

Safety Training for Spanish-Speaking Workers in the Logging Industry in the Southeastern United States

By

Brandon S. O'Neal

Thesis submitted to the faculty of
Virginia Polytechnic Institute and State University
In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Forestry

Approved:

Dr. R. M. Shaffer
Chair

Dr. J. M. (Rien) Visser
Committee Member

Dr. M. J. Mortimer
Committee Member

March 2006
Blacksburg, Virginia
© 2006 by Brandon O'Neal

Key words: Spanish-speaking worker, Hispanic, Logging, Safety

SAFETY TRAINING FOR SPANISH-SPEAKING WORKERS IN THE LOGGING INDUSTRY IN THE SOUTHEASTERN UNITED STATES

Brandon S. O'Neal

ABSTRACT

Safety in logging operations in the Southeastern United States has long been an issue of concern. Recently, a growing number of Spanish-speaking workers have become employed in logging operations in the Southeastern U.S. There is a growing concern that injury and fatality rates could increase due to inexperience, possible lack of proper safety training, and language barrier problems attributed to the new Spanish-speaking workers. The study area is the Southeastern U.S., comprising twelve states ranging from Texas to Virginia. The goal of this study is to determine the current percentage of Spanish-speaking workers in the study area, assess the previous and present safety training received by Spanish-speaking workers, and provide recommendations addressing the short and long-term logging safety training needs of Spanish-speaking workers. Data was collected through a combination of field surveys and questionnaires. The surveys collected data from 1890 logging operations in the study area, and was used to determine the population of Spanish-speaking workers in the logging industry. The questionnaires were completed during the summer of 2005 by 41 selected sample loggers who employ Spanish-speaking workers, in which they addressed the previous and present safety training received by Spanish-speaking workers, in addition to other information pertaining to safety. The percentage of Spanish-speaking workers in the logging industry in the Southeastern U.S. was 3.37%. Ten percent of operations employed one or more Spanish-speaking workers. Relevant literature as well as data collected through this study suggests that Spanish-speaking worker populations will continue to increase. The survey showed Spanish-speaking workers in the logging industry have tended to immigrate to specific regions, Arkansas and North Carolina. Loggers tend to employ one or two Spanish-speaking workers with several non-Spanish-speaking workers rather than forming entire crews of Spanish-speaking workers. Average employment tenure for Spanish-speaking workers was six years. The majority of loggers (90%) who employed Spanish-speaking workers had at least one worker who could translate safety training/instructions to other Spanish-speaking employees. Loggers ranked this method as the most effective way for presenting safety training to Spanish-speaking workers. Based on the

survey data, Spanish-speaking workers are not likely to substantially impact logging industry injury statistics in the Southeastern U.S. in the near future, but could in the long term.

Recommendations were developed from a combination of survey and questionnaire results and literature reviews. It is recommended that: (1) The use of multiple safety training methods will maximize the Spanish-speaking workers learning ability, (2) The combination of hands-on/demonstration training and the use of a bi-lingual employee/translator seem to be the optimal combination of safety training methods for Spanish-speaking workers, (3) Determine the education/literacy levels of Spanish-speaking employees. It is not appropriate to provide a Spanish-speaking worker with written safety material if they cannot read, (4) Safety training methods used for Spanish-speaking workers may require more “customization” than that of non-Spanish-speaking workers. This is, in part, due to language barriers, questionable literacy, and the fact that in other industries Spanish-speaking workers seem to be more accident prone, (5) It is advisable not to assign inadequately trained and experienced Spanish-speaking workers to tasks such as manual felling, trimming, or bucking with a chainsaw, as this is one of the most hazardous logging tasks. Assigning an experienced employee for a period of at least one week who can oversee the Spanish-speaking worker and correct any unsafe practices would be advisable when assigning a new Spanish-speaking worker to this task, (6) Use universally accepted hand signals around the landing area rather than verbal communication to prevent any miscommunication between Spanish-speaking and non-Spanish-speaking workers, (7) Monitor the Spanish-speaking worker population in the logging workforce closely. Depending on political and economic factors, this population could grow quickly and begin to impact safety/injury rates and (8) Crews comprised entirely of Spanish-speaking workers would likely communicate better. While the limited availability of Spanish-speaking workers in some areas may currently restrict this idea, it may be feasible in the future as more Spanish-speaking workers enter the logging workforce. At this time it may be beneficial for employers to learn Spanish or for Spanish-speaking workers to learn English.

Acknowledgements

I would like to thank the chair of my committee, Dr. Robert Shaffer, and my other committee members, Dr. J.M. (Rein) Visser and Dr. Michael Mortimer, who provided guidance and advice throughout the duration of my project. Dr. Michael Aust is also deserving of my thanks for his guidance and support. I would especially like to thank Dr. Shaffer and the other Industrial Forestry Operations faculty who gave me the opportunity to continue my education, and the IFO Coop and the USDA Forest Service Forest Engineering Unit in Auburn, AL for their funding.

A thanks also goes to the Workers Compensation Insurance companies, Davis-Garvin, Amerisafe, and Forestry Mutual, who provided data for the study. Also, this project would not have been possible without the cooperation of the FRA's Southwide Safety Committee, the South Carolina Timber Producer's Association, Georgia-Pacific, MeadWestvaco, Potlach, and Manry-Rawls.

Most importantly, I would like to thank all my friends and family who have supported me in my efforts in graduate school. Specifically, my parents, Jim O'Neal and Janet O'Neal, who have offered help and support, Steve Shifley who has been a role model and good friend, and Bill Lakel who helped add spice to the monotony off graduate life. Last but not least, I would like to thank my wife Brandy and my daughter Madysen for their love, support, and patience while I continue my academic career.

Table of Contents

Abstract-----	ii
Acknowledgements-----	iv
List of Figures-----	vi
List of Tables-----	vii
List of Appendices-----	viii
Definitions-----	ix
1. Introduction-----	1
2. Literature Review-----	7
Spanish-speaking workers-----	7
Legal Immigrants-----	7
Illegal Immigrants-----	9
Logging safety and training material-----	10
Spanish-speaking safety and training materials-private industry-----	12
Construction Industry-----	14
Agricultural Industry-----	16
Logging Industry-----	17
General-----	19
Spanish-speaking safety and training materials-OSHA-----	20
3. Objectives-----	22
4. Methods-----	23
Study Area-----	23
Survey-----	23
Questionnaire-----	24
5. Results-----	27
Survey-----	27
Questionnaire-----	30
6. Discussion-----	37
Survey-----	37
Questionnaire-----	40
7. Recommendations-----	43
8. Conclusion-----	46
9. Literature Cited-----	48
10. Appendices-----	53

List of Figures

Figure 1. Hispanic growth (percentage) by state, 1990-2000.....	2
Figure 2. Number of fatal work injuries involving Hispanics or Latino workers, 1992-2003.....	4
Figure 3. Number and rate of fatal occupational injuries for selected Occupations, 2003.....	5
Figure 4. English language ability of Latinos (all Latinos and foreign-born Latinos), 2000.....	13
Figure 5. Educational attainment in six Southern states by race and ethnicity, 2000.....	14
Figure 6. Map of the study area.....	23
Figure 7. Percentages of different attitudes towards safety by SSWs.....	31
Figure 8. Effectiveness of using “hands-on” demonstration training where the worker observes a safe operating practice and then tries it himself.....	32
Figure 9. Effectiveness of showing American-made safety videos with Spanish subtitles appearing at the bottom of the screen.....	33
Figure 10. Effectiveness of using a bi-lingual Spanish-speaking worker to interpret a “tailgate” safety at the landing meeting to his co-workers.....	33
Figure 11. Effectiveness of attending local safety training programs presented by a Spanish-speaking safety instructor.....	33
Figure 12. Effectiveness of using safety brochures and manuals printed in Spanish.....	34
Figure 13. Effectiveness of using pictures and diagrams rather than text in safety brochures.....	34

List of Tables

Table 1. Changes in the Hispanic population in the ten fastest growing states, 1990-2000.....	2
Table 2. Average annual change (per 100,000) in fatal occupational injury rates in men, by region and race/ethnicity: United States, 1990-1996.....	4
Table 3. Survey results by region and state.....	27
Table 4. Comparison of sampled and population data by employees and crews.....	28
Table 5. Demographic statistics by sub-region.....	28
Table 6. Crew sizes for region, sub-region, and state in the Southeastern U.S.....	29

List of Appendices

Appendix A. Distribution of workers by industry in six Southern states.....	53
Appendix B. Virginia Tech “Hispanic Logging Worker Safety Study” – interview questions (Questionnaire) for sample loggers currently employing one or more Hispanic workers.....	54
Appendix C. Written comments for survey questionnaire by question number.....	56
Appendix D. Comparing sample size and BLS data (Total) of employees and crews within the study area by state.....	59
Appendix E. Sampled percentage of SSWs by state.....	60

Definitions

Communication Barrier – A lack of communication between people or groups of people, which is caused by the inability of one or more of the involved parties to verbally communicate with the other party.

Logging Crew – The workers on a logging operation who are involved with working directly in the woods. This includes employees in the operations of felling, skidding, bucking, and loading.

Logging Operations – Operations associated with felling and moving trees and logs from the stump to the point of delivery, such as, but not limited to, marking danger trees and trees/logs to be cut to length, felling, limbing, bucking, debarking, chipping, yarding, loading, unloading, storing, and transporting machines, equipment and personnel to, from and between logging sites.
– OSHA

Photonovelas – A Spanish word meaning a type of pictorial communication through showing a story or giving directions

Safety training – Training received by an employee relating to safety at the workplace. This can include training required by law or the employer that is formal or informal, with an end result of decreasing injuries or deaths by creating safer working environments and safety oriented employees.

Southeastern U.S. – A range of twelve Southeastern U.S. states from Virginia to Texas including: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

Spanish-speaking worker (SSW) – Any worker whose primary means of communication is the Spanish language. Commonly used titles that fall under this classification in this article include; Guestworkers, Hispanics, Illegal Immigrants, Latinos, Migrants, Migrant Workers, and Mexicans.

1. Introduction

Spanish-speaking workers (SSWs) are becoming an increasing part of the U.S. private industry labor force, with recent statistics showing 17.5 million Hispanics working in the U.S. (DOL 2004, EEOC 2002). The 2000 U.S. Census notes that one in ten Americans over the age of five, or a little more than 28 million people, speak Spanish at home while speaking English “less than very well,” (Brooks 2003). The 2000 Census also revealed that 47% of the increase in the nation’s civilian labor force between 1990 and 2000 was due to new foreign immigrants, with nearly two-thirds of the growth in the male labor force being produced by new male immigrant workers (Sum et al. 2003). Additionally, immigrants arriving between 2000 and 2003, over 50% Hispanic, contributed to more than half of the growth in the nation’s labor force, exceeding their contribution in the entire decade of the 1990’s (Sum et al. 2003). In 2003, foreign born workers accounted for approximately 14% of the U.S. civilian labor force age 16 and over, and of that 14 percent, 48 percent were Hispanic or Latino (BLS 2004b). The new and increasing numbers of SSWs, legal or illegal, are here to fill many low-skilled jobs that Americans cannot or do not want to perform (Krikorian 2004).

A report released by the Pew Hispanic Center concludes that for nearly a century now the U.S. has relied on Mexican migrant workers to fill domestic labor shortages in nearly every area of U.S. commerce (Lowel and Suro 2002). This has recently become evident in the American South where a demographic shift in manual labor employment from what used to be primarily Black workers to Hispanic workers has taken place (Richardson et al. 2004). The Hispanic population is growing faster in much of the South than anywhere else in the U.S. While increasing Hispanic populations are typical throughout the U.S., the Southern region is growing with greater intensity and across a larger variety of communities - rural, small towns, suburbs, and big cities - than in any other part of the country (Kochhar et al. 2005). This region is home to six of the seven fastest growing Hispanic populations by state, with three of those states (Arkansas, North Carolina, and Georgia) recording over a 300% increase in population from 1990-2000 (Figure 1, Table 1). The sectors that migrant Spanish-speaking workers fill usually involve labor-intensive/low paying work and are related to the agriculture or construction industries (DOL 2004). In the six Southern states with the fastest growing SSW populations, Hispanics account for the majority of employees in these two industries (Appendix A) (Kochhar

et al. 2005). In the farming, fishing, and forestry occupations alone, almost one in every three employed were Mexicans (Grieco and Ray 2004).

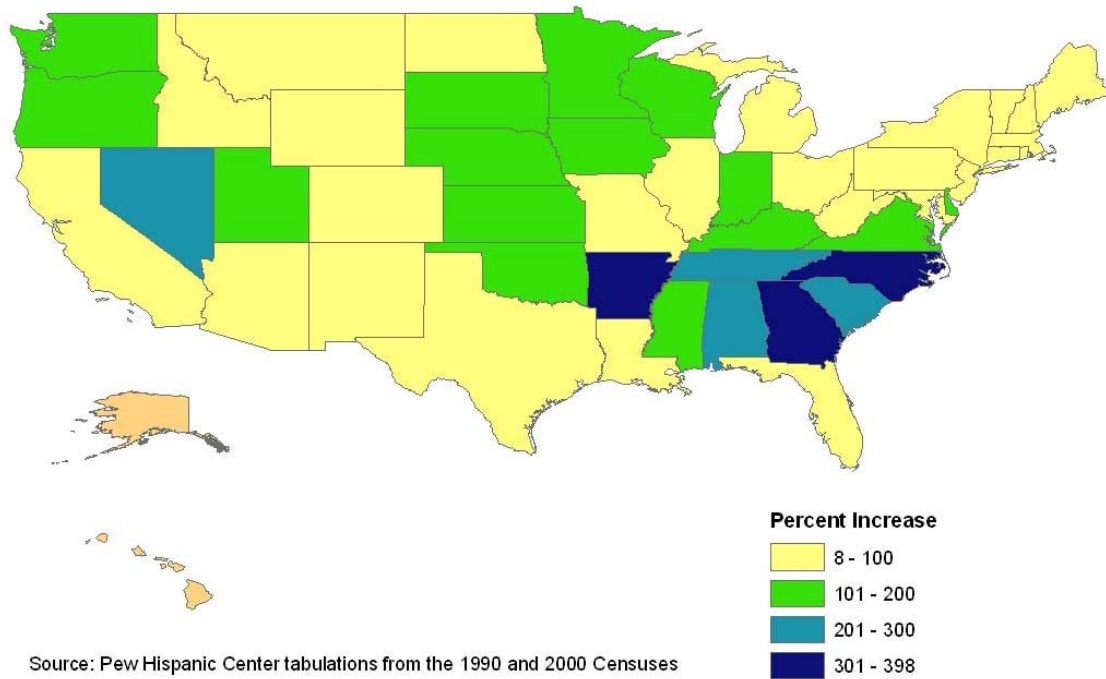


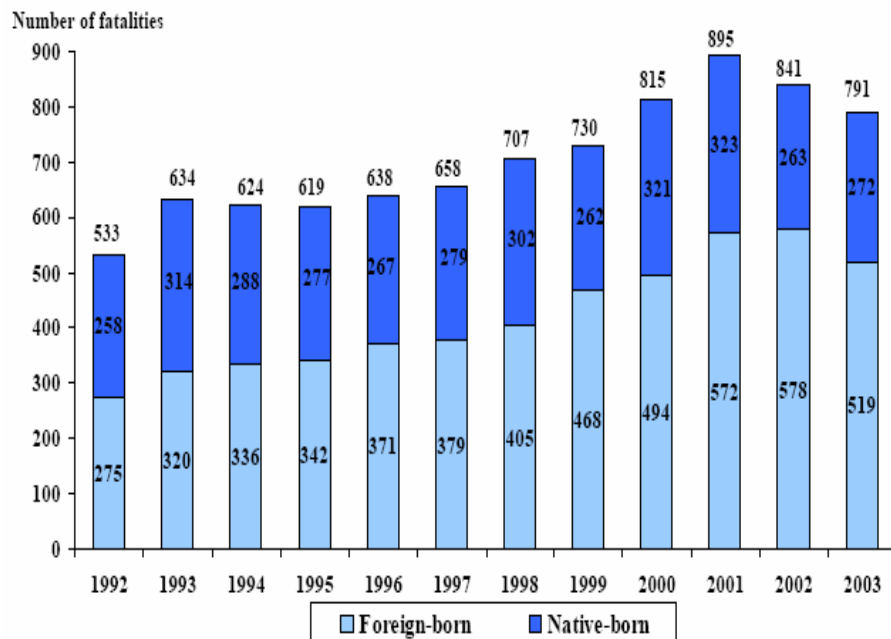
Figure 1. Hispanic growth (percentage) by state, 1990-2000.

