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Fall prevention training and its impact to southern Nevada construction workers

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FALL PREVENTION TRAINING AND ITS IMPACT TO SOUTHERN NEVADA CONSTRUCTION WORKERS

by

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ABSTRACT

Fall Prevention Training and Its Impact to Southern Nevada Construction Workers

by

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Death and injury from falls are a long-standing and continuing problem in construction, responsible for at least a third of the construction deaths in the U.S. from 2004 to 2007. Each of those years, Nevada has exceeded the national percentage. Although 29 CFR 1926.503 sets forth Occupational Safety and Health Administration (OSHA)'s requirements that construction employers train employees exposed to fall hazards and document such training, the incidence of deaths and injuries from falls are an indicator that this training was not provided or else was not effective.

Conventional fall protection training is more narrowly focused on recognizing fall hazards and using fall protection systems. Therefore the specific aim of this study is to :1) design, deliver, and evaluate an effective fall prevention training program for the Southern Nevada construction workers; 2) produce English and Spanish curricular materials, including the training approach, for dissemination; and 3) measure the impact of training on worker's job site behavior.

This study also assesses the participants' knowledge, teaches them how to use fall safety equipment, summarizes the feedback of the participants, and provides the findings from the follow-up survey conducted with the participants to measure the impact of

training on jobsite behavior. The participants' feedback of the class showed that the training classes were excellent. The trainees' competency evaluations showed that majority of the trainees were able to identify the fall hazards and safety of equipment. The follow-up interviews showed that the majority of the participants found this training helpful for their construction career.

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CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Safety and Construction Industry

Construction Industry, one of the largest industries, is also known as a high hazard industry. It involves wide range of activities, for instance, construction; repair/maintenance; renovation; and alteration of building, roads, bridges, hydropower, tunnels, and industrial facilities. Construction jobs are mostly labor intensive; thus workers are exposed to serious hazards and risks, such as falling form heights, electrocutions, silica dust, asbestos, unguarded machinery, and being struck by heavy equipments. Exposure to these hazards and risks, leads to a higher rate of injuries than for other industries.

According to Hinze and Appelgate 1991, “Construction worker injuries have an adverse impact on productivity in the industry”. Accidents and injuries directly affect people, and have legal and financial implications. Thus, safety has become a vitally important concern to most, in the construction industry.

Cost of accidents in the construction industry can be categorized into Direct Costs and Indirect Costs. These accident costs can be broken down as follows.

- Product damage
- Plant and equipment damage
- Legal costs
- Expenditure on emergency supplies
- Clearing the site
- Production delays

- Transportation of the injured persons
- Loss of efficiency of the construction gang
- Slower returned worker
- Lower morale of the site team
- Overtime working and use of temporary staff
- Recruitment of replacement staff
- Investigation time
- Supervisor's time diverted
- Clerical effort
- Fines
- Loss of expertise/experience

Due to these factors, construction safety is considered of paramount concern in order to establish a safe foundation from which construction enterprises and their employees can prosper. Today, the construction industry is striving to achieve the notion of "zero-injury" at sites, considering safety as part of an organizations' culture, and relating safety with quality.

At present, the construction industry is as a large employment industry, providing over 10 million jobs from 2003 to 2009 in the United States (Figure 1). Because employment is high, deaths and injuries in the construction industry are also higher than the norm for industries. Data from the U.S. Bureau of Labor shows that there were over 1,000 deaths from work-related injuries in the construction industry each year from 1994 to 2008 (Figure 2). Although the rate of fatal and non-fatal injuries in construction has declined, it still accounts for approximately 300 deaths per 100,000 full-time workers and

180 injuries per 10,000 full-time workers. Falls remain the predominant cause of occupational fatalities in the construction industry.

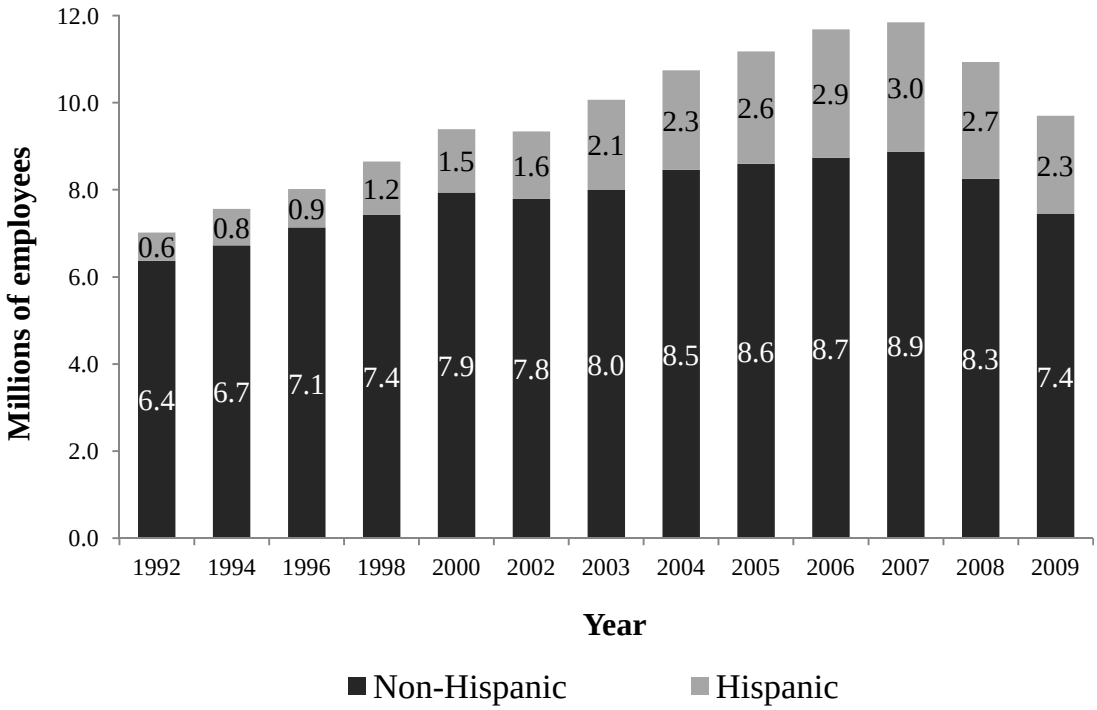

Figure 1. Construction Employments in United Stated, 1992-2009

Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey, 1992-2009.

The U.S. Department of Labor also has listed falls as one of the leading causes of traumatic occupational death. According to a report from the U.S Bureau of Labor Statistics, 1992-2008, Census of Fatal Occupational Injuries, the fatality rate for construction was lower than that for the mining and agriculture industries, but higher than the manufacturing industry.On the other hand, the rate of non fatal injuries and illness

with days away from work for construction industry was higher compared to those indutries.

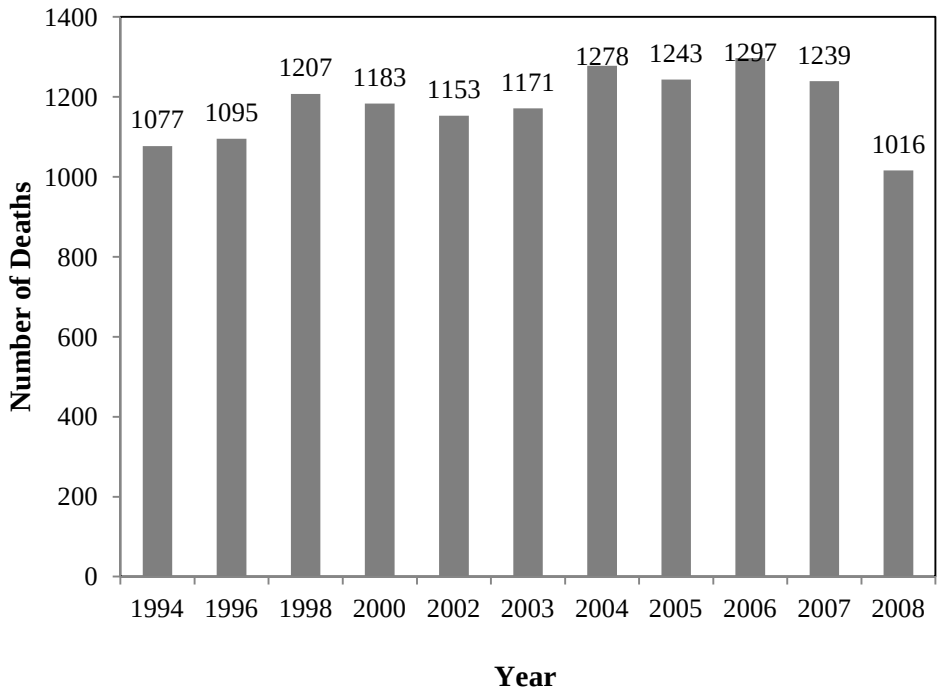

Figure 2. Number of deaths from injuries in construction, 1994-2008.
Source: U.S Bureau of Labor Statistics, 1992-2008, Census of Fatal Occupational Injuries.

1.2 Problem Statement: The need for Fall Prevention Training in Southern Nevada

According to Occupational Safety and Health Administration (OSHA), compared to other industries, the construction industry contributed a disproportionate number of fatalities and disabling injuries. Falls from elevations, as compared to other type of injuries, are included in one of the most costly and damaging categories. Even though OSHA strictly focused on falls and made revisions to the fall protection regulations;

workers' deaths due to falls from elevations has been shown to be persistently higher as compared to proportion to all deaths. A recent report (CPRW 2010), "Work-related fatal and nonfatal injuries among U.S. Construction Workers, 1992-2008", also examined construction industry fatalities data from Census of Fatal Occupational Injuries (CFOI); according to this report, falls constituted over 32% of the total number of fatalities (Figure 3).

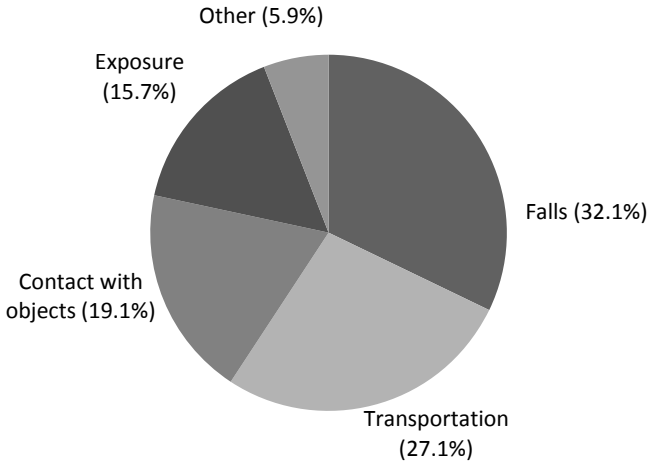

Figure 3. Distribution of leading causes of work related deaths from injuries. Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1992-2008.

OSHA divides falls into whether they were from a higher level to a lower level or to the same level. Table 1shows the number of fatal injuries, fatal falls, and falls to lower levels that occurred from 2005 to 2009. In injury cases, ladder-related falls often result in long work absences and sometimes permanent disability (Smith et al. 2006). In most of

the serious fall-related injuries, workers suffered fractures to the spine, vertebra, shoulder, hip, arm, hand, and legs; also, in 9 out of 10 fatal injuries, workers died due to a fracture of the skull or to brain injury (Hsiao and Simeonov 2001). OSHA data also shows that the majority of fatal falls occurred while working on roofs, ladders, scaffolding, staging, and steel structures. In the past five years, falling from roofs and ladders constituted the greatest number of fatalities related to falls (Table 2).

Table 1. Fatal falls and falls to lower levels in the U.S.

Year	Total fatal injury	Fatal Falls	Fatal Falls to lower levels
2009	4340	617	518
2008	5214	700	593
2007	5488	847	746
2006	5703	827	738
2005	5734	770	664

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2005-2009.

Table 2. Fatality percentage by type of works.

Year	Fatal Fall to lower level	Roof	Ladders	Scaffolds and staging's	Girders or steel structures	Total	Percentage
2009	518	109	122	53	15	299	57.72
2008	593	123	119	68	30	340	57.34
2007	746	161	132	88	42	423	56.70
2006	738	185	132	91	33	441	59.76
2005	664	129	160	82	25	396	59.64

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2005-2009.

Compared to other industries, construction jobs are considered to be one of the most risky jobs. Whether building homes, dams, bridges, or skyscrapers, most construction workers have to work on heights, which can lead to fatal falls. Deaths and injuries from falls are a long-standing and continuing problem in construction, responsible for at least a third of the construction deaths in the U.S. from 2004–2008 (Table 3). Nevada has exceeded the national percentage each of those years.

Falls also account for a significant percentage of lost-time injuries as well, with Nevada close to the national percentage most of the previous four years (Table 4). These statics clearly shows that there is an inevitable need to reduce the fatal and non fatal injuries due to falls, and one effective way is training.

Table 3. Construction fatalities due to falls in Nevada and U.S.

