higher in the US.), The standard of living of unskilled workers was about the same in the two cities, while skilled workers had about twice as high a standard of living. The American advantage grew over time from 1890 to 1914, and there was a heavy steady flow of skilled workers from Britain to industrial America. Skilled Americans did earn higher wages than British, yet unskilled workers did not, while Americans worked longer hours with a greater chance of injury and had fewer social services (p. 61).

Weaknesses of Organized Labor, 1920- 1929

Despite the fact that the labor movement had made great strides leading up to the 1920's, the next decade reflected a noticeable overall decline. The decline resulted in a marked decrease in union membership, as well as involvement of union members in affiliated activities. It is interesting to note that, although during this period there was economic prosperity, weak leadership within the movement and a growing prominence of anti-union beliefs on the part of employers, along with macro-level government entities, deeply undermined the union's ability to remain cohesive. One major decline was the number of workers participating in strikes. In 1919, over 4 million workers representing 21% of the workforce participated in over 36,000 strikes. By 1929, only 289,000 workers representing only 1.2% of the workforce participated in only 900 strikes (U.S. Bureau of the Census, 1976).

The 1920's were also marked by a noticeable absence of strong leadership within the labor movement. William Green, the Secretary-Treasurer of the United Mine Workers who took on the leadership role of the American Federation of Labor after the death of Samuel Gompers, was not well received. As a result, the AFL reflected a sharp decrease in membership, having less than 3 million members in 1925 after a peak of 4 million in 1920 (Wright, 2003). With this decline in the strength of union confederations, individual employers across the nation galvanized their forces in a highly successful campaign against unions which came to be known as the American Plan. The American Plan "sought to depict unions as alien to the nations individualistic spirit" (Sloane & Witney, 1997, p. 70).

Despite the aforementioned decline in the labor movement, the Great Depression breathed new life into the idea of the collective bargaining power of the worker and the ability for an organized workforce to establish a more integral role in both workplace conditions and worker safety.

Organized Labor, 1929-1955

With the crash of the stock market in October 1929, the Great Depression produced an unprecedented unemployment rate of 25% (Smith, 2006). Understandably, there was also a sharp decline in union membership, and in turn, union influence over the workplace, as the labor force simply could not afford dues. In the throes of such economic despair, one might expect the workforce to take a more radical approach to change. One such option would have been to rise up against what was deemed the capitalistic system that was oppressing them. In reality, while some workers did move toward a more radical approach (that of the Communist Party), the majority of workers did nothing, feeling an overwhelming sense of powerlessness (Smith, 2006). During this period, there was a marked increase in Communist and Socialist sentiments, organizations that strove to galvanize "unfocused neighborhood militancy into organized popular defense organizations" (Zieger, 1994, pp. 11-19).

With the passage of the Norris-LaGuardia Act of 1932, President Herbert Hoover supported this pro-union bill. His action sparked a move toward structured policies and procedures that protected against unfair court injunctions during the course of labor disputes (Cohen, 1979). The Act also recognized the need to protect both middle management as well as the front-line worker. More importantly, it signaled a systemic

change in United States public policy since collective bargaining power of workers was in direct contrast to, and sorely undermined by, the court system prior to the Act. Essentially, the judiciary did not recognize the importance of protecting the American workforce (Sloan & Witney, 1997). When President Franklin Delano Roosevelt took office on March 4, 1933, there was a sense of urgency to address the ramifications of this economic crisis and a commitment to change. This new impetus was seen in the creation and implementation of the National Industry Recovery Act, which once again undermined the importance and judicial support of the workers' right to organize under the auspices of the union (Wright, 2003). Though it did provide for worker safety, better working conditions and increased wages, the most important outcomes were the revitalization and recognition of both the need and legality to allow workers to leverage their collective strength. Specifically, it acknowledged that, "employees shall have the right to organize and bargain collectively through representative of their own choosing, and shall be free from the interference, restraint, or coercion of employers" (Smith, 2006, p.104).

The Norris-LaGuardia Act of 1932 was ultimately found unconstitutional by the Supreme Court in 1935 and was replaced by the Wagner Act. This new act played an important role in the history of the American workforce, especially at a time when the economic future of the country was in question. Furthermore, the Norris-LaGuardia Act of 1932 supported the concept of power in numbers and of recognizing a responsibility to the worker, as well as a worker's right and responsibility to play an active role in decisions being considered by the employer, which had a direct impact on workplace

safety. Specifically, it was the first time the federal government utilized its power and over-sight as a means of protecting and adjudicating employer-employee arguments and as an integral means of mitigating unlawful behavior against workers (Gildemeister, 1981).

Its core concepts fostered collective bargaining and defended the theory and practice of freedom of association. It also defined and prohibited five unfair labor practices by employers, including interfering with, restraining, or coercing employees against their rights; Interfering with the formation of a labor organization; discriminating against employees to encourage or discourage forming a union; discriminating against employees who file charges or testify; and refusing to bargain collectively with the employees' representative (Schilling, M. S., M. A. Mulford, et al. 2006) .

The AFL was not without its opposition. This was demonstrated in the creation of the Congress of Industrial Organizations (CIO) on November 9, 1939, reflecting dissent from eight international unions already belonging to the AFL. Both the CIO and AFL experienced unprecedented expansion in membership during the period of unrest among workers during the Great Depression, but did not always agree on how to meet the needs of the working class.

The contention between the two groups was often acrimonious. On September 10, 1936 in a show of power, the AFL unilaterally revoked all CIO unions, undermining the ability of the group to meet the needs of all workers in all industries. The CIO saw great change in 1938 when they made the decision to cut ties with the AFL, forming an

autonomous labor federation aptly named the Congress of Industrial Organizations. This choice reflected the CIO's central ideals regarding an effective and equitable organization of the United States labor movement. Additionally, there was an inclusive stance regarding the needs of industry-based workers.

While the AFL and the CIO were adversaries for close to two decades, with each calling for the other to disband and become part of the other, the Taft-Hartley Act of 1947 deeply undermined the CIO, with many leaders seeing the McCarthyism as invasive. This legislation can only be understood against the backdrop of the Cold War. Taft-Hartley, passed by a Republican Congress over President Truman's veto in 1947, harnessed the powerful psychological belief that a Communist influx would lead to a destabilization of the United States' national security as a justification for rolling back many of the advantages labor had gained in the 1935 Wagner Act. Most of the bill's provisions—banning closed shops, secondary strikes, and the spending of dues for political purposes, while allowing states to pass union-busting "right to work" laws—had no Cold War purpose. They represented a long-stymied pro-business Republican agenda that had suffered under FDR's New Deal administration (Bruns & Schlesinger, 1975). These anti-labor provisions caused labor leaders, and even Truman himself, to denounce Taft-Hartley as a "slave labor bill" (Holmlund, 2004) that was parlayed by Republicans as integral to national defense due to the threat engendered by the Cold War.

To that end, Taft-Hartley targeted Communists within the labor movement by demanding union officials sign affidavits asserting they were not members of the Communist Party. Any union that refused to sign lost all rights to a hearing before the

National Labor Relations Board, retracting any protection under federal law (Leebaert, 2002). The CIO's unwillingness to swear that they held no ties to the Communist Party weakened the cause and both internal and external pressures forced them on December 4, 1955 to rejoin the AFL, forming a restructured body known as the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO) (Zieger, 1994).

World War II had a dramatic impact on union membership:

> There was a marked increase from 8.7 million in 1940, to over 14.3 million in 1945, representing approximately 36% of the overall workforce. While this reincarnation of unions was of importance, of equal interest was the emergence of women factory workers. Both the AFL and CIO supported Roosevelt in 1940 and 1944 with an overwhelming 75 percent or more of their support reflected in votes, millions of dollars of support, and tens of thousands of workers (Lichtenstein, 1982, pp. 301-307).

These improvements were due in part to the fact that those spearheading the labor movement did not come from traditional families of privilege, and instead, mirrored the lives of the general population (Lich & Barron, 1978). With the passage of the Taft-Hartley Act of 1947, closed shops became illegal. This historical event is especially pertinent to this research, as it reflects recognition of the importance of contractual agreements within the arena of labor related issues. With an acknowledgment of the importance of unions, as well as an understanding of the need for nonunion entities, the Taft-Hartley Act of 1947 allowed for the emergence of a labor force that would recognize

the socio-political importance of working within a set of guidelines. These guidelines would not only potentially enhance the fiscal well-being of the employer, but also protect the worker and allow for economic advancement of the labor force collectively at both the macro and micro-levels

Recent History, Post 1960

After the 1960s, the United States experienced an expansion in the public sector, specifically in the area of labor unions. This rapid growth was due in part to secured wages and highly sought-after pensions for members. It was also marked by a decline in manufacturing and farming, manifesting in a spike of local government employment. According to the U.S. Bureau of the Census (2010), "local government employment quadrupled from 4 million workers in 1950 to 12 million in 1976 and 16.6 million in 2009" (n.p.). Yet from 2011 to the present, as a result of increased fiscal instability, the public sector, and more specifically unions, again came under heavy scrutiny as both the state and federal government tried to reduce the power and impact of unions to collectively bargain (Skocpol and Williamson, 2012).

The history of the labor market, worker conditions, unions, federations, and related institutions in the United States is well documented. As such, navigating the complexities of real world economics was inherently more multifarious than that of purely theory-based or academic modalities. Instead of simply exploring the often socio-economic and perceived needs of macro level market systems, the real-time progression and shifts of the United States labor force was manifested through an intricate and

interrelated web driven by the decisions, actions, and at times self-serving needs of market members.

Subsequently, history has shown that the impact on the labor market does not always respond immediately and as accurately as theorized due to fluctuating paradigms. These paradigms are based on an equally fluid set of motivators. Propelled by a multitude of psycho-social forces driven by an employer's desire for increased returns, history has shown that the best interest of the worker is not always a priority.

The history of labor markets in the United States reflects a systemic reality that supports the influence of market processes and of the distribution of both tangible and intangible resources on workplace safety (Norton, 2001). Often tumultuous, the United States' labor markets have shown both an ability and resiliency in response to ever emerging relationships between that of supply and demand. To that end, the labor movement has achieved great strides in recognizing the cyclical nature of the workforce as related to changes in settlement patterns within the United States (Kersten, 2006). In turn, the navigation of precarious organizational and structural fluctuations as a result of the frenetic pace imposed by technology, has led to issues impacting management ability and commitment to worker safety.

Worker Compensation

It would be impossible to explore the connection between the history of workplace safety and the ultimate creation of OSHA without also briefly discussing the impact of worker's compensation. With the rise of a recognition that workers have a right

to a safe job site, the concept for compensating those workers who were in fact injured quickly became part of discussions regarding a need to create policies and procedures as part of the overall structure for protecting the worker. Based on European best practices within the safety arena, several states in the U.S. made an effort to recognize a compensation system. While on the surface this might appear as yet another successful step towards a cohesive safety management plan of action, organized labor was not swayed and demonstrated great opposition, claiming that attention to this issue focused on reactive rather than proactive or preventative interventions. Although these ideas did not garner the support that was initially hoped for, "insurance company safety experts helped improve their client safety programs and the establishment of compensation gave the safety movement a moral boost" (Lubove, 1967, pp. 278-279).

Early Federal Action

During the infancy of workplace safety and the creation of OSHA, the federal government kept a relatively low profile. It was, however, not completely silent on issues regarding safety and health. This lack of involvement did slow the movement by undermining the real and implied importance and legitimacy of claims that worker safety needed to be a priority from the top down, and as such, to be recognized in macro-level initiatives. Of interest was the role of the U.S. Bureau of Labor Statistics, who quietly and almost invisibly began to investigate and publish detailed studies of death and disease, in what were deemed “dusty trades”, along with other health related topics. In 1910, the Bureau published a study by a labor law advocate, John B. Andrews, on the horrors of phosphorus necrosis (“phossy jaw”), a “disfiguring and sometimes fatal

disease of the jawbone suffered by workers in the white phosphorous match industry" (Doehring, 1903, p 44).

In 1913, the Federal Government took a more active role in labor relations when Congress created the Department of Labor. One of its prime directives was the improvement of working conditions. A Senate directive specifically "called on the newly appointed Secretary of Labor, William B Wilson, to report on industrial diseases and accidents" (Congressional Record Vol. 51, p. 11395, as cited in MacLaury, 1981). At Wilson's direction, the Bureau of Labor Statistics (formerly the US Bureau of Labor) began the arduous process of collecting accident statistics on a regular basis, beginning with iron and steel industries. This led to a gradual inclusion of what were deemed to be some of the more hazardous workplaces, including other areas such as construction. Wilson was unwavering in his efforts and was said to be driven by a mantra that included, "into the maw of unhealthy occupations… the thing to do is to make the unhealthy occupations healthy" (Wilson, 1914, n.p.)

With the need to balance the impact of World War I on the economy of the United States, as well as continue the momentum on the health and safety forefront, Congress created the Working Conditions Service. The service inspected war production sites, advising companies how to reduce hazards, and helped states develop and enforce safety and health standards. When the war ended, the Service was allowed to expire, but the Labor Department ordered its records "saved for the time when public and legislative opinion again shall have become focused upon the necessity for constructive organization of this character" (U.S. Department of Labor, 1919, n.p.).

OSHA: A Brief History

The construction industry can be seen as an industry in conflict with itself as a result of the actions, or lack thereof, between those dictating safety policies and protocols, that of management and those impacted directly by them, and that of the frontline worker. This was explored utilizing Marxist Theory and Systems Theory in the context of Construction Safety Management to better understand the impact on the means and methods that have been utilized to meet minimum OSHA standards. OSHA is an important construct in both theory and practice, as it is a large governmental agency and part of a larger socio-political schema with a history of being understaffed and slow to make changes. As such, it has not been in a position to keep the construction worker as safe as originally hoped across the continuum of this multi-faceted industry.

December 29, 1970, marked an important turning point in workplace safety as it was the day that President Richard Nixon signed the Williams-Steiger Occupational Safety and Health Act into law. The Act gave the Federal Government the right and authority to oversee and enforce safety and health standards for most of the country's workers. The Act came out of a long and arduous legislative tug-of-war beginning in 1968 when President Lyndon Johnson endeavored to realize similar outcomes. Much like the maturation of labor relations and the labor workforce, regulating workplace hazards reflects a tumultuous history dating back to the late 19th century (MacLaury, 1981).

In 1870, the Massachusetts Bureau of statistics of labor highlighted the need for legislation that would recognize, address, and have the means to correct unsafe acts, unsafe conditions, or a combination of both in the workplace; specifically, those related

to poor ventilation. In 1877, "Massachusetts passed the nation's first factory inspection law. It required guarding of belts, shafts, and gears, protection on elevators, and adequate fire exits" (Massachusetts Bureau of Labor Statistics, 1872, n.p.). This recognition of worker safety prompted many other states to recognize worker safety issues and put forth actions and legislation. While well intentioned, it was haphazard at best, and by 1899 some, but not all, states had established and adopted the need for factory inspections; 13 mandated machine guarding, and 21 states recognized to differing degrees the need to take into account health hazards impacting both the worksite and the individual worker.

OSHA and Labor Standards

The appointment of Frances Perkins in 1933 as Secretary of Labor marked a continued commitment by President Roosevelt to include the highest level of government in workplace safety and health policies and protocol. As part of Roosevelt's New Deal, the Federal Government took on a greater role in protecting people at the jobsite. Most specifically, the Social Security Act of 1935 made it possible for the U.S. Public Health and Service Department to fund programs related to worker and industrial health by allocating resources to state health departments. This remains relevant today, underscoring that for workers to be protected, a collaboration between the Federal, State, and local administrations must exist.

By 1960, this collaboration was recognized by the creation of Federal Occupational Safety and Health requirements that were applicable across state lines, as well as to a wide range of hazardous industries (U.S. Department of Labor, 1960). While innovative, these new initiatives and regulations did not garner overwhelming popularity.

General industry felt that because there had been no public access to hearings, employers in the labor industry as a whole had been ignored. In response, the federal government convened and, upon reflection of the public outcry, formally announced and recognized these issues. In October 1963, revisions were offered, in addition to public hearings in March 1964 (U.S. Department of Labor, 1964).

Early in 1969, the acknowledgment for the need of a more general approach to job safety and health was also addressed at the highest levels of government. In 1965, Congress enacted various laws in an effort to manifest further protection of workers. These laws included the Service Contract Act of 1965 and the Federal Construction Safety and Health Act of 1969. Both Acts offered the opportunity to fill the gaps to further protect the worker; yet, it wasn't until the Nixon Administration that the power of federal action was fully realized when the President presented his concept of a comprehensive job safety and health program to Congress in August 1969 (Wright, 2003).

The Nixon Administration proposal offered a five-person board that would set and enforce job safety and health standards. The Labor Department would be limited in inspecting workplaces. Nixon emphasized the use of existing efforts by private industry and state governments. The main federal concern would be with the health research and education and training, and only secondary with direct regulation (MacLaury, 1981).

Opposition by Labor

Nixon's movement towards greater levels of regulation regarding workplace health and safety were not supported by organized labor. In fact, unions were driven by a strong belief that specific actions must be created to deal with workplace hazards. They did not believe that this could be done under the Nixon proposal, and voiced strong concerns regarding dangers related to the handling of chemicals. There were mixed opinions. Yet out of these discussions and robust debates came comments and commentary by Irving Selikoff (1970), who reflected on the suffering of construction workers who were disproportionately impacted by fatal injuries during the application of asbestos insulation to buildings. In an effort to invigorate conversation rather than conflict, and refusing to point a finger at any one group, he posed the question, "who killed Cock Robin? No one… His has been an impersonal, technological death… We have all failed" (as cited in MacLaury, 1981).

Despite disagreements, President Nixon was finally able to sign the Occupational Safety and Health Act of 1970, creating OSHA and demonstrating the tangible benchmark of an historical movement that first found its voice in the factories of Massachusetts in the late 1800's.

Period Between 1970-2017

The early 1970s reflected a new sense of competition within heavily unionized industries. Due in part to deregulation in communications and transportation, as well as a paradigm shift leading to industrial restructuring, America was forced to face a new reality, one in which foreign goods were taking over the marketplace (Elling, 1989).

As the oligopolistic and highly regulated market structures began to fall apart, the non-union workforce became an economic necessity in some markets (Leebaert, 2002). Concession bargaining became a reality, forcing the once nearly un-wielding trade unions to offer allowances by surrendering unionized pay scales and worker conditions. This capitulation was seen as a necessary response to the Recession as a form of job security (Dionne, 2010).

Moreover, with the election of Ronald Reagan in 1980, the rise to power of an anti-union administration changed the course of union and non-union relations forever:

> Between 1975 and 1985, union membership fell by 5 million. In manufacturing, the unionized portion of the labor force dropped below 25 percent, while mining and construction, once labor's flagship industries, were decimated. By the end of the 1980s, less than 17 percent of American workers were organized, half the proportion of the early 1950's (Rosenbloom, 1998, pp. 287-288).

To that end, the Age of Reagan saw a continued collective bargaining retreat as wage-earning Americans were faced with declining living standards not experienced since the Great Depression, leaving the union movement a weakened economic and political influence on all fronts (Skocpol and Williamson, 2012).

From the end of the Reagan Era to the present, OSHA has been a major force in shaping and reshaping the labor force (Bartel & Thomas, 1985). With a focus on emergency response, President Clinton signed the Needlestick Safety and Prevention Act of 2000, directing OSHA to amend its Bloodborne Pathogens (BBP) standard and codify

industry compliance. To fully implement the new law, OSHA published updates to the Bloodborne Pathogens standard on January 18, 2001 in the Federal Register. The revisions went into effect on April 18, 2001 and focused on the obligations of employers, including additions to the exposure control and better record keeping regarding injury rates (Bunn, Pikelny, Slavin, & Paralkar, 2001).

After the attack on the World Trade Center in 2001, OSHA took on a pivotal role in safeguarding the safety and health of responders at the World Trade Center site. These attacks created a job site never experienced by the United States. Rescue workers, with the task of the search and recovery of both survivors and the deceased, faced an extraordinary number of hazards. During the extensive demolition and cleanup, "OSHA, the City of New York, labor unions, contractors, and other government agencies collaborated to ensure that no other injuries or fatalities occurred during the dangerous recovery operations" (Choudhry and Mohamed, 2007), p. 26).

On March 23, 2005, the BP Texas City refinery was the site of one of the worst industrial disasters in recent U.S. history. The resulting explosion and fire killed 15 people and injured 180. The incident alarmed the community and resulted in financial losses exceeding $1.5 billion (OSHA, 2012). After the incident, "OSHA conducted an investigation and issued 301 egregious willful violations for which BP paid a $21 million penalty" (OSHA, 2012).

An explosion in February 2008 left 14 employees dead with 39 others severely injured at the Imperial Sugar Refinery in Port Wentworth, Georgia. This catastrophic

incident engendered the third largest fine in the history of OSHA – $8.7 million – for safety violations identified at the company's facilities in Port Wentworth, Georgia and Gramercy, Louisiana (OSHA, 2009).

From 2008 to 2017, OSHA's efforts address worker safety, but as is shown since the Reagan Era, these efforts are largely from a reactive approach (Caldwell & Mays, 2012). More specifically, OSHA has addressed worker safety and has lobbied for various Acts to protect the worker, but these come after catastrophic events and a tremendous loss of human capital that no fines or penalties can ever recover (Leebaert, 2002).

Conclusion

The legacy of labor relations in America is complex. Organized labor played a significant role in shaping our society. At times, unions have obstructed the socio-economic growth of the nation, and, at other times, have supported industrious collaborations with management allowing for profitable innovation and the protection of human capital. With a history mirroring larger systemic challenges, including racism, sexism, and ageism, the labor movement is responsible for assisting immigrants, blacks, and women to gain access to the American Dream.

While seen as an impediment toward economic progress by some small businesses as a result of insistence upon rigid adherence to costly work-related guidelines, the war on wages has created better pay and benefits enabling millions of

workers to join the middle class. As a result, the history of this labor movement in America is as diverse as those it continues to represent.

Chapter 3: Literature Review

This section explores the present literature regarding the topic of safety across the continuum of the construction industry and its impact at the macro, mezzo, and micro levels. The importance of more effective means and methods related to construction safety management is not in question. Proactive approaches aimed at moving the industry forward in keeping the front-line worker safe have stagnated, and as such, construction safety management and job site safety have become a cruel oxymoron. By exploring a variety of sources on the topic, the impact of leadership styles on climate of safety were reviewed, while simultaneously highlighting key concepts including those of culture, safety, and climate of safety. Of further importance was an examination of what present literature deems as a disconnect between an extensive expanse of quantitative research on the topic, yet also a lack of reliable scales and measures that can be applied to all areas of the industry; an industry that employs many unique trades, but still must remain focused on means and methods that offer proactive solutions to ensure the worker is protected from unsafe acts, unsafe conditions, or a combination of both.

Of equal importance was the analysis of theoretical constructs, specifically those of Marxism and systems theory, to help better understand why accidents occur, and how to address the crossroads between utilizing theory to invigorate innovative and scalable safety practices. Nearly 6.5 million people work at approximately 252,000 construction sites across the United States on any given day (Occupational Health and Safety Administration, 2005). The fatal injury rate from workplace accidents for the construction industry is higher than the national average for all industries (OSHA, 2015).

Construction is a Hazardous Industry

Construction is a hazardous industry. Even if workplace injuries are not fatal, the results can be catastrophic, leaving the worker a paraplegic, quadriplegic, or manifesting various other physiological, cognitive, and psychological challenges. OSHA has identified Construction's Fatal Four, the leading causes of worker deaths on construction sites: falls, electrocution, struck by objects and caught-in-between (2015). The Bureau of Labor Statistics (BLS), in their Census of Fatal Occupational Injuries 2012, "Fatal Occupational Injuries By Industry and Event or Exposure" (OSHA, 2012), demonstrated that approximately 17 percent, were construction workers, the largest number of fatal workplace injuries nationally. In terms of the Fatal Work Injury Rate per 100,000 full-time equivalent workers, the national construction industry was 9.9, or almost three times that of the national all-worker injury rate of 3.4. (BLS, 2012).

Nationwide, as a result of the 2008 Recession having a strong impact on the construction industry, the years between 2007 and 2010 saw a steady and substantial decline in construction nonfatal lost time injuries, a decline of approximately 45%. With the Recession coming to a close beginning in 2010 and the construction industry beginning to rebound, the trend of declining lost time injuries halted between 2010-2012 with a slight increase of less than one-half of one percent (see Figure 1).

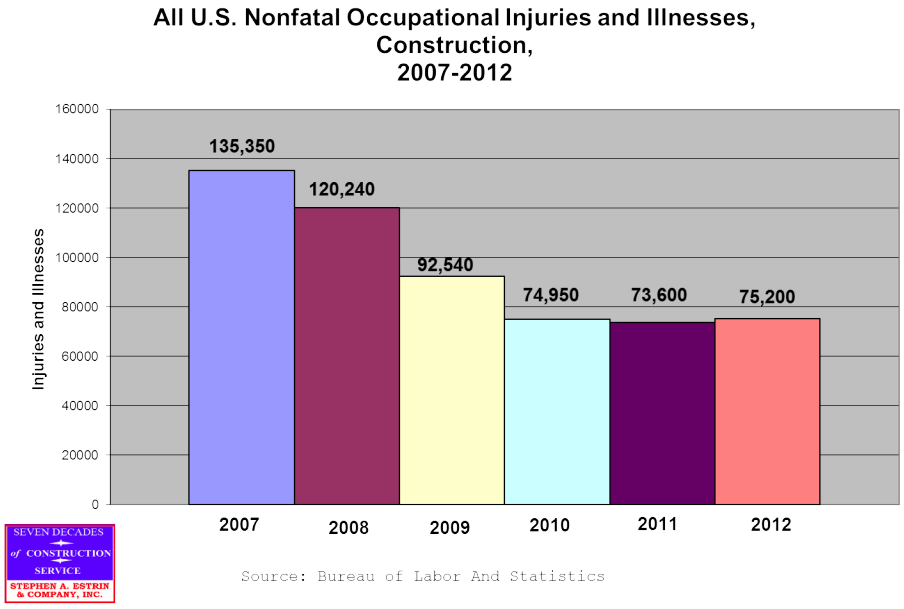

Figure 1. U.S. Nonfatal Occupational Injuries and Illnesses.

Nationwide, between 2007-2009, the construction industry experienced a major, substantial increase of nonfatal lost time injuries. However, from that year forward, the industry experienced substantial shifts in the number of these injuries. Between 2009 and 2010, a decrease of approximately 140% occurred; and between 2010 and 2012, no such similar accidents are reported to have taken place. This appears to be either a coding error or, more probably, the result of the height from which accidents occurred. Commercial buildings, warehouses, supermarkets, and box stores commonly have a roof to interior floor height of 24 feet.

A graphic representation of this trend in construction nonfatal nationwide lost time jobsite injuries involving fall through roof/fall through surface of existing opening, 26-30 feet, is shown below.

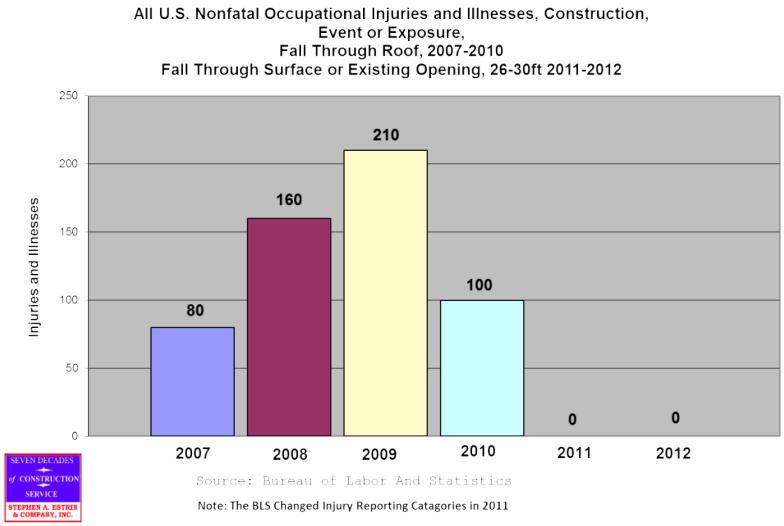

Figure 2. U.S. Nonfatal Occupational Injuries and Illnesses Construction.

To that end, although safety has been the focus of the industry, acknowledgement of the problem is not enough (Gillen, et. al., 2002). Instead, macro and mezzo level entities, specifically general contractors, sub-contractors, and safety supervisors must offer a tangible means of operationalizing policy and protocol at the executive level, so that it may be put into day-to-day practice regarding safety management (OSHA, 2015).

The concept of work or safety climate, and how workers perceive the safety climate of their workplace, was raised as an issue more than 20 years ago by Zohar (1980). At the time, it was recognized that successful injury control programs are based on strong management commitment to safety, including the status of safety officers within the organization, worker training, regular communication between management and workers, general housekeeping, and a stable workforce (Guo, Yiu, & Gonzalez, 2015). In his findings, Zohar (1980) discovered that factories reporting sustainable and successful safety programs were marked by a clear commitment on the part of

management to make safety protocol and practices a priority. This commitment was manifested in numerous ways.

Specifically, in companies realizing consistently low-accident rates, macro level management was repeatedly shown to take personal ownership in the creation, implementation and sustainability of safety policies and procedures at regular and often predetermined intervals, while the same level of commitment was noticeably lacking in companies with higher accident rate.

Safety climate, considered a subset of overall organizational climate, was one way of identifying characteristics that might distinguish between employers with high or low injury rates (Coyle, Sleeman & Adams, 1995; Zohar, 1980). Prioritizing safety is not a new concept for the construction industry, as it is accepted that workplace safety programs, when conceptualized and implemented properly, improve workplace safety. Hakkinen (1995) echoed this belief in her research on management's role in training, for example. This is further seen in the work of Chen and Jin (2012), where they showed the importance of the interplay between management and workers to address job site safety, finding that "such programs could also potentially enhance an organization's safety culture or climate" (pp. 805-817). This concept finds further support with Smith, Foklard, Tucker, and Macdonald (1998), who stated support for the belief that "the basis for acceptable safety performance is an established and robust safety management system that provides the means for controlling and monitoring performance safety" (p. 217).

Nearly two decades old, Climate of Safety still remains relevant to worker safety (Shapira & Lyachin, 2009). When first introduced into mainstream construction safety management, it was understood that successful injury control needed to be rooted in making safety a priority. This can only be accomplished when workplace safety, safety management, and safety climate are measured. Dedobbeleer and Beland (1991) specifically focused on finding ways in which to measure safety climate; they found that by converging on worker safety, incident rates could be decreased if the goal of the policies and procedures were specifically aimed at the micro/worker level. Gillen, Faucett, Beaumont, and McLoughlin (1997) showed interest in the construction industry by taking a focused look at nonfatal falls and their correlation to safety management issues. Matilla, Rantanen, and Hytinnen (1994) and Brown and Holmes (1986) also explored the effectiveness of safety climate scales with their focus on the manufacturing industry in United States. Diaz and Cabrera (1997) saw a similar need for those in construction to understand Climate of Safety as it related to overall worker safety in the area of large-scale highway construction.

Further evidence of the importance of continuing to carry out this kind of research is reflected in the work of Hinze, Hallowell, and Baud (2013), who all agreed that "accidents and injuries still occur repeatedly on sites and it appears construction safety has hit a plateau" (p 139). A new way of approaching safety management was emerging, one that addressed the multi-faceted aspects of the construction job site as the complexity of accident causation. Although accident statistics were widely used throughout the construction industry, Laitinen, Marjamäki, and Keijo (1993) state that it is almost

impossible to use accidents as a safety indicator for a single building construction site: "This is because of random variation where many sites will have no accidents, and it is not possible to determine whether these sites with zero accidents were safer than sites with accidents " (pp. 463-464).

To that end, Glendon and McKenna (1995) identified a number of reasons why accident data, or similar outcome data, were poor measures of safety performance. The main problems were that such data were insufficiently sensitive, of dubious accuracy, retrospective, and ignored risk exposure. Therefore, it makes sense that, as a result of the complexity of construction safety management and the inclusion of multiple trades and multi-organizational collaboration in the construction industry, barriers still exist systemically that impede the creation of an effective means of understanding the impact of management styles at the macro and micro levels (Lunt, Bates, Bennett, and Hopkinson, 2008).

Given the complexity of safety related issues in the construction industry and the multitude of moving parts and stakeholders associated with any single project, researchers such as Mitropoulos (2002), Abdelhamid, and Howell (2005) have suggested that a systems approach is an effective and efficient course of action when addressing improvements to the management of safety within the construction industry.

Consequently, since the construction industry is set apart from most other industries in respect to site-specific safety, research and interventions make it necessary to examine it as such. There must also be sensitivity to issues of leadership styles at the

macro-level (culture of safety), and the impact at the mezzo and micro level(s) (climate of safety) as a means of engendering a greater priority in all safety related construction research and interventions of keeping the worker safe (Rowlinson, 2004).

The Impact of Leadership Styles on Climate of Safety

This review of pertinent literature and the ensuing research specifically seeks to examine the impact that management's leadership styles has on climate of safety at the construction job site, paying close attention to the need to focus on the macro-level systems and the impact they have on micro-level outcomes. Macro-level systems research models have played a role in the creation and implementation of constructs of accident prevention for more than two decades, with one of the most widely accepted being that of the Swiss Cheese Model (SCM) developed by Reason (1997).

The Swiss Cheese Model (SCM), initially developed by James T. Reason in 1997, still offers great insight into accident prevention and causation at the macro-level and highlights the relationship and interaction between organizational policy at the highest level, that of the construction industry as a whole and the ultimate safety of the front-line worker.

As recently as 2013, research continues to be built upon the foundation of the Swiss Cheese Model. Therefore, any discussion regarding safety measures and culture and climate of safety cannot simply be based on retrospective data or lagging indicators such as fatalities, lost time accident rates and incidents. Instead, research transcends these paradigms and looks at more functional strategies that can be operationalized to assess

the degree to which organizations have the ability to properly evaluate day-to-day basis safety means and methods. The Swiss Cheese Model does just that and works collaboratively to protect the health and well-being of the construction worker. Reason (1997) offered a theory of accident causation as follows:

- Accidents involving complex systems were often the result of the grouping of multiple contributing factors.
- Contributing factors can occur in a wide range of domains from unsafe acts including organizational errors such as a lack of Culture of Safety.
- As opposed to the active errors that occur at the time of an incident, many contributing factors were in fact latent errors. These latent errors lie dormant, waiting for an active effort to turn them into a trigger for an incident.
- Human beings, lacking unlimited concentration, focus, and memory will always be at risk as a result of operational errors; therefore, properly designed systems must account for this limitation and be specifically designed to ultimately keep these errors from resulting in an actual incident/accident.

Understanding that scientific research needs to be applicable, Reason (1997) took the next step in his integrated accident causation approach, creating a highly effective infographic/visual that has come to be known and widely accepted as The Swiss Cheese Model.

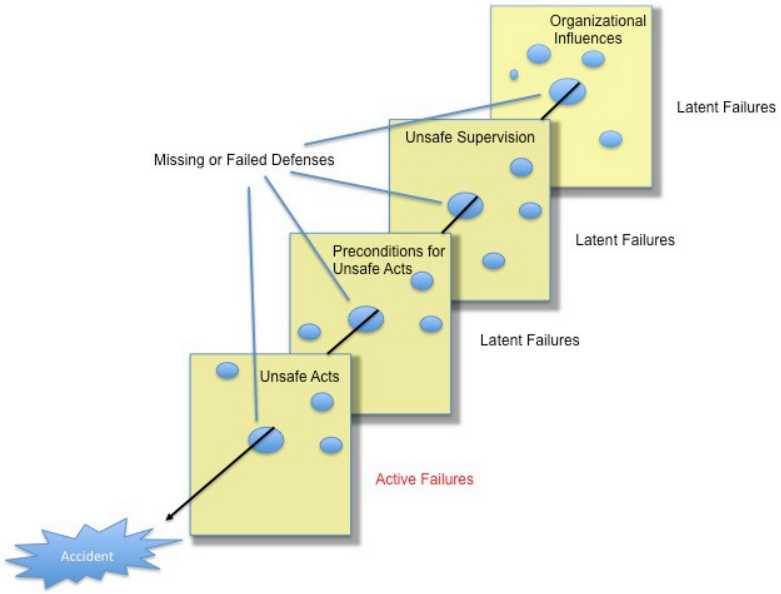

Figure 3.The Swiss Cheese Model Of Accident Causation

The figure above depicts accident causation against the backdrop of culture and climate of safety, allowing for a deeper understanding and greater perspective on the root cause of an accident. Rather than simply placing blame or pointing fingers, the Swiss Cheese Model offers user-friendly, as well as immediately visible, possibilities for not only why the accident occurred at the micro level, climate of safety, but more importantly, how the accident was allowed to occur at the macro level, culture of safety.

Instead of focusing simply on the worker, the Swiss Cheese Model demands management peel back the layers of accident causation, letting go of the historical tendency to blame the worker, using words such as “careless”, “reckless” and “stupid”; all of which were misleading as they cannot be measured and therefore have no place in either a proactive or reactive investigation/exploration of any accident. The Swiss Cheese

Model allows management the opportunity to preempt accidents, by proactively exploring any and all organizational influences that may slip through the holes that we have come to attribute literally to Swiss Cheese.

What makes this model and its contribution to construction safety so profound is the understanding that an accident is highly unlikely, if not impossible, to occur without a series of previous systemic failures, culture of safety. These failures may not be initially obvious, but they do exist. They are often dormant, and as such, demand a commitment on the part of management to sustain a level of vigilance that will allow the unseen, yet hazardous, components of a weak culture of safety to be highlighted and in turn, addressed and corrected long before an accident need occur.

This model acted as a foundation for further analysis and the development of other models, including the Human Factors Analysis Classification Model (HFACS) (Reason, 1997). Building on the foundation of accident causation, as seen in the Swiss Cheese Model where accidents were understood as no single safety act or omission, Drs. Shappell and Wiegmann (2000) furthered the work of Reason (1997) with the creation of the HFACS construct. While HFACS uses many of the same explanations for systemic failure and accident causation introduced by Reason, most notably those of organizational influences, unsafe supervision, preconditions for unsafe acts and unsafe conditions, it does not stop there. This model also realizes that information can be further categorized. This process allows for specific data to be extrapolated at each level by the inclusion of a means of identifying both overt and covert failures that exist.

To that end, systemic disconnect and ensuing failure will be realized at least once at each distinct level compromising the entire system and leading to an unfavorable event. Subsequently, during this process of system failure, if any one of these factors is corrected, the adverse event will be prevented. In its simplest terms, the HFACS contextual structure has the ability to offer safety professionals and researchers a reliable and replicable way to scientifically identify weak links in an organization's system of safety policies and protocols that engendered a specific accident. Blame becomes unimportant, as the focus of HFACS is not on individual fault, rather it is a measurement instrument to better recognize those fundamental causal factors that were supported systemically to allow for an accident to occur. (See Figure 4 below).

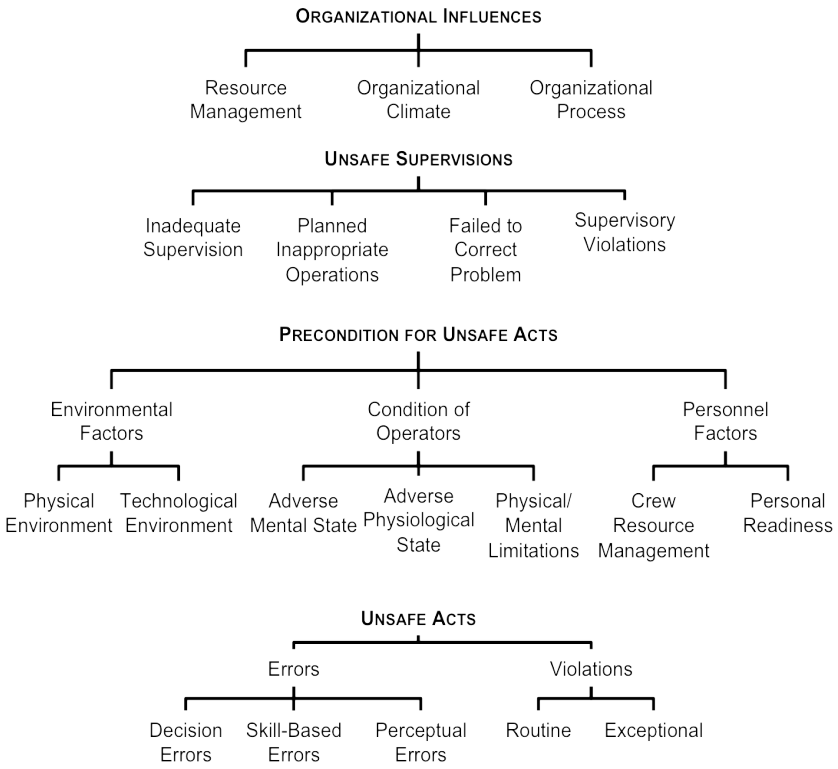

Figure 4. HFACS Model of Organizational Influences

The real power in this model is its ability to synthesize historical accident and safety data, and structure it against the backdrop of a scientific methodology. This is important, as it allows for a comparison between seemingly unrelated accidents in an effort to denote important trends in systemic failure. These trends were not only applicable across the continuum of a single industry, but within the arena of safety management as a whole. At the industry level, the application is no less powerful, as conjoint trends with an organization act as important markers that highlight where the highest levels of interventions were necessary to avoid system failure and in turn accidents. This approach is highly proactive as it looks to the past as a means of

understanding the present, with the ability to better predict the potential for accidents and take measures to decrease accident injury rates.

In utilizing the HFACS framework, organizations have a scientific method by which to recognize interruptions within a system in its entirety, rather than a single component of the system. This global perspective of accident prevention targets weak areas with laser focus, and offers data-driven solution-focused options with the sole purpose of avoiding blame and instead keeping the worker safe (Shappell & Wiegman, 2000; Celik & Cebi, 2009; Olsen & Shorrock, 2010). Therefore, the emphasis on accident prevention and causation at the macro-level highlights the relationship and interaction between organizational policy and the ultimate safety of the front-line worker.

