Identifying and Implementing Effective Training for Hispanic Craft Workers, American Supervisors, and DOT Inspectors

Phase III of the Hispanic Workforce Research Project

National Concrete Pavement Technology Center

Final Report
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16. Abstract

The number of Hispanic workers in the U.S. construction industry has been steadily increasing, and language and cultural barriers have sometimes arisen on the jobsite. Due in part to these barriers, the number of fatalities among Hispanics at construction sites in 2001 jumped 24%, while construction fatalities overall dropped 3%.

This study, which constitutes Phase III of the Hispanic Workforce Research Project, addresses these language and cultural barriers by investigating the most effective way to deliver training material developed in Phases I and II to Hispanic workers, American supervisors, and department of transportation (DOT) inspectors. The research methodology consisted of assessing the needs and interests of potential and current course participants in terms of exploring innovative ways to deliver the training. The training courses were then adapted and delivered to fit the specific needs of each audience. During Phase III of this project, the research team delivered the courses described in the Phase I and II reports to eight highway construction companies and two DOT groups.

The courses developed in Phases I and II consist of four construction-focused language training courses that can be part of an effective training program to facilitate integration among U.S. and Hispanic workers, increase productivity and motivation at the jobsite, and decrease the existing high mortality rate for Hispanic workers. Moreover, the research team developed a course for the construction season called Toolbox Integration Course for Hispanic workers and American supervisors (TICHA), which consists of nine 45-minute modules delivered to one construction company over 11 weeks in the summer of 2005.

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IDENTIFYING AND IMPLEMENTING EFFECTIVE TRAINING FOR HISPANIC CRAFT WORKERS, AMERICAN SUPERVISORS, AND DOT INSPECTORS

PHASE III OF THE HISPANIC WORKFORCE RESEARCH PROJECT

Final Report
May 2006

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This report constitutes Phase III of the Hispanic Workforce Research Project, which continues the work begun in Phases I and II, “Developing an Effective Training Program for Hispanic Supervisors and Craft Workers and American Supervisors” and “Developing an Effective Training Program for American Supervisors with Hispanic Craft Workers,” respectively. The authors would like to thank the Iowa Department of Transportation and the Federal Highway Administration for sponsoring this research.

EXECUTIVE SUMMARY

Hispanics are a large and growing part of the U.S. workforce. In 2000, the U.S. Census Bureau showed that Hispanics are the nation's largest ethnic or racial minority group. In addition, the Hispanic population in Iowa increased 153% from 1990 to 2000. By 2050, Hispanics are projected to make up 25% of the population of the United States. This growth has created several challenges for U.S. construction companies, which employ a significant portion of the Hispanic workforce and contend with language and cultural barriers between Hispanic and U.S. workers (Canales 2005).

This study, which constitutes Phase III of the Hispanic Workforce Research Project, addresses the situation by investigating the most effective way to deliver course material developed in Phases I and II to Hispanic workers, American supervisors, and department of transportation (DOT) inspectors. The courses developed in Phases I and II consist of four construction-focused language training courses that can be part of an effective training program to facilitate integration among U.S. and Hispanic workers, increase productivity and motivation at the jobsite, and decrease the existing high mortality rate for Hispanic workers.

The research methodology consisted of assessing the needs and interests of the course participants in terms of exploring innovative ways to deliver the training. The training courses were then adapted and delivered to fit the specific needs of each audience. This report also provides a final evaluation on the effectiveness of these courses.

Two independent surveys, one for Hispanic workers and DOT inspectors and one for American supervisors, were conducted to evaluate these three populations' current conditions and interests in terms of receiving training in the construction industry. Sixty eight Hispanic workers, 23 American supervisors, and 5 DOT inspectors were interviewed for this research. The results confirm that communication, because of language and cultural barriers, is the main concern for both the Hispanic workers and the native English-speaking employees involved in construction projects. Moreover, this research revealed important results about the training preferences of Hispanic workers, American supervisors, and DOT inspectors. All three populations agreed that the best time of the year to receive training is in the winter, due to time limitations during the construction season; the best day of the week to receive training is Monday; the best time of the day to receive training is in the mornings; the preferred duration of training is around two hours per event; and the favored method of teaching is face-to-face with instructor.

The limited availability of human capital to train these three populations has also led the researchers to consider cost- and time-effective options that use newly available technologies to meet these demands and the need for language-related instruction. Other ideas involved delivering training courses to bilingual construction workers who could teach the material developed in Phases I and II.

During Phase III of this project, the research team delivered the courses described in the Phase I and II reports to eight highway construction companies and two DOT groups. Moreover, the research team developed a course for the construction season called Toolbox Integration Course

for Hispanic workers and American supervisors (TICHA), which consists of nine 45-minute modules delivered to one construction company over 11 weeks in the summer of 2005.

1. INTRODUCTION

1.1. Problem Statement

Hispanics are a large and growing part of the U.S. workforce. According to U.S. Census Bureau projections, Hispanics have become the nation's largest ethnic or racial minority group as of 2000. It is projected that Hispanics will make up 25% of the population of the United States by 2050 (OSHA 2001). The number of Hispanic workers in the U.S. construction industry has been steadily increasing and now comprises nearly 18% of the workforce (CNN 2001). In Iowa, Hispanic workers comprise about 7.4% of the workforce, as reported by the 2002 employment survey submitted by contractors to the Iowa Department of Transportation (DOT). According to a workforce demographics study, the construction industry's traditional sources of workers are drying up, white males ages 25–40 with a modest formal education. Of necessity, the industry is broadening its recruitment base to include minorities (especially Hispanics), women, and older workers (Richards 2002). Hispanic workers provide a valuable service to the industry, as they perform a variety of important tasks such as general labor, concrete finishing, and equipment operation. Training, by and large, consists of on-the-job instruction and a limited number of formal classroom sessions.

However, training does not appear to be adequate, especially where safety is concerned. Safety statistics reveal an increasing accident rate for Hispanic workers. The Bureau of Labor Statistics reports that, in 2000, construction fatalities overall dropped 3% while the number of Hispanics killed at construction sites jumped 24% (BLS 2003). It seems reasonable to foresee that Hispanic workers will continue to play an important role in the U.S. construction industry. Because of the increasing numbers of Hispanic construction workers, as well as the disproportionate number of fatalities among Hispanic construction workers, construction companies need to make a more systematic effort to accommodate its diverse workforce (Canales 2005).

With increased numbers of Hispanic employees and rising Hispanic fatality rates, employers have aggressively sought bilingual safety tools for their employees, including training classes, trainers, and training materials (Arbelaez 2004). These improvements have been implemented where the Hispanic concentration is the greatest, in the southern Unites States. Because of the high presence of Hispanics in the southern states, the market supply for construction work has flooded, encouraging migration toward the less Hispanic-populated states such as those in the Midwestern United States.

Iowa has been affected by these trends, particularly within the construction sector. Furthermore, the construction industry is projected to experience one of the largest employment growths from 2000 to 2010 (Arbelaez 2004). The Iowa DOT, along with Iowa State University's Department of Civil, Construction, and Environmental Engineering, Associated General Contractors (AGC), and other organizations, are all taking action to face these new challenges. Various courses have been developed to focus on the needs of the Hispanic workers, American supervisors, and DOT inspectors in Iowa.

The “Hispanic Workforce Research Project” has begun addressing the needs of Hispanic construction workers in Iowa. The project consists of three phases. In Phase I, the needs of Hispanic craft workers were assessed, and the project resulted in the successful development and delivery of two courses focused on construction: English as a Second Language (ESL) and Stepping Up to Supervisor (SUTS). Phase II of the project assessed the needs of American supervisors with Hispanic crew workers. This study resulted in a developed and delivered Spanish as a Second Language (SSL) course, which is designed to facilitate basic communication between Hispanic workers and American supervisors by focusing only on construction terminology. In addition, a series of short technical courses called Concrete Pavement Construction Basics (CPCB) was developed. These courses address the specific needs uncovered in the research process of Phase II (Vazquez 2005).

In general, these courses intend to improve communication channels between American supervisors, Hispanic workers, and DOT inspectors. Specially, these courses attempt to strengthen the supervisor-worker relationship, increase Hispanic worker productivity (and motivation to learn), and decrease the existing mortality rates for Hispanic construction workers. These results can be achieved by continuously improving and delivering the courses developed to date in order to increase cultural awareness and deliver technical terminology in both Spanish and English and to promote safety and productivity.

1.2. Research Objectives

To determine the appropriate research objectives, the Iowa State University research team performed a detailed assessment of the current conditions of the Hispanic population in the United States, with an emphasis on construction craft workers in Iowa (Canales 2005). During Phases I and II of this project, surveys were conducted of Hispanic workers and American supervisors to investigate and assess in detail the current issues existing in the construction industry at the jobsite. It was found that Hispanics are experiencing higher accident rates for several reasons: the risk inconsistency is generally blamed on language barriers, educational levels, and the prevalence of Hispanics working under unsafe conditions.

One objective of the Phase III research was to overcome challenges in delivering the course materials developed in the earlier phases (i.e., ESL, SSL, SUTS, and CPCB) to the intended audiences, including Hispanic workers, American supervisors, and DOT inspectors. Due to a hectic construction season, during which workers put in long days and sometimes weekends to complete projects on time and within budget, it can be difficult to schedule formal classes and expect full attendance. To minimize interference with daily construction operations, the goal is to explore innovative ways to deliver the course material developed in Phases I and II. Moreover, this research involves addressing the needs of Iowa DOT inspectors, who need to be able to communicate with Hispanic workers on DOT jobsites.

Additionally, part of the Phase III research consisted of delivering the course material and adapting the courses to Hispanic workers, American supervisors, and DOT inspectors in ways that best fit their needs. The immediate solution has been to use the course materials developed in Phases I and II were to create a toolbox course that can be delivered during construction operations with minimum disruption of the daily operations and productivity. The new course,

Toolbox Integration Training for Hispanic workers and American supervisors (TICHA), involves a combination of face-to-face presentations during regular toolbox talks on the jobsite. Experimentation with advanced delivery approaches, such as delivering courses to bilingual workers who can teach the material to more workers at different locations more often, has also been part of this project.

The research team also delivered Spanish language instruction to Iowa DOT field inspectors to help them better communicate with Hispanic workers on DOT projects. This instruction involved adapting the SSL course from Phase II to fit the field inspectors' needs.

1.3. Research Approach

The following research approach was used to achieve the objectives for Phase III of the HWRP:

1. Using survey questionnaires, the most suitable and cost-effective training approaches for effectively reaching Hispanic workers, American supervisors, and Iowa DOT inspectors were assessed. The survey approach produced practical knowledge that illustrates similarities and differences in learning preferences among the three audiences.
2. Appropriate course content was delivered using the previously researched best practices for effectively training Hispanic construction workers and American supervisors.
3. An on-the-jobsite training course based on the findings of this study was developed and delivered.
4. An SSL course for interested Iowa DOT inspectors was developed and delivered.
5. A final report for the entire research project summarized the findings and offered a list of recommendations.

1.4. Definition of Terms

- Hispanic Workforce Research Project (HWRP). This project consists of Phases I, II, and III up to this point.
- Toolbox Integration Training for Hispanic Workers and American Supervisors (TICHA). This course was developed in Phase III to teach jobsite integration and communication.
- Contractors, construction companies. The research discussed in this paper focuses on the construction workers in the field. The term "contractors," in this report, refers to construction employees working in the field.
- On the jobsite. This refers to a location close to the place where the work is performed. It is used to describe the places where the courses are provided, which are commonly delivered at the jobsite.
- Construction season. This is the time of the year when most DOT construction work is performed, between April and late October each year.
- Construction off-season. This is the time when little or no DOT construction work is performed, between November and late March of the following year.
- Hispanics. In this report, this term describes foreign-born, native Spanish speaking immigrant workers who grew up in Mexico or Central and/or South America.
- In-class settings. This refers to courses taught in traditional classroom settings.

- Toolbox talk setting. This refers to courses taught on the jobsite.
- Research team. This consists of those involved in one way or another in the decision making, developing, and delivering of the research and training of this project.

1.5. Report Organization

This report is organized as follows:

- Chapter 1 introduces the topic, describes the existing problem, discusses the objectives of this research, and defines the research goals.
- Chapter 2 reviews the literature on current and available training programs for Hispanic construction workers and summarizes cultural models that provide an understanding of some of the communication issues that arise on the job site.
- Chapter 3 contains the methodology used for gathering necessary data, analyzing the results, and drawing reliable recommendations with which to develop and deliver the training as a solution to the stated problem.
- Chapter 4 provides the results of the survey questionnaire. Graphs and charts are developed to illustrate the information extracted and concluded from the survey data.
- Chapter 5 reports and assesses the teaching activities that are part of the Phase III research, as well as the process involved in developing the on-season construction course, TICHA. This chapter also suggests ways the training can be integrated into the contractors' usual training programs.
- Chapter 6 offers a summary of findings, conclusions and recommendations, and future research opportunities.

2. LITERATURE REVIEW

2.1. Current Hispanic Construction Worker Training Programs

Most existing training programs for Hispanic construction workers are mainly concerned with health and safety aspects (O'Connor 2003). For instance, the Occupational Safety and Health Administration (OSHA) has special concerns for non-English-speaking workers. According to an OSHA Trade News Release (2002), more than $2.2 million in new funding was allocated for outreach to Spanish-speaking and other non-English-speaking workers during the 2004 fiscal year. This represents the first time OSHA's budget included additional funding for Hispanic outreach (Canales 2005). Moreover, OSHA is forming alliances with Hispanic leaders and community-based organizations and offering an ever-increasing number of publications and fact sheets in Spanish. OSHA will continue to expand ongoing Hispanic outreach projects such as the community-based efforts to disseminate safety and health information among immigrants in New York and New Jersey (OSHA 2002).

In addition, a new website written in Spanish is helping OSHA reach out to non-English-speaking workers and employers. The web page features basic documents related worker and employer rights and responsibilities, resource materials, and other information of special interest to Spanish-speaking audiences. Moreover, OSHA's new program, Alliances, enables organizations committed to workplace safety and health to collaborate with OSHA to prevent injuries and illnesses of Hispanics in the workplace (Canales 2005).

Additionally, the Construction Accident Reduction Emphasis (CARE) program in Florida, in alliance with a Latino community group in Georgia, encourages workers to report hazards. Moreover, it offers safety and health courses, small business training taught in Spanish in the southwest, and bilingual compliance assistance specialists and inspectors available to assist Spanish-speaking workers and employers in several local offices (Canales 2005).

The Georgia Tech Research Institute (GTRI) believes that education in the construction industry is a matter of life and death and has shown great concern about the lack of job experience of Hispanics, which is causing high mortality rates in Georgia. GTRI has created material to make federally mandated training more effective for Hispanic construction workers. GTRI's areas of study are divided into five categories: fall protection, scaffolding, trenching and excavation, electrical hazards, and materials handling. This material has been prepared for computer presentation for job orientations and has been distributed through building associations, statewide and regional OSHA offices, and the Hispanic Chamber of Commerce (Professional Safety 2004).

Furthermore, the National Institute for Occupational Safety and Health (NIOSH) currently conducts a wide range of research, training, and technical assistance programs to identify and reduce hazardous working conditions. NIOSH in Spanish, another source of available material, includes Spanish-language versions of several NIOSH workplace safety and health documents relevant to industries and occupations in which large numbers of Spanish-speaking workers are

employed. This resource also describes in Spanish how workers and employers can contact NIOSH and access basic services such as health hazard evaluations (Canales 2005).

The state of Massachusetts has also given priority to these types of training programs for Hispanic construction workers. The Department of Work Environment, University of Massachusetts-Lowell, senses that there is a need for linguistically and culturally appropriate occupational and health resources targeted for Spanish-speaking workers (Brunett 2005). This entity has developed complete safety and health educational materials for Hispanic construction workers. These materials have been federally funded to be implemented in Lawrence, Massachusetts, a city with a Hispanic population majority. The structure of the training includes 13 modules of 1 duration hour each, 6 of which are mandatory and 7 are elective (Brunett 2005). Additionally, the AGC of Massachusetts has formed an alliance agreement with OSHA to help reduce and prevent the exposure of Hispanic workers to health and safety hazards (Gordon and Petrucelly 2005). The news release of this alliance was made on 19 April 2005, officially partnering OSHA and AGC of Massachusetts to provide expertise for developing training and educational programs for Hispanic construction workers (Fitzgerald 2005).