Year	Fatal Falls (% of Total) Nevada	Fatal Falls (% of Total) U.S.
2008	5(42%)	348(34%)
2007	8 (38%)	447 (37%)
2006	7 (39%)	433 (35%)
2005	6 (46%)	394 (33%)
2004	9 (60%)	445 (36%)

Source: Nevada Division of Industrial Relations and US Department of Labor, Bureau of Labor Statistics, 2004 – 2008.

Table 4. Construction Lost Time Injuries Due to Falls In Nevada and U.S.

Year	Falls, Nevada (% of Total)	Falls, U.S. (% of Total)
2007	22%	20%
2006	20%	22%
2005	22%	22%
2004	27%	22%

Source: Nevada Division of Industrial Relations and US Department of Labor, Bureau of Labor Statistics, 2005 – 2007.

Recognizing the need to provide Fall Prevention Training to the workers of Southern Nevada, a proposal entitled “Fall Prevention Training for Southern Nevada Construction Workers” was submitted and approved by the Susan Harwood Training Grant program. This training was practical- based training that targeted the Southern Nevada Construction Workers, with a specific focus on Hispanic workers, a hard-to-reach group with low English literacy. This training program aimed to train 760 workers. Training was provided to both Spanish-speaking and English-speaking workers. During the

training program, 1) the trainees were allowed to evaluate the course; 2) instructors assessed the competency of the trainees in using various fall safety equipments; and 3) the follow- up interviews were conducted to determine the immediate impact of the training on the workers' day to day works.

1.3 Occupational Safety and Health Administration (OSHA) Guidelines for Fall Protection

1.3.1 Background

Before the promulgation of the Occupational Safety and Health Act of 1970, there were a significant number of work-related accidents, diseases, and injuries. According to Fleming 2001, 25 years before promulgation of OSH Act, 400,000 Americans lost their lives due to work-related disease and accidents; and further, almost 50 million people were disabled due to injuries on the job. More than 14,000 workers died, and more than 2.5 million workers were disabled due to job-related accidents between 1960-1970 Fleming 2001. This loss in terms of productivity and wages, medical expenses, and disability compensation-- along with unaccountable human loss-- imposed a substantial effect upon the nations' economy Keller 1993. The OSH Act of 1970, also known as Williams-Steiger Act, was passed to address this issue Fleming Spring 2001. The OSH Act, enforced and administered by the U.S. Department of Labor (DOL), created three permanent agencies: the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Review Board (OSHRB) Fleming 2001.

1.3.2 OSHA

The primary duty and responsibility of OSHA is to create safety and health standards, with technical assistance from NIOSH. When these standards become law, all the employers and employees have to comply where applicable and possible. The OSHA standards primarily fall into four major categories: 1) General Industry, 2) Maritime, 3) Construction, and 4) Agriculture (U.S DOL 1992).

General Industry standards covers and guides general industry activities involving personal protective equipment, ergonomics, occupational health and environment control; and electrical, medical and first aid issues, to name a few. The construction industry standard is specifically applied to "…every employment and place of employment of every employee engaged in construction work," (29 Code of Federal Regulation [CFR] Part 1910 2001, p.21). The construction standard provides specific guidance for activities involving concrete and masonry, fall protection, scaffolding, ladders, demolition, welding and cutting, and occupational health and environment controls.

1.3.3 Fall Protection

To provide protection against fall hazards, the Occupational Safety and Health Administration (OSHA) addresses rules and regulations for fall protection under 29 CFR, Subpart M, Fall Protection, 1926. This standard is designed to prevent workers from falling and from being struck by falling objects. In addition, fall protection regulations for scaffolds, steel erection, and ladders are described separately in Subpart L, Subpart R, and Subpart X, respectively.

Subpart M specifies that employees working at or above 6 feet (1.8 meters) from the lower level must be protected by a guardrail system, a safety net system, a personal fall

arrest system, and/or implementation of a fall protection plan. This standard covers all construction workers except workers who are inspecting, investigating, or accessing the jobsite before and after work. It has identified some--but not all--of the potential fall hazard areas, that need fall protection, such as ramps, excavations, runways, hoist areas, holes formwork, leading edge work, unprotected sides and edges , overhead bricklaying, roofing work, pre-cast concrete erection work, elevated walking or working areas, and wall openings. This rule also clarifies the duty of the employer to identify and evaluate fall hazards, to provide and install all fall protection systems required for an employee; and to provide training to its employees. Subpart M explains the most common control methods of fall protection as:

a) Warning lines and controlled access zones
b) Guardrail systems
c) Safety net systems
d) Covering holes
e) Personal fall arrest systems
f) Positioning device systems
g) Safety monitoring systems
h) Fall protection plans
i) Training Programs

Generally, these methods were designed to be used in progressive order, moving from general knowledge towards higher and sophisticated levels of training, skills, and knowledge in order to function effectively (Ellis 2001) .For instance, the use a of warning

line does not necessarily require training or specialized knowledge, but the use of a personal Fall Arrest System (PFAS) requires specialized knowledge and training.

The Subpart L covers all scaffolds, but does not apply to cranes or derricks suspended from personnel platforms. This section specifies the strength and standards of various types of scaffolding and their components. It also explains the proper method of using various types of scaffolding under different circumstances, inspection procedure, and safety factors. This subpart explains the regulations of fall protection that must be followed by employers and employees while working on a scaffold and also the types of fall protection systems--for instance, warning lines, guardrails, and personal fall arrest systems--that can be used in scaffolds to prevent fall hazards.

According to Subpart R, workers working in steel erection that have an unprotected side over 15 feet shall be protected from fall hazard by a guardrail system, a safety net system, personal fall arrest systems, or fall restraint systems. A structure over 15 feet and up to 30 feet--where metal decking is initially being installed-- has to be protected by establishing a Controlled Decking Zone (CDZ). Fall hazard training should be provided to each employee by the employers to identify and recognize fall hazards in the work area.

Subpart X of 29 CFR cover the circumstances when and where ladders and stairways have to be provided, the strength of different types of ladders, the right inclination, proper use, and its testing. As per this section, the employer has to provide and install all stairways and ladders along with relevant fall protection systems like handrails. Additionally, the employer must also provide training to the employees on the correct use

of ladders and stairways, how to recognize hazards, and how to use a fall arrest system; this training will, make them more competent worker.

1.4 Scope and objectives

This thesis is based on the Fall Prevention Training program provided under the Susan Harwood Training Grant Program of the Occupational Safety and Health Administration (OSHA). The primary goal of this training program was to train 760 construction workers in Southern Nevada to improve their safety knowledge and reduce occupational injuries or death form falls. Most importantly, this training strives to provide the training in Spanish in order to include Hispanic construction workers having inadequate safety training due to the language barrier.

During the training program, the trainees were allowed to evaluate the course content and training methods. The ability of the trainees to use various personal fall arrest systems (PFAS), safety nets, ladders, and guardrails also were checked. Finally, the trainees were interviewed by telephone eight weeks after the training to determine the effect of the training at their job site. These three sets of data: -- 1) course evaluation, 2) trainee competency, and 3) follow up interviews -- were the primary data used in this thesis for analysis.

The main goal of this research is to develop curricular materials for fall prevention training in English and Spanish language, and to develop the training approach for this program. These curricular materials and the training approach either can be used by other instructors to train many more workers or the materials can be directly referred to by workers; they will benefit by enhancing their safety knowledge and skills to become

more aware and cautious about fall hazards.

Based on the data collected, the objectives of the thesis are;

1) Design, deliver, and evaluate effective fall prevention training for the targeted population.
2) Determine the effectiveness of class by conducting the course evaluation.
3) Determine the competency of the trainees to use various fall safety equipments.
4) Measure the immediate impact of the training on the trainees' job-site behavior.

1.5 Research Hypothesis

Four research hypotheses were formulated to determine the effectiveness of training program. The research hypotheses were related to course evaluation, trainee competency, and follow-up interviews.

Training course evaluation was conducted to determine the effectiveness of course content and ability of instructors' to teach the class. Data obtained from the Spanish classes and English classes were tested to find out which module of training was more successful. On the basis of course evaluation, research hypotheses were formulated as follows:

H_a1: There is a significant difference in the evaluation of English-speaking and Spanish-speaking classes.

Trainee competency was assessed related to the use various safety equipments, namely, personal fall arrest systems (PFAS), guard rails, and ladders. Data obtained from the competency assessment were then tested to determine which group of trainee was

more competent to use above mentioned safety equipments. Research hypothesis to compare the competency was formulated as follows:

H_a2: There is a significant difference in the competency of English-speaking and Spanish-speaking trainees to use and check safety of personal fall arrest systems, guard rails, and ladders.

Follow-up interviews were carried out to find the impact of fall prevention training on the daily job-site behavior. Tests were conducted to compare the importance of various topics covered in the class as well as the importance and effectiveness of fall prevention training to the English-speaking and Spanish-speaking populations. The research hypothesis for the follow-up interviews was formulated as follows:

H_a3: There is a significant difference in perception regarding the usefulness of topics covered in the class to English-speaking and Spanish- speaking trainees.

H_a4: There is a significant difference in importance and effectiveness of fall prevention training to the English-speaking and Spanish-speaking populations.

In order to conduct statistical tests, the above stated research hypotheses were converted to null hypotheses. These are:

H_o1: There is no significant difference in the evaluation of class by the English-speaking trainees and the Spanish-speaking trainees.

The scale used in the evaluation was rank order. Therefore, a non-parametric test was used to find the significance value. Mathematically, this is written as:

$$M_{\text{english}} = M_{\text{spanish}}$$

H_o2: There is no significant difference in the competency of English-speaking and Spanish-speaking trainees to use and check safety of personal fall arrest systems, guard rails, and ladders.

Mathematically, this is written as:

$$\pi_{english} = \pi_{spanish}$$

H_o3: There is no significant difference in perception regarding the usefulness of topics covered in the class to English-speaking and Spanish- speaking trainees.

Mathematically, this is written as:

$$\pi_{english} = \pi_{spanish}$$

H_o4: There is no significant difference in importance and effectiveness of fall prevention training to the English-speaking and Spanish-speaking population.

Mathematically, this is written as:

$$\pi_{english} = \pi_{spanish}$$

1.6 Thesis Structure

This thesis documents the research undertaken to determine the impact of fall prevention training to the construction workers of Southern Nevada. Basically, this thesis consists of nine chapters which explain why the training is needed, how the training was provided, and the impact of training on the trainees. The brief descriptions of all the chapters are as below:

Chapter 1 Introduction and Background: The chapter explains the main subject matter of the research. It provides a glance about, safety in construction industry, and OSHA. The problem statement, scopes and objectives and research hypothesis are also stated in this chapter.

Chapter 2 Background Literature Review: This chapter provides overview of various literatures reviewed to form a solid background for this research.

Chapter 3 Research Methodology: This chapter contains a description of the methods and design used in the study. Step by step method adopted for this research is depicted. The data collection process as well as the statistical background needed for analysis is also discussed.

Chapter 4 Data Description and Analysis: This chapter describes the various data sets involved in the research, its collection process and methods adopted for analysis.

Chapter 5 Course Curriculum Development: Methods and procedures adopted to develop an effective course curriculum material to be used in the fall prevention training class are clearly explained in this chapter.

Chapter 6 Training Approach: The specific training approaches used in the training to train the English and Hispanic construction workers are explained in this section.

Chapter 7 Results/Findings: Results obtained from various statistical analyses are presented, and the limitations of the research are also stated in this chapter.

Chapter 8 Recruiting Trainees for Fall Prevention Training: This chapter reflects the challenges faced while recruiting trainees and various strategies implemented to attract more workers for training.

Chapter 9 Conclusions: The conclusions derived from the research are discussed in this chapter.

1.7 Definition of important terms

Hispanic: The term Hispanic refers to those individuals with a Spanish speaking heritage. Though Brazilians and other Latin Americans are not Hispanic, this article uses "Hispanic" as a generic term for all Latin American workers.

Injuries/illness: Injuries or illness can be defined as an abnormal condition or disorder which includes cases such as a cut, fracture, sprain, or amputation etc. Illness includes both acute and chronic illnesses, such as a skin disease, respiratory disorder, or poisoning.

Fatal fall: Fatal fall can be defined as fall that results to death of an individual.

Full time equivalent (FTE): It is the unit to measure employed workers in such a way that it makes them comparable although they work different number of hours per week. FTE of 1.0 means that the person is equivalent to a full-time worker, on the other hand FTE of 0.5 means the worker is only half time. Generally, FTE is used as measure of work load and it is considered to be 8 hours a day, 40 hours per week for 50 weeks.

Fatal Injury rate: Fatal injury rate can be determined by using following equation.

$$\text{Fatal Injury Rate} = \frac{\text{Fatal work injuries}}{\text{Total hours worked by all employees}} \times 200{,}000{,}000$$

where,

200,000,000= base for 100,000 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Lost time injuries: Lost time injuries are work-related injuries or illness to an individual which makes an individual unable to work on a scheduled work day or shift.

