

SUBCONTRACTOR SAFETY PRACTICES FOR HISPANIC WORKERS

By

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To my family.

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LIST OF ABBREVIATIONS

- RIR Recordable Injury Rate. A ratio of the number of injuries to the number of man hours worked. It is a computed number that essentially represents the percentage of workers that were injured. A RIR of 9.0 signifies that 9 workers out of 100 experienced a recordable injury.
- PPE Personal Protective Equipment. Any number of items that a worker might use to protect themselves from injury. Examples of PPE include hard hats, safety glasses, and lanyards.

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In today's construction industry, the workforces of subcontractors and specialty contractors face greatest potential of injury. These contractors tend to be smaller firms with limited budgets for safety. For the most part, these contractors implement very basic safety practices when compared to larger firms. In developing firm safety practices, each company will need to consider the make-up of their workforce. The number of Hispanic construction workers is increasing, and these workers are more likely to suffer work-related injuries than the average construction worker. The differences between Hispanic and non-Hispanic workers are more than just lingual, they are also cultural and educational. Subcontractor safety practices need to be tailored to reach the Hispanic workforce while still working within their means as a smaller firm. Our study explored the safety practices of Floridian roofing subcontractors. Our study also explored the scope of the growing Hispanic construction workforce in order to observe the safety efforts of subcontractors to keep them safe. Finally, this research generates a set of best safety practices that can be applied to all subcontractors regardless of size.

CHAPTER 1 INTRODUCTION

It is common for subcontractors to supply 80 to 90% of the work on a given construction project, yet little research has been conducted about their best safety practices (Hinze and Tracey, 1994). Instead, most construction safety research studies have been focused at the general contractor level. Worker safety has become a subject of considerable interest in the construction industry. General contractors have been in the process of implementing zero-accident and incident and injury free programs across their jobsites. The construction industry, which once viewed injuries as a normal part of the job, no longer accepts them. Subcontractors must react to the pressures to work safe that are placed upon them by the general contractors.

Large general contractors have a different approach to safety than smaller subcontractors. For example, the general contractors have the ability to devote larger budgets and more personnel to their projects than do their subcontractors. In many cases, it is ultimately the subcontractor's personnel who are placed in dangerous situations, and it is up to them to implement procedures to mitigate the risks.

The changing landscape of today's construction workforce has created its own workplace safety challenges. These challenges arise from cultural, social, and communicative differences between the Hispanic workforce and management. "As of the first quarter of 2004, the overall Latino construction workforce was estimated to be 2.15 million" (Tinajero, 2005). While they are becoming an increasing part of the labor force, little research has been conducted to determine the best practices for ensuring the safety of Hispanic workers.

Jobsite injuries and fatalities remain an ever present concern of the construction industry. Injury rates have declined in recent years, falling 4% from 2004 to 2005 (United States Department of Labor, 2005); however, "in 2001 (the most recent year measured), the rate of

work-related deaths from construction injuries for Hispanics was 19.5 per 100,000 full-time workers—62.5% higher than the rate of 12.0 for non-Hispanic construction workers” (NIOSH Chartbook, 2004). Understanding the cause of the disproportionate number of Hispanic worker injuries and addressing this phenomenon should be a goal of the construction industry because every injury is an unacceptable occurrence. Increased efforts on the part of construction companies and construction employees are needed to promote jobsite safety.

Objective of study. Very little is known about the safety practices of subcontractors. The objective of this research is to explore the safety practices of subcontractors to identify their best safety practices. A secondary objective of this research is to explore the scope of the growing Hispanic workforce, and to observe the safety efforts of subcontractor’s to protect them from injury. The research systematically explores the current safety practices of subcontractors including those directed towards Hispanic workers. The resulting information obtained from this study could be used by subcontractors to improve their safety programs and performances.

CHAPTER 2 LITERATURE REVIEW

General Contractors Effect on Subcontractors

While most general contractors view safety as a goal, some general contractors are exploring the benefits of developing safety as a core value. Bovis Lend Lease, for example, is “committed to the belief that working incident & injury free is a choice and a basic human right” (Illia, 2006). The concept is simple, all workers deserve the right to return home after work unharmed to their families. The benefits of a strong safety culture are reflected in a firm’s OSHA recordable injury rate; some being below 2.0 compared to the 2005 industry average of 6.32. The fact that some general contractors are proactively embracing safety is a positive sign; however, it is important to note that subcontractors often perform 80 to 90% of work for a given contract and little research has been conducted concerning the best safety practices of subcontractors in the construction industry (Hinze and Tracey, 1994).

General contractors who strive to attain the goal of zero injuries encourage their subcontractors to also pursue that objective with them. For example, Bovis Lend Lease hosts a two-part eight-hour Supervisor Skills Workshop for their subcontractors on every project. The workshop is not designed to discuss safety equipment, but rather to discuss how to get employees to be involved in ensuring their own safety. Pre-task planning and the incident and injury free culture are both discussed at length, and *Remember Charlie*, a video about a worker who was severely injured in an accident, is shown (Dan Danner, personal communication, June 14, 2007).

General contractors can help to ensure the safety of their projects by choosing safety conscience subcontractors. For example, Bovis Lend Lease requires a safety prequalification form to be turned in with each subcontractor’s bid outlining their intended selection of safety

personnel, information about OSHA citations, current incident rates, and other key safety characteristics. Owners or general contractors can also

ask for copies of companies' general safety programs and other specific safety programs (e.g., fall protection program, hazard communication program, confined space program) for important hazards relevant to the upcoming project. Even more importantly, owners can request information on job hazard or job safety analyses that show company pre-planning for safety on the jobs. Documentation of safety training programs can also be requested. If the contractor is going to subcontract parts of the job, it should be asked what it plans to do to make sure all the subcontractors have an equivalent safety program (Schneider, 2005).

This type of contracting is called best value contracting. In best value contracting,

owners set a past and predicted performance floor for bids and, then, check into the background of the bidders so that inept, unscrupulous contractors with low bids do not win contracts. Instead, projects are awarded to bidders that have good records, including performance on issues of safety and health (Schneider, 2005).

Subcontractor safety is a more critical factor on projects that have owner controlled insurance programs (OCIPs) because of the potential cost savings to the owner.

After the contract is awarded, Bovis Lend Lease requires the subcontractor to submit an original site specific safety plan outlining the job and site risks and how the subcontractor plans to mitigate them. Other "general contractors are now requiring all subcontractors who work on their jobsites to have an accident-prevention plan and to enforce it or be labeled a company that doesn't recognize the importance of a safety program" (Lipoma, 1997). These efforts reveal the importance that general contractors are placing on safety, and their expectations from their subcontractors. Construction managers are now choosing their subcontractors on safety as well as cost. Crudely, safety and cost are synonymous, as injuries increase a variety of costs including workers' compensation and the cost of shutting down the job. "The lowest bidding subcontractor no longer wins if its incidence of jobsite accidents is high" (Lipoma, 1997).

Subcontractors in their efforts to win jobs must become safer.

According to the *National Census of Fatal Occupational Injuries in 2005*, the number of construction fatalities dropped 4% compared to 2004. A large percentage of this decrease was attributed to specialty contractors. In 2005, the fatality rate of specialty contractors fell 11% from 759 in 2004 to 675 in 2005. Roofing contractors accounted for almost half of this decrease, falling from 116 in 2004 to 75 in 2005 (United States Department of Labor, 2005).

Resource Constraints on Subcontractor Safety

There are of course noticeable differences between the resources that a small subcontractor can invest in safety and those of a large general contractor. One could make the argument that larger companies have more money to spend on safety training, incentives, and safety equipment; however, a 2004 study by Samant refutes the belief that it is economic resources that make small businesses less safe. “This study found no relationship between extrinsic organizational characteristics, total annual sales, or credit rating and their influences on the composite shop score” (Samant et .al, 2007). Champoux and Brun in 2003 reported similar findings in “that most small business owners do not think that resources are significant barriers to their improvement of health and safety measures. Only 37% of 223 owners of small businesses (fewer than 50 employees) thought cost was an important barrier to health and safety” (Samant et .al, 2007). Finally, in 2003, Hinze and Gambatese found that firms with less than 20 employees were safer than firms with more than 20 employees, likewise for firms that did less than \$2 million in annual revenues verses those that did more than \$2 million (Hinze & Gambatese, 2003).

Programs for Small Enterprises

Regardless of whether or not a company’s revenues are correlated to safety, there are inexpensive methods that can be employed to keep workers safe. OSHA, NIOSH, and other agencies and organizations have created a set of best safety practices that can be instituted in any

size firm at little cost. OSHA, for example, has developed a broad safety program from small businesses that can be adapted for any size company. The safety program contains four major tenants: management leadership and employee involvement, worksite analysis, hazard prevention and control, and training (OSHA Small Business, 2007). Examples of management leadership and employee involvement include a communicated worksite policy on safety, and the inclusion of safety items in employees' performance evaluations. Worksite analysis can contain anything from site safety inspections to accident investigations. Some obvious examples of hazard prevention and control are requiring the appropriate personal protective equipment and lockout tagout procedures. Finally, an example of training would consist of a firm having yearly training classes (OSHA Small Business, 2007).

The recommendations of NIOSH were developed as a direct result of an investigation into a small Kansas roofing company's fatality. The interesting feature of their program is that there is little or no cost to employers, but rather a time and effort commitment. Their recommendations are of particular benefit to small companies who do not have a safety staff or large sums of money to spend on outside training. The first recommendation is that "employers should ensure that appropriate fall protection equipment is available and correctly used when working where there is danger of falling" (NIOSH FACE Program 98-16, 1998). It is important for companies to not just supply the appropriate equipment, but to also train their workers on its proper use. Workers should be tied off when at heights above six feet and harnesses should be snug. Falls accounted for 33% of all construction fatalities in 2005, and 35% of all fatalities experienced by specialty contractors (United States Department of Labor, 2005). Other important PPE includes hardhats, safety glasses, hearing protection, and gloves.

The second recommendation states that “employers should develop, implement, and enforce a comprehensive written safety program that includes provisions for training workers in hazard identification, avoidance and abatement” (NIOSH FACE Program 98-16, 1998). A safety program can be a relatively inexpensive way of guarding against jobsite hazards. The program should include amongst other things: a drug testing and abuse policy, procedures to follow in case of an emergency, detail the role of the competent person, and a hazard communication program. The program should also detail the procedures for correcting employee behavior, be it by written citation or other means. The safety program should be communicated effectively to all workers so that they know how to work safely.

The third recommendation asserts that “employers should routinely conduct scheduled and unscheduled workplace safety inspections” (NIOSH FACE Program 98-16, 1998). These inspections are important for finding faulty equipment and violations of the safety procedures. However, these inspections are also very important because they display the firm’s commitment to safety to their employees.

The final recommendation serves to create a culture of safety. It states “employers should encourage workers to actively participate in workplace safety” (NIOSH FACE Program 98-16, 1998). When workers are encouraged to take responsibility for their own safety, they are more likely to wear the appropriate safety equipment and take the appropriate safety precautions. There are simple and inexpensive ways to institute this recommendation; these include a safety incentive program and pre-task planning.

Pre-task planning is one of the most effective means of keeping workers safe. In one study conducted by the Construction Industry Institute, firms who conducted pre-task planning had an average recordable incident rate of 1.04 verses 2.67 for those firms who did not (Mathis,

2001). Pre-task planning is a proactive approach to safety. Before each work task, the foreman and crew will come together to identify the potential risks and dangers of performing the task at hand and how to mitigate them. Free thought from the workers is encouraged on what procedures are to be followed, personal protective equipment that is necessary, and possible training that is needed. In this way, workers feel involved in their own safety, and are more likely to follow safe practices. Pre-task planning is an important step to developing a culture of safety.

In recent years, subcontractors have come under the scrutiny of OSHA. “According to OSHA's database of inspected construction companies, in 2005 83% of OSHA's construction inspections were of non-union, small, specialty, or residential contractors” (Thomas, 2006). In fact, OSHA is now targeting subcontractors now that their “Multi-Employer Citation Policy” has been reversed. This policy allows OSHA to fine general contractors for violations of their subcontractors “for a safety or health violation if such employers create the hazard, if they control the work site or if they have the authority to correct the hazard to which another’s employee is exposed” (Yohay and Walsh, 2007). Legally, subcontractors are now fully and solely responsible for their OSHA violations, and while this ruling might prove to be damaging to construction safety because it no longer attached general contractors to their subcontractors’ citations, it places great onus on the subcontractors to operate by the rules (Pallack, 2007).

When subcontractors violate OSHA standards, it can prove to be very costly. For instance, three subcontractors were issued citations and penalties totaling \$539,800 in a fatal Milwaukee crane collapse (OSHA Miller Park, 2000). When the affects of the lawsuits are added in, these errors prove to be very costly. The devastating effects and consequences of OSHA citations, be it monetary or to the firm’s reputation, caused 46% of the small or specialty

contractors mentioned above to close their doors and go out of business (Schneider, 2005). However, a good safety program over time can positively affect a subcontractor's profit by lowering their workers' compensation and experience modification rate (EMR). Arizona roofers have been able to bring their workers' compensation expense down from \$30 (per \$100 payroll) ten years ago to a rate that is around \$11 (SCF Arizona, 2004). However, Hinze "has argued that the limits placed on EMR reductions for small businesses (they generally do not go below 0.8) reduces the impact of this incentive for them" (Schneider, 2005).

The Hispanic Workforce

The Hispanic population residing in America has increased dramatically, more than doubling in the ten year span from 1990 to 2000. "According to the U.S. Census Bureau, the Latino population numbered 41.3 million persons as of July 1, 2004" (Tinajero, 2005).

Immigration occurs from many different countries.

Mexicans constitute the majority of Hispanics (64%), and Puerto Ricans are the next identifiable subgroup in terms of proportion of the overall Hispanic population (approximately 10%). The population also includes about 3% each of those of Cuban, Salvadoran, and Dominican origins, while the remainder are of Central American, South American, or other Hispanic/Latino origin (Tinajero, 2005).

While Hispanics can be found throughout the country, there are certain states with higher populations than others. The states along the Mexican border have a very sizable Hispanic population.

New Mexico has the highest proportion of Hispanics (43%) in comparison to the total state population and California has the largest number of Latinos (12.44 million). Other states not traditionally associated with the Hispanic community are now home to large numbers of Latinos. States with the most robust Latino growth rates between 1990 and 2002 were North Carolina (544%), Georgia (410%), Arkansas (396%), Tennessee (350%), South Carolina (286%), Nevada (281%), Alabama (266%), Kentucky (238%), Minnesota (220%), and Nebraska (195%) (Tinajero, 2005).

According to the U.S. Census Bureau, 20.2% of the Florida residents and overall 14.8% of the United States' 300 Million people are Hispanic in origin (U.S. Bureau of the Census, 2007).

Opportunities for Hispanics in Construction

It is difficult to pinpoint all of the reasons why they come to America, though it can be generalized that they seek the higher wages in the United States compared to their home countries (Durand and Massey, 2004). Many come for these jobs in order to send their wages back to their country of origin to help support their families. “The Hispanic civilian labor force is projected to increase 32.6% over the ten-year period reaching 23.8 million in 2012. Hispanics are the largest source of labor among minority groups in 8 out of 13 industry divisions in the Nation” (Jaselskis, 2005). Agriculture employs the largest percentage of Hispanics at 37% and construction is next at 17%.

Latinos experienced a 150% increase in construction employment, compared to 120% for the overall Hispanic labor force. Recent research shows that jobs in the construction field generated more than half of the total increase in employment for Hispanic workers in 2003. As of the first quarter of 2004, the overall Latino construction workforce was estimated to be 2.15 million (Tinajero, 2005).