Table 1. Changes in the Hispanic population in the ten fastest growing states, 1990-2000.

	Number of Hispanics 1990	Number of Hispanics 2000	Change (%)
North Carolina	76,726	378,963	394
Arkansas	19,876	86,866	337
Georgia	108,922	435,227	300
Tennessee	32,741	123,838	278
Nevada	124,419	393,970	217
South Carolina	30,551	95,076	211
Alabama	24,629	75,830	208
Kentucky	21,984	59,939	173
Minnesota	53,884	143,382	166
Nebraska	36,969	94,425	155
United States	22,354,059	35,305,818	58

Source: Adapted from Kochhar et al. 2005, as from the Pew Hispanic Center data from the 1990 and 2000 Censuses

Workplace safety of SSWs is becoming a concern due to their high numbers in U.S. private industry. The number of fatal work injuries involving foreign-born Hispanics or Latino workers was on a steady rise from 1995-2002 (Figure 2) (BLS 2003c). A 2002 report by OSHA's administrator, John Henshaw, reported that although Hispanic and Latino workers represent 10.7% of the workforce, they experience 13.8% of workplace fatalities – most likely because so many Hispanics or Latinos work in the more dangerous industries (Anonymous 2002b). Between 1992 and 2002, fatal occupational injuries for Hispanic workers increased by 58% while the rates for whites decreased by 17% and blacks (the largest minority group in private industry) decreased by 21% (BLS 2003c). In 2000 and 2001 alone, deaths among Hispanic workers rose by 12% and 10%, respectively, while overall workplace fatalities fell (DOL 2004). Although fatalities were lower for Hispanic workers (native and foreign-born) for the first time in seven years in 2002, they still experience a slightly disproportionate share of work related deaths, injuries, and illnesses as compared to other ethnicities (Anonymous 2002c, DOL 2004). This is especially evident in the construction industry where Hispanic workers represent about 18% of the workforce while accounting for 21% of deaths on the job (DOL 2004). A study looking at fatal occupational injury rates in the Southern U.S. suggests that male Hispanic workers are emerging as the race/ethnicity group with the highest fatal injury rate, and as the only race/ethnicity with an increasing fatality rate (Table 2) (Richardson et al. 2004). This trend can also be seen in nonfatal injuries. In 2002, Hispanics made up 10.9% of the private industry work force, yet they accounted for 12.5% of the nonfatal injuries or illnesses that involved days away from work (EEOC 2002, BLS 2004a). This can be compared to blacks, the largest minority on the U.S. workforce, who accounted for 13.9% of the private industry work force and only 8% of the nonfatal injuries or illnesses that involved days away from work (EEOC 2002, BLS 2004a).



Source: US Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2003.

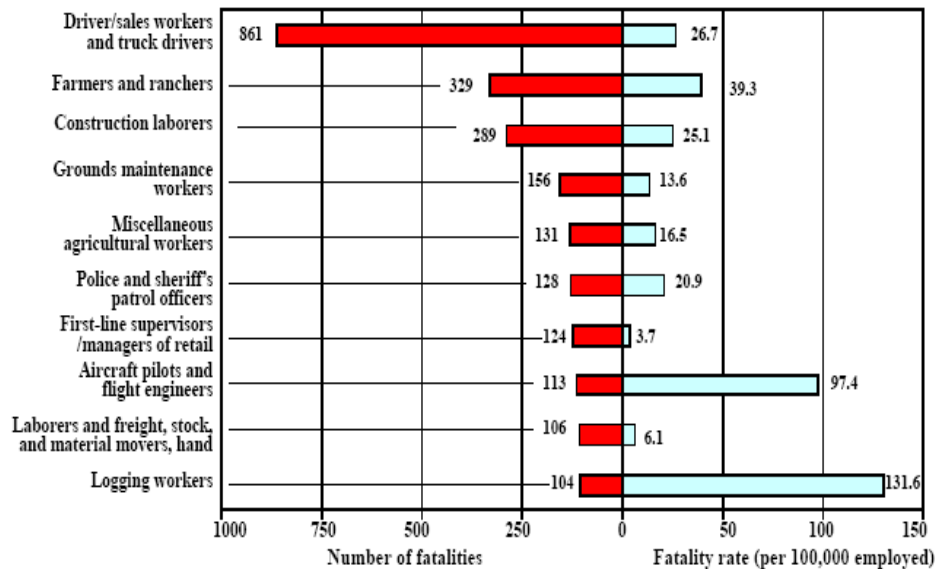
Figure 2. Number of fatal work injuries involving Hispanics or Latino workers, 1992-2003.

Table 2. Average annual change (per 100,000) in fatal occupational injury rates in men, by region and race/ethnicity: United States, 1990-1996.

	Estimated 1990 Fatality rate	Percentage Change in Rate per Year (95% Confidence Interval)
Southern states		
Hispanic	6.7	5.2(1.9,8.6)
Non-Black	7.1	-1.3(-2.4,-0.3)
Black	8.9	-1.6(-3.9,-0.8)
Non-southern states		
Hispanic	3.5	6.0(3.0,9.1)
Non-Black	5.3	-1.5(-2.3,-0.6)
Black	4.3	-3.1(-6.6,0.6)

Source: Adapted from Richardson et al. 2004

Recently, professionals whose work routinely brings them in contact with logging operations in the Southeastern U.S. (Texas through Virginia) have reported observing an increase in the number of SSWs being employed throughout the region’s logging businesses (Shaffer pers com 2004). An increase in the number of SSWs in the Southern logging industry raises concern because of the danger and safety issues that coincide with the industry. In 1996, logging was the second most dangerous occupation in the U.S. (FRA 2002). During that same time period the Southern forest region accounted for 49% of the OSHA-investigated logging fatalities (FRA 2002). From 1996 to 1998, 321 loggers died in the U.S. from injuries received in a job-related accident – the highest fatality rate for any industry during that period (FRA 1999). In 1996, the U.S. Bureau of Labor Statistics reported an injury rate of 8.7 injuries per 100 workers per year in the logging industry, while in 2001 the rate was 6.4 injuries per 100 workers per year (FRA 2000). In mechanized logging operations in the U.S. South, injury rates have decreased from 10 injuries per 100 workers per year in 1996 to 4.9 in 2003 (Roberts and Shaffer 2004). Yet, even with the recent reductions in injury rates, logging workers still have a fatality rate of 131.6 per 100,000 employed, the highest of any industry and more than five time that of a construction laborer (Figure 3) (BLS 2003b).



Source: US Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2003.

Figure 3. Number and rate of fatal occupational injuries for selected occupations, 2003.

Industry experts agree that the reduction of logging injuries has been primarily due to: (a) reduced exposure to manual chainsaw delimiting as more loggers purchase and use mechanical delimiting devices, and (b) increased industry-wide emphasis on logging safety training (Shaffer and Roberts 2001). To maintain reductions in fatalities and injuries in the logging industry it is important that safety training be continued, or expanded, in a manner and form that will effectively reach all logging employees, including those whose primary language is Spanish.

2. Literature Review

Spanish-Speaking Workers:

SSW's (non-college educated) in the U.S. labor force legally enter the country as seasonal migrant workers (guestworkers) through labor contractors working under an H2A or H2B visa, or arrive as illegal immigrants. Nearly half of the new immigrants between 2000 and 2003 were from eight Spanish-speaking countries in Central and South America; Mexico alone contributed 902,000 or one-third of the total, many of whom were illegal immigrants (Sum et al. 2003). SSWs that were native born and exposed to English in U.S. public schools will not be considered part of this study.

Legal Immigrants

Labor contractors, more specifically farm labor contractors, are most often the middlemen between migrant workers and employers. The Department of Labor (DOL) defines a labor contractor as: "Any farm labor contractor who, for any money or other valuable consideration paid or promised to be paid, recruits, solicits, hires, employs, furnishes, or transports any migrant or seasonal agricultural worker (excluding members of his/her immediate family) for agricultural employment..." (DOL 2005).

Labor contractors are currently regulated under the Migrant and Seasonal Agricultural Worker Protection Act (MSPA) (29 USC §1801). Under the MSPA labor contractors must obtain a federal Farm/Forestry Labor Contractor Employee (FLCA) Certificate of Registration with the DOL along with a permit from the state they intend to operate within (29 USC §1801). Although the application authorizes the applicants to act as a labor contractor, it does not grant them work visas for migrant laborers (29 USC §1801). Any operating labor contractor that does not comply with the regulations of the MSPA or fails to obtain certification can be subject to criminal penalties (Berenstein 2004, DOL 2005, Jones 2004). Other laws which significantly impact labor contractors and agricultural employers include the Fair Labor Standards Act (FLSA) (29 USC §201), the Federal Worker Protection Standard (WPS) (40 CFR §170), the Occupational Safety and Health Act (OSHA) (29 USC §651), and the Civil Rights Act (P.L. 102-166).

Guestworker programs are used to secure workers from outside the country because current residents are not seeking out the jobs available at the wages offered (Krikorian 2004). The primary visas used by guestworkers in the agricultural or forestry sector, H2A and H2B visas, are granted to workers on a temporary basis. In 2001, there were 348,995 H-type visas issued, a 116% increase from 1997 (Vaughan 2003). Each visa has its own set of regulations and procedures that are specific to different labor markets. The H2A visa is for temporary agricultural workers and the H2B visa is for temporary non-agricultural workers. Presently, the DOL classifies logging laborers under the H2B visa and all other agricultural related laborers under the H2A visa. This separation of logging from the agricultural field is currently under review, with a strong push from Maine's senators to have logging considered an agricultural activity (Ferrier 2004). Additionally, legislative initiatives in Congress to have both the H2A and the H2B program expanded up to 200,000 visas per year have begun based on support from the agriculture, forest products industry, service sectors, and construction industries (McDaniel and Casanova 2005).

The H2A visa is specifically for temporary agricultural workers. The visa must be requested by the employer at least 60 days before the temporary workers are needed. This happens only after the employer has exhausted efforts to recruit domestic labor to fill the positions. If no domestic labor is found and certifications for the H2A visas are granted, then the application is filed with the Immigration and Naturalization Service (INS). Once a migrant worker has received a visa they are allowed to work in the U.S. An H2A visa is generally valid for a maximum of one year, with a maximum extension of three 1-year periods. Once a migrant worker has spent three years in the U.S. on H2A status they must leave for at least six months before being able to resume H2A employment (Siskind and Ballentine 2003).

The H2B non-agricultural work visa is obtained similarly to the H2A visa. This visa is designed to provide temporary guest workers to non-agricultural industries facing scarcities of seasonal labor (McDaniel and Casanova 2005). For the past ten years, forest management (primarily tree planting) contractors in the Southeastern U.S. have been the largest participants nationwide in the H2B guest worker program (McDaniel and Casanova 2005). Currently, the annual cap for this type of visa is 66,000 people. The length of the stay on an H2B visa is limited by the duration of the employer's temporary need for additional workers. The maximum authorized period of stay is one year, and the visa may be extended for a total of three years.

Either skilled or unskilled workers may be employed under this visa. People who are specifically excluded from this visa are foreign medical graduates and agricultural workers. An important restriction of the H2B visa is the requirement that the need for foreign workers is temporary. The Department of Labor (DOL) recognizes four situations for the temporary need of workers: recurring seasonal need, intermittent need, peak-load need, and need based on a one-time occurrence (Siskind and Ballentine 2003).

The use of H2B visas has drastically increased over the previous years. In 1995, 2,398 H2B visas were issued, while early in FY2004 the 66,000 person cap was reached before many employers could fill their needs (Ferrier 2004, Murphy 2004, Siskind and Ballentine 2003). This cap has recently hurt forestry businesses in the New England states who apply for visas late in the fiscal year and are denied. This is because the demand for workers in the Southern states occurs earlier in the fiscal year, and therefore, they use the H2B visas before the New England states can legally apply for them (Ferrier 2004, Murphy 2004).

Illegal Immigrants

Spanish-speaking illegal workers tend to enter the U.S. through networks of relatives, friends, acquaintances, and fellow countrymen, with few immigrating to places where these connections are absent (Krikorian 2004). Another source of illegal workers stems from guestworker programs. Many of these guestworkers simply stay instead of returning to their home country and serve as magnets for further immigration; sparking the phrase “There is nothing as permanent as a temporary worker” (Krikorian 2004).

Spanish-speaking illegal immigrants contribute to a significant portion of the supply of SSWs in the U.S. According to the Urban Institute in Washington D.C. there are over 9.8 million undocumented immigrants in the U.S., primarily Latinos (Berestein 2004). In 2001, a study done at the University of California-Irvine estimated that 58% of the total undocumented workers in the U.S. were Mexican and another 20% were from Central America, both Spanish-speaking regions (AILF 2002). The same study also indicated that nearly a quarter of the undocumented population in 2001 arrived within the 1996 -2001 time frame.