Incidence Rate: Incidence rates is defined as the number of injuries and illnesses, or lost workdays, per 100 full-time workers. It is calculated as

Incidence Rate= $N \times 200{,}000 \div EH$

where,

N = number of injuries and illnesses, or number of lost workdays.

EH = total hours worked by all employees during a month a quarter, or fiscal year.

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

CHAPTER 2

BACKGROUND LITERATURE REVIEW

This chapter contains a literature review of the various researches done in different fields relating to this topic. The objectives of this section are to discuss the OSH Act and OSHA, fall protection standards, and accidents/incidents due to falls in the construction industry. This chapter also reviewed literature to better understand selection of the target population for fall prevention training, the processes for course curriculum development, and evaluation of the training.

2.1 Occupational Safety and Health Administration OSHA)

The Occupational Safety and Health Act (OSH Act) was enacted by President Richard M. Nixon on December 29, 1970, to help protect the nations' workers on the job (Fleming 2001). The main purpose of this Act was to "assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing research, information, education, and training in the field of occupational safety and health; and for other purposes" (U.S. DOL OSHA 2000). The OSH Act was part of the U.S Department of Labor (DOL) and was managed by the Secretary of Labor, appointed by the U.S. President. According to U.S. DOL OSHA 2000, the Act was applied to 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, and the Trust Territory of the Pacific Islands. The OSH Act (U.S. DOL OSHA 2000) did not cover the following:

1) The self-employed.
2) Immediate members of farming families that do not employ outside workers.
3) Employees whose working conditions are regulated by other federal agencies under other federal statutes. These include mine workers, certain truckers and rail workers, and atomic energy workers.
4) Public employees in state or local governments (U.S. DOL OSHA 2000).

The OSH Act also established the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Review Board (OSHRB) (Fleming 2001). OSHA which was established within DOL to administer the OSH Act, came into begin on April 28, 1971. OSHA's' first and foremost goal always has been to send "every worker home whole and healthy every day." As per U.S. DOL OSHA 2000, in order to attain these goals, OSHA focused on these three objectives.

1) Improve workplace safety and health by reducing injuries, illnesses, and fatalities.
2) Change workplace culture by increasing employer and employee commitment to improved safety and health.
3) Secure public confidence through excellence in developing and delivering OSHA services.

According to U.S. DOL OSHA 2006, to protect the American Workers and to promote work place health and safety OSHA does the following things:

1) Encourages employers and employees to reduce workplace hazards and to implement new safety and health programs or improve existing programs;

2) Develops mandatory job safety and health standards and enforces them through worksite inspections, employer assistance, and sometimes, by imposing citations or penalties or both;
3) Establishes responsibilities and rights for employers and employees to achieve better safety and health conditions;
4) Conducts research, either directly or through grants and contracts, to develop innovative ways of dealing with workplace hazards;
5) Maintains a reporting and recordkeeping system to monitor job-related injuries and illnesses;
6) Establishes training programs to increase the competence of occupational safety and health personnel; and
7) Develops, analyzes, evaluates, and approves state occupational safety and health programs.
8) Provides technical and compliance assistance, training and education, and cooperative programs and partnerships to help employers reduce worker accidents and injuries.
9) Works in partnership with states that operate their own occupational safety and health programs; and
10) Supports the Consultation Programs offered by all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, Guam and the Northern Mariana Islands.

As per U.S DOL OSHA 2000, in order to achieve these objectives to help employers and employee reduce injuries, illness, and deaths on the job, OSHA uses:

1) Strong enforcement to target workplaces with the highest injury and illness rates;
2) Creative partnerships to develop new ways of working with employers, employees, and other stakeholders;
3) Improved rule making for the challenges of the 21st century; and
4) Expanded outreach and training to create safe and healthful working environments.

According to U.S. DOL OSHA 2006, between 1970 to 2006, workplace fatalities were reduced by more than 60 percent, and occupational injury and illness rate subsided by 40 percent. During this period, U.S employment more than doubled; today, this act covers more than 115 million workers at 7.2 million work sites. It currently administers and enforces more than 180 federal laws, and it covers about 10 million employers and 125 million workers (U.S. DOL 2011). OSHA was empowered to promulgate safety and health standards with technical advice from NIOSH (Plog 1996). After promulgation by OSHA, the safety and health standards became law, and employers and employees had to comply. A part from promulgating standards, OSHA is also responsible for active participation throughout the safety assurance process in the workplace; it also encourages workers and employers to consider workplace safety and health issues seriously (U.S. DOL OSHA 2000). OSHA has four major standards, namely: General Industry, Maritime, Construction, and Agriculture (U.S. DOL OSHA 2000). These standards are revised annually, and then disseminated by OSHA in the Federal Register for public notification purposes. A complete set of standards are made available by means of

various communication sources, including books, manuals, websites, journals, audio, videos, and training institutes. These standards serve as a guideline or foundation for each and every employer to ensure its employees a hazard-free place of employment.

2.2 Construction Industry Standard

Construction safety standards, also known as the Construction Safety Act, initially were adopted by the U.S. Department of Labor in April 1971 in order to implement the Contract Work Hours and Safety Standard Act, 40 USC 333. In due course, these standards were converted to Occupational Safety and Health Administration (OSHA) standards by the Secretary of Labor under authority provided by the U.S. Congress in Section 6 (a) of the OSH ACT (Moran 1996).

Under these standards, construction, alterations, and/or repairs, including painting and decoration, all are considered as construction work; each employer has the duty to protect every employee engaged in construction work and their place of employment (29 CFR 1910.12b). The construction standard is applied to “every employment and place of employment of every employee engaged in construction work” (29 CFR 1910.12b).

Part 1926 of the Construction Standard has 26 subparts (Subpart A through Subpart Z). Subparts A and B apply only to determine the scope of Section 107 of the Construction Safety Act, 40 U.S.C. 333 (Moran 1996). Basically, the construction industry standards are the foundation to assist employers of the construction industry to establish a safe work place free from potential hazards that cause or may cause death or serious harm to their employees (Plog 1996).

Table 5. PART 1926 Safety and Health Regulations in Construction.

	Construction Industry Code of Federal Regulation
Subpart A	General
Subpart B	General Interpretations
Subpart C	General Safety and Health Provisions
Subpart D	Occupational Health and Environmental Controls
Subpart E	Personal Protective and Life Saving Equipment
Subpart F	Fire Protection and Prevention
Subpart G	Signs, Signals, and Barricades
Subpart H	Materials Handling, Storage, Use, and Disposal
Subpart I	Hand and Power
Subpart J	Welding and Cutting
Subpart K	Electrical
Subpart L	Scaffolds
Subpart M	Fall Protection
Subpart N	Cranes, Derricks, Hoists, Elevators, and conveyors
Subpart O	Motor Vehicles, Mechanized Equipment, and Marine Operations
Subpart P	Excavations
Subpart Q	Concrete and Masonry Construction
Subpart R	Steel Erection
Subpart S	Tunnels and Shafts, Caissons, Cofferdams, and Compressed Air
Subpart T	Demolition
Subpart U	Blasting and Use of Explosives
Subpart V	Power Transmission and Distribution
Subpart W	Rollover Protective Structures; Overhead Protection
Subpart X	Stairways and Ladders
Subpart Y	Commercial Diving Operations
Subpart Z	Toxic and Hazardous Substances

2.3 29 CFR 1926 Subpart M -Fall Protection

On August 9, 1994, OSHA published final standards in the Federal Register for 29 CFR Subpart M-Fall Protection in the construction industry. This standard did not cover

specific areas pertaining to steel erection, residential construction, scaffolds, and ladders, as they have their own fall protection requirements. The 29 CFR Subpart M-Fall Protection standards became effective and implemented beginning on February 6, 1995.

As per 29 CFR Subpart M the fall protection standard is broken down into four paragraphs:

a) Scope, application, and definitions applicable to this subpart.

b) Duty to have fall protection.

c) Fall protection systems criteria and practices.

d) Training requirements.

According to this standard, the employer has to assess walking/working surface in the work place to:

a) Ensure adequate strength and structural integrity,

b) Select fall protection systems where required,

c) Be responsible for contractors operating at their facilities,

This standard also specifies areas and activities where fall protection is required, including for:-

a) Employees working above 6 feet from a lower level.

b) Protection to employees from falling objects.

c) Protection of workers from the potential hazards of falling into dangerous equipment.

Employees who are inspecting, investigating, or assessing workplace conditions prior to start of construction work are the exception; the provision does not apply to them.

According to this standard, the employers should train their employees who are subject to be exposed to potential fall hazards; teach them how to recognize such hazards; and eliminate, minimize, or mitigate them. Employers should also provide certificates to trained workers; however, if the trained workers prove to be not competent enough or the employee changes jobs, then employers need to retrain the workers. The standard specifies the several areas that require training:

a) The nature of fall hazard in the work area;
b) Correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
c) Use and operation of safety monitoring systems, controlled access zones, guardrail systems, personal fall arrest systems, safety net systems, and warning line systems;
d) The role of each employee when a safety monitoring system is used;
e) Criteria for the use of mechanical equipment while performing roofing works on low-sloped roofs;
f) Correct procedures for the handling and storage of equipment and materials, and also for the erection of overhead protection;
g) The fall protection plan and the employees' role;
h) Awareness of fall protection standards.

2.4 Accident and incident history relating to falls

Accidents, incidents, illness, injuries, and fatalities are caused due to unsafe acts and conditions in the workplace .Fatalities caused by falls remain a serious public health

problem throughout the United States, and they occur in all industries and occupations. Many U.S. workers are exposed to fall hazards at their jobs regardless of industry or occupation. According to NIOSH, between 1980 and 1994, falls from elevations stood fourth on the list of leading cause of occupational fatalities. During this period, 8,102 deaths due to falls from elevation were recorded, accounting for 10% of all fatalities; this is an average of 540 deaths per year (NIOSH 2000).

Data from the Bureau of Labor Statistics (BLS) from 1997 showed 715 fatalities and 313,334 nonfatal injuries involving work absences due to fall. This accounted for slightly more than one tenth of all worker fatalities and slightly less than a fifth of all injuries and illness involving days away from work. The median recuperation time for fall injuries was 8 days, which was 3 days more than the median for all types of injuries and illness combined. Since 1992, the BLS started collecting occupational fatality data nationwide; in 1997, fatal work place fatalities due to falls were at a six-year high. Among the workers who fell to their deaths during from 1992 to1997, construction workers accounted for 50 percent of the falls. Falls to a lower level was the most frequent type of fatal fall in 1997, with falls from roofs being the most frequent cause, followed by falls from ladders. During a fall event, it was found that workers mostly suffered a sprain, strain, or a tear to multiple parts of body: neck, head, throat, upper extremities, lower extremities, and body systems (Webster 2000).

According to a study by Dong et al. 2005, from 1992 to 2003, the death rate remained almost constant with a slight decrease from 13.9 per 100,000 in 1992 to 11.7 in 2003. However, during this period, the rate of nonfatal injuries and illnesses rate involving days away from work declined steadily, from 529.5 to 259.4 per 10,000 Full Time Equivalents

(FTEs). Between 1992 and 2003, construction employment surged by 44%, from 7.0 million to 10.1 million. At the same time, deaths and injuries increased by 22%, from 963 to 1171 (Figure 2).During this time frame, the construction sector accounted for a disproportionate share of work-related deaths in the United States. For instance, in 2003, only 7% of the work forces consisted of construction workers, but they suffered 21% of the 5,575 work-related deaths in the U.S. Falls remain the leading cause of deaths in the construction industry (Figure 3).From 1992-2003, 4,234 construction workers died due to falls, which accounts for 31% of work-related deaths in the industry. Out of 4,234 deaths due to falls, falls to lower levels caused 4,124 deaths. Falls were also the second most common cause of non-fatal occupational injuries and illnesses involving days away from work.

Another study made by Dong et al. 2010 revealed that the U.S. construction industry persisted in having a disproportionate amount of deaths. In 2008, U.S. construction workers suffered 20% of the 5,214 reported work deaths; this percentage is disproportionately high, since construction workers made up only 8% of the total workforce that year. Between 1992 through 2007, the employment in the construction industry increased rapidly from 7 million to almost 12 million; in the next two years, more than 2 million jobs were lost due to the economic downturn, as shown in (Figure 1). There was a 35% increase in deaths from injuries in construction from 963 in 1992 to 1,297 in 2006; again, this percentage declined 18% between 2007 and 2008 (Figure 1). According to this study, falls were the leading cause of death in the construction industry between 1992 through 2008 (Figure 2). Injuries from falls took 6,304 lives, as shown in Figure 2; this accounted for 32% of work-related deaths in the industry (Figure 3). Falls

to lower levels were a significant cause of most deaths, totaling 6,142. In other words, 97% of all deaths resulted from falls. Among the leading causes of nonfatal injuries, falls were the second most common cause of nonfatal injuries during this period.

From 2003 to 2008, approximately one-third of the fatal falls in construction were due to falls from roofs, followed by ladders and scaffolds/staging (Figure 4). Altogether, falls form roofs, ladders and scaffolds caused about two-thirds of all fatal falls in construction. On the other hand, falls on the same level were the leading cause of non fatal falls in construction (Figure 5) (Dong et al. 2010).