Construction is a growth industry for the Hispanic population, and there is opportunity for an even increased presence. The United States is currently experiencing a construction labor shortage. Parents are placing greater emphasis on college and higher education. In addition the lack of a union presence in some areas creates a drought of young apprentices.

“You don’t find the average drywaller telling his kid to go into hanging sheet rock,” says Tony Calvis, president of Calvis Wyant Luxury Homes in Scottsdale, Ariz. “In the old days you’d have a finish carpenter showing his son how to take the shop over. I don’t think that works well anymore.” The U.S. Department of Labor projects that between 2004-2014, jobs for carpenters will increase at a rate of 9-17 percent (McCausland, 2006).

Calvis goes on to say that the reason for this trend is that this is the computer generation and kids “aren’t as attracted as previous generations to working with their backs” (McCausland, 2006).

The opportunity is there for Hispanic workers,

Recent information suggests that in the next five years, Hispanics may represent almost one-half of construction industry employees. In particular, the share of workers nearing retirement may represent an opportunity for Latino workers to fill these positions.

Occupational areas in crafts in which there may be the largest need for human resource replacements are boilermakers, bricklayers, equipment operators, and pipe fitters/plumbers (Tinajero, 2005).

Though there is need for skilled craftspeople in the United States, most Hispanics are employed in less skilled entry level trades as “more than a third of construction laborers are Hispanic (470,000); the highest number of any construction occupation” (Jaselskis, 2005).

Higher Injury Rates for Hispanic Workers

Worker safety is a major issue in today’s business sector. All workers should be able to return home to their families at the end of the day. In the construction industry, injury rates are dropping, however, injury rates amongst Hispanic workers are on the rise. “Recent data show that U.S. injury/illness rates for all occupations dropped 31% from 1992 to 2000 and fatality rates decreased by 2%. However, for the same period, Hispanic fatality rates increased 11.6%” (Tinajero 2005). The differences are magnified even greater in the construction industry where “In 2000, Hispanic deaths were 23.5% of deaths in construction, which was disproportionately high, considering that Hispanic workers were less than 16% of the construction workforce in the same year” (Dong and Platner, 2004). A trend analysis between 1992 and 2000 shows that there were 9,957 construction worker deaths from occupational injuries in the United States, of these 1,501 deceased were identified as being of Hispanic origin. Of those deceased, 47.8% of their deaths occurred from 1998 to 2000 (Dong and Platner, 2004). These figures can be compared with increases in Hispanic construction workers, to find that as more and more Hispanic workers enter the workforce, they should be represented by an increasing percentage of worker injuries.

However, once it is understood that “since 1992, Hispanic construction workers have had markedly higher fatal occupational injury rates than their non-Hispanic counterparts” a serious problem is noted (NIOSH Chartbook, 2004). “In 2001 (the most recent year measured), the rate of work-related deaths from construction injuries for Hispanics was 19.5 per 100,000 full-time

workers—62.5% higher than the rate of 12.0 for non-Hispanic construction workers” (NIOSH Chartbook, 2004). Hispanic construction workers are 1.6 times as likely to be hurt on the job, and in the year 2000, they were nearly twice as likely to be killed (Dong and Platner, 2004). It is startling that Hispanic injury rates have remained stagnant, and have not begun to normalize with those of non-Hispanic workers. It is also interesting to note that

the leading nature of fatal injuries differs for Hispanic and non-Hispanic workers, with nearly one-third (336) of 1,022 Hispanic deaths, resulting from intracranial injuries (i.e., head injuries) between 1996 and 2000 compared to a quarter (1,147) of 4,465 non-Hispanic construction fatalities (Dong & Platner, 2004).

Falls and fall protection are a major issue for Hispanic workers and the construction industry, especially considering that roofing is a very popular trade amongst Hispanics. The difference in injury rates will have to be explained through a variety of factors.

The Language Barrier

One possible reason that can be used to explain the higher injury rates among Hispanic workers is that often Hispanic workers cannot speak or understand English. Lack of proficiency in English can be expected from Hispanic workers as “seventy percent of the 1.4 million Hispanic construction workers in the U.S. in 2000 were born outside the United States, and fifty seven percent were not U.S. citizens” (Nissen, 2004). Most Hispanic workers were not brought up in the United States and therefore were not raised with English as their primary language, and this fact does not just hold true for the construction industry. According to the 2000 U.S. Census Bureau,

26.7 million American residents (5 years and older) spoke Spanish at home, and about half of them (46.6%) said they speak English less than ‘very well.’ In the same year, 452,840, or nearly one-third of Hispanic construction workers speak only Spanish (Dong and Platner, 2004).

Language barriers create unsafe conditions because the Hispanic workers are unable to understand instructions in English, unlike their non-Hispanic counterparts. Some non-English

speakers are unable to understand emergency and distress calls such as “watch-out” and “move.”

Even construction firms that do all the best practices safety procedures for their English speaking workers will need to alter their approach to accommodate to their Hispanic workers. In 2002, “OSHA reported that 25% of fatal workplace incidents in the U.S. involved either workers who did not speak English or a supervisor unable to communicate with employees” (Tinajero, 2005). Time is money on the jobsite, and managers would prefer to not spend a long time explaining to workers how to do a task safely. Similarly, Hispanic workers who are being paid piece rate often prefer to get their tasks started and may even regard instruction provided in English as being a waste of time.

A 35-year old U.S.-born glazier from Texas explained some of the safety and health problems that occur when construction workers do not know English: “Foremen get frustrated trying to explain to workers what to do or how to do it safely, because they haven’t been trained or maybe they didn’t understand English so they didn’t learn how to do it. So the foreman gets frustrated and just tells them to skip that part because they don’t understand. They just do it without safety equipment or procedures” (Ruttenberg and Lazlo, 2004).

As a way to bridge the communications gap, some construction companies have begun bilingual training programs. There are two trains of thought on the language education, train the managers or train the workers. It might be easier and more effective to train the managers to become bilingual because there are less of them, and they are more likely to stay with one company long enough to justify the costs and efforts involved in training managers to learn Spanish. Hispanic workers can be migratory, and perhaps follow work to other areas. ““Overall, supervisors today need better knowledge of work force issues and bilingual communications skills are critical.’ The introduction of bilingual supervisors and foremen at work sites has helped to improve the dialog and open channels of communication” (Quackenbush, 2007). Managers do not need to be fluent in Spanish, but they need to be able to communicate items that are important to the job tasks. “El Nuevo Constructor, a Spanish-language magazine for the

construction industry, found 44 percent of companies had no Spanish-speaking supervisors, and 54 percent said immigrant workers require more supervision” (Quackenbush, 2007). Many classes are now being taught in functional Spanish. Some companies are training their employees.

Florida Power & Light (FPL) is providing voluntary English classes for Hispanic construction employees at its Sanford power plant. Says Oscar Paredes, project safety manager for Black & Veatch, which operates the site for FPL: “Government studies show that Florida has one of the highest injury and fatality rates in the construction area. Many of these events are attributed to language barriers” (BLR, 2007).

Still, some firms are bringing language teachers to the jobsite as “certified instructors from Seminole Community College come to the job site to teach an English class twice a week” (BLR, 2007).

Safety Training in Spanish

The language barrier does not just affect conversational communications, it also affects safety training. “The vast majority of training is done in English, and a majority of that majority was provided without translation” (Nissen, 2004). A toolbox meeting is a very basic type of safety training; however, it can be rendered useless if the workers cannot understand the safety information. In one study,

Twenty five of the respondents (50%) indicated that their employer conducted weekly safety meetings, while 24 (48%) indicated that they either didn’t know or the employer did not. One (2%) stated ‘it depends.’ Of the twenty five holding safety meetings, 20 were held in English, with seven of those twenty providing translation. Five were conducted in the respondent’s original language (Nissen, 2004).

Construction firms need to start to cater their safety training to their Hispanic workers; they cannot simply use the same training procedures and materials that they use with their non-Hispanic workers. For example,

A roofer said lack of training as well as limited English led to a serious injury. “One Mexican who was working on the roof fell through a hole. They covered a hole with a 3-inch plywood 4-by-8. The worker noticed it and kept walking. The plywood moved and

the worker fell through it... He broke many bones and was not able to work for two months... The company gave him instructions but not safety training, and maybe he did not understand it because of his limited English” (Ruttenberg and Lazlo, 2004).

To promote safety training for their Hispanic workers, firms need to understand the educational background of their employees. This understanding, along with Spanish training, could help connect a firm’s Hispanic employees to their safety program. One study reveals

that Hispanic construction workers, on average, have fewer years of schooling. This reveals a need to add training and education programs for Hispanic construction workers. The construction industry needs to develop safety and skills training programs for a growing Hispanic community and these programs may need to be offered in Spanish because many Hispanic craft workers speak little or no English (Goodrum, 2004).

OSHA has translated its materials into Spanish, as have some construction firms. This is a good start; however, it is often overlooked that “a small, but significant, portion of Hispanic workers are illiterate in their own language (Brunette, 2004).”

Safety training does have an effect on worker behaviors. Hispanic workers are being injured performing tasks that have known safety controls. Their

deaths are not the result of unknown hazards which require complex engineering controls. They are, for the most part, common construction hazards with well recognized and accepted controls like guard rails, ground fault circuits, or fall arrest systems. Our challenge is to increase the use of these simple controls in the face of a complex web of economic, social, cultural, and perhaps language barriers. Research to improve our understanding of those barriers, in the context of moving specific interventions, should be a priority. To succeed we must go beyond simple translation into Spanish, and improve our understanding of the context within which the message is received and potentially acted upon, or ignored (Dong and Platner, 2004).

When done correctly, safety training is making inroads with the Hispanic workforce. For example,

A 29-year old roofer from Wisconsin said, “I follow all the safety tips I learned in training. I was taught also how to build scaffolds and where to place them. I always check all the tool cables.” He went on to say, “Before the training, I had some safety instruction but I could not understand everything.... Before the training I used to carry things on ladders: paper rolls, tools, lunch box, insulation, etc. I used to place them on my shoulder and climb. Now I know that I should never carry things on ladders; now I use ropes. Also, before the training I used to think what a waste of time it was to place the safety flags, but

now I know the importance of doing it.” This individual had become so safety conscious that he complained: “If we do not wear a hard hat the safety people suspend the worker for 3 days, but fall protection equipment is not controlled as much as hard hats. It is an irony” (Ruttenberg and Lazo, 2004).

In another case,

A 60-year-old Cuban-born electrician in Florida who had worked in the U.S. for 23 years said, “After the training, I am more responsible and careful. I make sure that workers with not much experience know how to deal with dangers. I make them use PPE” (Ruttenberg and Lazo, 2004).

Understanding Hispanic Culture

The language barrier is definitely a reason why Hispanic construction workers are at risk for injuries, however, it is not the only reason. The industry must consider the workers themselves; their beliefs, customs, culture, and upbringing are all relevant safety issues. Understanding their way of life just might lead to the means to keep them safe. Initially, consideration needs to be given to the fact that the majority of these workers are immigrants. As mentioned earlier 70% of Hispanic construction workers were not born in the United States, and while almost 50% are United States citizens, a portion are illegal (Nissen, 2004). These workers are constantly living with the fear of deportation, documented or undocumented. Consequently, this fear leads to workers underreporting injuries for fear that the authorities will deport them.

Also,

Serious underreporting levels of both fatal and non-fatal injuries might occur in an attempt to keep positive relationships with employers. As stated by the National Research Council, Hispanic workers are “less likely to report violations of their working rights or occupational injuries because they might lose their pay or their job” (Brunette, 2004).

For these reasons, Hispanic workers are likely to not seek treatment for their injuries and also work injured. Compounding this issue is the fact that culturally “this population has been raised to follow their supervisors’ instructions without question, often increasing their risk of injury, illness, or death on the job” (Santiago 2004). Combined with a fear of deportation, not

questioning supervisors may result in Hispanic workers accepting very dangerous tasks which put them at a higher risk for injury.

Many studies have been done relating immigration status to worker injuries. One study, though not in the United States “found that immigrant workers in Taiwan faced no higher risk of occupational injury than native-born workers” (Nissen, 2004). Another study found that neither length of residence in the United States nor length of time in the construction industry had an effect on worker safety. The same study did conclude that unionization and documented legal status correlate positively with worker safety (Nissen, 2004). In any event, this furthers the notion that a proper understanding of Hispanic culture is needed to improve their safety.

Firms should also consider the construction environment of the Hispanic worker’s home country. It is often taken for granted just how advanced the construction industry is in the United States. In most of their home countries, there is no powerful safety regulating authority as OSHA and workers generally do not have ready access to the appropriate personal protective equipment.

Work related experiences in their countries of origin are key determinants of these workers’ level of safety awareness. These include working under poor physical environments, little or no safety and health training, being exposed to dangerous tools, machines and equipment, abusive supervisors, and lack of appropriate personal protective equipment, among others (Brunette, 2004).

For example,

a 52-year-old roofer, born in Mexico, said he didn’t use any PPE in Mexico and was not aware of the importance of safety. He used to work in bare feet with cement [which can be caustic]. Here, he said, “everything is different.” A Florida electrician, born in Colombia said, “In Colombia...they only care about production. There are not many safety regulations” (Ruttenberg and Lazlo, 2004).

One significant aspect of Hispanic culture is the concept of machismo.

Machismo is a term that reflects a concept of masculinity among Hispanics. In many ways, machismo is strength in Hispanic families. Despite the popular conception of macho

Hispanic men as violent or animalistic, machismo can mean a nurturing, protective man (Marin, 2003).

In affect, machismo is a drive to be the manliest man one can be. It can be portrayed as one wanting to be the best father, provider, lover, toughest, strongest, most self-sufficient, or most fearless. Machismo can be of particular concern in the construction industry because, “sometimes it is necessary to wear protective gear to prevent injuries, but Hispanics may think it is not manly to wear protective gear. Hispanics may think work should be performed without any regard for safety” (Marin, 2003). That said however, Machismo can also be a positive force for worker safety. If management can connect to the nurturing and family oriented part of machismo, then they might be able to keep their workers safe. For example, a constant reminder that if a worker is hurt or killed, that the worker would not be able to provide for their family might prompt the worker to be more safety conscience.

Another aspect linked to Hispanic culture is the concept of fatalism. Fatalism can be best compared to the idea of predetermination. People, who believe in fatalism, believe that things are going to happen regardless of any measures taken to avoid the consequences. Hispanic fatalism can best be revealed thru medicine. For example,

because of the Latino/Hispanic concept of ‘fatalismo’ (fatalism), some Latinos/Hispanics might accept the inevitability of diabetic complications as part of the nature of the disease and their fate. This concept could also lead to skepticism and lack of trust in prevention measures (National Eye Health Education Program, 1994).

Fatalism is a feeling that “there are things in the world which we have no control over” (Bowdy, 1997). It is a concept that is being used to explain the escalation of HIV infections amongst Hispanic men (Bowdy, 1997). Fatalism affects construction in a major way. It is quite hard to convince someone to take the proper safety measures when they believe that they are going to be injured regardless. The fact that some Hispanic construction workers view injuries as a normal or routine part of the job is very discouraging, and steps should be taken to combat that notion.

Machismo and fatalism combine to make the Hispanic culture one that has a propensity towards risk. If someone believes they cannot prevent an injury, what is to keep them from acting reckless?