Approximately 800,000 new illegal aliens per year enter the U.S. looking to find work in labor-intensive industries such as agriculture or construction, and it is believed that more than half of the industry’s “agricultural” seasonal labor force is comprised of illegal aliens (Berestein

2004, Dow Jones & Co. 2004). A study from 2001 estimated that from 1 to 1.4 million unauthorized workers are employed in the agricultural sector, and that the agricultural sector estimates that it will require approximately half a million workers over the next decade to maintain its current production (AILF 2002).

In the Southeastern U.S., growth rates for illegal immigrants between 2000 and 2003/2004 showed no patterns throughout the region. Estimated growth rates for illegal immigrants in Mississippi and Tennessee range from 62% and above, while Virginia, North Carolina, and Florida range between 37 and 54%. North Carolina alone has had an estimated 400% growth in illegal immigrants in the past 15 years. Yet, all other states in the region show a 24% or less growth rate; further demonstrating the uneven distribution of which illegals are migrating and settling in the U.S. (Halloran 2005).

Logging Safety and Training Materials

Logging is a dangerous occupation due to its hazardous work environment (Milburn 1998, Shaffer and Milburn 1999). Throughout its history, logging has resulted in thousands of deaths and even more injuries. Most deaths and injuries have resulted from the use of manual chainsaws and the operation of large equipment (Shaffer and Milburn 1999). Chainsaw use in logging operations result in 38% of the injuries, while equipment operation, including mounting/dismounting and maintenance, result in 54% of the accidents in fully mechanized operations (Shaffer and Milburn 1999). Physical and long-term injuries such as back problems, tendonitis, and hearing impairment can also result from working in logging operations (Gaskin et al. 1989). Due to the high injury rate involved in logging operations, it has become apparent that the causes of these injuries must be addressed.

Many studies have addressed the logging industry to help identify actions that lead to injuries or deaths. These studies have created recommendations and standards for creating safer working environments (Jarvis 1997, Milburn 1998, Shaffer and Milburn 1999, Roberts et al. 2005). Many of these studies relate to safety training material as a primary method for reducing logging related accidents and deaths.

A study conducted by Virginia Tech's Department of Forestry surveyed forestry and logging industry safety experts across the South for what they believed were the primary factors accounting for the record improvement in logging safety in the South during the late 1990's.

Their results show that logging safety has been at the forefront of every Southern state's logger training program. The study also showed that most loggers have come to fully realize the competitive advantages of a strong commitment to workplace safety, and that there is a relationship between a good safety record and lower Workers Compensation Insurance premiums (Shaffer 2002).

A similar study in 2003 showed that an increased participation in logging safety training programs has contributed to a 50% reduction in the chance of injury on mechanized logging operations in the South. Yet, while the overall rate at which injuries occur on mechanized operations has decreased substantially, the likelihood that logging injuries will be severe enough to cause fatalities continues to push the industry to emphasize logging safety (Shaffer and Roberts 2003).

Realizing the dangerous nature of the industry, the Federal government developed OSHA standards for logging operations in 1971 and revised them in 1995. These standards (29 CFR §1910.266, OSHA Federal Registry Entry 59:51672-51748 and 60:47022-47037) address hazards that are unique to logging operations in addition to the General Industry standards (29 CFR §1910) (OSHA 2005a). OSHA also provides requirements for Compliance Directives (instructions for compliance officers) and Interpretation Letters (official interpretation of the standards). Even though OSHA sets the safety standards, it is the business owner who must take the responsibility of how to meet standards. In the case of SSWs, this means an employer must communicate with employees in a way that ensures they understand what is hazardous on any given worksite (Halverson 2003).

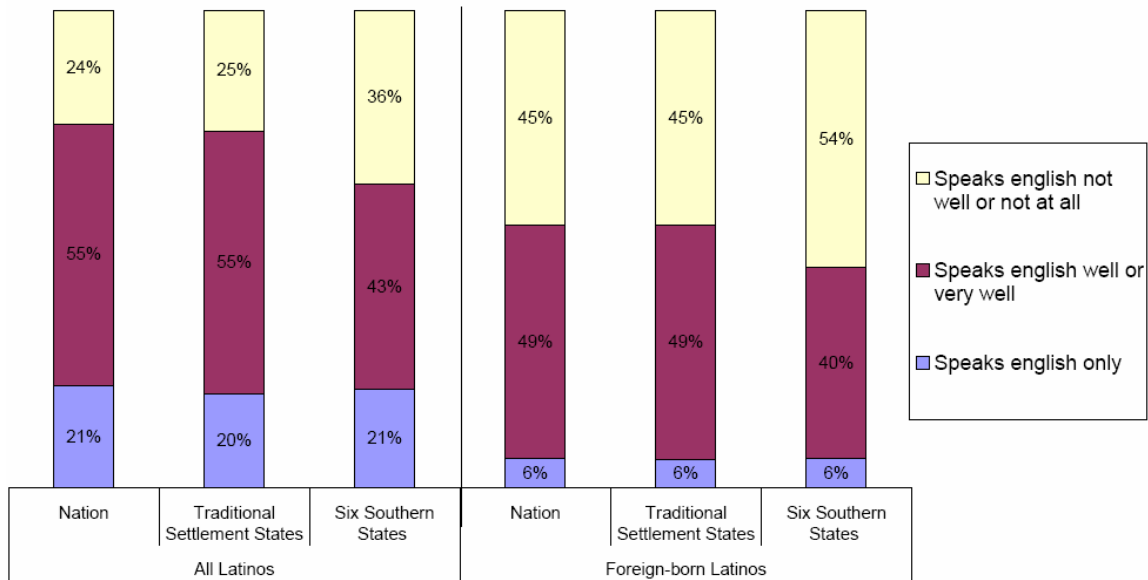
In addition to federal standards, there are 26 states that have OSHA approved State Plans, and have adopted their own standards and enforcement policies. For the most part, these states adopt standards that are identical to Federal OSHA standards. However, three states (Idaho, Oregon, and Washington) have adopted different standards applicable to the logging industry. Idaho's standards are enforced through the Idaho Industrial Commission, Oregon's standards are enforced through the Oregon Administrative Rules Division, and Washington's standards are enforced through the Washington Department of Labor and Industries. OSHA's federal website (www.osha.gov) provides links to all of these state departments under its federal logging standards page (OSHA 2005a).

In addition to federal and state regulations there are logging/forestry associations, as well as private companies and universities, that recommend standards and provide training materials to improve workplace safety in logging operations. One such association is the Forest Resources Association (FRA). The FRA is a national trade association concerned with the safe, efficient, and sustainable harvest of forest products and their transport from the woods to the mill. The organization established that “improving the safety of the forest work environment” is their primary goal. FRA staffs two regional safety committees (Southwide Safety and Northeastern Safety & Training), in addition to the National Timber Harvesting and Transportation Safety Foundation (THATS). THATS, established in 1991, has a mission to “promote, support, and serve as a catalyst for safe and professional work attitudes, practices, and conditions in timber harvesting and transportation”. The website for THATS is located at www.loggingsafety.com and serves as a knowledge source for logging safety resources in the Eastern United States (THATS 2005).

Spanish-Speaking Safety and Training Materials - Private Industry

Increasing numbers of SSWs in the United States labor force have led many industries to focus on rebuilding and increasing safety procedures. The primary obstacle employers’ face is how to train the growing number of Spanish-speaking individuals entering the workforce (Brooks 2003). The primary driving-force for this is the high fatality rate for SSWs (BLS 2003c, Halverson 2003). Many experts agree that high injury rates for SSWs are, in part, due to the Spanish-English language barrier. As the president of a Texas-based electrical contracting firm noted, “The primary method of communication is language. If you can’t communicate effectively, then you can’t maintain legitimate safety practices on the job,” (Halverson 2003).

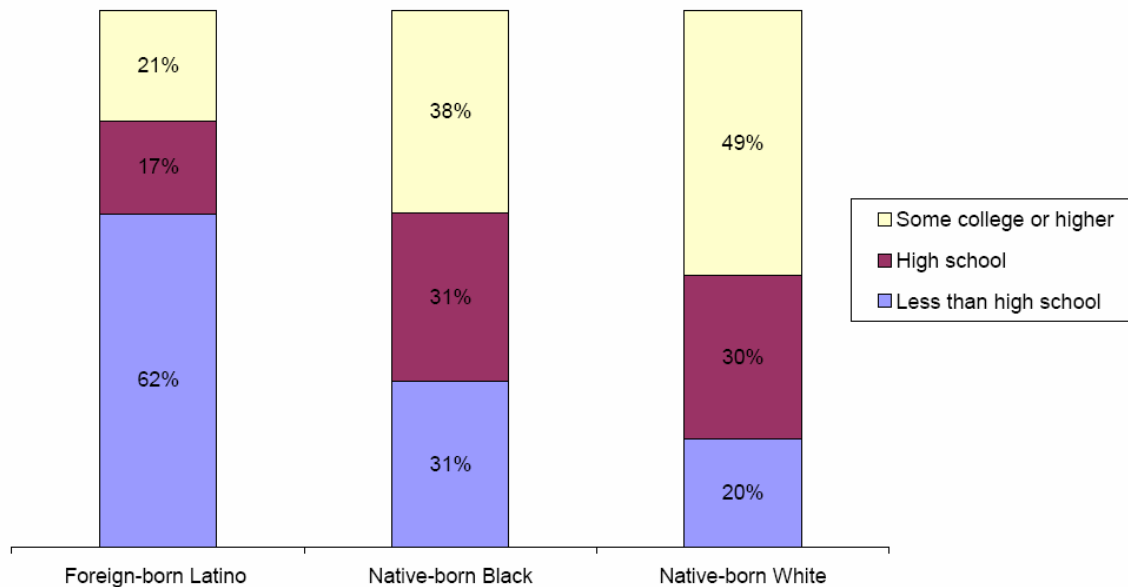
In a report issued by the Pew Hispanic center, it was found that in the six Southern states with the greatest Hispanic population growth (Table 1) only 43% of all Hispanics could speak English “well” or “very well” compared with 55% nationwide (Figure 4). It is believed the difference is driven by the larger share of foreign-born workers in the Latino population. Among these foreign-born Latinos, 54% said they speak English “not well” or “not at all” (Figure 4) (Kochhar et al. 2005).



Source: Adapted from Kochhar et al. 2005, as from the Pew Hispanic Center tabulations of Census 2000 Integrated Public Use Microdata Series.
 Notes: Traditional Settlement States are CA, IL, NJ, and NY. Six Southern States are AL, AR, GA, NC, SC, and TN.

Figure 4. English language ability of Latinos (all Latinos and foreign-born Latinos), 2000.

In addition to language differences, other factors have been identified as barriers for training SSWs. These barriers include the cultural differences between the employees and employer and the literacy level of the workers in their native language (Anonymous 2003, Boone 2003, Ceniceros 2001). As one study noted; “Many of the workers I interviewed couldn’t read or write Spanish, let alone English.” (Boone 2003). This literacy issue could partly be attributed to the lack of education in foreign-born Latinos. In the six Southern states with highest Latino populations, 62% of the foreign-born Latinos have less than a complete high school education, in comparison to 20% for whites and 31% for blacks (Figure 5) (Kochhar et al. 2005). This has led many safety programs to focus on the translation of safety materials from English to Spanish, as well as, develop programs that use unique methods to help SSWs understand and practice proper safety procedures. Other safety programs offer recommendations based on past experiences of working with SSWs.



Source: Adapted from Kochhar et al. 2005, as from the Pew Hispanic Center tabulations of Census 2000 Integrated Public Use Microdata Series
 Notes: Six Southern States are AL, AR, GA, NC, SC, TN.

Figure 5. Educational attainment in six Southern states by race and ethnicity, 2000.

A large number of SSWs are found in the agriculture and construction industry due to the industry's high number of manual and low-skill labor positions. SSWs also comprise a growing and significant workforce percentage in the forestry and wood products industry (Shaffer pers com 2004). Other industries that contain a significant amount of SSWs in the workforce include; fishing, crafts, transportation and service, and machine operations (Richardson et al. 2004). Safety has therefore become a major liability in these industries resulting in proactive solutions that are aimed at maintaining safe working environments.

Construction Industry

At the forefront of the development of Spanish-speaking safety training methods is the construction industry, due primarily to its high injury and fatality rates. Data from the Bureau of Labor Statistics shows that construction and repairing activities accounted for the second largest number of fatal occupational injuries behind vehicular and transportation operations (BLS 2003c). The industry accounts for 7% of all employment but 20% of work related fatalities (Anonymous 2002b). According to John Henshaw, OSHA's administrator, Hispanics and Latinos comprise almost 15% of construction employment, well above their representation in the

workforce overall (Anonymous 2002b). In a study of the New Jersey construction industry between the years of 1983 and 1989, it was found that the fatality rate for workers of Hispanic origin was 3.3 times greater than that of American-born whites (Sorock et al. 1993). Many different approaches have been taken to address safety concerns with SSWs. These approaches have attempted to bridge communication differences and teach SSWs through alternative methods.

OSHA and the Hispanic Contractors of America Inc. (HCA) have formed an alliance to promote safe and healthful working conditions for Hispanic construction workers. This is in addition to the Spanish-language webpage already developed by OSHA at www.osha.gov. The OSHA program aims to increase Hispanic construction contractors' knowledge of safe and healthful work practices and compliance with OSHA's safety and health standards and regulations (Anonymous 2002a, Anonymous 2002b, OSHA 2002). The program also hopes to increase access to safety and health training resources and related materials in Spanish for construction employers and employees who are not fluent in Spanish (Anonymous 2002b, OSHA 2002). The alliance plans to bridge the language barrier problems with accessing OSHA material by doing the following: (a) Identify existing safety and health resources available for Spanish speakers and stimulate the development of additional publications and audio-visual products, (b) Disseminate safety and health information through conferences, events, community-based activities, and electronic media, (c) Work with community and faith-based organizations and other leadership groups to build safety and health awareness within the Hispanic community, (d) Encourage bilingual individuals in construction to take OSHA's train-the-trainer class so they can teach the 10-hour and 30-hour construction safety and health outreach courses in Spanish, and (e) Promote and encourage HCA members to participate in OSHA cooperative programs such as compliance assistance, consulting, and mentoring (OSHA 2002). According to the close-out report issued by OSHA in 2003, the alliance achieved its goal through a number of notable accomplishments and intends to forge a foundation of cooperation upon which to build a broader alliance that includes several similar associations across the country (OSHA 2003).