California's Working Immigrant Safety and Health Coalition (WISH), with funding from the Institute for Labor and Employment at the University of California, Berkeley, is sharing strategies to protect the health and safety of Hispanic immigrant workers. WISH has begun developing a network of organizations to provide training and support for Hispanic immigrants working in construction (Teran 2002).

In the private construction industry, the nominal and human cost of losing a worker due to injury or death on the job is increasing by the day. Just in 2000, the state of Texas reported 81 Hispanic construction worker fatalities that ended in death on the job. It is important to mention the efforts being made to minimize injuries among Hispanic workers on the $2.6 billion Dallas/Forth Worth Airport (DFWA) expansion project. The airport's safety program appears to be decreasing the high mortality rates for Hispanic workers by breaking down barriers of language, literacy, and culture. According to reporter James Nash, the DFWA's Capital Development Program, as the airport expansion project is called, may have one of the best construction training programs in the United States due to its efforts in training Hispanic workers in health and safety (Nash 2004). In conjunction with the two primary contractors on the expansion, BEST Institute, Inc., of Garland, Texas, developed this 40 hour training program for the Hispanic construction workers. Nearly 13,000 workers have taken the BEST Institute's course, which is offered in Spanish as well as in English. This course intends to teach the basic vocabulary and phrases used in everyday work situations and focuses its teaching on vocabulary and phrases correlated to safety and health procedures. Because the expansion of the DFWA is a large, publicly funded construction project that could afford such an extensive training program for Hispanic workers, the cost-effective usability of this training for private contractors has been doubted. However, BEST Institute, Inc., and the contractors involved with originally developing this training course have considering the possibility of adapting it for use in other and smaller projects (Nash 2004).

To conclude this review of public and scholarly efforts to increase training programs for Hispanic construction workers, it is important to recognize the work of Paul Goodrum of the University of Kentucky, who studies possible factors explaining the high mortality rates for

Hispanic construction workers related to other races and ethnicities (Goodrum 2005). Michael Schulman from North Carolina State University and Tom O'Connor at the National Academy of Science have also contributed to achieving adequacy in health and safety training for Spanish speaking construction workers (O'Connor 2005).

Finally, a private company in Wyoming, Construction Communication Corp., has created the *Commercial Construction Communication* book and a *Construction Spanish-English Dictionary*, which can serve as a guide for contractors and Hispanic training developers to the architecture of training in construction language.

2.2. Models of Culture

To develop an effective training program that can lead to integration among Hispanic workers and their American supervisors, an effort was made to understand culture in terms of its definition, dimensions, and implications. Culture is a shared meaning system, found among those who speak a particular language dialect, during a specific time period, and in a definable geographic region (Gannon and Newman 2002). A major concern in the present study is training Hispanic immigrants working in places that do not share their native culture. Several researchers have developed models for understanding social and organizational cultures: for instance, Hall's high-context and low-context cultural framework, Hofstede's research on cultures, and Trompenaars's dimensions of culture (Nahavandi 2003; Hampden-Turner et al. 2000). These models facilitate understanding of the ways people from different cultural groups communicate with each other and help define the management styles most appropriate under given circumstances and job settings. The Hofstede model, perhaps the most complete and well-researched model, will be discussed further in this report.

Hofstede's terminology for describing cultures includes five different criteria, which he called "dimensions" because they occur in nearly all possible combinations and are largely independent of each other. These five criteria are as follows: individualism versus collectivism, large or small power distance, strong or weak uncertainty avoidance, masculinity versus femininity, and time orientation (Nahavandi 2003).

Individualism versus collectivism involves the relationship between an individual and his or her fellow workers. There are two general categories: (1) societies in which ties between individuals are very loose, that is, where everybody looks after his or her own self interests (individualistic); and (2) societies in which the ties between individuals are very tight, that is, where everybody looks after his or her group's interests (collectivistic). Hispanic societies tend to fall into the second category, where friendships prevail over tasks, and loyalty is very valuable among group members and between bosses and subordinates. In a collectivist culture, an employer hires a person who belongs to an "in-group." The individual will act according to the interest of the "in-group," which may not always coincide with his or her individual interest. The relationship between employer and employee is seen in moral terms, as it resembles a relationship of mutual obligations of protection in exchange of loyalty (Hofstede 1991). On the other hand, management in individualistic societies prefers to move workers around individually. If incentives and bonuses are given, these are linked to individual performance, the opposite of the

type of management in collectivist societies. Management techniques related to training exist almost exclusively in individualist cultures, and these are based on cultural assumptions that may not hold for the more collectivist Hispanic worker (Hofstede 1991).

Power distance refers to the way society and culture deals with social inequality. On the jobsite, the level of power is related to the degree of centralization of authority and the degree of autocratic leadership. Hispanic cultures, in general, are characterized as having a large power distance; in this situation, superiors are considered to be existentially unequal to their subordinates. Workers in these types of organizations are accustomed to the centralization of power and the concept that subordinates are expected to be told what to do. The ideal boss, from the worker's perspective in cultures with large power distance, is a benevolent autocrat or, as Hofstede says, a "good father." This type of worker may also ideologically reject the boss's authority after experiences with a "bad father" (Hofstede 1991).

Uncertainty avoidance, which is not the same as risk avoidance, indicates the extent to which a culture can program its members to sense or feel changing, unknown, or surprising situations. The two ends of this spectrum are related to how members of the culture accept or avoid uncertainties. Groups with weak uncertainty avoidance tend to accept the fact that the future is unknown and therefore accept each day as it comes. In contrast, other cultures tend to reduce uncertainty in the future by creating security and avoiding unnecessary risk. In this dimension, there exists a clear correlation between power distance and uncertainty avoidance (Hofstede 1984). That is, laws and rules help society prevent uncertainties in the behavior of people. According to Hofstede, this correlation is very noticeable in the workplace.

In cultures that tend to avoid uncertainty, such as the United States, many formal and informal rules control the rights and duties of employers and employees as well as the work process. For Hofstede, individuals in these societies have been programmed since early childhood to feel comfortable in structured environments; the need for rules in a society of this sort is an emotional matter. In contrast, countries such as Mexico, Colombia, and Guatemala, with very weak uncertainty avoidance, rather seem to be emotionally distraught about formal rules. Rules are only established in absolute necessity. In cultures with strong uncertainty avoidance, individuals like to always be busy. Life is hurried, and time means money. In cultures with weak uncertainty avoidance, individuals are quite able to work hard if there is a need for it, but they are not driven toward constant activity (Hofstede 1991).

Masculinity versus femininity is related to the social and cultural division and clear definition of roles between the sexes. Human societies in different ways have associated certain roles to men only or to women only. This is a socialization process, rather than a biological one. Latin American countries such as Venezuela and Mexico are considered to be quite masculine biased. However, Hofstede shows that the United States also has relatively high masculine bias compared to most western European countries and other Latin American countries such as Chile and Guatemala. In general, countries with high masculinity tend to have sympathy for the strong: men are supposed to be ambitious and tough, and dominant values in society are material success and progress. This is a dimension in which Hispanic workers may share many similarities with American workers (Hofstede 1991).

The time dimension of culture is related to the way people value the usage of time, the ways they set goals and objectives, and the importance and firmness of the deadlines and time commitments. In the long-term dimension, values are oriented towards the future, like saving and persistence. Businesses in long-term-oriented cultures, such as the United States, are traditionally accustomed to working toward building up strong positions in their markets without the expectation of short-term results. In the short-term dimension, in contrast, values are oriented towards the past and present, manifested in respect for tradition and fulfilling social obligations. Hispanic workers typically lean towards the short-term aspect of this dimension as they tend to view deadlines as more flexible than their American counterparts and place more emphasis on tradition (Hofstede 2001).

Hofstede established some relationship among these five dimensions, such as power distance and collectivism (Hofstede 1984). Collectivist cultures typically show large power distances, but individualist countries do not always show small power distance. Poor countries tend to be collectivist and show larger power distances, and many Hispanic construction workers are from these poorer countries.

Table 1 describes some examples of cultural values that will help trainers better understand the impact of cultural differences on the jobsite. According to Hofstede's findings about both Hispanic and American cultures, it is concluded that in the workplace, Hispanics, as subordinates, tend to expect to be told what to do, see hierarchy as an existential inequality, and want to consider their boss as a benevolent autocrat. Also, because of their collectivism, Hispanic workers often see relationships more important than tasks (Hofstede 1984). Much of Hofstede's work shaped the research team's thinking in this research and is used in the development of the ESL, SSL, and TICHA courses.

Table 2.1. Comparison of management styles between Hispanic and American cultures according to Hofstede (Chrispin 2004)

Cultural aspect	Hispanic cultures	American culture
Work/leisure	Works to live. Leisure considered essential for full life. Money is for enjoying life.	Lives to work. Leisure seen as a reward for hard work. Money often end in itself.
Direction/delegation	Traditional managers. Autocratic. Younger managers begin by delegating responsibilities. Subordinates accustomed to being assigned tasks, not authority.	Managers delegate responsibilities and authority. Executives seek responsibilities and accept accountability.
Theory vs. practice	Basically theoretical mind. Practical implementation often difficult.	Basically pragmatic mind. Take action-oriented and problem-solving approaches.
Control	Not fully accepted; sensitive to being checked on.	Universally accepted and practiced.
Staffing	Family and friends favored because of trustworthiness. Promotions based on loyalty to superior.	Relatives usually barred. Favoritism not acceptable. Promotion based on performance.
Loyalty	Mostly loyal to superior. Beginnings of self-loyalty.	Mainly self-loyalty. Performance motivated by ambition.
Competition	Avoids personal competition. Favors harmony at work.	Enjoys proving oneself in competitive situations.
Time	Deadlines flexible.	Deadlines and commitments are firm.
Planning	Short-term due to uncertain environments.	Long-term due to stable environments.

2.3. Concluding Remarks

The Hispanic population in the construction industry continues to grow, and as the literature review suggests, the number of entities involved in developing and delivering training to Hispanic workers is small compared to the needs of contractors and their growing numbers of Hispanic employees. Materials for training Hispanic workers are available, but not widely known. Moreover, the training available is seldom delivered to contractors with Hispanic workers. However, while Iowa still has a small population of Hispanic workers in construction

relative to other states in the Southwest, the project presented in this report shows the great effort put into delivering the material designed to increase communication on the jobsite in order to decrease hazards and increase productivity.

However, to deliver the training in the most effective way, it is necessary to understand the cultural dynamics of teaching a course to two groups from different cultures, together, and still make a great impact on both groups. Hofstede's cultural model provides stable ground from which the courses can be developed.

3. RESEARCH METHODOLOGY

3.1. Introduction

In general, the research methodology for this project involves assessing the needs and interests of American supervisors and Hispanic workers as these needs relate to the availability of training that would increase the efficacy of construction work. The process involved reviewing current methods of training and developing and delivering training courses. The contractor can choose from a full spectrum of methods to deliver the necessary training to their workers.

This report assesses how training courses can be better delivered to Hispanic craft workers and American supervisors in the construction industry, especially highway construction in the state of Iowa. The methodology used for this research is shown in Figure 3.1. It consists of four parts: (1) review of literature on the current training available for Hispanic workers and models of culture; (2) design of questionnaire, data collection, data analysis, and results; (3) analysis and description of training for on-the-jobsite and classroom settings; and (4) report of results, conclusions, and recommendations.

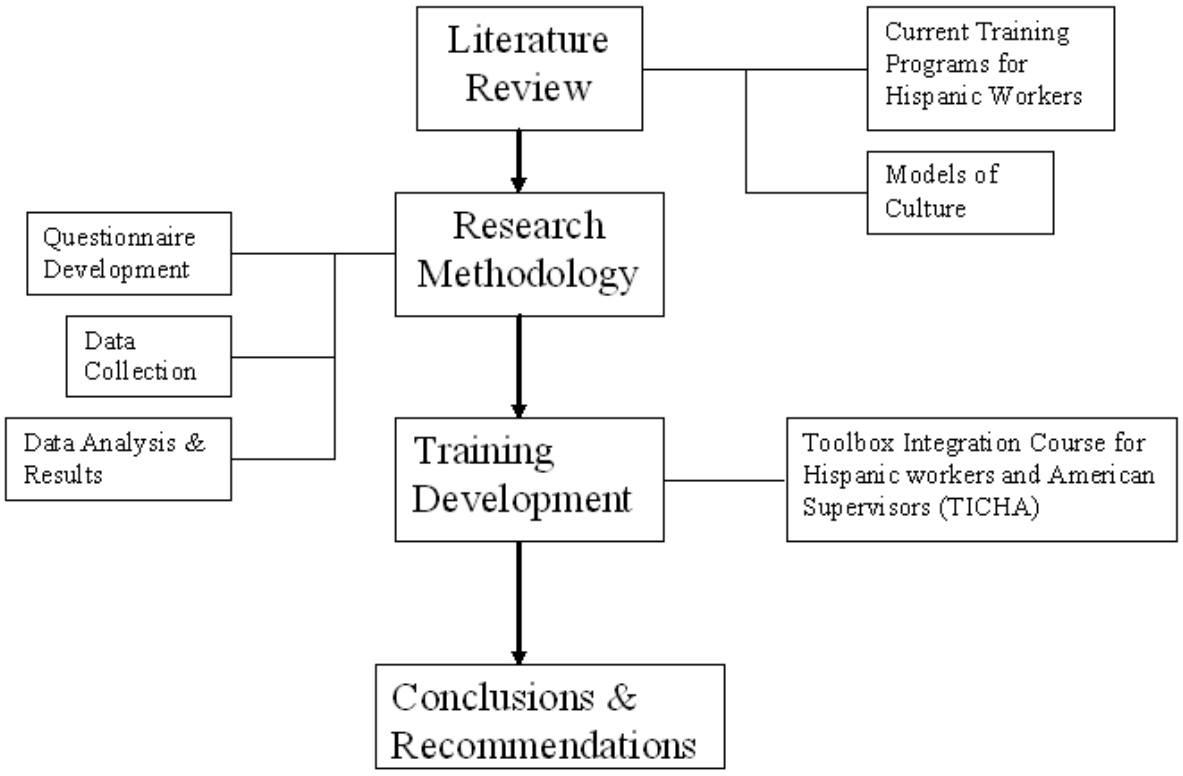


Figure 3.1. Research methodology

3.2. Questionnaire Design, Data Collection, and Data Analysis and Evaluation

3.2.1. Questionnaire Design

A face-to-face survey approach was used to collect data from American supervisors and Hispanic workers. Alternatively, an e-mail approach was used to collect data from five DOT workers. Thus, after the literature review, which studied construction companies and Hispanics in the state of Iowa, the research process continued with the research methodology. This consists of three stages: (1) questionnaire design, (2) data collection, and (3) data analysis and evaluation.

Two questionnaires, one for Hispanic workers and DOT inspectors and a second one with additional questions for American supervisors, were designed (see Appendices A and B). The goal of these questionnaires was to obtain the data necessary to understand and evaluate the needs and interests of American supervisors, Hispanic workers, and DOT inspectors by identifying the subjects regarding training in traditional settings and low attendance for the courses offered. After identifying these difficulties, suitable and effective training options could be evaluated and developed to facilitate solutions to the problems.

The following seven specific objectives were selected for the design of the questionnaire for contractor employees (Hispanic workers and American supervisors) and DOT inspectors:

1. Determine current training practices of contractors for training their employees.
2. Determine the contractor's preferences for training employees (e.g., classroom or on-the-job), during and/or outside of work hours.
3. Determine current training practices for Iowa DOT employees.
4. Determine Iowa DOT employees' training preferences.
5. Identify the contractor's resources for on-the-job training.
6. Determine patterns of needs, interests, and areas of opportunity for training.
7. Determine the factors and problems that prevent contractors from sending workers to receive training.

Having defined the objectives of the questionnaires, the sample size for the population was defined. It was determined that a preliminary estimate of 20 Hispanic workers, 10 American supervisors, and 10 DOT inspectors (40 random samples) was necessary to obtain enough data to draw and evaluate significant conclusions and generate recommendations. Factors influencing the sample size of the face-to-face survey consisted on the speed at which the assessment could be conducted on the jobsite, the type of survey implemented, the availability of workers, and the willingness of the project supervisors at the time of the interview. More specifically, the preliminary sample size was calculated according to the number of American supervisors in the construction industry in Iowa, obtained from statistics provided by the Bureau of Labor Statistics and the U.S. Census Bureau. Hence, this convenience sample was decided upon according to the literature review about conducting surveys (Fink 1998).