In short, the focus of this research moves away from the individual worker and the specific accident, and instead looks at the event systemically. This type of research has emerged and appropriately deviates from a traditional and fixed explanation of accidents. It instead accepts the complexity and multi-layered reality that the system is constantly in a state of fluctuation, and as such, research and intervention must continue to address this dynamic state accordingly. Le Coze (2013) and Flin, Mearns, O'Connor, and Bryden (2000) further echoed the need for exploration and implementation of an effective leadership style as a means of creating a strong culture of safety, stating that

> In recent years there has been a movement away from safety measures purely based on retrospective data or lagging indicators such as fatalities, lost time

> accident rates and incidents, toward so called leading indicators such as safety audits or measurements of as safety climate (p. 177).

Understanding the Key Concepts

In an effort to further understand the scope of the research, this review also endeavored to explain the key concepts that were most relevant to culture and climate of safety. Cooper (2000) makes a compelling argument that defining what he refers to as the product of safety culture allows for safety culture to take on both a form and function in both an entire industry, as well as individual organizations/companies. Specifically, he notes that, "this also could help to determine the functional strategies required to developing this product, and it could provide an outcome measure to assess the degree to which organizations might or might not possess a 'good' safety culture" (Cooper, 2000, p. 115).

The reason for this literature review and ensuing research is due to the fact that exploring safety in this manner has been absent from the construction industry. Dester and Blockley (1995) agree, admitting that the construction industry is best described as one with a neglected safety culture and climate, not one that is seen as a powerful organizational systemic module with the ability to resolve conflict and disagreement; nor can it act as an agent of change with the goal of focusing on efforts to improve the reality that new safety measures cannot be fully realized until the safety culture is improved. To that end, a culture of safety is best understood as consisting of shared beliefs, practices and attitudes that exist at a workplace. Therefore, a culture of safety is the construct that ultimately shapes management and employee behaviors (Parboteeah, & Kapp, 2008).

In contrast, a climate of safety consists of "shared employee perceptions of how safety management is operationalized" (Burke, Sarpy, Tesluk & Smith-Crowne, 2002, p. 429). While a subpart of culture of safety, climate of safety is no less integral to the creation, implementation, and ongoing sustainability of an effective and efficient culture of safety. Together, both culture of safety and climate of safety can engender a safe(r) construction workplace. But where ambiguity exists between macro and mezzo level forces (management), worker safety is at risk, leading to unsafe acts and unsafe conditions or a combination of both.

The Multi-Employer Worksite

Another important concept is that of the multi-employer construction worksite. This is defined as any job site consisting of more than one employer and as such, the Prime Contractor, General Contractor or any other employer or a mixture thereof can be cited for a hazardous condition that violates an OSHA standard.

> General contractors can be held liable for OSH Act violations even if they did not create or expose their own employees to the hazard, relying on 29 C.F.R. §1910.12(a), which provides that 'each employer shall protect the employment of each of his employees engaged in construction work by complying with the appropriated standards' (Fonte & Griffin, 2012).

The multi-employer worksite holds unique challenges as the culture and climate of safety are driven not only by the prime contract, but subcontracts as well.

Contracts and subcontracts can predict and impact safety when they include a stipulation for review and approval of a mandatory construction management safety plan included in the contract (Hinze, Hallowell, & Baud, 2013). Both a review of the literature and a review of statistics published by the United States Department of Labor, Bureau of Labor Statistics for a period of one decade shows that contracts and subcontracts have not historically been used to measure safety (Guo, Yiu, & González, 2015). As such, this research explores any statistically relevant relationship between catastrophic and severe injuries based on leadership styles, with sensitivity to the role of contract/subcontract compliance (Demirkesen & Arditi, 2015).

The Need for a Proactive Approach to Safety

The construction industry is in transition and there is still far less research looking to evaluate the impact of proactive, rather than reactive, measures regarding safety management on the construction work site. Flin, Mearns, O'Connor, and Bryden (2000) offers insight, recognizing that "recent academic interest in the measurement of safety climate, has resulted in a proliferation of assessment instruments typically in the form of self-report questionnaires administered as large-scale surveys…in manufacturing and construction" (p. 179). Yet, they also recognize that these measures were not without limitations, as they were usually created by a specific entity and as such, research validity varies greatly due to inconsistencies in content, sample size, statistical analysis, and methodologies. These were all reasons for more unified measurement scales that were focused on measuring indicators such as management style and perceived climate of safety of both key decision makers, as well the frontline worker as a means of

engendering a more unified analysis. To this end, Dedobbeleer and Beland (1991) analyzed ten safety climate instruments and concluded that only two variables, that of management commitment and worker involvement, had been adequately and reliably replicated across similar research. Coyle, Sleeman, and Adams (1995) also found a high level of variance in several studies all using the same Safety Climate Scale and concluded that, "the likelihood of establishing a universal and stable set of safety climate factors was highly doubtful" (p. 253).

The Need for More Quantitative Research

One of the most pressing questions in the study of construction safety is related to the true impact of the qualitative exploration of safety climate and culture within a company, as well as the degree to which this kind of research can exclusively be considered a reliable gauge of safety performance in construction. This question was brought to the forefront by Wamuziri (2007), who believed that there was a need for research to evaluate whether it was scientifically relevant to the construction sector.

Concurrently, Guldenmund (2007) engaged in an extensive meta-analysis of qualitative research, concluding that there were a large number of qualitative factors (dimensions, scales, and facets) that comprise the culture and climate of safety expressed in weak correlations. This is in agreement with Clarke (2013), who concluded, after his own meta-analytic review, that it is unlikely that a strong relationship can be fully explored, relying exclusively on qualitative measures.

Choudhry, Fang, and Mohamed (2007) suggest that although development of a positive safety culture can be an effective tool for improving safety, measurement of safety performance remains problematic. In turn, they advocate for a multi-faceted paradigm involving proactive approaches such as hazard identification and observation, rooted in a quantifiable percentage of safety policies, protocols, and behaviors.

Hence, there exists a significant need in the absence of reliable research to effectively explore and assess construction safety quantitatively and more specifically. Also important is to explore is the impact of management's leadership style on climate of safety in an effort to not only understand, but to produce tangible and proactive solutions. These solutions will decrease both fatal and nonfatal catastrophic injuries in the industry (Shapira & Lyachin, 2009; Hapira & Simcha, 2009).

William Thomson, best known as Lord Kelvin, recognized as early as the mid-Nineteenth Century the importance of quantitative research, stating that "if you cannot measure it, you cannot improve it" (Cervo, Allen, & Dyché, 2011. p. 127). Later, Hammer (1989) hypothesized that one of the greatest obstacles facing the execution of safety management was the intrinsic challenge of the reliability of measuring it. Kartam and Bouz (1998) voiced the same concern, focusing on the reality that if you cannot measure safety, then you certainly cannot manage it. To that end, the researcher endeavored to utilize quantitative data, offering the construction industry a reliable means by which to measure and improve culture and climate of safety.

The Application of Theory to Construction Safety

Applicable theoretical frameworks were explored to further support and gain insight into the challenges facing workplace safety. These included Marxism and Systems Theory, recognizing that worker health and safety have remained linked to both economic benchmarks as well as construction safety management means and methods.

Highly structured capitalist societies such as the United States created entities that were ostensibly meant to protect the worker. Most notably is the creation, implementation, and sustainability of OSHA; yet Elling (1989) captures the dichotomy of this endeavor explaining that, at the intermediate level, the agents of expropriation function in favor of the capitalist class in an effort to alienate the working and peasant classes from the surplus value which they produce (labor theory of value). These include: the multinational and other concentrations of capital in competition for the highest rate of profit; nation states and their state powers (legal, military, clandestine force, and work inspectorates such as OSHA – the Occupational Safety and Health Administration in the U.S.A.) which attempt to assure favorable conditions for what Marx termed general capital (not necessarily any particular firm, but capital in general); and a dynamic cultural hegemony which, if successful, encourages workers and peasants to cooperate in their own exploitation (p.1173).

To that end, it is necessary to explore the connection between construction workplace safety and Marxist ideology. As a philosophical, socio-economic, and political paradigm, Karl Marx and Friedrich Engels saw the latter portion of the Nineteenth

Century as a time not only wrought with social discontent, but also an opportunity to explore conflict and violence. This was an attempt to formulate a theoretical construct promulgated on the scientific pragmatism and rooted in the idea that imbalances in power and control between different classes will lead to conflict between those who were dominated and the parties and forces that keep them from realizing freedom and equality.

Marx and Engels looked to analyze and understand the experience of the subjugated working class and the opportunity for self-emancipation. Communism, the phenomenon of class struggle, and more specifically, the movement away from the obstacles created by opposing interests and towards that of public ownership, offers further support for the present interplay and interdependence between upper and middle management among the construction workforce that emerges as conflict when accidents occur.

The belief that history could be analyzed scientifically was also of great importance to Marx's ideologies. They were recognized in his theory of Historical Materialism or the Materialist Conception of History. This theory was based on the model of Dialectical Materialism, an amalgamation of Hegel's theory of Dialectics, giving substance to history rather than keeping it in the realm of idealism or spirituality. This concept gives further credence to proposed research within the field of construction safety management, as it is important to move from an idealistic approach to work safety to that of a concrete and action-oriented plan that clearly outlines policies and procedures, reflecting a top-down, bottom-up information loop.

Equally relevant is Marxism's acknowledgement of both a cultural and institutionalized superstructure that supports the transition from one stage of socio-political and ultimately economic transformation to another. This would take place when discontent is replaced by upheaval and violence and as the dominant class is displaced by the development, implementation, and acceptance of new modes of thought and actions by a new emerging class based on newly established political ideologies (Burns, 2002).

This focus on capital at the expense of safety is particularly relevant to a discussion of worker safety in the construction industry as there exists a history of placing production over safety. According to Marxist theory, safety is a commodity and has worth. The theory further explains that private industry can choose to disregard human capital, that of the worker, by not making safety a priority. This choice is often driven by a desire to avoid expenditures specifically focused on worker safety as a means of insulating profits. These decisions are reflected in leadership styles and perception of leadership styles, as well as climate of safety, the climate with the potential to become observable and in turn measurable in the form of unsafe acts, unsafe conditions, or a combination of both.

This sentiment of profits over people is supported by management, playing off gender roles, machismo, ethnicity, and a systemic hierarchy of power, and leadership that encourages the worker without proper access to information regarding safety. This leaves them with a false sense of security. In turn, Marx's elite class would include the General Contractors, Site Safety Managers, Foremen and anyone directly charged with worker safety; they would also oversee protecting the capitol. This capitol can manifest as

information, education, and traditional profits. There is a misguided belief that it is more cost-effective to address safety based on perceived worker carelessness, risk takers, or accident-prone laborers rather than supporting the systemic nature of construction safety management (Elling, 1989).

This revenue-centric focus, rooted in traditional Marxist Theory, is still pervasive today, as construction contracts reward early completion of tasks and often impose high monetary sanctions on not meeting project deadlines. As a result, safety is greatly undermined to protect profits.

Beyond Traditional Marxism

If the relevance of Marxism in a discussion of Construction Safety Management is to be explored, specifically the impact of Marxist constructs on the front-line worker, it is also important to highlight the reality that options do exist. While Marxism is rooted in the belief that worker exploitation leads to conflict between worker and manager, it does not fully take into account the potential for worker cooperatives, which would allow for labor to have a vested interest in the well-being of the company. This top-down bottom-up approach is especially relevant to any discussion of worker safety.

While it might be argued that the idea of worker cooperatives is outside the scope of this research, it is believed to be pertinent as it offers a lens through which to not only better understand Marxism, but also the potential for opportunities that support Marx's belief that industry should be publicly held. It was also felt that industry should protect human capital while allowing for the continued development of the necessary economic

health of a company. This protection was particularly important in construction, where profit can be driven by unpredictable economic margins and indicators that were dictated by unforeseen forces such as weather, availability of a skilled workforce, and fluctuating indirect and direct costs of building materials.

Although the integral synergy still exists, the capital-labor paradigm becomes more complex when seen through a worker cooperative capitalistic/Marxist lens. Yet the basic components deemed integral by Marx remain the same, as "workers sell their labor power to capital which appropriates the surplus values through the activities of management" (Egan, 1990, p.71).

Also of importance is an understanding of the concepts of Formal Subordination and Real Subordination as it relates to Marxism. Since neo-classical views on the labor force support the concept that labor is a commodity, the inherent implication is that the relationship between management and the worker must be comprised of purely opposing goals and objectives. Therefore, the theoretical construct that the workforce is disposable and can be reestablished for each new project must be recognized (Gintis, 1976, p. 44). This belief for the need for an adversarial relationship between workers and management, although flawed, is in concert with similar beliefs in the construction industry. More appropriate is a recognition that the construction worker, Marx's labor, is multi-faceted, not only representing the individual worker, but the power of that individual's work including his or her ability to work and collaborate with others to increase productivity. This reality must be recognized for its multiplicities as it supports the marketplace but is

consumed and controlled both within and separate from the market/workplace (Marx, 1930, Chap. 6 Vol. 1; Gintis, 1976, pp. 36 -37).

Therefore, the Marxist paradigm is an appropriate means of expressing not only the potential of an employer's control over the worker, but specifically in the construction industry, the modalities asserted by Marx regarding domination of the organization and subordination of the worker can be used as an expression of the potential for effective Construction Safety Management and a strong culture and climate of safety. The construction worksite, with the General Contractor in the seat of power, dictates that which governs both the labor force and the labor process (Stark 1978; Bowles & Ginitis 1976, p. 42). This need not be a purely dichotomous construct, as management and workers can and should work together to keep the construction worksite as safe as possible, given the realities of such a hazardous industry.

To that end, a more traditional Marxist view is most appropriate when exploring the role of management and its impact on worker safety in the construction industry. Beyond the power of the purse, Marxism is as much about a much larger continuum of power and control as it is with control that management can execute and delegate work tasks that supersede organizational culture, including policies, procedures, manifestos, and even OSHA standards, and still justify and protect capital.

This concept can be further expanded upon to include access to information and education, as both are resources; as such, by withholding training and information under the auspices of a worker's "Right to Know", akin to the capitalist principles of "trade

secrets", the worker is placed secondary to profits (Epstein, 1979). This philosophy of construction safety management simply does not work, and when explained through the lens of Marxist Theory, is neither an effective nor efficient means of keeping the worker safe.

Systems Theory

Systems Theory is also applicable to this research. It is based on the premise that information is to be understood in the context of the totality of all the parts and not a process of segmentation. This is especially relevant today with the whole vs. the parts challenge that manifested during the last century into so-called systems theory (Bogdanov, 1922; von Bertalanffy, 1968; Laszlo, 1996; Meadows, 2008). Interdisciplinary in its construct, systems theory is highly adaptable as it can be applied not only to systemic occurrences found in nature, but can also be used to explain challenges that arise in various other spheres including those frameworks that comprise the psychological as well as socio-economic continuum of the workplace.

At its core, a systems approach is built upon the belief that the focus must move from the part of the whole towards a unified and interactive understanding of phenomena, where the individual components are obscured by the more important correlation between them (Checkland, 1997; Weinberg, 2001; Jackson, 2001; Luhmann, 1990).

The systemic framework, when understood as a unit that can be observed and therefore measured (Ng, Maull, and Yip, 2009), is an especially relevant aspect of the proposed research as it explores interactions and relationships between the parts of the

entire system with a realization that the construction industry, as well as the individual job site, must be seen as components of both the conflict and the solution. As such, this allows for the understanding of how the system, the construction industry, as well as the construction job site, is ordered, allowing for the ability to quantify safety outcomes.

While the central concept of the theory is one which is focused on exchanges, these interactions must be further understood and categorized as open, closed, and isolated in their nature (Mele, Pels, & Polese, 2010). In an open system, the exchange of information energy and/or human capital exists as a result of the ability to interact and therefore be impacted externally by the environment. In a closed system, the exchange differs insofar as information remains within the system, whereas an insulated system is so far removed and inaccessible that energy has no opportunity to make contact or interact with any other forces reflecting 100% autonomy (Boulding, 1956; Katz & Kahn, 1978). The construction job site is a continuum, and as such must be seen as passing through all three stages. Yet when it becomes closed or isolated for too long communication breaks down and worker safety is at risk (Checkland, 1997).

To that end, these theories, in combination with the existing literature and critiques of said literature, act as both the foundation and explanation for construction safety. This is all done from a culture and conflict evaluation, offering the opportunity for exploration, in addition to an intact, yet limited body of research regarding the construction industry, which is an industry in transition and in conflict with itself.

Chapter 4: Methods

Research Method

The research method that was used was a quantitative approach comparing management leadership styles on climate of safety. The reason these variables were chosen was to reflect macro-level decisions (leadership styles) as well as micro-level outcomes (climate of safety) on the parts of key stakeholders as well as the worker who is involved in the actual tasks and as such, is most directly impacted by any unsafe acts, unsafe conditions, or a combination of both.

Data was collected using an anonymous electronic survey sent out by the National Demolition Association (NDA) as well as *Construction Today* Magazine in an effort to capture the greatest sample size of both management and the front-line worker. Two surveys were chosen. The first was that of the Leadership Questionnaire as created by Zohar (1980) because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, focusing on the importance of safety held by each group.

The second survey was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong, and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration

of a relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker, collectively giving greater insight into the top-down, bottom-up approach to construction safety management.

Respondents were able to log in anonymously via the link to the online server and complete the survey. The survey was the same for all respondents and should have taken approximately 15-20 minutes to complete.

The two surveys utilized by the researcher have been adapted only to reflect proper noun-verb agreement. They remained exactly the same in both form and content and the changes were merely to adhere to standard and accepted grammar. Specifically, this is reflected in the appropriate use of pronouns for the Manager and Worker Surveys where the manager was asked " I " statements and where necessary and when evaluating his or her manager, the worker was asked about the manager in "he/she" and "his/her" statements that do not deviate from the content of the question. These are noted and reflected in the attached surveys in both the instructions as well as the body of the research tool.

Both the NDA and *Construction Today* Magazine received a template letter/flyer to send out to their general membership as well as links to the survey that can be distributed. These organizations were asked to send out the survey in the form of web-

based mail to their opt-in members, as well as via their opt-in online newsletter to subscribers, all of whom hold managerial or worker status in the construction industry.

The NDA is member driven and includes a membership fee; *Construction Today* is subscription based. This is important as it shows interest and motivation on the part of those who join to utilize important industry information offered as well as share their own insights and feedback regularly via similar requests to complete surveys by both organizations throughout the year. Since safety has been identified as an important topic by both organizations, and due to the concise and user-friendly nature of the surveys, the researcher expected completion of the surveys within a timely manner.

In each case, when the survey was sent out, the individual link for management vs. workers was clearly indicated so that the proper group utilized the appropriate link. Respondents were then able to click the link anonymously via the link to the online sever and complete the survey. Adhering to good and accepted research guidelines and practices, no protected health information (PHI) was included in any of the surveys, so a Web Link Collector (WLC) was utilized in an effort to capture a larger audience by giving respondents the ability to forward the survey via a unique link to any individual(s) they believed fit the requirement. Furthermore, for added protection SSL encryption was utilized, as it improved security by encrypting surveys and survey results.

As noted, a (WLC) was included in the electronic survey. When the respondent forwarded the link, the recipient only received a blank copy of the survey and did not

have access to the sender's answers. This helped to ensure that when forwarded, the recipient was not intentionally or unintentionally influenced by the sender's responses.

Research Questions

Research Question One (RQ1): Is there a relationship between management's leadership style and climate of safety?

- ***Null hypothesis (H_o1):*** There is no relationship between participatory leadership style and the climate of safety.
- ***Alternate hypothesis (H_1):*** Managers who adopt a more inclusive and participatory leadership styles are more likely to rank higher on the climate of safety.
- ***Null hypothesis (H_o2):*** There is no relationship between autocratic leadership style and the climate of safety.
- ***Alternate hypothesis (H_2):*** Managers who adopt a more autocratic leadership styles were less likely to rank higher on the climate of safety.
- ***Null hypothesis (H_o3):*** There is no relationship between free rein leadership style and the climate of safety.
- ***Alternate hypothesis (H_2):*** Compared to their counterparts, managers who adopt more free rein leadership styles were neither less likely nor more likely to prioritize the climate of safety.

Research Question Two (RQ2): Is there a relationship between worker's perception of leadership style and the climate of safety?

- ***Null hypothesis (H_o4):*** There is no relationship between worker's perception of participatory leadership style and their perception regarding the climate of safety.
- ***Alternate hypothesis (H_4):*** Workers who perceive their managers as participatory are more likely to prioritize the climate of safety.
- ***Null hypothesis (H_o5):*** There is no relationship between worker's perception of autocratic leadership style and their perception regarding the climate of safety.
- ***Alternate hypothesis (H_5):*** Workers who perceive managers as autocratic are less likely to perceive their safety as being a workplace priority.
- ***Null hypothesis (H_o6):*** There is no relationship between worker's perception of free rein leadership style and their perception regarding the climate of safety.
- ***Alternate hypothesis (H_6):*** Workers who perceive managers to free rein are less likely to perceive their safety as being a workplace priority.

Research Question 3 (RQ2): Is there a relationship between the size of the workforce, the manager's leadership style, and their perception regarding the climate of safety?

- ***Null hypothesis (H_o7):*** There is no relationship between the size of the workforce, the manager's leadership style, and their perception regarding the climate of safety.

- ***Alternate hypothesis (H_7):*** Leaders who manage a small team and who ascribe to a participatory style of leadership are more likely to score high regarding the climate of safety when compared to autocratic leaders with a large sized workforce.

Surveys

The first two versions of the survey for this study, one created for management and one for the worker, are constructed in three parts. Part One was created by the researcher and is comprised of 11 questions used to capture necessary demographical information. The categories utilized are consistent with those used by the Bureau of Labor Statistics for collecting similar data across all industries in the United States. Part Two consists of 13 questions asking for the manager to rate his or her leadership style.

The same questions, with changes made only to noun-verb agreement, are also used with respondents in the worker category, asking them to rate the leadership style of the highest-level manager with whom they have contact with at least once a week. The questions for both groups involve leadership styles described by three styles: 1) Autocratic, 2) Participatory, and 3) Free Rein as these are consistent with the research methodology found to be most effective by the creators (Jung, Jeong, & Mills, 2014) and equally applicable by the researcher for this study. Part Three asks respondents in both

samples to circle or check the answer that most represents how strongly they feel about a specific statement. Again, only the noun-verb agreement has been adjusted to apply to management and the worker, having no bearing on the content of the question.

The techniques utilized by all forms of this survey are conveyed by answers in the form of fill-in-the-blank or Likert-type scales. Since Part One endeavors to capture necessary demographical information, it also implements, to a very limited degree, the use of open-ended/fill-in-the-blank questions in which the participants were be expected to type a response:

1. What is your highest educational level?
    a. Rationale: This is the first out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: Did Not Complete High School, High School/GED, Some College, Bachelor's Degree, Master's Degree, Advanced Graduate Work, or PhD.
2. What is your degree? (Check all that apply)
    a. Rationale: This is the second out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: Other, Engineering, Construction, Architecture, Construction Safety Management, and None of the Above.

3. What is your current Union Affiliation?

    a. Rationale: This is the third out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: Yes or No.

4. How many years have you worked in the construction industry?

    a. Rationale: This is the fourth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Participant enters the answer manually.

5. How many years have you worked in your present trade?

    a. Rationale: This is the fifth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Participants enters the answers manually.

6. Have you ever taken a leadership program?

    a. Rationale: This is the sixth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: Yes or No.

7. What is your Age?

    a. Rationale: This is the seventh out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Participants input the answers.

8. What is your Race?

    a. Rationale: This is the eighth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: White/Caucasian, Hispanic or Latino, Other, Asian, American Indian or Alaskan, and Black or African American.

9. What is your Gender?

    a. Rationale: This is the ninth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Answers include: Male or Female.

10. What Region of the country do you work in most often?

    a. Rationale: This is the tenth out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United

States Bureau of Labor Statistic's classifications for collecting industry data. Respondent enters the figures manually.

11. What size company do you work for most often?

    a. Rationale: This is the eleventh out of eleven questions chosen for this survey to capture necessary demographical information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. Respondent enters the figures manually.

12. Leadership style can be described into three styles: 1) Autocratic, 2) Participatory, and 3) Free Rein. When answering the questions below please rate YOUR PERSONAL leadership style. For the worker, it read: Leadership style can be described by three styles: 1) Autocratic, 2) Participatory, and 3) Free Rein. When answering the questions below please rate the leadership style of the highest-level Supervisor you have contact with at least once a week. Based on leadership styles above, please check, from your perspective, the appropriate leadership style in decision-making for position worked below.

    a. Rationale: This question was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between

leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey used a multiple-choice format. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

13. When making decisions in a team-working environment, I act in the following ways: Make sure the majority rules.

    a. Rationale: This question was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

14. When making decision in a team-working environment, I act in the following ways: Persuade others to do things my way.

    a. Rationale: This question is the second of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong, and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

15. When making decisions in a team-working environment, I act in the following ways: Tell others what to do.

    a. Rationale: This question is the third of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and

implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

16. When making decisions in a team-working environment, I act in the following ways: Turn decision over to others.

    a. Rationale: This question is the fourth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The

answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

17. When making decisions in a team-working environment, I act in the following ways: Share my own ideas.

    a. Rationale: This question is the fifth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

18. When making decisions in a team-working environment, I act in the following ways: Suggest a decision to others.

    a. Rationale: his question is the sixth of twelve questions and was chosen to measure preferred leadership styles by construction safety management

professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

19. When making decisions in a team-working environment, I act in the following ways: Rely on my own judgment.

    a. Rationale: This question is the seventh of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of

leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

20. When making decisions in a team-working environment, I act in the following ways: Participate just like any other person.

    a. Rationale: This question is the eighth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

21. When making decisions in a team-working environment, I act in the following ways: Make my own decision.

a. Rationale: This question is the ninth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

22. When making decisions in a team-working environment, I act in the following ways: Provide resources to others.

a. Rationale: This question is the tenth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership

preference on the overall efficacy when utilized, as well as offers a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

23. When making decisions in a team-working environment, I act in the following ways: Ask others to brainstorm choices.

    a. Rationale: This question is the eleventh of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

24. When making decisions in a team-working environment, I act in the following ways: Gather others' feedback before deciding.

    a. Rationale: This question is the twelfth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014) it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

25. When making decision in a team-working environment, I act in the following ways: Refer to contracts for direction.

    a. Rationale: This question is the twelfth of twelve questions and was chosen to measure preferred leadership styles by construction safety management professionals and integrate these choices with the perception of management's leadership style by the worker. First created and

implemented by Jung, Jeong and Mills (2014) it reflects the interdisciplinary and multifaceted character of the construction jobsite and as such, allows for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker collectively. This portion of the survey uses a Likert-type scale. The answers were responded to as follows: Never, Rarely, Sometimes, Always, and Often.

26. Safety Climate focuses on the day-to-day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: React quickly to solve the problem when told about safety hazards.

    a. Rationale: This is the first question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

27. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Insist on thorough and regular safety audits and inspections.

a. Rationale: This is the second question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

28. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Try to continually improve safety levels in each department.

a. Rationale: This is the third question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

29. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Provide all the equipment needed to do the job safely.

   a. Rationale: This is the fourth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

30. Safety Climate focuses on the day-to-day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Strict about working safely when work falls behind schedule.

   a. Rationale: This is the fifth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

31. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Quickly correct any safety hazard (even if it's costly).

a. Rationale: This is the sixth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

32. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Provide detailed safety reports to workers (e.g., injuries, near accidents).

    a. Rationale: This is the seventh question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

33. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Considers a worker's safety behavior when moving–promoting people.

a. Rationale: This is the eighth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

34. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Require each manager to help improve safety in his/her department.

    a. Rationale: This is the ninth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

35. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Invest a lot of time and money in safety training for workers.

a. Rationale: This is the tenth question out of sixteen questions chosen for this survey created by Zohar (1980) because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

36. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Use any available information to improve existing safety rules.

    a. Rationale: This is the eleventh question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

37. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Listen carefully to workers' ideas about improving safety.

a. Rationale: This is the twelfth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers; thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

38. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Consider safety when setting production speed and schedules.

    a. Rationale: This is the thirteenth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

39. Safety Climate focuses on the day-to-day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Provide workers with a lot of information on safety issues.

   a. Rationale: This is the fourteenth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

40. Safety Climate focuses on the day-to-day interaction between policies, procedures, and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety: Regularly holds safety-awareness events (e.g., presentations, ceremonies).

   a. Rationale: This is the fifteenth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

41. Safety Climate focuses on the day-to- day interaction between policies, procedures, and workers. Please rate your personal perception on the level of

priority of each as it relates to job site safety: Give safety personnel the power they need to do their job.

a. Rationale: This is the sixteenth question out of sixteen questions chosen for this survey created by Zohar (1980), because of its ability to measure both real and perceived levels of organizational safety on the part of management as well as workers, thereby focusing on the importance of safety held by each group. The answers were responded to as follows: Not A Priority, Low Priority, Medium Priority, High Priority, and Essential.

Participants

The sample population for this research included data for individuals in the private construction industry of all sizes across the entire United States. While the data may not be reflective of all fifty states, the sample of between 75 and 150 respondents reflects the Northern, Southern, Eastern, and Western regions of the country, including Puerto Rico and the District of Columbia. This sample population was comprised of adults 18 years of age or older, and as well as the following socio-economic statuses: Education, employment, inclusion in a leadership program of any kind, age, race, gender, and region of the country where they work in the construction industry most frequently. The aim of utilizing this group was to have the ability to effectively generalize results from the sample to better apply the results to the general construction industry (Babbie, 1990; Creswell, 2009).

Materials

Two instruments were utilized for this research. These research instruments captured data of the sample populations in the form of an online survey. The survey was in English only, and asked respondents to answer questions that were nearly identical, albeit with changes in noun-verb agreement to make the questions understandable and grammatically correct when applied to a sample of management vs. construction workers. To that end, only those respondents who were literate in English and had access to Internet and computers, tablets, or smart phones could participate and be included in this study.

Each survey consisted of a part one created by the researcher, and comprised 11 questions that collected demographic information consistent with the United States Bureau of Labor Statistic's classifications for collecting industry data. The first survey was chosen to measure preferred leadership styles by construction safety management professionals and workers and integrated these choices with the perception of management's leadership style by the worker. First created and implemented by Jung, Jeong and Mills (2014), it reflected the interdisciplinary and multifaceted character of the construction jobsite. It allowed for an exploration of the relationship between leadership preference on the overall efficacy when utilized, as well as offering a better understanding regarding the perceived and real perception of leadership expectations of both the manager and the frontline worker. Collectively, greater insight into the top-down, bottom-up approach to construction safety management was provided.

The second survey, created by Zohar (1980), was chosen because of its ability to measure both real and perceived levels of organizational safety, on the part of management as well as workers. It focused on the importance of safety held by each group.

Design and Procedure

This research utilized a quantitative methodology. The focus of the study was to examine the correlation between management's leadership styles and the impact on climate of safety, as this has the most far-reaching influence on worker safety. This was accomplished by examining macro, mezzo and micro-level constructs of leadership styles as well as perceived climate of safety as a means of measuring from a top-down and bottom-up approach.

The researcher endeavored to study and create a reliable measurement tool to gauge the level of construction safety on the jobsite. This was accomplished by moving beyond the traditional lagging indicators, which support reactive safety policy and protocols, and focusing on leadership styles of those charged with keeping the worker safe. Additionally, this study was concerned with a more comprehensive understanding regarding the perceived leadership style by the worker, focusing on whom he or she identifies to be in charge of their day-to-day safety, leading to a deeper understanding of each group's perception of safety climate at their construction jobsite.

The quantitative analysis regarding accident causation, or more specifically, the means and methods by which it is prioritized and operationalized, allowed for new insights into the way in which macro, mezzo, and micro-level entities in the construction

industry integrate both individual and group epistemological assumptions of leadership, leadership styles, safety and ultimately safety climate in an effort to keep the construction job site free of unsafe acts, unsafe conditions, or a combination of both.

Research Design

The intention of the surveys was to collectively gain greater insight into the macro-level issues related to construction safety management, how management perceives their role, and to further define the impact these forces have on the frontline worker.

Each survey had 11 demographic variables as a means of classifying respondents into various groupings. This delineation also helped to recognize if there were any unexpected or unforeseen statistical correlations among the variables, which included level of education, degree, union affiliation, years in the industry, years worked in present trade, inclusion in a leadership training course, age, race, gender, and region of the country worked.

The study further investigated the impact of particular variables and the resulting impact these variables had on the ability to manage effectively in an extremely hazardous industry such as construction. Systemically, it also allowed for the ability to gauge any differences in the perception of the macro and micro level entities of management and worker, regarding perceptions of leadership style and climate of safety. Subsequently, this research was also a barometer for safety mindfulness and responsiveness.

Leadership styles and perceived climate of safety were measured as a means of investigating the potential quantitative correlation between a specific leadership style and

climate of safety on the construction jobsite. While concrete leadership styles were scientifically evaluated, equally important was the measurement of both management's and workers' perception of safety, which reflects the systemic nature of the industry and the inherent potential, when strong, to keep the worker safe, and when undermined, put him or her at greater risk of injury.

Strategy and Measurement

The analysis was conducted with SPSS, which calculated statistical data. Equally important, it allowed for the analysis of inferential statistics (cross tabulation and correlation). The researcher also explored any statistically relevant outcomes based on the demographic information acquired. This provided a means of verifying if this information had any bearing on leadership styles and perceived climate of safety.

An analysis of variance (ANOVA) was utilized to further determine and measure the influence of leadership style as described by management, leadership of management as seen by the worker, and perceived climate of safety as described by both groups respectively.

Chapter 5: Results

This research utilized quantitative methods by means of a twenty-eight-question survey. This tool gathered general demographic information as well as more specific characteristics from respondents, including the perception of the general importance of the construction contract, specific perception of the importance the construction contract gives regarding safety, level of education, any specific degrees held, union affiliation (e.g. union versus non-union), overall years worked in the construction industry, number of years working in present trade, involvement in any leadership program(s), the state in which he/she presently works, size of company (number of employees), years worked in the construction industry and years worked in present trade.

Perception of leadership style on the part of both workers and managers was measured by utilizing a fourteen-question quiz, the *Survey of Construction Managerial Leadership Styles,* designed by Younghan Jung and Thomas H. Mills (2014) and an adapted sixteen-question *Safety Climate Scale* originally designed by Dov Zohar (1980) to measure perception of climate of safety.

Descriptive Statistics

Current U.S. State of Residence. The goal of all instruments was to acquire a sample of 150 total respondents equal to, or greater than, 75 managers and 75 workers, all of whom would reflect anonymous participants from the fifty United States, including Washington D.C. and Puerto Rico, with a minimum requirement of 150 total respondents for statistical significance. The survey was launched online, utilizing the help of the National Demolition Association (NDA) and *Construction Today* Magazine (CTM) to

gain further amplification and access by the industry. Respondents were further urged to share the survey link with professional peers appropriate for this study via email and social media platforms. A total of 530 participants took the survey, 314 managers and 203 workers completed it in its entirety totaling 513, with 17 incompletes. This tool demonstrates geographical representation with the sample reflecting states 48 of the 50 contiguous states, excluding responses from Montana and New Mexico, as well as Washington, D.C. and Puerto Rico. The state with the highest number of respondents was California (62), followed by Florida (36) and Texas (32). The other states represented a range of 1 to 28 regarding participation: Alabama (11), Alaska (1), Arizona (11), Arkansas (4), Colorado (11), Connecticut (5), Delaware (2), Georgia (22), Hawaii (3), Idaho (4), Illinois (19), Indiana (10), Iowa (6), Kansas (5), Kentucky (10), Louisiana (9), Maine (3), Maryland (4), Massachusetts (15), Michigan (18), Minnesota (12), Mississippi (4), Missouri (8), Nebraska (3), Nevada (3), New Hampshire (1), New Jersey (11), New York (28), North Carolina (18), Ohio (18), Oklahoma (2), Oregon (8), Pennsylvania (20), Rhode Island (5), South Carolina (4), South Dakota (2), Tennessee (9), Utah (6), Vermont (1), Virginia (7), Washington (9), West Virginia (1), Wisconsin (9), Wyoming (1). (See Figure 5 below).

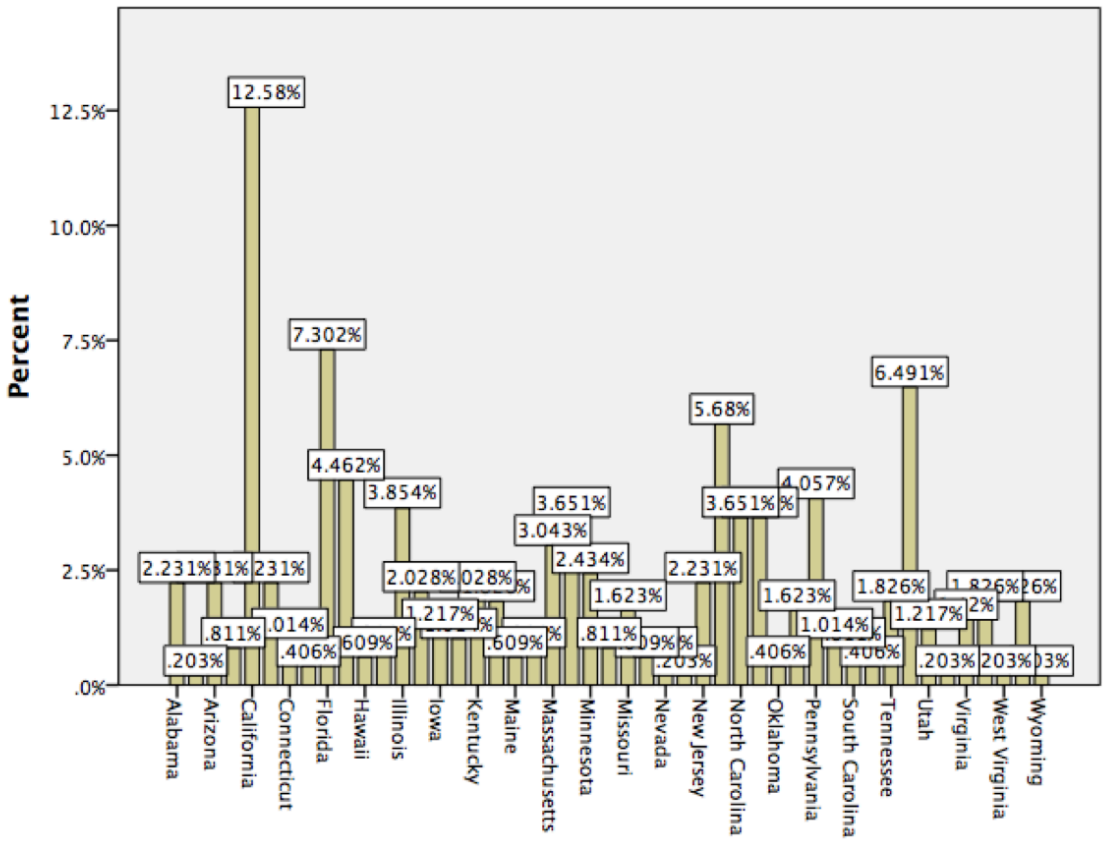

Figure 5.U.S. state of residence of participants.

Gender. The respondents had two choices regarding gender, Male or Female. A total of 504 participants responded to this question, with 26 choosing not to answer; of the 504 who did respond, 71.43 percent identified as male with the remaining 28.57 percent identifying as female. (See Figure 6 below).

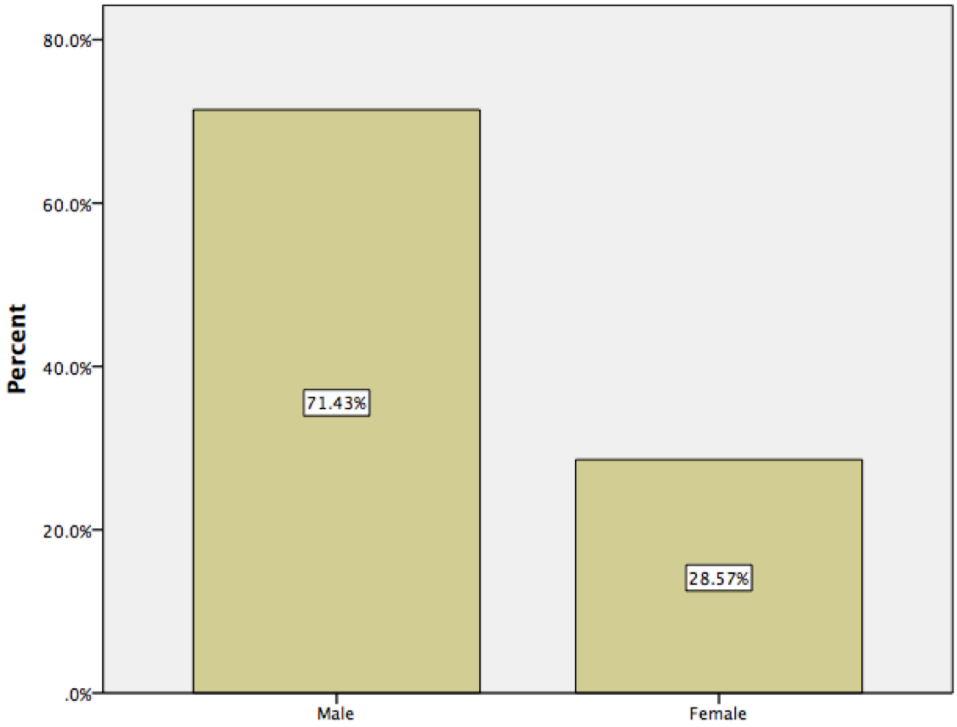

Figure 6.Gender of participants.

Age. The survey participants had to manually enter age, a distinction that is noteworthy when compared with the use of a range, often associated with other instruments. A total of 511 participants responded with 19 choosing to decline to answer. The associated histogram reflects the mean age of respondents as (*M*=36.51) with a standard deviation of 10.30. (See Figure 7 below).