Safety directors need to adapt their training to the Hispanic culture and the Hispanic lifestyle. Gonzalez notes,

a lot of Hispanic workers have gone through the danger of crossing the border, not once, but several times. This is dangerous. To many of these people, it just doesn't make sense to build scaffolding just because they are higher than six feet off the ground (Gonzalez, 2007).

Programs that have linked Hispanic culture and jobsite safety have been quite successful. In the Dallas area, a group of contractors teamed with OSHA to develop Hispanic specific safety training. What they found was that "information on what safety equipment to use and how to follow safety procedures was readily available, but what wasn't was a culturally meaningful explanation of why safety was important" (Delaney, 2002). Workers were presented with a list of the names of the 81 local Hispanic construction workers who had been killed on the job and details of their deaths. The group also had booths at local Cinco de Mayo festivals, where workers were with their families.

The critical indicator of improvement was the substantial decrease in fatal accidents. By December 2001, construction fatalities in Northeast Texas had fallen nearly 50 percent, to 13 for the year. And the percent involving Hispanic and Latino workers dropped from 60 percent to 40 percent (Delaney, 2002).

CHAPTER 3 METHODOLOGY

Introduction

The objective of this research was twofold. The first objective was to explore the safety procedures of subcontractors in the construction industry. The second objective was to explore issues related to Hispanic workers employed by subcontractors. The research systematically explored subcontracting from the subcontractor's point of view. The genesis of this study came from the fact that little research had been conducted concerning subcontractor safety; an idea that was first introduced by Dr. Jimmie Hinze in his Advanced Construction Safety class.

This research began with a literature review to examine relevant material related to the practice of subcontracting. The literature review provided a good basis to develop the foundation for this research. The literature references included numerous studies by Dr. Hinze and the work of past graduate students including Josh Markowitz, Marcelo Marin, and Tom Feronti. These past surveys and the recommendations for future research from their studies were examined to formulate this study.

From the sources listed above, the first version of the survey was drafted and presented to Dr. Hinze. Dr. Hinze helped to identify key questions to include in the survey. He also identified the Hispanic workforce as a group that needed exploration. From Dr. Hinze's input a second version of this study was drafted. This version of the study included many general questions concerning the subcontractor respondent's dealings experiences with Hispanic workers. Two roofing subcontractors were chosen to take a trial version of this survey. They were also asked to critique the survey and offer any information that they thought might be helpful to this study. One question that was altered was a question that asked about the responding firm's RIR. It was found from the trial surveys that some subcontractors did not

know this information. A second question concerning the magnitude of the responding firm's annual revenue was eliminated because it was felt the information was not needed. After examining data obtained from a study of Hispanic culture by Dr. Hinze and Ray Godfrey, questions were added or altered in the survey to gauge the subcontractor's views of Hispanic culture. These questions asked for a response based on a Likert Scale, and dealt with fatalism and risk aversion.

Survey Questions Design

The *Safety Survey of Specialty Contractors* was designed to determine the safety practices of subcontractors. This survey is included as an appendix. The first three questions of the survey were designed to obtain basic background information on the responding company. These questions were either fill-in the blank or check box questions. Question 1, which asked whether or not the company is an Hispanic Minority Business Enterprise (MBE) was included to find out if there is a difference between MBE and non-MBE companies in their safety procedures and experiences with Hispanic workers. Question 2, which asked how many fulltime field workers were employed by the subcontractor, was included to gauge the size of the firm. Question 3, which asked what percentage of the work is subcontracted to others, was included to see if the subcontractor actually performs the work or if it passed it along to a second-tier subcontractor.

The next 14 questions were designed to obtain basic information on the responding subcontractors' current safety practices. These questions were either fill-in the blank or check box questions. Question 4 asked if the subcontractor employed a fulltime safety director. Question 5 asked whether or not and what kind of drug testing program the firm utilized. Questions 6 thru 10 were designed to determine what basic safety practices the subcontractors' utilized, including the use of hardhats, safety glasses, toolbox meetings, pre-task planning

meetings, and whether or not the company prepares project specific safety programs for all projects. Question 11 asked whether or not the company provided orientation for all its employees on project sites, and if so, what was the duration of the training for new employees. Question 12 asked how many hours of safety training were provided to employees each month. Question 13 asked what percentage of safety training was available in Spanish. Question 14 asked for the company's approximate annual expenditure of safety training. Question 15 asked if the subcontractor utilized any safety incentive programs. Questions 16 and 17 asked whether or not the subcontractor had introduced any new programs designed to promote safety, and if so which were the most effective.

The second half of the survey was designed to obtain information on the subcontractor's experiences with Hispanic workers. Questions 18 thru 25 were formatted with a Likert Scale response. Each question asked participants to circle the extent of their agreement or disagreement with provided statements. An answer of one meant that the respondent "strongly disagreed" while an answer of five meant the respondent "strongly agreed." Question 18 asked the respondent if safety has a positive affect on productivity. Question 19 asked the respondent if they thought Hispanic workers were equally or more productive than non-Hispanic Workers. Question 20 asked respondents if Spanish speaking workers can be accommodated without learning English. Question 22 asked if the respondent's company encounters significant problems because workers do not speak English. Question 23 asked respondents if Hispanic workers take more risks on the job than non-Hispanic workers. Question 24 asked respondents if Hispanic workers are more likely to view injuries as a normal part of the job. Question 25 asked respondents if they felt non-Hispanic workers value their own safety more than Hispanic workers

do. Question 26 asked respondents if they felt Hispanic workers more regularly follow the company's safety procedures than non-Hispanic workers.

The next eight questions were designed to analyze the current state of the subcontractor's Hispanic workforce. These questions were either fill-in the blank or check box questions. Question 27 was designed to find out how many Hispanic workers the company employed. It asked what percent of the subcontractor's employee's primary language was Spanish. Question 28 asked respondents what percent of the firm's managers were bilingual. Question 29 inquired how the number of Hispanic workers employed by the firm had changed within the last five years. Question 30 asked respondents to indicate if their company required workers to be able to speak and understand English in order to be employed. Question 31 asked respondents what percent of the Hispanic workers employed could not speak or understand English. Question 32 asked respondents what percent of the subcontractor's Hispanic workers had been employed for at least two years. Question 33 asked respondents what other languages besides English are spoken on the jobsite. Question 34 asked respondents if their firm has a program in place to check I-9 forms. Question 35 asked respondents to indicate and then describe whether their firms had encountered any unique safety problems associated with Hispanic workers.

The final question of the survey was designed to calculate each respondent's RIR. A two part fill in the blank question, Question 36 asked respondents to indicate how many company employees suffered injuries treated by a doctor during the last year, and of those employees, how many were Hispanic workers, Responses to this question were combined with responses to Question 2, that asked about the number of full time field employed by the subcontractor , to determine the subcontractor's approximate RIR.

Survey Dissemination

Once the survey was finalized, a population to complete the survey was sought. The Executive Director of the Florida Roofing, Sheet Metal, & Air Conditioning Contractors Association (FRSA), Steve Munnell, was approached to see if his organization was willing to assist in this study. The FRSA expressed a willingness to help and offered to distribute the survey in exchange for a promise that a brief article on the findings that would be appropriate for a month trade publication. Mr. Munnell made suggestions for changes to the survey which were incorporated. The FRSA then conducted a “fax blast” by faxing the survey to all their roofing contractor members, around 500, on the 19th of June 2007. A total of 71 surveys were returned, of which 3 did not provide full information and were not included in the data.

Initial Analysis Performed

After the survey responses were received, the results were first input into Microsoft Excel 2002. After the data set was created, the file was converted into SPSS version 12 for further analyses. The surveys were analyzed by calculating the mean, median, and frequency of responses. Next, the firms’ RIR values were calculated and compared against the other questions to find statistically significant differences.

Limitations

The research instrument was limited in scope to roofing contractor members of the FRSA. Since the respondents are members of a trade organization, it is possible that they have a greater propensity towards working safely. Additionally, though there were 68 completed survey responses, not every question was answered by each participant, if there was no answer, the survey was not used in the calculations for that item. Because of this fact, some of the calculations that deal with RIR are based on a small number of responses.

CHAPTER 4 DATA ANALYSIS AND RESULTS

Introduction

Data collected from the survey were used as the basis of the analysis. Sixty-eight complete survey responses were received from the sample population.

Company Demographic Information

Basic demographic information was asked at the beginning of the survey to characterize the subcontractors. The first question asked the subcontractors whether they were an Hispanic MBE or if any portion of the company was owned by an Hispanic person. The question was asked to investigate whether firms with Hispanic ownership have a lower RIR for Hispanic workers than firms owned by non-Hispanics. Table 4-1 shows that only one respondent indicated that their firm was an Hispanic MBE.

Respondents were asked about the number of full time field employees they employed. This question was asked to gauge the size of the firm. The responses to this question were later used to compute the number of Hispanic and non-Hispanic workers each firm employed, as well as to calculate each firm's RIR. The data were quite varied. Table 4-2 shows that most firms employed no more than 20 workers. Note the median firm employed 19 workers and the largest firm employed 650 workers.

Finally, respondents were asked to indicate what percentage of their work was subcontracted to others. This question was asked to help determine how much work the subcontractor actually self performed. Table 4-3 shows that the majority of respondents (75.0%) either subcontracted out zero or less than five percent of their work. Note the largest amount of work any one firm subcontracted out was 50%.

Company Safety Information

The second part of the survey was designed to obtain basic information on the responding subcontractor's current safety practices. Respondents were asked if they employ a fulltime safety director. This question was asked to determine whether firms with safety directors are safer than firms without them. Table 4-4 shows the results to be nearly split, with 52.9% of respondents saying that they employed a fulltime safety director. Respondents who employed fulltime safety directors were then asked to indicate what percentage of the workday the company safety director spent in the field. Responses were varied. Table 4-5 shows that 45.4% of the company safety directors spend between 26 and 50% of their time in the field.

The next question asked respondents to indicate whether their firms had a drug-testing program. This question was asked to determine whether firms with drug-testing programs were safer than firms without them. Table 4-6 shows that the overwhelming majority of firms, 85.3%, employ some sort of drug-testing program. Respondents who employ a drug-testing program were then asked to indicate what type of drug tests the company conducted. They were given four choices and told to check all that apply. The choices were: pre-hire, random, for cause, and post-accident. Responses were varied. Table 4-7 shows that most (75.8%) drug-testing programs utilize a combination of drug-tests. Pre-hire and post-accident drug tests are included in 74.0% and 84.5% of the programs, respectively. The sizes of the firms who only perform post-accident or for cause drug testing are depicted in Table 4-8, indicating that these firms are predominantly small.

The next question asked respondents to indicate whether or not all their field employees were required to wear hard hats. Table 4-9 shows that nearly two-thirds of firms did not require their field employees to wear hard hats. Respondents were then asked to indicate whether or not

all their field employees were required to wear safety glasses. Table 4-10 shows that 55.2% of respondents require their field employees to wear safety glasses.

The next question asked respondents to indicate whether or not their company conducted weekly toolbox meetings. Normally held once a week, toolbox meetings last anywhere from 10 to 20 minutes and are designed to make employees aware of potential job related hazards or injuries. Table 4-11 shows that two-thirds of the firms conducted weekly toolbox meetings.

Respondents were then asked to indicate if their company held pre-task planning meetings before every task. Table 4-12 shows that 53.8% of respondents indicated that their firms do hold these meetings.

The next question asked respondents to indicate whether or not the company prepared project specific safety programs for each individual project. These programs are created because each project and jobsite poses its own unique hazards. Table 4-13 shows that 45.5% of the respondents indicated that they prepared these safety plans.

Respondents were asked to indicate whether or not the company provided orientation for all its employees on project sites. These orientation programs typically include topics related to safety practices. Table 4-14 shows that 53.0% of the responding firms provided orientation to all their field employees on their project sites. Respondents who provided orientation to all its employees on project sites were then asked to indicate how many hours were devoted to the orientation program for new employees. Table 4-15 shows that the majority of these orientation sessions (54.8%) last two hours or less, and that most of these sessions (80.8%) last four hours or less. Note that one respondent indicated that their company's new employee orientation program was 40 hours, or one full work week in duration.

The next question asked respondents to indicate how many hours of safety training were provided to employees each month. Table 4-16 shows that the majority of the responding companies (54.1%) spend two hours or less each month on safety training. Note that only two companies spend more than eight hours per month on safety training, the largest response was 25 hours.

Respondents were then asked what percentage of the safety training they offer is available in Spanish. The responses to this question vary, as some firms who took the survey do not employ Hispanic workers or persons who do not speak and understand English, and therefore do not have Spanish safety training. Table 4-17 shows the answers received from all survey respondents, while Table 4-18 shows the answers received from companies that employ at least one Hispanic worker. Table 4-19 shows the answers received from companies that employ at least one Hispanic worker who cannot speak or understand English. For this latter case, 8.3% of these firms do not provide any safety training in Spanish while 58.3% of these firms have all of their safety training available in Spanish. All 12 respondents who do not employ Hispanic workers provide no safety training in Spanish. Of the respondents who have at least one Hispanic worker, 19.2% of them offer no safety training in Spanish.

The next question asked respondents to input their company's approximate annual expenditure for safety training. Table 4-20 shows that the majority of companies (60.8%) spent approximately \$5,000 or less on safety training. Note that one respondent wrote that they did all their safety training in house and therefore could not attach a dollar figure to it. Table 4-21 shows the responding companies' computed safety training expense per worker. The majority of the firms (74.5%) spend \$300 or less per employee on safety training. Table 4-22 shows the company's computed safety training expense per worker, but only for firms with at least one

Hispanic worker. The majority of the firms (77.5%) spend \$300 or less per employee on safety training. Table 4-23 shows the respondents' computed safety training expense per worker, for firms who do not employ any Hispanic workers. There were not sufficient responses for firms who do not employ Hispanic workers to make any comparisons; however, the amount of safety training expense per worker does not correlate to the firm's RIR.

Respondents were then asked to indicate whether or not their company had an incentive program based on safety achievements. An incentive program would provide workers with prizes or cash considerations for working a period of time without injury. These programs have come under fire for not being an efficient use of money that would be better put towards safety gear or training. Table 4-24. shows that the majority of responding companies (58.5%) do not have an incentive program.

The next question asked respondents to indicate whether or not the company had implemented any new programs within the past five years to promote safety. Table 4-25 shows that the majority of responding firms (61.5%) have implemented new programs to promote safety within the past five years. Respondents who answered "Yes" to this question were then asked to describe the program, as shown in the responses in Table 4-26. The most popular responses included creating incentive programs, introducing safety meetings, introducing toolbox meetings, having FRSA come to the jobsite, and increasing safety equipment training.

Respondents were then asked to indicate their most successful practice to promote safety. Table 4-27 shows their responses. The most common responses included toolbox meetings, incentive programs, FRSA safety management and inspections, having monthly safety meetings, and increasing fall protection and safety equipment.

Company Experiences with Hispanic Workers

The third part of the survey was designed to obtain information on the subcontractor's experiences with Hispanic workers. The responses were formatted as a Likert Scale, ranging from 1 for "strongly disagree" to 5 for "strongly agree." Participants were asked to select the extent of their agreement or disagreement with the various statements.

The first statement that respondents were asked to evaluate was "safety has a positive effect on productivity." Table 4-28 shows that the overwhelming majority of respondents (81.6%) either "agreed" or "strongly agreed" with this statement.

The second statement that respondents were asked to evaluate was "Hispanic workers are equally or more productive than non-Hispanic workers." Table 4-29 shows that the majority of respondents, 60.9%, either "agreed" or "strongly agreed" with this statement.