The questionnaire for contractor employees (Hispanic workers and American supervisors) and DOT inspectors was developed after the results of Phase I and II had been obtained and enough feedback was available to direct actions for Phase III. The process for the questionnaire for

Hispanics was such that, once the factors of sample size were taken into account, quantitative and qualitative measurements were determined as well as question order and survey length. This step was mainly based on the specific objectives of the survey. Initially, the questionnaire consisted of 11 questions arranged in 4 categories of information, as follows: (1) current training practices, (2) training preferences, (3) jobsite training resources, (4) general Hispanic workforce information.

The first draft of the questionnaire was pre-tested on one work site and had three respondents; corrections and modifications were made accordingly. The final questionnaire for Hispanic workers and DOT inspectors consisted of 14 quantitative and 4 qualitative/descriptive questions a total of 18 questions). Moreover, the final questionnaire for American supervisors includes the same questions with an additional 11 quantitative and 3 qualitative/descriptive questions (a total of 32 questions).

Finally, the final questionnaire consists of the same four categories established before the pre-test. Appendix A contains the questionnaire in its final format and with its main objective, which was used as introductory information before the surveys took place.

3.2.2. Data Collection

Data collection was carried out by using face-to-face interviews with American supervisors and Hispanic Workers on-the-jobsites as well as using an e-mail approach for DOT inspectors. Twenty three American supervisors and 68 Hispanic workers were interviewed personally on the jobsite, surpassing the preliminary estimate of 10 American supervisors and 20 Hispanic workers. Conversely, while the e-mail approach was used with the DOT inspectors, only 5 out of the 10 surveys expected in the preliminary estimate were received and counted towards this study.

Seven construction companies in Iowa were willing to collaborate, and three of them were contacted prior to conducting the interviews. Research team members served as project contacts and explained the nature of the survey and requested permission in advance to enter the jobsite. It is perceived that previous experience in performing face-to-face surveys for Phases I and II was important for carrying out a more efficient survey in Phase III. The extra pool of random data collected for Hispanic workers and American supervisors was helpful for testing and estimating significant parameters for this study. Meanwhile, it is evident that the e-mail approach is not reliable and/or convenient for data collection of this sort.

Most of the construction projects chosen as data sources were located in the Des Moines area, Ames, Burlington, Council Bluffs, and cities in which the availability of American supervisors was sufficient to conduct the survey.

3.2.3. Data Analysis and Evaluation

Data analysis and evaluation were completed and used for the selection and development of the methods for delivering the training courses in a cost- and time-effective way.

Statistical software JMP 5.0.1 was used to store and calculate respondents' information. Thus, survey responses were input, coded, and kept confidential in a customized database. Totals and respective percentages were calculated, and charts were generated for each of the 19 questions (and the 33 questions used for American supervisors).

Data analysis continued with the evaluation of the generated charts. Variabilities and similarities were extracted from the bar charts obtained for each question. Establishing relationships indicated patterns that, in turn, would lead to significant conclusions and research project recommendations.

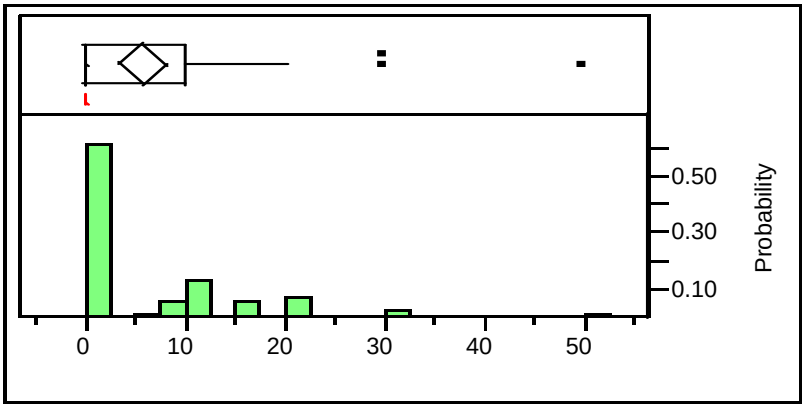
4. SURVEY RESULTS

The four objectives of the questionnaire were as follows: (1) current training practices, (2) training preferences, (3) jobsite training resources, and (4) general Hispanic workforce information.

4.1. Current Training Practices

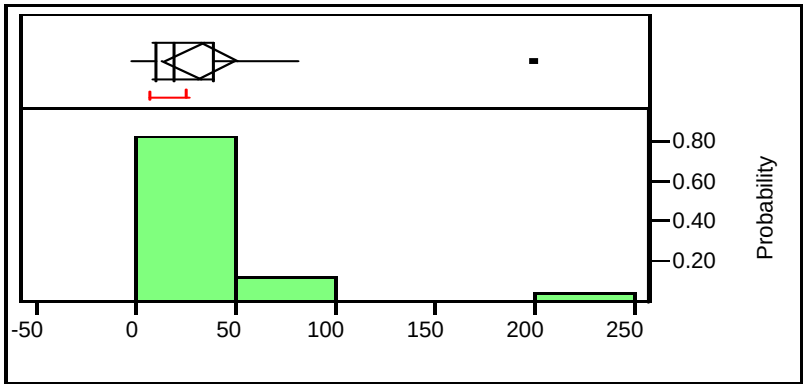
To obtain information that could facilitate to the development of the most efficient approach for delivering the courses developed to date, the questionnaire contained five specific questions (nine for American supervisors) that asked for specific details about the current training practices for Hispanic workers, American supervisors, and DOT inspectors. In this questionnaire, the distinction between formal classroom training and practical training at the jobsite was made. With this questions in place, it was found that the hours contractors spend giving formal classroom training to American supervisors is significant greater than the training given to Hispanic workers. When the three populations were asked about the average hours of formal classroom training received per year, the mean response from Hispanic workers was 5.93 hours per year. It is important to note, however, that 42 out of the 68 Hispanic workers surveyed, or 62%, responded to have had no hours of formal classroom training in the last year. In contrast, the American supervisors mean response was 25 hours of formal classroom training per year. This estimate was calculated after the omission of an outlier that responded to have had 200 hours of formal classroom training. Even though it was projected DOT inspectors received the most formal training out of the three populations, its average of 24 hours of formal training per year leads to the conclusion that this estimate is not significant. The main explanation for this phenomenon is the small sample of five surveyed DOT inspectors. Even though its p-value of 0.0217 suggests significance at the 5% level, variation for the five samples is too great to make accurate predictions.

When Hispanic workers were asked about the training time spent either in a formal classroom or on the jobsite, the response was that, on average, 79.2% of the training was given at the jobsite while 17.7% of the training was given in a formal classroom. Because the previous response showed a low number of yearly hours of formal classroom training, the hours of formal classroom training was regressed on this high percentage of time training at the jobsite. A negative and moderate correlation value (r-square 0.2315) consistent with our findings suggests that an average increase in training at the jobsite will result in a decrease in the average formal classroom training. The number of hours of formal classroom training per year for American supervisors and Hispanic workers is illustrated in Figures 4.1 and 4.2.



Mean	5.9264706
Std Dev	9.5469245
Std Err Mean	1.1577346
upper 95% Mean	8.2373186
lower 95% Mean	3.6156226
N	68

Figure 4.1. Distribution of average hours of formal training for Hispanic workers



Mean	32.913043*
Std Dev	41.085181
Std Err Mean	8.5668524
upper 95% Mean	50.679608
lower 95% Mean	15.146479
N	23

*This was estimated without the omission of the outlier

Figure 4.2. Distribution of average hours of formal training for American supervisors

To collect more data that could assist in determining the current training practices contractors prefer for their employees, four more questions of this sort were asked to American supervisors. It was found that, on average, American supervisors take charge of eight Hispanic workers per crew. The average time span during which these American supervisors have been working with Hispanic workers is eight years. In addition, American supervisors answered that, on average, 82.25% of the training given to Hispanic workers takes place on the job. This result is reliable compared to the prior result of 79.2% when Hispanic workers were asked to estimate the time spent in training at the jobsite. Finally, 96% of American supervisors said that Hispanic workers received most of their training during working hours.

4.2. Training Preferences

To obtain more information that could facilitate the development of the most efficient approach for delivering the courses developed to date, the questionnaire contained 10 specific questions (15 for American supervisors) focused on giving explicit details about the training preferences

for Hispanic workers, American supervisors, and DOT inspectors. These questions were intended to provide a better understanding of the methods, times and seasons, and the locations that would help these courses be delivered more effectively.

In the case of Hispanic workers, 34 out of 68 (50%) responded that the best day to receive training is Monday. In addition, 21% (the second largest response) of Hispanic workers said that any day is preferred to receive training. Likewise, the majority of American supervisors and DOT workers expressed the same preference, but with the difference that most American supervisors said that any day is fine to receive training. However, when American supervisors were asked about the best day on which to train Hispanic workers, 43% said Monday and 26% (the second largest response) said that any day to be preferred.

Interestingly, the great majority, 78.3%, of the three populations said that the preferred time of the day to receive training is in the morning. Even more convincing, 87% of American supervisors prefer to have their Hispanic workers trained in the morning.

Both Hispanic workers' and American supervisors' preferences for training Hispanic workers show strong similarities. However, when the question was asked of the preferable time of the year to receive training, variation in responses among groups and within groups is predominant, as shown in Table 4.1. While 30.8% of Hispanic workers favor the option of being trained during the summer, only 16.6% of American supervisors seemed to prefer that their Hispanic workers be trained during the summer. However, when American supervisors were asked the preferred season for their own training, 4.1% of them responded during summer season or during the construction season. It is reasonable to think that this percentage difference of 12.5% (= 16.6%-4.1%) in the American supervisor's response may depict the need for urgent training of Hispanic workers. Although most American supervisors, 50%, preferred that Hispanic workers be trained during the winter or off-season, American supervisors also prefer their Hispanic workers to have more opportunities for receiving training during the construction season than the American supervisors themselves have.

Lastly, the three populations were asked about the best method or approach to be applied for their training. With the intention of finding the preferred methods to use, four questions (seven for American supervisors) were developed. Two questions aimed to analyze the differences in preference between the duration of regular construction training and the duration of training as it relates to learning a foreign language. It was found that 34.4% of all three populations prefer to receive training on any topic for one to two hours, while 34.9% of all three populations prefer to receive training as it relates to learning a foreign language for three to four hours. To the question about the duration of regular construction training, 30% (the second largest percentage) of all three groups responded with "no preference." For the question about the duration of training as it relates to learning a foreign language, 30.5% of all three populations preferred one to two hours. This high demand and interest for training as it relates to learning a foreign language is evident when looking at these percentages. Even more significant, 66.67% of American supervisors said that they would like to be trained in learning a foreign language for a duration of three to four hours. Furthermore, 43.3% and another 43.3% of American supervisors said they prefer training for their Hispanic workers to last for one to two hours and three to four hours, respectively, which also suggests a strong desire for more training.

Table 4.1. Preferences regarding time of the year to receive training

Position (Population)	# Respondents	Seasons	Percentages
Hispanic workers	68	Winter	30.8
		Summer	30.8
		Anytime	38.2
American supervisors	24	Winter	54.1
		Summer	4.1
		Anytime	41.6
Am. supervisors' pref. for Hispanic workers*	24	Winter	50
		Summer	16.6
		Anytime	33.3
DOT inspectors	5	Winter	80
		Summer	0
		Anytime	20
All	97	Winter	39.1
		Summer	22.6
		Anytime	38.1

*All estimates come from Q8 in Appendix A, but this information comes from Q26.

When these three populations were asked about the best method for training, both in the classroom and on the job, an outstanding majority of 72.1% responded that they prefer face-to-face interaction with an instructor for both training in the classroom and on the job. It is remarkable that most of the respondents requested a high personalized level of instruction. This high percentage that preferred face-to-face interaction with an instructor may be a consequence of the limited knowledge about the new technologies and methods that could be used to deliver courses more efficiently.

4.3. Jobsite Training Resources

To obtain more information that would help develop the most efficient approach for delivering the courses developed to date, the questionnaire contained two simple yes or no questions that asked respondents to give detail about the availability of jobsite training resources for Hispanic workers, American supervisors, and DOT inspectors. These questions were intended to provide a better understanding of the ways new technologies could help deliver more cost- and time-effective courses.

Interestingly, 80% of Hispanic workers claimed not to have a trailer or other facility adequate for training on the jobsite. In contradiction to this finding, 70.8% of American supervisors stated that their jobsite had a trailer or other facility adequate for training. This inconsistency is intriguing and may be a result of the Hispanic or American respondents' misunderstanding of the question. To check for consistency, the DOT inspectors' estimates were observed; four of the five interviewed responded that they did not have a trailer or other facility adequate for training on the jobsite. There may also have been a misunderstanding of the word "trailer," and the DOT inspectors may have read over the option in parentheses, "(or facility)." When asked about internet access at the jobsite, 54.1% of American supervisors said "Yes," that there was internet

access. Conversely, 56% and 39.3% of Hispanic workers responded to the same question with "I don't know" and "No," respectively. These results make logical sense, as the American supervisors would be more likely than Hispanic workers to use the internet on the jobsite.

4.4. General Hispanic Workforce Information

To the determine patterns of needs, interests, and areas of opportunity for training Hispanic workers and to consider the ways this information applies to the American supervisors' desires to train their Hispanic workers, four descriptive open-ended questions (seven for American supervisors) were asked. In addition, these questions try to determine the factors and problems that prevent contractors from sending their Hispanic workers and American supervisors to receive training.

When asked what they considered to be the main problem(s) on the jobsite in terms of their own training needs, 83% of the three populations responded "language" and "little time available." A similar question was asked to American supervisors, but this question focused on the problem as it relates to Hispanic workers. An overwhelming 90.9% of the respondents said that language was the main problem on the jobsite. Tables 4.2 and 4.3 show this relationship.

Table 4.2. Jobsite problems in terms of the three populations' own training needs

Level	Count	Percent
Lack of Interest	1	0.01149
Lack of facilities for training	5	0.05747
Lack of interest	5	0.05747
Language	35	0.40230
My age	1	0.01149
No time available	1	0.01149
Time factor	38	0.43678
Willingness for company to provide training	1	0.01149
Total	87	1.00000

Table 4.3. Jobsite problems in terms of Hispanic workers' training needs

Level	Count	Percent
Availability during winter	1	0.04545
Language	20	0.90909
Time factor	1	0.04545
Total	22	1.00000

A subsequent question that asked respondents to propose solutions for these training deficiencies provided appealing results. Specifically, 53.8% of Hispanic workers believe that the solution for these problems will come with "more construction-related training in both languages for American supervisors and themselves." The second most popular solution Hispanic workers offered was to "dedicate more time on a weekly basis" to receiving these courses. These results are shown in Table 4.4.

Table 4.4. Hispanic response to possible solutions to training problems

Level	Count	Percent
Be more aware and considerate	2	0.03846
Dedicate time on a weekly basis	10	0.19231
Employ a bilingual person at the work office	1	0.01923
Have supervisors provide training	1	0.01923
Job trade during instructions	1	0.01923
Need more of facilities for training	2	0.03846
Need more training construction language worker/supervisor	28	0.53846
Provide time off for training	5	0.09615
Training after work	1	0.01923
Willingness for company to provide training	1	0.01923
Total	52	1.00000

American supervisors were asked to answer the same question in terms of their own purposes and the purposes of their Hispanic workers. In the former, American supervisors' three main proposed solutions for training deficiencies are to "commit to more training, trade jobs during training time, and provide construction-related language in both languages for Hispanic workers and American supervisors." Though learning a foreign language is important to the respondents (and represented more than 22% of the results), the significance of this statement is not clearly shown until the assessment of the latter question. In fact, 80% of American supervisors responded that providing construction-related language training in both English and Spanish for Hispanic workers and American supervisors is the most important solution for the training deficiencies that exist on the jobsite. The contrast of these two questions is shown in Figures 4.3 and 4.4.