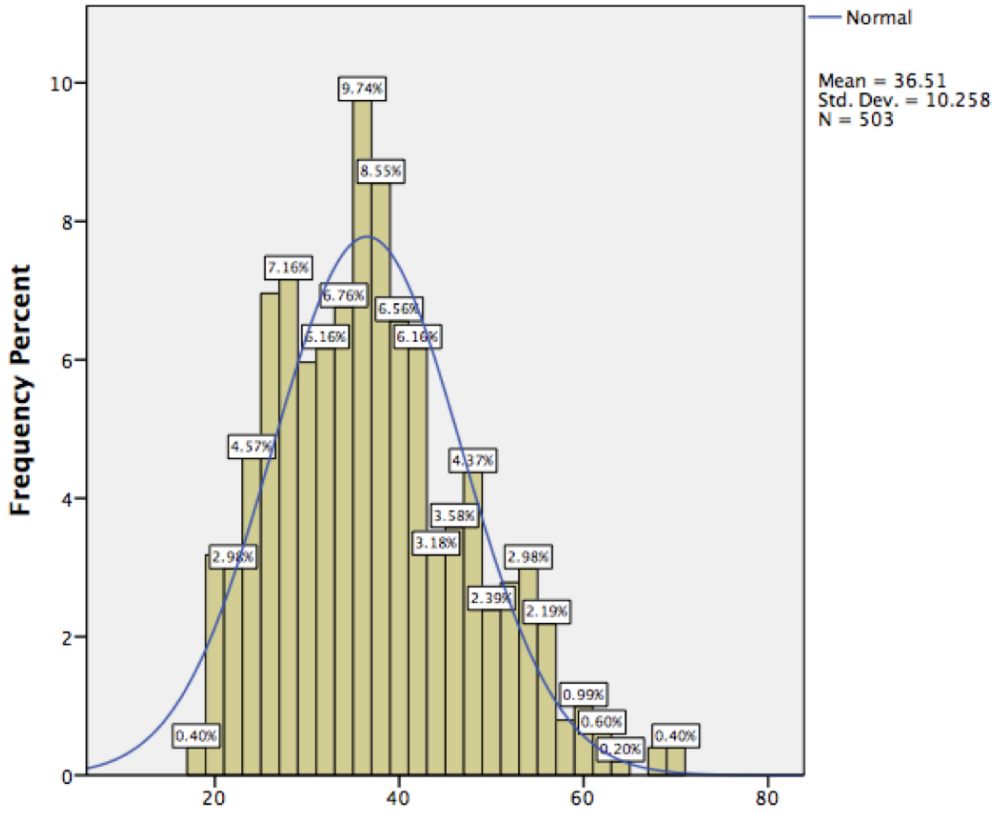

Figure 7.Distribution of participants' ages.

Race. The diversity of race and/or ethnicity in the construction industry has historically been reflected in its work force and on the jobsite. Subsequently, this survey endeavored to mirror this multiplicity, understanding that individual workers and managers may identify themselves utilizing more traditional categories, while others may feel more comfortable with self-created or emerging classifications. For this reason, this question was created to have both fixed responses including a choice for "other" as a means of capturing a response rather than risking losing the participant's response. The selections included: White/Caucasian, Hispanic or Latino, Asian, American Indian or Alaska Native, Black or African American and Other. There were 504 respondents who answered with 26 choosing to not to respond. Those who responded reflected the

following results, with 69.8 percent identifying as White/Caucasian, 10.8 percent Hispanic or Latino, 2.5 percent as Asian, .80 percent American Indian or Alaska Native 8.3 percent Black or African American and 3.0 percent as "Other." (See Figure 8 below).

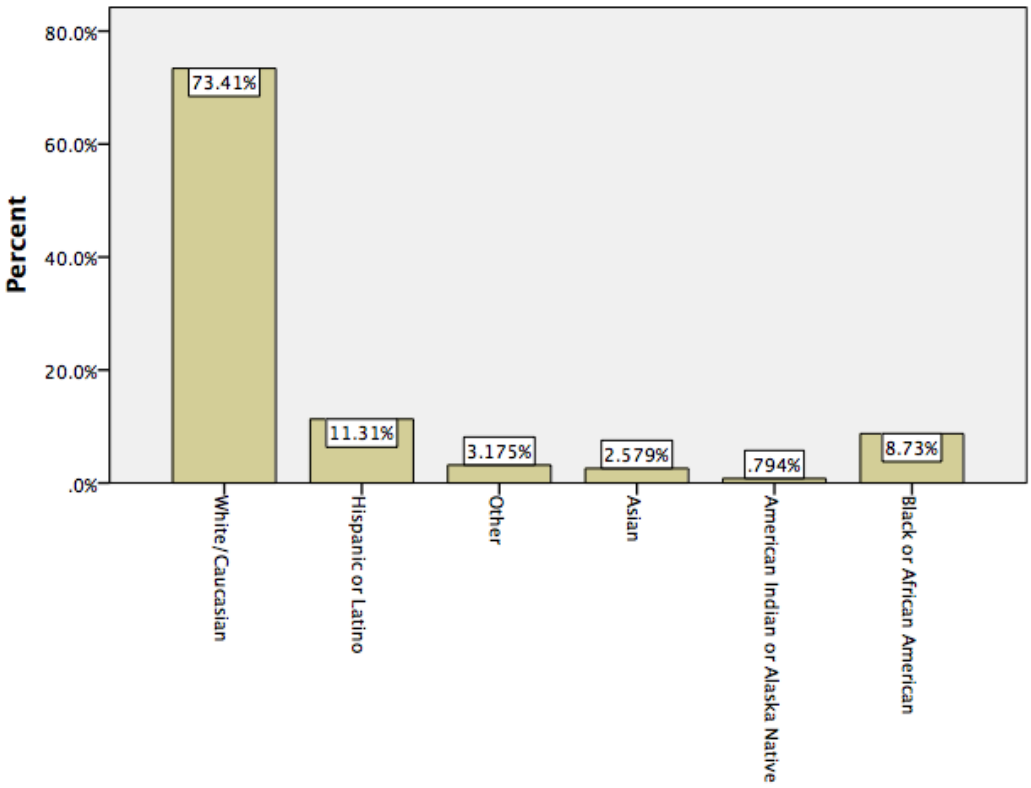

Figure 8. Distribution of participants' race/ethnicity

Years working in the construction industry. In a continued effort to collect the most comprehensive data to best understand the sample, respondents were asked how long they had worked cumulatively in the construction industry. The question was open-ended, allowing the respondents to manually enter a numerical value. The associated histogram reflects the mean age of respondents as (*M*=11.59) with a standard deviation of 8.24. There were 511 respondents who answered this question and 19 who chose not to

respond. The greatest number of years in the industry was (10) at 10.2 percent followed by (15) at 9.8 percent and (20) at 8.8 percent with the other. (See Figure 9 below).

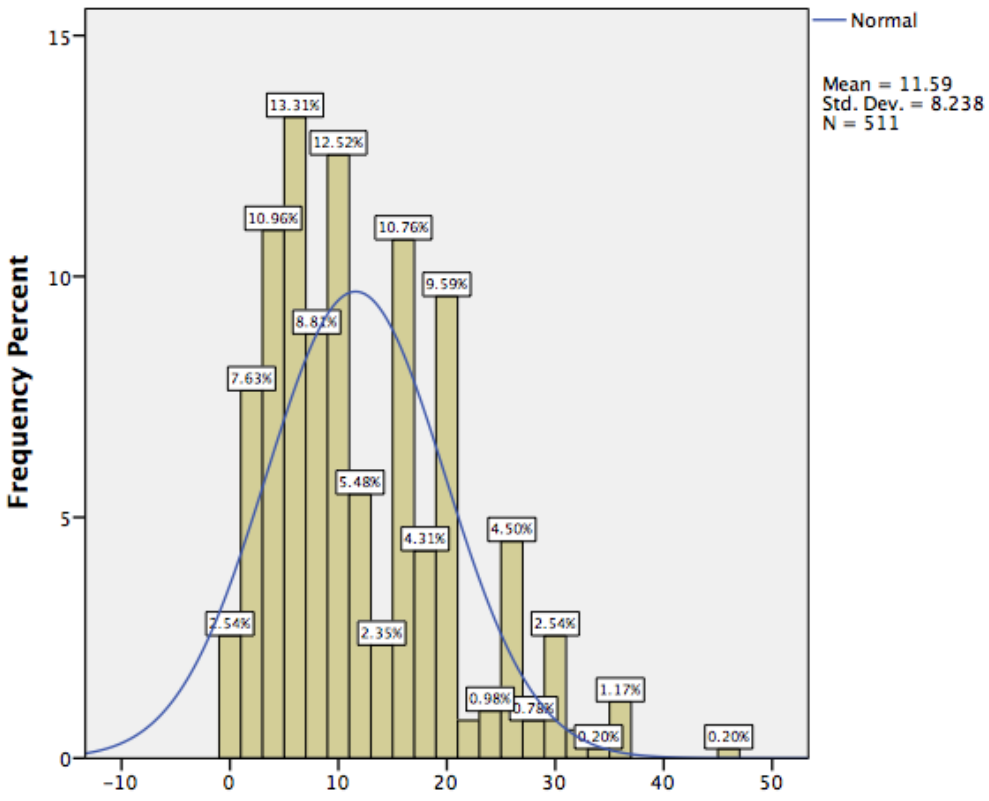

Figure 9.Years working in the construction industry.

Years working in present trade. Recognizing that as in any industry workers often have a multiplicity of skills, this question asked respondents to focus on the area/trade in which they were working in the construction industry at the time they took the survey. The associated histogram reflects a mean age of respondents as (*M*=10.15) with a standard deviation of 7.80. There were 506 respondents who answered the question and 24 who chose not to answer. The question was open-ended, allowing the respondents to manually enter a numerical value. The greatest number of years working

in their present trade was (11) at 11.3 percent followed by (5) at 9.1 percent and (15) at 7.5 percent. (See Figure 10 below).

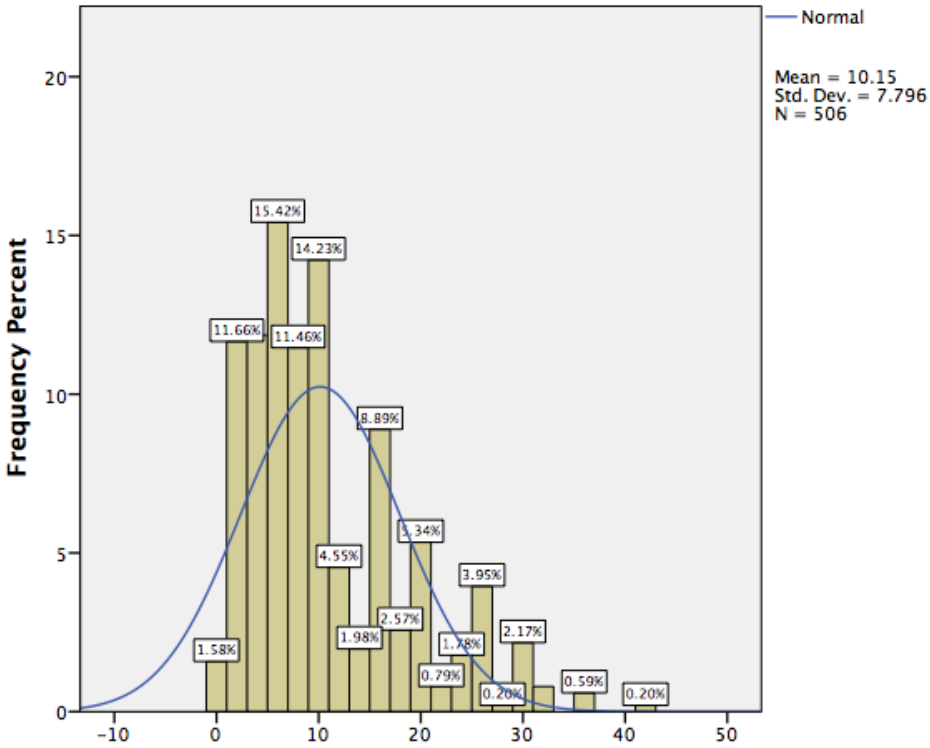

Figure 10. Years working in present trade.

Education level. In this portion, the survey respondents were asked to designate their highest level of completed education. The question was constructed offering the following selections: Did not complete High School, High School/GED, Some college, Bachelor's degree, Master's degree, Advanced graduate work or PhD. There were 511 respondents with 19 choosing not to answer. Those who responded reflected the following results: 2.136 percent of the participants did not complete High School, 26.99 percent indicated completing High School or obtaining a GED, 34.37 percent had some college, 24.08 percent a Bachelor's degree, 10.1 percent a Master's degree and 2.33

percent had been involved in Advanced graduate work or held a PhD. (See Figure 11 below).

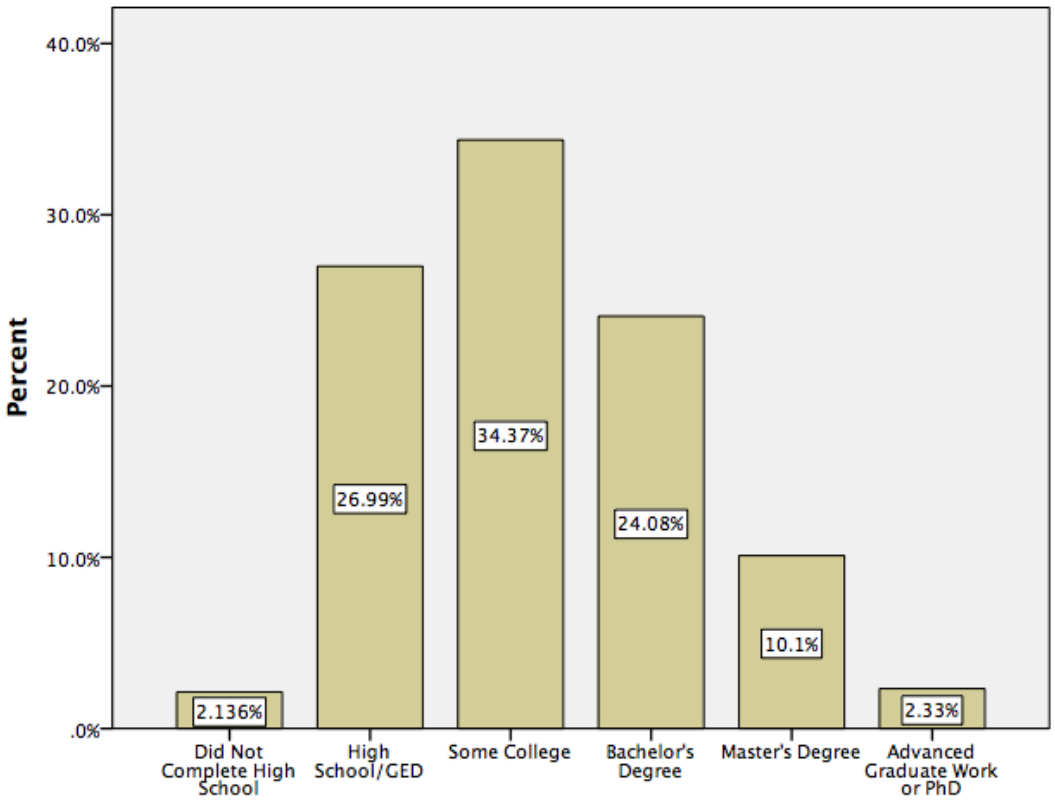

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Figure 11.Education level

Type of college degrees. Understanding that the construction industry is comprised of a multi-faceted work force, which is further reflected in an interdisciplinary cross-section of college degrees on the part workers and managers, this question aimed to gather greater specificity from those with college degrees. Therefore, it was constructed to provide both fixed and open-ended responses and allowed for multiple categories to be checked, including the option to manually add a specialized degree in the box marked

"Other". The selections were: Engineering, Construction, Architecture, Construction Safety Management, None of the above and "Other". There were 510 respondents with 20 choosing not to respond. Of those who responded, the results were: 14.31 percent reported having an Engineering degree, 31.76 percent a Construction degree, 3.53 percent a degree in Architecture, 9.02 percent Construction Safety Management, 31.76 None of the above, and 9.61 percent "Other". Those choosing the "Other" option responded with the following: Accounting, Automotive, Aviation, Bachelor of Arts, Business Management, Business, Certificated, Computer Drafting, Communications, Cook, Counter-Terrorism, CPA, Education, Elementary Education, Finance, General Contractor licensed by state, Heavy Equipment Operator, High School GED, Healthcare, HVAC, Human Biology, Industrial Design, IT Technology, Janitor, Management Medical Assistant, No, Nursing, Other, Occupational Safety and Health, Ok, On Job certification training, Paralegal Technology and Business Management, Private Investigator and Science. (See Figure 12).

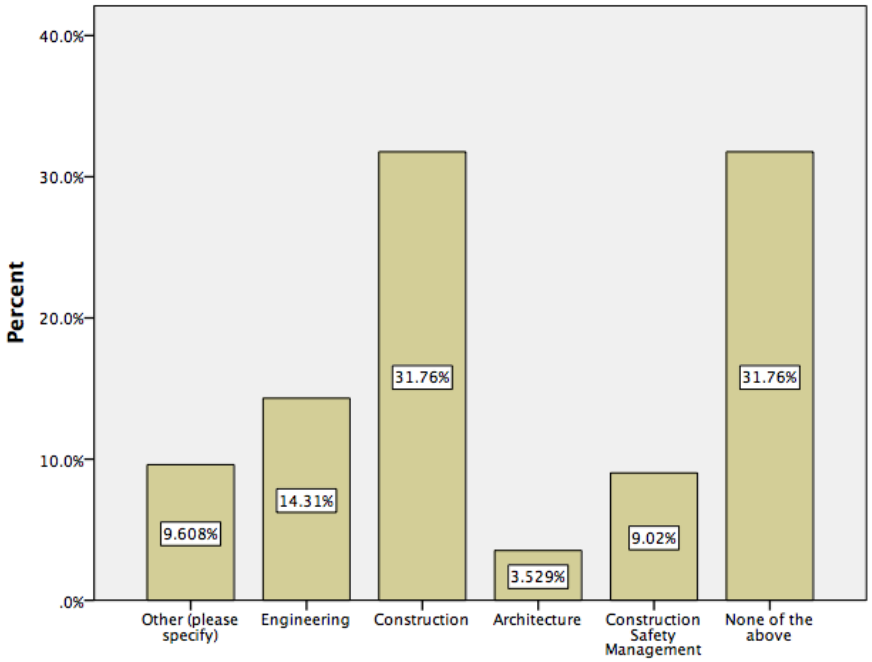


Figure 12. Specialized college degree.

Union Affiliation. The construction industry is comprised of both Union and Non-Union workers. As a result, it was important to include this question regarding union status as a means of capturing the most well-rounded profile of those who responded. The selections included: Union and Non-Union. There were 511 respondents and 19 choosing not to respond. Those who responded reflected the following results: 30.53 percent identified as Union workers and 69.47 percent as Non-Union workers. (See Figure 13 below).

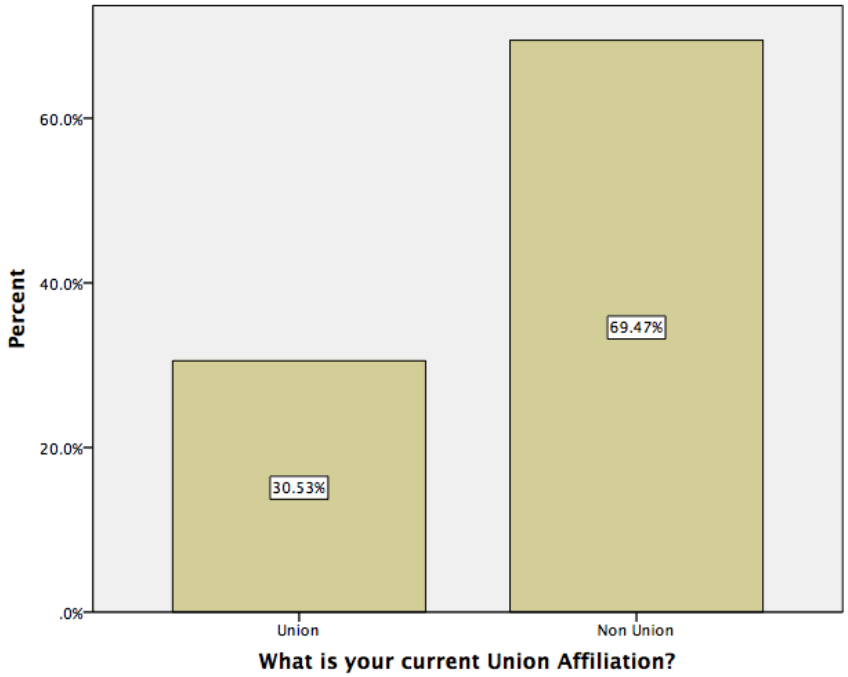


Figure 13.Union affiliation.

Size of Organization. Because the construction industry is comprised of various sized companies, this question was asked to better understand the size of the organization based on number of employees. The selections included: 1-50, 51-250, 251-500, 501-1000, 1001+. There were 504 respondents who chose to answer and 26 who did not. Those who responded reflected the following results: 47.82 percent reported working in companies with 1-50 employees, 24.40 percent with 51-250 employees, 14.48 percent with 251-500 employees, 6.94 percent with 501-1000 employees and 6.40 percent reporting 1001 or more. (See Figure 14 below).

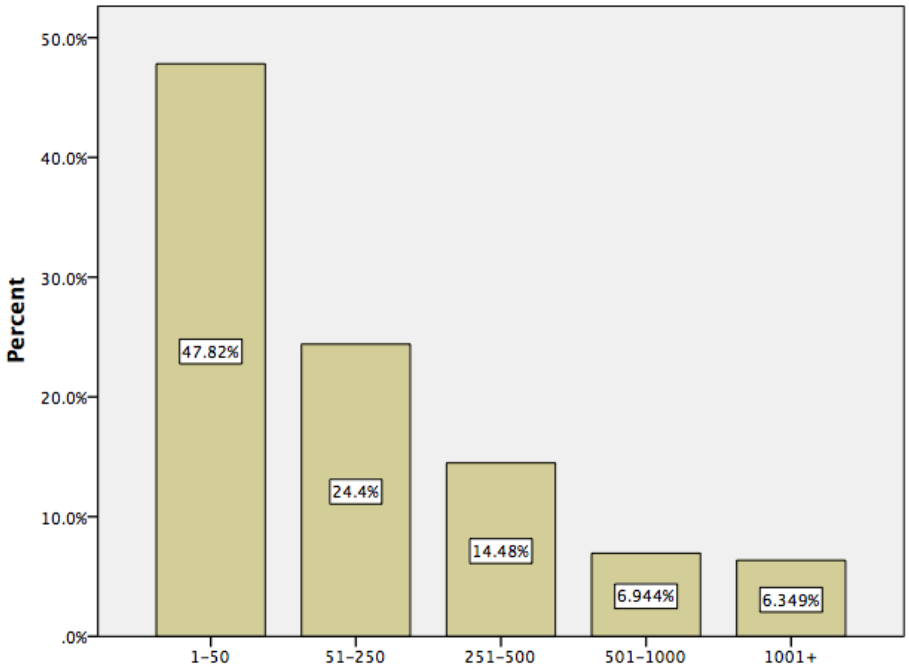


Figure 14.Size of 0rganization

Leadership Training. While not all workers will ever realize managerial/leadership roles, this question was utilized to better understand how familiar the sample of respondents was with basic leadership concepts. The selections included: yes or no. There were 513 responses with 17 individuals choosing not to respond. Those who responded indicated that 51.66 percent answered yes and 48.34 answered no. (See Figure 15).

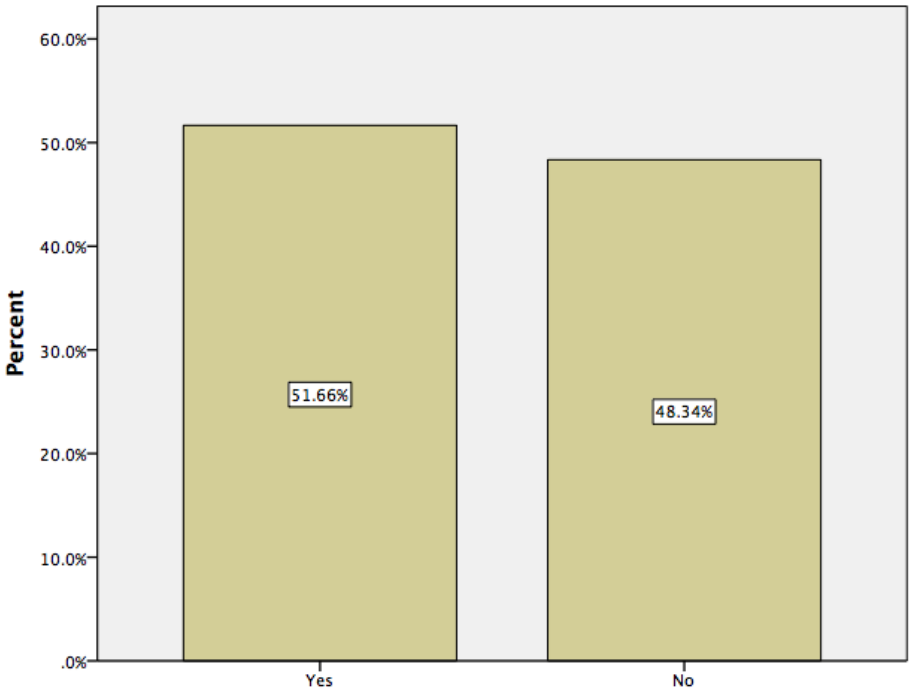


Figure 15.Leadership program

Leadership Style. Building on the desire for a deeper understanding of how those taking the survey perceived either their personal leadership style or that of their supervisor, respondents were asked to refer to an explanation of three leadership styles, specifically that of the autocratic, participatory, or free rein leadership and associated traits as outlined in the brief description accompanying the question. Given these selections: autocratic, participatory, or free rein, there were 499 responses and 31 individuals who chose not to respond. The responses showed that 25.65 percent identified with those qualities of an autocratic leader, 61.92 percent with that of a participatory leader and 12.42 percent with that of a free rein leadership style. (See Figure 16 below).

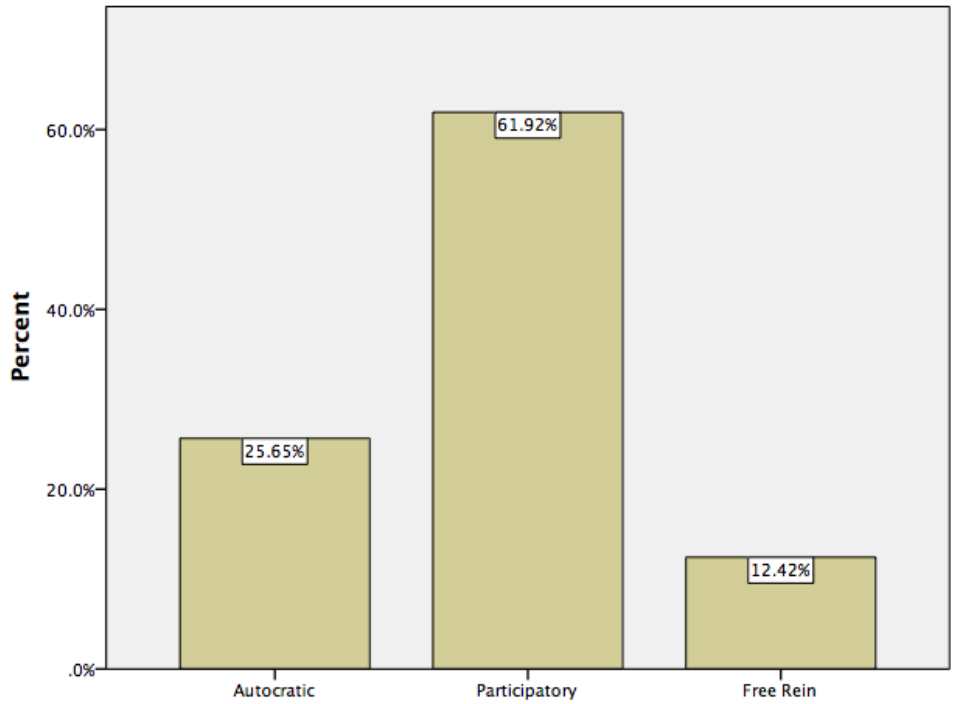


Figure 16.Perceived leadership style.

The Construction Contract. The means and methods associated with completing a construction project are reflected in the construction contract. To that end, the perception of the importance of this document is also integral in understanding the sample of respondents. This question was constructed based on the Likert model and consisted of the following selections: Not very important, Not important, Neither, Important, and Very important. There were 525 individuals in the sample who responded and 5 who did not. The responses showed that 1.33 percent deemed the construction contract as Not very important, 1.14 percent as Not important, 2.48 percent as neither, 28.95 percent as Important and 66.10 percent as Very important. (See Figure 17).

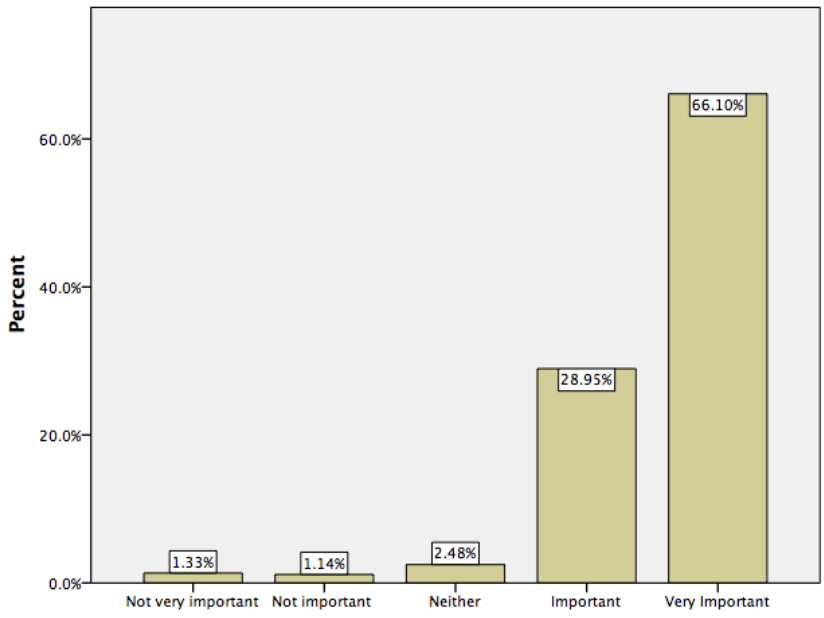


Figure 17.The construction contract.

The Construction Contract and Safety. While awareness of the contract offers insight, understanding this level of awareness, especially as it relates to safety, is yet another means of building a comprehensive profile of those who responded to the survey. This question regarding the importance of the construction contract regarding safety was constructed to do just that by utilizing the same Likert scale as that used in the prior contract question consisting of the following selections: Not very important, Not important, neither, Important and Very important. There were 524 individuals in the sample who responded and 6 who chose not to respond. These responses regarding the construction contract and safety indicated that 0.76 percent deemed it Not very important,

1.15 percent Not important, 2.10 percent as neither, 19.08 percent Important and 76.91 percent as Very important. (See Figure 18 below).

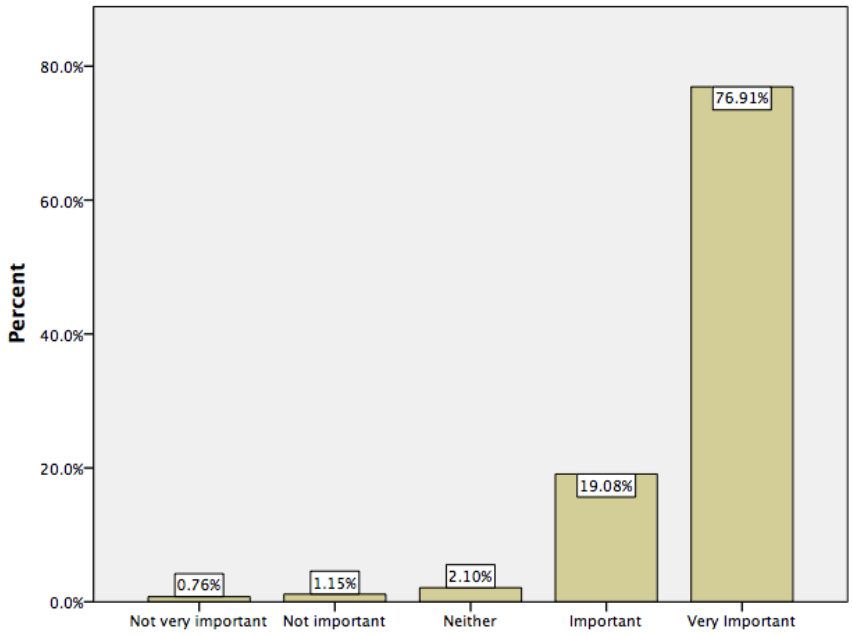


Figure 18.The construction contract and safety.

The Construction Contract: Safety Policies and Procedures. This question was posed in a continued effort to understand the extent to which the sample perceived the importance of the construction contract as a safety tool. This was achieved by constructing a yes or no question regarding awareness of the existence of safety policies, procedures, and protocols within a standard construction contract. There were 501 respondents and 29 who chose not to respond. The responses indicated that 88.62 percent answered yes to an awareness of such components in the standard construction contract with 11.38 percent responding no. (See Figure 19).

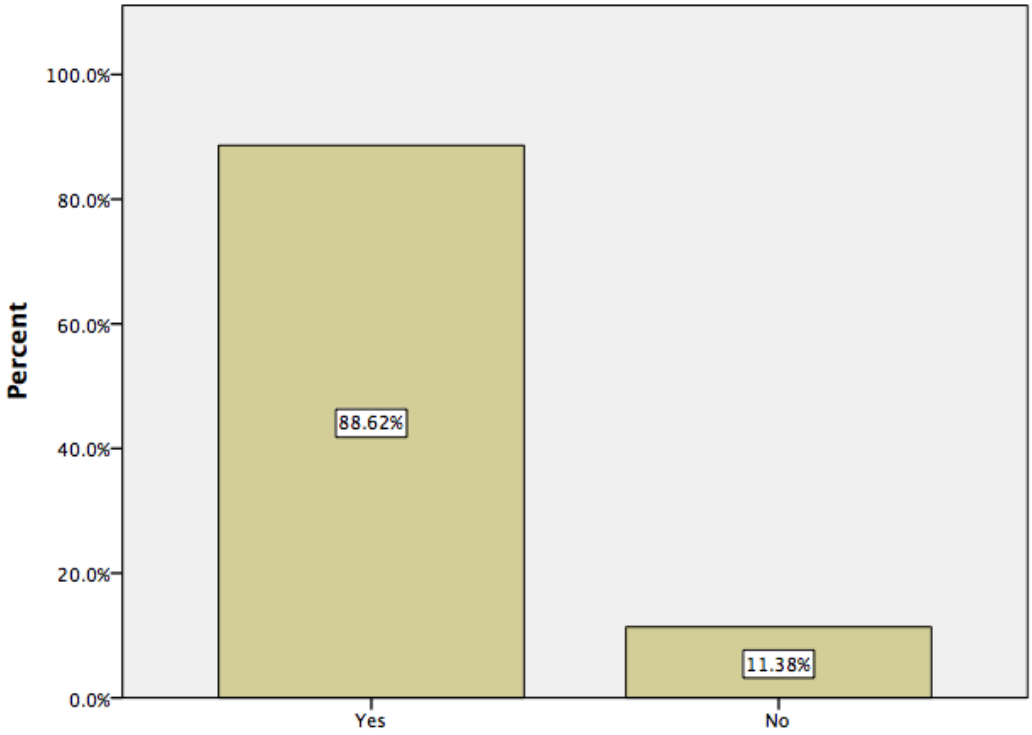
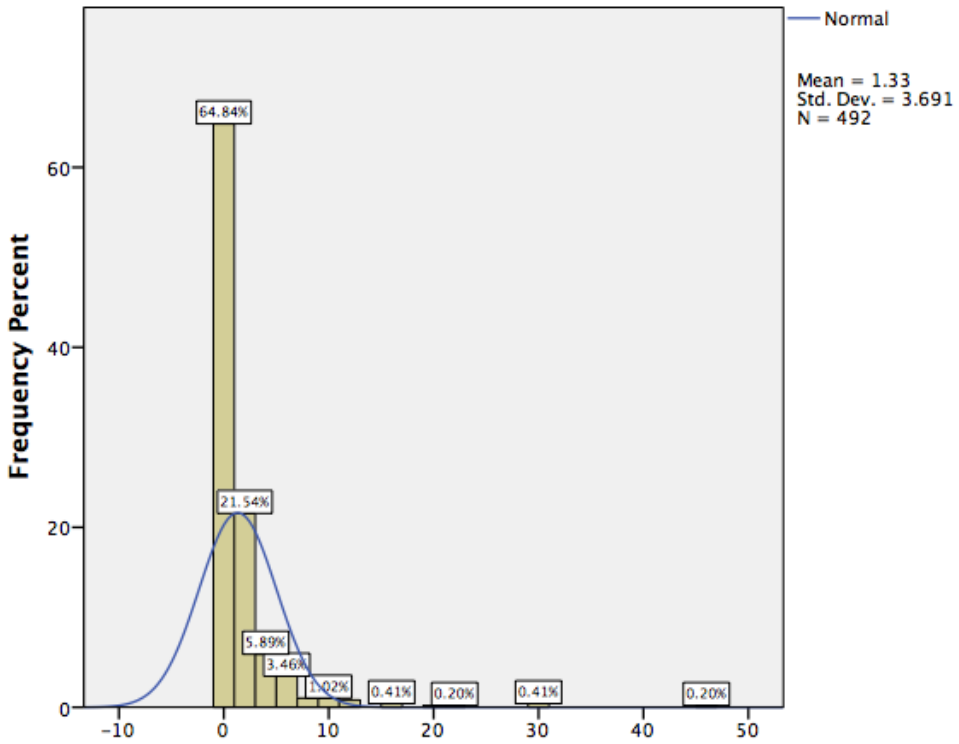


Figure 19.Awareness of safety policies and procedures

Perception of safety. The construction job site is not without hazards, and the construction contract can be used to mitigate risk of unsafe acts, unsafe conditions, or a combination of both. As such, perception of safety is an important factor in understanding those who chose to take part in this survey. Subsequently, they were asked an open-ended question allowing them to manually input a numeric value utilized to measure the number of times in the last 30 days he or she perceived feeling unsafe (on the part of worker) or received reports of feeling unsafe (on the part of the manager). The associated histogram reflects a mean of (M=1.33) with a standard deviation of 3.70. There were 492 respondents who answered the question and 38 who chose not to

respond. The greatest number regarding feeling unsafe on the jobsite was 60.2 percent reporting they never felt unsafe followed by 10.4 percent who felt unsafe one time and 9.6 percent who felt unsafe two times, 4.3 percent felt unsafe (3) times, 1.1 percent (4) times, 2.1 percent (5) times, 1.1 percent (6) times, .40 percent (7) times, .60 percent (8) times, .90 percent (10) times, .20 percent (11) times, .60 percent (12) times, .40 percent



(15) times, .20 percent (20) times, .20 percent (22) times, .40 percent (30 times) and .20 percent (45) times.

Figure 20. Perception of safety.

Managers, Workers, and the Climate of Safety

Managers by importance of the construction contract. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and the importance of construction contract. Participants were asked to rate the importance of the construction contract with answers ranging from not very important, not important, neither, important, and very important. The relationship between these variables was significant, $\chi^2(4, N=517) = 21.59$, $p<.001$. (See Figure 21 below).

Figure 21. Managers by importance of the construction contract.

Table 1

Managers by Importance of the Construction Contract

Chi-Square Tests for Manager by Importance of the Construction Contract

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	22.107[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	22.075	4	.000	.000[b]	.000	.000
Fisher's Exact Test	21.591			.000[b]	.000	.000
Linear-by-Linear Association	3.238[c]	1	.072	.081[b]	.074	.088
N of Valid Cases	517					

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is 2.36.
b. Based on 10000 sampled tables with starting seed 624387341.
c. The standardized statistic is -1.800.

A post hoc analysis was conducted to examine the relationship between managerial status and the importance of the construction contract. The Cramer's *V* was .21, suggesting a moderate association between the two variables. While both managers and workers value construction contract, 72.9% of managers viewed it as very important, compared to workers at 56.2%. Conversely, 40.4% of workers viewed the construction contract as important, compared to managers at 21.7%. As such, managers and workers differed in how they view the construction contract.

Manager's perception of the importance of the construction contract regarding safety. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and the importance of construction contract regarding safety. Participants were asked to rate the importance of the construction contract with answers ranging from not very important, not important,

neither, important, and very important. The relationship between these variables was significant, χ 2(4, N=513) = 11.89, p=.012. (See Figure 22 below).