The third statement that respondents were asked to evaluate was "Spanish speaking workers can be accommodated without learning English." Table 4-30 shows that the results were mixed where 34.4% of the respondents either "disagreed" or "strongly disagreed" while 37.5% "agreed" or "strongly agreed."

The fourth statement that respondents were asked to evaluate was "our company encounters significant problems because workers don't speak English." Table 4-31 shows that the results were mixed as 34.4% of the respondents either "disagreed" or "strongly disagreed" while 21.8% "agreed" or "strongly agreed." A large portion of respondents (43.8%) "neither agreed nor disagreed."

The fifth statement that respondents were asked to evaluate was "Hispanic workers take more risks on the job than non-Hispanic workers." Table 4-32 shows that these results were also mixed where 37.4% of the respondents either "disagreed" or "strongly disagreed" while 28.3%

“agreed” or “strongly agreed.” A portion of the respondents (34.3%) “neither agreed nor disagreed.”

The sixth statement that respondents were asked to evaluate was “Hispanic workers are more likely to view injuries as a normal part of the job.” Table 4-33 shows that the results were mixed where 39.7% of the respondents either “disagreed” or “strongly disagreed” while 30.2% “agreed” or “strongly agreed.” A portion of respondents (30.1%) “neither agreed nor disagreed.”

The seventh statement that respondents were asked to evaluate was “non-Hispanic workers value their own safety more so than Hispanic workers do.” Table 4-34 shows that 40.6% of the respondents either “disagreed” or “strongly disagreed” while only 21.9% “agreed” or “strongly agreed.” A portion of respondents (30.1%) “neither agreed nor disagreed.”

Finally, respondents were asked whether or not Hispanic workers more regularly follow the company’s safety procedures than their non-Hispanic counterparts. To answer the question, there were three boxes to check and the results are presented in Table 4-35. The results show that the majority of the respondents (68.3%) felt that both Hispanics and non-Hispanics followed safety procedures equally. However, a portion of respondents (26.7%) felt that Hispanic workers followed safety procedures less frequently than their non-Hispanic counterparts.

Current State of the Subcontractor’s Hispanic Workforce

The fourth part of the survey was designed to obtain information to characterize the current state of the responding subcontractor’s Hispanic workforce. The first question asked respondents about the percentage of their company’s workforce whose primary language is Spanish (Table 4-36). The majority of respondent’s workforces (76.5%) were made up of 50% or fewer Hispanic workers. It is important to note that the percent of the workforce that is Hispanic is directly related to the magnitude of the company’s workforce with a correlation coefficient of 0.229 and a level of significance of 0.004.

The next question asked respondents about the percent of their company's managers that are bilingual. Table 4-37 shows that for all survey respondent's, 62.2% employ 10% or fewer bilingual managers. Table 4-38 shows that for survey respondent's with at least one Hispanic worker, 56.3% of the firms also employ 10% or fewer bilingual managers. Note that the firms with at least one Hispanic worker employ a higher percentage of bilingual managers than when all the firms are taken as a whole.

Respondents were then asked to characterize how the number of Hispanic workers in their firms has changed in the past five years. Table 4-39 shows that the results were varied, however, the most common responses indicate that the firms either had no change in the amount of Hispanic workers employed (34.9%) or they employ slightly more Hispanic workers now versus five years ago (31.8%).

Next, respondents were asked whether or not their company has a requirement that workers must be able to speak and understand English in order to become employed. Table 4-40 shows that the majority of the firms (78.8%) do not have this requirement as a condition of employment.

Respondents were then asked to input the percent of their Hispanic workers that cannot speak or understand English. Not being able to speak or understand English is a primary concern when distress calls such as "watch out" and "help" are exclaimed. The results were mixed, and Table 4-41 shows 56.9% of firms noted that 10% or fewer of their Hispanic workers could not speak or understand English.

The next question asked respondents to indicate what percent of their Hispanic workers had been employed for at least two years. This question was designed to characterize the job stability and/or transient nature of the Hispanic workforce. It was also hypothesized that time

served at a one job with one employer would correlate with safety, but this study did not support that. Table 4-42 shows the results were mixed across the board.

Next, respondents were asked to provide the languages, besides English that are spoken on their jobsites. Table 4-43 shows that on the majority of jobsites (63.3%) Spanish is spoken, while English is the solely spoken language on 36.2% of jobsites. Also note that various other languages are spoken on jobsites, including Tongan, Fijian, Portuguese, and various European languages.

The next question asked respondents whether or not they had a program in place to check their employee's I9 forms. Interestingly, there is no real perceived difference in the percentage of firms that have I9 programs between all firms and those firms that employ Hispanic workers (see Tables 4-44 and 4-45).

Respondents were asked whether or not their companies had encountered any unique safety problems associated with Hispanic Workers. The majority of respondents, 82.4%, had not encountered any unique safety problems associated with Hispanic workers (see Table 4-46). Respondents who had experienced specific problems were then asked to describe the unique safety problems. Responses were varied, but most had to do with the language barrier or other communication problems (see Table 4-47).

Company Injury Information

The final portion of the survey was designed to calculate the respondents RIR values. Respondents were first asked how many company employees suffered injuries treated by a doctor in the previous year. The majority of companies (77%) suffered three or fewer injuries (see Table 4-48). The second part of the question asked respondents to denote how many of those injuries were incurred by Hispanic workers (see Table 4-49). Note, Table 4-49 is not related to Table 4-48, rather it is merely a tabulation of responses.

Because of company size differences, comparisons of safety performances could not be made on the basis of the number of injuries. Therefore, the data were converted into individual company RIR, Hispanic RIR, and non-Hispanic RIR values which can be used to compare company safety performances. To do so, each company's response to the question about the number of company employees that suffered injuries treated by a doctor in the previous year was divided by the corresponding company's response regarding the number of fulltime field employees the company employed. This figure was then multiplied by 100 to derive the firm's RIR. The 56.9% of respondents had an RIR of five or less (see Table 4-50). Note that the largest RIR was 50.0.

For comparison purposes, only companies who employed at least one Hispanic worker were included in the following calculations. First, the RIR was recalculated for all the companies who employed at least one Hispanic worker, as presented in Table 4-51. The RIR distribution of the responding companies that do not employ any Hispanic workers is presented in Table 4-52 for comparison purposes. There were insufficient responses from firms who did not employ Hispanic workers to make any statistically significant conclusions; one can note that these firms have a smaller average RIR than firms who employ Hispanic workers, 4.1 and 10.5, respectively.

To compute each company's Hispanic RIR and non-Hispanic RIR, the number of Hispanic employees was first computed and the remainder of the employees was assumed to be non-Hispanic. To calculate the Hispanic RIR, the number of Hispanic workers who experienced injuries in the past year was divided by the number of Hispanic workers. This figure was then multiplied by 100 to derive the firm's Hispanic RIR, as shown in Table 4-53. A similar process was used to determine the responding company's non-Hispanic RIR, as shown in Table 4-54.

Those companies with at least one Hispanic worker experienced an average Hispanic RIR that was higher than the average non-Hispanic RIR, 14.9 and 9.2, respectively (Table 4-55). A Test of two means was conducted to determine if the Hispanic RIR and Non-Hispanic RIR were statistically different. It was determined that their difference was statistically significant with a score of 2.218 (see Figure 4-1).

Findings Correlated to RIR

One of this study's primary goals was to identify a set of best safety practices for subcontractors. To do so, the responses to the various questions were compared with the three types of RIR in a one-tailed Kendall's bivariate correlation using SPSS version 12.0.

The characteristics of the subcontractors that correlated with the company's RIR were identified (see Table 4-56, Figures 4-2 to 4-9). There exists a statistically significant correlation between RIR and both safety glasses and pre-task planning meetings with correlation coefficients of 0.206 and 0.281, respectively. The correlation between RIR and "hard hats" and holding toolbox meetings had a tendency towards significance with correlation coefficients of 0.173 and 0.171, respectively. Respondents who said that they have experienced "unique safety problems associated with Hispanic workers" experienced a higher RIR than those firms who did not.

A combination of safety practices was identified and these were combined to form a single variable. This composite variable was correlated with the RIR. This was done to determine if a combination of safety practices improved the firm's RIR more than just one practice alone. Two combinations of variables are listed in Table 4-56 as safety culture and safety tone. Safety culture is a combination of hard hats, safety glasses, pre-task planning meetings, project specific safety planning, and new worker orientation. Safety tone is a combination of hard hats, safety glasses, toolbox meetings, pre-task planning meetings. A strong correlation with the RIR was

achieved from the scores of both of the combinations, 0.508 and 0.309, respectively. The scores are explained in depth later in this chapter.

The characteristics of the subcontractors that correlate significantly with the company's Hispanic RIR were identified (Table 4-57, Figures 4-10 to 4-13). The correlations between Hispanic RIR and the requirement for the workers to wear hard hats and pre-task planning meetings have a tendency towards significance with correlation coefficients of 0.199 and 0.209, respectively. Both combination scores correlate with the firm's Hispanic RIR; however, each has a weaker correlation coefficient than the combinations experienced when correlated to the firm's total RIR.

Table 4-58 displays the characteristics of the subcontractors that correlate significantly with the company's non-Hispanic RIR. There exists a significant correlation between the non-Hispanic RIR and practices related to safety glasses, pre-task planning meetings, and project specific safety plans with correlation coefficients of 0.224, 0.280, and 0.238, respectively. Additionally, the number of hours spent on new employee orientation has a tendency towards significance with a correlation coefficient of -0.250. That is, the more hours a firm spends on orientation, the lower their RIR (see Figure 4-14). Both combination scores, safety culture and safety tone, correlate with the firm's non-Hispanic RIR and each has a stronger correlation coefficient than the combinations experience when correlated to the firm's Hispanic RIR. There is a tendency towards significance that firms who said that they have experienced "unique safety problems associated with Hispanic workers" experienced a higher non-Hispanic RIR than those firms who did not.

There is a significant correlation coefficient of 0.283 between non-Hispanic RIR and the perception that "Hispanic workers are more likely to view injuries as a normal part of the job."

Firms who “agreed” or “strongly agreed” with the statement have a higher RIR than those who either “disagreed” or “strongly disagreed” (see Figure 4-15). There is a tendency towards significance between the non-Hispanic RIR and the firm’s perception that “Hispanic workers take more risks on the job than non-Hispanic workers.” The correlation coefficient is -0.181, meaning firms who “disagreed” or “strongly disagreed” with the statement have a higher RIR than those who either “agreed” or “strongly agreed” (see Figure 4-16).

The percentage of the work that is subcontracted correlates with the company’s size (see Table 4-59). There exists a significant relationship between the company size and the requirement to wear of hard hats, the hours of safety training workers receive each month, and the percentage of safety training that is available in Spanish with correlation coefficients of -0.405, 0.227, and 0.189, respectively. Additionally, there is a tendency towards significance between firm size and the requirement to wear safety glasses, hold toolbox meetings, and implement safety incentive programs with correlation coefficients of -0.160, -0.187, and -0.188. The combination score of safety tone also has a significant correlation coefficient with firm size of -0.283. Additionally, there is a significant correlation coefficient between firm size and implementing new safety programs within the last five years of -0.207.

The data reveals that larger companies are more likely to have safety incentive programs (Table 4-60). Safety incentive programs reward workers with a small gift for achieving a specified accident rate, e.g. no accidents over a specified period of time, such as a month. However, the data analysis reveals that these incentive programs are not correlated to the RIR.

There are many characteristics closely associated with firms that have Hispanic workers that correlate with company size (see Table 4-59). There is a tendency towards significance between firm size and the percentage of employees whose primary language is Spanish with a

correlation coefficient of 0.150. Also, there is a significant correlation between firm size and the percentage of bilingual managers, the percentage of Hispanic workers who cannot speak or understand English, and firms having a program to check I-9 forms of 0.193, 0.253, and -0.240, respectively.

Finally, firm size correlates significantly with the subcontractors' level of agreement with three Likert scale statements (Table 4-59). In all three cases, the correlation coefficient indicates that firms who "agreed" or "strongly agreed" with the statement have a larger workforce than those who either "disagreed" or "strongly disagreed." First, there is a tendency toward significance between firm size and the level of agreement with the statement "safety has a positive affect on productivity" with a correlation coefficient of 0.186. Second, there is a significant correlation between firm size and the level of agreement with the statement "Hispanic workers are equally or more productive than non-Hispanic workers" with a correlation coefficient of 0.197. Finally, there is a significant correlation between firm size and the level of agreement with the statement "Spanish speaking workers can be accommodated without speaking English" with a correlation coefficient of 0.187. Larger firms seemingly have a more positive view of both safety and Hispanic workers.

One of the research goals was to come up with a set of best safety practices for the subcontracting profession. Correlations were run to find a grouping of practices that had the greatest effect on RIR; this grouping would be referred to as the safety culture score. For this study, RIR was best correlated with a group of five practices: hard hats, safety glasses, pre-task planning meetings, project specific safety plan, and the number of orientation hours per new employee. A correlation of 0.508 was calculated with a level of significance less than 0.001. For the first four practices, a "yes" response received a score of one, while a "no" received a

score of two. To weigh orientation hours around the same level as the others, the number of orientation hours per new employee was divided by a factor of 10 and then subtracted from the sum of the other questions. For example, a subcontractor that that required hard hats, safety glasses, and provided new employees with 4 hours of orientation, but did not implement pre-task planning meetings or create a project specific safety plan earned a score of 5.6 (Figure 4-17). Companies that performed all four practices and had at least a half an hour of new employee orientation would earn a score under four. Companies who performed none of the four safety practices and provided no orientation would earn a score of 8.

It was determined that firms who performed at least four of the five listed practices would earn a score of five or less (see Table 4-61). Firms with a score of five or less had a much lower overall RIR than those who did not, 7.17 and 18.37, respectively. This trend was also observed for the Hispanic RIR and non-Hispanic RIR. Thus, it was concluded that the firm's safety culture has a positive effect on RIR.

Computations were made to see if the safety culture variable was related to the size of the firm. These variables were found to not be correlated. For this analysis, the cutoff number to define small firms was set at 20 employees because it was hypothesized that at this level, firm owners move from working in the field to working in the office. Results show that the firm's safety culture is independent of the firm's size. That is, small and large firms alike can implement these safety practices to enhance safety performances (see Table 4-62).

A chi-square analysis was conducted to examine company size (as measured by the number of employees) in relation to the associated safety culture score (see Table 4-63). This test was run to evaluate the relationships that the correlation test might have missed. The data shows that at extreme sizes, from 1-10 and more than 76 employees, the firm's safety culture

score is related to firm size. Larger firms perform more of the safety practices than do small firms.

Computations were run to see whether the RIR correlated significantly to a combination of safety practices known as safety tone which included hard hats, safety glasses, toolbox meetings, and pre-task planning meetings. For each response a “yes” earned a score of one, while a “no” earned a score of two. Firms who performed all four safety practices would earn a score of 4, while firms who performed none of these safety practices would earn a score of 8. Firms who performed at least three of the four listed practices would earn a score of five or less (see Table 4-64). Firms who earned a score of five or less had a lower overall RIR than those with higher scores 7.22 and 13.47, respectively. This combination of safety practices was found to be positively correlated with the RIR. This relationship was observed for both the Hispanic RIR and the non-Hispanic RIR. Thus, it was concluded that safety tone has a positive effect on RIR, and its effect is less than that of the combination of safety practices that make up safety culture.