Figure 4.3. Distribution of American supervisors' solutions to training deficiencies

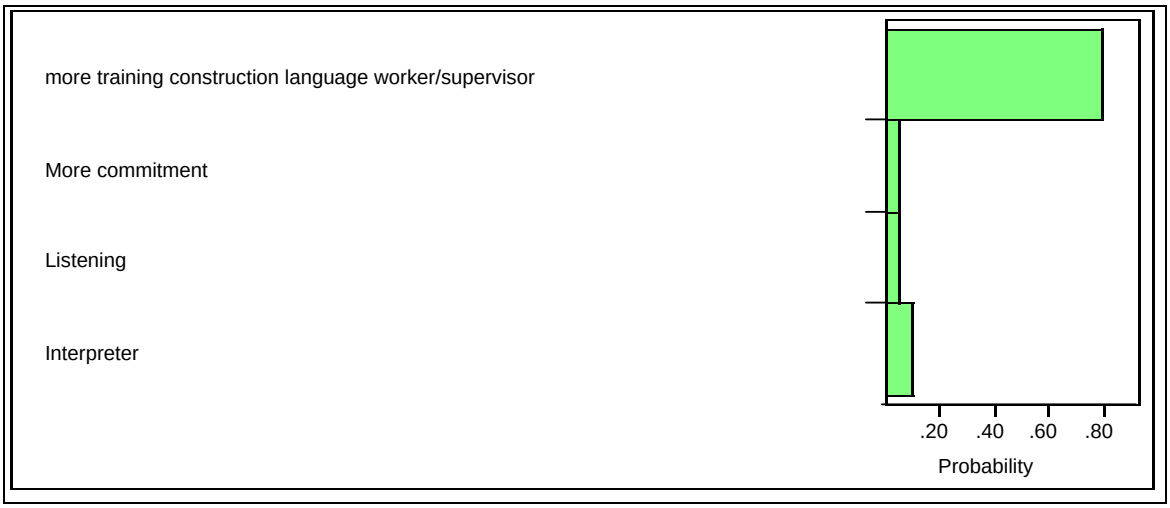


Figure 4.4. Distribution of American supervisors' response to the training deficiency of their Hispanic workers

Two final questions for the three populations asked them to provide extra comments about training preferences in terms of when and where the training should happen. Taking into account all three populations, the respondents stated that the best time to receive training is in the mornings (28.3%), the second best time to receive training is on Saturday mornings (15%), the third most common response was that there is no preference in terms of time (13%), and the fourth best time to receive training is on Mondays (9%). By the time the three populations answered this question at this point in the survey, a similar quantitative/specific question had been asked, to which 78.3% of the three populations responded that the preferred time of the day to receive training is in the morning, and 87% of American supervisors prefer to have their Hispanic workers trained in the morning. Though these results are consistent for both questions, there is evidence that by the end of the survey respondents gave major consideration to the option of receiving training on Saturdays and not only on Mondays. Only 14.7% of Hispanic workers preferred Saturdays, compared to the 50% that preferred Mondays. In addition, when American supervisors were asked about the preferred day on which to train their Hispanic workers, 43.4% responded Monday and none responded Saturday as a choice. These data suggest that questions with limited choices bring more consistent results. Moreover, it is important to note that 22.6% of all three populations said that any day is good for training.

Likewise, the three populations responded to the question about the preferred location for the training by stating "training on the jobsite" and "classroom close to the jobsite," with 41.9% and 38.7% of the response, respectively. However, it is possible that many of the individuals answering "on the jobsite" meant "classroom at the jobsite." Because this was an open-ended qualitative question, there is no way to test this hypothesis unless the question is asked again with limited options. Figure 4.5 depicts these results.

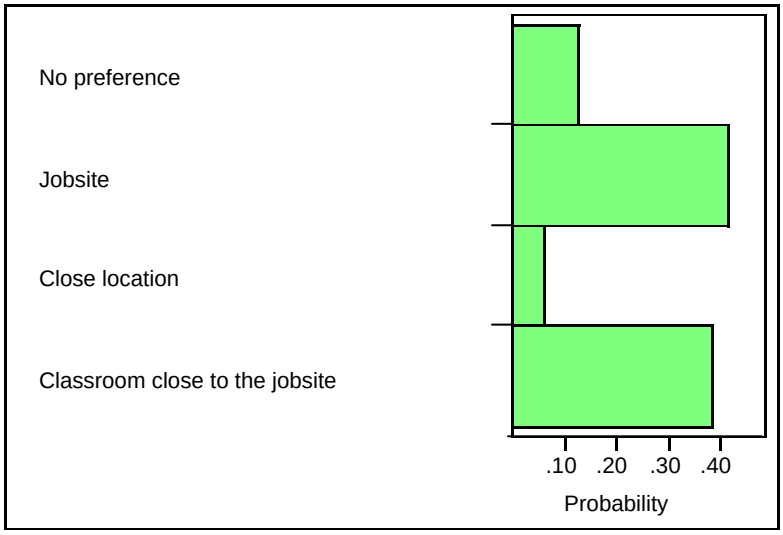


Figure 4.5. Distribution of the preferred location for training

With the intent of measuring the willingness of these three populations to take the courses developed to date, an inferential question was added to the survey. Willingness and interest in taking the courses is measured as function of miles a worker is willing to drive to receive the course. In asking this question, it was assumed that all respondents had transportation available to them. It was found that, on average, the three populations are willing to drive 72.9 miles to receive these courses. On average, Hispanic workers are willing to drive 71.2 miles, American supervisors are willing to drive 74.3 miles, and DOT inspectors are willing to drive 92.5 miles to receive these courses. Generally, it should be noted that the Hispanic workers have less income to pay for gasoline. Despite this factor, Hispanics, on average, responded that they are willing to drive as much as the other two groups to receive the training.

5. TRAINING COURSE DEVELOPMENT

5.1. Introduction

The problem addressed in Phase III of this research project involves overcoming the challenges inherent in delivering the course materials developed (i.e., the ESL and SSL courses) to the intended audiences, including Hispanic workers and American supervisors. Due to a hectic construction season in which workers put in long days and sometimes weekends to complete projects, providing the training developed in Phases I and II was a difficult task. Even though these courses were not delivered extensively, a short summary is reported below.

The intent of the ESL and SSL courses from Phases I and II is to be highly interactive and provide basic material on only the necessary information, including construction-related vocabulary, names of tools and equipment, and simple and direct language phrases to facilitate basic communication. These courses target American supervisors and Hispanic workers with a low level of second language knowledge in Spanish or English, respectively. Survey findings led researchers in Phases I and II to structure the courses such that they contain two types of instructional materials: a booklet and a visual presentation. The booklet provided to trainees consists of a list of words sorted alphabetically and organized by categories. These categories include general vocabulary (alphabet, vowels, numbers, and hand tools), resources (materials, workforce, and equipment), safety (safety equipment and safety signs), and other information (productivity, quality, and survival phrases). The visual presentation contains pictures of the words and their meanings in English and Spanish. In addition to providing "survival words," the course includes "survival phrases" that facilitate communication between Hispanic workers and American supervisors. This course is designed to be taught in one eight-hour session.

An example of the booklet is shown in Figure 5.1. The full version of the SSL and ESL courses are available by contacting the third author, Thomas Cackler.

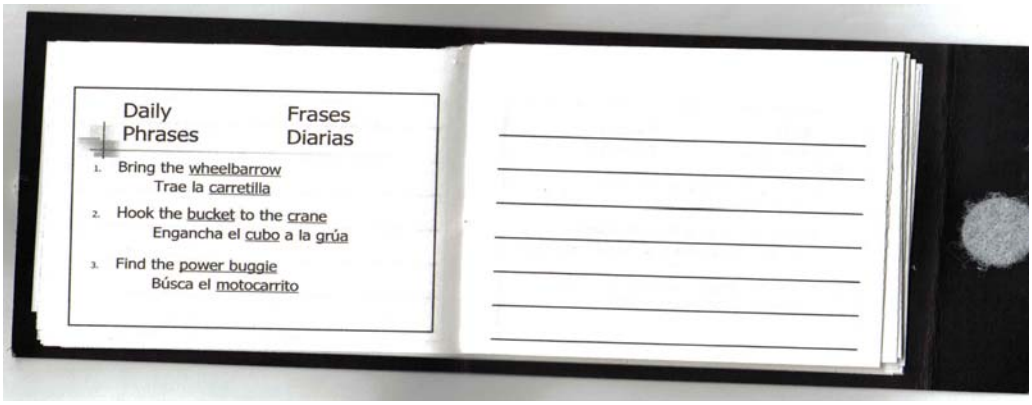


Figure 5.1. Pocket-sized booklet

In addition to language training, instructors discuss aspects of Hofstede's (1984) cultural dimensions in order to give Hispanic workers a sense of confidence that goes beyond simply

pronouncing the words correctly. By discussing these cultural dimensions, participants are sensitized to the fact that people are different, that cultural diversity exists, and that people are somehow located or belong/behave in one or more of Hofstede's dimensions.

The SSL and the ESL courses were delivered to American supervisors and Hispanic workers, respectively. Attendance for these courses was low, and the survey results from the Phase III research provide important information that suggests innovative ways to deliver the course material developed to date in a way that can reach more workers at different periods of time.

5.2. Systematic Approach to Training Course Development

As stated above, the main goal of this phase is to understand the most effective ways to deliver the courses developed during Phases I and II of the Hispanic Workforce Research Project. Initially, two sessions of the SSL course (developed in Phase II) were delivered to DOT inspectors in April of 2005 in a traditional classroom setting, as part of the agreement of the Phase III research. Overall, three face-to-face and three Iowa Communications Network (ICN) instruction sessions of the SSL course developed in Phase II were given to 15 Iowa DOT inspectors in the Cedar Rapids and Bettendorf area in March and April 2005 by Augusto Canales. These courses provided training in the areas of construction terminology, common phrases, the alphabet, numbers, and months and seasons of the year.

At about the same time, all the survey questionnaires from the Phase III research were being collected and stored. Data analyses of these surveys were performed during May and early June of 2005. Preliminary results were presented to three DOT representatives who have been involved in sponsoring this project (see Acknowledgments).

At this point in the project, the research team had only provided training sessions in a traditional classroom setting. Part of the plan of Phase III involved performing empirical research by delivering the courses on the jobsite to contractors, which had not been done before, as the literature review reports. Various construction companies working on DOT projects were contacted to find out whether any would be interested in receiving training on the jobsite in a toolbox form. One company (GUS Construction, Inc.) opened the doors for our training.

At this point, there was no specific course developed that would fit the demands of a class taught to Hispanic workers and American supervisors together on the jobsite. It was clear that this course had to be taught by a bilingual instructor, but the dynamics and best techniques to teach it were unknown. The research team then began developing what would become the Toolbox Integration Course for Hispanic workers and American supervisors (TICHA). By the end of the construction season (summer 2005), the research team taught 11 toolbox talks of 45 minutes each to one crew, which consisted of nine Hispanic workers, one American machine operator, and one American supervisor.

One clear conclusion that was drawn from these 11 toolbox sessions was the need to develop a new course that fits the toolbox environment on the jobsite. Up to this point, the sessions were provided with teaching materials from the courses developed in Phases I and II and were

customized each week by the research team according to the demands of the crew members. After finding the need for a new course with these characteristics, TICHA was formally developed by November of 2005.

5.3. Toolbox Integration Course for Hispanic workers and American supervisors (TICHA)

5.3.1. Brief Description and Course Content

Shortly after examining the survey results for Phase III, the research team created a course for the construction season. TICHA is a product of this research and has the following characteristics:

- Contains flashcards and quick references, including English and Spanish spelling and pronunciation
- Includes survival phrases
- Includes topics that go beyond language learning (e.g., cultural differences and safety)
- Is designed not to interrupt the daily operations of the American-Hispanic crews
- Has crew integration as the main goal
- Can be customized to specific projects and crew needs at the time the course is received

This course is designed to facilitate integration between Hispanic workers and American supervisors. Integration between these groups would minimize hazards and miscommunication and increase harmony and productivity on the jobsite. During daily operations, contractors could train their workers using TICHA once a week for half an hour before the working day starts or during lunch time. It is recommended that the instructor of this course be a worker in the crew. Construction crews often have a bilingual Hispanic worker and leader, known as the “link” person.

The research team followed one crew during the 2005 construction season in the state of Iowa. This crew received ten sessions of the TICHA course, which were enough for the research team to make essential inferences about and improvements to this course.

TICHA contains the following modules:

- Module 1. Construction Materials
- Module 2. Pronunciation and Alphabet
- Module 3. Hand Tools
- Module 4. Safety Equipment
- Module 5. Numbers
- Module 6. Construction Personnel
- Module 7. Construction Machinery
- Module 8. Construction Quality
- Module 9. Colors, Time, and Measurements

The vital contribution of the SSL and ESL survival courses in Phases I and II, which are separate courses, was their similarity to each other, which made it easy for the research team to put them together to form combined SSL/ESL toolbox talk material. Flashcards were a crucial element of this course. In addition, reference sheets have been created for the majority of the TICHA sessions. An example from a reference sheet is depicted in Table 5.1, and all module flashcards and reference sheets can be found in Appendices C and D. These reference sheets are mainly used for the topics containing phrases. The phrases are divided in two columns and separated by language, with the written phonetic spellings below the phrases.

Table 5.1. Sample from a reference sheet

How do you say that in English? *Jao du yu sey dat in inglish?*	¿Como se dice eso en Español? *Coe-moe say dee-say eh-so ehn Ehs-pan-yol?*
Tell the boss *tel de bos*	Dígale al jefe *Dee-ga-lae*
I need that dowel *Ai nid de daul*	Necesito esa dóvela *Nehz-eh-see-toe eh-sah dóvela*

5.3.2. Course Delivery and Evaluation

One effective way to deliver these courses to a large number of crews is to train and provide the "link" persons with the material presented above. TICHA would make a greater impact in the construction industry and in society if this practice is implemented. For topics such as cultural models and customized technical vocabulary, the research team would step in to conduct the sessions in their entirety. However, most of the sessions presented above could be learned and taught by the "link" person, as long as he/she receives the necessary knowledge and technical support required for teaching and evaluating the results of the course.

5.4. Course Delivery and Evaluation

5.4.1. On-the-Job TICHA

As described above, 11 short toolbox talks that would come to be called TICHA were delivered to a crew from GUS Construction, Inc., on five different sites from June to September of 2005. For this specific crew, Friday was found to be the preferred day, and 30 minutes before work (6:30 a.m.) was the preferred time for training. These talks were a success and, based on the experienced gained in these 11 toolbox sessions given during the construction season and the preliminary survey results from the Phase III survey, TICHA was formally developed by November of 2005.

The research team kept a journal with notes of the effects this toolbox course had on the participants. These notes record the progression of the workers and the most effective ways for teaching such toolbox courses. The following are some of the comments extracted from the journal:

- 1st session. “Hispanic workers portrayed motivation and excitement for the course, while the American supervisor seems hesitant about it. Nine out of the ten workers in this crew are Hispanic.”
- 2nd session. “American supervisor ’breaks the ice’ trying to pronounce the words in Spanish. Hispanic workers start to feel comfortable to speak after their supervisor led by example.”
- 3rd session. “A ’link’ Hispanic worker is detected, and he shows interest in taking our Stepping Up to Supervisor (SUTS) course [developed in Phase I].”
- 4th session. “‘Problems of the day’ are addressed in this session, as the American supervisor requests that the research team explain the differences in name of the three kinds of chains used in this crew. According to supervisor, some of these workers have been with him for three years and until that moment they could not hear the difference between ‘sling chain,’ ‘log chain’, and ‘long chain.’ That has been clarified to the Hispanic crew, and productivity is expected to increase.”
- 5th session. “The crew feels more tired that usual, as they had been working until late the night before. American supervisor request a quiz for the next session.”
- 6th session. “Quiz show that Hispanic workers have improved their communication ability and interaction confidence towards their American supervisor.”
- 7th session. “Oral and survey feedback was received. Results indicate that the course has been effective in the 30-minute toolbox fashion.”
- 8th session. “It was reported by a new worker that Larry surprised him on his first day on the job as he heard on the jobsite words such as ‘cuidado,’ ‘como se dice,’ and ‘traiga.’”
- 9th session. “It was noted that 80% of the workers, including the American supervisor, know about 90% of the vocabulary presented in these flashcards.”
- 10th session. “Members of the DOT onboard for this research project visit jobsite and listen to a Hispanic worker express his gratitude for the training that we have been providing. American supervisors asks the trainer to come back one more time.”
- 11th session. “Hispanic workers say that their American supervisor is less stressed out by them now after taking the courses. The research team believes this is due to the integration approach.”