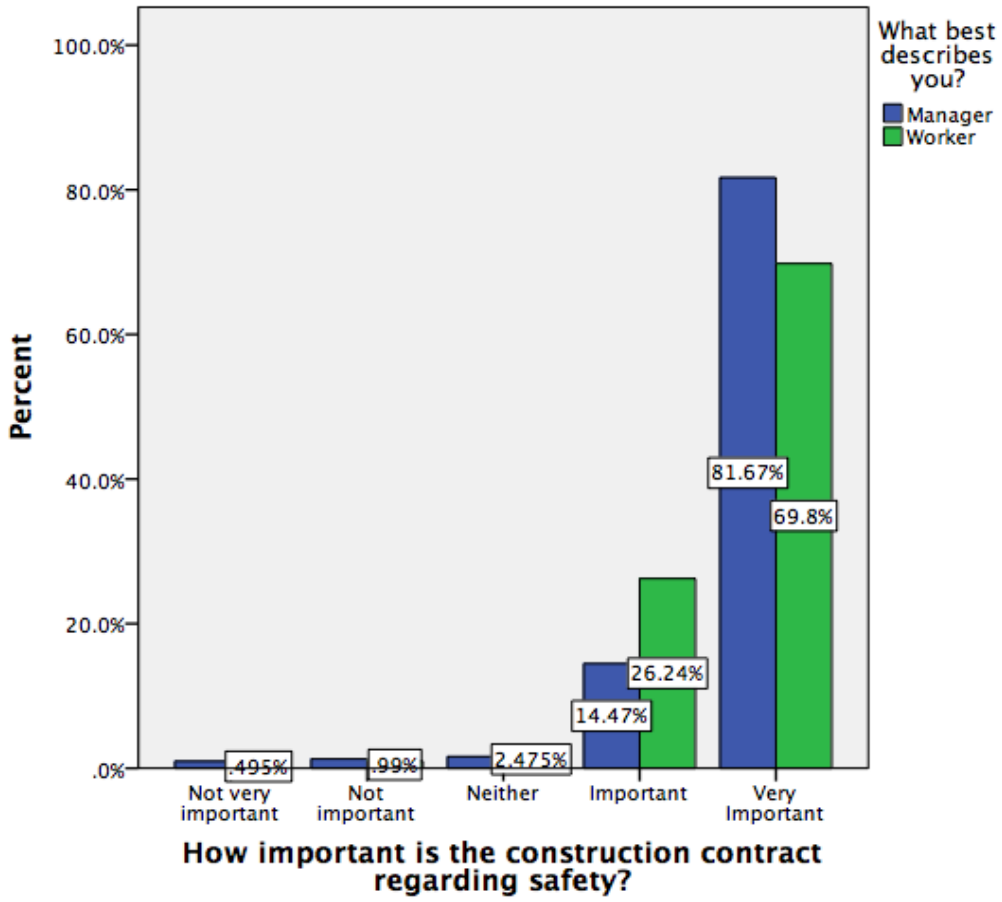


Figure 22. Manager's perception of the importance of the construction contract regarding safety

Table 2

Chi-square test of managers by importance of construction contract regarding safety.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	12.030[a]	4	.017	.013[b]	.010	.016
Likelihood Ratio	11.825	4	.019	.031[b]	.027	.036
Fisher's Exact Test	11.886			.012[b]	.009	.015
Linear-by-Linear Association	3.426[c]	1	.064	.067[b]	.060	.073
N of Valid Cases	513					

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is 1.58.
b. Based on 10000 sampled tables with starting seed 957002199.
c. The standardized statistic is -1.851.

A post hoc analysis was conducted to examine the relationship between managerial status and the importance of the construction contract regarding safety. The Cramer's *V* was .15, suggesting a weak association between the two variables. As such, managers were more likely to rate the construction contract regarding safety as very important (81.7%), compared to workers (69.8%). Conversely, workers were more likely to view the construction contract regarding safety as important (26.2%) when compared to managers (14.5%). The graph on page 127 depicts this relationship.

Manger by Education. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and level of education. Participants were asked to report the highest level of education they have completed, with answers ranging from did not complete high school, high school or GED, some college, Bachelor's degree, Master's degree, and advanced graduate work or

PhD. The relationship between these variables was significant, $\chi^2(5, N=503) = 38.55$, $p<.001$. (See Figure 23 below).

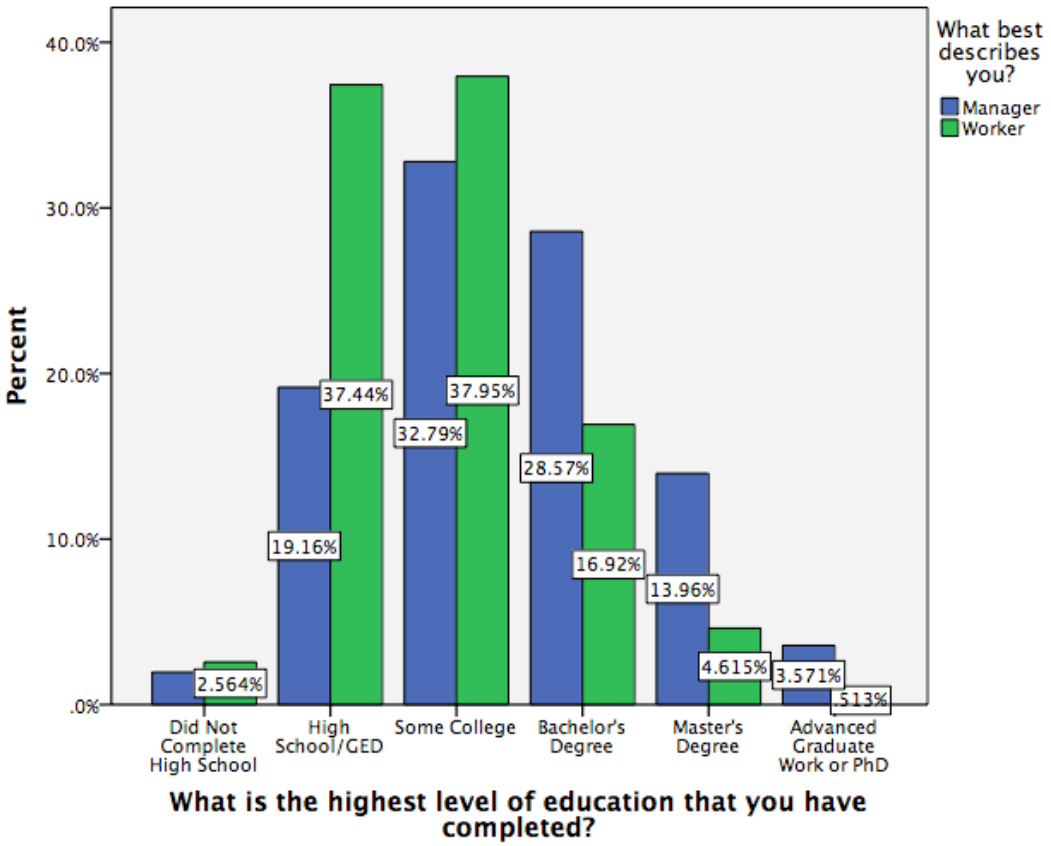


Figure 23.Manager by education.

Table 3

Manager by Education

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	37.829[a]	5	.000	.000[b]	.000	.000
Likelihood Ratio	40.021	5	.000	.000[b]	.000	.000
Fisher's Exact Test	38.553			.000[b]	.000	.000
Linear-by-Linear Association	35.384[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	503					

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 4.26.
b. Based on 10000 sampled tables with starting seed 92208573.
c. The standardized statistic is -5.948.

A post hoc analysis was conducted to examine the relationship between managerial status and level of education. The Cramer's *V* was .27, suggesting a moderate association between the two variables. As such, managers were more likely to have completed Bachelor's degree (28.6%) compared to workers, (16.9%) as well as Master's degrees (14.0%) compared to workers (4.6%). Conversely, workers were more likely to have completed only some high school or GED (37.4%) compared to managers (19.16%), and more likely to have completed some college (37.95%) when compared to managers (32.8%). The graph above depicts this relationship.

Manager by taken a leadership program. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and attendance in a leadership program. Participants were asked to report whether they had taken a leadership program by answering either yes or no. The

relationship between these variables was significant, $\chi^2(1, N=501) = 52.23$, $p<.001$. (See

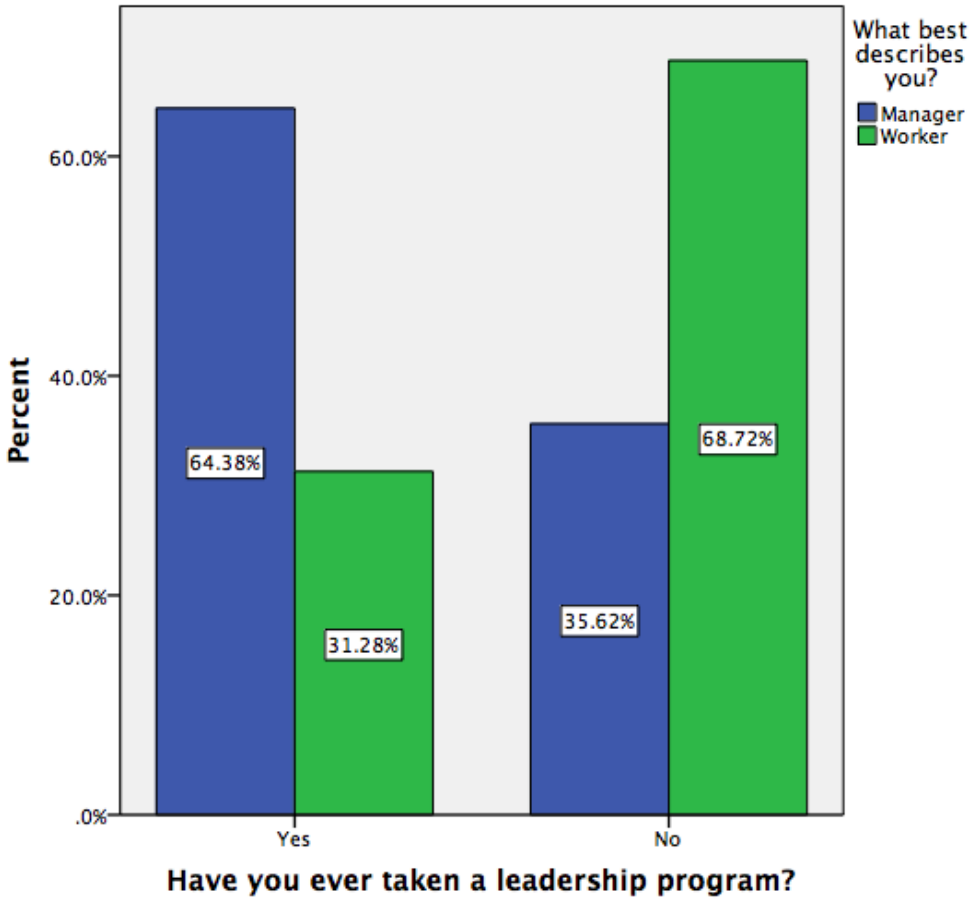


Figure 24. Manager by taken a leadership program.

Table 4

Manager by Taken a Leadership Program

Chi-Square Tests[c]

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	52.233[a]	1	.000	.000
Continuity Correction[b]	50.916	1	.000	
Likelihood Ratio	53.224	1	.000	.000
Fisher's Exact Test				.000
Linear-by-Linear Association	52.129[d]	1	.000	.000
N of Valid Cases	501			

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 94.58.
b. Computed only for a 2x2 table
c. For 2x2 crosstabulation, exact results are provided instead of Monte Carlo results.
d. The standardized statistic is 7.220.

A post hoc analysis was conducted to examine the relationship between managerial status and attendance in a leadership program. The Cramer's *V* was .32, suggesting a moderate association between the two variables. As such, managers were more likely to have taken a leadership program (64.4%) compared to workers (31.3%). The graph below depicts this relationship.

Manager by leadership styles. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and leadership style. Participants were asked to determine their type of leadership style with answers ranging from autocratic to participatory and free rein. The relationship between these variables was significant, $\chi^2(2, N=489) = 9.80$, $p=.008$.

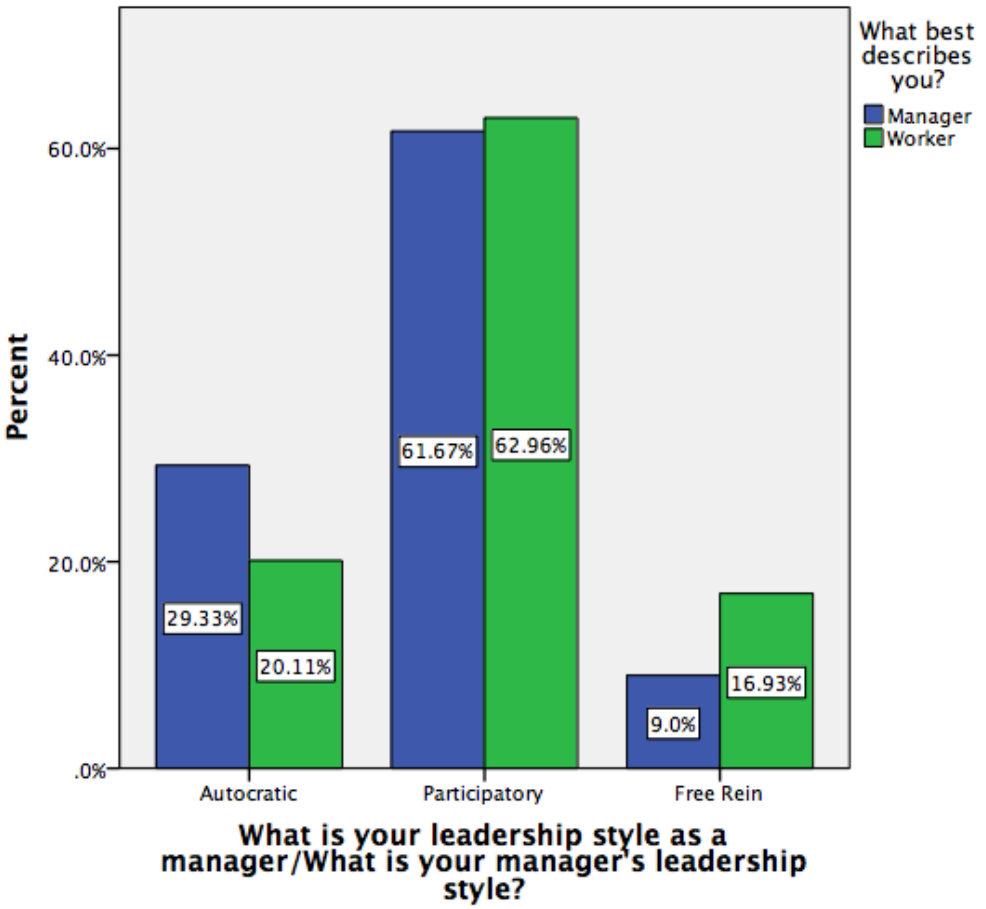


Figure 25. Manager by leadership styles.

Table 5

Manager by Leadership Styles

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	9.908[a]	2	.007	.007[b]	.005	.009
Likelihood Ratio	9.849	2	.007	.008[b]	.006	.010
Fisher's Exact Test	9.795			.008[b]	.006	.010
Linear-by-Linear Association	9.475[c]	1	.002	.002[b]	.001	.003
N of Valid Cases	489					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 22.80.
b. Based on 10000 sampled tables with starting seed 79654295.
c. The standardized statistic is 3.078.

A post hoc analysis was conducted to examine the relationship between managerial status and type of leadership style. The Cramer's *V* was .14, suggesting a weak association between the two variables. As such, managers were more likely to have an autocratic leadership style (29.3%) compared to workers (20.1%). Conversely, workers were more likely to have free rein leadership style (16.9%) when compared to managers (9.0%). Additionally, both managers (61.7%) and workers (63.0%) had similar rates of participatory leadership styles.

Manager by implementation of a successful safety program. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and whether their organization has implemented a successful safety program. Participants were asked to rate their organization having a successful safety program with answers ranging from strongly disagree, disagree, neither agree or disagree, agree, and strongly agree. The relationship between these variables was significant, $\chi^2(4, N=496) = 12.34$, $p=.014$.

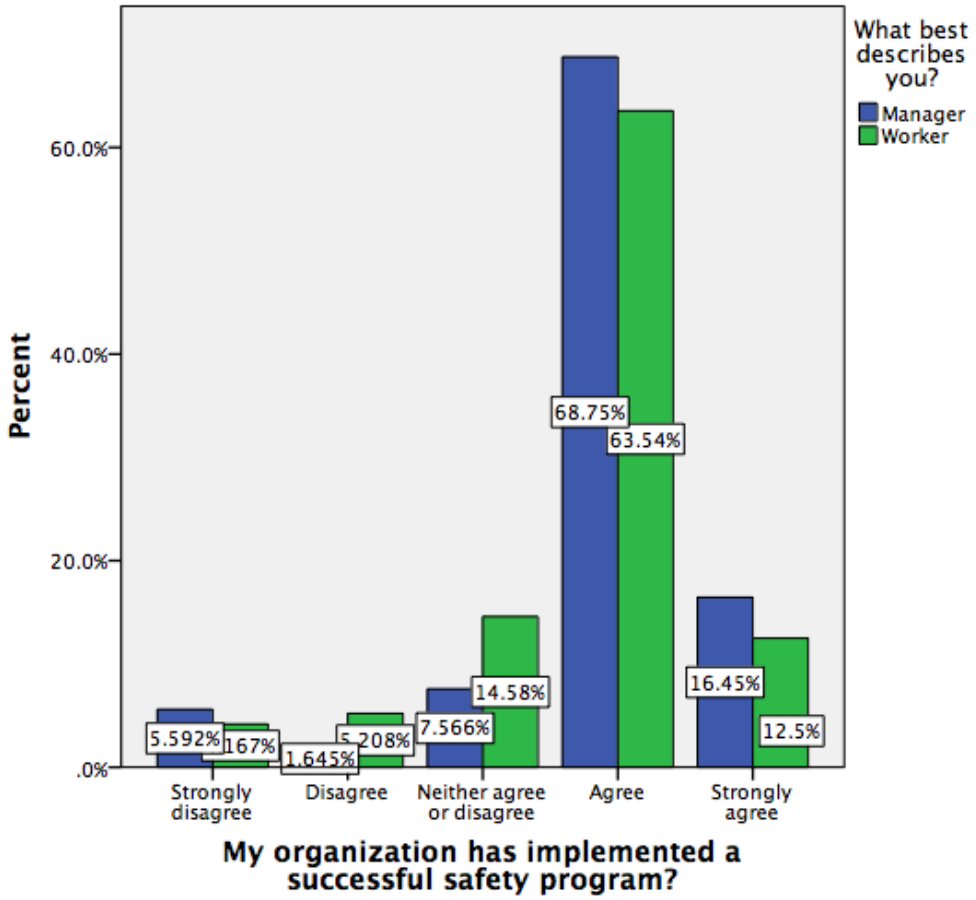


Figure 26. Manager by implementation of a successful safety program.

Table 6

Manager by Implementation of a Successful Safety Program
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	12.759[a]	4	.013	.011[b]	.009	.014
Likelihood Ratio	12.465	4	.014	.016[b]	.013	.020
Fisher's Exact Test	12.338			.014[b]	.011	.017
Linear-by-Linear Association	2.805[c]	1	.094	.101[b]	.093	.108
N of Valid Cases	496					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.81.
b. Based on 10000 sampled tables with starting seed 1810951851.
c. The standardized statistic is -1.675.

A post hoc analysis was conducted to examine the relationship between managerial status and whether they agree that their organization implemented a successful safety program. The Cramer's *V* was .16, suggesting a weak association between the two variables. As such, managers were slightly more likely to agree that their organization had implemented a successful safety program (68.8%), compared to workers (63.5%). The graph above depicts this relationship.

Manager by commitment to safety. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and top managers having a strong commitment to safety. Participants were asked to rate their level of agreement that top managers have a strong commitment to safety, with answers ranging from strongly disagree, disagree, neither agree or disagree, agree, and strongly agree. The relationship between these variables was significant, $\chi^2(4, N=493) = 11.60$, $p=.017$.

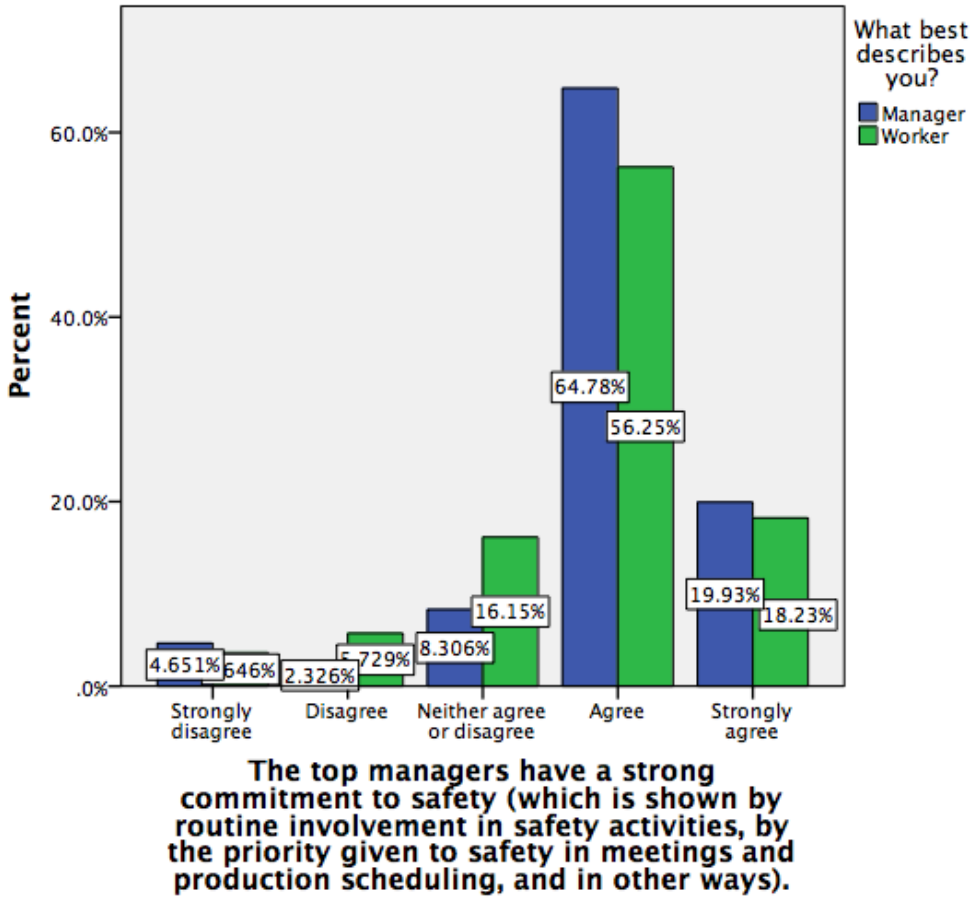


Figure 27. Manager by commitment to safety.

Table 7

Manager by Commitment to Safety

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	11.907[a]	4	.018	.015[b]	.012	.018
Likelihood Ratio	11.612	4	.020	.021[b]	.017	.024
Fisher's Exact Test	11.598			.017[b]	.014	.020
Linear-by-Linear Association	2.534[c]	1	.111	.117[b]	.109	.125
N of Valid Cases	493					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.01.
b. Based on 10000 sampled tables with starting seed 762367465.
c. The standardized statistic is -1.592.

A post hoc analysis was conducted to examine the relationship between managerial status and top managers having a strong commitment to safety. The Cramer's *V* was .16, suggesting a weak association between the two variables. As such, managers were slightly more likely to agree that top managers have a strong commitment to safety (64.8%), compared to workers (56.3%) and were also more likely to strongly agree (19.9%), compared to workers (18.2%). The graph above depicts this relationship.

Manager by prioritize safety on a daily basis. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and whether their direct manager prioritizes safety on a daily

basis. Participants were asked to rate the level that they agree that their direct manager prioritizes safety, with answers ranging from strongly disagree, disagree, neither agree or disagree, agree, and strongly agree. The relationship between these variables was not significant, $\chi^2(4, N=495) = 9.50$, $p=.051$.

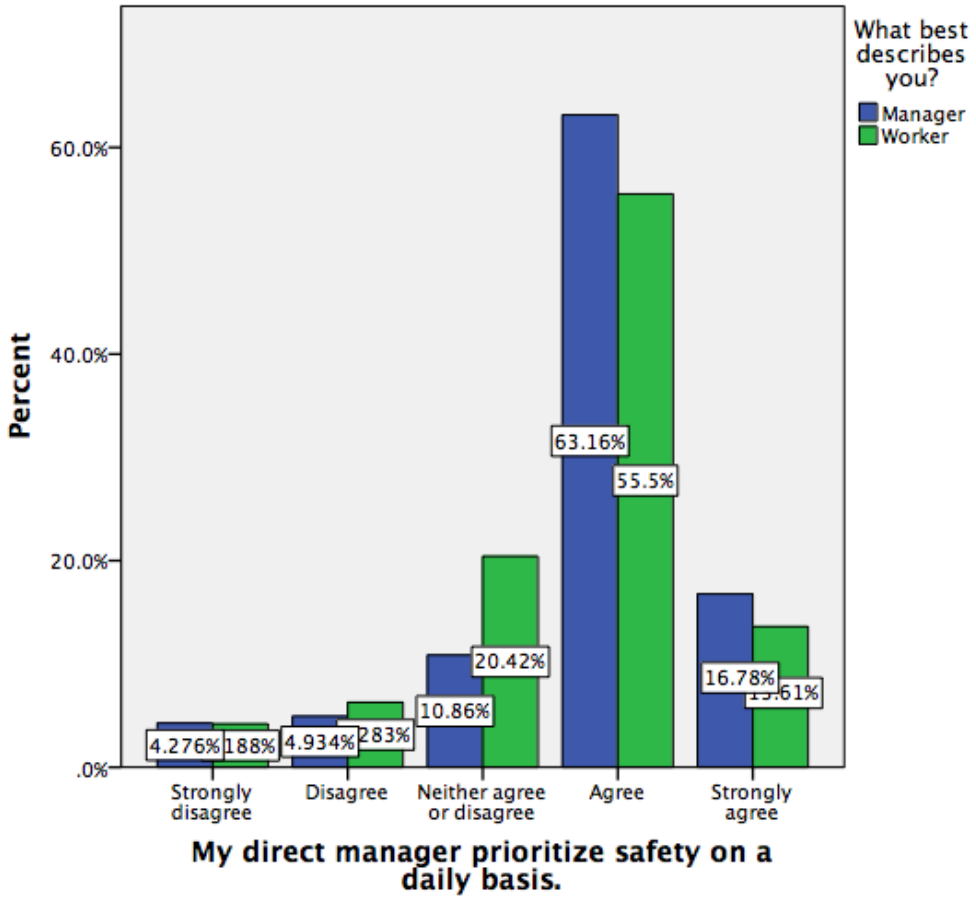


Figure 28. Manager by prioritize safety on a daily basis.

Table 8

Manager by Prioritizing Safety on a Daily Basis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	9.667[a]	4	.046	.048[b]	.042	.053
Likelihood Ratio	9.453	4	.051	.057[b]	.051	.063
Fisher's Exact Test	9.504			.051[b]	.045	.056
Linear-by-Linear Association	3.166[c]	1	.075	.081[b]	.074	.088
N of Valid Cases	495					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.10.
b. Based on 10000 sampled tables with starting seed 762367465.
c. The standardized statistic is -1.779.

Manager by CSS1. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and reacting quickly to solve the problem when advised of safety hazards. Participants were asked to rate the level of importance to react quickly when advised of safety hazards, with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=479) = 19.37$, $p<.001$.

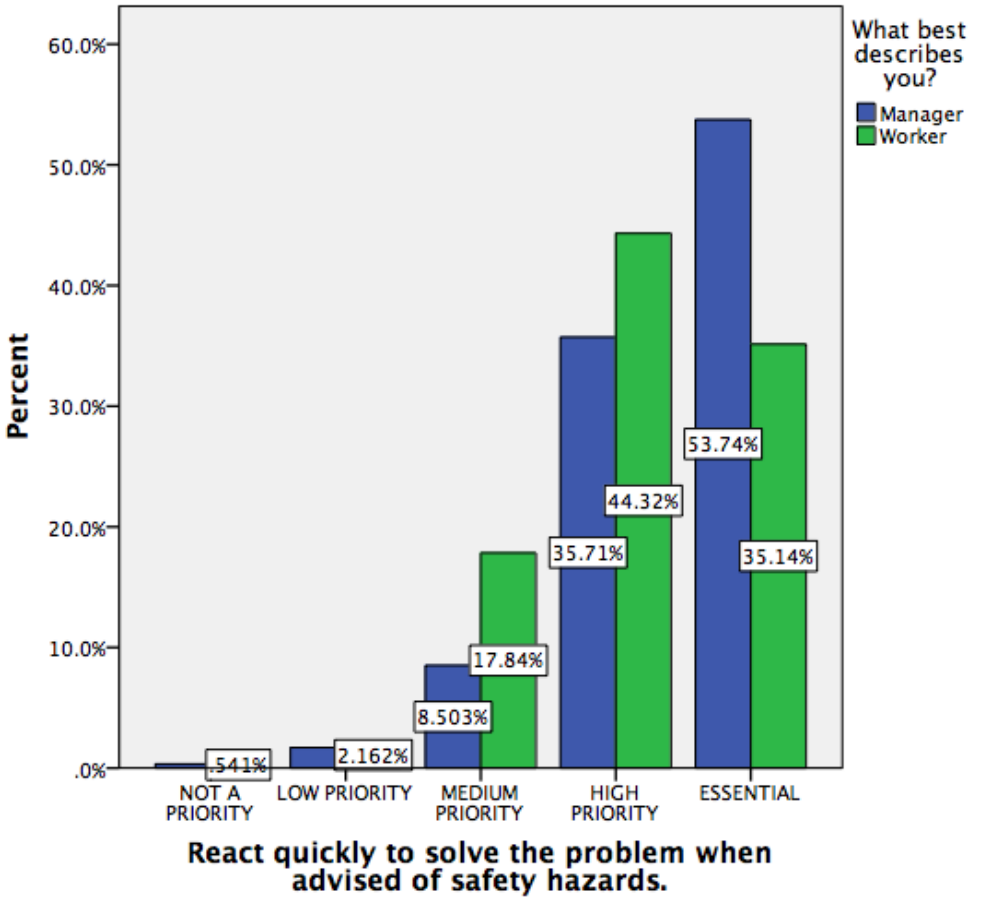


Figure 29. Manager by CSS1.

Table 9

Manager by CSS1

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound	Sig.
Pearson Chi-Square	19.009[a]	4	.001	.001[b]	.000	.001	
Likelihood Ratio	19.027	4	.001	.001[b]	.000	.002	
Fisher's Exact Test	19.367			.000[b]	.000	.001	
Linear-by-Linear Association	16.055[c]	1	.000	.000[b]	.000	.000	
N of Valid Cases	479						

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is .77.
b. Based on 10000 sampled tables with starting seed 1388918686.
c. The standardized statistic is -4.007.

A post hoc analysis was conducted to examine the relationship between managerial status and the reacting quickly when advised of safety hazards. The Cramer's *V* was .20, suggesting a moderate association between the two variables. As such, managers were more likely to rate reacting quickly to safety hazards as essential (53.7.9%), compared to workers (35.1%). Conversely, workers were more likely to view reacting quickly as high priority (44.3%) when compared to managers (35.7%). The graph above depicts this relationship.

Manager by CSS2. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and insistence on thorough regular safety audits and inspections. Participants were asked to rate the level of importance of regular safety audits and inspections with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=479) = 17.75, p=.001$.

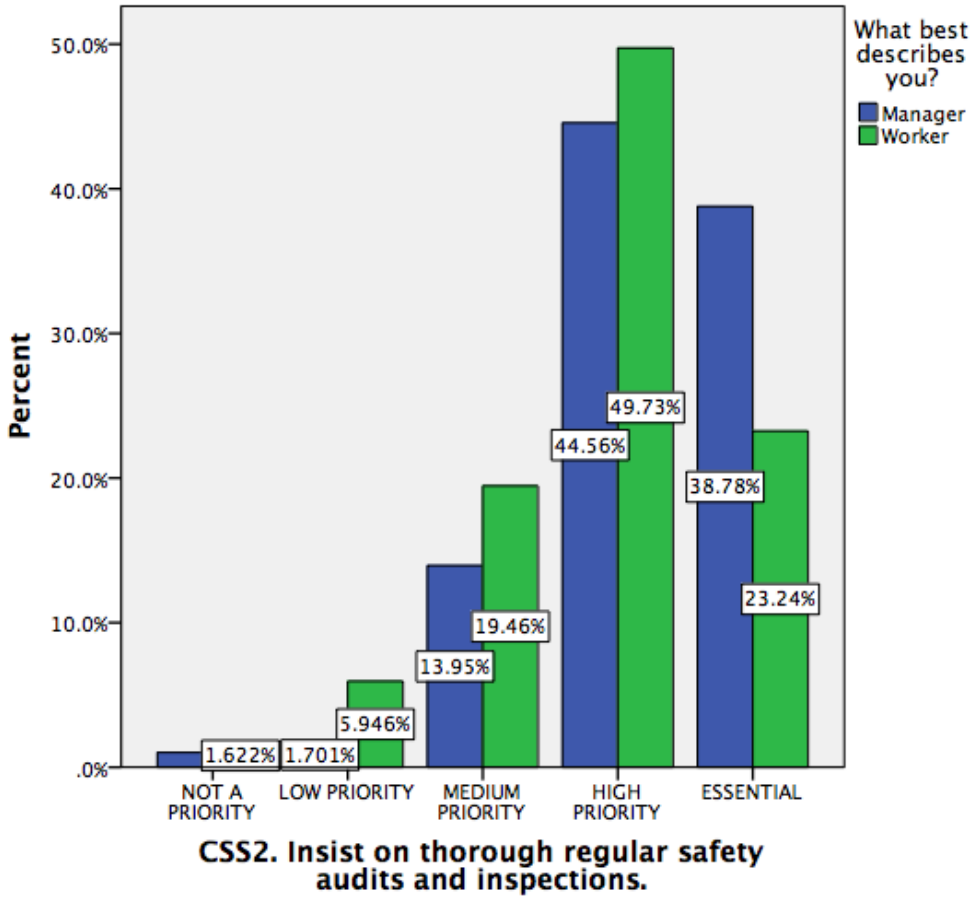


Figure 30. Manager by CSS2.

Table 10

Manager by CSS2

Chi-Square Tests

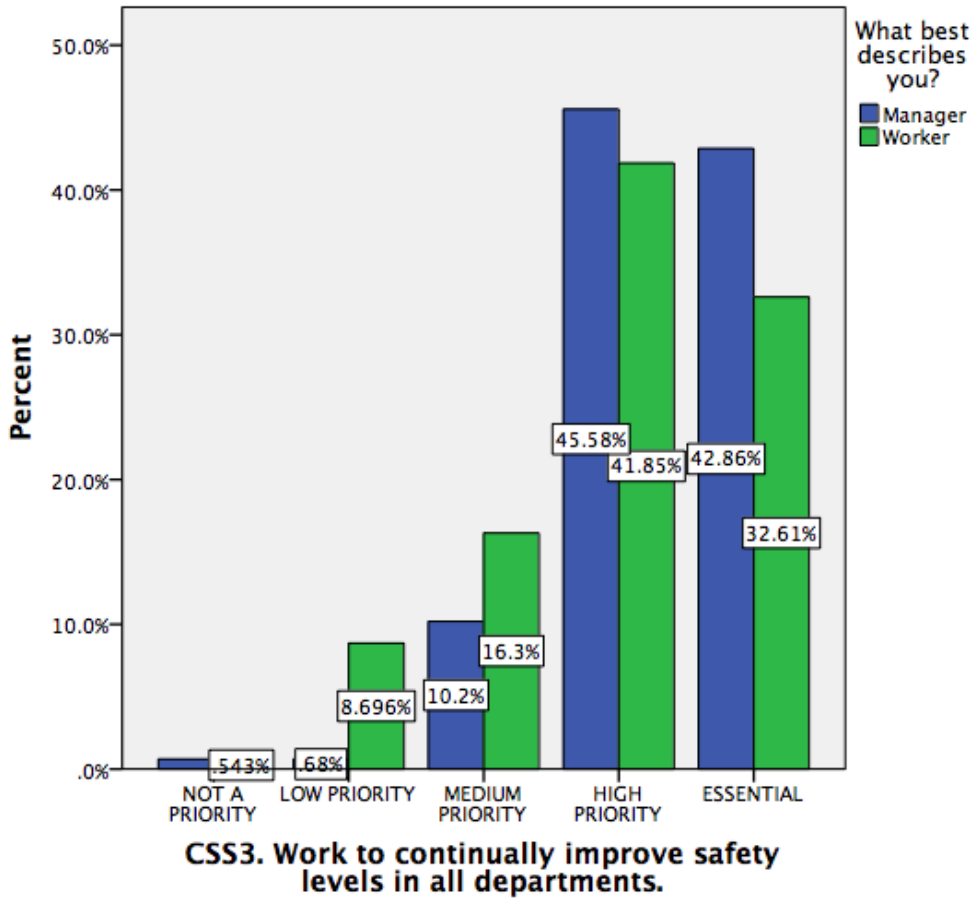
	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	17.612[a]	4	.001	.001[b]	.000	.002
Likelihood Ratio	17.768	4	.001	.002[b]	.001	.003
Fisher's Exact Test	17.751			.001[b]	.000	.002
Linear-by-Linear Association	15.226[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	479					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.32.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -3.902.

A post hoc analysis was conducted to examine the relationship between managerial status and insistence on thorough regular safety audits and inspections. The Cramer's *V* was .19, suggesting a weak association between the two variables. As such, managers were more likely to rate thorough regular safety audits and inspections as essential (38.8%), compared to workers (23.2%). Conversely, workers were more likely to view safety audits and inspections as a high priority (49.7%) when compared to managers (44.6%). The graph above depicts this relationship.

Manager by CSS3. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and working to continually improve safety levels in all departments. Participants were asked

to rate the level of importance of continuing to improve safety levels in all departments with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=478) =$



26.02, p<.001.

Figure 31. Manager by CSS3.

Table 11

Manager by CSS3

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	17.612[a]	4	.001	.001[b]	.000	.002
Likelihood Ratio	17.768	4	.001	.002[b]	.001	.003
Fisher's Exact Test	17.751			.001[b]	.000	.002
Linear-by-Linear Association	15.226[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	479					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.32.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -3.902.

A post hoc analysis was conducted to examine the relationship between managerial status and working to continually improve safety levels in all departments. The Cramer's *V* was .23, suggesting a moderate association between the two variables. As such, managers were more likely to rate working to continually improve safety levels as essential (42.9%), compared to workers (32.61%) and as a high priority (45.6%) compared to workers (41.85%). Conversely, workers were more likely to view working to continually improve safety levels as a medium priority (16.3%) when compared to managers (10.2%). The graph above depicts this relationship.

Manager by CSS4. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and providing all the equipment necessary to do the job safely. Participants were asked to rate the level of importance of providing necessary equipment with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=477) = 24.18$, $p<.001$.

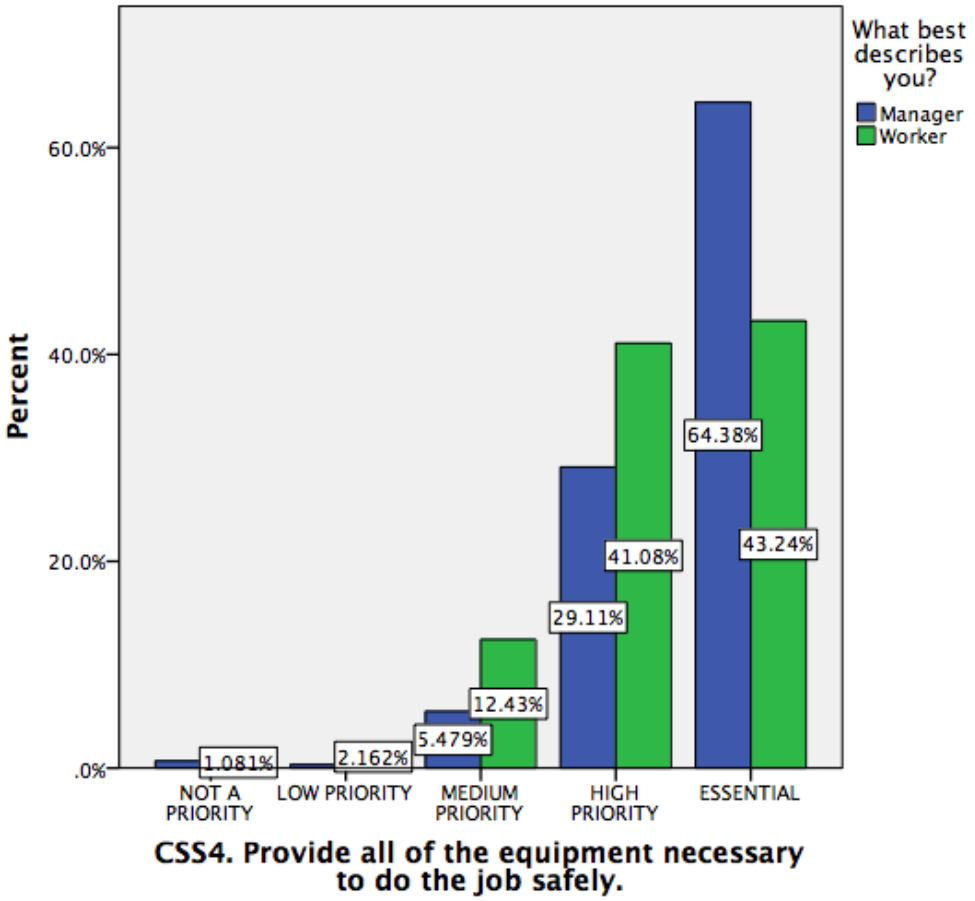


Figure 32. Manager by CSS4.

Table 12

Manager by CSS4

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	24.303[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	24.271	4	.000	.000[b]	.000	.000
Fisher's Exact Test	24.182			.000[b]	.000	.000
Linear-by-Linear Association	21.388[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	477					

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.55.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.625.

A post hoc analysis was conducted to examine the relationship between managerial status and providing all the equipment necessary to do the job safely. The Cramer's *V* was .23, suggesting a moderate association between the two variables. As such, managers were more likely to rate providing all the necessary equipment as essential (64.4%), compared to workers (43.2%). Conversely, workers were more likely to view providing all the necessary equipment as a high priority (41.1%) when compared to managers (29.1%). The graph above depicts this relationship.

Manager by CSS5. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

being strict about continuing to work safely when work falls behind schedule. Participants were asked to rate the importance of being strict about continuing to work safely with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=479) = 20.92, p<.001$.