Computations show that safety tone scores are related to company size. The safety tone score was found to be correlated to workforce size with a correlation of -0.283 and a level of significance of 0.006. Thus, firms are more likely to implement those practices included in the safety tone score as the size of the firm increases. For this analysis, 20 employees or less was designated as the cutoff number to define small firms. For firms with 20 or fewer workers, 27.8% earned a score of five or less, compared to 56.5% of the firms with more than 20 workers (see Table 4-65).

Computations were performed to determine if any safety practices were significantly correlated with the size of the firm’s workforce or the firm’s RIR (Table 4-66). It was noted that

some safety practices correlate to RIR but do not correlate significantly with size, (see Table 4-67).

The RIR for firms who have no safety training available in Spanish was compared against the RIR, Hispanic RIR, and non-Hispanic RIR of all firms with Hispanic workers and those firms who have at least 50% of their safety training available in Spanish (Tables 4-68 and 4-69). Despite the apparent influence of safety training in Spanish on Hispanic RIR a chi-squared analysis showed the relationship between Hispanic RIR and the percentage of safety training available in Spanish is not significant (Table 4-70).

A chi-squared test was run between Hispanic RIR and the level of agreement with the following statement, “Spanish speaking workers can be accommodated without learning English.” Companies who checked that they either “strongly agree” or “agree” with the statement have a lower RIR than those firms who “strongly disagree” (Table 4-71).

Also, a chi-squared test was run between firm size and the length of employment of Hispanic workers. Large firms, with more than 75 employees, had a greater percentage of Hispanic employees that had been employed for at least two years (Table 4-72).

The data revealed that the size of the company did not correlate with the firm’s RIR. Table 4-73 and Table 4-74 display the number of full time field employees and the associated RIR. Small firms with 10 or fewer employees, who can be tight knit operations, have a low RIR. It is presumed that these firms can be family businesses, where the employees have been working together for many years, often with the president of the company working in the field. As the company’s workforce increases to 20 employees, the RIR increases. This occurs until a point where the workforce is greater than 20 employees but less than 75, where the company RIR values start to decrease. It is assumed that perhaps at this point, the firm’s workforce is so large

that they start investing in safety measures, buying better equipment, and employing more safety managers. Finally, for companies with a workforce that is larger still, over 75 employees, the RIR drops even further (Figure 4-3). It is assumed that those companies put a greater focus on working safely as their workforce increases.

Table 4-1. Number of Hispanic Minority Business Enterprises responding to the survey

| Hispanic MBE | Number of firms | Percent |
|--------------|-----------------|---------|
| Yes | 1 | 1.5 |
| No | 66 | 98.5 |
| Total | 67 | 100.0 |

Table 4-2. Number of fulltime field employees

| Number of fulltime field employees | Number of firms | Percent |
|------------------------------------|-----------------|---------|
| 1-10 | 23 | 33.8 |
| 11-20 | 17 | 25.0 |
| 21-40 | 14 | 20.6 |
| 41-75 | 7 | 10.3 |
| 76-100 | 3 | 4.4 |
| 101-200 | 3 | 4.4 |
| 201-650 | 1 | 1.5 |
| Total | 68 | 100.0 |

Table 4-3. Percent of work that is subcontracted

| Percent of work subcontracted | Number of firms | Percent |
|-------------------------------|-----------------|---------|
| 0-5 | 51 | 75.0 |
| 6-10 | 8 | 11.8 |
| 11-20 | 2 | 2.9 |
| 21-35 | 5 | 7.4 |
| 36-50 | 2 | 2.9 |
| Total | 68 | 100.0 |

Table 4-4. Number of firms with fulltime safety directors

| Fulltime safety director | Number of firms | Percent |
|--------------------------|-----------------|---------|
| Yes | 36 | 52.9 |
| No | 32 | 47.1 |
| Total | 68 | 100.0 |

Table 4-5. Percent of workday the safety director spends in the field

| Percent of workday | Number of firms | Percent |
|--------------------|-----------------|---------|
| 1-10 | 7 | 21.2 |
| 11-25 | 3 | 9.1 |
| 26-50 | 15 | 45.4 |
| 51-75 | 2 | 6.1 |
| 76-100 | 6 | 18.2 |
| Total | 33 | 100.0 |

Table 4-6. Does the firm have a drug-testing program

| Drug testing program | Number of firms | Percent |
|----------------------|-----------------|---------|
| Yes | 58 | 85.3 |
| No | 10 | 14.7 |
| Total | 68 | 100.0 |

Table 4-7. What type of drug tests does the firm conduct

| Type | Number of firms | Percent |
|---------------------------------------|-----------------|---------|
| Pre-hire | 4 | 7.0 |
| Random | 2 | 3.5 |
| Post accident | 9 | 15.4 |
| All four | 13 | 22.4 |
| Pre-hire and post accident | 7 | 12.1 |
| Pre-hire, for cause and post accident | 10 | 17.2 |
| Random and post accident | 2 | 3.5 |
| Pre-hire, random, and post accident | 9 | 15.4 |
| Random, for cause, and post accident | 2 | 3.5 |
| Total | 58 | 100.0 |

Table 4-8. Number of full time field employees in firms that only perform post-accident drug-testing

| Number of field employees | Number of firms | Percent |
|---------------------------|-----------------|---------|
| 1-10 | 5 | 55.6 |
| 11-20 | 3 | 33.3 |
| 21-40 | 1 | 11.1 |
| Total | 9 | 100.0 |

Table 4-9. Are all company employees required to wear hard hats

| Hard hats | Number of firms | Percent |
|-----------|-----------------|---------|
| Yes | 24 | 35.8 |
| No | 43 | 64.2 |
| Total | 67 | 100.0 |

Table 4-10. Are all company employees required to wear safety glasses

| Safety glasses | Number of firms | Percent |
|----------------|-----------------|---------|
| Yes | 37 | 55.2 |
| No | 30 | 44.8 |
| Total | 67 | 100.0 |

Table 4-11. Are weekly toolbox meetings conducted on project sites

| Toolbox meetings | Number of firms | Percent |
|------------------|-----------------|---------|
| Yes | 44 | 66.7 |
| No | 22 | 33.3 |
| Total | 66 | 100.0 |

Table 4-12. Are pre-task planning meetings held before every task

| Pre-task planning meetings | Number of firms | Percent |
|----------------------------|-----------------|---------|
| Yes | 35 | 53.8 |
| No | 30 | 46.2 |
| Total | 65 | 100.0 |

Table 4-13. Does the company prepare a project specific safety plan for each project

| Project specific safety plan | Number of firms | Percent |
|------------------------------|-----------------|---------|
| Yes | 30 | 45.5 |
| No | 36 | 54.5 |
| Total | 66 | 100.0 |

Table 4-14. Does the company provide orientation for all its employees on project sites

| Project site orientation | Number of firms | Percent |
|--------------------------|-----------------|---------|
| Yes | 35 | 53.0 |
| No | 31 | 47.0 |
| Total | 66 | 100.0 |

Table 4-15. How many hours are devoted to the orientation program for new employees

| Hours of orientation | Number of firms | Percent |
|----------------------|-----------------|---------|
| .5-2 | 17 | 54.8 |
| 2.5-4 | 8 | 26.0 |
| 4.5-8 | 1 | 3.2 |
| 8.5-16 | 3 | 9.6 |
| 16-40 | 2 | 6.4 |
| Total | 31 | 100.0 |

Table 4-16. How many hours of safety training are provided to employees each month

| Hours of training | Number of firms | Percent |
|-------------------|-----------------|---------|
| .5-2 | 33 | 54.1 |
| 2.5-4 | 19 | 31.1 |
| 4.5-8 | 7 | 11.5 |
| 8.5-25 | 2 | 3.3 |
| Total | 61 | 100.0 |

Table 4-17. What percentage of the safety training is available in Spanish

| Percent available in Spanish | Number of firms | Percent |
|------------------------------|-----------------|---------|
| 0 | 22 | 34.4 |
| 1-25 | 6 | 9.4 |
| 26-50 | 8 | 12.5 |
| 51-75 | 1 | 1.6 |
| 76-99 | 1 | 1.6 |
| 100 | 26 | 40.5 |
| Total | 64 | 100.0 |

Table 4-18. What percentage of the safety training is available in Spanish (for firms with at least one Hispanic worker)

| Percent available in Spanish | Number of firms | Percent |
|------------------------------|-----------------|---------|
| 0 | 10 | 19.2 |
| 1-25 | 6 | 11.6 |
| 26-50 | 8 | 15.4 |
| 51-75 | 1 | 1.9 |
| 76-99 | 1 | 1.9 |
| 100 | 26 | 50.0 |
| Total | 52 | 100.0 |

Table 4-19. What percentage of the safety training is available in Spanish (for firms with at least one Hispanic worker who cannot speak or understand English)

| Percent available in Spanish | Number of firms | Percent |
|------------------------------|-----------------|---------|
| 0 | 3 | 8.3 |
| 1-25 | 4 | 11.1 |
| 26-50 | 6 | 16.7 |
| 51-75 | 1 | 2.8 |
| 76-99 | 1 | 2.8 |
| 100 | 21 | 58.3 |
| Total | 36 | 100.0 |

Table 4-20. What is the company's approximate annual expenditure for safety training

| Approximate annual expenditure | Number of firms | Percent |
|--------------------------------|-----------------|---------|
| 0 | 5 | 9.8 |
| 1-1000 | 8 | 15.7 |
| 1001-2500 | 8 | 15.7 |
| 2501-5000 | 10 | 19.6 |
| 5001-10000 | 7 | 13.7 |
| 10001-20000 | 9 | 17.7 |
| 20001-100000 | 4 | 7.8 |
| Total | 51 | 100.0 |

Table 4-21. Company's computed safety training expense per worker

| Expense per worker | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 5 | 9.8 |
| 1-100 | 10 | 19.6 |
| 101-200 | 10 | 19.6 |
| 201-300 | 13 | 25.5 |
| 301-500 | 4 | 7.8 |
| 501-750 | 3 | 5.9 |
| 751-1000 | 1 | 2.0 |
| 1001-1850 | 5 | 9.8 |
| Total | 51 | 100.0 |

Table 4-22. Company's computed safety training expense per worker (for firms with at least one Hispanic worker)

| Expense per worker | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 5 | 12.5 |
| 1-100 | 7 | 17.5 |
| 101-200 | 7 | 17.5 |
| 201-300 | 12 | 30.0 |
| 301-500 | 2 | 5.0 |
| 501-750 | 3 | 7.5 |
| 751-1000 | 1 | 2.5 |
| 1001-1850 | 3 | 7.5 |
| Total | 40 | 100.0 |

Table 4-23. Company's computed safety training expense per worker (for firms with no Hispanic workers)

| Expense per worker | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 0 | 0.00 |
| 1-100 | 1 | 12.5 |
| 101-200 | 2 | 25.0 |
| 201-300 | 1 | 12.5 |
| 301-500 | 2 | 25.0 |
| 501-750 | 0 | 0.00 |
| 751-1000 | 0 | 0.00 |
| 1001-1850 | 1 | 12.5 |
| Total | 8 | 100.0 |

Table 4-24. Does the company have an incentive program based on safety achievements

| Incentive program | Number of firms | Percent |
|-------------------|-----------------|---------|
| Yes | 27 | 41.5 |
| No | 38 | 58.5 |
| Total | 65 | 100.0 |

Table 4-25. Has the company implemented any new programs within the past 5 years to promote safety

| New programs | Number of firms | Percent |
|--------------|-----------------|---------|
| Yes | 40 | 61.5 |
| No | 25 | 38.5 |
| Total | 65 | 100.0 |

Table 4-26. Listing of responses for those who answered “Yes” to the question has the company implemented any new programs within the past 5 years to promote safety

| Response | Number of firms |
|--|-----------------|
| Creating incentive programs | 7 |
| Introduction of safety meetings | 5 |
| Introduction of toolbox meetings | 4 |
| Having FRSA come to the jobsite | 4 |
| Increasing safety or equipment training | 4 |
| Having jobsite inspections | 3 |
| Increasing fall protection and safety equipment | 3 |
| Updating safety materials to NRCA standards | 2 |
| Showing videos and posters in Spanish and English | 2 |
| Conducting driver safety classes | 2 |
| Creating a safety committee or hiring a safety consultant | 2 |
| Introduction of new safety rules or equipment | 1 |
| Instituting and documenting lock-out tag-out procedures | 1 |
| Reviewing and rating individual employee safety procedures | 1 |
| Introduction of a chemical safety program | 1 |
| Introduction of a site clean up program | 1 |
| Introduction of equipment inspection | 1 |
| Introduction of weekly meetings in Spanish | 1 |
| Introduction of a written safety test in Spanish | 1 |
| Total | 46 |

Table 4-27. Listing of about the most successful practice implemented to promote safety

| Response | Number of firms |
|--|-----------------|
| Toolbox meetings | 10 |
| Incentive programs | 5 |
| FRSA safety manager and inspections | 4 |
| Monthly safety meeting | 4 |
| Increasing fall protection and safety equipment | 4 |
| Showing videos and posters in Spanish and English | 3 |
| Talking safety daily and at every meeting | 3 |
| Retraining workers on fall protection | 3 |
| Ladder tie-off procedures and training | 2 |
| Training on slip hazards and pinch points | 2 |
| Site clean up program | 1 |
| Behavior based programs to change safety culture | 1 |
| Limiting the size of the workforce to below 10 employees | 1 |
| Having a safety training day each quarter | 1 |
| Total | 44 |

Table 4-28. Safety has a positive affect on productivity

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 1 | 1.6 |
| Disagree | 2 | 3.1 |
| Neither agree or disagree | 9 | 13.8 |
| Agree | 34 | 52.3 |
| Strongly agree | 19 | 29.2 |
| Total | 65 | 100.0 |

Table 4-29. Hispanic workers are equally or more productive than non-Hispanic Workers

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 3 | 4.7 |
| Disagree | 2 | 3.1 |
| Neither agree or disagree | 20 | 31.3 |
| Agree | 26 | 40.6 |
| Strongly agree | 13 | 20.3 |
| Total | 64 | 100.0 |

Table 4-30. Spanish speaking workers can be accommodated without learning English

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 8 | 12.5 |
| Disagree | 14 | 21.9 |
| Neither agree or disagree | 18 | 28.1 |
| Agree | 23 | 35.9 |
| Strongly agree | 1 | 1.6 |
| Total | 64 | 100.0 |

Table 4-31. Our company encounters significant problems because workers don't speak English

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 3 | 4.7 |
| Disagree | 19 | 29.7 |
| Neither agree or disagree | 28 | 43.8 |
| Agree | 12 | 18.7 |
| Strongly agree | 2 | 3.1 |
| Total | 64 | 100.0 |

Table 4-32. Hispanic workers take more risks on the job than non-Hispanic Workers

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 2 | 3.1 |
| Disagree | 22 | 34.3 |
| Neither agree or disagree | 22 | 34.3 |
| Agree | 13 | 20.4 |
| Strongly agree | 5 | 7.9 |
| Total | 64 | 100.0 |

Table 4-33. Hispanic workers are more likely to view injuries as a normal part of the job

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 8 | 12.7 |
| Disagree | 17 | 27.0 |
| Neither agree or disagree | 19 | 30.1 |
| Agree | 18 | 28.6 |
| Strongly agree | 1 | 1.6 |
| Total | 63 | 100.0 |

Table 4-34. Non-Hispanic workers value their own safety more so than Hispanic workers

| Response | Number of firms | Percent |
|---------------------------|-----------------|---------|
| Strongly disagree | 7 | 10.9 |
| Disagree | 19 | 29.7 |
| Neither agree or disagree | 24 | 37.5 |
| Agree | 10 | 15.6 |
| Strongly agree | 4 | 6.3 |
| Total | 64 | 100.0 |