Other empirical results from the survey include the following:

- American supervisors prefer their workers to receive the training half an hour before the day’s operations begin or during lunch time
- Integration instruction (i.e., cultural awareness, safety standards, improved relationships, and language instruction) should be the focus of the course and not only language instruction.
- American supervisors find the course to be a waste of time during the initial sessions, while Hispanic workers look forward to these courses.
- American supervisors, as well as Hispanic workers, find the course extremely useful and rewarding by the end the course.
- Each session of the course should not last longer than 45 minutes in order to avoid disrupting the day’s operations.

Overall, findings show increasing interaction on the jobsite between American supervisors and Hispanic workers. TICHA's main benefit, in addition to the language instruction, is encouragement for the American supervisors and Hispanic workers to interact and recognize their differences in a friendly and supervised way on the jobsite. Evaluations of this course were collected that described the course as "very helpful" and "very useful" in the everyday communication process.

The American supervisor who evaluated the TICHA delivery suggested that this course continue, as the course helped him understand how the workers think and how to manage them more effectively. Many Hispanic workers wrote in their feedback that, after going through the 11 sessions of training, they felt their relations with their supervisor improved. These are representative instances of the positive feedback received from this specific crew.

5.4.2. Classroom-Adapted TICHA

From February to April 2006, an classroom-adapted version of TICHA was formally taught to six construction companies and one group of DOT inspectors. The audience for this course mostly included American supervisors interested in learning more Spanish construction language and other integration-related topics, such as cultural differences, safety expectations in Latin American countries, and other issues related to communication. The following entities participated in the classroom-adapted TICHA:

- Concrete Foundations
- Absolute Construction
- Mannatts Construction (Ames)
- Mannatts Construction (Manaska County)
- Kareth Construction
- Schmidt Construction Co., Inc.
- DOT inspectors, Manaska County

All of these groups received a total of eight hours of training. Some of them preferred to receive the eight hours in one long session, in two sessions of four hours each, or in four sessions of two hours each. It was found that the most effective formal instruction is experienced when the course is taught in four or two sessions instead of one large session of eight hours.

5.4.3. Train the Trainer and Flagger Courses

A "train the trainer" course named "Teaching How to Teach TICHA" has been partially developed. This course intends to prepare the "link" person of different crews to deliver the TICHA course effectively and to track its contributions. At the moment, it is not clear whether there is strong demand for this type of course, but the research team strongly believes this approach could have outstanding results when trying to train several crews around Iowa.

The research team also had the opportunity to teach a flaggers course to the Hispanic workers of Concrete Foundations during the first week of April 2006. This course was taught by a certified

trainer in English along with the research team, which provided the translation of course materials in Spanish. Upper management personnel of this company argued that they did not "know how all the other contractors could teach this course without translation services." In light of this comment, it was found that during an earlier flagging course none of the Hispanic laborers undertook the session. For the flagger course in both English and Spanish, however, Hispanic workers and upper management were pleased with the service provided, and the Hispanic workers have now been properly trained to perform the important task of flagging.

5.5. Concluding Remarks

There has been a natural progression in the development of the Phase III research. During the survey development and data collection, DOT inspectors received Spanish language training. Later, after the survey results were analyzed, the research team went on to teach a customized course at a construction jobsite to one construction crew with nine Hispanic workers. Conclusions were drawn from the results of both the survey and the training sessions. Finally, a formal course whose main focus is integration was developed (TICHA). This course can be adapted to traditional classroom settings as well as toolbox talks on the jobsite. During this progression of events, the research team reached the goal of finding the most effective way to teach the material developed to date in two learning environments.

6. CONCLUSIONS AND RECOMMENDATIONS

As part of the analysis and evaluation of the survey results, the data from the Hispanic workers in Phases I and II were taken into consideration. Key survey results reaffirm the need for Hispanic workers and American supervisor to be integrated by using the developed courses in a more effective way. The results are as follows:

Current Training Characteristics

- Eighty-nine percent of the Hispanic workers had no classroom training in the past year.

Training Preferences

- Fifty-four percent of the American supervisors preferred winter training (42% said any time of year; 4.1% preferred the summer). Hispanic workers were evenly divided on this question (31% winter, 31% summer, and 38% anytime).
- A majority of American supervisors felt that Monday would be the best day to train Hispanic workers.
- Eighty-seven percent of American supervisors felt that mornings would be best for training the Hispanic workers.
- Seventy-two of the respondents preferred face-to-face training for either classroom or on-the-job training, implying a desire for a high level of personalized instruction.

Training Resources

- Seventy-one percent of American supervisors said that a trailer or facility adequate for training was available onsite.

Barriers to Training

- Eighty-three percent of the respondents felt that “language” and “little time available” were the two primary barriers to training.

Solutions to Training Problems from Hispanic workers

- Fifty-four percent of Hispanic workers feel that the solution for these problems involves “more construction-related training in both languages for American supervisors and themselves.”
- Twenty percent of the Hispanic workers felt that “dedicating more time on a weekly basis” would be important.

Solutions to Training Problems from American Supervisors

- Thirty-four percent said that “more commitment” on their part was necessary as a solution.
- Twenty-five percent said “more language training” is needed “for both worker and supervisor.”

In conclusion, it would be quicker, more cost-effective, and easier to train American supervisors and Hispanic workers at the same time using the integration approach rather than the language approach used in earlier phases. This new approach allows the crew to “break the ice,” which is

necessary in crews where two or more cultures are represented. In the case of Hispanic workers and American supervisors, the integration approach using TICHA has proven successful, and contractors in Iowa would benefit in taking advantage of this course.

For the success of these courses, it is recommended that the course be delivered by individuals who possess multicultural experience in the construction industry, specifically Hispanic and American cultures, and who are fluent in both English and Spanish. This will provide the participants with a good understanding of the differences between the two cultures and encourage interaction in the classroom through real experiences. The courses must also fit the contractors' work schedules or seasons. For example, the TICHA course was best taught before the work operations started or during lunch, while the classroom setting version of this course was taught immediately before the construction season began in order for the participants to retain the knowledge as long as possible.

These courses are mostly suited for construction companies that employ a large percentage of Hispanic workers and work mostly in DOT construction projects, but the courses could be adapted to other industries as well as other types of construction operations. Contracting companies should be the driving force behind the implementation of these training programs, since upper management involvement and support plays a big role in the success of the program.

As the Literature Review reports, the TICHA integration approach of delivering training is unique in its kind. The authors suggest that these courses be taken by construction companies who have four or more Hispanic workers in their crews.

Further research will be performed to understand the impact of this TICHA course in terms of productivity and accident rates. More research will also be performed to understand the best ways for Hispanics to learn English and American supervisors to learn Spanish. If the effect of the training is found to be highly significant, contractors will have greater motivation to train their crew with our training.

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APPENDIX A. QUESTIONNAIRE IN ENGLISH

ESL/SSL TRAINING

Questionnaire for Construction Employees: Iowa DOT Inspectors. Contractor's Supervisors and Hispanic Employees

Conducted by: Iowa State University and the Iowa Department of Transportation

Date:_____

Anonymity: Your answers to the following questions will be completely anonymous and the results will be held strictly confidential and will be used for statistical purposes only and not linked to the respondent.

General Objective:

The main objective of this survey is to determine the level of interest, and best method for training Contractor employees and Iowa DOT inspectors. This training would be based on the needs, interests and preferences as they relate to the delivery of Construction Communication Spanish/English to Contractors Supervisors, their Hispanic workers and Iowa DOT inspectors who deal directly or indirectly with those Hispanic workers. These assessments will help develop the appropriate methods, timing and technology suitable for effective delivery of training courses aimed to creating a starting point for each population to begin learning the basics of how to communicate with other.

Specific Objectives

1. Determine current training practices for contractor's employees.
2. Determine current training practices for Iowa DOT's employees
3. Determine the contractor's preferences for training employees (e.g. classroom, on-the-job, INC), during or off work hours.
4. Identify the contractor's resources for on-the-job training (e.g. trailer, classroom)
5. Determine patterns of needs, interests, and areas of opportunity for training.
6. Determine the factors and problems that prevent the contractor and DOT from training employees

Note: This questionnaire will take approximately 15-20 minutes to complete.

Respondent Information

Name (optional): _____
Job title: _____
Company: _____
Phone No.: Office (optional):_____Mobile (optional): _____
Email (optional): _____
Gender (please circle one): 1=Male 2=Female
Question for Iowa DOT and the Contractor Supervisors: Frequency of interaction with Hispanic construction workers (# interactions per week) _____(#)

Current Training Practices

1. How many hours (average) of formal classroom training do you typically receive per year?

   _____(hours)

2. How many years ago did you begin receiving this formal training?

   _____(years)

3. Where do you typically receive training? Please identify the percentage of time spent in a formal classroom or on the jobsite. If you received all of your formal training in the classroom, then place a "0" in the "% of time on the jobsite" and "100" in the "in a classroom".

4. % of time on the jobsite_____ % in a classroom setting_____

5. When do you usually receive training?

   1= during work hours 2= after work hours

6. What is your best day of the week to receive training?

   1= Monday 2= Tuesday 3= Wednesday 4= Thursday 5=Friday

   6= Saturday 7= Sunday

7. At what time of the day would you prefer to have training

   1= Morning 2= Afternoon 3= Evening after work

8. At what time of the year do you prefer to have training?

   1= Winter break 2= Afternoon 3= Anytime

   If you answered 3, please explain: _____

---

9. What would be your preference as it relates to the duration of training on any topic per any given event?

   1= 1-2 hrs 2= 3-4 hrs 3= 4-8 hrs 4= no preference

10. What would be your preference as it relates to the duration of training as it relates learning a foreign language per any given event?

    1= 1-2 hrs 2= 3-4 hrs 3= 4-8 hrs 4= no preference

11. If your method for training is the classroom, indicate your best preference for training.

    1= Face-to-face with the instructor
    2= INC/Videoconferencing
    3= Either of the above

12. If your method for training is on-the-job, indicate your best preference for training.

    1= Face-to-face with the instructor
    2= Video Streaming; synchronous (to your computer at the same time instructor presents material)
    3= Video Streaming; asynchronous (to your computer using prerecorded materials)
    4= INC/ Videoconferencing
    5= Any of the above

13. How far would you be comfortable traveling to receiving training?

_____(miles)

14. Do you have a trailer (or facility) adequate for training on the jobsite?

    1= Yes 2= No

15. Do you have access to the internet at the jobsite?

    1= Yes 2= No 3= I do not know

General Questions

16. What do you consider to be your main problem(s) on the job site as they relate to your own training needs?

17. What solution(s) do you propose to solve any training deficiencies that exist (if any)? Please mention times, places, methods, and other solutions, as appropriate

18. What is your training preference as it relates to when and where?

19. Would you like to make any additional comment/suggestions?

If you are an American construction supervisor, please go to question 20. Otherwise, you are done with the survey. Thank you for your participation.

Please send completed survey to:

Iowa Department of Transportation Employee:
Craig Russell
800 West Lincoln Way
Ames, Iowa 50010
Phone: (515) 294-1422
Email: craig.russell@dot.state.ia.us

Hispanic Employees:
Dr. Edward Jaselskis
450 Town Engineering Building
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-7531
Email: ejaselsk@iastate.edu

Additional Questions for Construction Supervisors

Hispanic Workforce Information

20. How many workers do you typically have in your crews?

_____(#)

21. How long have you supervised Hispanic workers?

_____(#)

22. Where do you typically provide training to your Hispanic workers?

1= % on the jobsite_____ 2= % in the classroom_____

23. When do they usually receive training?

1= during work hours 2= after work hours

24. What do you consider is the best day to provide training to your Hispanic workers?

1= Monday 2= Tuesday 3= Wednesday 4= Thursday 5= Friday
6= Saturday 7= Sunday

25. At what time of the day would you prefer to have them trained?

1= Morning 2= Afternoon 3= Evenings

26. At what time of the year would you prefer to have them trained?

1= Winter Break 2= Construction Season 3= Anytime

27. What would be your preference as it relates to the duration of training for your Hispanic workers on any topic per any given event?

1= 1-2 hrs 2= 3-4 hrs 3= 4-8 hrs 4= no preference

28. If your method for training is the classroom, indicate your best preference for training.
1= Face-to-face with the instructor
2= INC/Videoconferencing
3= Either of the above

29. If your method for training is on-the-job, indicate your best preference for training.

1= Face-to-face with the instructor
2= Video Streaming; synchronous (to your computer at the same time instructor presents material)
3= Video Streaming; asynchronous (to your computer using prerecorded materials)
4= INC/ Videoconferencing
5= Any of the above

30. How far would be convenient for your workers to travel to receive training?

_____(miles)

General Questions

31. What do you consider to be your main problem(s) on the job site as they relate to training Hispanic workers?

32. What solution(s) do you propose to solve any training deficiency (if any)? Please mention times, places, methods, and other solutions, as appropriate

33. What is your training preference as it relates to when and where?

Your participation is greatly appreciated…

THANK YOU

Please send your completed survey to:
Dr. Edward Jaselskis
450 Town Engineering
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-0250
Email: ejaselsk@iastate.edu

APPENDIX B. QUESTIONNAIRE IN SPANISH

ENTRENAMIENTO ESL/SSL

Cuestionario Para Empleados en Construcción: Inspectores de Iowa DOT. Supervisores y Trabajadores Hispanos en Constructoras

Conducido por: Iowa State University y el departamento de transportación. Fecha:_____

Anonimato: Las respuestas a las siguientes preguntas serán guardadas en su anonimato y sus resultados va a ser guardados estrictamente para usos de estudio estadísticos y que no están relacionados con el participante..

Objetivo General:

El objetivo principal de esta encuesta es de determinar el nivel de interés, y la mejor metodología a emplearse para ofrecer entrenamiento a trabajadores en constructoras y a los inspectores del DOT. Estas respuestas ayudaran a desarrollar métodos apropiados, su tecnología y coordinación, que será los indicados para brindar efectivas charlas que ayuden con lo básico que ayudara a que los participantes mejores las comunicaciones entre ellos.

Objetivos Principales

1. Determinar las prácticas actuales de entrenamiento de las constructoras.
2. Determinar las prácticas actuales de entrenamiento de empleados de Iowa DOT.
3. Determinar las preferencias de constructoras sobre el lugar, método y momento ideal para recibir entrenamiento.
4. Identificar los recursos de constructoras para dar cursos en el lugar de trabajo.
5. Determinar los patrones de interés, necesidades y áreas oportunas de entrenamiento.
6. Determinar factores y problemas que previenen a constructoras y inspectores de DOT a recibir el entrenamiento.

Nota: Esta encuesta tomara aproximadamente 15 minutos en completar.

Información del Entrevistado

Nombre (opcional): _____
Titulo de puesto: _____
Compañía: _____
Tel. No.: Oficina (opcional):_____Celular (opcional): _____
Email (opcional): _____
Sexo (colocar circulo): 1=Masculino 2=Femenino

Practicas Actuales

34. ¿Cuantas horas (promedio) de entrenamiento formal en un salón de clase recibes típicamente cada ano?

_____ (horas)

35. ¿Cuantos anos hace que empezaste a recibir esta capacitación formal?

_____ (anos)

36. ¿Donde recibes típicamente la capacitación? Por favor indetificar el porcentaje de tiempo que pasas capacitándote en un salón formal o en la obra. Si tu recibes toda tu capacitación formal en un salón, entonces coloca un "0" en el "% de tiempo en la obra" y un "100" en el "en un salón de clase".

37. % de tiempo en la obra_____% de tiempo en salón de clase_____

38. ¿Cuando recibes típicamente capacitación?

1= durante horas de trabajo 2= después de horas de trabajo

39. ¿Cual es el mejor día para recibir capacitación?

1= Lunes 2= Martes 3= Miércoles 4= Jueves 5= Viernes

6= Sábado 7= Domingo

40. A que hora del día preferirías recibir capacitación?

1= Mañana 2= Tarde 3= después de horas de trabajo

41. En que periodo del ano prefieres recibir capacitación?

1= Receso de invierno2= Temporada de construcción 3= Cualquier rato
Si respondiste 3, por favor explica:_____

42. ¿Cual es tu preferencia en cuanto a la duración de la capacitación en cualquier tópico por evento?

    1= 1-2 hrs 2= 3-4 hrs 3= 4-8 hrs 4= no preferencia

43. ¿Cual es tu preferencia en cuanto a la duración de la capacitación por evento para aprender un idioma extranjero?