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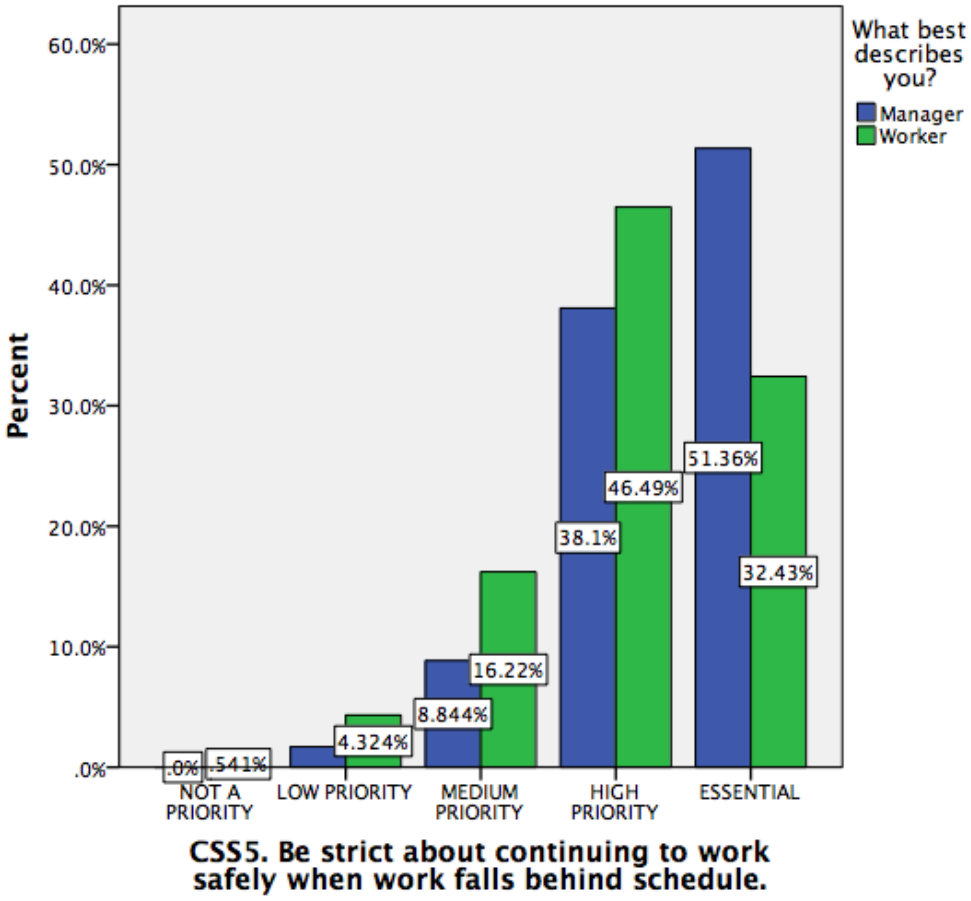


Figure 33. Manager by CSS5.

Table 13

Manager by CSS5

Chi-Square Tests

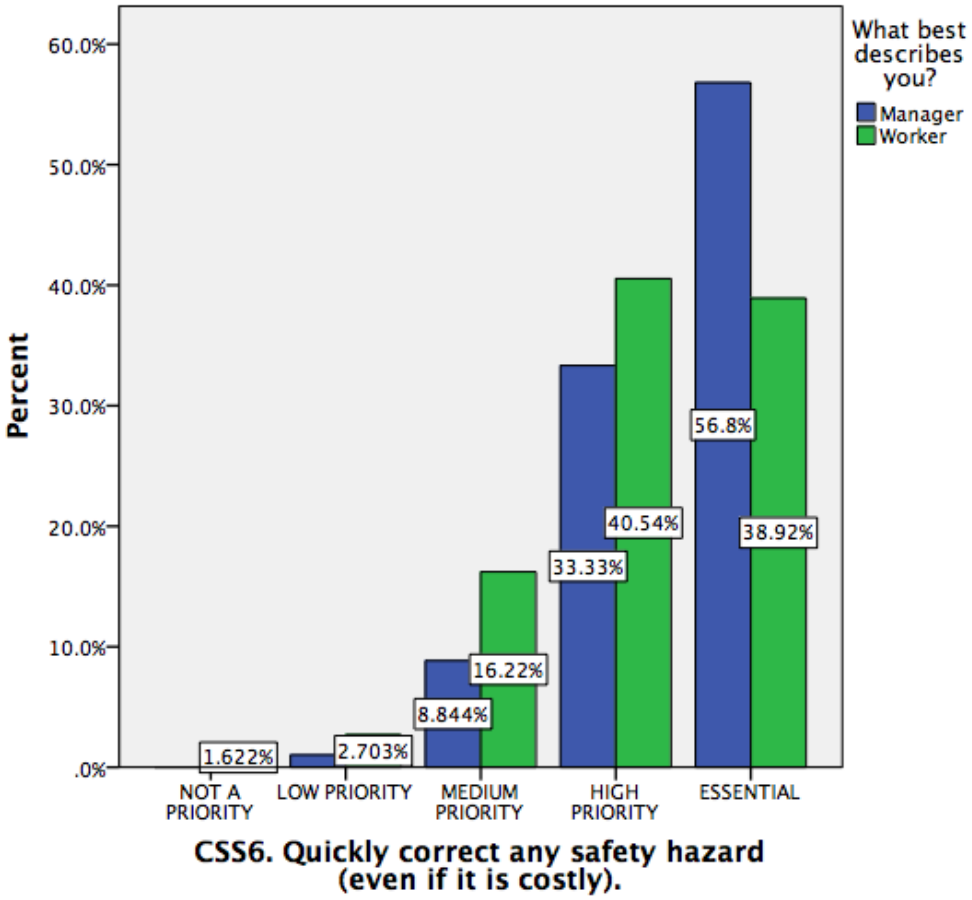
	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	20.918[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	21.336	4	.000	.000[b]	.000	.000
Fisher's Exact Test	20.922			.000[b]	.000	.000
Linear-by-Linear Association	20.253[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	479					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .39.
b. Based on 10000 sampled tables with starting seed 1675645214.

A post hoc analysis was conducted to examine the relationship between managerial status and being strict about continuing to work safely when work falls behind schedule. The Cramer's *V* was .21, suggesting a moderate association between the two variables. As such, managers were more likely to rate being strict about continuing to work safely as essential (51.4%), compared to workers (32.4%). Conversely, workers were more likely to view being strict about continuing to work safely as a high priority (46.5%) when compared to managers (38.1%). The graph above depicts this relationship.

Manager by CSS6. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

quickly correcting any safety hazard despite cost. Participants were asked to rate the level of importance of quickly correcting any safety hazard with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship



between these variables was significant, $\chi^2(4, N=479) = 20.36$, $p<.001$.

Figure 34. Manager by CSS6.

Table 14

Manager by CSS6

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	20.883[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	21.819	4	.000	.000[b]	.000	.000
Fisher's Exact Test	20.357			.000[b]	.000	.000
Linear-by-Linear Association	20.160[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	479					

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.16.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.490.

A post hoc analysis was conducted to examine the relationship between managerial status and quickly correcting any safety hazard despite cost. The Cramer's *V* was .21, suggesting a moderate association between the two variables. As such, managers were more likely to rate quickly responding to safety hazard as essential (56.8%), compared to workers (38.9%). Conversely, workers were more likely to view

quickly responding to safety hazard a high priority (40.5%) when compared to managers (33.3%). The graph above depicts this relationship.

Manager by CSS7. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and providing detailed safety reports to workers. Participants were asked to rate the level of importance of providing detailed safety reports with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=477) = 16.65, p=.002$.

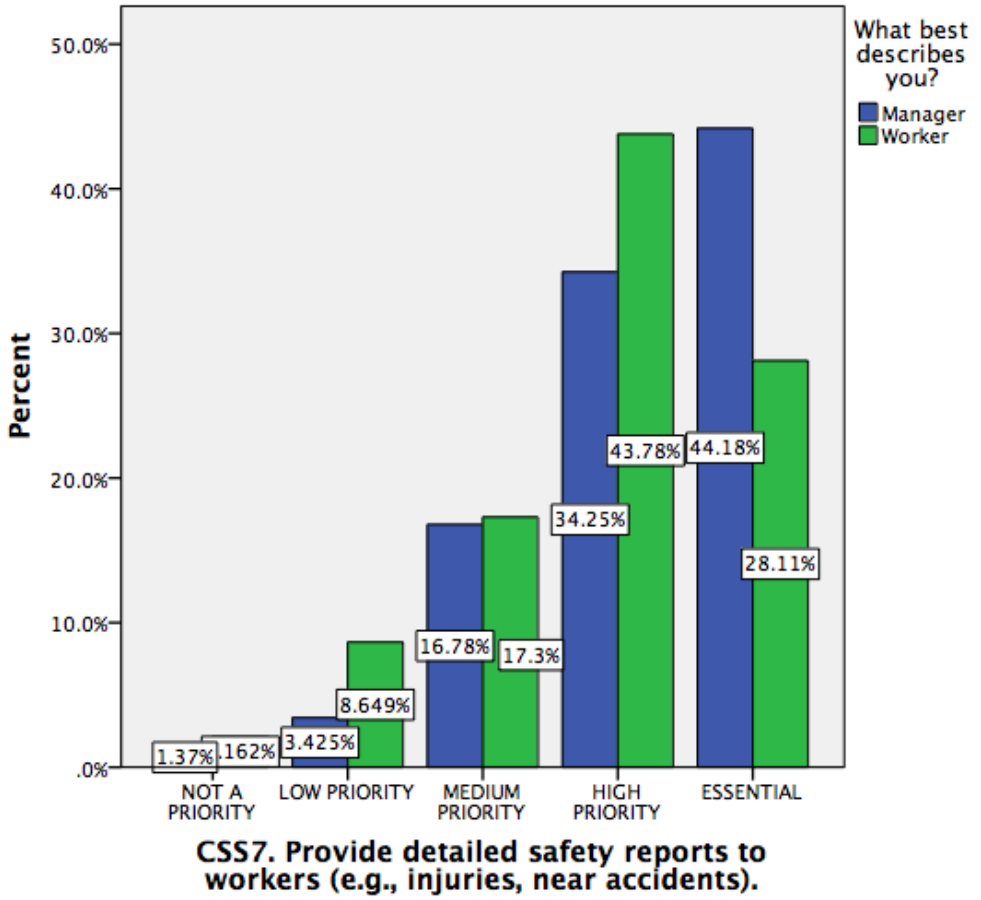


Figure 35. Manager by CSS7.

Table 15 Manager

by CSS7 Chi-

Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval

					Lower Bound	Upper Bound
Pearson Chi-Square	16.534[a]	4	.002	.002[b]	.001	.003
Likelihood Ratio	16.607	4	.002	.003[b]	.002	.004
Fisher's Exact Test	16.649			.002[b]	.001	.003
Linear-by-Linear Association	10.676[c]	1	.001	.001[b]	.000	.002
N of Valid Cases	477					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.10.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -3.267.

A post hoc analysis was conducted to examine the relationship between managerial status and providing detailed safety reports to workers. The Cramer's *V* was .19, suggesting a weak association between the two variables. As such, managers were more likely to rate providing detailed safety reports to workers as essential (44.2%), compared to workers (28.1%). Conversely, workers were more likely to view providing detailed safety reports as a high priority (43.8%) when compared to managers (34.3%). The graph above depicts this relationship.

Manager by CSS8. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and considering a worker's safety behavior when moving or promoting people. Participants were asked to rate the level of importance of considering a worker's safety behavior with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=478) = 22.65, p<.001$.

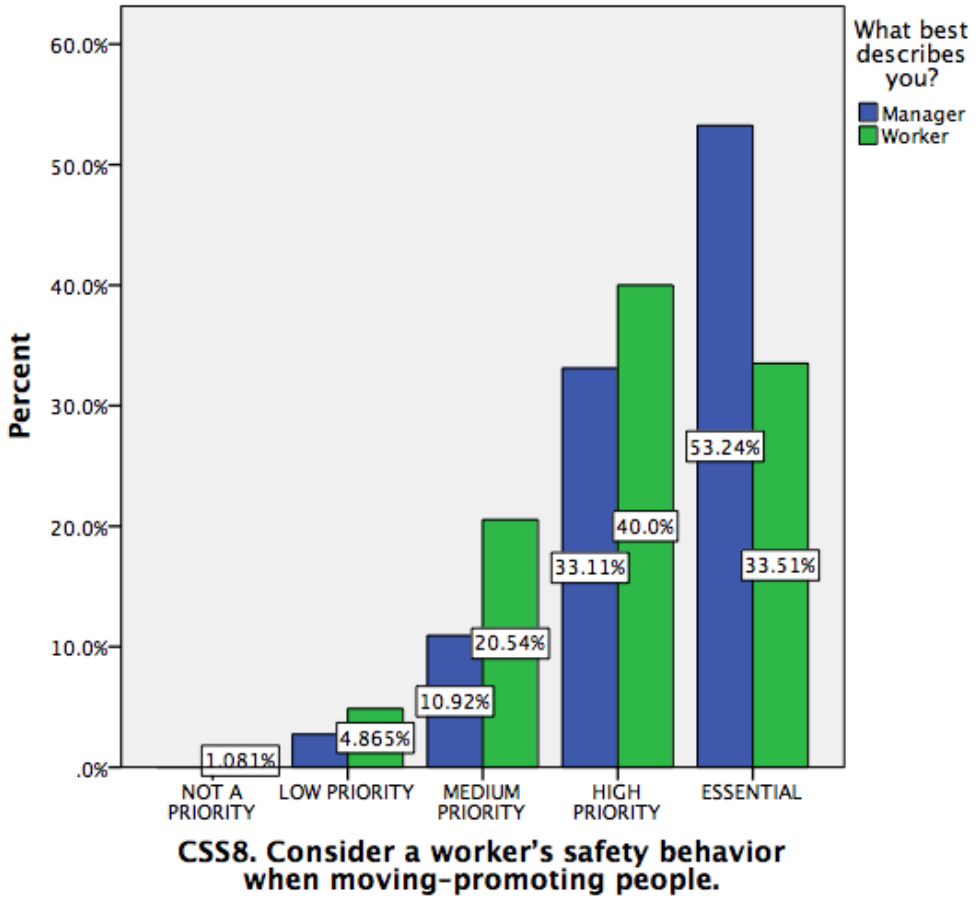


Figure 36. Manager by CSS8

Table 16

Manager by CSS8

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	22.970[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	23.728	4	.000	.000[b]	.000	.000
Fisher's Exact Test	22.652			.000[b]	.000	.000
Linear-by-Linear Association	21.022[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	478					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .77.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.585.

A post hoc analysis was conducted to examine the relationship between managerial status and considering a worker's safety behaviors when moving or promoting people. The Cramer's *V* was .22, suggesting a moderate association between the two variables. As such, managers were more likely to rate considering a worker's safety behavior as essential (53.2%), compared to workers (33.5%). Conversely, workers were more likely to view considering a worker's safety behavior as a high priority (40.0%) when compared to managers (33.1%). The graph above depicts this relationship.

Manager by CSS9. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

requiring each manager to help improve safety in his/her department. Participants were asked to rate the level of importance of requiring each manager to help improve safety in his/her department with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=478) = 29.76, p<.001$.

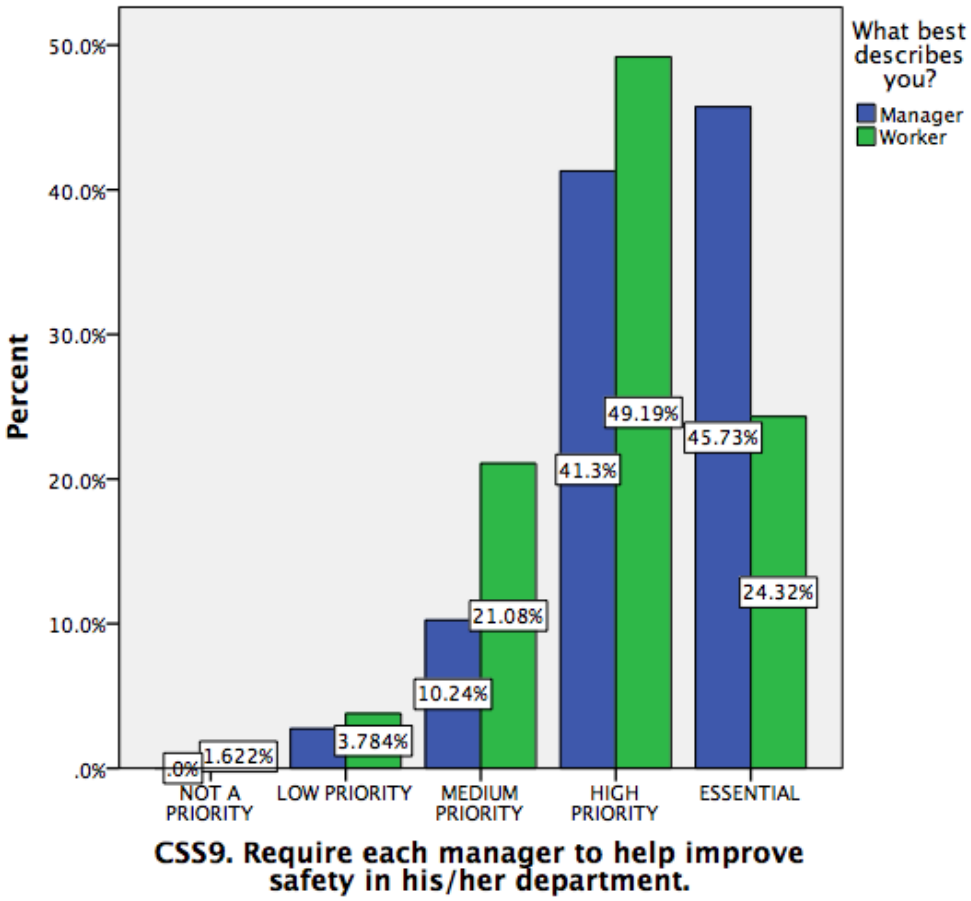


Figure 37. Manager by CSS9.

Table 17

Manager by CSS9

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)			
				Sig.	99% Confidence Interval		
					Lower Bound	Upper Bound	Upper Bound
Pearson Chi-Square	29.860[a]	4	.000	.000[b]	.000	.000	
Likelihood Ratio	31.332	4	.000	.000[b]	.000	.000	
Fisher's Exact Test	29.764			.000[b]	.000	.000	
Linear-by-Linear Association	25.649[c]	1	.000	.000[b]	.000	.000	.000
N of Valid Cases	478						

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.16.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -5.064.

A post hoc analysis was conducted to examine the relationship between managerial status and providing all the equipment necessary to do the job safely. The Cramer's *V* was .25, suggesting a moderate association between the two variables. As such, managers were more likely to rate requiring each manager to help improve safety in his/her department as essential (45.7%), compared to workers (24.3%). Conversely, workers were more likely to view requiring each manager to help improve safety as a high priority (49.19%) when compared to managers (41.3%) or as a medium priority (21.1%) when compared to workers (10.2%). The graph above depicts this relationship.

Manager by CSS10. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and investing a lot of time and money in safety training for workers. Participants were asked to rate the level of importance of investing a lot of time and money in safety training with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=475) = 22.02$, $p<.001$.

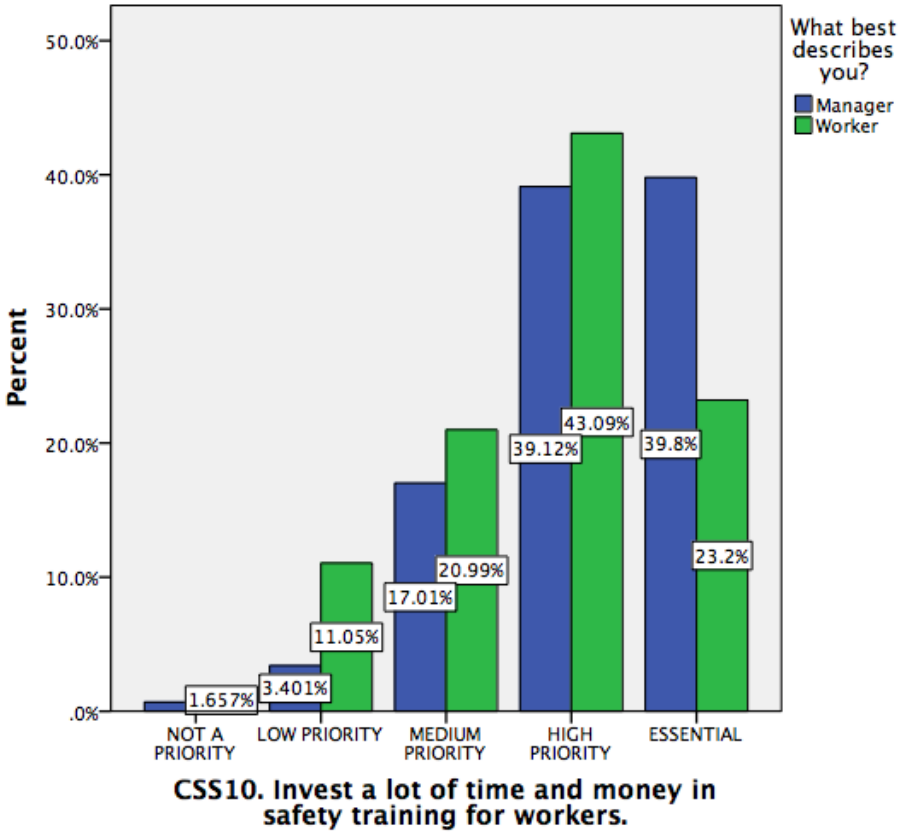


Figure 38. Manager by CSS10.

Table 18

Manager by CSS10

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	22.003[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	22.059	4	.000	.000[b]	.000	.001
Fisher's Exact Test	22.020			.000[b]	.000	.000
Linear-by-Linear Association	19.412[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	475					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.91.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.406.

A post hoc analysis was conducted to examine the relationship between managerial status and investing a lot of time and money in safety training for workers. The Cramer's *V* was .22, suggesting a moderate association between the two variables. As such, managers were more likely to rate investing a lot of time and money in safety training as essential (39.8%), compared to workers (23.2%). Conversely, workers were more likely to view investing a lot of time and money in safety training as a high priority (43.1%) when compared to managers (39.1%). The graph above depicts this relationship.

Manager by CSS11. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

using any available information to improve existing safety rules. Participants were asked to rate the level of importance of using any available information to improve existing safety rules with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=478) = 18.47$, $p=.001$.

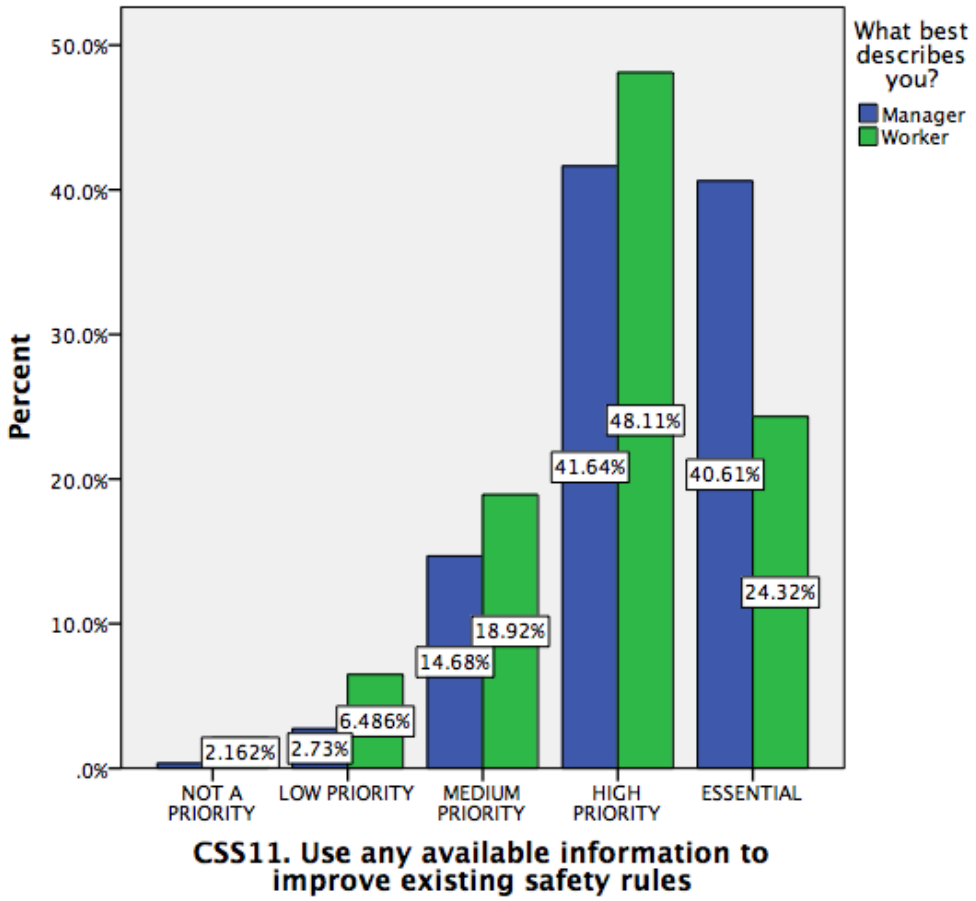


Figure 39. Manager by CSS11.

Table 19

Manager by CSS11

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	18.515[a]	4	.001	.001[b]	.000	.001
Likelihood Ratio	18.751	4	.001	.001[b]	.000	.002
Fisher's Exact Test	18.471			.001[b]	.000	.002
Linear-by-Linear Association	16.640[c]	1	.000	.000[b]	.000	.000

A post hoc analysis was conducted to examine the relationship between managerial status and using any available information to improve existing safety rules. The Cramer's *V* was .20, suggesting a moderate association between the two variables. As such, managers were more likely to rate using any available information to improve existing safety rules as essential (40.6%), compared to workers (24.3%). Conversely, workers were more likely to view using any information to improve safety rules a high priority (48.1%) when compared to managers (41.6%). The graph above depicts this relationship.

Manager by CSS12. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and listening carefully to workers' ideas about improving safety. Participants were asked to rate the level of importance of listening to workers' ideas about improving safety with

answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=478) = 20.66$, $p<.001$.

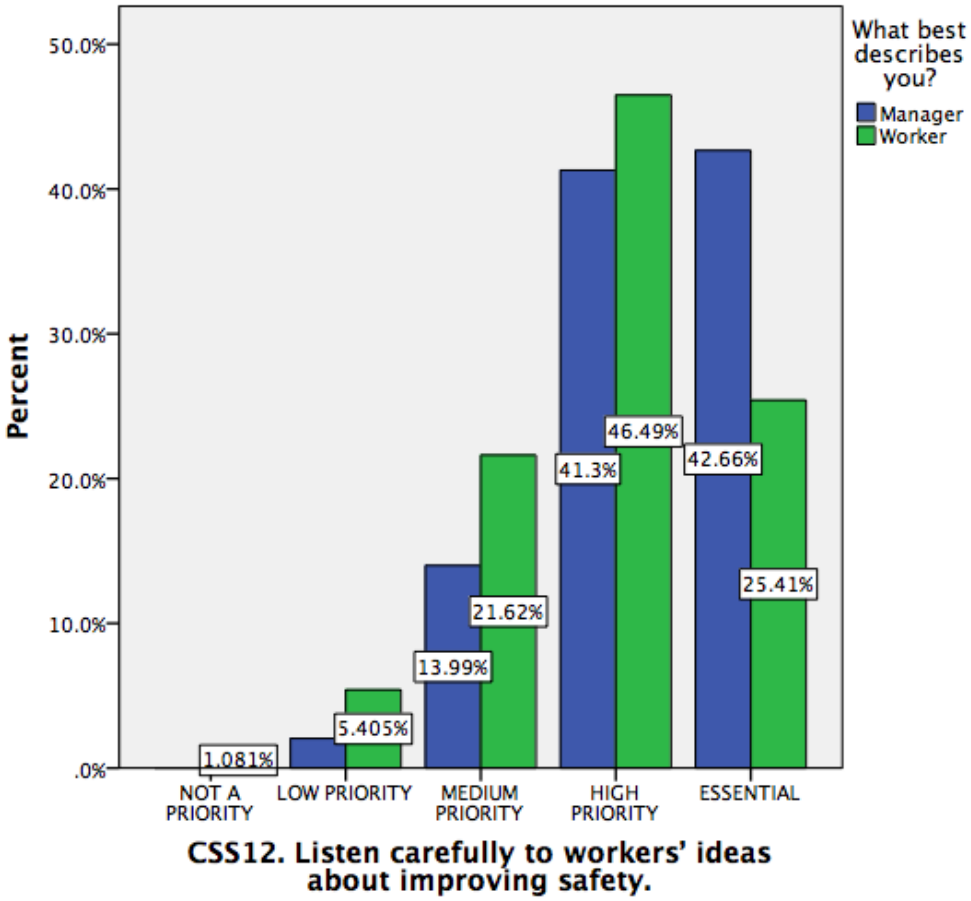


Figure 40. Manager by CSS12.

Table 20

Manager by CSS12

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	20.971[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	21.825	4	.000	.000[b]	.000	.000
Fisher's Exact Test	20.664			.000[b]	.000	.000
Linear-by-Linear Association	19.953[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	478					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .77.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.467.

A post hoc analysis was conducted to examine the relationship between managerial status and the listening carefully to workers' ideas about improving safety. The Cramer's *V* was .21, suggesting a moderate association between the two variables. As such, managers were more likely to rate listening to workers as essential (42.7%), compared to workers (25.4%). Conversely, workers were more likely to view listening to workers a high priority (46.5%) when compared to managers (41.3%). The graph above depicts this relationship.

Manager by CSS13. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

considering safety when setting production speed and schedules. Participants were asked to rate the level of importance of considering safety when setting production speed and schedules with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=476) = 14.39$, $p=.003$.

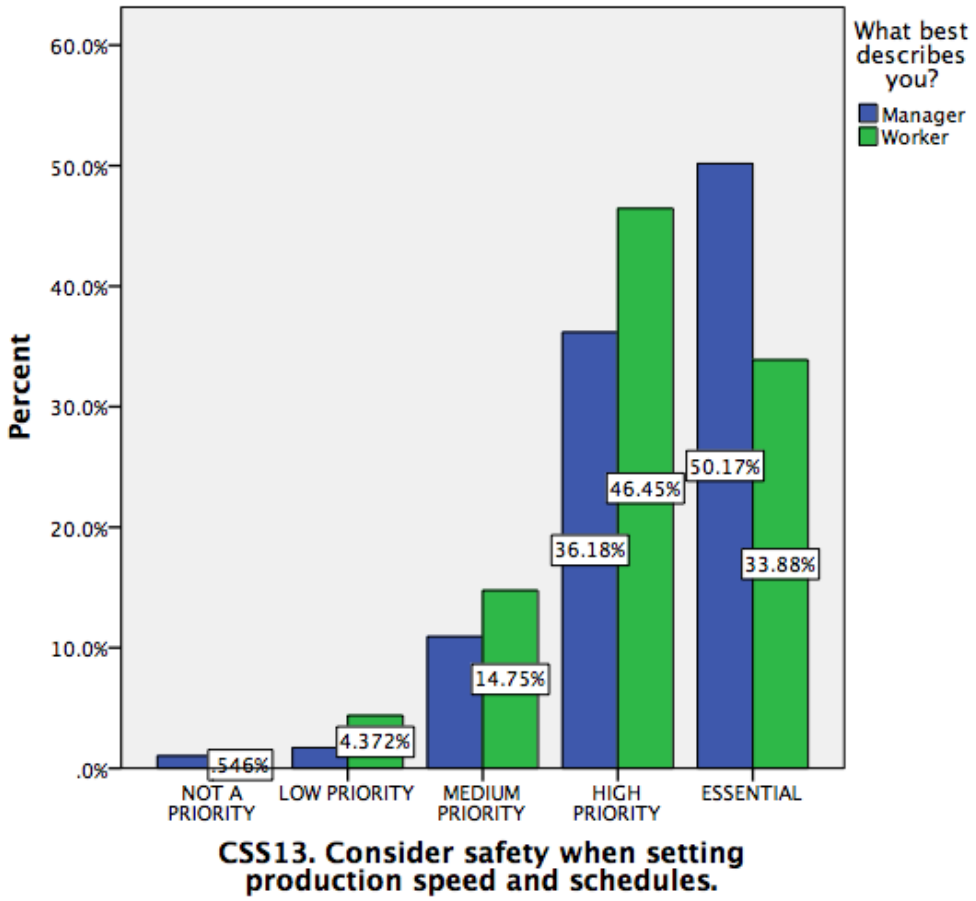


Figure 41. Manager by CSS13.

Table 21

Manager by CSS13

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	14.340[a]	4	.006	.004[b]	.002	.006
Likelihood Ratio	14.423	4	.006	.007[b]	.005	.009
Fisher's Exact Test	14.385			.003[b]	.002	.005
Linear-by-Linear Association	9.366[c]	1	.002	.002[b]	.001	.003
N of Valid Cases	476					

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 1.54.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -3.060.

A post hoc analysis was conducted to examine the relationship between managerial status and considering safety when setting production speed and schedules. The Cramer's *V* was .17, suggesting a weak association between the two variables. As such, managers were more likely to rate considering safety when setting production speed and schedules as essential (50.2%), compared to workers (33.9%). Conversely, workers were more likely to view considering safety when setting production speed and schedules as a high priority (46.5%) when compared to managers (36.2%). The graph above depicts this relationship.

Manager by CSS14. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and providing workers with a lot of information on safety issues. Participants were asked to rate the level of importance of providing workers with a lot of information on safety issues with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=475) = 20.77$, $p<.001$.

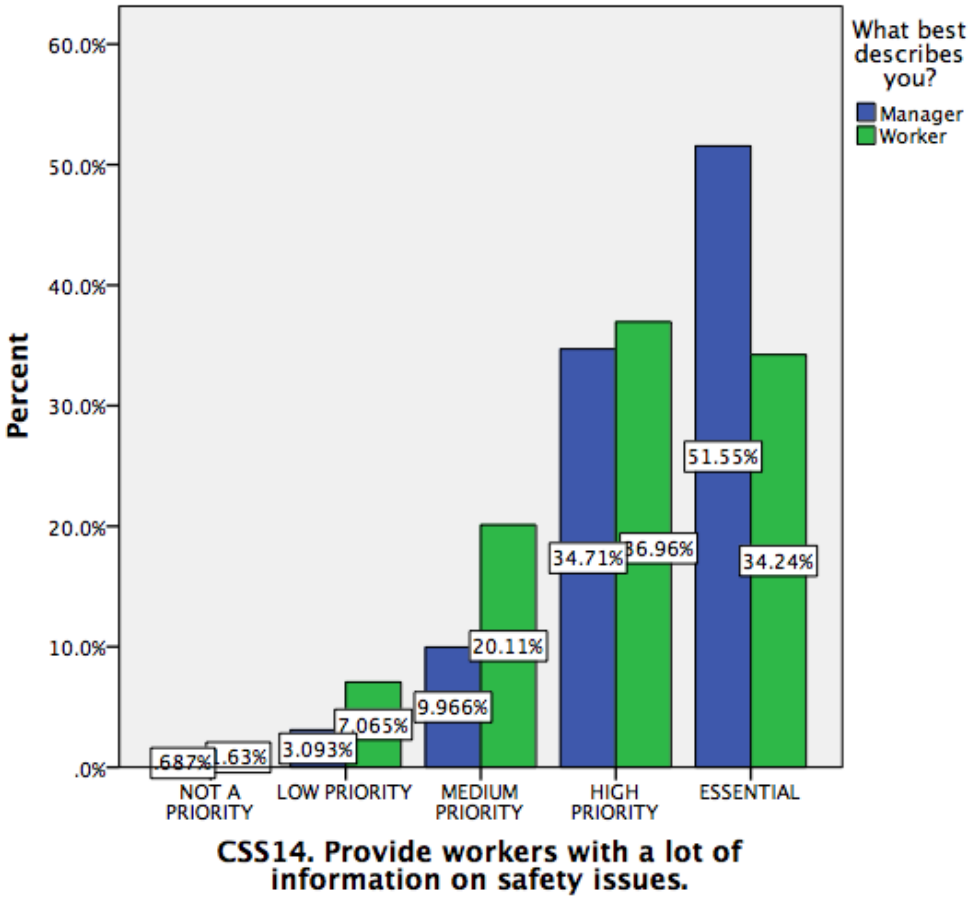


Figure 42. Manager by CSS14.

Table 22

Manager by CSS14

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	20.830[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	20.675	4	.000	.000[b]	.000	.001
Fisher's Exact Test	20.766			.000[b]	.000	.000
Linear-by-Linear Association	19.730[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	475					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.94.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.442.

A post hoc analysis was conducted to examine the relationship between managerial status and the providing workers with a lot of information on safety issues. The Cramer's *V* was .21, suggesting a moderate association between the two variables. As such, managers were more likely to rate providing workers with a lot of information as essential (51.6%), compared to workers (34.2%). Conversely, workers were slightly more likely to view providing a lot of information as a high priority (37.0%) when compared to managers (34.7%). The graph above depicts this relationship.

Manager by CSS15. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and

regularly holding safety-awareness events. Participants were asked to rate the level of importance of regularly holding safety-awareness events with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=475) = 19.45$, p=.001.

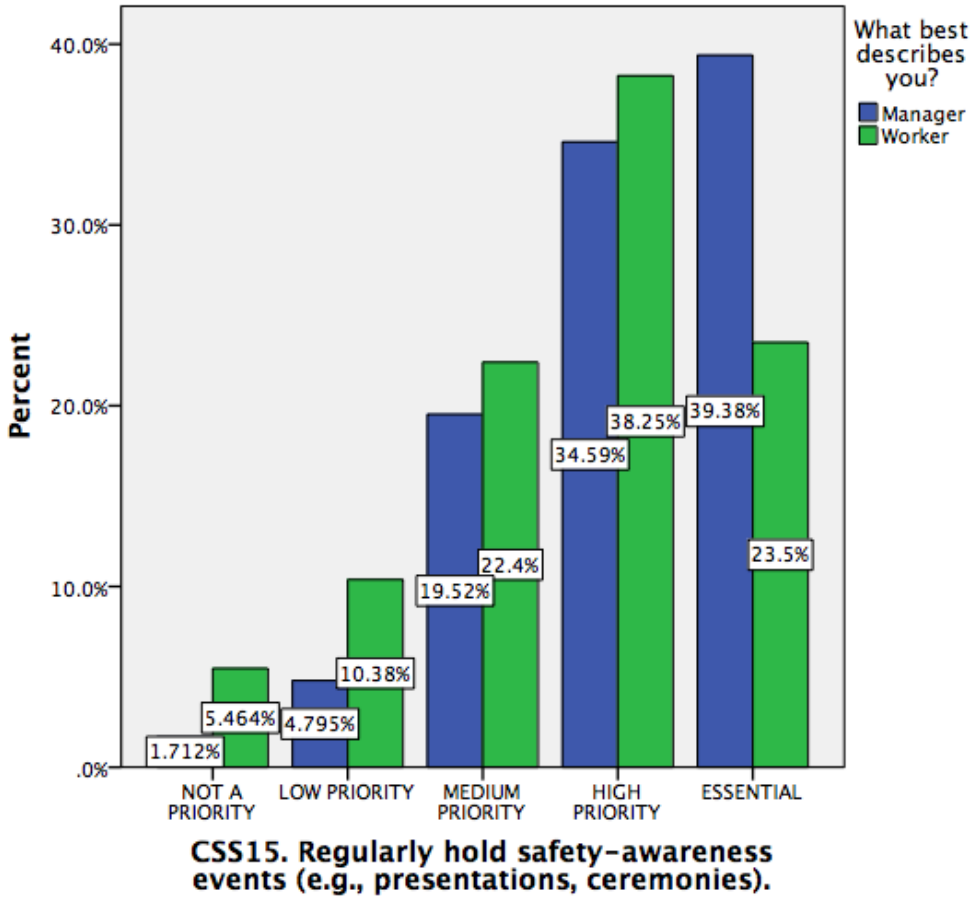


Figure 43. Manager by CSS15.

Table 23

Manager by CSS15

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	19.480[a]	4	.001	.001[b]	.000	.001
Likelihood Ratio	19.550	4	.001	.001[b]	.000	.002
Fisher's Exact Test	19.452			.001[b]	.000	.001
Linear-by-Linear Association	17.492[c]	1	.000	.000[b]	.000	.000

A post hoc analysis was conducted to examine the relationship between managerial status and regularly holding safety-awareness events. The Cramer's *V* was .20, suggesting a moderate association between the two variables. As such, managers were more likely to rate regularly holding safety-awareness events as essential (39.4%), compared to workers (23.5%). Conversely, workers were slightly more likely to view regularly holding safety-awareness events as a high priority (38.3%) when compared to managers (34.6%). The graph above depicts this relationship.

Manager by CSS16. A Chi-square test of independence was calculated to determine the relationship between management status (manager versus worker) and giving safety personnel the power they need to do their job. Participants were asked to rate the level of importance of giving safety personnel the power they need to do their job with answers ranging from not a priority, low priority, medium priority, high priority, and essential. The relationship between these variables was significant, $\chi^2(4, N=477) = 19.01$, $p<.001$.

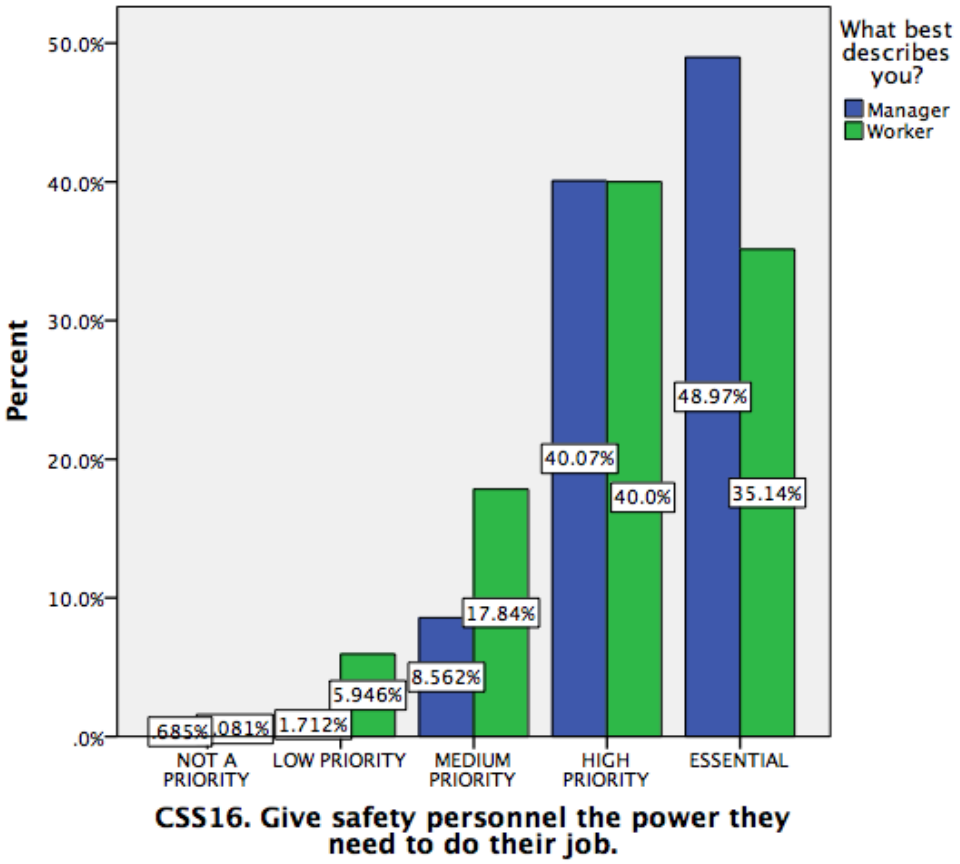


Figure 44. Manager by CSS16.