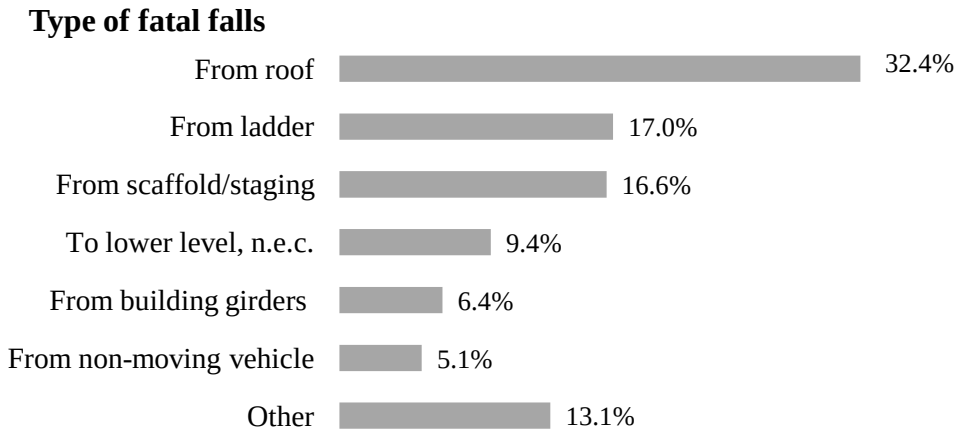

Figure 4. Number of fatal falls from work-related injuries in construction, 1992-2008

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1992-2008.

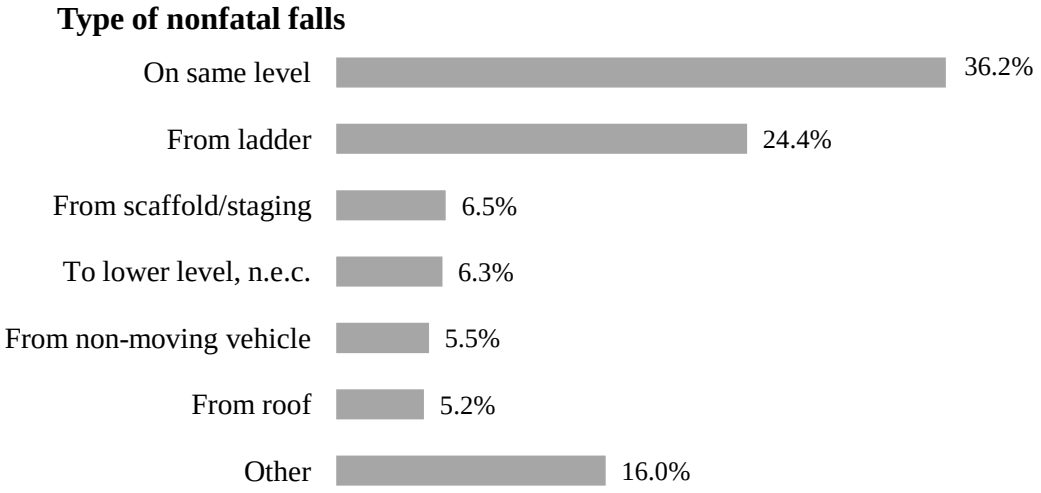

Figure 5. Type of nonfatal falls in construction, 2003-2008

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1992-2008.

Every autumn from October through September, OSHA announces the top ten most frequently cited violations. According to OSHA citation list, fall protection (29 CFR 1926.501) was the second most frequently cited standard, and was the highest penalty paying standard in the fiscal years from 2008 to 2010 (Table 6).

Table 6. Top 10 most cited standards from 2006-2010.

Standards	Description	Ranking				
		2010	2009	2008	2007	2006
29 CFR 1926.451	Scaffolding, general requirements, construction	1	1	1	1	1
29 CFR 1926.501	Fall protection, construction	2	2	2	2	2
29 CFR 1910.1200	Hazard Communication, general industry	3	3	3	3	3
29 CFR 1926.1053	Ladders, Construction	4	7	8	8	9
29CFR 1910.134	Respiratory protection, general industry	5	4	5	4	4
29 CFR 1910.147	Control of hazardous energy, lockout/tag out general industry	6	5	4	5	5
29 CFR 1910.305	Electrical, wiring methods, components and equipment, general industry	7	6	6	7	7
29 CFR 1910.178	Powered industrial trucks, general industry	8	8	7	6	6
29 CFR 1910.303	Electrical systems design, general requirements, general industry	9	9	10	10	10
29 CFR 1910.212	Machines, general requirements, general industry	10	10	9	9	8

2.5 Target Population for Training

The fall prevention training program was designed to be delivered in both Spanish and English language in order to accommodate both English-speaking and Spanish-speaking populations in Southern Nevada. This training program mainly targeted the

population involving in occupations that had higher number / rate of fatalities and injuries.

Construction labor were the largest trade in the construction industry, between 2003 and 2008, and had the highest number of fatalities, followed by carpenters and foremen (Figure 6). During the same period of time, ironworkers, electrical power installers, and roofers had high rates of work-related deaths from injuries with 64.7, 60.9, and 32.0 per 100,000 FTEs, respectively (Figure 7). The trend of fatalities between 1992 to 2008 shows that falls to lower levels were the primary cause of death for most of the construction occupations, as indicated in Table 7 (Dong et al. 2010).

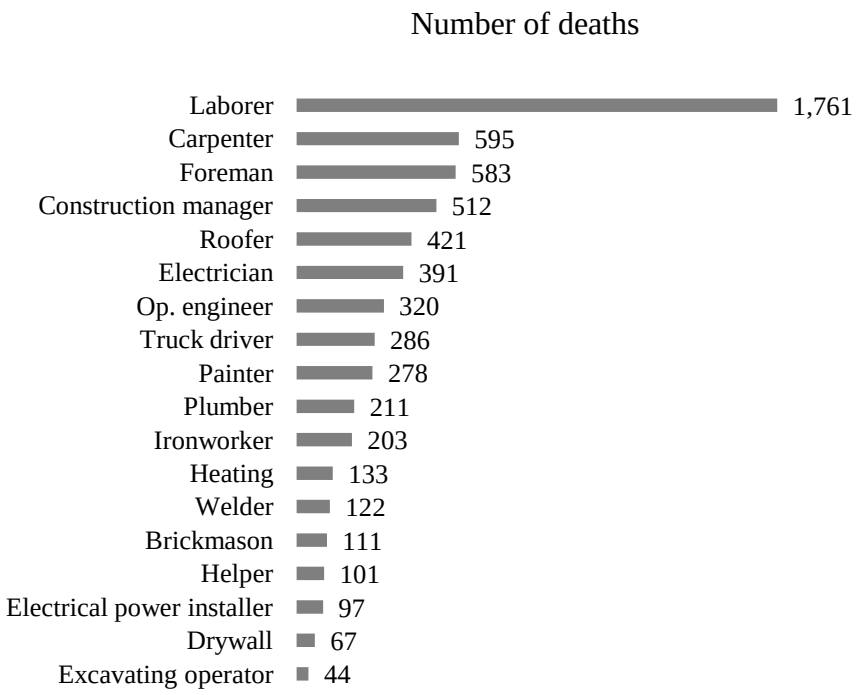

Figure 6. Number of work-related deaths in various constrution occupation,2003-2008

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2003-2008.

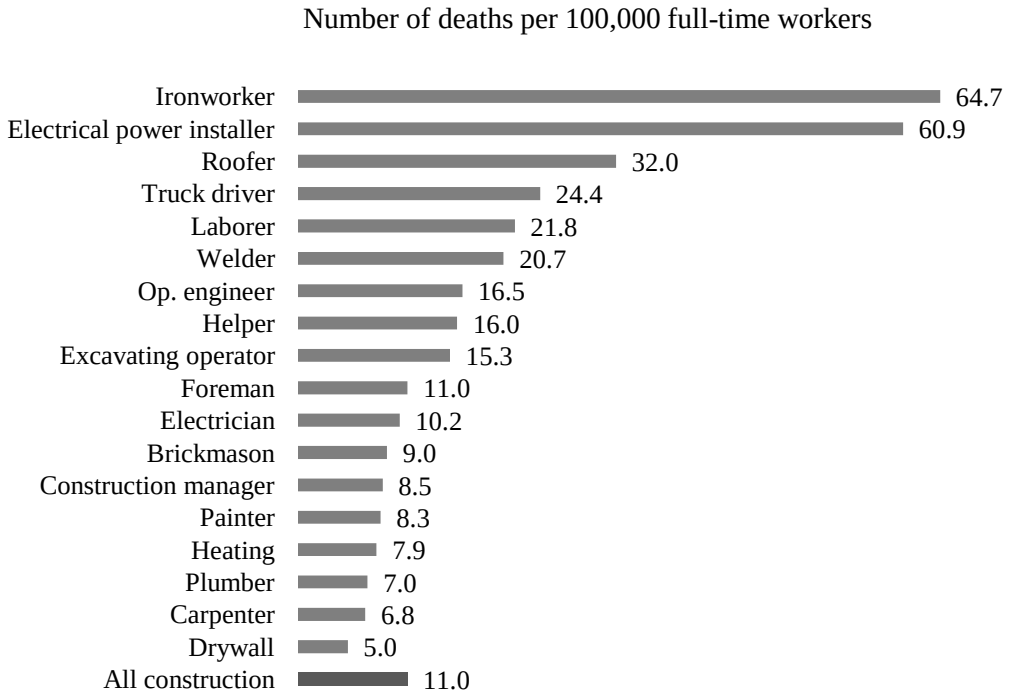

Figure 7. Rate of work-related deaths in various construction occupations, 2003-2008.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries and current population survey, 2003-2008.

Table 7. Fatalities due to falls to lower level among construction occupation, 1992-2008.

Occupation	**Fatalities**		**% of fatality due to falls to lower level**	**Ranking of Cause**
	Total	Due to falls to lower level		
Bricklayers	276	142	51	1
Carpenters	1546	838	54	1
Laborers	4928	1361	28	1
Electrical power-line installer	260	74	28	2
Electricians	596	128	17	2
Ironworkers	666	453	68	1
Painters	704	401	57	1
Plumbers	520	92	18	1
Roofers	1080	810	75	1
Welders/ Driver	403	143	35	1

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1992-2008.

Today, the ethnic composition of United States has changed because of a large wave of immigration in the last two decades (Brunette 2005). According to the U.S. Census Bureau, as of July 1, 2009, there are 48.8 million Hispanics living in the nation, making them the country's largest ethnic minority. In another study by the National Institute for Occupational Safety and Health (NIOSH), it has been revealed that in the last decade, the number of Hispanic workers doubled among all U.S. industries and more than tripled in construction, as shown in Figure 8 (CPWR 2009).

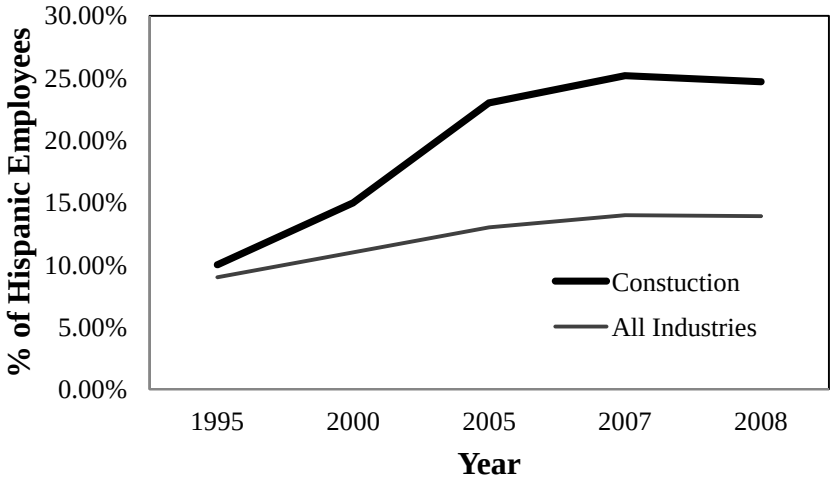

Figure 8. Hispanic employees as a percentage of Construction vs. All industries.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 1995-2008.

Hispanic workers are subjected to more severe and hazardous working conditions and have a higher rate of injury and illness than Non-Hispanic Whites (Kilborn 1992; Baker et al. 1999). In 2006, the U.S. Department of Labor reported that fatal work injuries involving Hispanic workers reached the highest on record. Fatalities for foreign-born Hispanic workers increased from 12% in 1996 to 18% in 2006. Until 2006, the rate of fatal injuries for Hispanic construction workers was about 41% higher than white, non-Hispanic construction workers. However, the fatality rates for these two groups were same in 2007 and 2008. Between 2003 and 2008, 40% of the work-related deaths among Hispanic construction workers were caused by falls; 80% of these workers were foreign-born (Dong et al. 2010). Among construction trades, laborers--which are the entry job for most foreign-born Hispanics (Brunette 2004) -- have one of the highest risks of death (Dong and Platner 2004). Hispanics also experienced high rates of non-fatal injuries involving lost time at work and also prolonged recovery times (Goodrum and Dae 2005; Anderson et al. 2000). According to U.S Department of Labor, Bureau of Labor Statics, in 2006, 23% of construction injuries involving days away from work occurred to Hispanic workers, an increase from 18% in 2004.These numbers, which illustrate occupational health disparities with adverse outcomes for Hispanic construction workers, indicate the need to address this issue, using strategies that will be successful in reducing the human and economic costs of these workplace incidents.