    1= 1-2 hrs 2= 3-4 hrs 3= 4-8 hrs 4= no preferencia

44. Si tu método de capacitación es el salón de clase, indica cual es tu preferencia para capacitarte..

    1= Cara-a-cara con instructor
    2= INC/Videoconferencia
    3= Cualquiera de los dos

45. Si tu método de capacitación es en la obra, indica cual es tu preferencia para capacitarte.

    1= Cara-a-cara con instructor
    2= Video; sincronizado (a tu computadora el mismo tiempo que el instructor presenta el material.
    3= Vide; no sincronizado (a tu computadora usando material pregrabado).
    4= INC/ Videoconferencia
    5= Cualquiera de los de arriba

46. ¿Que tan lejos te sentirías cómodo viajando para recibir la capacitación?

_____(millas)

47. ¿Tienes un trailer (instalación) adecuada para recibir capacitación en la obra?

    1= Si 2= No

48. ¿Tienes acceso al Internet en el lugar de trabajo?

    1= Si 2= No 3= No se

Preguntas Generales

49. ¿Cual consideras que es tu principal problema(s) en la obra en relación a tus necesidades de capacitación?

50. ¿Que solución(es) propones para resolver cualquiera de las deficiencias de capacitación (si existen)? Por favor menciona tiempos, lugares, métodos, y otras soluciones como consideres adecuado.

51. ¿Cual es tu preferencia de capacitación con relación al “cuando” y al “donde”?

52. ¿Te gustaría agregar comentarios y/o sugerencias adicionales?

Favor enviar la encuesta a:

Dr. Edward Jaselskis
450 Town Engineering Building
Iowa State University
Ames, Iowa 50011
Phone: (515) 294-7531
Email: ejaselsk@iastate.edu

APPENDIX C. TICHA INTRODUCTION

Toolbox Integration Course for Hispanic Workers and American Supervisors

Sponsored by the Iowa Department of Transportation
Prepared by Iowa State University

Project Background

The overall Hispanic Workforce Research Project includes three phases:

- Phase I. Construction Language Course for American Supervisors
- Phase II. Construction Language Course for Hispanic Workers
- Phase III. Toolbox Integration Course for Hispanic Workers and American Supervisors

TICHA Overview

The Toolbox Integration Course for Hispanic Workers and American Supervisors (TICHA) contains the following modules:

- Module 1. Construction Materials
- Module 2. Pronunciation and Alphabet
- Module 3. Hand Tools
- Module 4. Safety Equipment
- Module 5. Numbers
- Module 6. Construction Personnel
- Module 7. Construction Machinery
- Module 8. Construction Quality
- Module 9. Colors, Time, and Measurements

TICHA Features

TICHA offers the following:

- Contains flashcards and quick references, including English and Spanish spelling and pronunciation
- Includes survival phrases
- Touches topics that go beyond language learning (e.g., cultural differences and safety)
- Designed to minimize interruptions in daily operations of the American-Hispanic crews
- Has crew integration is the main goal
- Can be customized to specific project and crew needs at the time the course is received

Using TICHA

In the everyday operations, contractors could train their workers using TICHA once a week for half an hour before the working day starts or during lunch time. It is recommended that the instructor of this course be a worker in the crew. Construction crews often have a bilingual Hispanic worker and leader, known as the “link” person.

Benefits

This course is designed to facilitate integration of the Hispanic worker and the American supervisor. Integration between these groups would minimize hazards and miscommunication and increase harmony and productivity on the jobsite.

APPENDIX D. TICHA MODULES

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 1. Construction Materials

Sponsored by the Iowa Department of Transportation

Prepared by

IOWA STATE UNIVERSITY

Center for Transportation Research and Education
Department of Civil, Construction, and Environmental Engineering

Aluminum

Alúminom

Aluminio

Ah-loomi-neeo

TICHA Module 1, Flashcard 1

Block

Bloc

Bloque

Block-ay

TICHA Module 1, Flashcard 2

Brick

Bric

Ladrillo

La-dree-yo

TICHA Module 1, Flashcard 3

Cement

Cemént

Cemento

Ceh-mén-to

TICHA Module 1, Flashcard 4

Concrete

Con-creet

Concreto

Con-cray-to

TICHA Module 1, Flashcard 5

Dirt / Dust

Dert / Duhst

Tierra / Polvo

Tee-eh-rra / Pol-vo

TICHA Module 1, Flashcard 6

Lumber

Luhm-bur

Madera

Mahd-ehr-ah

TICHA Module 1, Flashcard 7

Mortar

Mor-tur

Mortero

More-téro

TICHA Module 1, Flashcard 8

Nails

Nayls

Clavos

Klah-bows

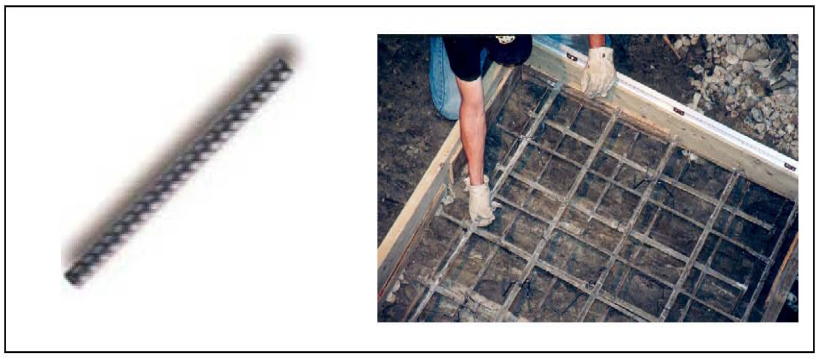
TICHA Module 1, Flashcard 9

Rebar

Ree-bar

Varilla

Vah-ree-ya



TICHA Module 1, Flashcard 10

Sand

Sand

Arena

Ah-ray-nah

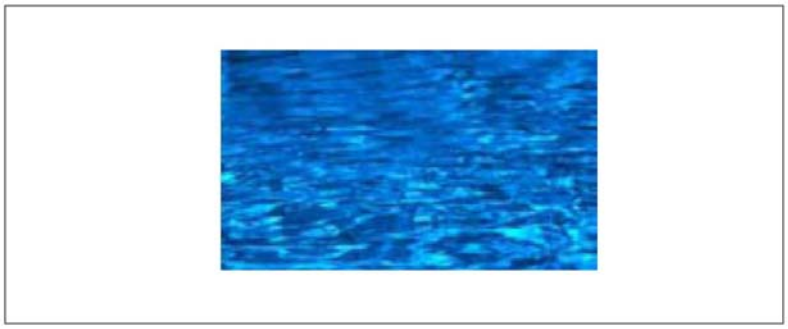
TICHA Module 1, Flashcard 11

Water

Wah-tur

Agua

Ah-gwa



TICHA Module 1, Flashcard 12

Module 1. Construction Materials

Aluminum Alúminom	Aluminio Ah-loomi-neo
Block Bloc	Bloque Block-ay
Brick Bric	Ladrillo La-dree-yo
Cement Cemént	Cemento Ceh-mén-to
Concrete Con-creet	Concreto Con-cray-to
Dirt / Dust Dert / Duhst	Tierra / Polvo Tee-eh-rah / Pol-vo
Lumber Luhm-bur	Madera Mahd-ehr-ah
Mortar Mór-tur	Mortero More-téro
Nails Nayls	Clavos Klah-bows
Rebar Ree-bar	Varilla Vah-ree-ya
Sand Sand	Arena Ah-ray-nah
Water Wah-tur	Agua Ah-gwa
What is your name? Wat is iour neim?	¿Cómo se llama? Com-oh seh ee-ama?
What is your address? Wat is iour adress?	¿Cuál es su dirección? Koo-ahl ehs zoo dee-rectión?
How old are you? Jao old ar iu?	¿Qué edad tiene? Ke eh-dad tee-ene?
Sign here Sain jier	Firme aquí Firm-eh ah-kee
Do you have a driver's license? Du iu jav ai draivers laicens?	¿Tiene licencia de conducir? Tee-eh-neh lee-sen-seea the con-doo-sir?
Do you speak English? Du iu espic inglish?	¿Habla Inglés? Ah-bla een-glés?
Do you understand English? Du iu anderstand inglish?	¿Comprende usted Inglés? Com-prehn-deh oos-ted een-glés?
Do you write English? Du iu ruait inglish?	¿Escribe usted Inglés? Es-cree-beh oos-ted een-glés?
Who do we call in case of emergency? Ju du wi col in keis if emeryensi?	¿A quien llamamos en caso de emergencia? Ah kee-en yah-mah-mos ehn cah-soh the eh-mer-hencia?
What is your social security number? Wat is iour social sekiurity namber?	¿Cuál es su número de seguro social? Koo-ahl ehs zoo noó-meh-roh the seh-goo-roh soh-ciál?

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 2. Pronunciation and Alphabet

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Department of Civil, Construction, and Environmental Engineering

Pronunciación en Inglés

- "ch" se pronuncia como "sh" en *Sasha*
- "h" se pronuncia como "j" en *jarra*
- "y" se pronuncia como "ia" en *iato*
- "i" se pronuncia como "ae"
- "o" se pronuncia como "ou"
- "u" se pronuncia como "iu"

TICHA Module 2, English Flashcard 1

Aggregate Agregado

Agreget

TICHA Module 2, English Flashcard 2

Bag Saco

Bag

TICHA Module 2, English Flashcard 3

Carpenter Carpintero

Carpenter

TICHA Module 2, English Flashcard 4

Dig Excavar / Escarbar

Deg

TICHA Module 2, English Flashcard 5

Equipment Maquinaria

Iquipment

TICHA Module 2, English Flashcard 6

Fence Barda / Cerca

Fens

TICHA Module 2, English Flashcard 7

Glass

Glas

Vidrio

TICHA Module 2, English Flashcard 8

Hardhat

Jard jat

Casco

TICHA Module 2, English Flashcard 9

Inch

Pulgada

Inch

TICHA Module 2, English Flashcard 10

Jack

Gato (Hidraulico)

Yac

TICHA Module 2, English Flashcard 11

Knife Cuchillo / Navaja

Naif

TICHA Module 2, English Flashcard 12

Ladder Escalera

Lader

TICHA Module 2, English Flashcard 13

Masonry Albañilería

Meisonry

TICHA Module 2, English Flashcard 14

Noise Ruido

Nois

TICHA Module 2, English Flashcard 15

Oil

Oiol

Aceite / Petroleo

TICHA Module 2, English Flashcard 16

Pavement

Peivment

Pavimento

TICHA Module 2, English Flashcard 17

Road

Roud

Camino / Vía

TICHA Module 2, English Flashcard 18

Scaffolding

Scafolding

Andamio

TICHA Module 2, English Flashcard 19

Utilities

Iutilitis

Servicios

TICHA Module 2, English Flashcard 20

Water

Guater

Agua

TICHA Module 2, English Flashcard 21

Yield

Ield

Ceder

TICHA Module 2, English Flashcard 22

Zone

Zoun

Zona

TICHA Module 2, English Flashcard 23

Spanish Pronunciation

- "I" is pronounced as "ee" in *feet*
- "u" is pronounced as "oo" in *pool*
- "h" is always silent
- "J" is pronounced as "h" in *hen*
- "Ñ" is pronounced as "ny" in *canyon*
- "y" alone is pronounced as ee
- "y" in a word is pronounced as "j" in *jar*

TICHA Module 2, Spanish Flashcard 1

Aggregate

Agregado

Ah-gre-ga-do

TICHA Module 2, Spanish Flashcard 2

Barrier

Barrera

Bah-rray-ra

TICHA Module 2, Spanish Flashcard 3

Footing

Cimiento

See-mee-en-to

TICHA Module 2, Spanish Flashcard 4

Defect

Defecto

Deh-fec-toe

TICHA Module 2, Spanish Flashcard 5

Dig

Excavar / Escarbar

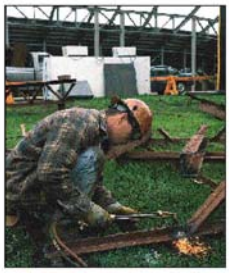
Ex-ca-var / Es-car-bar

TICHA Module 2, Spanish Flashcard 6

Ironworker

Fierrero

Fee-eh-rero



TICHA Module 2, Spanish Flashcard 7

Jack

Gato

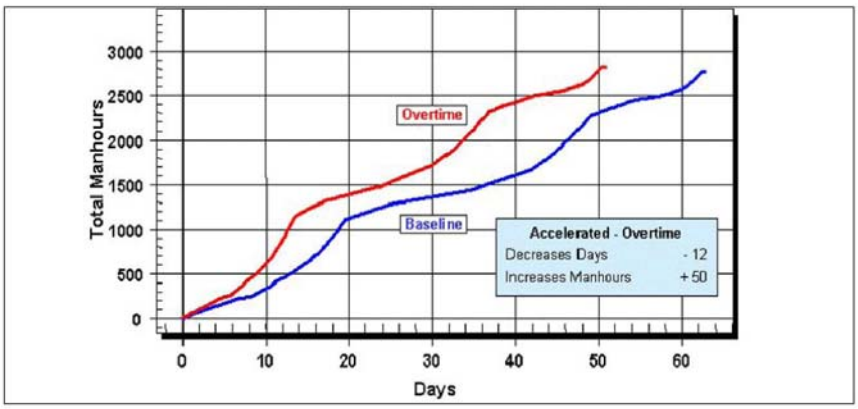
Ga-toe

TICHA Module 2 , Spanish Flashcard 8

Overtime

Horas Extras

Oh-ras Extras



TICHA Module 2, Spanish Flashcard 9

Inspection

Inspección

Ins-pec-see-on

TICHA Module 2, Spanish Flashcard 10

Boss

Jefe

He-fe

TICHA Module 2, Spanish Flashcard 11

Equipment

Maquinaria

Maki-na-ria

TICHA Module 2, Spanish Flashcard 12

Laborer

Obrero / Peón

Oh-bre-roe/Peh-ón

TICHA Module 2, Spanish Flashcard 13

Inch

Pulgada

Pool-ga-da

TICHA Module 2, Spanish Flashcard 14

Noise

Ruido
Ru-ee-do

TICHA Module 2, Spanish Flashcard 15

Utilities

Servicios
Ser-vee-seeos

TICHA Module 2, Spanish Flashcard 16

Glass

Vidrio
Vi-dree-o

TICHA Module 2, Spanish Flashcard 17

Zone

Zona
So-na

TICHA Module 2, Spanish Flashcard 18

Module 2. Pronunciation and Alphabet

Hello *Jelou*	Hola *Oh-la*
What is your name? *Guat is ior neim*	¿Cual es su nombre? *Koo-ahl ehs soo nohm-breh*
How do you say that in English? *Jao du yu sey dat in inglish?*	¿Como se dice eso en Español? *Coe-moe say dee-say eh-so ehn Ehs-pan-yol?*
I do not understand/ I understand *Ai du not anderstand/Ai anderstand*	No entiendo/Entiendo *No ehn-tee-ehn-doe/ ehn-tee-ehn-doe*
Watch out! *Watch aut!*	Cuidado *Kwee-dáh-doe*
Please *Plis*	Por favor *Pour fah-vore*
Thank you *Denkiu*	Gracias *Gráh-see-ahs*
Dangerous *Denyeros*	Peligroso! *Peh-lee-grów-so*
Yes *Ies*	Si *See*
Good Morning *Gud mourning*	Buenos días Buh-eh-nose dee-ahs