Table 24

Manager by CSS16

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	19.251[a]	4	.001	.000[b]	.000	.001
Likelihood Ratio	18.947	4	.001	.001[b]	.000	.002
Fisher's Exact Test	19.006			.000[b]	.000	.001
Linear-by-Linear Association	16.904[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	477					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.55.
b. Based on 10000 sampled tables with starting seed 1675645214.
c. The standardized statistic is -4.111.

A post hoc analysis was conducted to examine the relationship between managerial status and giving safety personnel the power they need to do their job. The Cramer's *V* was .20, suggesting a moderate association between the two variables. As such, managers were more likely to rate giving safety personnel the power they need to do their job as essential (49.0%), compared to workers (35.1%). Conversely, workers were equally as likely to view giving safety personnel power they need to do their job as a high priority (40.0%) when compared to managers (40.1%). The graph above depicts this relationship.

Leadership Styles on Climate and Culture of Safety

Leadership styles by importance of construction contract. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the importance of construction contract. Participants were asked to rate the importance of the construction contract with answers ranging from not very important, not important, neither, important, and very important. The relationship between these variables was significant, $\chi^2(4, N=495) = 17.22$, $p<.05$. The null hypothesis is rejected.

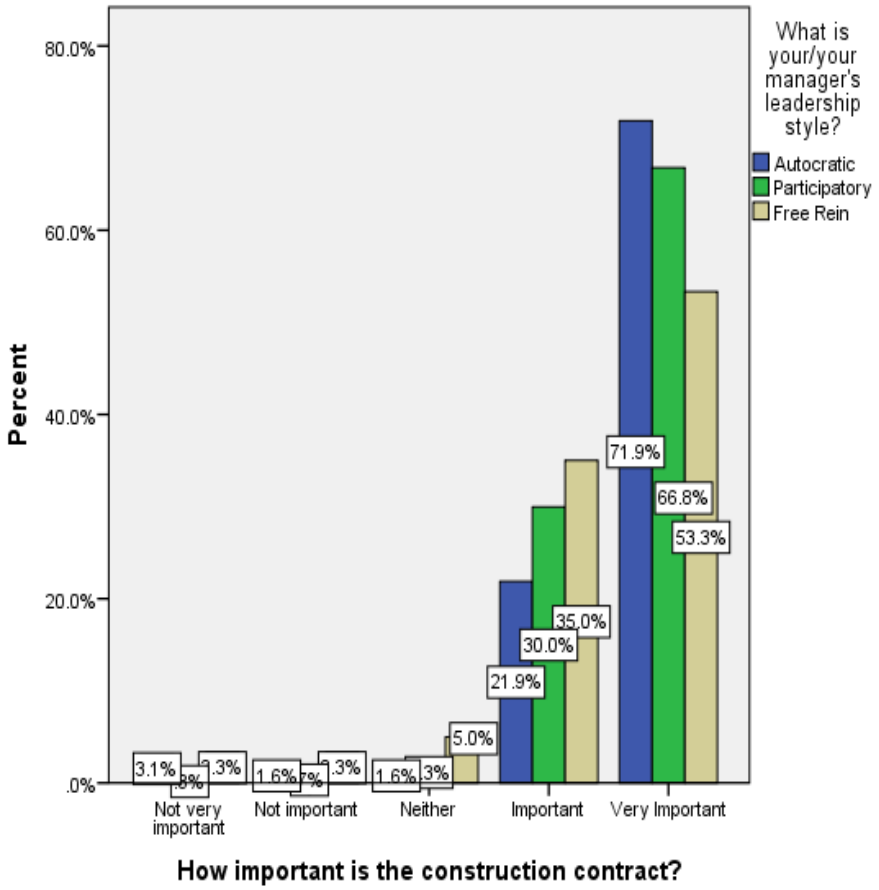


Figure 45.Leadership Styles by Importance of Construction Contract

Table 25

Leadership Styles by Importance of Construction Contract

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	17.216[a]	8	.028	.031[b]	.027	.036
Likelihood Ratio	16.569	8	.035	.044[b]	.039	.049
Fisher's Exact Test	18.123			.009[b]	.007	.012
Linear-by-Linear Association	2.666[c]	1	.103	.114[b]	.105	.122
N of Valid Cases	495					

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is .73.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -1.633.

A post hoc analysis was conducted to examine the relationship between leadership styles and the importance of the construction contract. The Cramer's *V* was .13, suggesting a weak association between the two variables. While a majority of managers consider the construction contract as "very important", autocratic leadership scored the highest (71.9%), compared to participatory (66.8%) and free rein leaders (53.3%). Conversely, the trend is opposite with regard to the category of "importance" with free rein leaders ranked the highest at 35%, compared to participatory (30%) and autocratic (21.9%) leaders.

Leadership styles by levels of education. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and educational level. Participants were asked to rank their educational level with answers including: did not complete high school, high school/GED, some

college, bachelor degree, Master's degree, and advanced graduate work or PhD level. The relationship between these variables was significant, $\chi^2(10, N=497) = 23.63$, $p<.05$. The null hypothesis is rejected.

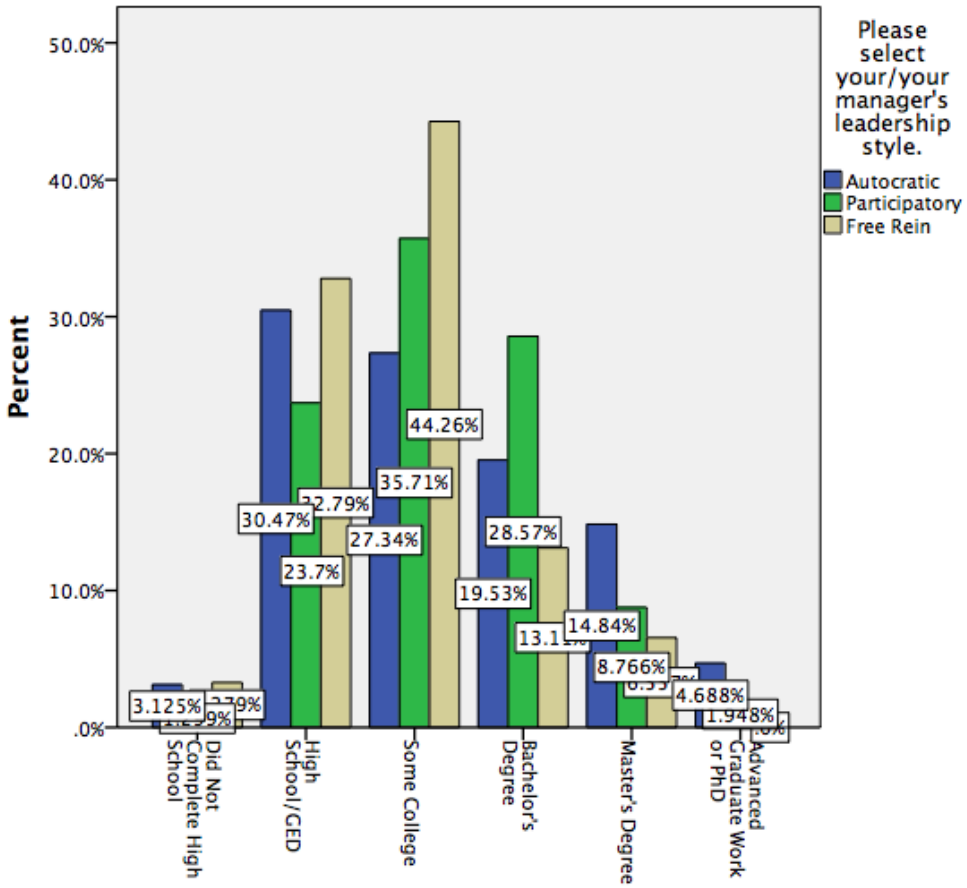


Figure 46.Leadership Styles by Levels of Education

Table 26

Leadership Styles by Levels of Education

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	23.627[a]	10	.009	.010[b]	.007	.012
Likelihood Ratio	24.765	10	.006	.008[b]	.006	.010
Fisher's Exact Test	23.193			.006[b]	.004	.008
Linear-by-Linear Association	3.692[c]	1	.055	.060[b]	.054	.066
N of Valid Cases	497					

a. 4 cells (22.2%) have expected count less than 5. The minimum expected count is 1.23.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -1.921.

A post hoc analysis was conducted to examine the relationship between leadership styles and educational level. The Cramer's *V* was .15, suggesting a weak association between the two variables. Compared to its cohorts, free rein leaders are more likely to report some college (44.26%), autocratic leaders Master's degree (14.84%), and participatory leaders bachelor's degree (28.57%). It is interesting to note that a majority of respondents reported having attained some high school/GED or some college degrees. For instance, 44.26% of free rein leaders reported having attained some college degree while 32.79% reported attaining high school/GED degrees.

Leadership styles by leadership program. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and whether or not the subjects participated in a leadership program.

The relationship between these variables was significant, $\chi^2(2, N=495) = 7.09, p<.05$. The null hypothesis is rejected.

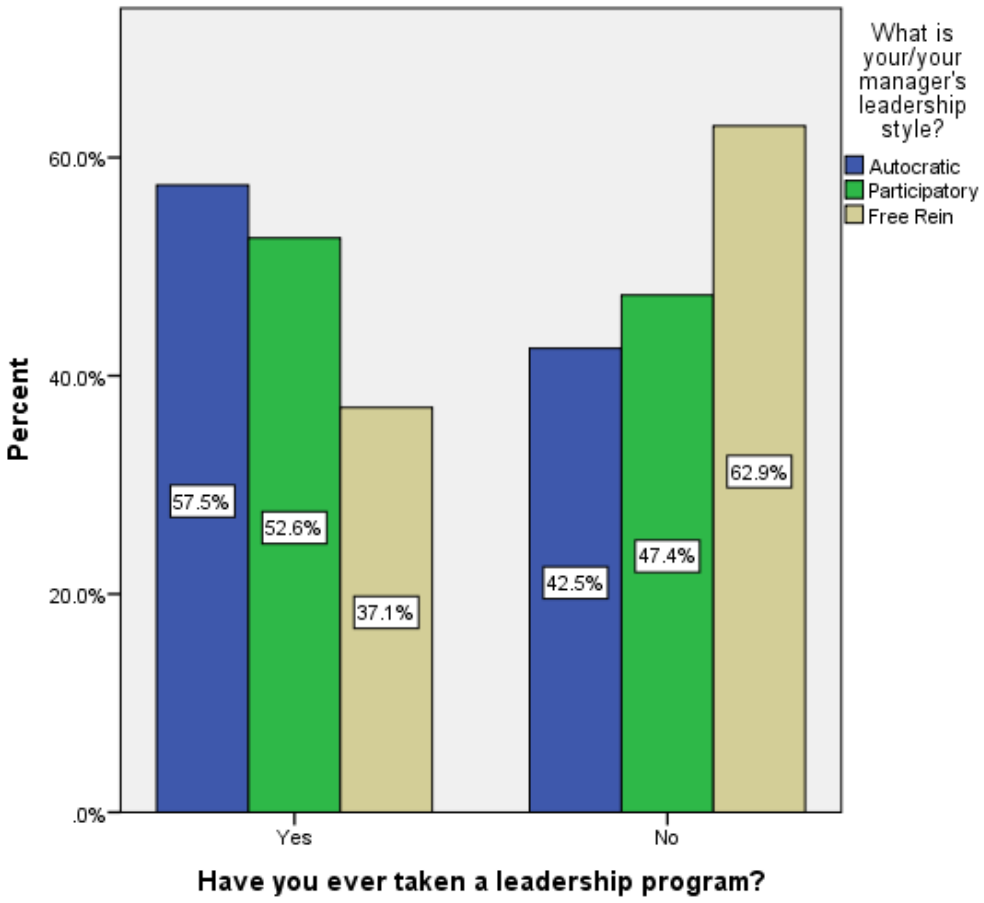


Figure 47.Leadership Styles by Leadership Program

Table 27

Leadership Styles by Leadership Program

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	7.089[a]	2	.029	.031[b]	.027	.035
Likelihood Ratio	7.137	2	.028	.030[b]	.026	.035
Fisher's Exact Test	7.061			.031[b]	.027	.035
Linear-by-Linear Association	5.852[c]	1	.016	.019[b]	.016	.023
N of Valid Cases	495					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 29.81.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is 2.419.

A post hoc analysis was conducted to examine the relationship between leadership styles and whether participants had taken a leadership program. The Cramer's *V* was .12, suggesting a weak association between the two variables. It is interesting to note that leaders differ in regard to taking leadership styles; autocratic leaders were more likely to say "yes" to taking a leadership style (57.5%) when compared to participatory (52.6%) and free rein leaders (37.1%). Conversely, free rein leaders were more likely to say "no" to taking a leadership style (62.9%), compared to participatory (47.4%) and autocratic leaders (42.5%).

Leadership styles by implementation of successful safety program. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and participant's perception of whether their organization has implemented a successful safety program. Respondents had options ranging from "strongly disagree", "disagree", "neither agree or disagree",

"agree", or "strongly agree." The relationship between these variables was significant, $\chi^2(2, N=495) = 7.09$, $p<.05$. The null hypothesis is rejected.

Figure 48.Leadership styles by implementation of successful safety program

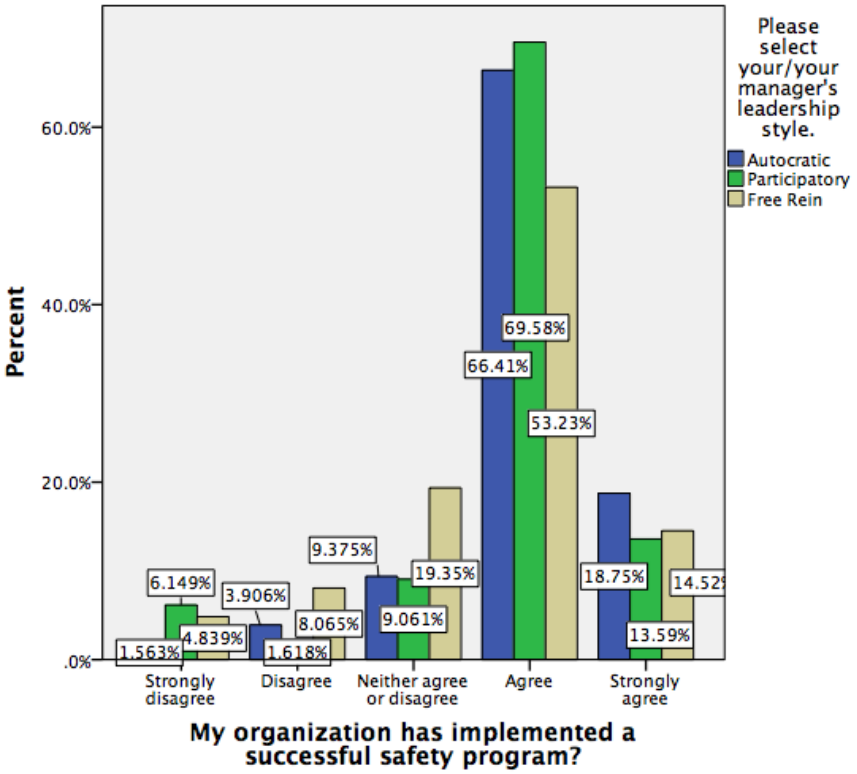


Table 28
Leadership Styles by Implementation of a Successful Safety Program

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	20.679[a]	8	.008	.009[b]	.006	.011
Likelihood Ratio	19.399	8	.013	.016[b]	.012	.019
Fisher's Exact Test	19.715			.008[b]	.006	.010
Linear-by-Linear Association	5.694[c]	1	.017	.017[b]	.014	.020
N of Valid Cases	499					

a. 3 cells (20.0%) have expected count less than 5. The minimum expected count is 1.86.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -2.386.

A post hoc analysis was conducted to examine the relationship between leadership styles and implementation of a successful safety program. The Cramer's *V* was .14, suggesting a weak association between the two variables. Autocratic leaders (66.4%) and participatory leaders (69.6%) were more likely to "agree" when compared to free rein leaders (53.23%). Furthermore, autocratic leaders (18.75%) were more likely to "strongly agree" with the statement, compared to participatory leaders (13.59%) and free rein leaders (14.52%)

Leadership styles by strong commitment to safety. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and commitment to safety. Respondents were asked whether they believed that their top managers had a strong commitment to safety; the choices were: "strongly disagree", "disagree", "neither agree or disagree", "agree", or "strongly agree." The relationship between these variables was significant, $\chi^2(8, N=496) = 27.32$, $p<.001$. The null hypothesis is rejected.

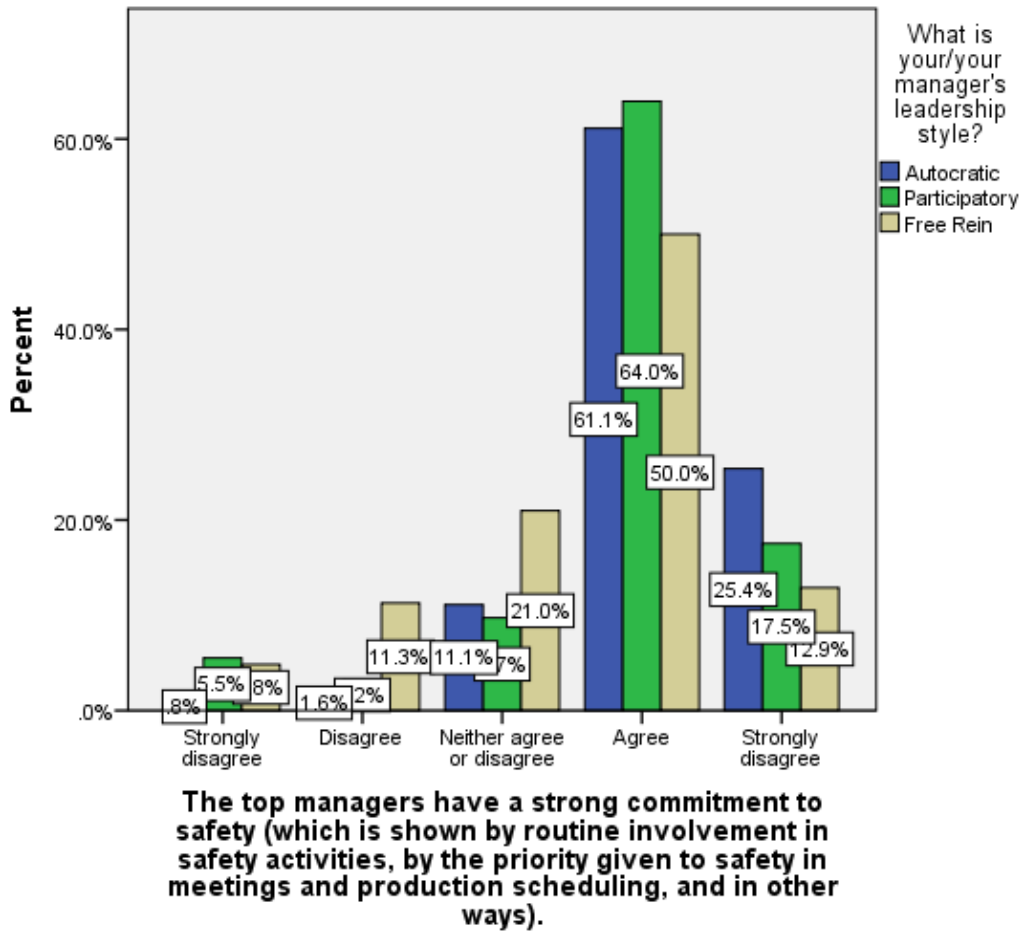


Figure 49.Leadership styles by strong commitment to safety

Table 29

Leadership Styles by Strong Commitment to Safety

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	27.323[a]	8	.001	.001[b]	.000	.002
Likelihood Ratio	25.444	8	.001	.003[b]	.001	.004
Fisher's Exact Test	24.654			.002[b]	.001	.002
Linear-by-Linear Association	15.084[c]	1	.000	.000[b]	.000	.001
N of Valid Cases	496					

a. 3 cells (20.0%) have expected count less than 5. The minimum expected count is 2.38.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -3.884.

A post hoc analysis was conducted to examine the relationship between leadership styles and strong commitment to safety by top managers. The Cramer's *V* was .16, suggesting a weak association between the two variables. Autocratic leaders (61.1%) and participatory leaders (64.0%) were more likely to "agree" when compared to free rein leaders (50.0%). Furthermore, autocratic leaders (25.4%) were more likely to "strongly agree" with the statement, compared to participatory leaders (17.5%) and free rein leaders (12.9%).

Leadership styles by direct manager prioritizing safety. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and direct manager prioritizing safety. Respondents were asked whether they believed that their direct managers prioritize safety; the choices ranged from "strongly disagree", "disagree", "neither agree or disagree", "agree", or "strongly agree." The relationship between these variables was significant, $\chi^2(8, N=498) = 34.60$, $p<.001$. The null hypothesis is rejected.

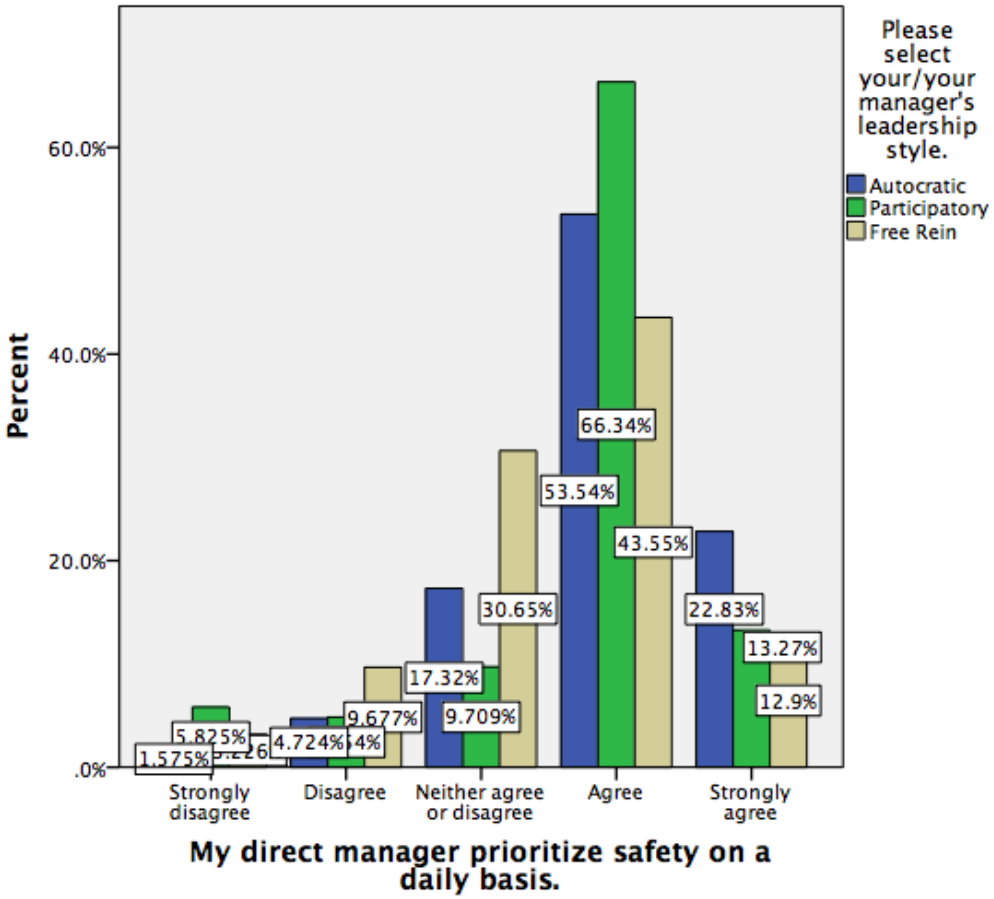


Figure 50. Leadership styles by direct manager prioritizing safety

Table 30

Leadership Styles by Direct Manager Prioritizing Safety

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	34.604[a]	8	.000	.000[b]	.000	.001
Likelihood Ratio	32.325	8	.000	.000[b]	.000	.000
Fisher's Exact Test	32.114			.000[b]	.000	.000
Linear-by-Linear Association	6.877[c]	1	.009	.010[b]	.007	.012
N of Valid Cases	498					

a. 2 cells (13.3%) have expected count less than 5. The minimum expected count is 2.74.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -2.622.

A post hoc analysis was conducted to examine the relationship between leadership styles and direct manager prioritizing safety on a daily basis. The Cramer's *V* was .18, suggesting a weak association between the two variables. Autocratic leaders (53.42%) and participatory leaders (66.340%) were more likely to "agree" when compared to free rein leaders (43.0%). Furthermore, autocratic leaders (22.81%) were more likely to "strongly agree" with the statement, compared to participatory leaders (13.27%) and free rein leaders (12.9%). Thus, when it comes to direct manager prioritizing safety, participatory leaders are more likely to "agree", autocratic leaders "strongly agree", and free rein "neither agree or disagree."

Leadership styles by feeling safe. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and feeling safe. Respondents were asked whether they believed that they feel safe; the choices ranged from "strongly disagree", "disagree", "neither agree or disagree", "agree", or "strongly agree." The relationship between these variables was significant, $\chi^2(8, N=497) = 17.21$, $p<.05$. The null hypothesis is rejected.

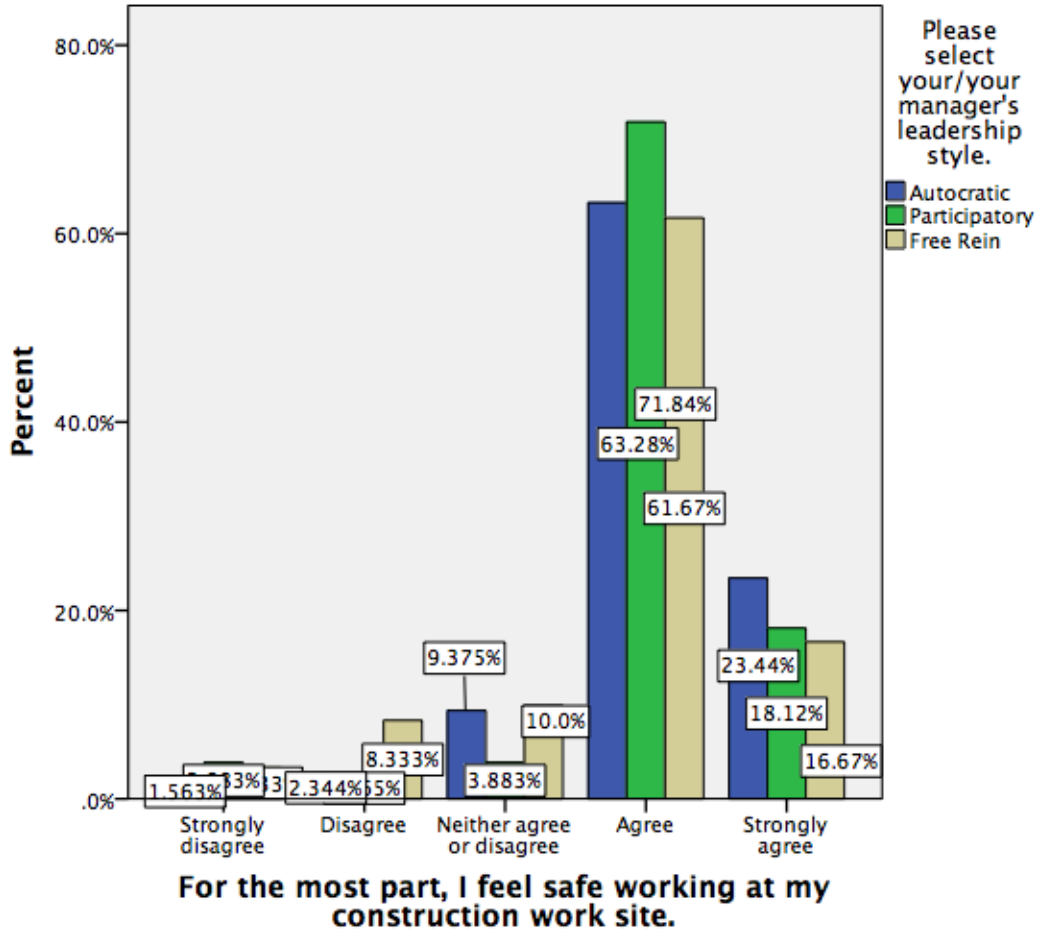


Figure 51.Leadership Styles by Feeling Safe

Table 31

Leadership Styles by Feeling Safety

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	17.200[a]	8	.028	.026[b]	.021	.030
Likelihood Ratio	15.367	8	.052	.071[b]	.064	.077
Fisher's Exact Test	16.042			.029[b]	.024	.033
Linear-by-Linear Association	3.248[c]	1	.072	.073[b]	.066	.079
N of Valid Cases	497					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is 1.81.
b. Based on 10000 sampled tables with starting seed 1304558784.
c. The standardized statistic is -1.802.

A post hoc analysis was conducted to examine the relationship between leadership styles and feeling safe. The Cramer's *V* was .13, suggesting a weak association between the two variables. Autocratic leaders (63.28%) and participatory leaders (71.84%) were more likely to "agree" when compared to free rein leaders (61.67%). Furthermore, autocratic leaders (23.44%) were more likely to "strongly agree" with the statement, compared to participatory leaders (18.12%) and free rein leaders (16.67%). Thus, when it comes to direct manager prioritizing safety, participatory leaders are more likely to "agree", autocratic leaders "strongly agree", and free rein "neither agree or disagree."

Leadership styles by organizational size. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and organizational size. Choices for organizational size ranged from 1-50, 51-250, 251-500, 501-1,000, and 1,000+. The relationship between these variables was significant, $\chi^2(8, N=499) = 18.65$, $p<.05$. The null hypothesis is rejected.

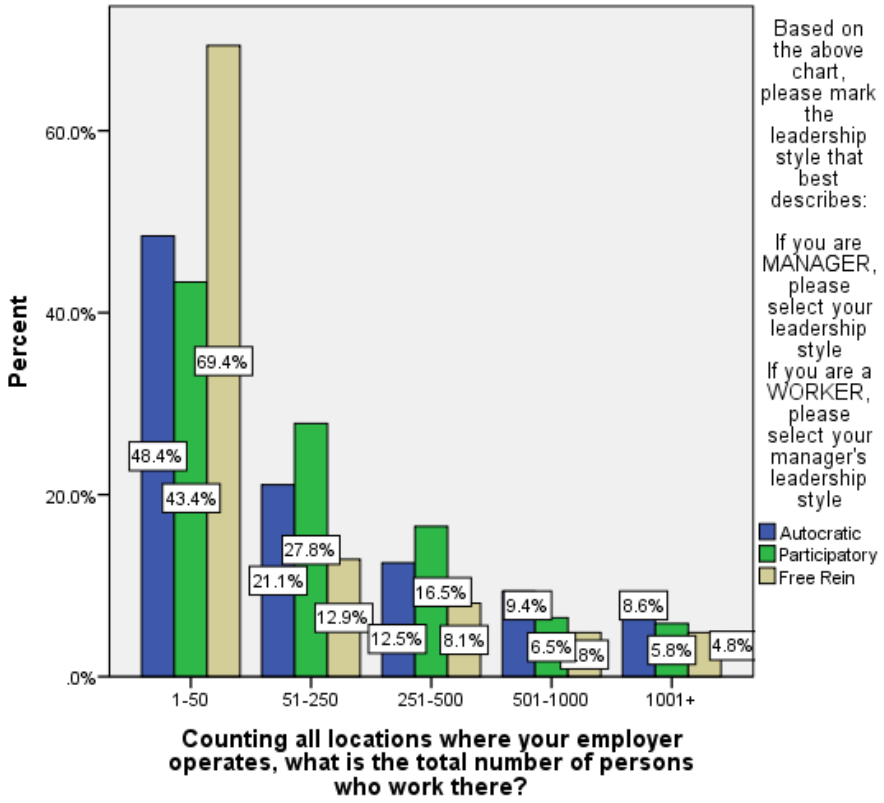


Figure 52. Leadership styles by organizational size

Table 32

Leadership Styles by Organizational Size

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	18.659[a]	8	.017	.018[b]	.014	.021
Likelihood Ratio	18.803	8	.016	.021[b]	.017	.024
Fisher's Exact Test	17.838			.021[b]	.017	.024
Linear-by-Linear Association	4.331[c]	1	.037	.036[b]	.031	.041
N of Valid Cases	499					

a. 2 cells (13.3%) have expected count less than 5. The minimum expected count is 3.98.
b. Based on 10000 sampled tables with starting seed 23202691.
c. The standardized statistic is -2.081.

A post hoc analysis was conducted to examine the relationship between leadership styles and organizational size. The Cramer's *V* was .14, suggesting a weak association between the two variables. While a majority of the participants belonged to organizations between 1-50 workers, free rein leaders particularly had the highest concentration at 69.4%, followed by autocratic leaders at 48.4%, and participatory leaders at 43.4%. Compared to free rein and autocratic leaders, participatory leaders were more present with larger organizations: 27.8% for 51-250 size and 16.5% for 201-500 size. This is also the case for autocratic leaders.

Leadership styles by CSS1. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to how quickly the organization solves the problem when advised of safety hazards. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=485) = 13.73$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS2. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to insisting on thorough regular safety audits and inspection. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=485) = 13.74$, $p>.05$. The null hypothesis is accepted.

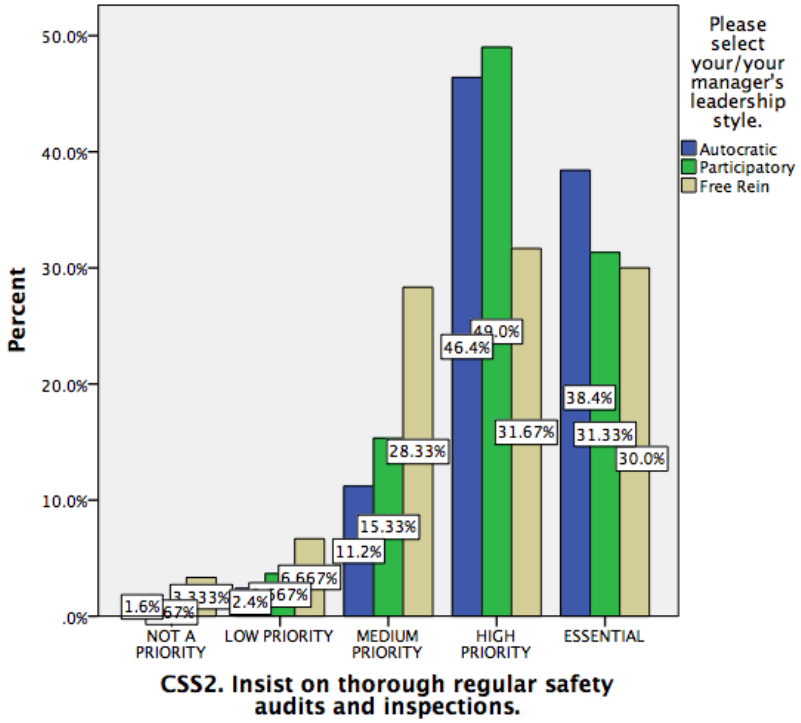


Figure 53. Leadership Styles by CSS2

Table 33

Leadership Styles by CSS2

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	17.463[a]	8	.026	.029[b]	.024	.033
Likelihood Ratio	16.108	8	.041	.053[b]	.047	.059
Fisher's Exact Test	17.131			.023[b]	.019	.026
Linear-by-Linear Association	7.357[c]	1	.007	.008[b]	.006	.010
N of Valid Cases	485					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .74.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.712.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey relating to insisting on thorough regular safety audits and inspection. The Cramer's *V* was .10, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to view regular safety audits and inspections as "essential" and "high priority" while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority." That is, free rein leaders were evenly split between viewing CSS2 as "medium priority," "high priority," and "essential."

Leadership styles by CSS3. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to working to continually improve safety levels in all departments. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=484) = 9.86$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS4. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to providing all of the equipment necessarily to do the job well. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=483) = 14.85$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS5. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to being strict about continuing to work safely when work falls behind schedule. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=485) = 23.48$, $p<.05$. The null hypothesis is rejected.

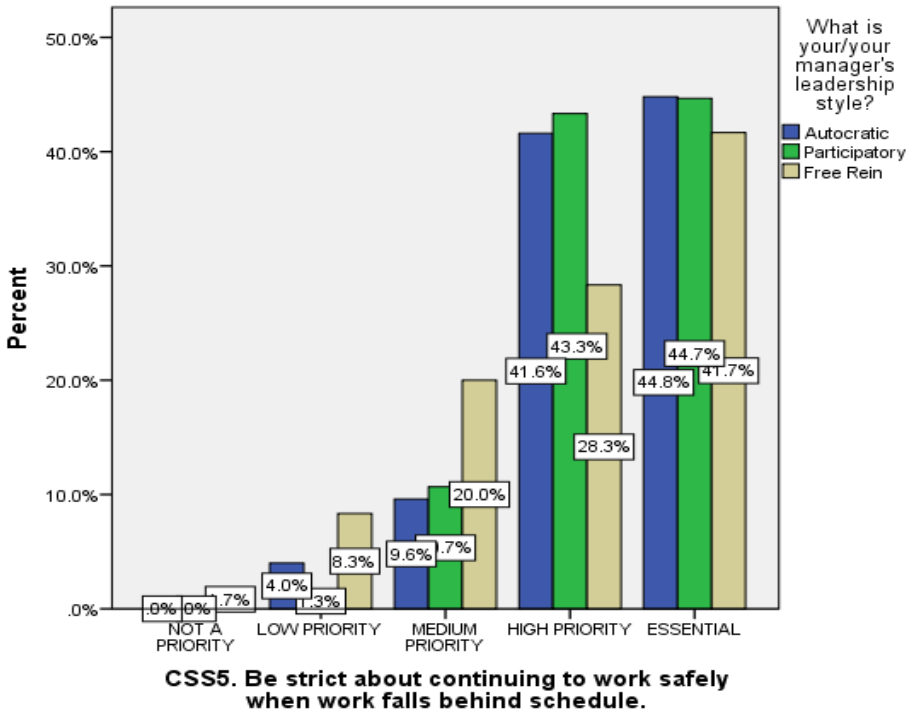


Figure 54. Leadership styles by CSS5

Table 34

Leadership styles by CSS5

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	23.484[a]	8	.003	.005[b]	.003	.006
Likelihood Ratio	18.696	8	.017	.014[b]	.011	.017
Fisher's Exact Test	19.646			.007[b]	.005	.010
Linear-by-Linear Association	2.578[c]	1	.108	.115[b]	.107	.124
N of Valid Cases	485					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .12.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -1.606.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey relating to being strict about continuing to work safely when work falls behind schedule. The Cramer's *V* was .16, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to view regular safety audits and inspections as "essential" and "high priority" while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority." That is, free rein leaders were evenly split between viewing CSS5 as "medium priority," "high priority," and "essential."

Leadership styles by CSS6. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to quickly correcting any safety hazard (even if costly). Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=485) = 14.41$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS7. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to providing detailed safety reports to workers (e.g. injuries, near accidents). Choices were "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=483) = 16.77$, $p<.05$. The null hypothesis is rejected.

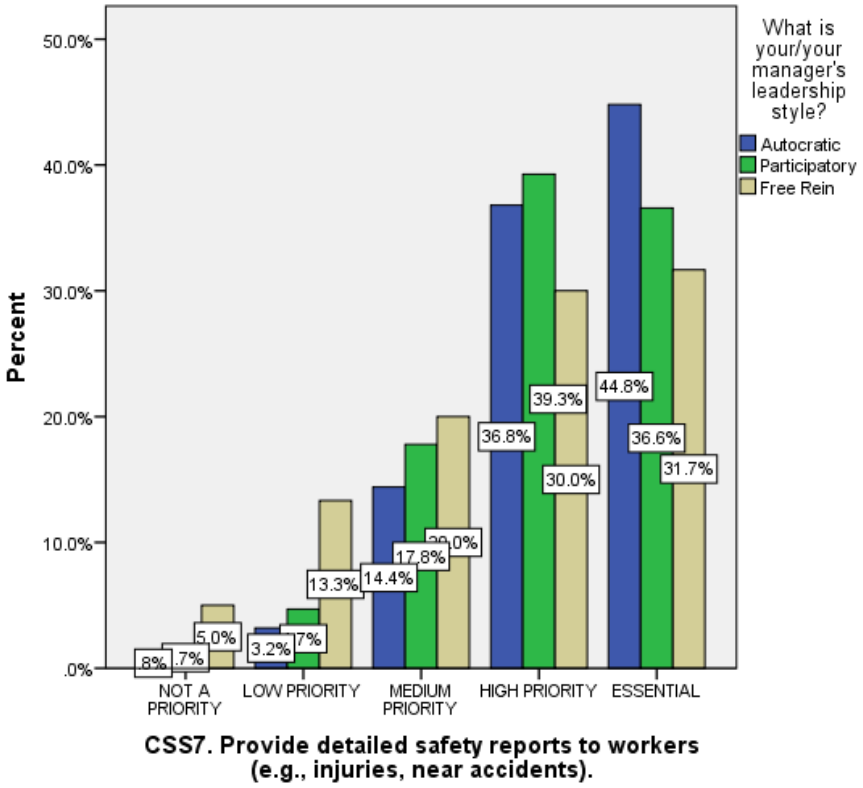


Figure 55.Leadership styles by CSS7

Table 35

Leadership Styles by CSS7

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	16.766[a]	8	.033	.035[b]	.031	.040
Likelihood Ratio	14.140	8	.078	.094[b]	.086	.101
Fisher's Exact Test	14.525			.057[b]	.051	.063
Linear-by-Linear Association	10.716[c]	1	.001	.002[b]	.001	.003
N of Valid Cases	483					

a. 3 cells (20.0%) have expected count less than 5. The minimum expected count is 1.12.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -3.274.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey relating to being strict about continuing to work safely when work falls behind schedule. The Cramer's *V* was .16, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to view regular safety audits and inspections as "essential" and "high priority" while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority." That is, free rein leaders were evenly split between viewing CSS7 as "medium priority," "high priority," and "essential."