Many private industry groups have also taken Spanish-speaking construction safety concerns into their own hands. The Laborers' Health and Safety Foundation of North America (HSNA) and the International Safety Equipment Association (ISEA) translate many of their

materials into Spanish (Brooks 2003). HSNA has developed a road safety orientation training module for road construction workers. This program is available in CD-ROM and can switch between English and Spanish with the click of a button. Additionally, HSNA believes there is a need for the continual ability to communicate with SSWs and that the need for supervisors who can speak both languages is great (Brooks 2003). The organization notes that a bilingual manager can bridge the gap between employer and employee, and therefore, the quickest way to solve problems with SSWs is to find bilingual supervisors (Brooks 2003).

Another construction company, Black and Veach Corp., has a workforce of 1200 people with 25% of them of Latino origin. The company arranges for community college instructors to provide English lessons to SSWs at its power plant construction site. The lessons focus on health and safety issues, and are made available not only to company employees but also employees of its subcontractors. The company says, “The classes help improve the SSWs personal lives, as well as reduce the risk of accidents... the classes can help them advance in work.” In addition, the company provides weekly Spanish classes for supervisors and issues bilingual newsletter with reinforcing safety messages (Ceniceros 2001).

Agricultural Industry

Agriculture is viewed as one of the most hazardous industries in the nation (May-Lambert 1998). In 2003, farmers and ranchers accounted for the second most occupational fatalities (329) behind driver/sales workers and truck drivers, and had the third highest fatality rate (39.3/100,000) behind logging workers and aircraft pilots and engineers (BLS 2003b). Agriculture is also an industry that employs large numbers of SSWs. Many studies have documented high death and injury rates involving SSWs in the agricultural industry. A study conducted from 1991-1996 in 2 counties in California revealed that 85% of the farm injury cases within that time frame involved Hispanic workers (Osorio et al. 1998). A similar study during the same time period in Texas revealed that 42% of the fatal work injuries involved farmworkers of Hispanic origin (May-Lamber 1998). A study from 1983-1992 in Colorado showed that of the 80 farmworkers who died from head injuries, 45 were Hispanic (Stallones and Sweitzer 1999). This study goes on to conclude that Hispanic farmworkers were at significantly elevated risk for skull injuries and fractures.

Most training materials for Spanish-speaking farmworkers are available in both English and Spanish and can be obtained from a number of different sources. For example, the National Ag Safety Database (NASD) offers over 100 agricultural safety video for sale and loan (NASD 2005). OSHA also offers agricultural related safety training videos that can be purchased or rented. However, it is evident from the 2003 occupational fatality data and the disproportionate Hispanic fatality rate that Spanish language safety videos are not adequately addressing the safety training needs of the agriculture industry.

A study assessing pesticide knowledge of migrant farmworkers reported the reason migrant farmworkers are not adapting to the currently available training material is that an increasing number of workers are coming from the Southern states of Mexico, where they speak indigenous languages such as Mixteco and Zapoteco (McCauley et al. 2004). Another study reported that issues such as literacy levels, language skills, and migrations patterns need to be considered when developing farm health and safety education (Elkind 2002). This study chose to use theater as a method for providing health education and farm safety training to farmworkers and their families. Results showed that theater as a method for safety training yielded a significant degree of positive knowledge change, and that overall the participants indicated that they liked the plays (Elkind 2002).

The available literature shows that the agriculture industry lacks the broad scope of methods, ideas, and programs developed to deal with safety issues in comparison to the construction industry. The agricultural industry could benefit from the construction industry by forming relationships with OSHA and other safety related organization to increase the effectiveness of farm safety training programs.

Logging Industry

In 2003, according to BLS data, logging workers had the highest fatality rate of any occupation (131.6/100,000 employed) (BLS 2003b). Even with such a high fatality rate, yearly fatalities have decreased recently due to the increased focus on safety training. Yet, within the past five years an increase in the number of SSWs employed in the Southeastern U.S. logging industry has been observed (Shaffer pers com 2004). This trend is similar to the one in the sawmill industry, where mill owners are currently investing in temporary non-English speaking workers to help cut down on turnover (McDilda 2000). There is a concern that in the near future

SSWs will have substantial negative effects on an industry that already supports the highest fatality rate. Only recently have organizations begun to address safety concerns with SSWs and attempted to prevent potential negative effects on safety in the logging industry.

A study conducted by Auburn University's School of Forestry and Wildlife Sciences suggests that overcoming the communication barrier is key to improving the safety of SSWs in logging (Smidt 2005). Researchers point out that communication of safety information to SSWs relies on training material that is auditory, visual, and written. Auburn researchers therefore created a "Visual Guide to Landing Safety" (Smidt 2005). The guide addresses safety issues, largely in the absence of text, by using signs and symbols that are designed for users that may not share a common language. The finished visual guide contains warning symbol information, landing hazard diagrams, and four photonovelas. It is used for informing logging workers about common landing hazards and is published with both English and Spanish text. The document can be found at www.sfws.auburn.edu/plm/landingguide.htm (Smidt 2005).

The FRA has also begun to take notice of concerns with SSWs in the logging industry. In addition to the organization funding the previously mentioned Auburn study, the FRA recently recognized a Maine Employers' Mutual Insurance Company (MEMIC) safety consultant as the winner of the 2004 H.H. Jefferson Memorial Safety Award. The consultant specializes in training workers in the logging industry. He had recently developed a new training program focused towards migrant workers, and since many of the workers were Spanish-speaking, the training was offered in both Spanish and English (Bourque 2004).

In the closely related field of wood products, companies have been so concerned about the challenges they were facing with their increasing Hispanic workforce that they asked the U.S. Forest Service and the Wood Education Resource Center (WERC) for assistance. As a result, a webpage was developed, www.na.fs.fed.us/wihispanic/, with information and resources to help companies improve communication and information exchange regarding SSWs. Two of the resources from this webpage, "The Small Guide for the Hispanic Immigrant" and "Wood Products Terminology Audio Glossary," have won awards for publication and communication excellence (DJCA 2005).

General SSW Training

There are many more organizations that focus on Spanish-language safety material that are not directly tied to any individual industry. For example, the Bilingual Employee Skills Training (BEST) Institute, a vocational training facility based in the suburbs of Dallas, TX, specializes in industrial education for SSWs. The institute was developed because it was discovered that the high job related injury and fatality rates in the Hispanic community were occurring because no one was available to train non-English speaking workers. The BEST Institute strongly believes that training for non-English speaking workers does not necessarily lead to learning unless it incorporates cultural and literacy elements. Therefore, BEST Institute conducts on-site audits and assessments for customers to identify areas of risk so they can customize the training programs and help workers learn by doing instead of watching videos or using printed material. One company who used BEST to train over 5,000 SSWs yielded injury rates significantly below industry standards, and workers compensation claims were less than 25% of the amount insurers had estimated (Boone 2003).

Another company that specializes in training SSWs is Command Spanish Inc. The company's objective is to provide learner-friendly language materials and workshops that require no prior knowledge of Spanish. In addition to language programs the company offers a full range of cross-cultural training seminars and materials designed to eliminate cultural misunderstandings in the workplace between Hispanic and non-Hispanic persons. The company is comprised of nationally recognized and award-winning professors of Spanish, second language acquisition, and curriculum and instructional design, as well as world-class Spanish-language translators. Information regarding services provided by Command Spanish can be found at www.commandspanish.com (Command Spanish 2005).

Some employers are reaching out to SSWs with new and innovative approaches to reducing workplace injuries. One such method borrows a design idea from a traditional Mexican board game that has a lottery theme. This game attempts to make a cultural connection so that SSWs are more likely to listen to safety messages and adhere to safety practices. The lottery requires employers to put aside a pot of money with more money added each day a worksite is accident-free. Workers then draw a lottery ticket giving them a chance to claim the pot. Instead of typical lottery tickets, these tickets are adorned with icons such as safety glasses, first aid kits, and fire extinguishers. This game has been used in Southern California where employers rely on

the lottery and other types of reward programs to encourage employees to reduce accident rates (Ceniceros 2001).

Recommendations for training SSWs have also been developed and published. A report published in 2003 lists eight proven tips for training SSWs in any industry. This report was written by the Institute of Management and Administration (IOMA), and was compiled from the advice of one dozen safety directors. Their advice for training SSWs includes: (1) Determine where workers are from and exactly what language and/or dialect they speak, (2) Use existing sources (i.e. existing bilingual employees), (3) Beware of translation software, (4) Determine the education level of employees, (5) Make sure translated safety training materials are sufficient for your company to use, (6) Schedule extra time for training sessions if you use a translator, (7) Train specific to the job tasks of the individual, and (8) Devise a method for making sure workers understand the training. The report also suggest that employers should combine translated training with job shadowing, help workers attend English classes at a local community college, cultivate friendships with their SSWs, follow guidelines for writing safety-training materials, and use pictures when possible (Anonymous 2003).

Spanish-Speaking Safety and Training Materials - OSHA

Concerned about the safety of SSWs, OSHA created a Spanish-language webpage in 2002 that was designed to reach Spanish-speaking employers and employees (Corbin 2002). The webpage provides an overview of OSHA and its mission, explains how to file complaints electronically, and review worker and employer rights and responsibilities (Anonymous 2002c). Regarding the creation of the web page, Secretary of Labor Elaine Chao stated that, “Through our new Spanish page, millions more employers and workers in this country will have access to information they can use to make their workplaces safer”. Other federal agencies, such as NOISH and the EPA, have also developed Spanish Web sites designed to help employers and employees communicate more effectively (Brooks 2003).

More recently OSHA has improved their Spanish-speaking outreach tools by developing a new Hispanic Outreach Module, providing Spanish language safety training videos for loan, and offering safety training grants. The Hispanic Outreach Module is designed specifically for employers to assist in helping their workforce learn more about workplace rights and responsibilities (OSHA 2005b). It does this by helping identify Spanish-language outreach and

training resources and how to work cooperatively with OSHA (OSHA 2005b). Additionally, the web page provides a list of OSHA's Hispanic/English-as-a-second language coordinators (OSHA 2005b). OSHA's Resource Center Loan Program provides videos that cover more than 100 occupational safety and health subjects from accident investigation to workplace violence (OSHA 2005c). Recently, their collection has expanded to include 40 new Spanish language safety training videos with new videos added each year: books covering the videos are also available upon request (OSHA 2005c). Safety training programs and grants are also provided by OSHA. For instance, the Susan Harwood Training Grants Program awards grants to nonprofit organizations to provide training and education programs or to develop training material for employers and workers on the recognition, avoidance, and prevention of safety and health hazards in their workplace (OSHA 2005d). In recent years Susan Harwood Grants have sections which focus on Hispanic or Spanish-speaking training development. Other initiatives used by OSHA to reach out to SSWs include: (a) Establishing an Hispanic Task Force to pursue creative solutions to improve the agency's outreach and prevent fatalities among Hispanic workers, (b) using OSHA's telephone number, (800) 321-OSHA, for emergency reporting by Spanish-speaking individuals, and (c) compiling a list of fluent Spanish-speaking employees in both federal and state OSHA locations and selected onsite consultation agencies (Anonymous 2002b).

3. Objectives

This study has three primary research objectives to address the issue of workplace safety for Spanish-speaking workers in the Southeastern U.S. logging industry. First, the study will determine the current percentage of the logging workforce in the Southeastern U.S. comprised of Spanish-speaking workers. This information will help determine the overall need for Spanish language safety training materials and programs.

Next, the study will document the current state of logging safety training as it relates to Spanish-speaking workers, including training they may or may not have received prior to their current U.S. employment. This will identify the type of safety training needed by Spanish-speaking workers so that they can be provided with the same level and quality of safety training as English speaking workers.

Lastly, the study will recommend strategies to address the short and long-term logging safety training needs of Spanish-speaking workers in the Southeastern U.S. These strategies will attempt to address the English/Spanish language barrier as it relates to logging safety training.

4. Methods

Study Area

The study area for this project is referred to as the Southeastern United States. This is an area that starts at Virginia and, moving southwest, ranges as far South as the Gulf Coast and as far west as Oklahoma and Texas. There are twelve states within this range, which are; Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia (Figure 6).



Source: Southern Pine council, www.southernpine.com

Figure 6. Map of the study area.

Survey

The first set of data for this study was collected through on-site surveys performed by three of the largest WCI providers for the logging industry in the Southeastern U.S. All logging businesses employing one or more workers are required by law to carry WCI. The participating WCI carriers were Davis-Garvin, Inc. of Columbia, SC, Amerisafe Inc. of Baton Rouge, LA, and Forestry Mutual of Raleigh, NC. Davis-Garvin and Amerisafe insure loggers in every state in the study area, while Forestry Mutual insures loggers primarily in the mid-Atlantic area. Field agents for the three WCI carriers conducted the surveys of their insured logging operations

within the study area during the summer of 2005. The surveys took place during the field agent's routine safety inspection visits to the logging operations which they perform year-round. The surveys recorded three observations for each logging crew visited: (1) the state and geographic region of the operation, (2) the total number of employees on the logging crew, and (3) the total number of SSWs on the logging crew.

Once all sample data were collected and blended, the total number of crews, workers, and SSWs were determined. From this data the percentage of SSWs in the sample workforce, the percentage of crews with at least one SSW, and the average crew size could be determined for the sample area, state, and region.

This data was then categorized into three sub-regions: (1) Atlantic Region, (2) Eastern Gulf Region, and (3) Western Gulf Region. These sub-regions were created to see if significant differences in SSWs occurred by sub-regions of the South. For the purpose of this study, the Atlantic Region includes the states of Virginia, North Carolina, South Carolina, and Tennessee. The Eastern Gulf Region includes the states of Alabama, Florida, Georgia, and Mississippi. The Western Gulf Region includes Arkansas, Louisiana, Oklahoma, and Texas.

Data from each region was entered into a Chi-square calculation to determine if there are statistical differences in the number of SSWs employed, and the number of crews employing at least one SSW, between each region.

Each sub-region was then examined to look at variability within the respective states of that sub-region. Statistical analysis was not performed due to the high variability in sample sizes between individual states. Instead, individual state data were simply examined within each sub-region to identify states where higher percentages of SSWs existed, along with identifying states where no SSWs were recorded. States were also identified within each region for having the highest and lowest crews sampled, and having the highest and lowest average crew size.