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 3. Hand Tools

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Bender
Bender

Doblador
Doh-blah-door

TICHA Module 3, Flashcard 1

Broom

Brum

Escoba

Es-koh-bah

TICHA Module 3, Flashcard 2

Bucket

Baket

Cubeta

Koo-bay-ta

TICHA Module 3, Flashcard 3

Cutter

Cater

Cortador

Cor-ta-door

TICHA Module 3, Flashcard 4

Floats

Flouts

Llanas

Ja-na

TICHA Module 3, Flashcard 5

Hammer

Jamer

Martillo

Mar-tee-yo

TICHA Module 3, Flashcard 6

Level

Level

Nivel

Knee-vel

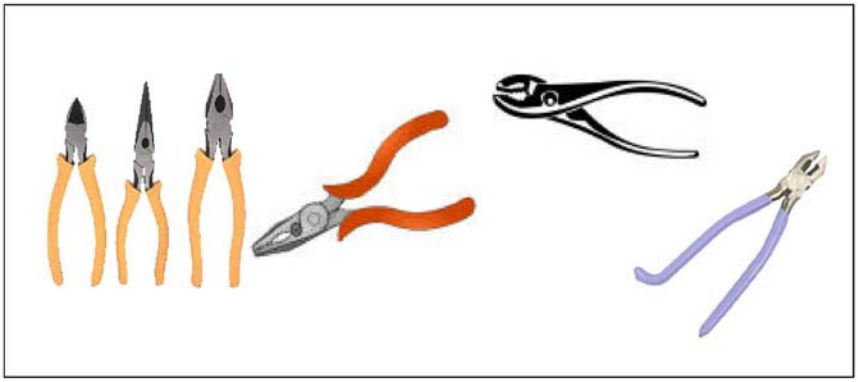
TICHA Module 3, Flashcard 7

Pliers

Plaiers

Pinzas

Peen-sas



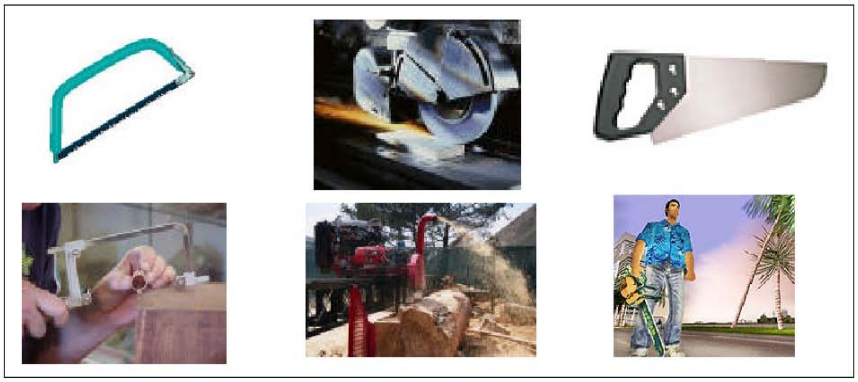
TICHA Module 3, Flashcard 8

Saw

So

Serrucho

Say-rroo-cho



TICHA Module 3, Flashcard 9

Screwdriver
Scrudraiver

Desarmador
Des-ar-ma-door

TICHA Module 3, Flashcard 10

Shovel
Shavol

Pala
Pa-la

TICHA Module 3, Flashcard 11

Tape (to measure) Cinta (métrica)

Teip (to meshure) Seen-ta (may-tree-ca)

TICHA Module 3, Flashcard 12

Module 3. Hand Tools

Bender Bender	Doblador Doh-blah-door
Broom *Brum*	Escoba *Es-ko-ba*
Bucket *Baket*	Cubeta Ku-be-ta
Cutter Cater	Cortador Cor-tah-door
Floats *Flouts*	Llanas *Ee-ah-nahs*
Hammer *Jamer*	Martillo *Mar-tee-eo*
Level Level	Nivel Knee-vel
Shovel *Shavol*	Pala *Pah-La*
Tape (to measure) *Teip*	Cinta (métrica) *Sin-tah*
Cutter *Cater*	Cortador *Cord-tah-door*
Level *Lével*	Nivel *Nee-vel*
Pliers *Plaier*	Pinzas *Peen-zaz*
Saw So	Serrucho Say-rroo-choh
Screwdriver *Escrudraiber*	Desarmador *Des-arma-door*
How many feet? Jao meny fit?	¿Cuantos pies? Koo-ahn-tos pee-ehs?
Measure four by three feet Meshur for by thri fit	Mida cuatro por tres pies Mee-dah koo-ah-troh por tres pee-ehs
How do you say that in English? Jao du iu sei dat in Inglish?	¿Como se dice eso en Español? Coh-moh seh dee-se eh-soh ehn Espa-nyol?
Bring concrete to make the footing Bring concrit to meik de futing	Traiga el concreto para hacer el cimiento Trah-ee-gah ehl con-cre-toh pah-rah ah-ser ehl see-mee-ehn-toh
Measure the height of _____ Meshur de jait of _____	Mida el largo de _____ Mee-da ehl –lar-goh the ____
Use three markers Ius thri markers	Use tres marcadores Oo-seh tres mar-cah-doh-res
Can you work extra-hours? Can iu work extra-auers?	¿Puede trabajar horas extras? Poo-eh-de tra-bah-har o-ras extras?
Measure the width of _____ Meshur de wid of _____	Mida el ancho de _____ Mee-da ehl an-cho de____
Measure the length of _____ Meshur de lengd of _____	Mida el largo de _____ Mee-da ehl lar-goh deh_____
How many feet? Jao meny fit?	¿Cuantos pies? Koo-ahn-tos pee-ehs?

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 4. Safety Equipment

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Boots (steel toe) Botas (punta de acero)

Buts (stil tou) Bo-tas (poon-tah de a-se-ro)

TICHA Module 4, Flashcard 1

Extinguisher
Extinguisher

Extinguidor
Ex-ting-gee-door

TICHA Module 4, Flashcard 2

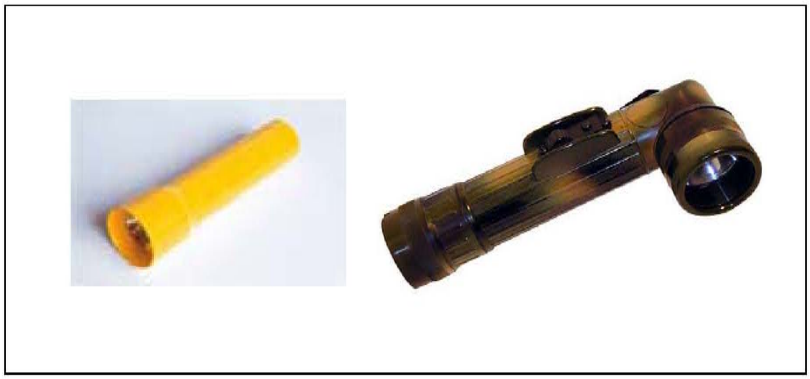
First Aid Kit
Ferst eid ket

Botiquín
Bo-tee-keen

TICHA Module 4, Flashcard 3

Flash light
Flash lait

Linterna
Lean-tear-na



TICHA Module 4, Flashcard 4

Gloves
Gloubs

Guantes
Goo-wan-tes

TICHA Module 4, Flashcard 5

Goggles
Gagols

Gafas
Ga-fas

TICHA Module 4, Flashcard 6

Hardhat
Jardhet

Casco
Kas-co

TICHA Module 4, Flashcard 7

Harness
Jarnes

Arnés
Are-nes

TICHA Module 4, Flashcard 8

Signs
Sains

Letreros
Lay-tray-ros

TICHA Module 4, Flashcard 9

Vest

Vest

Chaleco

Cha-lay-co

TICHA Module 4, Flashcard 10

Module 4. Safety Equipment

Boots (steel toe) Buts (stil tou)	Botas (punta de acero) Bo-tas (poon-tah de a-se-ro)
Extinguisher Extinguisher	Extinguidor Ex-ting-gee-door
First aid kit Ferst eid ket	Botiquín Bo-tee-keen
Gloves Gloubs	Guantes Goo-wan-tes
Goggles Gagols	Gafas Ga-phas
Hardhat Jadhat	Casco Kas-co
Harness Jarnes	Arnés Are-néss
Signs Sains	Letreros Lay-tray-ros
Flash light Flash lait	Linterna Leen-ter-nah
Vest Vest	Chaleco Cha-leh-coh
What is your telephone number? Wat is iour telefoun namber?	¿Cuál es su número de teléfono? Koo-ahl ehs soo noó-meh-roh the teléhpho-nho?
Are you sick? Ar iu sec	¿Está enfermo? Ehs-tah ehn-pher-moh?
Are you hurt? Ar iu hert?	¿Está herido? Ehs-tah eh-ree-doh?
Do you have a medical problem? Du iu jav ei médical problem?	¿Tiene usted algún problema médico? Tee-eh-neh oos-ted ahl-goón problema méh-dee-coh?
Call for help! Col for jelp!	Llama ayuda! Yama ah-yoo-dah!
Go for help! Gou for jelp!	Vaya por ayuda! Vah-yah poor ah-yoo-dah!
Don't move! Dont muv!	No se mueva! Noh seh moo-eh-vah!
Get the first aid kid Guet de ferst eid kit	Traiga la caja de primeros auxilios Trah-ee-gah lah kaha the pree-meh-rohs aux-ee-lee-ohs
Do you use alcohol? Du iu ius alcojol?	¿Usted bebe alcohol? Oss-ted beh-beh al-col?
We are taking you to a doctor Wi ar teikin iu tu ei dóctor	Vamos a llevarle a un doctor. Vah-mohs ah yeh-bar-teh ah oon doctór.

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 5. Numbers

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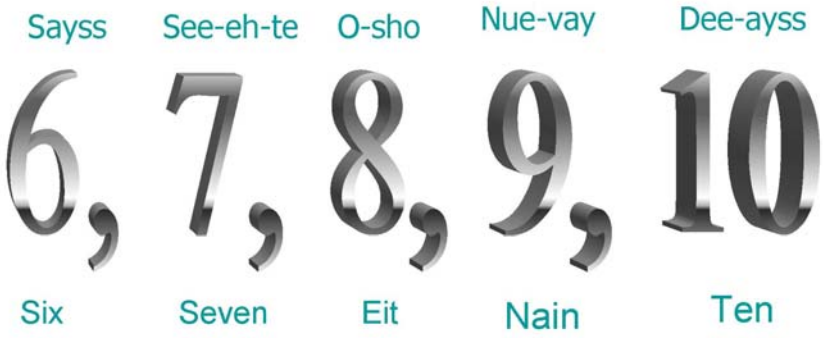
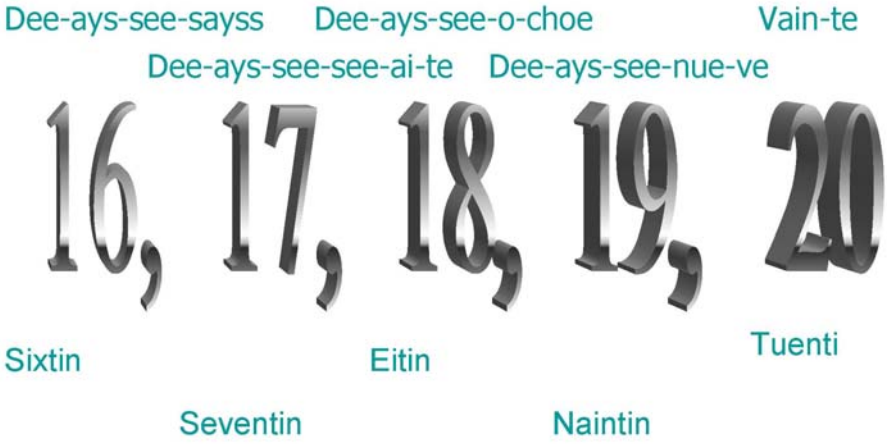
TICHA Module 5, Flashcard 1



TICHA Module 5, Flashcard 2

TICHA Module 5, Flashcard 3



TICHA Module 5, Flashcard 4

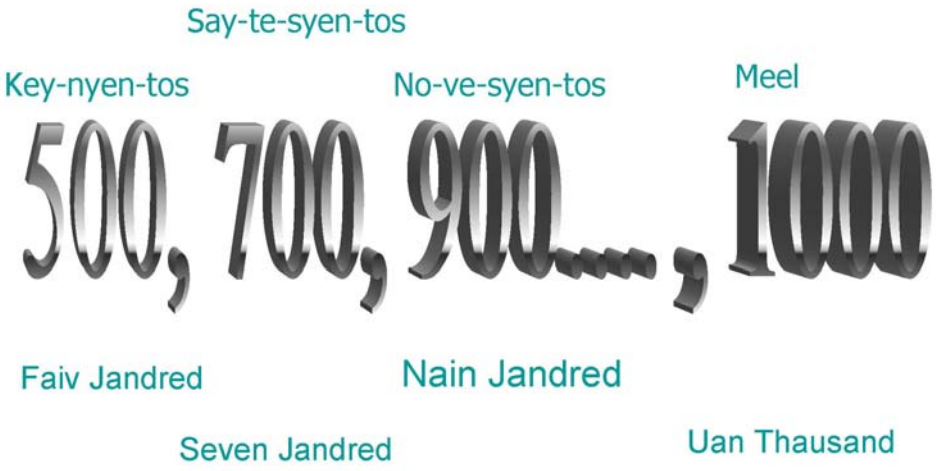
TICHA Module 5, Flashcard 5

TICHA Module 5, Flashcard 6

TICHA Module 5, Flashcard 7

TICHA Module 5, Flashcard 8

TICHA Module 5, Flashcard 9



TICHA Module 5, Flashcard 10

Module 5. Numbers

One	**1**	Uno
Two	**2**	Dos
Three	**3**	Tres
Four	**4**	Cuatro
Five	**5**	Cinco
Six	**6**	Seis
Seven	**7**	Siete
Eight	**8**	Ocho
Nine	**9**	Nueve
Ten	**10**	Diez
Eleven	**11**	Once
Twelve	**12**	Doce
Thirteen	**13**	Trece
Fourteen	**14**	Catorce
Fifteen	**15**	Quince
Sixteen	**16**	Dieciséis
Seventeen	**17**	Diecisiete
Eighteen	**18**	Dieciocho
Nineteen	**19**	Diecinueve
Twenty	**20**	Viente
Twenty one	**21**	Veintiuno
Thirty	**30**	Treinta
Thirty one	**31**	Treinta y uno
Forty	**40**	Cuarenta
Fifty	**50**	Cincuenta
Sixty	**60**	Sesenta
Seventy	**70**	Setenta
Eighty	**80**	Ochenta
Ninety	**90**	Noventa
One hundred	**100**	Cién
One hundred ten	**110**	Ciento diez
Two hundred	**200**	Doscientos
One thousand	**1,000**	Mil

Bring me the _____ Bring mi de _____	Traiga el ____ (or) la_____ Tra-ee-gah ehl ____(or) lah____
Can someone translate? Can som uan transleit?	¿Puede alguien traducir? Poo-eh-deh al-guee-ehn tra-doo-seer?
Clean this up Clin dis ap	Limpie esto Leem-pee-eh ehs-toh
Good job! Gud yob!	Buen trabajo! Boo-en trah-bah-hoh!
Keep the jobsite clean Kip de yob sait clin	Mantenga la obra limpia Man-ten-gah lah oh-bra lim-pee-ah
Move the equipment Muv de equipment	Mueva el equipo Mooe-va el ekipoh
Pick up the trash Pic ap de trash	Recoja la basura Reh-coh-ha lah bah-suh-rah
Work safely work seifli	Trabaje con cuidado Tra-bah-he con koo-ee-dah-doh
Take this to _____ Teik dis to _____	Lleve esto a _____ Yeve ehs-to ah_____
What is that? Wast is dat?	¿Qué es eso? Ké ehs ehso_____

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 6. Workforce Personnel

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Department of Civil, Construction, and Environmental Engineering