Hispanics are a large and growing part of the United States workforce. According to U.S. Census Bureau, by 2050, Hispanics will account for 25 percent of the population. The construction industry is of a labor-intensive nature, so it is expected to have a greater percent increase in Hispanic population. Geographically, Hispanic workers are found to

be more concentrated in the southwestern United States; in 2007, 40% of the construction workers in Nevada were Hispanic (CPWR 2009). Besides the high concentration, Hispanic workers in Nevada also have a higher fatality rate, compared to the fatality rate of whole country (Table 8).

In addition, Southern Nevada experienced a residential and commercial building boom from 2005 to late 2007; then, the current recession began, and construction stalled in Nevada, as in the rest of the country. In the U.S., construction employment has fallen by 1.3 million since the start of the recession (U.S DOL BLS 2011). Among those who lost jobs, Hispanic construction workers have been affected disproportionately. Some construction unions have reported a drop in membership due to job losses, reducing the funds available to them to provide safety training to their members. However, these employment challenges also represent an opportunity to attract underemployed workers to participate in fall prevention training classes in preparation for the next increase in construction job demand. Available to all construction workers in Southern Nevada, this training focuses on Hispanic construction workers.

Table 8. Fatality rate of Hispanic workers in Nevada and in the U.S.

Year	% of Total Nevada	% of Total U.S.
2009	25.00%	15.39%
2008	31.71%	15.42%
2007	16.90%	16.56%
2006	24.49%	16.95%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2006-2009.

2.6 Development of Course Curriculum

According to the Federal Occupational Safety and Health Act of 1970 (OSHA Act), employers should provide mandatory education and training regarding the job site safety to the people or workers covered by this Act. The training requirement stipulated in the OSHA health and standard strives to cover such factors as:

- Who is to be trained,
- When initial training is to be completed,
- Frequency of training,
- Content of the training program, and
- Access to information and training material.

Although these requirements seem specific, they actually are quite ambiguous. For example, such factors as the conceptual approach to training and the organizational structure for training and instruction are not clear (Vojtecky and Schmitz 1986).

The success of the construction industry largely depends on how well workers are trained for different trades. Training is the basic means of self-protection against site hazards. Thus, better trained workers are more aware and cautious, and also less susceptible to hazards and accidents. In the case of the Hispanic population of construction workers, allocation of safety education and training is a predominant factor as this type of training requires resources that are appropriate both linguistically and culturally. As a result, the translation of existing resources into Spanish requires rigorous care (National Research Council 2003). Baker et al. 1999 documents the difficulties of this process, since much of the language used in OSHA safety standards is specific to English, and has no readily comparable translation in Spanish. However, the few

resources available lack quality; these are merely translations of available English material and are often inaccurate (Brunette 2005).

According to Brunette 2005, in order to develop an appropriate, effective, and well-directed health and safety training and educational resources to Hispanic workers, research was conducted at the University of Massachusetts-Lowell under the OSHA Susan Harwood Training Grant Program. Basically, this research disseminated educational materials for OSHA's 10- Hour Construction Safety Program. Creative and useful ideas come from the worker themselves, so this research used the participatory approach to develop the curriculum material for the Hispanic. Workers idea and perception regarding the working environment was considered to develop a curriculum material that were linguistically and culturally appropriate. "Decentering" method was used for translating materials from English to Spanish language. Decentering is a continuous revision process, where source materials are first translated into the target source language and remain subject to revisions until conceptual clarity and appropriate grammatical structures have been achieved. The entire curriculum development process of this course involved five stages: analysis, design, development, implementation, and continuous education. In order to bolster the effectiveness of the training to adults, it used graphics, photos, and images of Hispanic workers taken directly from construction sites. A Hispanic cartoon character also was introduced in the educational and training material to enhance the effectiveness of the educational material. The training material was made assessable on the internet, which served as a valuable resource for organizations interested in disseminating training and education to Hispanic workers.

A study conducted by Thompson and Siddiqi 2007 found that construction employers needed to understand Hispanic cultural issues comprehensively and also needed to use that knowledge to their advantage by significantly reducing injuries to the Hispanic work force. Creating awareness about the Hispanic workers' importance to their families worked well to create safety awareness. In addition, this research found that Hispanic workers often have a tendency to ignore bringing up safety issues to a supervisor; therefore, they needed to be educated on the importance of bringing up safety concerns to supervisors. Providing extensive safety training in their own language was important because most of the skilled workers often get jobs in their homelands, and most of the people who come to U.S. seeking jobs are unskilled. This research emphasized the importance of developing training materials in Spanish and providing hands-on job specific training to Hispanic workers.

2.7 Training Effectiveness Evaluation

According to Brown and Nguyen-Scott 1992, "Little published documentation exists regarding the impact of health and safety training programs on workers' health, worker exposure to hazards, or worker actions to improve health and safety conditions,". In 1984, a survey of workplace health and safety education conducted by health professionals found that the majority of the evaluations undertaken were either, in the areas of training process, or immediate impact evaluation by testing the trainees' knowledge immediately after the educational training (Vojtecky and Schmitz 1986).

A course evaluation form was used for evaluating a training course entitled "Construction Safety in Department of Energy", taught in Chicago, Illinois, 1992. A

numeric course rating system, with written comment section, was used to check the efficacy of the training material and the instructor. As a whole, the course evaluation form consisted of question regarding course content, teaching materials, course topic areas, and the instructor. After collecting the data, descriptive statistic was used to interpret the data.

In another research conducted by Sokas et al. 2007 a web based survey model was developed to evaluate the training material developed to teach the OSHA-10-hour hazard awareness course. It conducted a web based survey with the trainers to evaluate the material used in the Smart Mark Training and provide open ended suggestions for improvement. Basically, the survey was divided into three sections: demographic and training characteristics, an evaluation of 13 Smart Mark Training Modules, and an overall impression of the Smart Mark Training. From the research, it was determined that more than 80% of the trainers identified falls that were most relevant to their trainees occurred from ladders, bending, stooping, and lifting hazards were most important to their trainees. The research also highlighted the fact that there were numerous trainees who were not native English speakers, and the educational requirements for such a population needs further study.

California- Arizona Consortium (CAC) designed an evaluation program to appraise the impact of its training on trainees, after they returned to their work-place. It was carried out under a 5-year grant for a training program on hazardous waste, provided by the National Institute of Environment Health Sciences in 1988. A 40-hour training class was designed to educate the workers at hazardous waste sites to comply with OSHA standards and possible hazards and also to educate them on their legal rights; the outcome

of this training was to minimize or eliminate those hazards. After the training, process evaluation and intermediate impact evaluation of the training was carried out. Process evaluation was accomplished with the help of a course evaluation questionnaire, which the trainees filled out at the end of the class. Important information regarding the effectiveness of topics covered, teaching methods used, instructor's knowledge and teaching skills, and recommendations for improving the course were extracted from the process evaluation. Intermediate impact analysis was carried out to find whether or not the trainees were using the knowledge gained from the training at their workplace. These were done by conducting a follow-up interview after 3-months and 12-months (Brown and Nguyen-Scott 1992).

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of the study was to create awareness about fall hazards, evaluate the training class, access the competency of workers, and to determine the immediate impact of the training on workers' job site behavior. This chapter contains a description of the methods and design used in the study. The following areas are discussed in this section: overview of the research, development of training course, questionnaire development, and data collection and data analysis.

3.1 Overview of Research Methodology

The flow chart of methodology adopted for this research is shown in Figure 9. This section briefly describes various steps adopted to carry out the research.

3.1.1 Define Scope and Objective (Problem Statement)

The problem statement defines the need, scope, and objective of the research. Introduction and background, purpose of the study, occupational safety and health administration (OSHA) guidelines, and the research hypothesis are discussed in CHAPTER 1.

3.1.2 Literature Review

Numbers of literatures were reviewed to develop a proper methodology for the research. Guidelines from the Occupational Safety and Health Administration (OSHA), papers from journals and conference proceedings, and books all were reviewed to refine the scope, objective, and limitations of this research as well as to develop an effective

training course curriculum with the appropriate training approach. CHAPTER 2 discusses the various literature reviewed during this research.

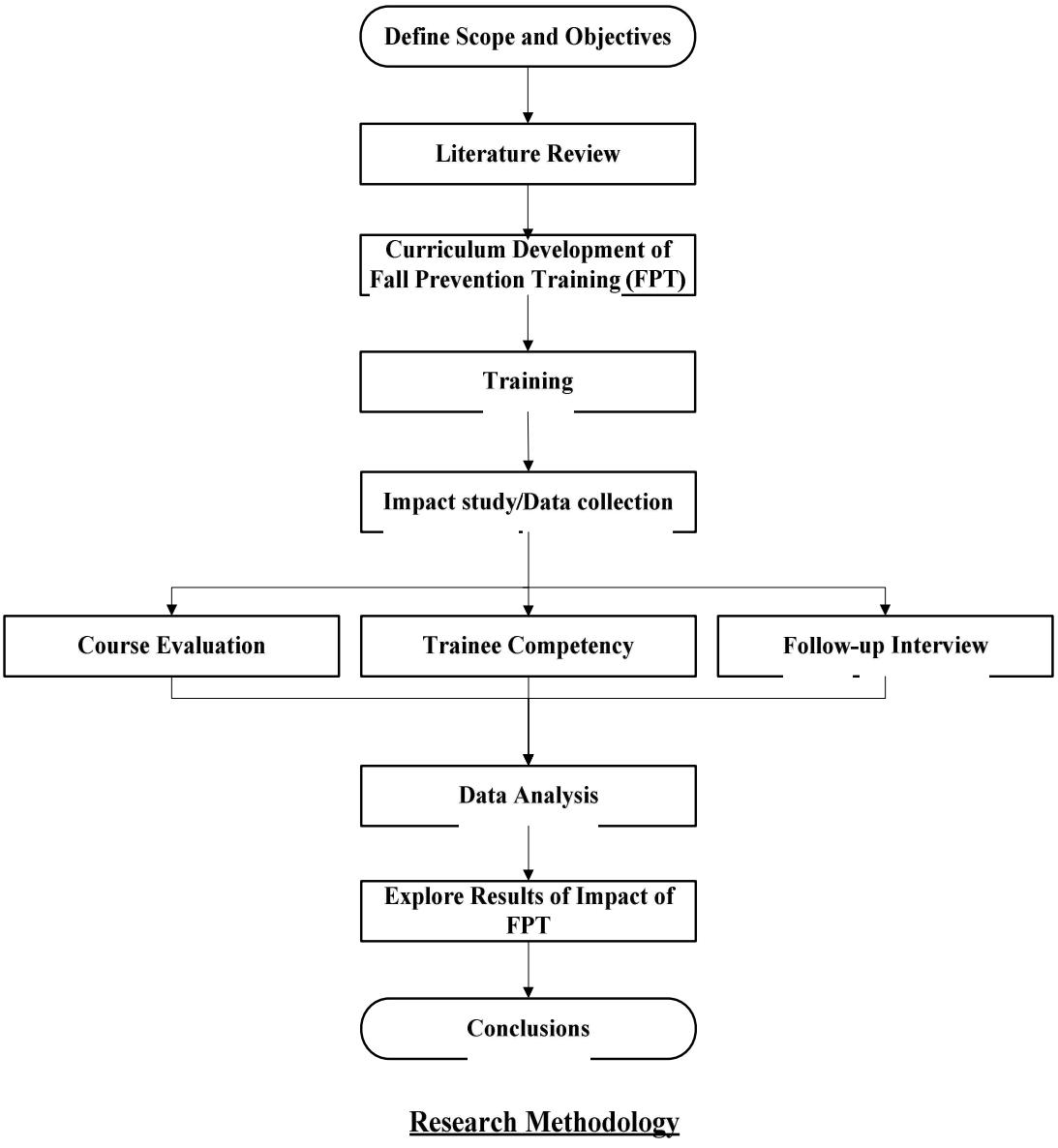

Figure 9. Flow Chart of Research Methodology.

3.1.3 Curriculum Development of Fall Prevention Training (FPT)

One of the main objectives of this research was to design and develop an effective course curriculum for fall prevention training in Spanish and English language. The factors considered and processes involved for development of the course curriculum for fall prevention training are described in CHAPTER 4.

3.1.4 Training

After development of the course curriculum, training was provided to the workers. The training class was divided into two parts: lecture based training, and hands-on training. The approach made during the training phase is described in detail in CHAPTER 5.