Questionnaire

The second data set for this study comes from interview questionnaires completed by selected sample logging operations that are currently employing one or more SSW. The complete survey can be found in Appendix B. Sample logging operations were purposely selected from a representative group of logging business owners who employ SSWs. This task was carried out by Virginia Tech researchers and project cooperators who identified logging

business owners employing SSWs, and conducted interviews with them or provided the business owners with the questionnaire through correspondence. All questionnaires were completed during late summer and early fall of 2005. The questionnaire is designed to collect information about logging safety issues with regards to SSWs. It is comprised of ten questions which can be broken into three subsets. A breakdown of the questions are listed as follows and numbered in the order they appear on the questionnaire.

(A) General crew data.

1. What state is your operation located in?
2. What year did you hire your first SSW?
3. How many Hispanic workers do you currently employ, how many total employees do you have?

(B) Yes/No questions regarding previous experience, English comprehension, safety training, and injuries.

4. Do any of your SSWs have previous logging experience before you hired them?
5. Do any of your SSWs understand or speak English well enough to effectively interpret your instructions to the other SSWs?
6. Do any of your SSWs read English well enough to translate a safety training manual printed in English for the other workers?
7. Have you provided any safety training for your SSWs? Briefly describe how it was presented.
9. Have any of your Hispanic employees been injured on the job?

(C) Ranking questions regarding safety attitude and safety training methods

8. How would you rate the overall safety attitude of your SSWs?
 - a. They are always focused on safety.
 - b. They work safely most of the time.
 - c. They don't always pay as much attention to safety as they should.
 - d. Safety is a problem with them.
10. The following are six possible ways of presenting safety training to Spanish-speaking logging workers. In your opinion, please rate the potential effectiveness of each on a 1 to 4 scale, with **1** being definitely effective, **2** being probably effective, **3** being probably not effective, and **4** being definitely not effective.
 - a. Give them safety brochures and safety manuals printed in Spanish.
 - b. Give them safety brochures that demonstrate safety primarily through pictures and diagrams rather than text.
 - c. Have them attend a local safety training program presented by a Spanish-speaking safety instructor.

- d. Use a bi-lingual SSW to interpret a “tailgate” safety discussion at the landing to his co-workers.
- e. Show them American-made safety videos with Spanish “subtitles” appearing at the bottom of the screen.
- f. “Hands-on” demonstration training where the worker observes a safe operating practice being done and then tries it himself.

Room was left for comments under most questions. In addition to this, there were three questions which required written answers and were not answered by all respondents. These questions were:

1. Briefly describe how the training (for SSWs) was presented.
2. Any other suggestions on the best way to present logging safety training to Spanish-speaking employees.
3. Any other comments on the topic of Spanish-speaking logging workers and safety.

Numerous companies and organizations aided in the distribution and collection of questionnaires in addition to Virginia Tech faculty and graduate students. This list includes; Georgia Pacific, MeadWestvaco, South Carolina Timber Producer’s Association, Potlatch Corporation, and members of the Forest Resources Association’s Southwide Safety Committee. These companies and organizations also cooperated in identifying and locating qualified logging business owners who employ SSWs. Questionnaires were filled out by an interviewer from the previously mentioned companies and organizations, Virginia Tech staff or students, or completed by the business owners. Data indicating the number of total employees and number of SSWs is given for the entire business which can consist of a single crew or multiple crews.

5. Results

Survey

There were 1890 logging operations surveyed for this study. These crews collectively employed 11,525 total employees, of which 388 were identified as Spanish-speaking (Table 3). Thus, SSWs represent 3.37% of the logging workforce in the study area.

Table 3. Survey results by region and state.

REGION	STATE	CREWS	EMPLOYEES	HISPANICS
Atlantic	Virginia	136	666	21
	North Carolina	291	1386	97
	South Carolina	89	620	7
	Tennessee	101	546	0
Eastern Gulf	Georgia	281	1508	19
	Florida	11	47	10
	Alabama	169	901	6
	Mississippi	151	953	10
Western Gulf	Louisiana	163	1368	0
	Arkansas	400	2720	185
	Oklahoma	44	452	18
	Texas	54	358	15
TOTAL	Southeastern U.S	1890	11525	388

The total employee sample size was compared to the estimated total logging employee workforce in the study area of 34,507 (BLS 2004c), providing a sample of 33.4% of the total population (Table 4). Taking into account the large sample size and using a confidence level of 99%, this data produces a confidence interval of < 0.35 for the percentage of SSWs in the Southeastern logging workforce. According to Bureau of Labor Statistics population data we can be 99% confident that the percentage of SSWs in the Southeastern logging workforce falls between 3.05% and 3.75%. Thus, the current population of SSWs in the Southeastern logging industry is 1162, ranging between 1051 and 1293 workers.

Table 4. Comparison of sampled and population data by employees and crews.

REGION	EMPLOYEES SAMPLED	2004 POPULATION	% SAMPLED	CREWS SAMPLED	2004 POPULATION	% SAMPLED
ATLANTIC	3218	10068	31.96%	617	1781	34.64%
EASTERN GULF	3409	16049	21.24%	612	2345	26.10%
WESTERN GULF	4898	8390	58.38%	661	1291	51.20%
TOTAL	11525	34507	33.40%	1890	5417	34.89%

Of the 1890 operations surveyed, 192 of them employed one or more SSW. This represents approximately 10% (10.16%) of the sample crews, which is a significantly higher statistic than the SSW population percentage in the Southeastern logging industry (3.37%) (Table 5). This data also reveals that of the 192 crews with 1 or more SSW, the average number of SSWs per crew is 2.02.

Table 5. Demographic statistics by sub-region.

REGION	CREWS	PERSONNEL	SSWs	%	CREWS W/SSWs	%
Western Gulf	661	4898	218	4.45%	108	16.34%
Eastern Gulf	612	3409	45	1.32%	22	3.59%
Atlantic	617	3218	125	3.88%	62	10.05%
TOTAL	1890	11525	388	3.37%	192	10.16%

The average crew size for the study area was 6 (6.1) workers. This ranged from 10.27 employees per crew in Oklahoma to 4.27 in Florida. Regionally, the Western gulf had the highest average of 7.41 employees per crew, and the Atlantic region had the lowest average of 5.22 employees per crew (Table 6).

Table 6. Crew sizes for region, sub-region, and state in the Southeastern U.S.

REGION	STATE	CREWS	EMPLOYEES	AVERAGE
<u>Atlantic</u>	Virginia	136	666	4.90
	North Carolina	291	1386	4.76
	South Carolina	89	620	6.97
	Tennessee	101	546	5.41
<i>Total</i>		617	3218	5.22
<u>Eastern Gulf</u>	Georgia	281	1508	5.37
	Florida	11	47	4.27
	Alabama	169	901	5.33
	Mississippi	151	953	6.31
<i>Total</i>		612	3409	5.57
<u>Western Gulf</u>	Louisiana	163	1368	8.39
	Arkansas	400	2720	6.80
	Oklahoma	44	452	10.27
	Texas	54	358	6.63
<i>Total</i>		661	4898	7.41
TOTAL	Southeastern U.S	3119	18152	5.82

Once the data was divided into 3 regions, a Chi-square test was used to test the statistical difference between the SSW population of each region and the number of crews with at least one SSW. Results of the Chi-square for both tests resulted in a $P \leq 0.001$ value.

Atlantic Region

Within the Atlantic region slight variability exists between states in the areas of number of crews surveyed, total number of personnel, number of SSWs, and average crew size. Surveyed SSW percent populations for North Carolina, Virginia, South Carolina, and Tennessee were 7%, 3.2%, 1.1% and 0% respectively. North Carolina accounted for the majority of the SSWs in the region, while no SSWs were observed on the sample operations in Tennessee. North Carolina accounted for the most crews surveyed (291) and South Carolina the least (89). Crew size was largest in South Carolina with an average crew size of 7 employees and smallest in North Carolina with an average crew size of 4.8 employees. The Atlantic region had the smallest overall crew size out of all the regions at 5.2 employees per crew. (Tables 5 & 6)

Eastern Gulf Region

Within the Eastern Gulf region, considerable variability exists between states in the areas of number of crews' surveyed, total number of personnel, number of SSWs, and average crew size. Surveyed SSW percent populations for Florida, Georgia, Mississippi, and Alabama were 21.2%, 1.3%, 1% and 0.7% respectively. Georgia accounted for the highest total number of SSWs in the region, yet Florida yielded the highest percentage per operation. Georgia accounted for the most crews surveyed (281) and Florida the least (11). Florida accounted for the least number of surveyed crews of all regions. Crew size was largest in Mississippi with an average crew size of 6.3 employees and smallest in Florida with an average crew size of 4.3 employees. The region as a whole had an average crew size of 5.6 employees. (Tables 5 & 6)

Western Gulf Region

Within the Western Gulf region moderate variability exists between states in the areas of number of crews' surveyed, total number of personnel, number of SSWs, and average crew size. Surveyed SSW percent populations for Arkansas, Texas, Oklahoma, and Louisiana were 6.8%, 4.2%, 4% and 0% respectively. Arkansas accounted for the highest total number of SSWs surveyed out of all states in the Southeastern U.S., while Louisiana recorded no SSWs. Arkansas was also the third highest ranked state out of all Southeastern states in SSW workforce population. Arkansas accounted for the most crews surveyed out of all Southeastern states (400) and Oklahoma had the least in the region with 44. Crew size was largest in Oklahoma with an average crew size of 10.3 employees and smallest in Texas with an average crew size of 6.6 employees. The region as a whole had the highest average crew size of all regions with 7.4 employees. (Tables 5 & 6)

Questionnaire

A total of 41 questionnaires (Appendix B) were collected from logging crews in eight Southern states. The total number of employees working for the sample logging business owners (respondents) was 582, with 179 of them Spanish-speaking. The average respondent employed 14 workers of which four (29%) were Spanish-speaking. The median respondent employed ten workers of which two (20%) were Spanish-speaking. The average respondent had employed

SSWs for 6.7 years, while the range was from less than 1 year to 20 years. The median employment time for SSWs was six years.

More than one-half (63%) of the SSWs on these crews had previous logging experience before entering their current job. Of all respondents, four (10%) did not provide their SSWs with safety training, and 44% had SSWs injured on the job. When asked if the respondents believed their SSWs have a positive attitude toward safety, 85% replied positively (44% believe they were always focused on safety and 41% believe they work safely most of the time) (Figure 7).

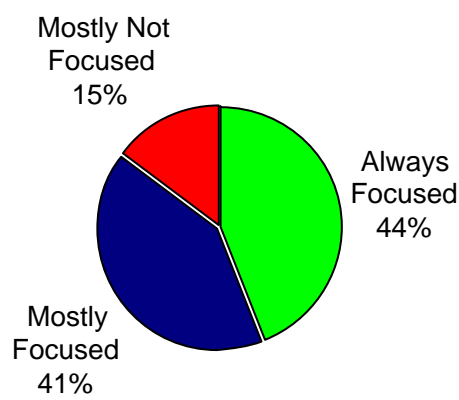


Figure 7. Percentages of different attitudes towards safety by SSWs.
Note: Zero respondents classified their SSWs as believing safety is a problem with their workers.

Ninety percent of the 41 respondents employ a SSW that can understand English well enough to interpret instructions to other Spanish-speaking crew members, while 51% employ a SSW that can read English well enough to translate a safety training manual.

The respondent's ratings of safety training methods yielded differences in the perception of the most effective way to relay safety training material to SSWs (Figures 8-13). Using "hands-on" demonstration training, where the worker observes a safe operating practice and then tries it himself, was considered the most effective way to train SSWs by 73% of the respondents (Figure 8). This was also the only method that no respondents believed would definitely not be effective. Showing American-made safety videos with Spanish subtitles appearing at the bottom of the screen was considered the least effective way to train SSWs, with only 8% of the

respondents believing it was definitely effective (Figure 9). This method also had the highest percentage of respondents (13%) believing it was definitely not effective.

Using a bi-lingual Spanish-speaking worker to interpret a “tailgate” safety meeting at the landing and attending local safety training programs presented by a Spanish-speaking safety instructor were the next two most effective methods of training SSWs, with 59% and 54% of respondents, respectively, believing they would be definitely effective methods (Figures 10&11). The last two suggested methods, using safety brochures and manuals printed in Spanish and using pictures and diagrams rather than text in safety brochures, were not believed to be highly effective, with only 43% and 33% of the respondents, respectively, believing them to be definitely effective (Figures 12&13).

When looking at the potential effectiveness of each training method (definitely effective + probably effective) the results are similar. The order of greatest to least potentially effective training method is as follows (along with the percentages of respondents classifying the method as definitely effective or probably effective);

1. (97%) Using “hands-on” demonstration training where the worker observes a safe operating practice and then tries it himself.
2. (87%) Using a bi-lingual Spanish-speaking worker to interpret a “tailgate” safety at the landing to his co-workers.
3. (87%) Attending local safety training programs presented by a Spanish-speaking safety instructor.
4. (85%) Using safety brochures and manuals printed in Spanish.
5. (76%) Using pictures and diagrams rather than text in safety brochures.
6. (56%) Showing American-made safety videos with Spanish subtitles appearing at the bottom of the screen.

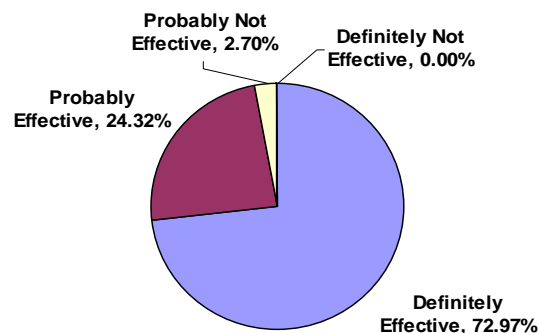


Figure 8. Effectiveness of using “hands-on” demonstration training where the worker observes a safe operating practice and then tries it himself.

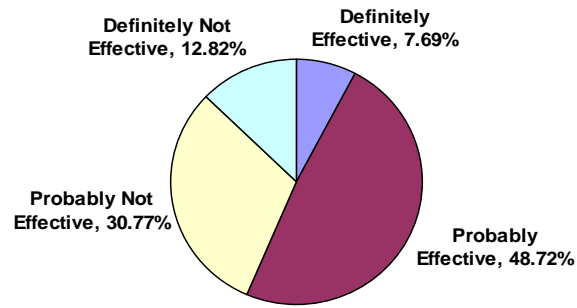


Figure 9. Effectiveness of showing American-made safety videos with Spanish subtitles appearing at the bottom of the screen.