Table 4-35. Do Hispanic workers more regularly follow the company's safety procedures than non-Hispanic workers

| Response | Number of firms | Percent |
|--------------------------------|-----------------|---------|
| Yes | 3 | 5.0 |
| They follow procedures equally | 41 | 68.3 |
| No | 16 | 26.7 |
| Total | 60 | 100.0 |

Table 4-36. What percent of the company's employee's primary language is Spanish

| Percent of workers | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 12 | 17.6 |
| 1-10 | 11 | 16.2 |
| 11-25 | 11 | 16.2 |
| 26-50 | 18 | 26.5 |
| 51-75 | 9 | 13.2 |
| 76-100 | 7 | 10.3 |
| Total | 68 | 100.0 |

Table 4-37. What percent of the company's managers are bilingual

| Percent of workers | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 28 | 42.5 |
| 1-10 | 13 | 19.7 |
| 11-25 | 12 | 18.2 |
| 26-50 | 7 | 10.6 |
| 51-75 | 3 | 4.5 |
| 76-100 | 3 | 4.5 |
| Total | 66 | 100.0 |

Table 4-38. What percent of the company's managers are bilingual (for firms with at least one Hispanic worker)

| Percent of managers | Number of firms | Percent |
|---------------------|-----------------|---------|
| 0 | 19 | 34.5 |
| 1-10 | 12 | 21.8 |
| 11-25 | 11 | 20.0 |
| 26-50 | 7 | 12.7 |
| 51-75 | 3 | 5.5 |
| 76-100 | 3 | 5.5 |
| Total | 55 | 100.0 |

Table 4-39. How has the number of Hispanic workers in your firm changed in the past two years

| Change in Hispanic workers | Number of firms | Percent |
|--------------------------------------|-----------------|---------|
| No Change | 23 | 34.9 |
| Slightly More Hispanic Workers Today | 21 | 31.8 |
| Less Hispanic Workers Today | 9 | 13.6 |
| A Lot More Hispanic Workers Today | 13 | 19.7 |
| Total | 66 | 100.0 |

Table 4-40. Does the company require workers to speak and understand English in order to be employed

| English required | Number of firms | Percent |
|------------------|-----------------|---------|
| Yes | 14 | 21.2 |
| No | 52 | 78.8 |
| Total | 66 | 100.0 |

Table 4-41. Of Hispanic workers, what percent cannot speak or understand English

| Response in percent | Number of firms | Percent |
|---------------------|-----------------|---------|
| 0 | 14 | 21.5 |
| 1-10 | 23 | 35.4 |
| 11-25 | 6 | 9.2 |
| 26-50 | 14 | 21.5 |
| 51-75 | 7 | 10.9 |
| 76-90 | 1 | 1.5 |
| Total | 65 | 100.0 |

Table 4-42. What percent of the Hispanic workers have been employed for at least two years (for firms with at least one Hispanic worker)

| Response in percent | Number of firms | Percent |
|---------------------|-----------------|---------|
| 0 | 7 | 12.5 |
| 1-25 | 13 | 23.2 |
| 26-50 | 14 | 25.0 |
| 51-75 | 8 | 14.7 |
| 76-100 | 14 | 25.0 |
| Total | 56 | 100.0 |

Table 4-43. Besides English, what languages are spoken on the jobsite

| Language | Number of firms | Percent |
|---|-----------------|---------|
| None | 22 | 36.2 |
| Spanish | 34 | 55.8 |
| Tongan and Fijian | 1 | 1.6 |
| Spanish and Central American Indian | 1 | 1.6 |
| Spanish and Serbian | 1 | 1.6 |
| Spanish and Portuguese | 1 | 1.6 |
| Spanish, Romanian, Lithuanian, and Russian | 1 | 1.6 |
| Total | 61 | 100.0 |

Table 4-44. Does the company have a program in place to check employee's I-9 forms

| Program in place | Number of firms | Percent |
|------------------|-----------------|---------|
| Yes | 48 | 78.6 |
| No | 13 | 21.3 |
| Total | 61 | 100.0 |

Table 4-45. Does the company have a program in place to check employee's I-9 forms (for firms with at least one Hispanic worker)

| Program in place | Number of firms | Percent |
|------------------|-----------------|---------|
| Yes | 42 | 79.2 |
| No | 11 | 20.8 |
| Total | 53 | 100.0 |

Table 4-46. Has the company encountered any unique safety problems associated with Hispanic workers (for firms with at least one Hispanic worker)

| Unique safety problems | Number of firms | Percent |
|------------------------|-----------------|---------|
| Yes | 9 | 17.6 |
| No | 42 | 82.4 |
| Total | 51 | 100.0 |

Table 4-47. Listing of responses for those firms who encountered unique safety problems associated with Hispanic workers

| Response | Number of firms |
|--|-----------------|
| General language barrier | 4 |
| Communication problems when injuries occur | 1 |
| Communication gaps even when speaking in Spanish | 1 |
| Language a barrier for prompting quick movements | 1 |
| Miscommunications with use of equipment | 1 |
| Hispanic workers waiting to report injuries | 1 |
| Incurring OSHA fines | 1 |
| Expectation company will take care of their non-work related illnesses | 1 |
| Total | 11 |

Table 4-48. How many company employees suffered injuries treated by a doctor last year

| Number of injuries | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 25 | 38.5 |
| 1-3 | 25 | 38.5 |
| 4-6 | 11 | 16.8 |
| 7-10 | 2 | 3.1 |
| 11-20 | 2 | 3.1 |
| Total | 65 | 100.0 |

Table 4-49. Of injured employees, how many were Hispanic

| Number of injuries | Number of firms | Percent |
|--------------------|-----------------|---------|
| 0 | 37 | 57.8 |
| 1-3 | 24 | 37.5 |
| 4-6 | 0 | 0.0 |
| 7-10 | 2 | 3.1 |
| 11-20 | 1 | 1.6 |
| Total | 64 | 100.0 |

Table 4-50. Distribution of RIR values

| RIR | Number of firms | Percent |
|-------------|-----------------|---------|
| 0 | 25 | 38.5 |
| 0.01-5.00 | 12 | 18.4 |
| 5.01-10.00 | 7 | 10.8 |
| 10.01-15.00 | 5 | 7.7 |
| 15.01-20.00 | 7 | 10.8 |
| 20.01-25.00 | 3 | 4.6 |
| 25.01-50.00 | 6 | 9.2 |
| Total | 65 | 100.0 |

Note: The average RIR was 9.0.

Table 4-51. Company's computed RIR (for firms with at least one Hispanic worker)

| RIR | Number of firms | Percent |
|--------------|-----------------|---------|
| 0 | 14 | 27.5 |
| 0.01-5.00 | 11 | 21.5 |
| 5.01-10.00 | 7 | 13.7 |
| 10.01-15.00 | 5 | 9.8 |
| 15.01-20.00 | 7 | 13.7 |
| 20.01-25.00 | 1 | 2.0 |
| 25.01-50.00 | 6 | 11.8 |
| 50.01-100.00 | 0 | 0.0 |
| Total | 51 | 100.0 |

Note: The average RIR was 10.5

Table 4-52. Company's computed RIR (for firms with no Hispanic worker)

| RIR | Number of firms | Percent |
|--------------|-----------------|---------|
| 0 | 9 | 75.0 |
| 0.01-5.00 | 1 | 8.3 |
| 5.01-10.00 | 0 | 0.0 |
| 10.01-15.00 | 0 | 0.0 |
| 15.01-20.00 | 0 | 0.0 |
| 20.01-25.00 | 2 | 16.7 |
| 25.01-50.00 | 0 | 0.0 |
| 50.01-100.00 | 0 | 0.0 |
| Total | 12 | 100.0 |

Note: The average RIR was 4.1

Table 4-53. Company's computed Hispanic RIR (for firms with at least one Hispanic worker)

| RIR | Number of firms | Percent |
|--------------|-----------------|---------|
| 0 | 23 | 45.1 |
| 0.01-5.00 | 4 | 7.8 |
| 5.01-10.00 | 8 | 15.7 |
| 10.01-15.00 | 2 | 3.9 |
| 15.01-20.00 | 1 | 2.0 |
| 20.01-25.00 | 0 | 0.0 |
| 25.01-50.00 | 10 | 19.6 |
| 50.01-100.00 | 3 | 5.9 |
| Total | 51 | 100.0 |

Note: the average Hispanic RIR was 14.9.

Table 4-54. Company's computed non-Hispanic RIR (for firms with at least one Hispanic worker)

| RIR | Number of firms | Percent |
|--------------|-----------------|---------|
| 0 | 22 | 43.1 |
| 0.01-5.00 | 6 | 11.8 |
| 5.01-10.00 | 8 | 15.7 |
| 10.01-15.00 | 2 | 3.9 |
| 15.01-20.00 | 5 | 9.8 |
| 20.01-25.00 | 3 | 5.9 |
| 25.01-50.00 | 5 | 9.8 |
| 50.01-100.00 | 0 | 0.0 |
| Total | 51 | 100.0 |

Note: the average non-Hispanic RIR was 9.2.

Table 4-55. Company's computed RIR statistics (for firms with at least one Hispanic worker)

| Statistic | RIR | Hispanic RIR | Non-Hispanic RIR |
|-----------|------|--------------|------------------|
| Mean | 10.5 | 14.9 | 9.2 |
| Median | 6.1 | 4.8 | 4.6 |

Table 4-56. Characteristics as they correlate to the company's RIR (for firms with at least one Hispanic worker)

| Characteristic | Correlation | Significance |
|---------------------------------------|-------------|--------------|
| Pre-task planning meetings | 0.281 | 0.012 |
| Safety glasses | 0.206 | 0.043 |
| Project specific safety plan | 0.197 | 0.051 |
| Hard hats | 0.173 | 0.078 |
| Toolbox meetings | 0.171 | 0.082 |
| Safety culture | 0.508 | < 0.001 |
| Safety tone | 0.309 | 0.004 |
| Unique problems with Hispanic workers | -0.203 | 0.046 |

Table 4-57. Characteristics as they correlate to the company's Hispanic RIR (for firms with at least one Hispanic worker)

| Characteristic | Correlation | Significance |
|----------------------------|-------------|--------------|
| Hard hats | 0.199 | 0.058 |
| Pre-task planning meetings | 0.209 | 0.053 |
| Safety tone | 0.204 | 0.043 |
| Safety culture | 0.392 | 0.005 |

Table 4-58. Characteristics as they correlate to the company's non-Hispanic RIR (for firms with at least one Hispanic worker)

| Characteristic | Correlation | Significance |
|---|-------------|--------------|
| Safety glasses | 0.224 | 0.035 |
| Pre-task planning meetings | 0.280 | 0.014 |
| Project specific safety plan | 0.238 | 0.027 |
| Orientation hours | -0.250 | 0.057 |
| Safety tone | 0.278 | 0.009 |
| Safety culture | 0.501 | 0.001 |
| Unique problems with Hispanic workers | -0.201 | 0.052 |
| Hispanic workers take more risks on the job than do non-Hispanic workers | -0.181 | 0.062 |
| Hispanic workers are more likely to view injuries as a normal part of the job | 0.283 | 0.008 |

Table 4-59. Characteristics as they correlate with the company size (for firms with at least one Hispanic worker)

| Characteristic | Correlation | Significance |
|---|-------------|--------------|
| Percentage of work subcontracted | 0.229 | 0.016 |
| Hard hats | -0.405 | 0.000 |
| Safety glasses | -0.160 | 0.088 |
| Toolbox meetings | -0.187 | 0.061 |
| Hours of safety training per month | 0.227 | 0.019 |
| Percentage of safety training available in Spanish | 0.189 | 0.046 |
| Safety incentive program | -0.188 | 0.062 |
| Implemented new safety program within the last five years | -0.207 | 0.043 |
| Safety has a positive affect on productivity | 0.186 | 0.051 |
| Hispanic workers are equally or more productive than non-Hispanic workers | 0.197 | 0.041 |
| Spanish speaking workers can be accommodated without speaking English | 0.187 | 0.048 |
| Percentage of the employees whose primary language is Spanish | 0.150 | 0.067 |
| Percentage of bilingual managers | 0.193 | 0.033 |
| Percentage of Hispanic workers who cannot speak or understand English | 0.253 | 0.008 |
| Checks I-9 forms | -0.240 | 0.024 |
| Hard hats, safety glasses, toolbox meetings, pre-task planning meetings | -0.283 | 0.006 |

Table 4-60. Number of full time field employees as a factor of the company having implemented an incentive program

| Number of field employees | Yes | No |
|---------------------------|-------|---------------------|
| 1-20 | 12 | 28 |
| 41+ | 10 | 3 |
| Chi Square | 8.897 | Significant to 0.01 |

Table 4-61. Number of full-time field employees and the firm's RIR (for firms with at least one Hispanic worker)

| Hard hats | Safety glasses | Pre-task planning | Project specific safety plan | Orientation hours |
|---------------------------|----------------|-------------------|------------------------------|-------------------|
| Yes 1 | Yes 1 | No 2 | Yes 2 | 4 0.4 |
| Score = 1+1+2+2-0.4 = 5.6 | | | | |

Table 4-62. Company's computed RIR as a factor of their safety culture (for firms with at least one Hispanic worker)

| Statistic | Score ≤ 5 | Score > 5 |
|------------------|-----------|-----------|
| Number of firms | 13 | 11 |
| RIR | | |
| Mean | 7.17 | 18.37 |
| Median | 3.33 | 16.67 |
| Hispanic RIR | | |
| Mean | 7.99 | 33.00 |
| Median | 0.66 | 28.57 |
| Non-Hispanic RIR | | |
| Mean | 3.88 | 15.22 |
| Median | 0.00 | 7.50 |

Table 4-63. Company safety culture as a factor of the company's workforce (for firms with at least one Hispanic worker)

| Workforce of firm | Score ≤ 5 , (%) | Score > 5 , (%) |
|-------------------|-----------------|------------------------|
| ≤ 20 employees | 5 , (45.5%) | 6 , (54.5%) |
| > 20 employees | 8 , (61.5%) | 5 , (38.5%) |
| Total | 13 , (54.2%) | 11 , (45.8%) |
| Chi square | 0.621 | Not significant > 0.10 |

Table 4-64. Number of full time field employees as a factor of the firm's safety culture score (for firms with at least one Hispanic worker)

| Number of field employees | Score ≤ 5 | Score > 5 |
|---------------------------|-----------|---------------------|
| 1-10 | 0 | 2 |
| 76+ | 4 | 1 |
| Chi square | 3.733 | Significant to 0.10 |

Table 4-65. Company's computed RIR as related to the safety tone score (for firms with at least one Hispanic worker)

| Statistic | Score ≤ 5 | Score > 5 |
|------------------|-----------|-----------|
| Number of firms | 18 | 28 |
| RIR | | |
| Mean | 7.22 | 13.47 |
| Median | 4.17 | 10.91 |
| RIR Hispanic | | |
| Mean | 8.07 | 19.97 |
| Median | 0.33 | 9.54 |
| RIR Non-Hispanic | | |
| Mean | 7.38 | 11.54 |
| Median | 2.24 | 7.32 |

Table 4-66. Safety tone score as related to company size (measured by employees) (for firms with at least one Hispanic worker)

| Workforce of firm | Score ≤ 5, (%) | Score > 5, (%) |
|-------------------|----------------|---------------------|
| ≤ 20 employees | 5, (27.8%) | 18, (72.2%) |
| > 20 employees | 13, (56.5%) | 10, (43.5%) |
| Total | 18, (39.1%) | 28, (60.9%) |
| Chi square | 5.841 | Significant to 0.02 |