3.1.5 Data Collection for Impact Study

Data used in this research were quantitative data. Primary data were collected by means of course evaluations, a trainees' competence checklist, and follow-up interviews. Survey and observation techniques were adopted to collect the data. A detail description of collected data is discussed in section 3.2, Data Collection.

3.1.6 Data Analysis

Impact study of the training was measured by analyzing the collected data. Generally, descriptive statistics was used to analyze the data. Then parametric and nonparametric statistical tests were conducted to make conclusions. Data analysis part is properly demonstrated in CHAPTER 4.

3.1.7 Results of Impact Study of Fall Prevention Training

Results obtained from the data collected from the trainees of the fall prevention training class, after analysis, are presented in CHAPTER 7.

3.1.8 Conclusions

Conclusions of the study are conferred in CHAPTER 9.

3.2 Data Collection

Data for analysis in this research were collected from the trainees of the Fall Prevention Training class. Three sets of data were collected in the form of a course evaluation, trainees' competency checklist, and follow-up interviews. These three sets of data were collected from the trainees by doing surveys and observations during the training class.

The Course evaluation form, which consisted of questions to evaluate the quality of class and ability of instructor, was provided to each trainee. The course evaluation form also had a separate "comments" section for trainee to write their suggestions or observations, if any. Each trainee had to fill out the course evaluation form and return it at the end of the training class; their identity was kept anonymous. Data obtained in the course evaluation was in the form of an ordinal scale, excellent to poor.

During the hands-on training session of the fall preventing training class, the trainees were allowed to demonstrate their skills regarding the use of personal fall arrest systems (PFAS), guard rails, safety nets, and ladders. Observations regarding the trainees' competency to use the above-mentioned items were made and recorded in the Trainee Competency form. Data obtained from the competency form was in the form of a nominal scale.

To determine the immediate impact of the training on the workers' job site behavior, a telephone questionnaire survey was conducted eight weeks after the training date. The

research portion of this project received Institutional Review Board (IRB) approval. Before conducting the telephone interviews, the interviewer passed the Collaborative Institutional Training Initiative (CITI) exam to conduct research on human subject, and got certified as a Social / Behavioral Research Investigators and Key personnel. The trainees were provided with inform consent form to obtain their follow-up contact information. The follow-up telephone interview was made only to trainees who provided consent for the survey. The telephone questionnaire sheet consists of twelve different questions. Data obtained from the telephone questionnaire survey was of both nominal and ordinal scale.

After the data were obtained, they were entered into a spreadsheet for analysis. Samples of the course evaluation form, trainee competency form, and post-training telephone questionnaire are provided in the APPENDIX A and APPENDIX B.

3.3 Statistical Background

The data obtained from the course evaluation forms, trainee competency forms, and the follow-up interviews were analyzed by using descriptive statistics. Number of hypothesis testing were also conducted to make comparison between the results obtained from, course evaluation of the Spanish and English class, the competency of the Spanish and English workers; and the follow-up interviews.

3.4 Descriptive Statistics

Descriptive statistics is the art of collecting, summarizing, and describing data from a sample. The measures used to describe the data set are measures of central tendency and measures of variability or dispersion.

3.4.1 Measures of Central Tendency

3.4.1.1 The Mean

The arithmetic mean (mean) is the most common measure of central tendency. The mean is the only common measure in which all the values play an equal role. The mean is also affected by the extreme values (outliers). It is calculated by adding together all the values in a data set and then dividing that sum by the number of values in the data set. The general equation of arithmetic mean is shown in Eq. 1.

$$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n} = \frac{X_1 + X_2 + \cdots + X_n}{n} \quad (1)$$

3.4.1.2 The Median

The median is the middle value in an ordered array of data that has been ranked from smallest to largest (50% above, 50% below). The median is not affected by extreme values, so it can be used when extreme values are present. The location of median position is given by Eq. 2.

$$\text{Median Position} = \frac{n+1}{2} \quad \text{Position in the ordered data} \quad (2)$$

3.4.1.3 The Mode

The mode is the value in a set of data that occurs most often. Mode in not affected by extreme values. It is used for either numerical or categorical data. Several times, there is no mode or there are several modes in a set of data.

3.4.1.4 Quartiles

Quartiles split the ranked data into four segments with an equal number of values per segment.

First quartile position: $Q_1 = (n+1)/4$

Second quartile position: $Q_2 = 2\ (n+1)/4$ (the median position)

Third quartile position: $Q_3 = 3(n+1)/4$

where, n is the number of observed values

3.4.2 Measure of Variation

In addition to central tendency, every data set can be characterized by its variation and shape. Measures of variation give information on the spread or variability of the data values.

3.4.2.1 The Range

Range is the simplest numerical descriptive measure of variation in a set of data. It is basically the difference between the largest and the smallest observation. It is very much sensitive to outliers. Eq.3. shows formula to calculate range.

Range = X largest – X smallest (3)

3.4.2.2 Interquartile Range

Interquartile range eliminates some high and low-valued observations and calculates the range from the remaining values. Interquartile range can be calculated by using Eq. 4.

Interquartile range = 3^{rd} quartile – 1^{st} quartile

$= Q_3 - Q_1$ (4)

3.4.2.3 Variance

Variance measure the “average” scatter around the mean-how larger values fluctuate above it and how smaller values fluctuate below it. Variance is the average of squared deviation of values from the mean. Variance can be calculated by using Eq. 5.

Sample variance $$S^2 = \frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{n-1} \quad (5)$$

Where, $\overline{X}$ = Arithmetic mean

n = Sample size

X_i = i^{th} value of the variable X

3.4.2.4 Standard Deviation

Standard Deviation is the most commonly used measured of variation. It shows variation about the mean. It has the same unit as the original data. It can be defined as the average measure of the “average” spread around the mean. Standard deviation can be calculated by using Eq. 6.

Sample Standard Deviation $$S = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{n-1}} \quad (6)$$

Where, $\overline{X}$ = Arithmetic mean

n = Sample size

X_i = i^{th} value of the variable X

3.4.2.5 Coefficient of Variation (CV)

Coefficient of variation measures relative variation. It is always represented in percentage (%). Basically, it shows variation relative to mean. It can be used to compare

two or more sets of data measured in different units. CV can be determined by using Eq. 7.

$$CV = \left(\frac{S}{\overline{X}} \right) \cdot 100\% \qquad (7)$$

where,

$\overline{X}$ = Arithmetic mean

S = Standard Deviation

3.4.3 Type of Analysis

The data used in this research were either of ordinal scale or nominal scale. The data gathered from the course evaluation form was of ordinal scale, whereas from the trainee competency form was of nominal scale. The data obtained from the follow-up interviews was of both nominal and ordinal scale. The various terms and methodologies used in this analysis are described below.

3.4.3.1 Z test of Hypothesis for the proportion

Z test of Hypothesis for proportion is used when we want to test a hypothesis about the proportion of events of interest in the population, π, rather than testing the population mean. The proportion of success in the population, *p*, is estimated through the sample proportion. Then the value of "*p*" compared to the hypothesized value of the parameter, π, in order to decide whether to reject the null hypothesis. If the number of events of interest (*X*) and the number of events that are not of interest (*n*-*X*) are each at least five, the sampling distribution of a proportion approximately follows a normal distribution. Z test for the proportion is given in Eq. (8) is used to perform the hypothesis test for the

difference between the sample proportion, *p*, and the hypothesized population proportion, π (Levine et al. 2011).

Z test for the proportion

$$\text{Zstat} = \frac{\text{p-}\pi}{\sqrt{\frac{\pi(1-\pi)}{n}}} \quad (8)$$

where,

p = sample proportion = $\frac{\text{number of success (X)}}{\text{sample size (n)}}$

π= hypothesized proportion of events of interest in the population

The Z stat test statistic approximately follows a standardized normal distribution when *X* and (*n*-*X*) are each at least five (Levine et al. 2011).

3.4.3.2 Confidence Interval Estimation for the Proportion

For finding a confidence interval we use the results from the central limit theorem on the distribution of *p* and get confidence interval for a population proportion *p.* Equation (9) defines the confidence interval estimate for the population proportion.

$$p \pm z^* \sqrt{\frac{p(1-p)}{n}}$$

$$p - z^* \sqrt{\frac{p(1-p)}{n}} \leq \pi \leq p + z^* \sqrt{\frac{p(1-p)}{n}} \quad (9)$$

Where

z* is the (1-α/2) percentile of the standard normal distribution.

p = sample proportion = $\frac{\text{number of success (X)}}{\text{sample size (n)}}$

π = hypothesized proportion of events of interest in the population

To use this confidence interval, the sample size n must large enough to ensure that both X and n-X is greater than five.

3.4.3.3 Z test for the difference between two proportions

Z test for the difference between two proportions can be used to compare proportions that describe two populations. In this research this test was used to compare whether the percentage of Spanish-speaking and the English-speaking trainees who found the usefulness of various topic covered in the class same or not.

Notation:

	Population proportion	**Size**	**Sample**	
			successes	**proportion**
population 1	π_1	n_1	x_1	*p1*
population 2	π_2	n_2	x_2	*p2*

As per Levine et al. 2011, the difference in population proportion, $\pi_1 - \pi_2$, can be estimated based difference in the sample proportion, p_1-p_2.

- For the mean: $\mu_{\pi 1-\pi 2} = \mu_{\pi 1} - \mu_{\pi 2} = \pi_1 - \pi_2$, so that p_1-p_2 is an unbiased estimator for $\pi_1 - \pi_2$.
- For the variance:

  $\sigma^2_{p1-p2} = \sigma^2_{p1} + \sigma^2_{p2} = \frac{\pi 1(1-\pi 1)}{n1} + \frac{\pi 2(1-\pi 2)}{n2}$

- For the standard deviation:

  $\sigma_{p1-p2} = \sqrt{\frac{\pi 1(1-\pi 1)}{n1} + \frac{\pi 2(1-\pi 2)}{n2}}$

- Shape: If n_1 and n_2 are both large (that is, if $n_1 \pi_1 \geq 5$, $n_1 (1-\pi_1) \geq 5$, $n_2 \pi_2 \geq 5$, *and* $n_2 (1-\pi_2) \geq 5$, then the sampling distribution of p_1-p_2 is approximately normal.

Z test for the difference between two proportions

$$zstat = \frac{(p1-p2)-(\pi 1-\pi 2)}{\sqrt{\frac{\pi 1(1-\pi 1)}{n1}+\frac{\pi 2(1-\pi 2)}{n2}}} \quad (10)$$

3.4.3.4 Chi-square test for the difference between two proportions

In this, the hypothesis-testing procedure uses a test statistic that is approximated by a chi-square (X^2) distribution. The results of the X^2 distribution is similar to the Z test described in 3.4.3.3.

According to Levine et al. 2011, Chi-square test for the difference between two proportions is used for response of counts of categorical responses between two independent groups by developing a two-way contingency table to display the frequency of occurrence of items of interest and items not of interest for each group.

The 2x2 contingency table shown in Table 9 has two rows and two columns, the cells in the table indicate the frequency for each row and column combination.

Table 9. Layout of 2 x 2 Contingency table.

Row Variable	**Column Variable**		
	1	**2**	**Totals**
Items of interest	X_1	X_2	X
Items not of interest	n_1-X_1	n_2-X_2	n-X
Total	$\boldsymbol{n_1}$	$\boldsymbol{n_2}$	$\boldsymbol{n}$

where,

X_1 = number of items of interest in group 1

X_2= number of items of interest in group 2

$n_1 - X_1$ = number of items that are not of interest in group 1

$n_2 - X_2$ = number of items that are not of interest in group 2

$X = X_1 + X_2$, the total number of items of interest

$n - X = (n_1 - X_1) + (n_2 - X_2)$, the total number of items that are not of interest

n_1= sample size in group 1

n_2= sample size in group 2

$n = n_1 + n_2$ = total sample size

To test the null hypothesis that there is no difference between the two populations:

$$H_o: \pi 1 = \pi 2$$

Against the alternative hypothesis that the two population proportions are not the same:

$$H_1: \pi 1 \neq \pi 2$$

X^2 test statistics shown in equation (11) is used.

$$X^2_{\text{stat}} = \Sigma \frac{(fo - fe)^2}{fe} \quad (11)$$

where

f_o = observed frequency in a particular cell of a contingency table

f_e = expected frequency in a particular cell if the null hypothesis is true

The X^2_{stat} test statistic approximately follows a chi-square distribution with 1 degree of freedom.

The estimated overall proportion for two groups is given by equation (12).

$$P = \frac{X1+X2}{n1+n2} = \frac{X}{n} \quad (12)$$

The expected frequency, f_e, for each cell pertaining to the items of interest is obtained by multiplying the sample size for a group by $\mathcal{P}$. To compute the expected frequency, f_e, for each cell pertaining to the items that are not of interest, we multiply the sample size for a group by 1-P.

Using the level of significance α, we reject the null hypothesis if the computed X^2_{stat} test statistic is greater than X^2_{α}, the upper-tail critical value from the X^2 distribution with 1 degree of freedom. Hence, the decision rule is

Reject H_o if $X^2_{\text{stat}} > X^2_{\alpha}$

Otherwise, do not reject H_o.