Boss
Bos

Jefe
He-fay

TICHA Module 6, Flashcard 1

Electrician
Electrician

Electricista
Elec-tree-sys-ta

TICHA Module 6, Flashcard 2

Engineer
Inyenier

Ingeniero
In-he-knee-eh-ro

TICHA Module 6, Flashcard 3

Foreman

Fourman

Capataz

Ca-pa-tas

TICHA Module 6, Flashcard 4

Helper

Jelper

Ayudante

Ah-you-dan-te

TICHA Module 6, Flashcard 5

Inspector
Inspector

Inspector
Inspectohr

TICHA Module 6, Flashcard 7

Laborer
Leiborer

Obrero / Peón
Oh-bre-ro / Pe-on

TICHA Module 6, Flashcard 8

Operator
Opereitor

Operador
Oh-pe-ra-door

TICHA Module 6, Flashcard 9

Superintendent
Superintendent

Superintendente
Superinten-den-te

TICHA Module 6, Flashcard 10

Surveyor
Surveior

Topógrafo
Topogra-fo

TICHA Module 6, Flashcard 10

Module 6. Workforce Personnel

Boss Bos	Jefe He-fay
Electrician Electrician	Electricista Elec-tree-sys-ta
Engineer Inyenier	Ingeniero In-he-knee-eh-ro
Foreman Forman	Capataz Ca-pa-tas
Helper Jelper	Ayudante Ah-you-dan-te
Inspector Inspéctor	Inspector Inspectór
Laborer Leiborer	Obrero / Peón Oh-bre-ro
Operator Opereitor	Operator Oh-pe-ra-door
Superintendent Superintendent	Superintendente Superinten-den-te
Surveyor Surveior	Topógrafo Topogra-pho
When will you finish? Wen wil iu finish?	¿Cuando va a terminar? Koo-ahn-doh vah ah termi-nahr?
When will you start? Wen will iu estart?	¿Cuando va a comenzar? Koo-ahn-doh vah ah comen-sahr?
Where is the _____? Wer is de____?	¿Donde esta el ____ (or) la_____? Don-deh ehs-tah ehl____ (or) lah____?
Where is your _____? Where is iour_____?	¿Donde esta su _____? Don-deh ehs-tah zoo____?
How do you say ____ in English? Jao du iu sei_____ in Inglish?	¿Como se dice _____ en Español? Co-moh seh dee-seh_____ ehn Espanyol?
You must use _____ for safety Lu most ius _____ for seifti	Usted debe usar _____ por seguridad Oos-ted deh-beh oo-sahr_____ poor seh-goo-ree-dahd
Watch out! Watch aut!	Cuidado! Ku-ee-dah-doh!
Hazard! Jasard!	Peligro! Peh-lee-groh!
Get out of the way Get aut od de wei	Haste para un lado Ass-teh pah-rah oon lah-doh
Be careful Bi kerful	Ten cuidado Ten coo-ee-dah-doh

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 7. Construction Machinery

Sponsored by the Iowa Department of Transportation

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Center for Transportation Research and Education
Department of Civil, Construction, and Environmental Engineering

Backhoe
Bak jo

Retroexcavadora
Retroexca-vah-do-ra

TICHA Module 7, Flashcard 1

Compactor
Compactor

Compactador
Compac-ta-door

TICHA Module 7, Flashcard 2

Crane
Krein

Grúa / Pluma
Groo-ah / Ploo-mah

TICHA Module 7, Flashcard 3

Bulldozer
Buldouser

Tractor / Buldozer
Trac-tor / Buldoser

TICHA Module 7, Flashcard 4

Excavator
Excaveitor

Excavadora
Exca-vah-doh-ra

TICHA Module 7, Flashcard 5

Motorgrader
Motogreider

Motoniveladora
Moto-knee-ve-la-do-ra

TICHA Module 7, Flashcard 6

Jumping jack
Yampin Yac

Apizonadora
Ah-pee-so-na-do-ra

TICHA Module 7, Flashcard 7

Loader
Louder

Cargador
Car-ga-door

TICHA Module 7, Flashcard 8

Paver
Peiver

Carpeteadora
Car-pay-tay-ah-do-ra

TICHA Module 7, Flashcard 9

Screeder
Scrider

Allanadora
Ah-ya-na-do-ra

TICHA Module 7, Flashcard 10

Dump Truck
Damp Trok

Camión de Volteo
Ca-meeon day Vol-tay-o

TICHA Module 7, Flashcard 11

Module 7. Construction Machinery

Backhoe Bak jo	Retroexcavadora Retroexca-vah-do-rah
Compactor Compactor	Compactador Compac-ta-door
Crane Krein	Grua Groo-ah
Bulldozer Buldoucer	Tractor Trac-tor
Excavator Excaveitor	Excavadora Exca-vah-doh-ra
Motorgrader Motofreider	Motoniveladora Moto-knee-veh-la-do-ra
Jumping jack Yampin yac	Apizonadora Ah-pee-so-na-do-ra
Loader Louder	Cargador Car-ga-door
Paver Peiver	Carpeteadora Carpay-tay-ah-do-ra
Screeder Scrider	Allanadora Ah-ya-na-do-ra
How do you say ____ in English? jao du iu sei _____ in Inglish?	¿Como se dice ____ en Español? Coh-moh seh dee-seh ____ ehn Es-pah-nyol?
I need that tool Ai nid dat tul	Necesito esa herramienta Neh-seh-see-toh eh-sah eh-rrah-mee-ehn-tah
I do not understand Ai du not anderstand	No entiendo No en-tee-ehn-doh
Can you repeat that? Can iu ripit dat?	¿Puede repetirlo? Pooh-eh-deh reh-peh-teer-loh?
Speak slowly, please spic slouly, plis	Hable lento, por favor Ah-bleh lehn-toh, poor fah-vor
Do not do that Du not du dar	No haga eso Noh ah-gah eh-soh
Do you understand? Du iu anderstand?	¿Me entiende? Meh en-tee-ehn-deh?
Thank you Denkiu	Gracias Grah-see-as
Put your hard hat on Put ior jard jat on	Póngase el casco Póhn-gah-seh el kas-koh
Bring me the _____, please Bring mi de _____, plis	Traiga el (or) la _____, por favor Trah-ee-gah ehl (or) la ____, poor fah-vor

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 8. Construction Quality

Sponsored by the Iowa Department of Transportation

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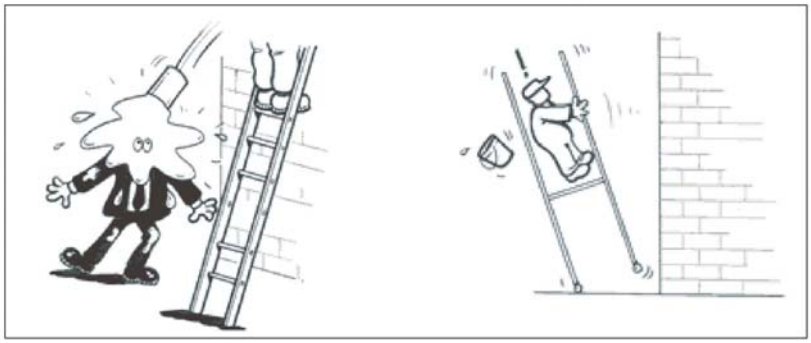
Department of Civil, Construction, and Environmental Engineering

Adequate Tool	Herramienta Adecuada
Edecueit Tul	Ai-ra-mee-en-tas A-dai-qua-das



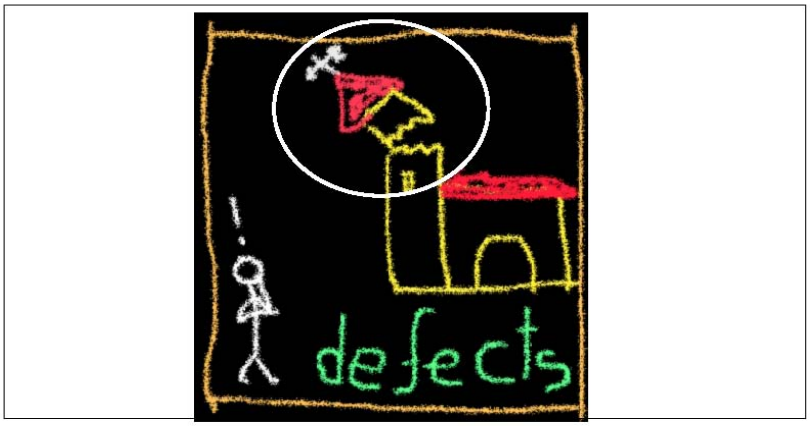
TICHA Module 8, Flashcard 1

Defect

Defect

Defecto

Dai-fec-to



TICHA Module 8, Flashcard 2

Evaluation

Evalueishon

Evaluación

A-va-lua-seeon

TICHA Module 8, Flashcard 3

Inspection

Inspecshion

Inspección

Inspec-seeon

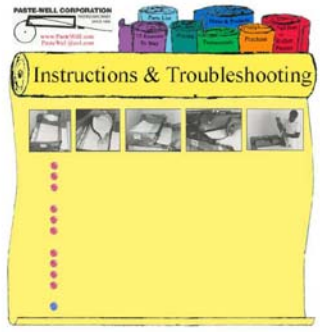
TICHA Module 8, Flashcard 4

Instructions

Instrocshions

Instrucciones

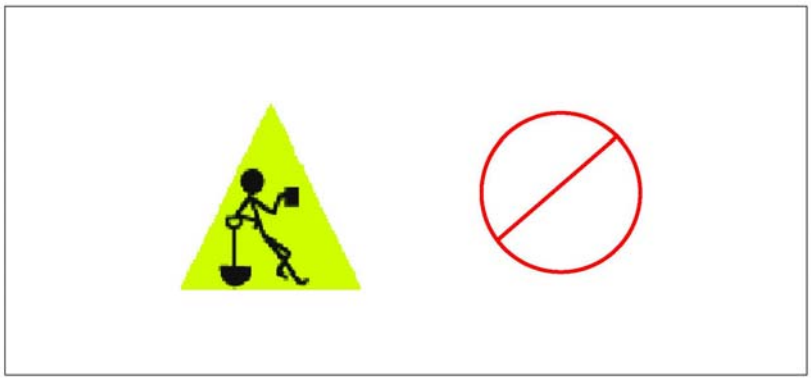
Ins-trook-seeo-nes



TICHA Module 8, Flashcard 5

Mistake
Misteik

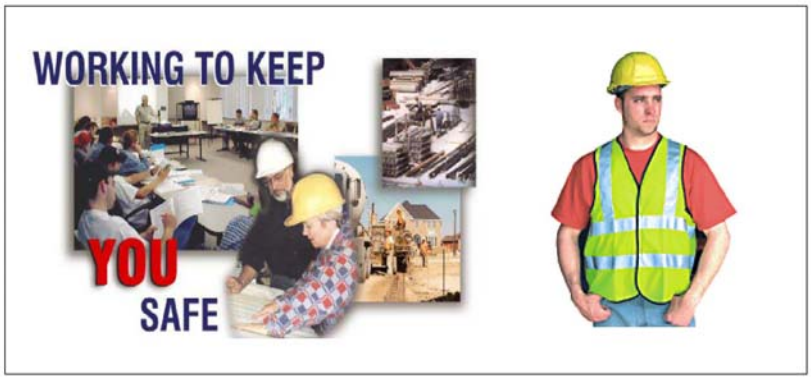
Error
A-rror



TICHA Module 8, Flashcard 6

Safety
Seifty

Seguridad
Se-goo-ree-dad



TICHA Module 8, Flashcard 7

Standard
Standard

Standard
Stan-dard

TICHA Module 8, Flashcard 8

Teamwork
Timwork

Trabajo en equipo
Tra-ba-ho n ai-kee-po

TICHA Module 8, Flashcard 9

Violations
Violeishions

Violaciones
Vee-o-la-seeo-nes

TICHA Module 8, Flashcard 10

Module 8. Construction Quality

Adequate Tool Edecueit tul	Herramienta Adecuada Ai-ra-mee-en-ta A-dai-qua-da
Defect Defect	Defecto Dai-fec-to
Evaluation Evalueshion	Evaluación A-va-lua-seeón
Inspection Inspecshion	Inspección Inspec-seeon
Instructions Instrocshions	Instrucciones Ins-trook-seeo-nes
Mistake Misteik	Error A-rror
Safety Seifty	Seguridad Se-goo-ree-dad
Standard Standard	Standard Standard
Teamwork Timwork	Trabajo en equipo Tra-ba-ho en ai-keepo
Violations Violeishions	Violaciones Vee-o-la-seeones
Go up, please Gou ap, plis	Suba Soo-bah
Go down Gou daun	Baje Bah-he
Move to the right Muv tu de rait	Muevase a la derecha Moo-eh-va-seh ah lah deh-reh-cha
Move to the left Muv tu de left	Muevase a la izquierda Moo-eh-va-seh ah lah ees-kee-erda
How do you say that in English? Jao du iu sei dat in Inglish?	¿Como se dice eso en Español? Coh-moh seh-dee-seh eh-soh en Espanyol?
I do not understand Ai du not anderstand	No entiendo No en-tee-ehn-doh
I understand Ai anderstandt	Entiendo En-tee-ehn-doh
Repeat Ripit	Repita Re-pee-tah
Bring me the _____, please Bring mi de _____, plis	Traiga_____, por favor Trai-gah ____, poor fah-vor
The site is ____ miles from here De sait is ____ mails from jir	El sitio es _____ millas de aquí El see-tee-oh es _____ mee-yahs deh akí

Toolbox Integration Course for Hispanic Workers and American Supervisors

Module 9. Colors, Time, and Measurements

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Prepared by

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Colors			Colores	
ielou	Yellow		Amarillo	*A-ma-ree-yo*
Blu	Blue		Azul	*A-sool*
Red	Red		Rojo	*Ro-ho*
Grin	Green		Verde	*Ver-dai*
Guait	White		Blanco	*Blan-ko*
Blac	Black		Negro	*Ne-groh*
Oranch	Orange		Naranja	*Naran-ha*
Grey	Gray		Gris	*Greese*

TICHA Module 9, Flashcard 1

Days of the Week

Monday	Lunes
Tuesday	Martes
Wednesday	Miércoles
Thursday	Jueves
Friday	Viernes
Saturday	Sábado
Sunday	Domingo

TICHA Module 9, Flashcard 2

Months of the Year

January	Enero
February	Febrero
March	Marzo
April	Abril
May	Mayo
June	Junio
July	Julio
August	Agosto
September	Septiembre
October	Octubre
November	Noviembre
December	Diciembre

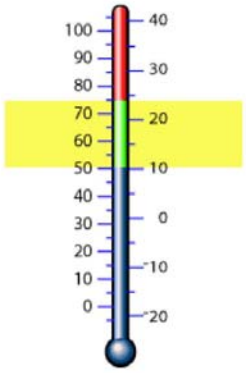
TICHA Module 9, Flashcard 3

Temperature

Temper-chur

Temperatura

Temp-eh-rah-tuh-rah



0 Celsius °C = 32 Fahrenheit °F

TICHA Module 9, Flashcard 4

Linear

Lineal

- 1” inch = 2.54 centimetro
- 12” (inch) = 1 foot = 30.48 centimetro
- 1’ or ft (foot) = 0.33 yardas
- 1 mile = 1.61 kilometro

TICHA Module 9, Flashcard 5

Area

Area

- 1 square inch = 6.45 centimetro^2
- 1 foot^2 = 929.03 centimetros^2
- 1 mile^2 = 2.59 kilometro^2
- 1 Acre = 4050 metros^2
- 1 Acre = 0.40 Hectarias
- 1 Yard^2 = 9 ft^2

TICHA Module 9, Flashcard 6

Module 9. Colors, Time, and Measurements

Meter Miter	Metro Meh-tor
Centimeter Centimeter	Centímetro Cen-teé-meh-troh
Feet Fit	Pies Pee-ehs
Foot Fut	Pie Pee-éh
Acre Eiquer	Acre Ah-creh
Yard Iard	Yarda Jar-dah
Miles Mail	Milla Mee-jah
Kilometer Kilometer	Kilometro Kee-loh-meh-troh
Hectares Jectars	Hectarias Ek-tah-ree-ahs
Diameter Diameter	Diametro Dee-ah-meh-troh
Measure _____ feet Meshur_____ fit	Mide _____ pies Mee-deh _____ pee-ehs
Use the tape to measure the surface Ius de teip tu meshur de surfeis	Usa la cinta para medir la superficie Oo-sah lah sin-tah pah-rah me-dir lah super-phy-see-eh
That costs twenty dollars Dat costs tuenti dolars	Eso cuesta veinte dólares Eh-soh koo-ehsta veh-een-teh dóh-lah-rehs
Find the _____ Faind de _____	Busca la ____ (or) el_____ Boos-ca lah ____ (or) ehl_____
The crane is behind you De krein is bijain iu	La grúa esta atrás de ti La groo-ah ehs-tah ah-trás deh tee
The surface is _____ feet long De surfeis is _____ fit long	La superficie es ____ pies de largo Lah super-fee-see-eh ehs ___ pee-ehs the lar-goh
The temperature tomorrow is ____ De tempetur tumorrou is____	La temperatura mañana es_____ Lah temp-eh-rah-tuh-rah ma-nya-nah es __
What color is that? Wat cólor is dat?	¿Qué color es eso? Ke coh-lór ehs eh-soh
It looks horizontal It luks jorisontal	Se ve horizontal Seh veh or-ee-son-tal
It looks vertical It luks vértical	Se ve vertical Seh veh ver-ti-cál