Leadership styles by CSS8. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to considering a worker's safety behavior when moving-promoting people. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=499) = 18.66$, $p<.05$. The null hypothesis is rejected.

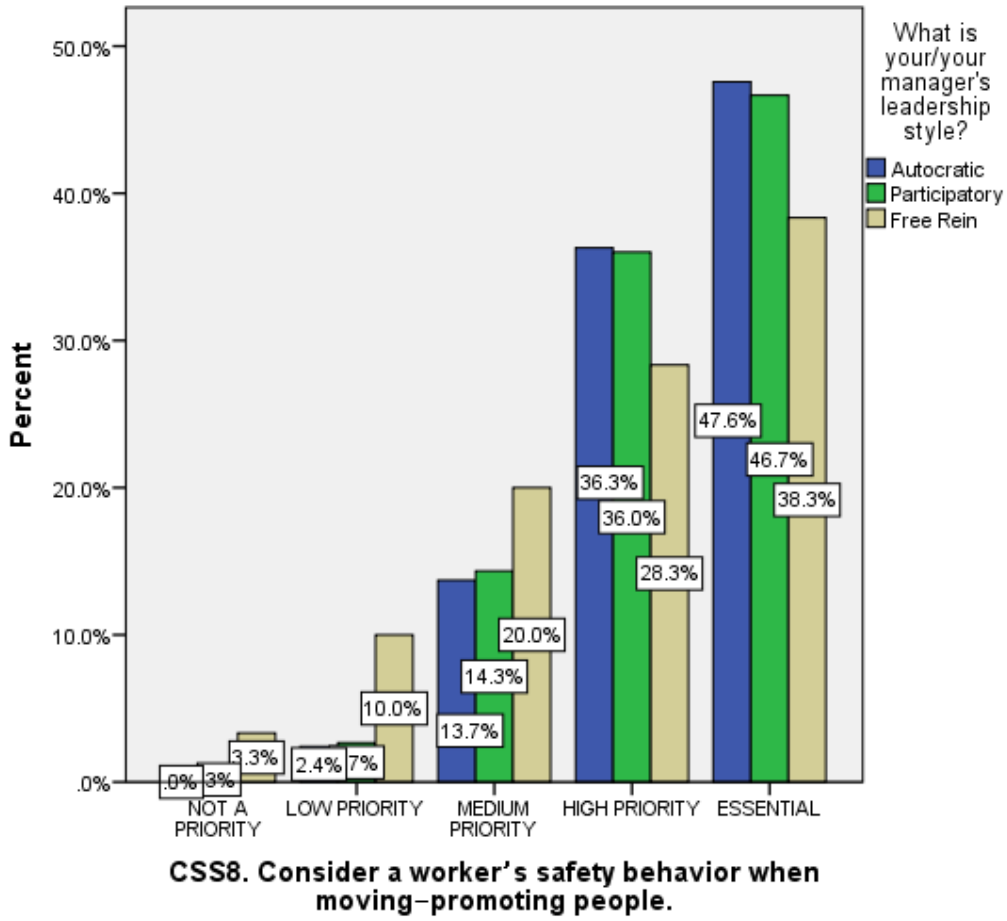


Figure 56.Leadership styles by CSS8

Table 36

Leadership Styles by CSS8

Chi-Square Tests

	Value	df	Asymp. Sig. (2-	Monte Carlo Sig. (2-sided)

			sided)	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	19.513[a]	8	.012	.016[b]	.013	.019
Likelihood Ratio	14.394	8	.072	.080[b]	.073	.087
Fisher's Exact Test	14.503			.050[b]	.044	.056
Linear-by-Linear Association	6.269[c]	1	.012	.013[b]	.010	.016
N of Valid Cases	484					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .37.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.504.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey relating to considering a worker's safety behavior when moving-promoting people. The Cramer's *V* was .14, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to consider a worker's safety behavior when moving-promoting people as "essential" and "high priority," while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority." That is, free rein leaders were evenly split between viewing CSS8 as "medium priority," "high priority," and "essential."

Leadership styles by CSS9. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to requiring each manager to help improve safety in his/her department. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=483) = 23.68$, $p<.05$. The null hypothesis is rejected.

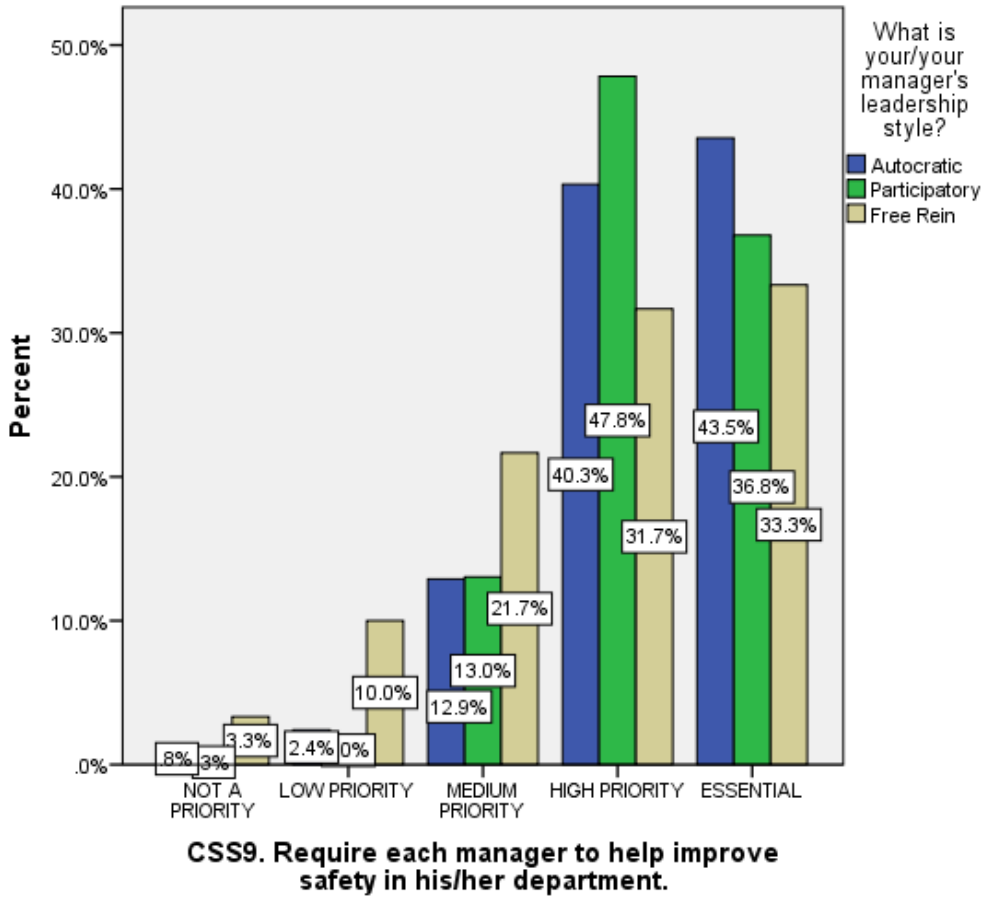


Figure 57. Leadership Styles by CSS9

Table 37

Leadership Styles by CSS9

Chi-Square Tests

	Value	df	Asymp. Sig. (2-	Monte Carlo Sig. (2-sided)

			sided)	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	23.681[a]	8	.003	.004[b]	.003	.006
Likelihood Ratio	18.551	8	.017	.021[b]	.017	.024
Fisher's Exact Test	19.911			.009[b]	.006	.011
Linear-by-Linear Association	7.437[c]	1	.006	.007[b]	.005	.009
N of Valid Cases	483					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .50.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.727.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey relating to requiring each manager to help improve safety in his/her department. The Cramer's *V* was .16, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to consider a manager to help improve safety in his/her department as "essential" and "high priority," while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority." That is, free rein leaders were evenly split between viewing CSS8 as "medium priority," "high priority," and "essential."

Leadership styles by CSS10. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to investing a lot of time and money in safety training for workers. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=481) = 24.01$, $p<.05$. The null hypothesis is rejected.

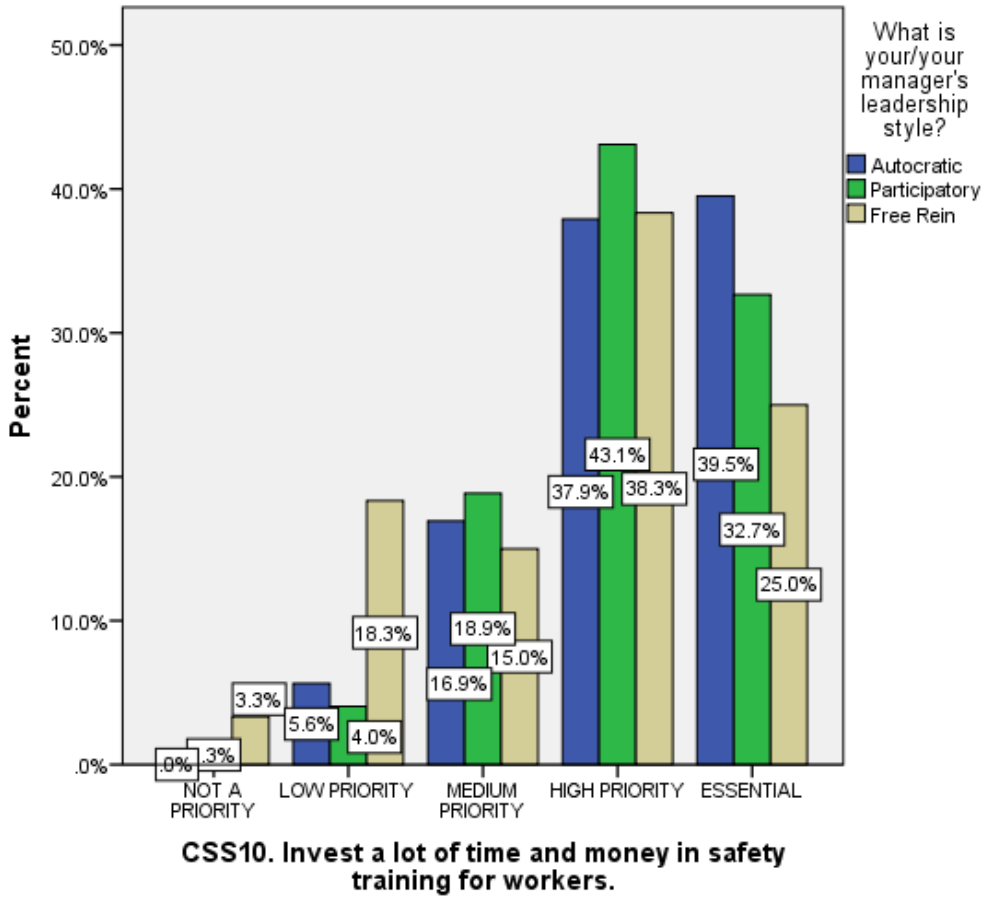


Figure 58.Leadership styles by CSS10

Table 38

Leadership Styles by CSS10

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	24.010[a]	8	.002	.003[b]	.002	.005
Likelihood Ratio	20.426	8	.009	.012[b]	.009	.015
Fisher's Exact Test	19.515			.009[b]	.007	.012
Linear-by-Linear Association	8.608[c]	1	.003	.004[b]	.002	.005
N of Valid Cases	481					

a. 4 cells (26.7%) have expected count less than 5. The minimum expected count is .75.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.934.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey to investing a lot of time and money in safety training for workers. The Cramer's *V* was .16, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to consider investing a lot of time and money in safety training as "essential", "high priority", and "medium priority" while free rein leaders were ranked lower than their counterparts and were more likely to consider it as "medium priority" and "low priority."

Leadership styles by CSS11. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to using any available information to improve existing safety rules. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=484) = 13.21$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS12. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to listening carefully to worker's ideas about improving safety. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(8, N=484) = 13.21$, $p>.05$. The null hypothesis is accepted.

Leadership styles by CSS13. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to considering safety when setting production speed and schedules. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=482) = 26.75$, $p<.001$. The null hypothesis is rejected.

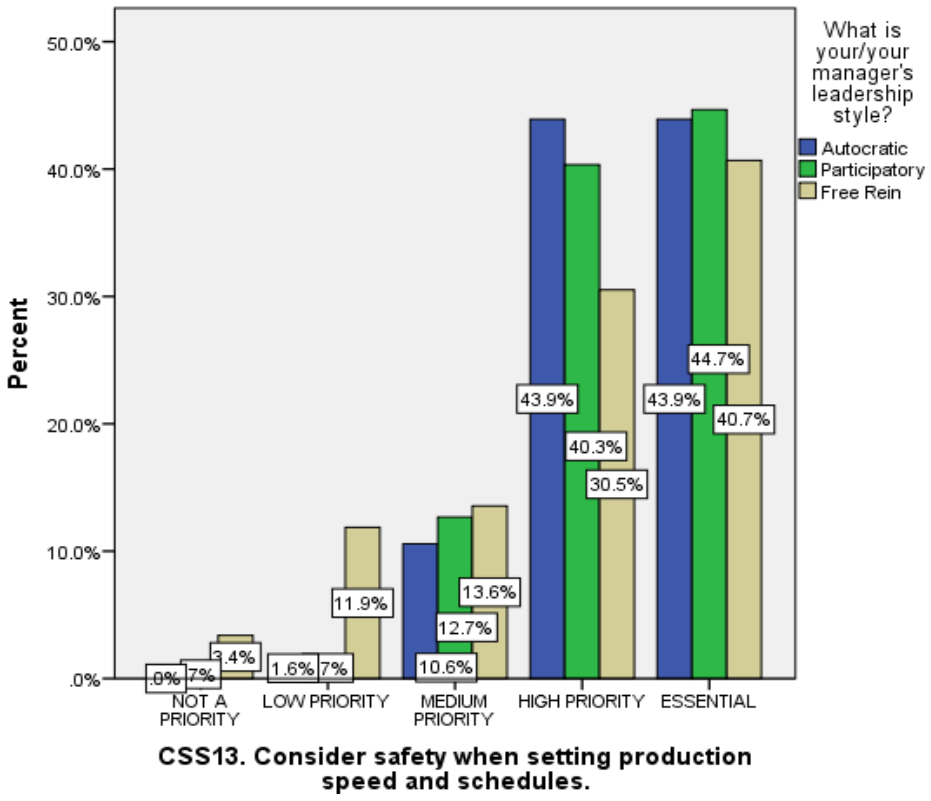


Figure 59. Leadership Styles by CSS13

Table 39

Leadership Styles by CSS13

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	26.749[a]	8	.001	.002[b]	.001	.002
Likelihood Ratio	19.092	8	.014	.018[b]	.015	.022
Fisher's Exact Test	18.751			.011[b]	.008	.014
Linear-by-Linear Association	5.567[c]	1	.018	.020[b]	.016	.023
N of Valid Cases	482					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .49.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.360.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey to considering safety when setting production speed and schedules. The Cramer's *V* was .17, suggesting a weak association between the two variables. Autocratic and participatory leaders were more likely to considering safety when setting production speed and schedules as "essential", "high priority", and "medium priority," while free rein leaders were ranked lower than their counterparts and ranged in "low priority", "medium priority", and "low priority."

Leadership styles by CSS14. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to providing workers with a lot of information on safety issues. Choices ranged from "not a priority," "low priority",

"medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=480) = 42.28$, $p<.001$. The null hypothesis is rejected.

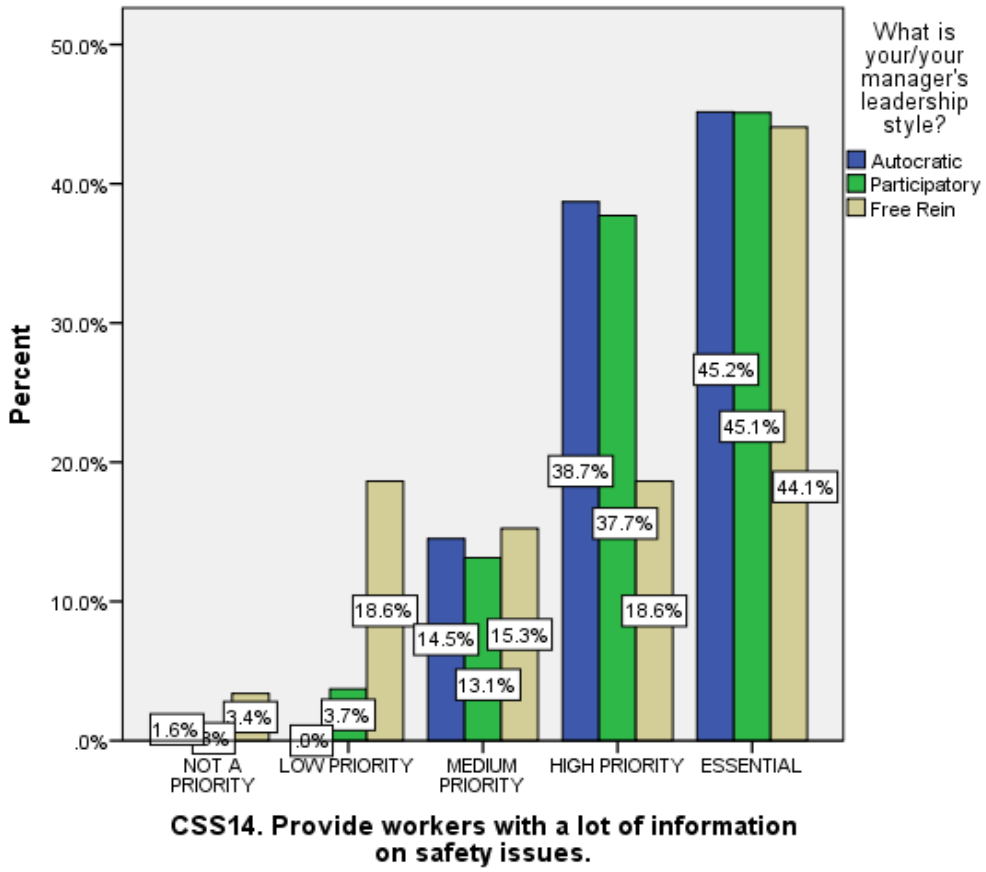


Figure 60.Leadership styles by CSS14

Table 40

Leadership Styles by CSS14

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	42.278[a]	8	.000	.000[b]	.000	.000
Likelihood Ratio	37.103	8	.000	.000[b]	.000	.000
Fisher's Exact Test	35.166			.000[b]	.000	.000
Linear-by-Linear Association	6.506[c]	1	.011	.013[b]	.010	.016

N of Valid Cases 480

a. 4 cells (26.7%) have expected count less than 5. The minimum expected count is .61.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.551.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey to considering safety when setting production speed and schedules. The Cramer's *V* was .20, suggesting a moderate association between the two variables. Autocratic and participatory leaders were more likely to considering safety when setting production speed and schedules as "essential", "high priority", and "medium priority," while free rein leaders were ranked lower than their counterparts and ranged in "low priority", "medium priority", and "low priority."

Leadership styles by CSS15. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to regularly held safety-awareness events (e.g., presentations, ceremonies). Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=481) = 15.86$, $p<.05$. The null hypothesis is rejected.

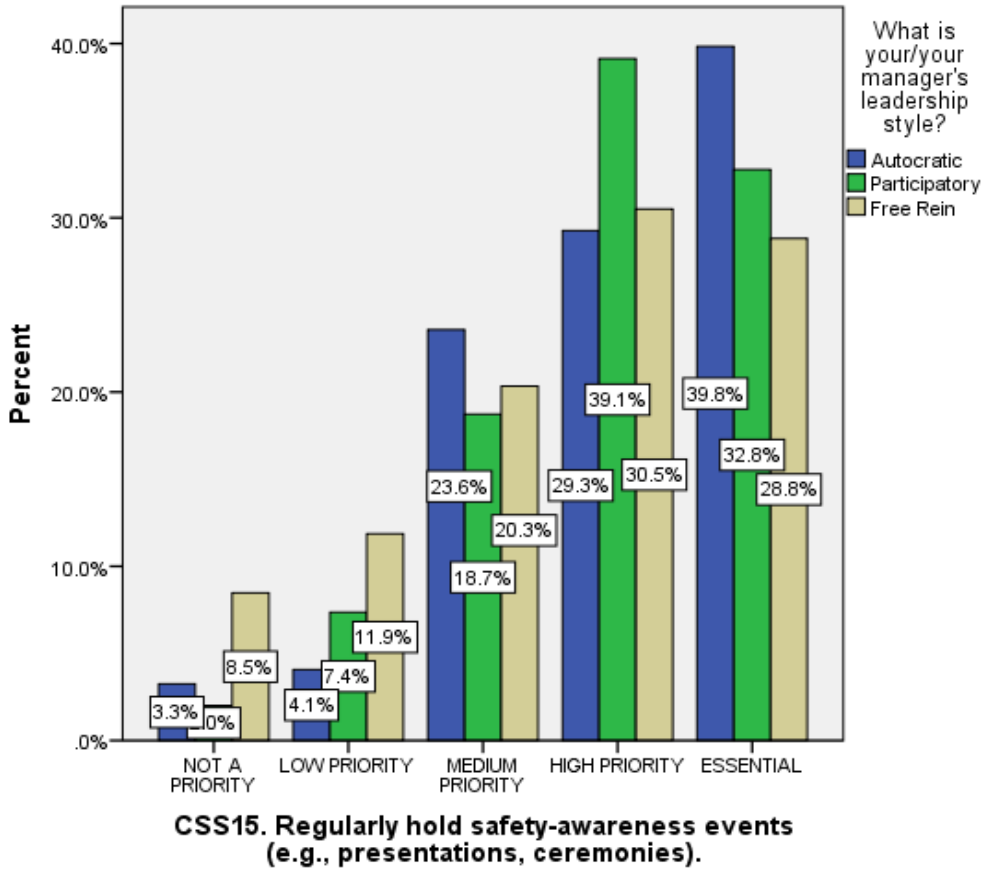


Figure 61.Leadership styles by CSS15

Table 41

Leadership Styles by CSS15

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	15.851[a]	8	.045	.044[b]	.039	.049
Likelihood Ratio	14.245	8	.076	.091[b]	.083	.098
Fisher's Exact Test	14.834			.055[b]	.049	.061
Linear-by-Linear Association	4.147[c]	1	.042	.045[b]	.040	.050
N of Valid Cases	481					

a. 3 cells (20.0%) have expected count less than 5. The minimum expected count is 1.84.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.036.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey to considering safety when setting production speed and schedules. The Cramer's *V* was .13, suggesting a weak association between the two variables. Autocratic leaders are more likely to view CSS15 as "essential" by 39.8% when compared to participatory and free rein at 32.8% and 28.8%, respectively. Participatory leaders are more likely to report it as "high priority" at 39.1% compared to free rein and autocratic leaders at 30.5% and 29.3%, respectively.

Leadership styles by CSS16. A Chi-square test of independence was calculated to determine the relationship between leadership (autocratic, participatory, and free rein) styles and the culture of climate survey relating to regularly hold safety-awareness events (e.g., presentations, ceremonies). Choices ranged from "not a priority," "low priority", to "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(8, N=483) = 16.75, p<.05$. The null hypothesis is rejected.

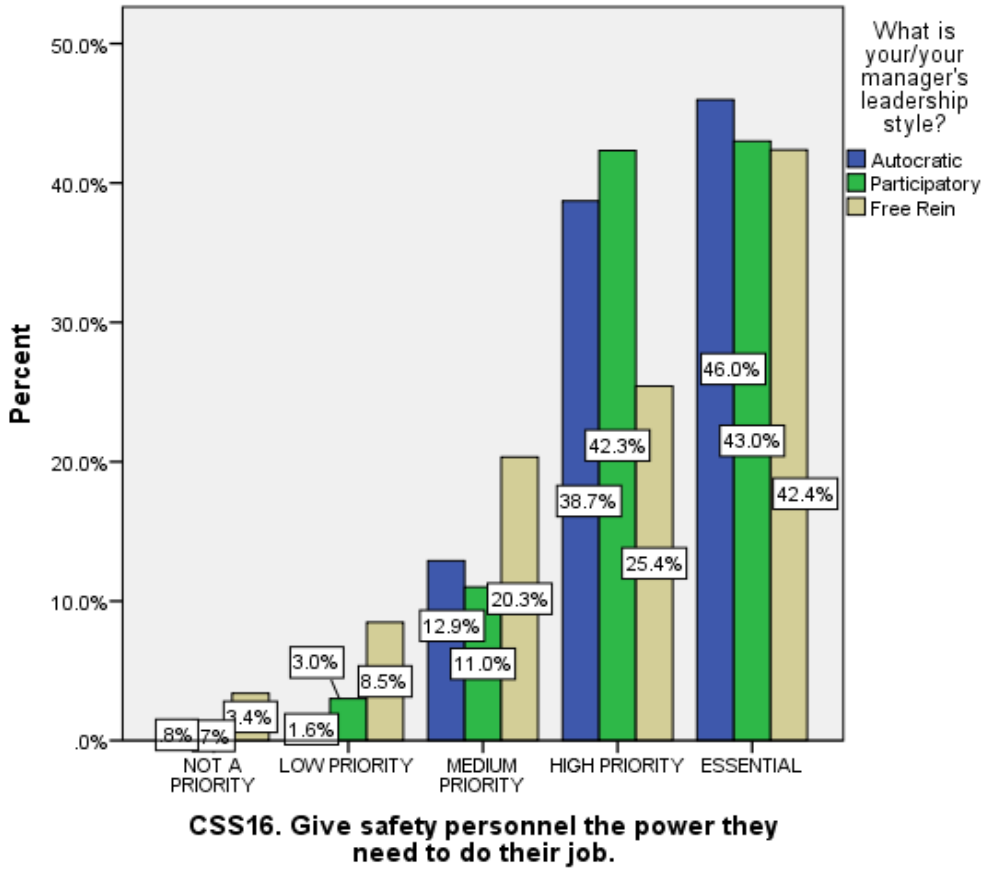


Figure 62.Leadership styles by CSS16

Table 42

Leadership Styles by CSS16

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	16.751[a]	8	.033	.036[b]	.031	.041
Likelihood Ratio	14.426	8	.071	.088[b]	.081	.095
Fisher's Exact Test	15.494			.038[b]	.033	.043
Linear-by-Linear Association	4.125[c]	1	.042	.045[b]	.039	.050
N of Valid Cases	483					

a. 5 cells (33.3%) have expected count less than 5. The minimum expected count is .61.
b. Based on 10000 sampled tables with starting seed 1157648955.
c. The standardized statistic is -2.031.

A post hoc analysis was conducted to examine the relationship between leadership styles and the culture of climate survey to considering safety when setting production speed and schedules. The Cramer's *V* was .14, suggesting a weak association between the two variables. Autocratic leaders are more likely to view CSS16 as "essential" at 46.0% when compared to participatory and free rein at 43.0% and 42.4%, respectively. Participatory leaders are more likely to report it as "high priority" at 42.3%, compared to free rein and autocratic leaders at 25.4% and 38.7%, respectively.

Organizational Size by Climate and Culture of Safety

Organizational size by educational level. A Chi-square test of independence was calculated to determine the relationship between organizational size and educational level. Participants were asked to rank their educational level with answers including: did not complete high school, high school/GED, some college, bachelor's degree, master's degree, and advanced graduate work or PhD level. The relationship between these variables was significant, $\chi^2(20, N=502) = 65.14$, $p<.001$. The null hypothesis is rejected.

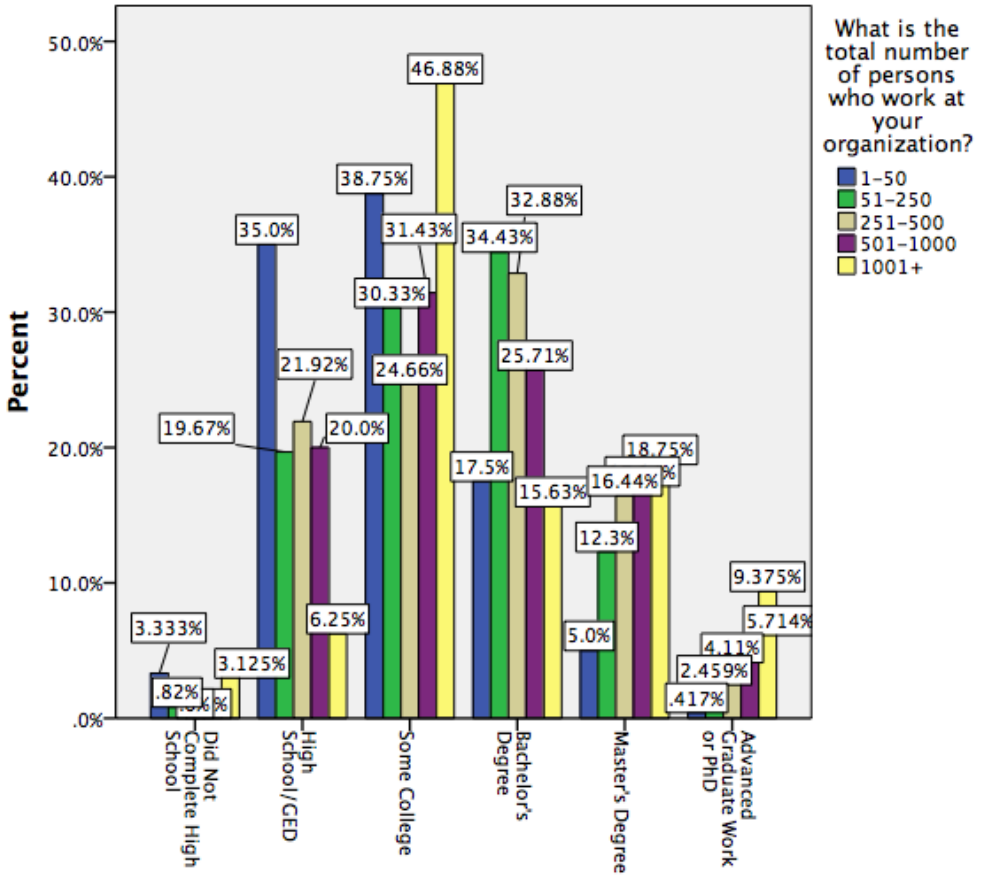


Figure 63.Organizational size by educational level

Table 43

Organizational Size by Educational Level

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	65.138[a]	20	.000	.000[b]	.000	.000
Likelihood Ratio	67.837	20	.000	.000[b]	.000	.000
Fisher's Exact Test	65.261			.000[b]	.000	.000
Linear-by-Linear Association	36.757[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	502					

a. 11 cells (36.7%) have expected count less than 5. The minimum expected count is .64.

b. Based on 10000 sampled tables with starting seed 2000000.

c. The standardized statistic is 6.063.

A post hoc analysis was conducted to determine the relationship between organizational size and educational level. The Cramer's *V* was .18, suggesting a weak association between the two variables. It is interesting to note that 46.88% of those belonging to 1000+ company size reported having some level of college, though slightly positively skewed towards bachelor's degree and above. Those belonging to 1-50 company size were less educated compared to their counterparts, with a majority straddling between high school (35.0%) and some college (38.75%). Those belonging to 51-250 company size were slightly more educated, with the majority straddling between some college (30.33%) and bachelor's degree (34.43%). It is also interesting to note that those with a master's degree were more likely to belong to 51+ size organizations.

Organizational size by leadership program. A Chi-square test of independence was calculated to determine the relationship between organizational size and whether or not the participants took a leadership program. The relationship between these variables was significant, $\chi^2(4, N=502) = 36.02$, $p<.001$. The null hypothesis is rejected.

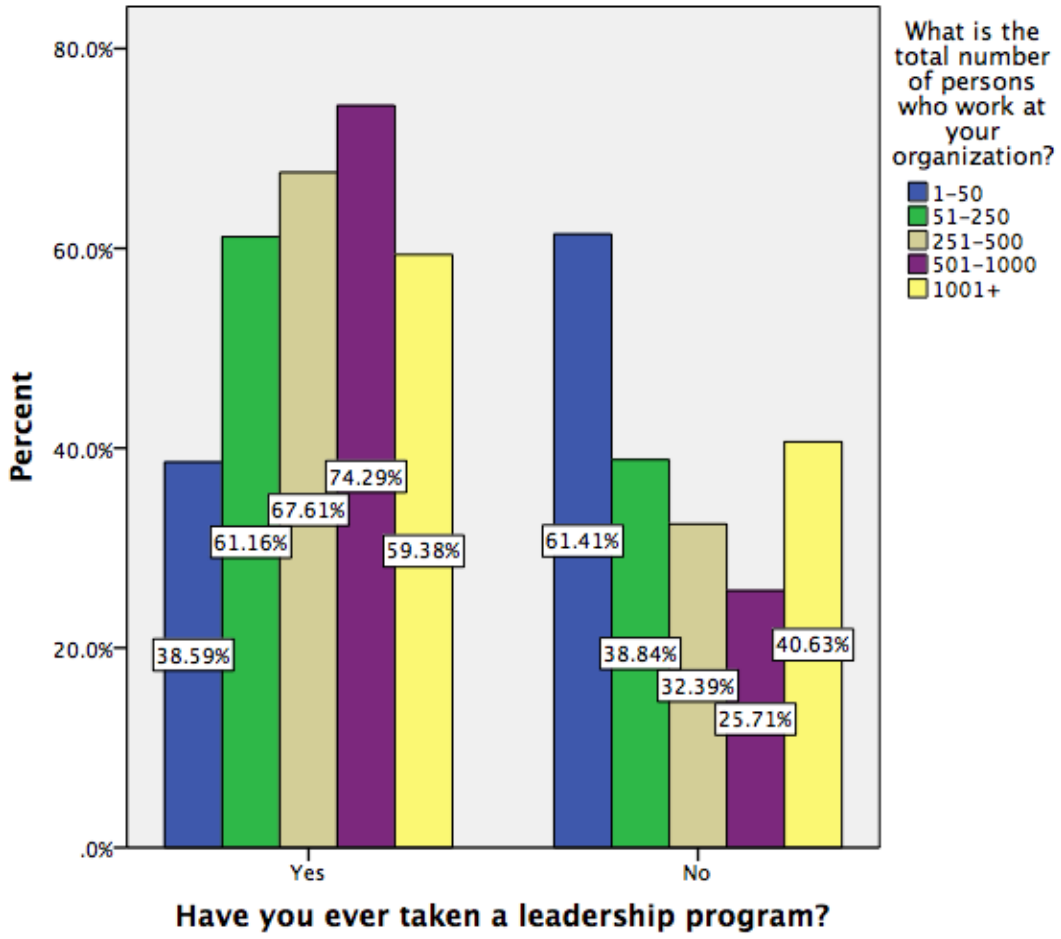


Figure 64. Organizational Size by Leadership Program

Table 44

Organizational Size by Leadership Program

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	36.019[a]	4	.000	.000[b]	.000	.000
Likelihood Ratio	36.682	4	.000	.000[b]	.000	.000
Fisher's Exact Test	36.199			.000[b]	.000	.000
Linear-by-Linear Association	23.595[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	500					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.36.
b. Based on 10000 sampled tables with starting seed 334431365.
c. The standardized statistic is -4.857.

A post hoc analysis was conducted to determine the relationship between organizational size and whether or not they took a leadership program. The Cramer's *V* was .27, suggesting a weak association between the two variables. Those belonging to 501-1000 were more likely to report taking a leadership program (74.29% compared to 25.71%), followed by 251-500 (67.61% compared to 32.39%), 51-250 (61.16% compared to 38.84%), and 100+ (59.38% compared to 40.63%). Consequently, those

who belong to the 1-50 organizational size were less likely to take a leadership program with 61.41% reporting “no” compared to the 38.59% “yes.”

Organizational size by CSS1. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to how quickly the organization solved the problem when advised of safety hazards. Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was not significant, $\chi^2(16, N=487) = 14.53$, $p>.05$. The null hypothesis is accepted.

Organizational size by CSS2. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to insisting on thorough, regular safety audits and inspections. Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was significant, $\chi^2(16, N=487) = 39.03$, $p<.001$. The null hypothesis is rejected.

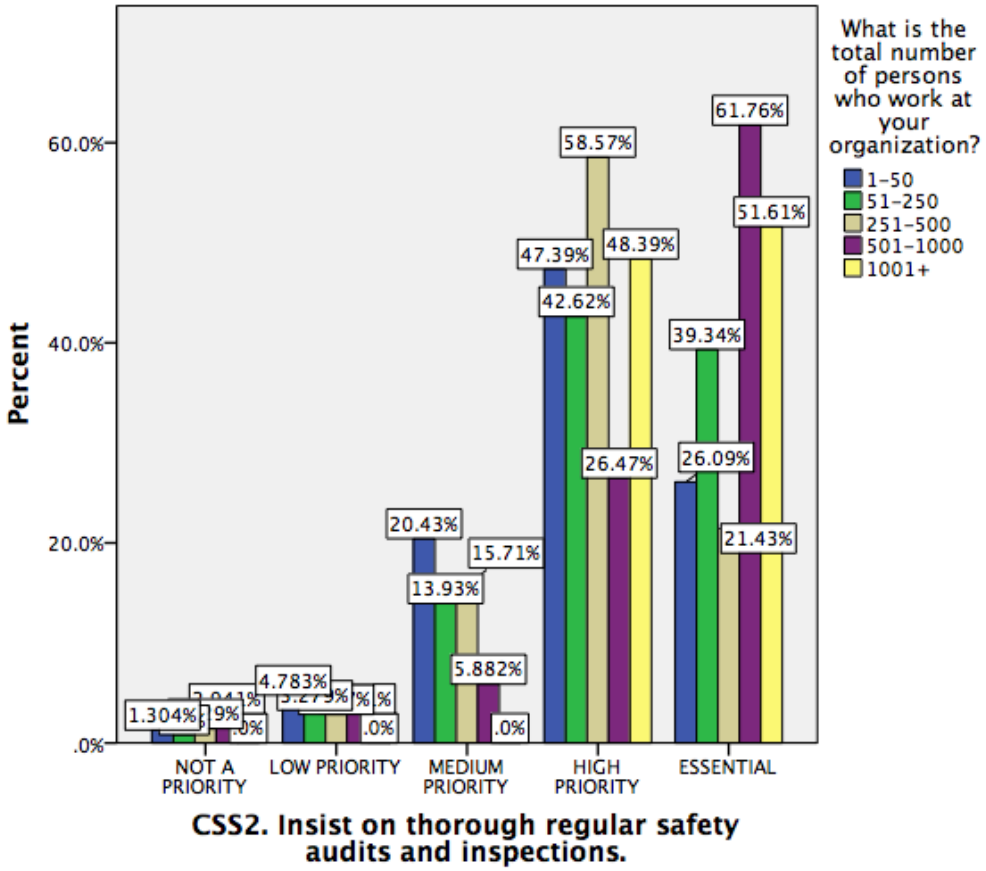


Figure 65. Organizational size by CSS2

Table 44

Organizational size by CSS2

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	39.031[a]	16	.001	.003[b]	.002	.005
Likelihood Ratio	44.261	16	.000	.000[b]	.000	.000
Fisher's Exact Test	38.667			.000[b]	.000	.000
Linear-by-Linear Association	15.560[c]	1	.000	.000[b]	.000	.001
N of Valid Cases	487					

a. 10 cells (40.0%) have expected count less than 5. The minimum expected count is .38.
b. Based on 10000 sampled tables with starting seed 1801792942.
c. The standardized statistic is 3.945.

A post hoc analysis was conducted to determine the relationship between organizational size and CSS2. The Cramer's *V* was .14, suggesting a weak association between the two variables. Those belonging 500+ organization were more likely to view CSS2 as essential, while those below 500 were more likely to view it as a "high priority." Thus, larger organizations were more likely to view CSS2 as more essential and high priority when compared to its cohorts.

Organizational size by CSS3. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to working to continually improve safety levels in all departments. Choices ranged from "not a priority," "low priority", to "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=486) = 22.393, p>.05$. The null hypothesis is accepted.

Organizational size by CSS4. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to working to continually improve safety levels in all departments. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=485) = 10.16, p>.05$. The null hypothesis is accepted.

Organizational size by CSS5. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to being strict about continuing to work safely when work falls behind

schedule. Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was not significant, $\chi^2(16, N=485) = 9.137, p>.05$. The null hypothesis is accepted.

Organizational size by CSS6. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to quickly correcting any safety hazard (even if it is costly). Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was not significant, $\chi^2(16, N=487) = 9.34, p>.05$. The null hypothesis is accepted.

Organizational size by CSS7. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to providing detailed safety reports to workers (e.g. injuries, near accidents). Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was not significant, $\chi^2(16, N=485) = 15.67, p>.05$. The null hypothesis is accepted.

Organizational size by CSS8. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to considering a worker’s safety behavior when moving-promoting people. Choices ranged from “not a priority,” “low priority”, “medium priority”, “high priority”, and “essential.” The relationship between these variables was not significant, $\chi^2(16, N=486) = 12.88, p>.05$. The null hypothesis is accepted.

Organizational size by CSS9. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to requiring each manager to help improve safety in his/her department. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(16, N=485) = 33.91, p<.05$. The null hypothesis is rejected.