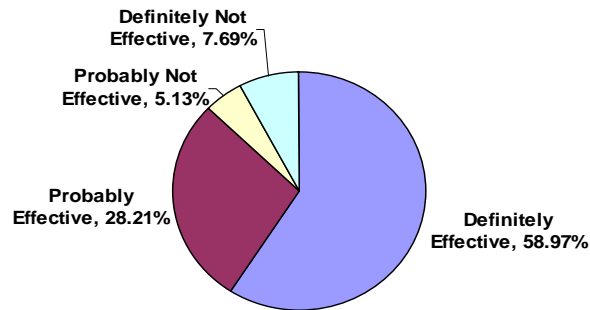


Figure 10. Effectiveness of using a bi-lingual Spanish-speaking worker to interpret a "tailgate" safety at the landing meeting to his co-workers.

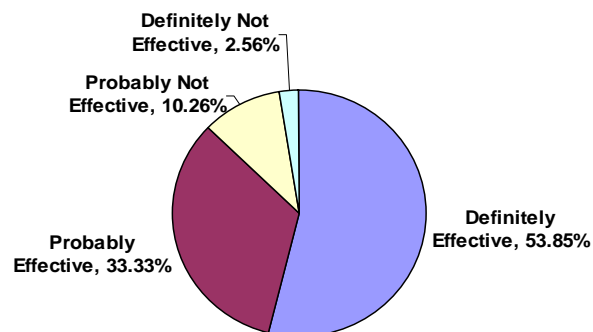


Figure 11. Effectiveness of attending local safety training programs presented by a Spanish-speaking safety instructor.

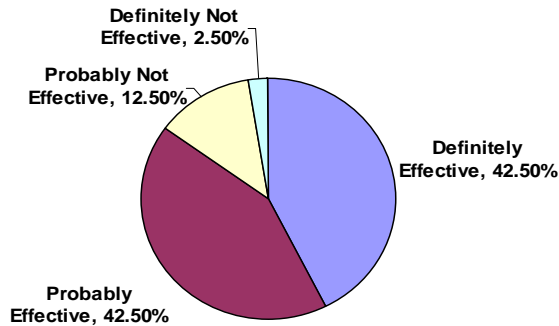


Figure 12. Effectiveness of using safety brochures and manuals printed in Spanish.

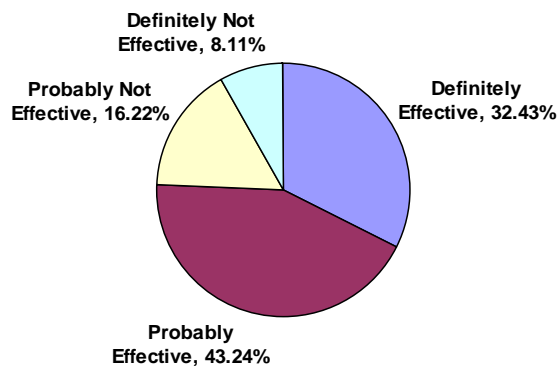


Figure 13. Effectiveness of using pictures and diagrams rather than text in safety brochures.

Written comments were invited for questions #4 through #7 on the questionnaire. Comments from question #4 (Did any of your Hispanic employees have previous logging experience before you hired them?) varied, and focused on locations where their SSWs had received previous experience. This was primarily experience from other loggers in and out of the state, while one worked at a nearby sawmill. The range of prior experience for SSWs was from 1 to 20+ years.

Comments from question #5 (Do any of your SSWs understand or speak English well enough to effectively interpret your instructions to other SSWs?) used descriptive words such as, “enough”, “some”, and “basic” to describe the comprehension level of their SSWs to understanding English. Other respondents mentioned that they have one worker who comprehends English well and translates it to the other SSWs. One respondent goes so far as to state that he will not hire Hispanics that cannot speak English well.

Question #6 (Do any of your SSWs read English well enough to translate a safety training manual printed in English for the other workers?) received the fewest written comments. One respondent replied that he has all his safety rules in Spanish so that English reading is not an issue. Another respondent replied that he did not know if his SSWs could read English or not.

Question #7 (Have you provided any safety training for your SSWs? Briefly describe how it was presented) received the most written comments out of all questions on the questionnaire, with 34 (83%) of the respondents replying. There were a variety of methods used to present safety training materials to SSWs. Few respondents used more than one method such as holding monthly “tailgate” safety meetings and using an interpreter, while most respondents only used one method of safety training such as only having safety meetings or sending their SSWs to formal logger training programs. The following is a break-down of the different kinds of training provided by the respondents for their SSWs;

- 23% use only hands-on/demonstration type training
- 14.5% use only safety meetings
- 14.5% only talk about safety in a general sense or when needed
- 12% use only an employee or hired translator/interpreter
- 12% use only third party training programs (SFI, SHARP, Insurance Co.)
- 9% use only Spanish materials
- 3% use only safety brochures with pictures
- 12% use a combination of the previously listed methods

The final two questions on the survey ask for suggestions on the best way to present logging safety training to SSWs and for comments on the topic of Spanish-speaking logging workers and safety in general. The suggestions for safety training follow very closely with comments from question #7. “Hands-on” training was favored as the best way for training SSWs. Other comments included the use of Spanish training videos for logging equipment that covers maintenance, operation, and inspection, and that using a bilingual SSW or interpreter is the best way to present safety training to SSWs.

Comments regarding Spanish-speaking logging workers and safety in general were generally positive. Most of the respondents believe their SSWs are good and safe workers. One respondent goes as far as saying his SSWs are the “cream of the crop”. Only two respondents replied negatively to SSWs, one stating that he would not hire another due to the language barrier, while another respondent commented about concerns with access to safety training materials. Overall, the respondents were pleased with their SSW’s work and safety habits, but are concerned with the Spanish-English language barrier. The full list of comments received on the questionnaires can be found in Appendix C.

6. Discussion

Survey

Using the percentage of SSWs found in the survey (3.37%), the total SSW population in the Southeastern logging industry was estimated based on logging industry worker population data from the BLS (Appendix D). This is the only published source providing a comprehensive estimate of the total logging workforce population in the Southeast. This population data is questionable, and actual numbers may be higher. For example, in the case of Oklahoma, the sampled workforce was actually larger than the BLS population estimate. Yet, no other known source is available for determining logging workforce population estimates for the study area. Therefore, while it is possible that BLS population data is underestimated, a SSW population estimate for the logging industry in the Southeastern U.S. of 3.37% is the most accurate estimate we can make given the available published information. Nevertheless, the percent population for SSWs in the Southeastern U.S. logging industry is substantially less than that of the national workforce average for Hispanics (13%), and even further less than that of the construction industry Hispanic workforce (18%) (DOL 2004, Utgoff 2005).

Reasons for the relatively low population of SSWs in the logging industry may be explained by two factors. First, professionals who are regularly in contact with logging operations in the Southeast have noticed an increase in the number of SSWs on logging crews only in the past few years (Shaffer pers com 2004). This coincides with questionnaire data that shows 49% of the respondents have employed their SSWs for 5 years or less. Thus, the number of SSWs has only recently begun to rise to considerable numbers, but overall it is still relatively low.

The second factor may be attributed to the H2B visa cap. Presently, the maximum amount of H2B visas that can be issued is 66,000. Recently, this number has been reached early in the fiscal year, leaving many employers without the much needed immigrants to fill manual labor jobs in the non-agricultural work sector (Murphy 2004). Since (Spanish-speaking) immigrants in the logging industry can only work legally under an H2B visa, this may be a limiting factor to the number of SSWs that can be acquired to fill the needs of the industry

These factors lead to 3 conclusions about the population of SSWs in the Southeastern U.S. logging industry: (1) Only recently has the population of SSWs begun to accumulate in high enough numbers to make them a substantial labor source for the logging industry, (2) The

H2B visa is potentially an influential factor in limiting the number of SSWs in the industry, and (3) The current population has the potential to increase in the future, more-so if the H2B visa cap is removed or expanded.

A critical statistic regarding the SSW population is the percentage of all operations with one or more SSWs. Ten percent of the surveyed crews employed a SSW. These crews are all subject to dealing with the necessity of providing effective safety training to account for the language barriers between employers and employees, even if they only employ one SSW. This percentage is over three times greater than the entire SSW workforce percentage, and shows that there are few logging crews that are predominantly SSWs and many crews with only one or two SSWs. The 192 operations in the survey that employed SSWs averaged two SSWs per crew.

The average crew size in this survey was six employees, but this number varied throughout the study area. The Western Gulf region had the highest average crew size of over seven employees. This was primarily due to the fact that the region contained four of the top five states in terms of highest average crew size. Surprisingly, Oklahoma, a state not known for a large logging industry, had the highest average crew size of just over ten employees, although this statistic was based on a relatively small sample size of 44 operations.

The population of SSWs between the three subregions was statistically different at a high level, $P \leq 0.001$. This shows that SSWs are moving/migrating to specific regions and cities in the Southeast, rather than moving/migrating in a general pattern across the region. Pew Hispanic Center data confirms this observation, as can be seen in Figure 1 (Kochhar et al. 2005). Crew size was also varied between the regions with the Western Gulf region having approximately a two person per crew greater average than the other two regions.

Of the three subregions, the Eastern Gulf appeared to be the lowest in terms of SSW activity. The Eastern Gulf region had the lowest number of SSWs surveyed, percent SSW workforce population, and number of crews with a SSW. This contrasts with Pew Hispanic Center data which shows Georgia with over a 300% and Alabama with over a 200% increase in Hispanics from 1990-2000 (Kochhar et. al 2005). It is possible that in Georgia and Alabama, states with very prominent logging industries, the native workforce may be large enough to slow the influx of SSWs into the industry. Yet, data shows that SSWs are being employed on logging crews in this region, and that available data supports an increasing population of SSWs in the logging workforce.

Arkansas and North Carolina were identified through this study as two areas with relatively high populations of SSWs compared to the rest of the study area. This corresponds with Pew Hispanic Center data that shows from 1990 to 2000 these two states had the fastest growing Hispanic populations, 394% and 337%, respectively (Table 1) (Kochhar et al. 2005). These states recorded the highest sampled SSWs and were the second and third highest in percent of SSWs in the logging workforce. Florida showed the highest percent of SSWs in the logging workforce, but also was the state with the smallest number of operations sampled, making it inconclusive as an area with a large population of SSW in its logging industry.

Sample operations in Tennessee and Louisiana employed no SSWs. While not every logging crew was surveyed in these two states, it can be inferred from the data that these areas have much lower concentrations of SSWs in the logging industry than other states in the Southeast. Tennessee did have over a 200% increase in Hispanic population between 1990 and 2000, yet this increase in Hispanic population has evidently not made its way into the state's logging workforce (Kochhar et al. 2005). Louisiana, on the other hand, only had a 16% growth in its Hispanic population. Additionally, Alabama, Georgia, Mississippi, and South Carolina had a relatively low sample population of SSWs in the logging industry, with populations approximately 2% below the study area average.

It would be difficult to accurately estimate the rate at which the logging workforce percentage of SSWs is expected to change. A combination of literature reviews showing the increasing percentage of SSWs in the South along with initiatives in the U.S. Senate to expand visa limits, suggest that the availability of SSWs in the labor force will increase (Snowe 2005, Kochhar et al. 2005). Therefore, it is probable that the percentage of SSWs in the Southeastern U.S. logging workforce will increase. The rate of increase is questionable, but can be estimated to parallel the growth of SSWs in the entire Southeastern U.S. (This is complicated by the number of illegal immigrants and the H2B visa cap). It can also be suggested that this growth will peak as it reaches the national average of SSWs in the U.S. workforce, and continue to grow at the national U.S. workforce average thereon. The most recent data from the Pew Hispanic Center shows an average Hispanic population growth from 2000-2003 of 7%/year in the six fastest growing Southern states and 4% a year nationwide (Kochhar et al. 2005). This growth is expected to drop slightly as overall populations of Hispanics rise.

Questionnaire

Selected logger respondents (41) to the questionnaire provided data for their entire logging operation, which in several cases included multiple crews. Thus, the average and median number of workers employed from the questionnaires were larger than that of the average crew sizes from the survey for the entire Southeastern U.S.

SSWs represented 29% of the questionnaire respondent workforce. The median respondent had a logging operation with approximately 20% of the crew member being Spanish-speaking. This correlates with the survey data which suggests that rather than having logging operations with many SSWs, there are several logging operations with one or two SSWs.

Average and median employment time was seven and six years, respectively. This would put the average starting employment date for most SSWs around 1999 or 2000, which is towards the end of the large Hispanic population growth in the South (Kochhar et al. 2005). A possible explanation for not having shorter average employment time is the fact that the H2B visa cap has been reached early in the fiscal year since 2003 (Ferrier 2004, Murphy 2004, Siskind and Ballentine 2003). This would limit the availability of new SSWs in the logging industry, since the H2B is the only legal visa that a migrant worker can obtain to work on a logging job.

Surprisingly, four respondents said they had provided no safety training for their SSWs - a violation of OSHA regulations. Forty-four percent of the respondents had SSWs injured on the job. This percentage is slightly higher than the injury rate for logging employees on Feller-Buncher/Grapple Skidder operations with less than one year experience (39%), and much higher than the percentage of injuries of workers with more than five years on the job (24%) (Roberts et al. 2005). These figures only serve as a comparison since many logging operations had more than one SSW and there is no data to tell how many SSWs were injured from each logging operation. Still, the majority of respondents believed their SSWs had a positive attitude toward safety.

Fifty-one percent of the respondents employ a SSW that can read English well enough to translate a safety training material. A study conducted by the Pew Hispanic Center found that only 46% of Foreign-born Latinos in the six Southern states with the fastest growing populations can speak English “well” or “very well”, and 64% of Latinos (foreign-born and native) in the same states can speak English “well” or “very well” (Figure 4) (Kochhar et al. 2005). Although the questionnaire data seems to be similar to the Pew Hispanic Center data, there are two points

that should be noted. First, Pew Hispanic Center data is categorized in levels of speaking ability, while questionnaire data is categorized in a format regarding reading ability. While these are not the same comparisons, they are similar and are the best data available for comparison. Second, the questionnaire asks if there is “at least one SSW that can read English well”, leaving the possibility that no other SSWs on the crew are capable of reading English.

Hands-on training ranked as the most effective method for training SSWs. This was the only non-resource based training method that was listed. It involved no spoken or written communication, only physical demonstration of a safe operating practice with the SSW then trying to repeat the practice. The use of a bi-lingual Spanish-speaking workers or attending local safety training programs presented by Spanish-speaking instructors were the next two most effective methods for training SSWs. This approach is popular in the construction industry where many organizations are creating and using methods such as this to train their SSWs (Brooks 2003, OSHA 2002, Ceniceros 2001). Even though the use of hands-on training is favored by the respondents as the best approach to safety training, it might not be effective without the use of a bilingual employee/translator. This is due to the fact that an employer is required by OSHA to relay safety training to their employees in a method they understand. To find out if a SSW understands a safety training method taught through hands-on training, a bilingual employee/translator would be needed to translate any questions or comments.