Table 4-67. Safety practices that correlate with both the size of the company's workforce and the company's RIR (for firms with at least one Hispanic worker)

| Characteristic | Correlation coefficient to size | Level of significance to size | Correlation coefficient to safety (RIR) | Level of significance to safety (RIR) |
|------------------|---------------------------------|-------------------------------|---|---------------------------------------|
| Hard hats | -.405 | .000 | .173 | .078 |
| Safety glasses | -.160 | .088 | .206 | .043 |
| Toolbox meetings | -.187 | .061 | .171 | .082 |
| Safety tone | -.283 | .006 | .309 | .004 |

Table 4-68. Characteristics which do not correlate with the size of company but correlate with the company's RIR (for firms with at least one Hispanic worker)

| Characteristic | Correlation coefficient to size | Level of significance to size | Correlation coefficient to safety (RIR) | Level of significance to safety (RIR) |
|------------------------------|---------------------------------|-------------------------------|---|---------------------------------------|
| Safety culture | -.135 | .185 | .463 | .001 |
| Pre-task planning meetings | -.100 | .207 | .281 | .012 |
| Project specific safety plan | -.136 | .125 | .197 | .051 |

Table 4-69. Recordable injury rate for companies that have no safety training available in Spanish (for firms with at least one Hispanic worker)

| | RIR | Hispanic RIR | Non-Hispanic RIR |
|--------|-------|--------------|------------------|
| Mean | 11.96 | 23.57 | 7.87 |
| Median | 2.86 | 14.28 | 0.00 |

Table 4-70. Recordable injury rate for companies that have at least 50% safety training available in Spanish (for firms with at least one Hispanic worker)

| | RIR | Hispanic RIR | Non-Hispanic RIR |
|--------|-------|--------------|------------------|
| Mean | 10.15 | 11.29 | 9.95 |
| Median | 5.00 | 3.57 | 3.70 |

Table 4-71. Percent of safety training available in Spanish as a factor of Hispanic RIR (for firms with at least one Hispanic worker)

| Percent available in Spanish | Hispanic RIR \leq 10 | Hispanic RIR $>$ 10 |
|------------------------------|------------------------|---------------------|
| 0 | 4 | 4 |
| \geq 50% | 24 | 9 |
| Chi square | 1.536 | Not Significant |

Table 4-72. Company responses to the statement “Spanish speaking workers can be accommodated without learning English” and the associated RIR (for firms with at least one Hispanic worker)

| Response | Hispanic RIR \leq 6.11 | Hispanic RIR $>$ 6.11 |
|-------------------------|--------------------------|-----------------------|
| Strongly disagree | 0 | 4 |
| Strongly agree or agree | 12 | 8 |
| Chi square | 4.800 | Significant to 0.05 |

Table 4-73. Percent of Hispanic employees who have been employed at least two years as a factor of the firm’s size (for firms with at least one Hispanic worker)

| Percent employed 2 years | Employees 1-10 | Employees 76+ |
|--------------------------|----------------|---------------------|
| 0 | 4 | 0 |
| 50+ | 6 | 6 |
| Chi square | 3.200 | Significant to 0.10 |

Table 4-74. Number of full-time field employees and the firm’s RIR

| Number of field employees | Mean RIR | Median RIR |
|---------------------------|----------|------------|
| 1-10 | 8.30 | 0.00 |
| 11-20 | 12.85 | 10.55 |
| 21-75 | 8.21 | 4.77 |
| 76+ | 4.46 | 5.00 |

Table 4-75. Number of full-time field employees and the firm's RIR (for firms with at least one Hispanic worker)

| Number of field employees | Mean RIR | Median RIR |
|---------------------------|----------|------------|
| 1-10 | 13.13 | 7.14 |
| 11-20 | 14.04 | 11.11 |
| 21-75 | 8.57 | 5.00 |
| 76+ | 4.46 | 5.00 |

$$Z = \frac{RIR_H - RIR_N}{\sqrt{\frac{VAR_H}{N_H} - \frac{VAR_N}{N_N}}}$$

Figure 4-1. Z calculation for the differences between the mean injury rates related to Hispanic workers and non-Hispanic workers.

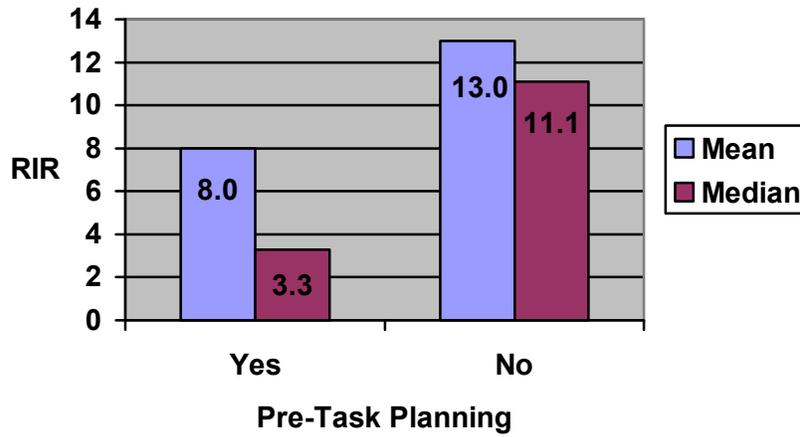


Figure 4-2. Firm RIR and pre-task planning (for firms with at least one Hispanic worker)

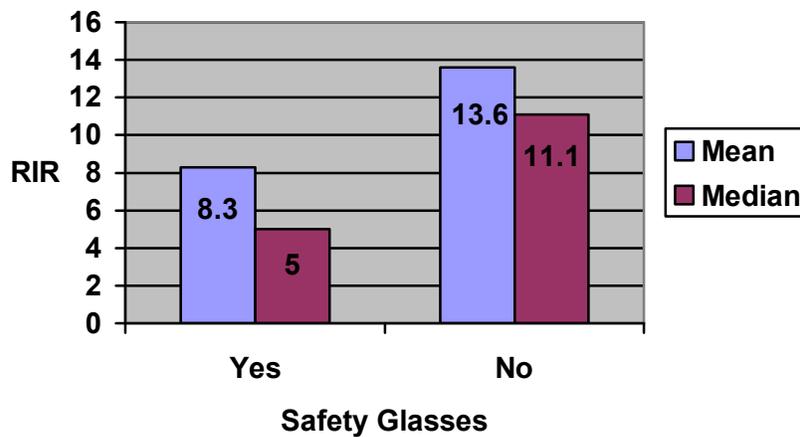


Figure 4-3. Firm RIR and safety glasses (for firms with at least one Hispanic worker)

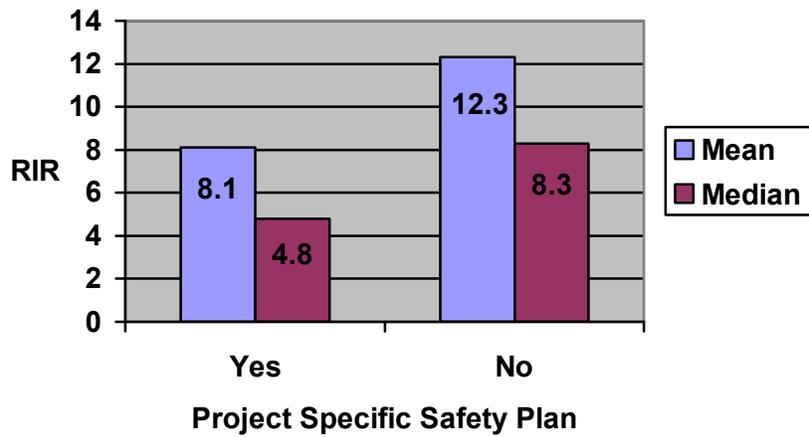


Figure 4-4. Firm RIR and project specific safety plans (for firms with at least one Hispanic worker)

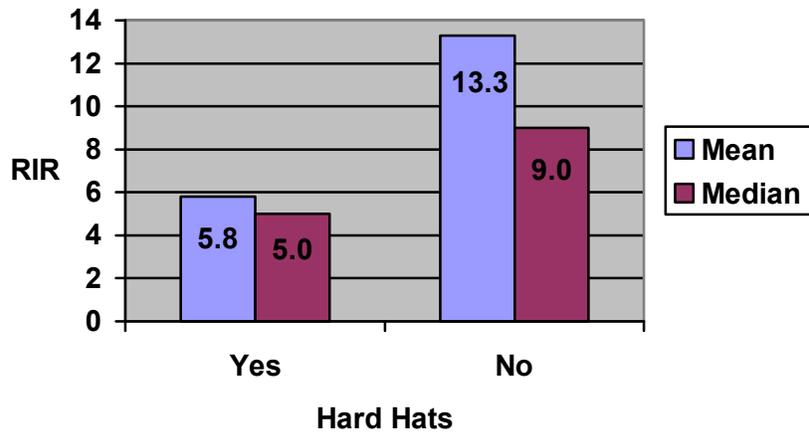


Figure 4-5. Firm RIR and hard hats (for firms with at least one Hispanic worker)

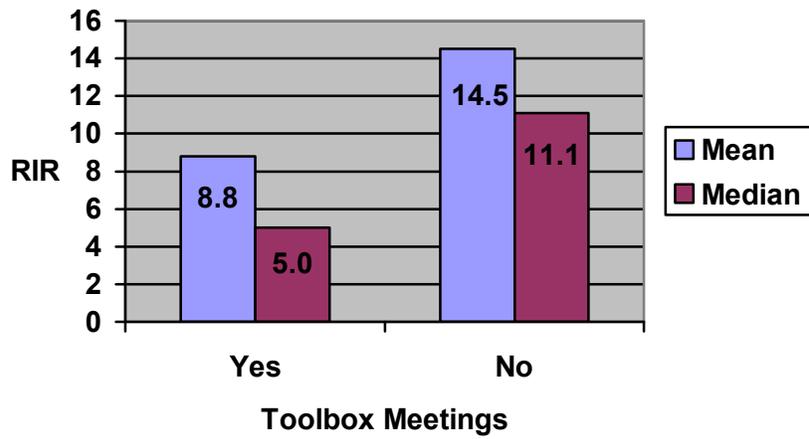


Figure 4-6. Firm RIR and toolbox meetings (for firms with at least one Hispanic worker)

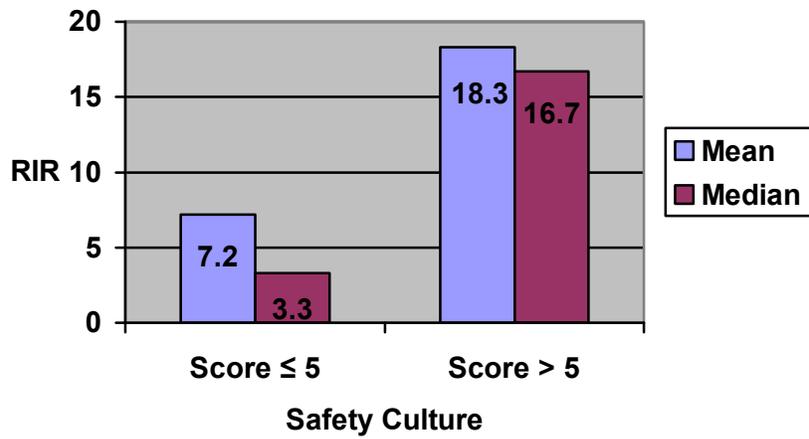


Figure 4-7. Firm RIR and safety culture (for firms with at least one Hispanic worker)

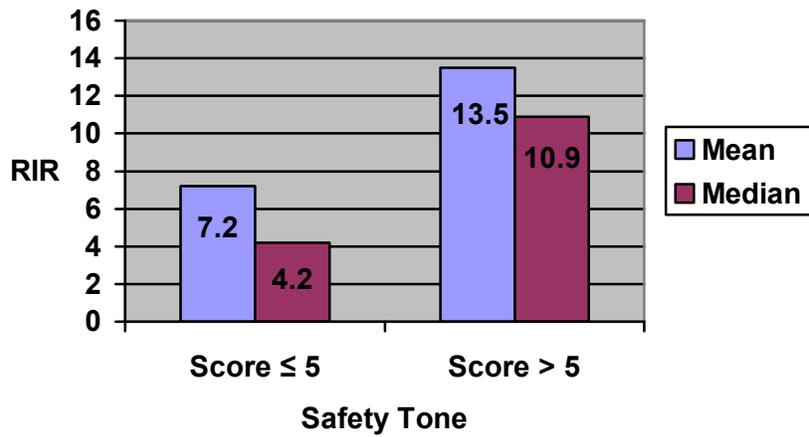


Figure 4-8. Firm RIR and safety tone (for firms with at least one Hispanic worker)

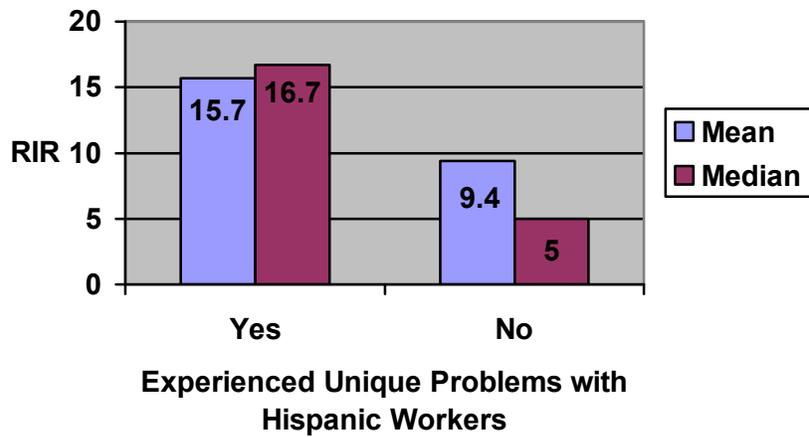


Figure 4-9. Firm RIR and unique problems experienced with Hispanic workers (for firms with at least one Hispanic worker)

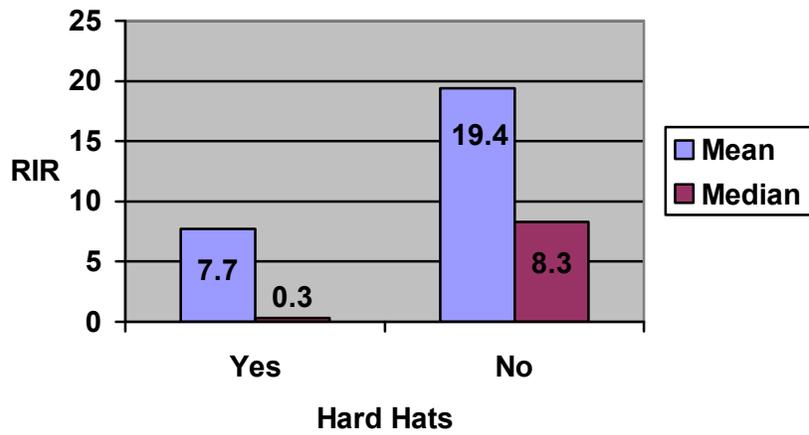


Figure 4-10. Hispanic RIR and hard hats (for firms with at least one Hispanic worker)