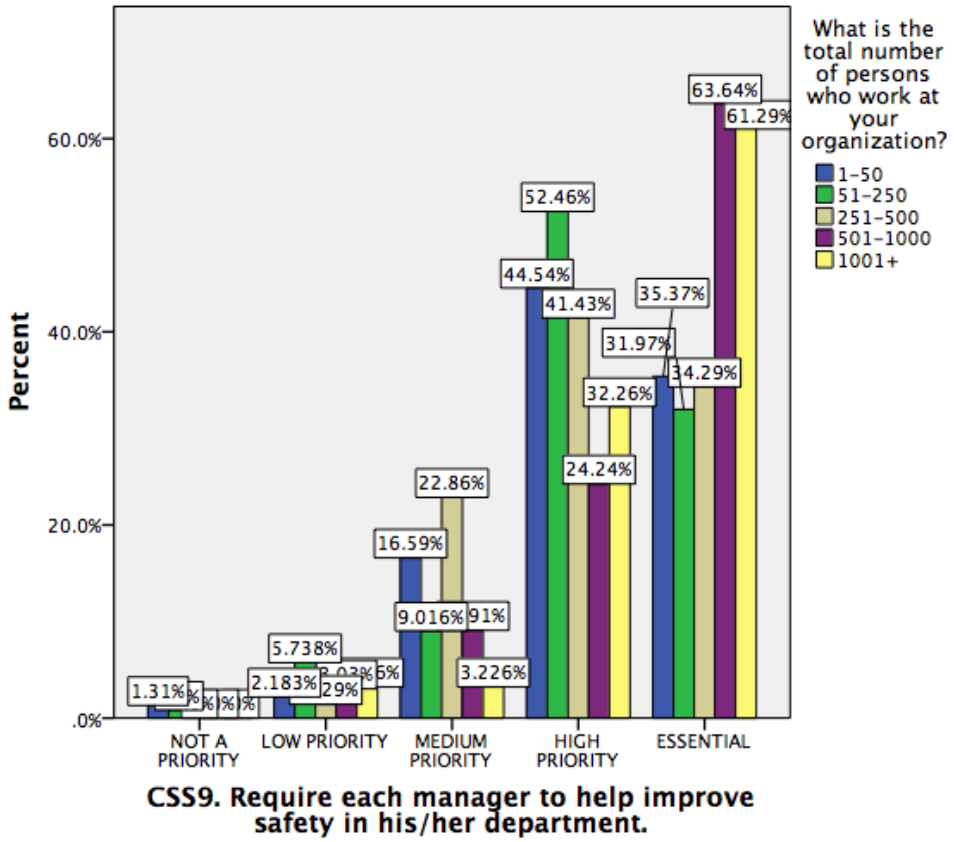


Figure 66. Organizational size by CSS9

Table 45

Organizational Size by CSS9

Chi-Square Tests

	Value	df	Asymp. Sig. (2-	Monte Carlo Sig. (2-sided)

			sided)	Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	33.908[a]	16	.006	.011[b]	.008	.013
Likelihood Ratio	34.562	16	.005	.004[b]	.003	.006
Fisher's Exact Test	31.378			.005[b]	.003	.006
Linear-by-Linear Association	7.752[c]	1	.005	.007[b]	.005	.009
N of Valid Cases	485					

a. 11 cells (44.0%) have expected count less than 5. The minimum expected count is .26.
b. Based on 10000 sampled tables with starting seed 1801792942.
c. The standardized statistic is 2.784.

A post hoc analysis was conducted to determine the relationship between organizational size styles and CSS9. The Cramer's *V* was .13 suggesting a very weak association between the two variables. Those belonging 500+ organization were more likely to view CSS9 as "essential" while those below 500 were more likely to view it as a "high priority."

Organizational size by CSS10. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to investing a lot of time and money in safety training for workers. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(16, N=483) = 35.82$, $p<.05$. The null hypothesis is rejected.

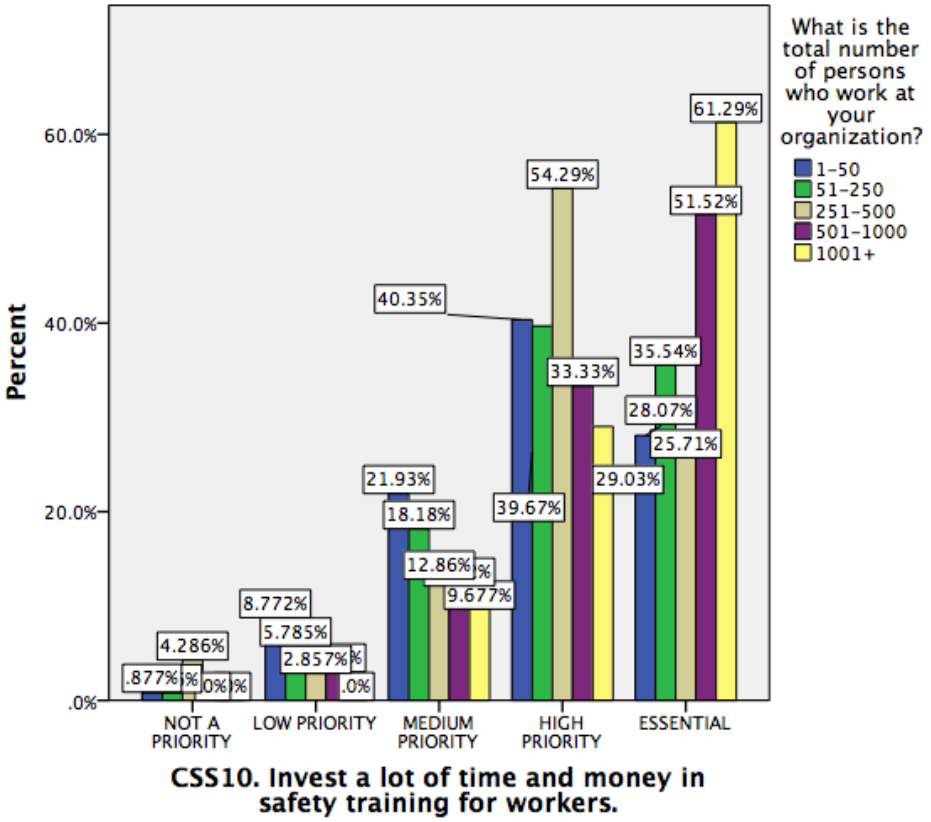


Figure 67. Organizational size by CSS10

Table 46

Organizational size by CSS10

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	35.821[a]	16	.003	.006[b]	.004	.008
Likelihood Ratio	35.242	16	.004	.005[b]	.003	.007
Fisher's Exact Test	30.064			.009[b]	.006	.011
Linear-by-Linear Association	15.440[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	483					

a. 8 cells (32.0%) have expected count less than 5. The minimum expected count is .39.
b. Based on 10000 sampled tables with starting seed 1801792942.
c. The standardized statistic is 3.929.

A post hoc analysis was conducted to determine the relationship between organizational size styles and CSS10. The Cramer's *V* was .14, suggesting a weak association between the two variables. Those belonging 500+ organization were more likely to view CSS10 as "essential" while those below 500 were more likely to view it as a "high priority."

Organizational size by CSS11. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to using any available information to improve existing safety rules. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=486) = 24.63, p>.05$. The null hypothesis is accepted.

Organizational size by CSS12. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to listening carefully to worker's ideas about improving safety. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=486) = 13.28, p>.05$. The null hypothesis is accepted.

Organizational size by CSS13. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to considering safety when setting production speed and schedule. Choices ranged from "not a priority," "low priority", "medium priority", "high

priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=484) = 18.50, p>.05$. The null hypothesis is accepted.

Organizational size by CSS14. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to providing workers with a lot of information on safety issues. Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was not significant, $\chi^2(16, N=482) = 10.58, p>.05$. The null hypothesis is accepted.

Organizational size by CSS15. A Chi-square test of independence was calculated to determine the relationship between organizational size styles and the culture of climate survey relating to regularly holding safety-awareness events (e.g., presentations, ceremonies). Choices ranged from "not a priority," "low priority", "medium priority", "high priority", and "essential." The relationship between these variables was significant, $\chi^2(16, N=483) = 28.77, p<.05$. The null hypothesis is rejected.

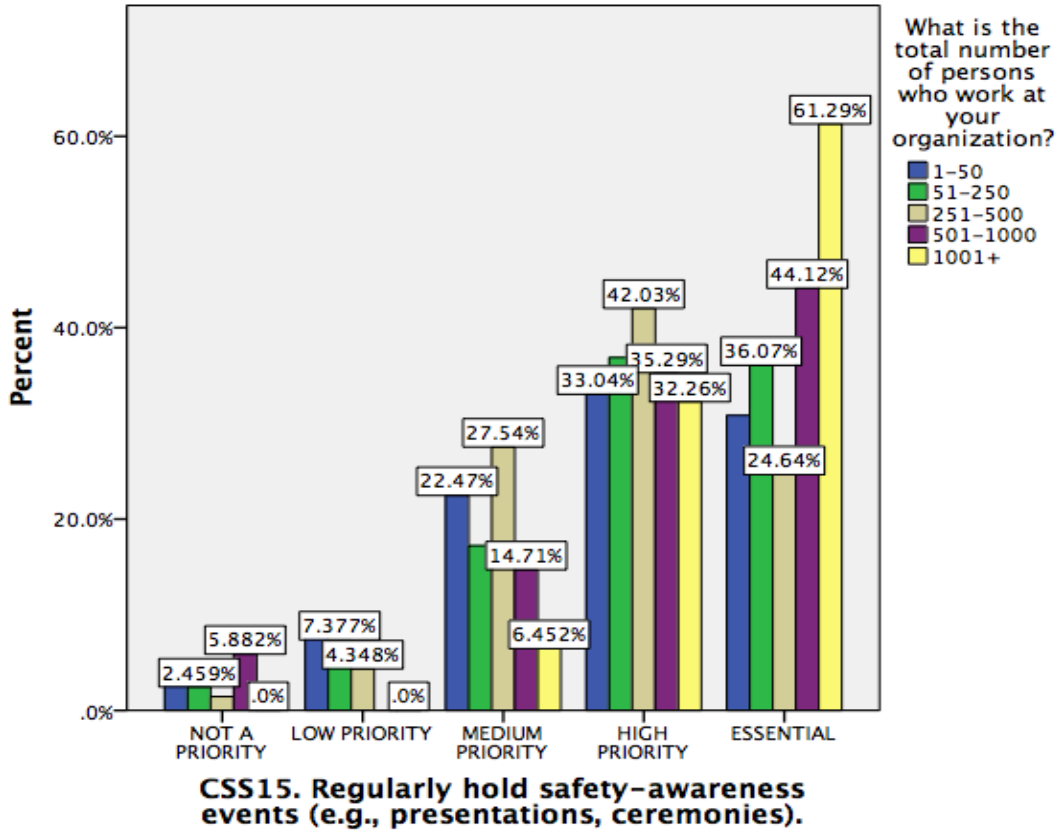


Figure 68. Organizational size by CSS15

Table 47

Organizational Size by CSS15

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided) Sig.	99% Confidence Interval Lower Bound	Upper Bound
Pearson Chi-Square	35.821[a]	16	.003	.006[b]	.004	.008
Likelihood Ratio	35.242	16	.004	.005[b]	.003	.007
Fisher's Exact Test	30.064			.009[b]	.006	.011
Linear-by-Linear Association	15.440[c]	1	.000	.000[b]	.000	.000
N of Valid Cases	483					

a. 8 cells (32.0%) have expected count less than 5. The minimum expected count is .39.
b. Based on 10000 sampled tables with starting seed 1801792942.
c. The standardized statistic is 3.929.

A post hoc analysis was conducted to determine the relationship between organizational size styles and CSS15. The Cramer's *V* was .12, suggesting a weak association between the two variables. Those belonging 500+ organization were more likely to view CSS15 as "essential" while those below 500 were more likely to view it as a "high priority" or "medium priority."

Chapter 6: Discussion, Conclusion, and Recommendations

While the study of safety within the construction industry has spanned over the last three decades, the emphasis of safety as a systemic issue is a relatively new concept, as is the need for full recognition by the construction industry of the powerful role it plays as a key stakeholder in the systemic organizational interplay between the industry and individual organizations regarding safety. Yet, the understanding of a need to protect the worker is a topic with a robust history, including discussion, research, and debate with roots in a struggle for the recognition that the labor force has a right not only to fair wages, but also a safe work environment. This realization has been addressed in the fields of politics and economics as well as the social sciences, but it has rarely addressed the fact that the construction industry is in conflict with itself. The construction industry neglects to effectively explore the multiplicity within the etiology of conflict—that of the industry, the individual job site, the worker, and the manager—and the perception of safety at the macro-level, the mezzo-level entities, and finally the micro-level through specific work tasks. It is the cornerstone of not only understanding the conflict, but of moving from awareness and comprehension to action and solutions that are best explored through systems theory and the utilization of the Marxist theory.

The study also rendered insight into better addressing the needs of small construction companies that account for the largest portion of the industry. While they may lack the resources of larger companies, because of their ability to disseminate information and initiate organizational change more quickly as a result

of their size, smaller companies may be in the position to implement more proactive rather than reactive approaches to worker safety.

Purpose

Despite the creation of OSHA more than 30 years ago, the construction industry has yet to effectively integrate a large-scale, sustainable, and replicable model of construction safety initiated of and by the industry demanding the emergence of forums that facilitate necessary discussions to ensure that management does more than address safety at the macro-level (i.e., culture of safety). This research argued that both managers and workers already put a high priority on safety. Yet this does not seem to be enough, as the Construction Industry of and to itself has been unable to effectively offer integrated solutions that would support a shift from placing the blame on the worker to recognizing the true systemic nature of both the industry and the activities it engenders at the construction job site. Furthermore, it argued for the need to reevaluate at all levels of construction safety regarding policy construct, the design, and the decision-making processes of those who rank highest in the system hierarchy.

The purpose of this research was to explore the perception of climate of safety among construction managers and workers and also to determine if there was a relationship between the perception of safety and the three distinct leadership styles – authoritarian, participatory, and free rein. Additionally, this study endeavored to find if certain demographics within the construction industry had any statistical relevance regarding the aforementioned areas of investigation. Specifically, the characteristics of

age, gender, geographic location of the worker and/or manager, level of education, union affiliation, and company size were utilized in an effort to further extrapolate any interdependence between groups and variables.

This study was also interested in the macro-level conflict within the construction industry, as this industry has continued to lead a very public call to action for job site/worker safety. While construction safety has been the driving force behind all projects, the levels of severe and fatal injuries across the continuum of the construction field have surpassed all other industries. This issue is crucial to the industry as it is inherently hazardous; as such, safety and the exposure of the worker to unsafe conditions, unsafe acts, or a combination of both must be addressed.

Key Findings from Study

This study explored the different factors contributing to how safety is experienced and perceived within construction organizations. It considered how managers and workers regard safety, how the varying types of leadership style may perceive these concerns differently, and finally how the size of the organization may influence the prioritization of safety.

Managers and workers with regard to safety concerns

The first research question sought to explore the relationship between managerial status and the perception of safety concerns. Specifically, it was concerned with the issue of whether workers and managers were aligned with regard to safety concerns. While most managers and workers were relatively similar in their level of agreement that safety

is of high importance in the work environment, there were several differences worth noting. First, although both managers and workers view the construction contract in general, and regard safety specifically as important, managers tended to rate it at a higher level of priority. Managers were also slightly more likely to report that their organization had implemented successful safety programs and to endorse the idea that their top managers have a strong commitment to safety. Compared to workers, managers were more likely to emphasize the importance of helping to improve their safety department and affording safety personnel the power they needed to do their job. Despite these differences, having access to the necessary safety equipment was generally considered to be a high priority despite managerial status or leadership styles.

Although workers viewed enforcing regular safety audits and inspections as a priority, managers were more likely to view this as essential for the work environment. Managers were also slightly more likely to promote investing time and money in safety training, providing workers with information on safety issues, and holding safety-awareness events. Managers also tended to prioritize quick responses to safety hazards, continuing to work safely, and considering safety when setting production speed and schedules beyond workers. Furthermore, managers were more likely to put a higher importance on listening to workers' concerns and continuing to improve safety levels regardless of leadership styles. Providing detailed safety reports and considering workers' safety behavior when considering promotions was generally perceived to be a high priority across both managerial positions despite leadership style.

Overall, while both managers and workers endorsed similar levels of importance of the construction contract and safety concerns, managers were slightly more likely to consider their companies as having strong commitments to safety concerns and improvements in the workplace. Furthermore, managers were also more concerned with implementing safety programs and considering safety when developing the success and productivity of their company.

Leadership styles with regard to safety concerns

The second research question explored whether different types of leadership styles (autocratic, participatory, and free rein) differed in regard to the perception of safety. While the majority of managers considered the construction contract and overall safety concerns as very important, autocratic leaders tended to report a higher level of importance across the different safety concerns and their commitment to safety compared to the other leadership styles. This was found to be true because autocratic leaders tend to develop in larger organizations where there are greater resources and a greater number of codified policies and procedures set forth by macro-level management. Autocratic leaders were more likely to perceive their construction site as safe when compared to free rein or participatory leaders. Furthermore, they emphasized the importance of providing detailed safety reports to workers (injuries, near accidents, etc.) above participatory and even more so than those who adopted a free rein leadership style.

Although participatory leaders were more likely to consider safety a high priority when compared to free rein leaders, autocratic leaders were more likely to place the highest level of importance and commitment across all safety concerns. Autocratic and

participatory leaders tended to perceive their organizations as having implemented a successful safety program and their top managers as having a strong commitment to prioritizing safety. They were also much more likely than free rein leaders to prioritize the need to provide safety personnel the power to do their job, endorse regular safety audits and inspections, and continue to work safely when work falls behind schedule. Consequently, free rein leaders were less concerned about a worker's safety behavior when considering promotion or providing workers with information on safety issues compared to the other two leadership styles. Autocratic leaders, followed by participatory leaders, tended to place a greater emphasis on regular safety-awareness events compared to free rein leaders.

The majority of managers across leadership styles tended to place a high level of importance on correcting any safety hazard despite the cost. However, autocratic and participatory leaders were more likely to not only endorse investment of time and money in safety training, but also consider safety when setting production speed and schedules compared to free rein leaders, who were less likely to report this aspect as an important aspect in the work place.

These results suggested that autocratic leaders tended to perceive safety concerns in general with the highest priority, while participatory leaders followed closely behind. Individuals that identified with a free rein leadership style were less likely to rate these concerns as high priorities. Furthermore, autocratic and participatory leaders tended to be more interested in maintaining and correcting safety concerns in the work environment despite the cost. Consequently, they were more likely to belong to larger organizations,

and larger organizations may have more resources to invest. Taking into consideration organizational size, larger organizations were more likely to view investment in safety concerns as a higher priority when compared to smaller companies, despite managerial status or leadership style. In essence, larger corporations were more likely to invest in the maintenance and correction of safety in the work place. Furthermore, free rein leaders tended to belong to smaller organizations of 1-50 workers, while participatory and autocratic were more present within larger organizations.

Organizational size with regard to safety concerns

The third main research question sought to determine if organizational size impacted the perception of safety. Organizational size did not differ in many aspects of safety concerns in the work place. Across all organizational sizes, there was a high level of importance and priority placed on improving safety levels and rules, continuing to work safely when work falls behind schedule, providing detailed safety reports to workers, considering a worker's safety behavior during promotions, listening to workers ideas about improving safety, considering safety when setting production speed and schedule, providing workers with information on safety issues, or giving safety personnel the power to do their job. Yet, managers in small companies were more likely to be free rein leaders when compared to their mid and large-sized counterparts.

Managers, specifically autocratic or participatory leaders, were more likely to prioritize safety audits and were more likely to belong to larger organizations. Those belonging to larger organizations were also more likely to place a higher level of

importance on requiring each manager to help improve safety in his/her department. They were also more likely to prioritize investment in safety training and safety-awareness events.

In essence, the research suggested that larger organizations may place a greater emphasis on each manager's responsibility in creating a safer environment due to the fact that they have a larger number of workers to maintain. They were also more likely to have resources to invest in safety trainings and programs to ensure their commitment to creating a safe work environment. Consequently, larger organizations were more likely to have autocratic leaders, who, by nature, are concerned with following the rules and regulations.

Recommendations for Future Research

This research explored the perception of safety climate on the construction jobsite by both workers and managers. It also examined how the perception of safety climate could be impacted by different leadership styles and how these findings could bring the construction industry from one that is in conflict with itself to one that is focused on understanding possible alternative ways to approach safety management. This study was neither meant to show causation nor be predictive, but rather uncover the true nature of why an industry that has a rich tradition of calling for a greater priority to be given to measuring safety effectively has repeatedly been unable to do so. Many in the industry did not know how to react when OSHA and the BLS reported an increase in 2015 in fatal construction injuries, as this seemed counterintuitive to the programs, policies, and

procedures that had been implemented over the last decade and were meant to keep the worker free from unsafe acts, unsafe conditions or a combination of both.

The reaction was unfortunately silence—or, at best, an inclination to regress into a debate about lagging indicators and frequency—rather than severity in an attempt to make sense of what was clearly a flawed system and inadequate resources. To be effective, construction safety must emphasize the need for an integrated safety management approach involving macro, mezzo, and micro level directives starting at the broadest level, the macro, and include policies and procedures such as those found in the construction contract and subcontracts. When discussing the macro level constructs, it is important to note that these forces are established at the highest level of management as a means of creating a clear and concise blueprint upon which all safety decisions are implemented, reinforced, and monitored. Furthermore, this approach uses a top-down/bottom-up approach regarding the dissemination of necessary safety-related issues. When managed correctly and responsibly, these initiatives create a strong systemic climate of safety that ultimately engenders the necessary and effective information loop between management and the worker.

Jobsite relationships are based on communication. This communication becomes the foundation upon which expectations are prioritized, as they first are documented in writing, which must include measurable outcomes and leave no room for interpretation when communicated to the worker (Parboteeah & Kapp, 2008). Building upon the foundation of perception of climate of safety, the construction jobsite and the safety issues influenced by leadership styles cannot be seen as resulting from one single safety

act or omission. More specifically, organizational influences, contracts, subcontracts, master agreements, unsafe supervision, preconditions for unsafe acts and unsafe conditions or a combination of all, are where the real issue of understanding the problem exists. Further, it allows for the potential of solutions to be realized when information is effectively categorized and, in turn, is extrapolated at each level by the inclusion of groupings, trends, and relationships that are identified as a means of further recognizing both overt and covert systemic failures.

The construction industry can no longer hide from its own flawed truth, one that is highlighted by the reality that while hazardous in nature, it does not need to be unsafe. Construction safety management is systemically flawed, and as such, the worker is at risk from the moment he/she steps onto the construction jobsite.

This flawed formula for keeping the worker safe was the impetus for this research. Future research must continue with a focus on perception of safety, as perception appears to be a key to the actualization of a solution as a deeper understanding; it is the only way in which to address this conflict and gain greater insight into the extent by which it can be effectively applied to those means and methods that drive construction safety management. As noted, this researcher found both workers and managers cognizant of the importance of job site safety, yet even with this awareness, the construction industry continues to be one that is both inherently hazardous and unnecessarily dangerous. Practical implementation of more effective safety standards, therefore, may be found in discussions regarding perceived safety climate and real-time safety measures, as well as looking at the reasons for the disconnect between perception

of a safe workplace and the reality of above average catastrophic and fatal injuries. As a result, it appears prudent that the industry look to the adoption of leadership styles that meet the needs of each job site based on the criteria used in this research, rather than a one-size fits all approach.

Expected Contribution

This research marks an important contribution to the construction industry, as it explored a niche within research that has long been ignored. Despite the inherent hazards related to construction work, it would be highly suspect to assume that any worker, given the choice and the awareness, would choose to work on a jobsite that is unsafe. This was reflected in their responses that show that safety is perceived as important by workers across the continuum of the industry. There was little deviation when expressed through the lenses of age, gender, geographic location, company size, education, union affiliation, and years as members of this specific workforce.

Given these results, the notion that this is an industry in conflict with itself is not simply an idea but a statement of fact. If the construction industry is genuine in its protestations for the need to keep the worker safe, it must recognize itself as not only a party of the system, but at the highest level of the systemic hierarchy. As such, it holds both the power and the responsibility for job site safety. The current research method attempted to provide a window into creating a dialogue for resolution and change relating to the relationships between leadership style and perceived climate of safety. It created the potential to offer insight and inspiration regarding the ways in which the construction industry can begin to understand itself as both part of the conflict as well as the solution,

a solution that allows managers the ability to better adapt and adopt leadership styles that effectively meet the safety needs of those they were charged to protect, the worker.

The construction workforce is tasked daily to engage in activities that, by the very nature of the industry, are potentially hazardous but do not need to be unsafe. By using this research and that of future studies, this researcher hopes that it will stimulate discussion at all levels of construction safety management. This will allow for new means and methods to better manage and measure safety in a manner that addresses the most important aspect of any project, keeping the worker safe.

This research is aligned with those characteristics that drive the field of Conflict Analysis and Resolution, specifically those focused on the facilitation of solutions that honor the opinions of all parties and recognize that systemic conflict like construction accidents do not manifest out of a single act or omission. This realization in turn allows for the emergence of informed leaders/managers who are better prepared to understand and address the needs of workers while permitting an environment for robust debate that must ultimately lead to the design and implementation of new ideas and models of safety that create links between production driven outcomes and the understanding that by acknowledging workers' perception of climate of safety, there comes the potential for a reduction in workplace conflict(s) as well as an overall attenuation of safety related anxieties.

Limitations of the Study

The primary limitation of this study was related to the fact that the country's workforce is not comprised solely of English speaking workers and thus may not be completely representative of the entire construction industry in the United States. To that end, this study was only made available to those proficient in English. While this is a recognized restriction, as noted early in this research, the Bureau of Labor Statistics (2015) recognized that 27.3% of the construction workforce is Hispanic, which makes it the largest ethnic minority in the industry. Yet, the assumption that all men and women in construction who identify as Hispanic are unable to read, write, or speak English at a level making them ineligible to partake in this study is a broad assumption. While distinctive and recognized by this researcher as a limitation, it is also his hope that future studies will include surveys offered in multiple languages.

It is also acknowledged that this study was web-based, allowing only those with access to a Smart Device or computer with Internet access to participate. This limitation is, according to Anderson (2015),

> 68% of U.S. adults have a smartphone, up from 35% in 2011, and tablet computer ownership has edged up to 45% among adults, according to survey data from the Pew Research Center. Smartphone ownership is nearing the saturation point with some groups: 86% of those ages 18-29 have a smartphone, as do 83% of those ages 30-49 with 85.1% percent of American homes having some sort of computer with internet access. (para. 4)

Another limitation was the fact that while this study tested relationships between leadership styles and perceived climate of safety, the relationships in and of themselves do not dictate causation. That is, this study did not seek to prove that certain leadership styles would not cause or lead to a safer climate of safety. Therefore, it was not meant to engender proof of any causal relationship, leaving this for future study.

Conclusion and Implications

This dissertation was focused on the reality that current interventions and resources fall short of protecting the worker. While a core belief in worker safety continues to permeate the industry in theory, the job tasks performed (e.g. climate of safety) can be catastrophic, and fatal injuries continue to occur at an alarming rate. When first instituted into conventional construction safety management, it was agreed that safety must be a priority to successfully mitigate the potential for injury. This research understands that safety cannot be reconciled if it is addressed as an obscure concept, and workplace safety, safety management, and safety climate must be measured. It is a sentiment substantiated in the work of Dedobbeleer and Beland (1991), who specifically focused on finding ways in which to measure safety climate in an effort to decrease incident rates.

Further evidence of the importance of continuing to carry out this kind of research was reflected in the work of Hinze, Hallowell, and Baud (2013), who argued that "accidents and injuries still occur repeatedly on sites and it appears [that] construction safety has hit a plateau" (p 139). What made this research unique was its focus on the need for awareness regarding the importance of understanding climate of safety. It

emphasized the lack of research regarding the potential for creating newly designed proactive policies and procedures based on the perceptions of leadership styles and climate of safety.

The literature review also reflected the need for recognizing that the root cause of any construction accident was complex, as a result of the multi-faceted nature of the industry. The recognition also revealed that relying exclusively on secondary data is simply not the solution when exploring more effective means and methods to keep the worker safe. Despite the fact that accident statistics were historically relied upon throughout the construction industry, Laitinen, Marjamäki, and Keijo (1999) further elucidated that it was almost impossible to use accidents as a safety indicator for a single building construction site. They stated that "This is because of random variation where many sites will have no accidents, and it is not possible to determine whether these sites with zero accidents were safer than sites with accidents" (pp. 463-464).

Therefore, as a result of the complexity of construction safety management and the inclusion of multiple trades and multi-organizational partnerships in the construction industry, this research offers new insights into the impediments that still exist systemically and obstruct the formation of an effective means of understanding the impact of management styles at the macro, mezzo and micro levels.

Conflict analysis and the potential for resolution was the driving force for this research, as this is an industry in a struggle to make safety a priority without undermining fiscal gains. Safety cannot be seen as an obscure construct but instead, systemic models that embrace an information loop that supports dialogue from the top-down and bottom-

up. This research emphasizes that certain leadership styles are more suited to engender worker safety. Furthermore, both managers and workers consistently agree on the importance of a jobsite free of unsafe acts, unsafe conditions or a combination of both, while not yet fully aligned as a united front.

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Appendix A: Cover Letter & Consent Form

Consent Form for Participation in the Research Study Entitled

CONSTRUCTION SAFETY: A QUANTITATIVE STUDY OF THE IMPACT OF LEADERSHIP STRATEGIES ON PERCEIVED CLIMATE OF SAFETY AT THE CONSTRUCTION JOB SITE

Funding Source: None

IRB protocol **2017-20**

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For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

What is the study about?
The purpose of this study is to evaluate how management addresses job site safety. While the industry has made an effort to approach safety, the full potential to reduce the need to wait for the system to fail in order to successfully take action that keeps the worker out of harm's way has been sorely under utilized.

Why are you asking me?
The reason for asking you to participate is to better understand how you view how safety is addressed by your supervisor and how safe you personally feel on the job site. Approximately 300 people (Management and Workers) will be taking this survey.

What will I be doing if I agree to be in the study?
This survey is 100% anonymous and voluntary. By agreeing to take part in this study you will be asked to spend approximately 15 to 20 minutes answering a series of 16 questions. You are expected to answer the questions honestly and to the best of your ability by following the instructions.

Is there any audio or video recording?
None

What are the dangers to me?
While this research poses no likely dangers or risks to you, any study may have unknown or unforeseeable risks. If you have any questions about the research, your research rights, please contact [Joshua Estrin and/or Jason Campbell]. You may also contact the IRB at the numbers indicated above with questions as to your research rights."

Are there any benefits for taking part in this research study?
There are no direct benefits.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

How will you keep my information private?
None of the questions in any of the surveys require information that could be used to identify you. For a full explanation how the information in this survey is protected you may read the full privacy policy here
https://www.surveymonkey.com/mp/policy/privacy-policy/ .

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

If you have any questions or concerns regarding the protection of your answers you may contact the Joshua Estrin, the lead researcher in this study at (954) 243-7436 or jestrin@nova.edu

Other Considerations:
If significant new information relating to the study becomes available, which may relate to your willingness to continue to participate, this information will be provided to you by the investigator.

Voluntary Consent by Participant:
By checking the box, you indicate that

- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered
- you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury

- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you are entitled to a copy of this form after you have read and signed it

you voluntarily agree to participate in the study entitled CONSTRUCTION SAFETY: A QUANTITATIVE STUDY OF THE IMPACT OF LEADERSHIP STRATEGIES ON PERCEIVED CLIMATE OF SAFETY AT THE CONSTRUCTION JOB SITE

Appendix B: IRB Exempt Form

NOVA SOUTHEASTERN UNIVERSITY
Institutional Review Board

MEMORANDUM

To: **joshua estrin**
College of Humanities, Arts, and Social Sciences

From: **Pei-Fen Li, Ph.D,**
Center Representative, Institutional Review Board

Date: **January 11, 2017**

Re: **IRB #: 2017-20; Title, "CONSTRUCTION SAFETY: A QUANTITATIVE STUDY OF THE IMPACT OF LEADERSHIP STRATEGIES ON PERCEIVED CLIMATE OF SAFETY AT THE CONSTRUCTION JOB SITE"**

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review under **45 CFR 46.101(b) (Exempt Category 2)**. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms, they must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and Pei-Fen Li, Ph.D, respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: **Jason Campbell, Ph.D.**

Appendix C: Survey Instrument

Final Leadership Strategies on Climate of Safety Survey

Leadership Questionnaire (Management)

THE IMPACT OF LEADERSHIP STRATEGIES ON THE PERCEIVED CLIMATE OF SAFETY AT THE CONSTRUCTION JOB SITE

Online Consent Form

Funding Source: None

IRB protocol 2017-20

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For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

What is the study about?
The purpose of this study is to evaluate how management addresses job site safety. While the industry has made an effort to approach safety, the full potential to reduce the need to wait for the system to fail in order to successfully take action that keeps the worker out of harm's way has been sorely under utilized.

Why are you asking me?
The reason for asking you to participate is to better understand how you view how safety is addressed by your supervisor and how safe you personally feel on the job site. Approximately 300 people (Management and Workers) will be taking this survey.

What will I be doing if I agree to be in the study?
This survey is 100% anonymous and voluntary. By agreeing to take part in this study you will be asked to spend approximately 15 to 20 minutes answering a series of 16 questions. You are expected to answer the questions honestly and to the best of your ability by following the instructions.

Is there any audio or video recording?

None

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

If you have any questions or concerns regarding the protection of your answers you may contact the Joshua Estrin, the lead researcher in this study at (954) 243-7436 or jestrin@nova.edu.

Other Considerations:
If significant new information relating to the study becomes available, which may relate to your willingness to continue to participate, this information will be provided to you by the investigator.

What are the dangers to me?
While this research poses no likely dangers or risks to you, any study may have unknown or unforeseeable risks. If you have any questions about the research, your research rights, please contact [Joshua Estrin and/or Jason Campbell]. You may also contact the IRB at the numbers indicated above with questions as to your research rights.

Are there any benefits for taking part in this research study?
There are no direct benefits.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

Voluntary Consent by Participant:

By clicking "NEXT" below, you indicate that

1. This study has been explained to you
2. You have read this document or it has been read to you
3. Your questions about this research study have been answered
4. You have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
5. You have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
6. You are entitled to a copy of this form after you have indicated agreement.

By clicking the "NEXT" button below, you voluntarily agree to participate in the study entitled CONSTRUCTION SAFETY: A QUANTITATIVE STUDY OF THE IMPACT OF LEADERSHIP STRATEGIES ON PERCEIVED CLIMATE OF SAFETY AT THE CONSTRUCTION JOB SITE.

1. What best describes you?

- **Worker:** An individual who works in the construction industry holding either union or non-union status. This individual can have a specific skill (e.g. plumber, electrician, carpenter, etc.) or be an unskilled general laborer. They have no supervisory responsibilities.
- **Supervisor/Manager:** An individual who works in the construction industry holding either union or non-union status. This individual can have a specific skill (e.g. plumber, electrician, carpenter, etc.). He or she maintains responsibilities that include overseeing a department or group of workers.

- ◯ Manager
- ◯ Worker

2. How important is the construction contract?

- ◯ Not very important
- ◯ Not important
- ◯ Neither
- ◯ Important
- ◯ Very Important

3. How important is the construction contract regarding safety?

- ◯ Not very important
- ◯ Not important
- ◯ Neither
- ◯ Important
- ◯ Very Important

Final Leadership Strategies on Climate of Safety Survey

Part 1. Informative Questions.

4. What is the highest level of education that you have completed?

- ◯ Did Not Complete High School
- ◯ High School/GED
- ◯ Some College
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Advanced Graduate Work or PhD

5. What is your degree? (check all that apply)

- ◯ Engineering
- ◯ Construction
- ◯ Architecture
- ◯ Construction Safety Management
- ◯ None of the above
- ◯ Other (please specify)

6. What is your current Union Affiliation?

- ◯ Union
- ◯ Non Union

* 7. How many years have you worked in the construction industry?

* 8. How many years have you worked in your present trade?

9. Have you ever taken a leadership program?

- ◯ Yes
- ◯ No

Final Leadership Strategies on Climate of Safety Survey

* 10. In the last 30 days, how many times have you felt unsafe (or have workers reported feeling unsafe) while performing your work tasks?

11. On a scale of 1-5, how would you rate the following statements:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly disagree
My organization has implemented a successful safety program?	◯	◯	◯	◯	◯
The top managers have a strong commitment to safety (which is shown by routine involvement in safety activities, by the priority given to safety in meetings and production scheduling, and in other ways).	◯	◯	◯	◯	◯
My direct manager prioritize safety on a daily basis.	◯	◯	◯	◯	◯
For the most part, I feel safe working at my construction work site.	◯	◯	◯	◯	◯

Final Leadership Strategies on Climate of Safety Survey

Part 1A. Demographic Information.

The following questions are strictly for research demographic as is the entire survey, remain anonymous.

* 12. What is Your Age?

13. What is your ethnicity?

- ◯ White/Caucasian
- ◯ Hispanic or Latino
- ◯ Other
- ◯ Asian
- ◯ American Indian or Alaska Native
- ◯ Black or African American

14. What is Your Gender?

15. What state do you work in?

16. Counting all locations where your employer operates, what is the total number of persons who work there?

- ◯ 1-50
- ◯ 51-250
- ◯ 251-500
- ◯ 501-1000
- ◯ 1001+

17. How important is the construction contract?

- ◯ Not very important
- ◯ Not important
- ◯ Neither
- ◯ Important
- ◯ Very important

18. If you are aware of a contract do you know if it has a section specifically referring to safety related policies, procedures and protocol in an effort to keep the job site and the worker safe?

- ◯ Yes
- ◯ No

Final Leadership Strategies on Climate of Safety Survey

Part 2. Best Leadership Style.

Leadership styles may be delineated in three categories: 1) Autocratic, 2) Participatory, and 3) Free Rein.

AUTOCRATIC	PARTICIPATORY	FREE REIN
• Leader makes most decisions	• Leader involves employees in project decisions	• Allows employees to make decision and have almost complete freedom
• Employee is given little freedom to act on their own	• Employees have some independence of action	• Leader role is to provide necessary resources to employees
• Net result is that employees are totally dependent upon the leader	• Leads to a more adaptive, flexible employee structure	

19. Based on the above chart, please mark the leadership style that best describes:

- If you are **MANAGER**, please select your leadership style
- If you are a **WORKER**, please select your manager's leadership style

◯ Autocratic

◯ Participatory

◯ Free Rein

Final Leadership Strategies on Climate of Safety Survey

Part 3. My Leadership.

Please click the button for the corresponding choice that represents how strongly you feel about the statement. Be honest about your choices as there are no right or wrong answers.

20. When making decision in a team working environment:

- As a **MANAGER**, I
- As a **WORKER**, my manager

	Never	Rarely	Sometimes	Often	Always
Make sure the majority rules.	◯	◯	◯	◯	◯
Persuade others to do things my way.	◯	◯	◯	◯	◯
Tell others what to do.	◯	◯	◯	◯	◯
Turn decisions over to others.	◯	◯	◯	◯	◯
Share my own ideas.	◯	◯	◯	◯	◯

Final Leadership Strategies on Climate of Safety Survey

Part 3. My Leadership Cont.

21. When making decision in a team working environment:

- As a **MANAGER**, I
- As a **WORKER**, my manager

	Never	Rarely	Sometimes	Often	Always
Suggest a decision to others.	◯	◯	◯	◯	◯
Rely on my own judgement.	◯	◯	◯	◯	◯
Participate just like any other person.	◯	◯	◯	◯	◯
Make my own decision.	◯	◯	◯	◯	◯

22. When making decision in a team working environment:

- As a **MANAGER**, I
- As a **WORKER**, my manager

	Never	Rarely	Sometimes	Often	Always
Provide resources to others.	◯	◯	◯	◯	◯
Ask others to brainstorm choices.	◯	◯	◯	◯	◯
Gather others' feedback before making a decision.	◯	◯	◯	◯	◯
Refer to contracts for direction.	◯	◯	◯	◯	◯

Final Leadership Strategies on Climate of Safety Survey

Job Safety, Policies & Procedures and Workers

23. Safety Climate focuses on the day-to day interaction between policies, procedures and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety.

	NOT A PRIORITY	LOW PRIORITY	MEDIUM PRIORITY	HIGH PRIORITY	ESSENTIAL
React quickly to solve the problem when advised of safety hazards.	◯	◯	◯	◯	◯
Insist on thorough regular safety audits and inspections.	◯	◯	◯	◯	◯
Work to continually improve safety levels in all departments.	◯	◯	◯	◯	◯
Provide all of the equipment necessary to do the job safely.	◯	◯	◯	◯	◯
Be strict about continuing to work safely when work falls behind schedule.	◯	◯	◯	◯	◯
Quickly correct any safety hazard (even if it is costly).	◯	◯	◯	◯	◯
Provide detailed safety reports to workers (e.g., injuries, near accidents).	◯	◯	◯	◯	◯
Consider a worker's safety behavior when moving–promoting people.	◯	◯	◯	◯	◯

24. Safety Climate focuses on the day-to day interaction between policies, procedures and workers. Please rate your personal perception on the level of priority of each as it relates to job site safety.

	NOT A PRIORITY	LOW PRIORITY	MEDIUM PRIORITY	HIGH PRIORITY	ESSENTIAL
Require each manager to help improve safety in his/her department.	◯	◯	◯	◯	◯
Invest a lot of time and money in safety training for workers.	◯	◯	◯	◯	◯
Use any available information to improve existing safety rules	◯	◯	◯	◯	◯
Listen carefully to workers' ideas about improving safety.	◯	◯	◯	◯	◯
Consider safety when setting production speed and schedules.	◯	◯	◯	◯	◯
Provide workers with a lot of information on safety issues.	◯	◯	◯	◯	◯
Regularly hold safety-awareness events (e.g., presentations, ceremonies).	◯	◯	◯	◯	◯
Give safety personnel the power they need to do their job.	◯	◯	◯	◯	◯