The three methods for training SSWs through written or visual communication were rated the least effective way for training SSW. This could be due to the low education levels of foreign-born Latinos; 62% have less than a high school education (Kochhar et al. 2005). Low education levels could relate to low literacy levels which would make written safety training materials and videos with Spanish subtitles difficult to understand. Other studies identify education and literacy levels of SSWs as specific issues of concern when training SSWs (Anonymous 2003, Elkind 2002).

Respondent’s opinions of the best way to train SSWs were similar to the actual methods used by the respondents. The majority of respondents used only hand-on/demonstration type training, while a large percentage also used an employee or hired translator/interpreter to conduct safety training. Interestingly, 29% of respondents used only safety meetings or only talked about safety in a general sense or when needed. These methods use no aides designed for training SSWs, and therefore, the effectiveness of these methods must be questioned. Another interesting

note is that only 12% of the respondents use a combination of any of the previously mentioned training methods. It would be logical to assume that a combination of training methods would be beneficial on crews with more than one SSW since each SSW may have a different level of education and English comprehension. A combination of different training methods is the approach that OSHA and the Hispanic Contractors of America Inc. (HCA) used when they formed an alliance to promote safe and healthful working conditions for Hispanic construction workers (OSHA 2002).

7. Recommendations

Based on the literature and websites reviewed during this study, as well as logger responses to the questionnaires, the following recommendations regarding safety training of SSWs are offered. The objective for an employer should be to provide their SSWs with training methods that maximize comprehension of the specific safety concept.

- Determine the education/literacy levels of Spanish-speaking employees in your crew. Spanish-language safety training material and videos with Spanish sub-titles would not be appropriate if the employees cannot read. If the SSWs can read, use (or if need be develop) Spanish language training materials and brochures.
- Use hands-on/demonstration training. Hands-on/demonstration training provides a visual safety training method which does not involve a written or verbal component of communication.
- Use a bi-lingual employee/translator to help with any safety training. This ensures that the SSW comprehends the safety training he or she is receiving, as well as providing an outlet for the relay of questions between the demonstrator and the employee.
- Use multiple safety training methods to maximize the SSW's learning ability. The combination of hands-on/demonstration training and the use of a bi-lingual employee/translator seem to be the optimal combination of safety training methods. These two safety training methods were ranked by respondents as the two potentially most effective methods for training SSWs, and were also methods which are presently being used by loggers to train SSWs.
- Safety training methods used for SSWs may require more "customization" than that of non-SSWs. This is, in part, is due to language barriers, variable levels of literacy, and the fact that in other industries SSWs seem to be more accident prone. Specific safety

training should be tailored to accommodate the needs of SSWs on logging crews in contrast to standard training given to non-SSWs.

- Certain logging tasks are more hazardous than others, such as manual felling, trimming, or bucking with a chainsaw. Assigning an inadequately trained and experienced SSW to this task would thus be especially risky. Before assigning a SSW to do manual chainsaw work ensure they have the necessary training and experience to carry out the job safely, or provide them such training through demonstration. Assign an experienced employee for a period of at least one week who can oversee the SSW and correct any unsafe practices.
- Operations on the landing are dangerous due to the high traffic and constant movement of machinery. Use universally accepted hand signals around the landing area rather than verbal communication to prevent any miscommunication between Spanish-speaking and non-Spanish-speaking workers.
- Provide SSWs with formal classes specifically designed to teach them English, whether it be at a community college or through a private company. This concept is successfully used by employers in the construction industry to not only teach English, but also integrate the SSW into the community.
- The more employees a crew has that speak the same language, the less communication barriers you have. Perhaps, rather than having “mixed” crews with only a few SSWs, crews comprised entirely of SSWs could promote better communication throughout the workplace. While the limited availability of SSWs in some areas may currently restrict this idea, it may be feasible in the future as more SSWs enter the logging workforce.
- It would be beneficial for a logger who employs SSWs to learn Spanish, at least enough to relay basic messages.

- Finally, the industry should monitor the SSW population in the logging workforce closely. Depending on political and economic factors, this population could grow quickly and begin to impact safety/injury rates. Further research in 2-3 years would be advisable to measure population growth (or decline) and determine precisely how SSWs are affecting logging injury/fatality rates.

8. Conclusions

Results of this study identify the current population of SSWs in the Southeastern U.S. logging industry as a whole and by region. Within the study area, states with relatively high SSW populations were identified, as well as areas of little SSW activity. Average employment length and the percentage of workers with previous logging experience were determined. English comprehension levels of SSWs were determined. Safety training methods for SSWs in the study area were ranked from most effective to least effective. The current methods used by employers for training SSWs were also identified.

The percentage of SSWs in logging in the Southeastern U.S. is substantially lower than in construction and agriculture industry, as well as, in the U.S. industry in general. While less than 4% of the total logging workforce is Spanish-speaking, every one in ten operations (10%) must deal with the challenge of providing safety training to a SSW.

SSWs show a trend of immigrating to specific regions in contrast to distributing themselves in a general pattern throughout the Southeastern U.S. Regions with higher populations of SSWs in the logging industries also had higher average crew sizes. There are no reasons that can be concluded from this study to explain the attractions that SSWs have to certain states such as Arkansas and North Carolina, or to the stagnation of movement into other states such as Louisiana or Tennessee.

Loggers tend to employ one or two SSWs to work with several non-SSWs, rather than form an entire (or majority) crew of SSWs. Additionally, loggers employed their SSWs an average of 6.7 years, showing that the majority of SSWs are getting their visas renewed every year, are citizens that have not learned English well, or are illegal immigrants. The latter is a feasible option, given that an estimated 800,000 illegal immigrants enter the U.S. each year.

Since a strong majority of loggers who employ SSWs have at least one who can translate verbal safety training/instructions to other SSW, and they are currently using this method effectively to provide safety training for their SSWs, the translation and large scale dissemination of logging safety training materials is not needed at this time. For crews who do not have an employee who can act as a translator, finding an outside source to provide bi-lingual training or to act as a translator is the best option. Since the majority of operations only used one method of safety training for their SSW, it would not be advisable to use only Spanish-language material since literacy levels of Spanish-speaking employees tend to be low.

SSWs are not likely to substantially impact the logging injury rate in the Southeastern U.S. in the near future, but could in the long term if their percentage of the workforce continues to grow. The safety training methods currently used in the logging industry appear to be adequate for training SSWs and preventing unusually high injury/accident rates. Therefore, while the development of Spanish-language safety training material (including methods such as using pictures rather than words) should be encouraged, the widespread distribution and use of these materials are not yet necessary.

9. Literature Cited

Anonymous. 2002a. Alliance Formed to Reduce Construction Deaths Among Spanish-Speaking Workers. *Professional Safety* 47 (5); 14.

Anonymous. 2002b. OSHA Reaches Out to Hispanics About... *Job Safety and Health Quarterly* 13 (3); 14-17.

Anonymous. 2002c. OSHA Launches Website for Spanish-speaking Employers, Employees. *Professional Safety* 47 (4); 14.

Anonymous. 2003. Safety Pros Share Proven Tricks for Training Spanish-Speaking Workers. *IOMA's Safety Director's Report* 3 (7); 2-4.

American Immigration Law Foundation (AILF). 2002. The Value of Undocumented Workers: The numbers behind the U.S. – Mexico immigration debate. Retrieved from: www.ailf.org.

Berestein, Leslie. 2004. On the Payroll: Illegal Immigrants. *Union-Tribune*. November 7, 2004.

Boone, Elisabeth. 2003. The Language of Safety. *Rough Notes* 146 (4); 24-29.

Borque, Michael. 2004. MEMIC Logging Safety Specialist Wins National Safety Award; Andy Wood is National 'Safety Man of the Year'. Retrieved from: www.memic.com.

Brooks, Roger Jr. 2003. Lost in the Translation. *Occupational Health and Safety* 72 (12); 49-51.

Bureau of Labor Statistics (BLS). 2003b. Census of Fatal Occupational Injuries, 2003 data: Information on deadly work hazards. From BLS internet database at: www.bls.gov.

Bureau of Labor Statistics (BLS). 2003c. Fatal occupational injuries by selected characteristics, 1992-2002. From BLS internet database at: www.bls.gov.

Bureau of Labor Statistics (BLS). 2004a. Lost-worktime injuries and illnesses: characteristics and resulting days away from work, 2002. March 25, 2004 From BLS internet database at: www.bls.gov.

Bureau of Labor Statistics (BLS). 2004b. Labor Force Characteristics of Foreign-Born Workers in 2003. December 1, 2004. From the BLS internet database at: www.bls.gov.

Bureau of Labor Statistics (BLS). 2004c. Quarterly Census of Employment and Wages. From BLS internet database at: <http://data.bls.gov>.

Ceniceros, Roberto. 2001. Safety Efforts Crossing Cultural Lines. *Business Insurance*, (Chicago) 35 (43); 10-11.

Command Spanish. 2005. Retrieved from: www.commandspanish.com.

Corbin, Dana E. 2002. Speaking Their Language: By Going Bilingual, OSHA hopes to reach out to Latino workers and save lives. *Occupational Health and Safety* 71 (7); 32.

Department of Labor (DOL). 2004. John Henshaw Remarks. DOL-OSHA Hispanic Safety and Health Summit. Orlando, Florida. July 22, 2004.

Department of Labor (DOL). 2005. 17.308 Farm Labor Contractor Registration

D.J. Case and Associates (DJCA). 2005. Hispanic Worker Integration in the Wood Products Industry. Retrieved from: www.na.fs.fed.us/wihispanic/.

Dow Jones & Company. 2004. Immigration's Progress. *Wall Street Journal* (Eastern Edition). New York, N.Y.: May 7, 2004; 16.

Elkind, P.D., K. Pitts, and S.L. Ybarra. 2002. Theater as a mechanism for increasing farm health and safety knowledge. *American Journal of Industrial Medicine* 42 (S2); 28-35.

Equal Employment Opportunity Commission (EEOC). 2002. Occupational Employment in Private Industry by Race/Ethnic Group/Sex, and by Industry, United States 2000-2002. From EEOC internet database at: www.eeoc.gov.

Ferrier, Antonia (contact). 2004. Maine Congressional Delegation Urges Labor Secretary Chao to Grant Canadian Loggers Entry to U.S. on H2a Visas. News release – Olympia Snow, U.S. Senator for Maine.

Forest Resources Association (FRA). 1999. National logging and wood fiber transportation fatalities for 1996-1998. Tech. Rept. 99-A-12. FRA, Rockville, MD. 26pp.

Forest Resources Association (FRA). 2000. Injury rates for feller-buncher/grapple skidder operations. Tech. Release 00-R-2. FRA, Rockville, MD.

Forest Resource Association (FRA). 2002. Logging Fatalities Investigated by OSHA: 1996-1997. Tech Release 02-R-30. FRA, Rockville, MD. 2pp.

Gaskin, J., B. Smith, and P. Wilson. 1989. The New Zealand Logging Worker – A Profile. Logging Industry Research Association, Project Report 44.

Grieco, Elizabeth, and Brian Ray. 2004. Mexican Immigration in the U.S. Labor Force. Migration Policy Institute. March 1, 2004.

Halloran, Liz. 2005. Under the Sun: A New Wave of Immigrants is Transforming Communities Nowhere Near the Border. *U.S. News and World Report*. June 20, 2005; 20-25.

Halverson, Matthew. 2003. Lost in the Translation. Electrical Construction and Maintenance. June 01, 2003.

Jarvis, Steve. 1997. APA's Top Ten Points of Logging Safety. APA Tech. Paper 97-P-23. FRA, Rockville, MD. 2pp.

Jones, Lindsay. 2004. State Cites Farm Labor Contractors at Local Groves. Palm Beach Post. February 5, 2004.

Kochhar, Rakesh, R. Suro, and S. Tafoya. 2005. The New Latino South: The Context and Consequences of Rapid Population Growth. Pew Hispanic Center Report. July 26, 2005.

Krikorian, Mark. 2004. Flawed Assumptions Underlying Guestworker Programs. Center for Immigration Studies. Retrieved from: www.cis.org

Lowel, L., and R. Suro. 2002. The Value of Undocumented Workers. The Pew Hispanic Center, March 2002. Retrieved from: www.aifl.org.

May-Lambert, S., S. Richardson, and K. Herrmann. 1998. Fatal Work Injuries Involving Farmworkers. Journal of Agricultural Safety and Health. Special Issue (1); 47-55.

McCauley, L.A., S.E. Shapiro, J.A. Scherer, and M.R. Laserev. 2004. Assessing Pesticide Safety Knowledge Among Hispanic Migrant Farmworkers in Oregon. Journal of Agricultural Safety and Health 10 (3); 177-186.

McDaniel, Josh, V. Casanova. 2005. Forest Management and the H2B Guest Worker Program in the Southeastern United States: An Assessment of Contractors and Their Crews. Journal of Forestry. April/May 2005; 114-119.

McDilda, Katherine Woodford. 2000. Personnel Recruitment, Retention Requires New Philosophies Today. Southern Lumberman. October 2000.

Milburn, Jason S. 1998. Injuries on Mechanized Logging Operations in the Southeastern United States. Thesis: Virginia Polytechnic Institute and State University, Department of Forestry, Blacksburg, VA 24061.

Murphy, Edward D. 2004. System Gives Southern States the Edge on Work Visas. Press Herald. Portland, Maine. Date unknown.

National Ag Safety Database (NASD). 2005. Spanish Materials: English Titles. Retrieved from: www.nasd.com

National Timber Harvesting and Transportation Safety Foundation (THATS). 2005. Logging and Transportation Safety: On-line Resource. Retrieved from: www.loggingsafety.com

Occupational Safety and Health Administration (OSHA). 2002. Hispanic Contractors Form Alliance: Goal to Reduce Construction Deaths Among Spanish-Speaking Workers. OSHA Trade News Release. March 5, 2002.

Occupational Safety and Health Administration (OSHA). 2003. Hispanic Contractors of America Alliance Close-out Report. From the OSHA internet database: www.osha.gov

Occupational Safety and Health Administration (OSHA). 2005a. Logging Standards. From the OSHA internet database: www.osha.gov

Occupational Safety and Health Administration (OSHA). 2005b. OSHA Offers New Hispanic Outreach Web Tool. OSHA Trade Release. January 10, 2005. From the OSHA internet database: www.osha.gov

Occupational Safety and Health Administration (OSHA). 2005c. OSHA Resource Center Loan Program. From the OSHA internet database: www.osha.gov

Occupational Safety and Health Administration (OSHA). 2005d. Susan Harwood Training Grants Program. From the OSHA internet database: www.osha.gov

Osorio, A.M., C.R. Geiser, E. Lee Husting, and K.F. Summerill. 1998. Farm Injury Surveillance in Two California Counties—General Findings. *Journal of Agricultural Safety and Health*. Special Issue (1); 89-98.