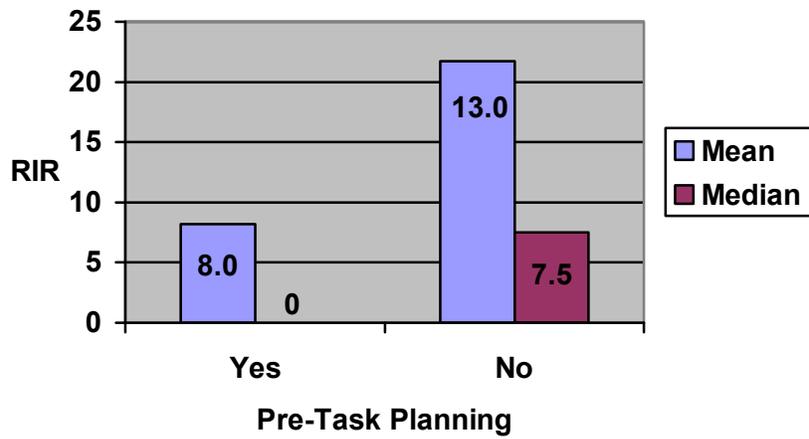


Figure 4-11. Hispanic RIR and pre-task planning (for firms with at least one Hispanic worker)

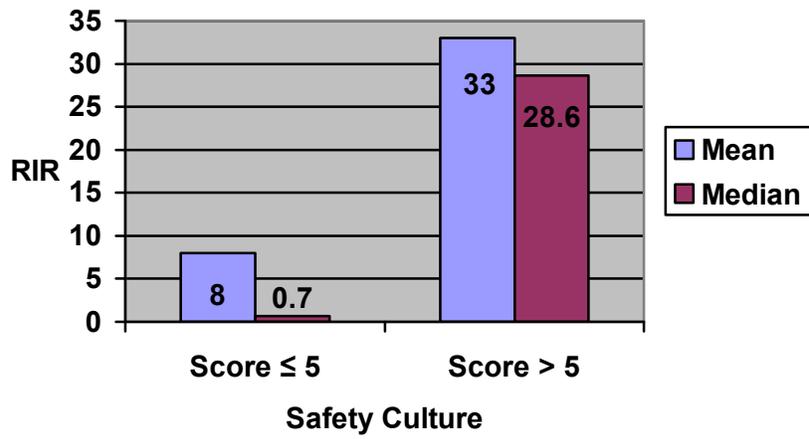


Figure 4-12. Hispanic RIR and safety culture (for firms with at least one Hispanic worker)

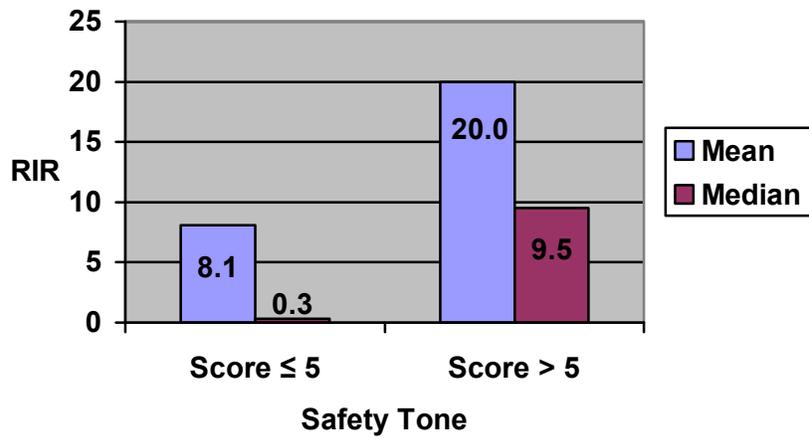


Figure 4-13. Hispanic RIR and safety tone (for firms with at least one Hispanic worker)

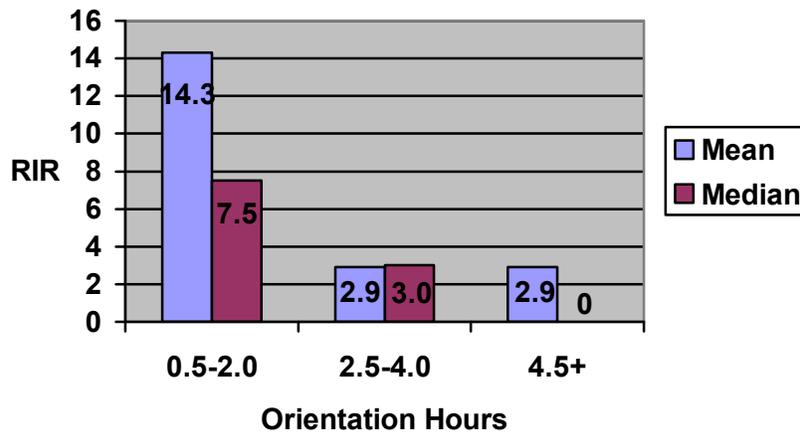


Figure 4-14. Non-Hispanic RIR and orientation hours (for firms with at least one Hispanic worker)

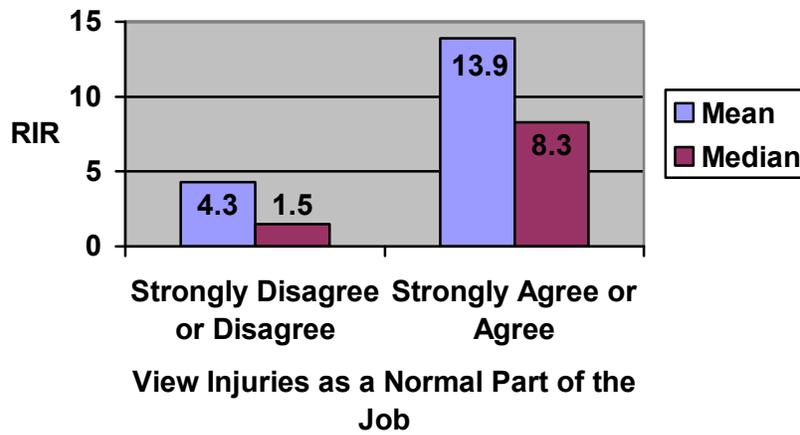


Figure 4-15. Non-Hispanic RIR and level of agreement with the statement “Hispanic workers are more likely to view injuries as a normal part of the job” (for firms with at least one Hispanic worker)

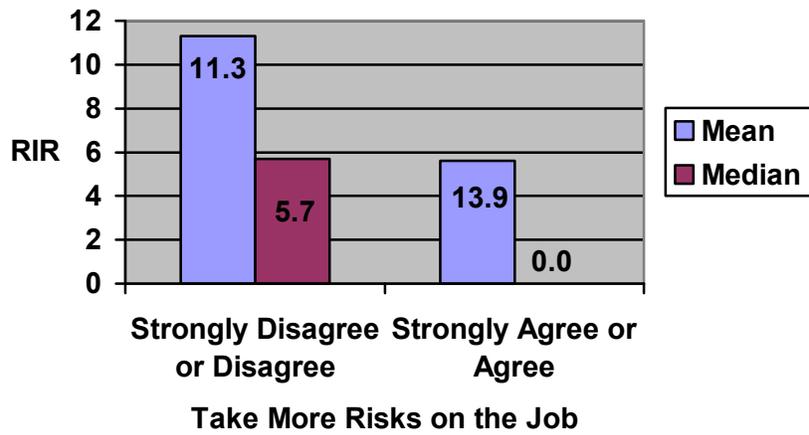


Figure 4-16. Non-Hispanic RIR and level of agreement with the statement “Hispanic workers take more risks on the job than do non-Hispanic workers” (for firms with at least one Hispanic worker)

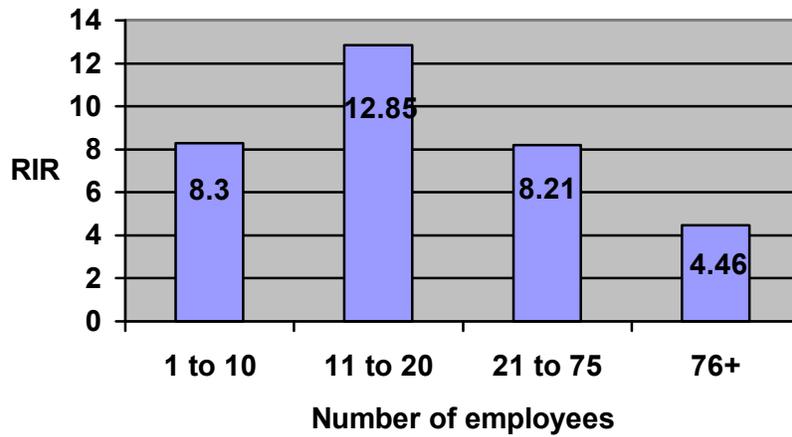


Figure 4-17. RIR and the number of full time field employees.

CHAPTER 5 CONCLUSIONS

The safety practices of small subcontractors have not been examined at length in prior research studies. The majority of the research studies on construction safety have focused mainly on determining the effective safety practices of large general contractors. However, most construction projects involve a significant number of subcontracting firms, many of which are small firms. Additionally, little research has been conducted relating safety practices to the Hispanic workforce. The Hispanic workforce in the construction industry is steadily increasing, and these workers have experienced a disproportionate number of injuries. The results of this study can be beneficial to subcontractors who want to improve their safety performances.

One goal of this research was to perform an exploratory examination of small subcontractor safety practices. The majority of the subcontracting firms view safety as having a positive effect on productivity. To this end, the majority of the firms implement a variety of safety practices including but not limited to drug testing programs, weekly toolbox meetings, and requirements for wearing safety glasses. Also, the majority of the firms said that they had implemented a new program within the past five years to promote safety. It shows that some firms are continuing in the right direction towards improving their safety programs; however, it also shows that there is room for improvement. Additionally, the average RIR for all firms surveyed was 8.98, which is above but near the national average of 7.3 for roofing contractors (EHSO, 2006).

The research supported the fact that each individual safety practice reinforces the necessity of the other practices, and together they send a positive message that worker safety is important to the firm. It was hypothesized that subcontractors have fewer available resources than general contractors to invest in safety training and equipment, and that smaller

subcontractors would have fewer resources to invest than larger subcontractors. Despite this difference in available resources, safety culture was not correlated with firm size except at the absolute extremes. Thus, smaller firms have also shown that these safety programs can be successfully implemented. It should be noted that these safety practices are not dependent on company size in order to be successful. These safety practices can be implemented by all firms regardless of size. Most importantly, the implementation of these safety programs can be accomplished at a relatively low cost.

The second goal of this study was to observe the integration of the Hispanic workforce into the subcontracting industry. This research concludes that the number of Hispanic construction workers is increasing and it was found that many firms have adjusted their safety practices to address the special needs of Hispanic workers. The study also concluded that Hispanic workers have their own unique safety issues that need to be addressed. Most of these issues are a result of language and cultural differences. Combating these differences is difficult when only a small percentage of supervisory personnel are bilingual. The translation of safety materials into Spanish is a start, but more action is needed to slow the injury rate in the Hispanic workforce.

CHAPTER 6 RECOMMENDATIONS

Recommendations for Subcontractors

Subcontractor's, regardless of size, should place more emphasis on their safety programs. This study outlined some simple procedures that all subcontractors can perform regardless of their resources or income level. These procedures include the wearing of hard hats and safety glasses, the creation of project specific safety plans, the implementation of pre-task planning meetings, and conducting new worker orientation. Additionally, firms should be proactive in their approach to safety for all workers. Hispanic workers should be treated with the same duty of care that is placed on non-Hispanic workers. Employers should take steps to understand the culture and background of their Hispanic workforce so that when dealing with them they can adjust their approach accordingly. The Hispanic workforce is growing, particularly in the construction industry. Employers have a responsibility to not only check I-9 forms when hiring workers, but also to help assimilate them into their workforces and protect them from injury.

Recommendations for Future Research

Additional research is needed on subcontractor safety. A study, similar to this one, should be conducted with other subcontracting trades. The results should be compared to see if the benefit of any particular safety practices correlate with specific trades. If this were to occur, a set of best safety practices by trade could be developed.

A case study should be conducted with three subcontractors of different sizes, with employees numbering under 10, between 20 and 40, and over 50. It would be best to select firms that do not currently utilize many safety practices. The study would take place over a period of time to examine how these subcontractors initiate and follow through with the implementation of a new safety program. Safety programs to be implemented include the wearing of hard hats and

safety glasses, the creation of project specific safety plans, conduct pre-task planning meetings, and conduct new worker orientation. The firms' RIRs would be monitored, but the true benefit of the study would be in seeing the roadblocks and breakthroughs involved in safety programs implementation.

Additionally, more research needs to be done concerning Hispanic construction workers. This research should be conducted utilizing personal interviews of Hispanic workers and their employers. The interviews with Hispanic workers should inquire about their experiences on the jobsite. The interviews would address their feelings on safety, experiences in their home country, ability to identify risks, and obtain their thoughts and feelings about how safety programs can be adjusted to make them feel protected and part of the team. Next, interviews should be conducted with their employers to see what their perceptions are of their Hispanic workforce. Topics discussed should include how they perceive the Hispanic culture, their ability to instruct in Spanish, and how they think Hispanic workers identify and deal with jobsite risks. Results of these interviews could be used to formulate a program that could teach Hispanic workers to identify and mitigate risks. The results could also instruct employers on understanding the perception of their Hispanic workers so that they can communicate both and share jobsite safety information with their Hispanic workers.

APPENDIX A
CONTRACTOR SURVEY QUESTIONNAIRE

Safety Survey of Specialty Contractors

The following questionnaire can be finished within five minutes. Please answer only the questions you are comfortable in answering.

1. Is the company a Hispanic MBE (Minority Business Enterprise) or is any portion of the company owned by a Hispanic person?

Hispanic MBE Hispanic Person Ownership (non MBE) No

2. How many full time field employees does the company employ? _____(average)

3. What percentage of the work is subcontracted to others? _____%

4. Does the company have a full-time safety director on staff? Yes No

If “yes”, what percentage of the workday does the company safety director spend in the field? _____ %

5. Does the company have a drug-testing program? Yes No

If “yes”, what type of drug tests does the company conduct? (Check all that apply)

Pre-hire Random For Cause Post-Accident

6. Are all company field employees required to wear hard hats? Yes No

7. Are all company field employees required to wear safety glasses? Yes No

8. Are weekly “Tool Box Meetings” conducted on project sites? Yes No

9. Are “Pre-Task Planning Meetings” held before every task? Yes No

10. Does the company prepare project specific safety programs for all projects?

Yes No

11. Does the company provide orientation for all its employees on project sites?

Yes No

If yes, how many hours are devoted to the orientation program for new employees?

_____hours per worker

12. How many hours of safety training are provided to employees each month? _____hours

13. What percentage of safety training is available in Spanish? _____%

14. What is your company's approximate annual expenditure on safety training?
\$ _____ thousand

15. Does the company have an incentive program based on safety achievements?
 Yes No

16. Has the company implemented any new programs within the past five years to promote safety?
 Yes No

If yes, please describe the programs. _____

17. Of the practices implemented by the company to promote safety, which has been the most successful? _____

For each of the statements below, please indicate the extent of your agreement or disagreement by circling the one appropriate answer.

18. Safety has a positive affect on productivity?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

19. Hispanic workers are equally or more productive than non-Hispanic Workers?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

20. Spanish speaking workers can be accommodated without learning English?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

22. Our company encounters significant problems because workers don't speak English?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

23. Hispanic workers take more risks on the job than non-Hispanic workers?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

24. Hispanic workers are more likely to view injuries as a normal part of the job?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

25. Non-Hispanic workers value their own safety more so than Hispanic Workers do?
1 2 3 4 5
Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree

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