Richardson, D.B., D. Loomis, J. Bena, and A.J. Bailer. 2004. Fatal Occupational Injury Rates in Southern and Non-Southern States, by Race and Hispanic Ethnicity. *American Journal of Public Health* 94 (10); 1756-1761.

Roberts, T. and R.M. Shaffer. 2004. 2003 injury rate for mechanized logging operations in the South. *Forest Operations Review* 7 (1); 23-24

Roberts, T., R.M. Shaffer, and R.J. Bush. 2005. Injuries on Mechanized Logging Operations in the Southeastern United States in 2001. *Forest Products Journal* 55 (1); 1-4.

Shaffer, R.M. 2002. Logging Safety Improvement in the South: An Ongoing Success Story. *Forest Landowner* January/February; 17-19.

Shaffer, R.M. 2004. *Personal contact* with forest industry procurement foresters (Robert Shaffer is the Charles Nettleton Professor of Forest Operations at Virginia Tech), Worker's Compensation Insurance providers' field agents, and logging equipment manufacturer's field staff.

Shaffer, R.M. and J.S. Milburn. 1999. Injuries on Feller-Buncher/Grapple Skidder Logging Operations in the Southeastern United States. *Forest Products Journal* 49 (7/8); 24-26.

Shaffer, R.M. and T. Roberts. 2001. Injury rates dropping on mechanized logging operations in the South. Tech. Release 01-R-12. FRA, Rockville, MD. 2pp.

Shaffer, R.M. and T. Roberts. 2003. Logging Injuries Continue Downward Trend. Tech. Release 03-R-27. FRA, Rockville, MD. 2pp.

Siskind, Gregory, and A. Ballentine. 2003. The ABCs of Immigration – H-2A Visas for Temporary Agricultural Workers and H-2B Visas for Temporary Nonagricultural Workers. Immigration Daily. November 11, 2003. Retrieved from: www.ilw.com

Smidt, Mathew. 2005. Visual Guide to Landing Safety. Forest Resources Association Tech. Release 05-R-12. FRA, Rockville, MD. 2pp.

Snowe, Olympia J. 2005. The H2B Visa Crisis. Press Room Weekly Update. January 7 – 14, 2005.

Sorock, Gary S., E. O'Hagen Smith, and M. Goldoft. 1993. Fatal Occupational Injuries in the New Jersey Construction Industry, 1993 to 1989. Journal of Occupational Medicine 35 (9); 916-921.

Stallones, L. and K. Sweitzer. 1999. Fatal Head Injuries among Hispanic Farmworkers and Farmers in Colorado, 1983-1992. Journal of Agricultural Safety and Health 5 (2); 201-205.

Sum, Andrew, I. Khatiwada, P. Harrington, S. Palma. 2003. New Immigrants in the Labor Force and the Number of Employed New Immigrants in the U.S. from 2000 through 2003: Continued Growth Amidst Declining Employment Among the Native Born Population. Center For Labor Market Studies. December.

Utgoff, Kathleen P. 2005. Statement of the Commissioner of the Bureau of Labor Statistics. Friday, September 2, 2005. Retrieved from: www.bls.gov.

Vaughan, Jessica. 2003. Shorcuts to Immigration: The 'Temporary' Visa Program is Broken. Center for Immigration Studies. Retrieved from: www.cis.org.

29 USC 1801. Migrant and Seasonal Agricultural Worker Protection Act.

10. Appendices

Appendix A. Distribution of workers by industry in six Southern states

	United States	Alabama	Arkansas	Georgia	North Carolina	South Carolina	Tennessee
Hispanics							
Agr., forestry, mining, etc.	3.2	2.8	7.1	3.7	5.1	4.4	3.7
Construction	9.8	10.5	8.1	22.8	22.3	22.0	18.1
Manufacturing	15.7	30.4	43.8	22.1	28.9	18.8	23.6
Transportation and warehousing	4.2	2.9	2.8	2.6	1.5	1.8	3.0
Info., comm. and utilities	2.9	1.4	1.1	2.1	1.6	2.3	2.3
Trade	15.2	12.9	10.7	10.5	9.2	12.3	11.6
FIRE	5.0	3.6	2.0	2.9	1.7	3.5	2.3
Services	40.5	32.7	22.6	31.6	28.2	32.7	33.9
Public administration	3.4	2.9	1.8	1.8	1.5	2.1	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-Hispanic Whites							
Agr., forestry, mining, etc.	0.7	2.2	3.9	1.4	1.5	1.0	1.5
Construction	3.8	8.2	7.4	8.2	8.4	8.8	7.6
Manufacturing	13.0	17.6	17.8	14.2	18.3	17.4	19.1
Transportation and warehousing	6.5	3.8	4.9	4.5	3.5	3.3	4.7
Info., comm. and utilities	4.3	4.0	3.5	4.6	3.4	4.2	3.6
Trade	12.3	16.7	17.1	16.9	16.1	16.1	16.0
FIRE	6.5	6.2	5.1	7.1	6.5	6.6	6.0
Services	45.9	36.2	36.2	38.0	38.2	38.1	37.7
Public administration	7.2	4.9	4.1	5.0	4.0	4.7	3.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-Hispanic Blacks							
Agr., forestry, mining, etc.	1.9	1.2	2.0	1.0	0.9	1.3	0.4
Construction	7.0	4.5	3.5	4.6	4.5	6.0	3.4
Manufacturing	13.9	20.7	23.6	15.5	22.6	25.1	17.6
Transportation and warehousing	4.1	3.9	4.7	7.0	5.0	4.3	8.4
Info., comm. and utilities	4.1	3.0	2.6	4.8	3.1	2.6	3.6
Trade	15.8	13.1	12.7	13.4	11.9	12.4	13.3
FIRE	7.2	4.8	3.0	5.8	5.3	3.5	5.1
Services	41.2	42.7	41.3	41.1	41.8	39.2	42.3
Public administration	4.7	6.1	6.7	6.6	4.9	5.7	5.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Adapted from Kochhar et al. 2005.

Appendix B. Virginia Tech “Hispanic Logging Worker Safety Study” – interview questions (Questionnaire) for sample loggers currently employing one or more Hispanic workers.

Date _____

1. What State is your operation located in? _____
2. What year did you hire your first Hispanic employee? _____
3. How many Hispanic workers do you currently employ? ____ How many total employees do you have? _____
4. Did any of your Hispanic employees have previous logging experience before you hired them? __YES __NO
Comments? _____

5. Do any of your Hispanic workers **understand or speak English** well enough to effectively interpret your instructions to the other Hispanic workers? __YES __NO
Comments? _____

6. Do any of your Hispanic workers **read English** well enough to translate a safety training manual printed in English for the other workers? __YES __NO
Comments? _____

7. Have you provided any safety training for your Spanish-speaking employees?
__YES __NO.....IF YES – Briefly describe how the training was presented.

8. How would you rate the overall safety attitude of your Hispanic employees?
[Choose one]
__ They are always focused on safety
__ They work safely most of the time
__ They don't always pay as much attention to safety as they should
__ Safety is a problem with them
9. Have any of your Hispanic employees been injured on the job? __YES __NO

Appendix B. (continued)

10. The following are six possible ways of presenting safety training to Hispanic logging workers. In your opinion, please rate the potential effectiveness of each on a 1 to 4 scale, with **1** being definitely effective, **2** being probably effective, **3** being probably not effective, and **4** being definitely not effective.

- a. Give them safety brochures and safety manuals printed in Spanish.
- b. Give them safety brochures that demonstrate safety primarily through pictures and diagrams rather than text.
- c. Have them attend a local safety training program presented by a Spanish-speaking safety instructor.
- d. Use a bi-lingual Hispanic employee to interpret a “tailgate” safety discussion at the landing to his co-workers.
- e. Show them American-made safety videos with Spanish “subtitles” appearing at the bottom of the screen.
- f.. “Hands-on” demonstration training where the worker observes a safe operating practice being done and then tries it himself.

Any other suggestions on the best way to present logging safety training to Spanish-speaking employees? _____

Any other comments on the topic of Hispanic logging workers and safety?

Please return this questionnaire to:

Bob Shaffer
Forestry Department (0324)
Virginia Tech
Blacksburg, VA 24061

Appendix C. Written comments for survey questionnaire by question number.

4. Did any of your Hispanic employees have previous logging experience before you hired them?

- 1 year experience
- Two previously worked for another logger – those 2 trained the rest. (1 has 20+ years logging experience)
- Experience in another state
- Worked for other logging companies in area
- Picked tomatoes
- No logging work, lumber stacker at sawmill
- 2 of several tried had logging experience

5. Do any of your Hispanic workers understand or speak English well enough to effectively interpret your instructions to the other Hispanic workers?

- Enough to follow instructions
- 8 or 9 understand some English – 5 speak good English
- Through interpretation from on worker, 2 don't understand any English
- One speaks good English and the other understands but doesn't speak much English
- Will not hire Hispanics that cannot speak English
- Sign language and examples worked well
- Basic English but not fluent
- 2 employees spoke fluent English
- One worker interprets

6. Do any of your Hispanic workers read English well enough to translate a safety training manual printed in English for the other workers?

- 3 can read English
- I'm not sure translator is telling what I want him to
- I don't know
- I have safety rules in Spanish
- 1 reads English well
- 1 employee can read English some

Appendix C. (continued)

7. Have you provided any safety training for your SSWs? Briefly describe how it was presented.

- Enough to carryout job as chainsaw operator safely
- Training through SHARP logger program
- Through verbal training form logger interpreted by English speaking worker. Had one first aid program through Spanish-speaking interpreter in Roanoke through Red Cross (paid for it)
- Attended training classes and one on one training
- We talk about safety and they have worked for me about five years and have worked in woods for about 15 yrs
- We talk about safety and when they start I watch them and if there are any unsafe conditions we address them
- We address safety issues on the job when needed
- Monthly safety meeting and more
- Spanish chainsaw training manual
- Lecture in English
- SFI logger training, safety talks
- Safety brochures with pictures
- Working with other Hispanics
- Spanish language training materials
- Videos, safety meeting
- SFI logger training, safety videos, safety poster
- SFI qualified logger training and safety videos
- Basic on the job pointing out hazards and demonstrating proper procedures
- I like to do hands on training, I also hold safety meetings
- I do hands on training
- Hands on training done by us and chainsaw trainer
- I hold monthly safety meeting that are translated, also Brian Wagner (chainsaw trainer) has done hands on training with my Hispanic toppers
- Safety meetings held with someone translating, also hands on training
- Safety meetings held and translated to Hispanic employees
- Weekly safety meetings are held with all employees, also Forestry Mutual's chainsaw trainer has trained Hispanic toppers
- We hold safety meeting (formal) on a monthly basis with an interpreter
- All were trained on their specific job, hands on training by owner
- Training was provided through safety meetings and using a "show and tell" type of format
- Safety meetings
- The bilingual employees translated for the others not as familiar with English
- Tailgate safety meetings
- Have it translated
- Used Spanish materials
- Pedro translates the operating instructions and safety info for the job the worker is to perform

Appendix C. (continued)

Any other suggestions on the best way to present logging safety training to SSWs?

- I like the idea of having a safety manual written in both English and Spanish
- Demonstration training such as Brian Wagner chainsaw training, “hands on”, “pictures rather than words are best”
- Just keep close eye on all new employees and if you see a problem address immediately
- Would like to have Spanish training videos for skidders, loaders, and feller-bunchers showing maintenance, operation, and inspection
- Hands on only
- If possible have them work with a trained friend or relative
- I believe hands on training is one of the most effective ways of training
- I believe hands on training is most effective while using a translator
- We basically use a bilingual Hispanic employee to interpret a safety discussion at the landing to his co-workers

Any other comments on the topic of Hispanic logging workers and safety?

- he believes his employees are “cream of the crop” for Hispanic workers, most have been with him 7-8 years, 1 has 11 years with the company
- Hispanic worker seem about as safe as other workers – concerned with access to safety training materials in general – Has a Hispanic foreman who translates materials and speaks English well
- Would probably be able to use more Hispanic workers in the future
- Good workers need help communicating
- Good workers who want to please
- I have 4 different dialects spoken, hard to understand other Hispanic workers
- Owner states he will not hire any more due to language problems
- They were probably the safest and best workers I’ve had in last 4 years
- Most of my Hispanic workers are very safety aware
- If trained properly they make a good/safe workforce
- Will not hire another Hispanic employee due to language barrier
- We only employed 1 Hispanic and he works safely, I have no further experience regarding Hispanic logging workers
- They have an appreciation for safety and adhere to the safety rules
- Our Hispanic workers are just as safety alert as non-Hispanic workers

Appendix D. Comparing sample size and BLS data (Total) of employees and crews within the study area by state.

STATE	EMPLOYEES TOTAL			CREWS TOTAL		
	SAMPLED	2004	%	SAMPLED	2004	%
VA	666	2108	31.59%	136	482	28.22%
NC	1386	3425	40.47%	291	588	49.49%
SC	620	3543	17.50%	89	502	17.73%
TN	546	992	55.04%	101	209	48.33%
GA	1508	5185	29.08%	281	662	42.45%
FL	47	1795	2.62%	11	273	4.03%
AL	901	5081	17.73%	169	795	21.26%
MS	953	3988	23.90%	151	615	24.55%
LA	1368	3153	43.39%	163	442	36.88%
AR	2720	3148	86.40%	400	535	74.77%
OK	452	167	270.66%	44	36	122.22%
TX	358	1922	18.63%	54	278	19.42%
TOTAL	11525	34507	33.40%	1890	5417	34.89%

Appendix E. Sampled percentage of SSWs by state.

REGION	STATE	EMPLOYEES	SSWs	%
Atlantic	Virginia	666	21	3.15%
	North Carolina	1386	97	7.00%
	South Carolina	620	7	1.13%
	Tennessee	546	0	0.00%
Eastern Gulf	Georgia	1508	19	1.26%
	Florida	47	10	21.28%
	Alabama	901	6	0.67%
	Mississippi	953	10	1.05%
Western Gulf	Louisiana	1368	0	0.00%
	Arkansas	2720	185	6.80%
	Oklahoma	452	18	3.98%
	Texas	358	15	4.19%
Total	Southeastern U.S	11525	388	3.37%