3.4.3.4 Wilcoxon Rank Sum Test

Wilcoxon rank sum test is a nonparametric analysis for two independent populations. It is used for testing whether there is a difference between two medians. The Wilcoxon rank sum test does not depend on the assumption of normality for the two populations. This test is generally used when the data is of ordinal scale.

According to Levine et al. 2011, to perform the Wilcoson rank sum test, we replace the values in the two samples of size n_1 and n_2 with their combined ranks. We begin by defining $n = n_1+n_2$ as the total sample size. Then, we define the ranks so that rank 1 is given to the smallest of the n combination values, rank 2 is given to the second smallest, and so on, until rank n is given to the largest. In the condition when several values are tied, we assign each the average of the ranks.

In case of unequal sample sizes, n_1 represents the smaller sample and n_2 represents the larger sample.T_1 (Wilcoxon rank sum test statistic), is defined as the sum of the ranks

of assigned to the n_1 values in the smaller sample. The test statistic T_1 plus T_2 can be determined by using equation (13) to check the accuracy of rankings.

$$T_1 + T_2 = n(n+1)/2 \quad (13)$$

When n_1 and n_2 are both ≤ 10, then we use the Wilcoxon rank sum test table to find the critical values of the test statistics T_1.

For large sample sizes, the test statistic T_1 is approximately normally distributed, with the mean, $\mu_{T1,}$

$$\mu_{T1} = \frac{n1(n+1)}{2}$$

$$\sigma_{T1} = \sqrt{\frac{n1n2(n+1)}{12}}$$

where

σ_{T1} = standard deviation

The standardized Z test statistic for large sample Wilcoson rank sum test is defined by equation (14)

$$Zstat = \frac{T1 - \frac{n1(n+1)}{2}}{\sqrt{\frac{n1n2(n+1)}{12}}} \quad (14)$$

For testing the null hypothesis when the sample sizes are in the range of the Wilcoson rank sum test table we use Equation (14). On the basis of selected level of significance, α, we reject the null hypothesis if the Z_{stat} lies in the rejection region (Levine et al. 2011).

CHAPTER 4

DATA DESCRIPTION

4.1 Data Set

The data sets used in this research were collected from the trainees, who participated in the Fall Prevention training program. Three sets of data were collected in this research for analysis, namely: a) Course Evaluation data, b) Trainees' Competency data, and c) Follow-up Interview data.

By the time this thesis was written, the Fall Prevention training program had provided 40 classes, from April 2010 to October 2011. The training class was held at the University of Nevada, Las Vegas, Nevada. Altogether, 29 English and 11Spanish classes were offered during the training program. Table 10 shows the dates and number of trainees in each of the English and Spanish classes.

The total number of trainees was 742, out of which 562 were English-speaking and 180 were Spanish- speaking. During the training program, 722 course evaluations, 725 trainee competency assessments, and 350 follow-up interviews data were collected for analysis. Details of the data collected from the English and Spanish Fall Prevention classes are shown in Table 11.

Table 10. Roster summary of Fall Prevention training classes.

S.N.	Training End Date	Training Module	Length (Hours)	No. of Attendees
1	14-Apr-10	English	8	2
2	28-Apr-10	English	8	3
3	5-May-10	English	8	2
4	3-Jun-10	Spanish	8	8
5	23-Jun-10	English	8	5
6	8-Jul-10	Spanish	8	70
7	12-Jul-10	English	8	53
8	21-Jul-10	Spanish	8	10
9	4-Aug-10	English	8	6
10	12-Aug-10	Spanish	8	8
11	21-Aug-10	Spanish	8	7
12	11-Sep-10	English	8	23
13	18-Sep-10	Spanish	8	9
14	9-Oct-10	English	5	24
15	16-Oct-10	Spanish	5	7
16	30-Oct-10	English	5	19
17	5-Nov-10	English	5	41
18	6-Nov-10	Spanish	5	16
19	20-Nov-10	English	5	33
20	4-Dec-10	Spanish	5	18
21	11-Dec-10	English	5	31
22	15-Jan-11	English	5	29
23	5-Feb-11	Spanish	5	9
24	12-Feb-11	English	5	17
25	5-Mar-11	English	5	29
26	2-Apr-11	English	5	20
27	23-Apr-11	English	5	30
28	21-May-11	English	5	12
29	4-Jun-11	English	5	33
30	11-Jun-11	English	5	13
31	18-Jun-11	English	5	10
32	25-Jun-11	English	5	10
33	9-Jul-11	English	5	14
34	16-Jul-11	English	5	9
35	30-Jul-11	English	5	14
36	6-Aug-11	English	5	14
37	13-Aug-11	English	5	13
38	10-Sep-11	Spanish	5	18
39	17-Sep-11	English	5	35
40	1-Oct-11	English	5	18

Table 11. Summary sheet of data collected from English and Spanish classes.

Training Module	Total no. of trainees	No. of Course Evaluation data	No. of Trainee Competency data	Follow-up Interviews	
				No. of Consents	No. of Respondents.
English	562	555	556	499	249
Spanish	180	167	169	148	101
Total	**742**	**722**	**725**	**647**	**350**

4.2 Course Evaluation

Evaluation of the course was carried out to determine the effectiveness of the training, evaluate the instructor, and to receive feedback for improvement of the training program. The course evaluation form consisted of six questions. The first three questions of the form covered items dealing with the course content, and the fourth and fifth questions were about the instructor. In the last question, the trainees were asked to provide suggestions and comments for improvement of the class. A sample of English and Spanish Course Evaluation form is provided in the APPENDIX A and APPENDIX B, respectively.

The trainees were allowed to grade the questions from excellent to poor. Numeric points were assigned for each response, as shown in Table 12. The responses to the course evaluation questions are presented in APPENDIX A.

Table 12. Course evaluation criteria.

Responses	Points
Excellent	5
Good	4
Neutral	3
Fair	2
Poor	1

4.3 Trainee Competency

During the hands-on training session, the competency of trainees was assessed in using personal fall arrest systems, guardrails, and ladders. A sample Competency Assessment form is provided in APPENDIX A and APPENDIX B. Nominal data obtained from these forms were used to calculate the percentage of trainees that were competent and incompetent in demonstrating skills with the above--mentioned safety equipment. The data also were analyzed in three different ways, namely: a) English trainees competency data only, b) Spanish trainees competency data only, and c) combined English and Spanish trainees competency data. Then, a confidence interval for proportions was carried out to find the competency of each population. In order to compare the competency of English-speaking and Spanish-speaking trainees, a chi-square test was used to determine the difference between proportions. The data obtained from the competency form are shown in APPENDIX C.

4.4 Follow-up interviews

The follow-up interview questionnaire had 12 questions; response to these questions was in the form of ‘yes’ or ‘no’. The questionnaire also had an open-ended question regarding changes made in fall prevention behavior after taking the training. Responses to this question were transcribed, and are presented verbatim in APPENDIX C. Data of follow-up interviews were analyzed in three different ways, namely: a) English trainees data only, b) Spanish trainees data only, and c) Combined English and Spanish trainees data.

Question number two involved determining the importance of the topics covered in the training class. Therefore, a Z test for the difference between population proportions was conducted to compare the importance of various topics covered in the class for the English-speaking and Spanish-speaking trainees. Data obtained from other questions was of nominal scale; hence, a Chi-square test was used to compare the results for each question between the English-speaking and Spanish-speaking trainees. Descriptive statistics also was used to show the frequency distribution to the responses. A sample of the questionnaire and the data obtained are presented in APPENDIX A, APPENDIX B , and APPENDIX C, respectively.

CHAPTER 5

COURSE CURRICULUM DEVELOPMENT

In order to train the workers for fall prevention, the first and foremost job is to prepare an effective course curriculum material. Good training and education materials regarding health and safety are very essential for the reduction and prevention of injuries. Because a well trained/educated worker is more aware of hazards, it is very essential to develop appropriate occupational safety and health resources. The fatal and non-fatal occupational injuries due to falls occur frequently in the construction industry; therefore, it is critical to allocate safety educational and training resources for fall prevention. Development of health and safety resources targeting the Spanish-speaking workers is very difficult because Spanish-speaking workers require linguistically and culturally appropriate resources. This research involved the participation of workers in the design, development, and continuous evaluation stages, with the assumption that the workers themselves could contribute creative, useful ideas (Brunette 2004). This chapter describes the design and development of Fall Prevention curriculum in English, and its translation to Spanish.

5.1 Development of English /Spanish Fall Prevention Material

In this project, first, the training and educational materials were developed in English and then translated into Spanish, as shown in Figure 10. The English curricular materials were prepared by faculty members of the Construction Management Program and School of Nursing at UNLV because they have a great deal of experience in construction safety. While preparing the training materials, existing sources were used, for example, the

Electronic Library of Construction Safety and Health (eLCOSH); in addition, original material also was created, where necessary. The basic guidelines of training curriculum materials were derived from several studies (O'Conner 2003; Christopher 2002; Marin and Van Oss-Marin 1991); these guidelines were:

1. Using language familiar to workers;
2. Designing materials that are linguistically and culturally appropriate;
3. Maintaining the limited literacy level of materials (medium-to-low literacy level);
4. Using plenty of relevant graphics and photographs;
5. Introducing basic OSHA laws and workers' rights;
6. Establishing a continuous evaluation program;
7. Avoiding a straight translation from Spanish to English;
8. Using a native-speaking Spanish translator who has sound knowledge of the topic;
9. Providing Spanish language training by native Hispanic trainer;
10. Conducting pilot testing with small subset of workers.

The written materials were developed to a fifth-grade literacy standard, and contained many graphics, in accordance with Brunette's recommendations (Brunette 2005). These materials were first sent to Labor Union for review and then sent to OSHA for final approval. Upon approval by OSHA, the training materials were reproduced in a paper format as well as in DVD format. In addition, a wallet card was also developed in both English and Spanish that highlighted important fall protection fundamentals so that each worker could have it with them at their jobsite.

5.1.1 Translation of English Materials to Spanish

Translation of English material to culturally and linguistically appropriate Spanish material is a critical job that requires rigorous care. Until now, there has not been a consensus about best translation method. Just using a simple translation can lead to communicating the wrong meaning. The quality of the translated material directly depends upon the translation method that is adopted. Therefore, in this research, prepared English materials were translated into Spanish by native Spanish-speaking students who had a good knowledge of safety and construction sites. The student was a senior student of Construction Management program of UNLV. During the translation process, OSHA Dictionaries (English-to-Spanish) were used as well as other resources, including The Wiley Dictionary of Civil Engineering and Construction: English-Spanish/Spanish-English; Construction Spanish (en inglés y español); Constructionary, Second Edition: English-Spanish/Spanish/English by the International Code Council; and the R.S. Means English/Spanish Dictionary for Construction. After the translation process the materials were sent to OSHA for review, as shown in Figure 10.

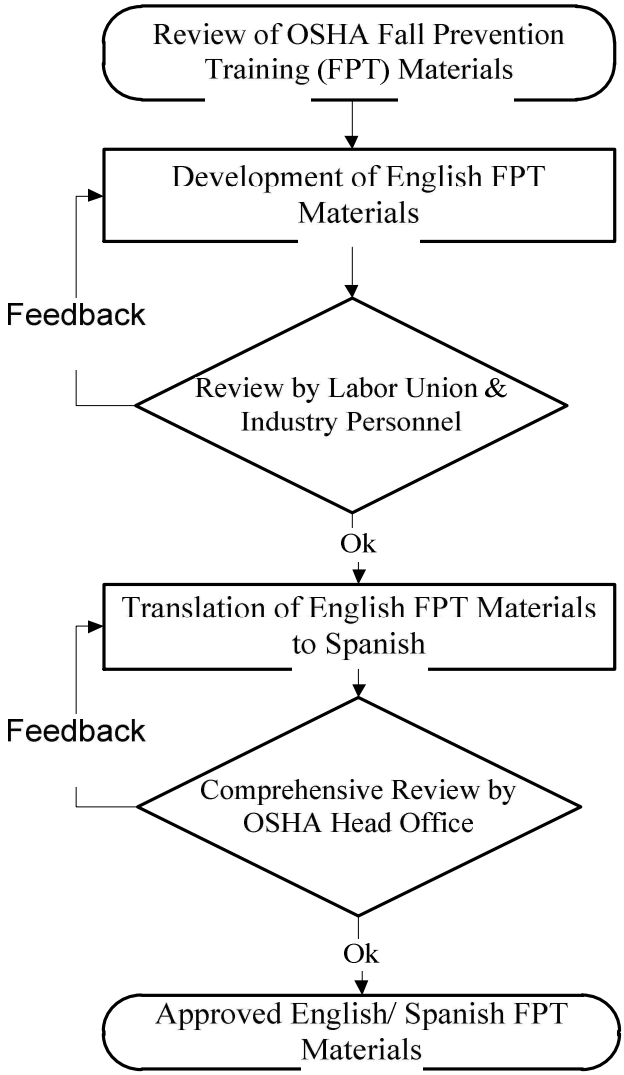

Figure 10 Flow Chart of Curriculum Development

5.3 Training Topics

The training topics were selected that provided an overview of various fall hazards in the construction industry. The selected topics also taught workers to identify potential fall hazards and mitigate hazards; in addition, they also taught the workers what their rights are and how to ask the rights with their supervisors regarding hazards. The various topics covered in the class were:

- Introduction to basic OSHA and Workers' rights and responsibilities
- Fall Protection Requirements
- Fall Protection Hierarchy
- Safe Work Practices
- Falling Object Hazards
- Warning Line Systems
- Safety Monitoring Systems
- Safety Nets
- Controlled Access Zones
- Guardrails
- Personal Fall Arrest Systems
- Harness Safety Checks
- Ladders Safety and Setup
- Scaffold Safety and Setup
- Connectors & Lanyards
- Anchor Points
- Equipment Inspections
- Rescue Plan
- Recognition of Environments with High Risk of Falls
- Assertiveness Training

CHAPTER 6

TRAINING APPROACH

Safety training has been effective as a primary prevention for construction injuries (Dong et al. 2004). However, access to minority worker populations is difficult due to literacy, language, and other socio-cultural and legal barriers, traditional lecture-based safety training approaches are often ineffective. During focus groups with Hispanic construction workers in Southern Nevada, they expressed a desire for practical, learning with role playing for specific situations (Menzel and Gutierrez 2010). Many foreign-born Hispanic laborers are unfamiliar with formal lecture-based classes, and have learned their trades through hands-on apprenticeships or tutoring by mentors; therefore, this training used simulation as one of its primary teaching strategies. In the past, simulation training for construction safety has been found to be effective (Wojcik et al. 2003).The Hispanic community involved in the study consisted of laborers, the entry point in the construction trades for most foreign-born construction workers (Brunette 2005).Laborers are the first workers on any construction project and the last to leave. In Southern Nevada, a wide range of OSHA-regulated construction companies employ laborers, from small residential subcontractors to large multinational firms. In the 2009 biennium, the Nevada legislature passed a law that required all construction workers to have the OSHA 10-hour training. OHSA 10-hour training is very general in nature; therefore, there is a recognized need for more detailed training in specific hazard areas as they apply to specific trades. Additional fall prevention training for laborers is an example of specific additional in-depth training that is appropriate for this trade, given that the laborers had double the

death rate from falls--7.5 per 100,000 full-time workers--from 2003 to 2005, compared to all construction trades (3.8 per 100,000)(CPRW 2007).

This training is based on high engagement training methods. The trainees are given more opportunities to have interaction with the material, and ask questions to the instructors. The participants of the training are also involved in hands-on practice of the behavior taught. This training used practical based learning method, as requested during a focus group by members from the Laborers' International Union of North American (LIUNA) # 872 members. In particular, the Hispanic value of collectivism dictates the use of peer groups, rather than individual study, to promote learning (Grzywacz et al. 2007). This kinesthetic approach is likely to be well-received; previous studies involving English as a Second Language (ESL) learner have demonstrated this learning preference (Lincoln and Rademacher 2006). For example, in a study of active learning styles, Hispanic diabetics found that the easiest way to understand self-management tasks were kinesthetic and the hardest ones involved cognitive thinking (Carbone et al. 2005). To better illustrate this approach, while lecture-based training might include pictures of fall arrest systems or even a demonstration of its proper use, attendees may not get the opportunity to practice wearing and securing it under various conditions. In addition, numerous factors can hinder proper use of a fall arrest system, such as feeling pressed for time, inability to ask questions in English, embarrassment due to poor English skills or lack of knowledge, or damaged or ill-fitting equipment. In this training, participants practiced skills under standardized conditions, for instance, with a "supervisor" telling the worker to hurry up. These scenarios allowed class instructors and peer trainers to

provide coaching on assertiveness as well. At the conclusion of this exercise, instructors checked to evaluate skill competency of the trainees.

Figure 11 shows the process used to train construction workers regarding fall prevention and the impact study of the training under Susan Harwood Training Grant. After the development and pilot testing of the course curriculum, training class was conducted in English and Spanish. Training was provided by instructors certified in OSHA 500. The eight-hour training class was divided into two four-hour sessions offered during the weekends. The training session included 1) limited theoretical instruction, with more audiovisual materials than usual for standard training; 2) demonstration/return demonstrations; and 3) simulation of fall prevention methods. Approximately, three fourth duration of the training involved classroom instruction, and one fourth involved actual hands-on training. The classroom instruction was made interactive by showing actual photos of a site having violations of safety rules; the trainees were asked to identify these violations, and encouraged them to share similar experiences from their own work site. Hands-on training involved the use of a personal fall arrest system PFAS) and the fall prevention options, including guard rails, safety nets, scaffoldings, and ladders. The competency of the participants in using the PFAS was assessed during the hands-on training, and they were asked to identify hazards in actual, defective ladders and scaffolds. The trainees were allowed to evaluate the class and make suggestions for its improvement at the end of class instruction.

Also at the end of the class, trainees were asked to give their consent, optionally, to fill a research contact information form for purposes of studying the impact of the training. Eight weeks after each class ended, telephone interviews were conducted with

the trainees who provided their consent for the impact study. The questionnaires were used to assess whether the trainees were able to recall and describe specific fall prevention skills, whether they have been exposed to fall hazards in the previous month, and, if so, what specific fall prevention behavior they used, if any. They also were asked whether or not they fell at work in the past month, and how many possible fall hazards they have avoided.

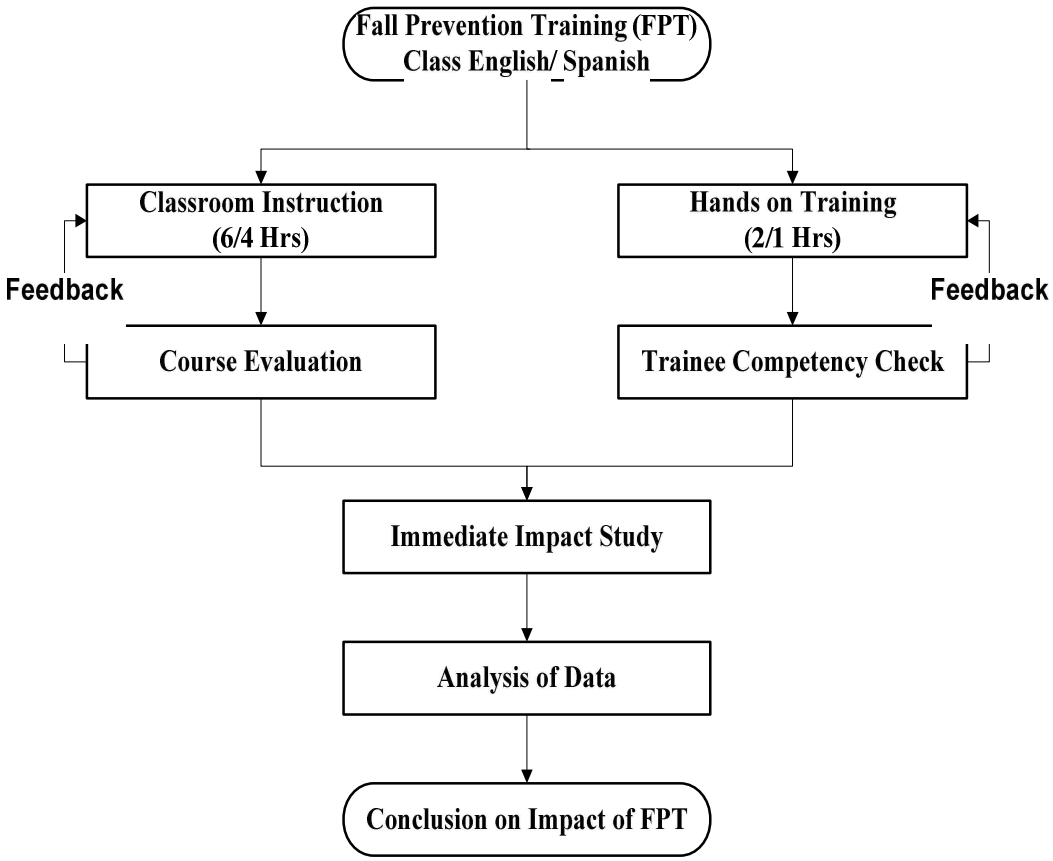

Figure 11 Training and Impact Study Process

CHAPTER 7

RESULTS/FINDINGS

Descriptive and inferential statistics were used to draw conclusions on the various research hypotheses formulated for this study. The raw data obtained from the training classes and the follow-up interviews were systematically recorded into Microsoft Excel worksheets for further analysis. Thereafter, PHstat2, which is compatible with Microsoft Excel, was used to conduct statistical analysis. This chapter summarizes the results of various statistical tests performed on the data collected during the training and post-training interviews.

7.1 Results of Course Evaluation

The data of the course evaluation were analyzed in three different ways, namely: a) data from English classes only, b) data from Spanish classes only, and c) combined data from both English and Spanish classes. Descriptive statistics for the response to five questions was performed to find out the mean, median, and standard deviation for each question. Then, the Wilcoxon Rank Sum test was conducted to test whether there is difference between two medians of responses to a question, between the English-speaking and Spanish-speaking classes. Written comments were analyzed and summarized.

The results of the descriptive statistics of course evaluation are shown in Table 13. The average class rating for all five questions was high. The overall class rating for the course content was 4.66, and the overall class rating for the ability of instructor was 4.75. This reinforces the applicability of the course content to the trainees' work and the ability

of instructors to teach. The results also showed that there is no virtually difference in the ratings between the Spanish-speaking and English-speaking classes.

Table 13 Descriptive statistics of responses to the Course Evaluation form.

Questions		**Response**					
		Min	**Max**	**Mean**	**Med**	**Mode**	**STD**
1) To what extent did the training increase your knowledge about dangers of falls on the job?	English (N=555)	1	5	4.65	5	5	0.56
	Spanish (N=167)	2	5	4.68	5	5	0.56
	Combined (N=722)	1	5	4.67	5	5	0.56
2) To what extent did the training improve your knowledge of how to identify and prevent risks of falls on the job?	English (N=555)	1	5	4.65	5	5	0.54
	Spanish (N=167)	2	5	4.68	5	5	0.53
	Combined (N=722)	1	5	4.66	5	5	0.53
3) To what extent did the training improve your skills in preventing falls on the job?	English (N=555)	1	5	4.65	5	5	0.58
	Spanish (N=167)	2	5	4.68	5	5	0.53
	Combined (N=722)	1	5	4.65	5	5	0.57
4) To what extent did the instructors answer your question (s) or concern (s) in a complete and courteous manner?	English (N=555)	2	5	4.72	5	5	0.55
	Spanish (N=167)	2	5	4.72	5	5	0.54
	Combined (N=722)	2	2	4.72	5	5	0.54
5) To what extent were the instructors well prepared to teach?	English (N=555)	1	5	4.78	5	5	0.5
	Spanish (N=167)	2	5	4.79	5	5	0.48
	Combined (N=722)	1	5	4.78	5	5	0.49

The participants also provided written comments about the course; these comments are summarized below.

1) Expectations. Although several trainees desired more hands-on training, most of the trainees' expectations were met. The trainees were very satisfied with the course content and the instructor. Also, the trainees anticipated that UNLV would provide more training like this in the years to come.
2) Suggestions. There was a mixed reaction about the duration of the class. Many said that it was a long class, while others said that the class time should be increased to cover the topics in more detail. As many trainees suggested that the duration of the class was long, the class was shortened from 8 hours to 5 hours, starting in October 2010. A few participants commented on the starting time of the class; instead of 8 a.m. start time, they suggested shifting the class to the afternoon. The trainees also opted that more videos related to jobsite safety should be shown, and that a site visit should be arranged. In addition, the participants suggested providing refreshments and pastries for the class.

Inferential statistics were used to determine whether the research hypotheses were found to be true or not. The Wilcoxon Rank Sum test was conducted at 95% confidence interval to test whether there is significant difference between two median responses to a question for each of the five questions in the course evaluation form. The results of this test are shown in Table 14. The result from the statistical analysis showed that there is no significant difference in the perceptions of English-speaking and Spanish-speaking trainees relating to the training content. Also, there is no significant difference in the ability of instructors to teach English-speaking and Spanish-speaking classes.

Table 14. Wilcoson Rank Sum Test for the difference between two medians of response to the Course Evaluation form.

Research Hypothesis	Mean Score		Z Test Statistic	P-Value
	English (N=555)	Spanish (N=167)		
There is a significant difference in the median score to response to the question "To what extent the training increased your knowledge about dangers of falls on the jobs?" between the Spanish-speaking and English-speaking Class.	4.65	4.68	0.703	0.482
There is a significant difference in the median score to response to the question "To what extent did the training improve your knowledge of how to identify and prevent risks of falls on the job?" between the Spanish-speaking and English-speaking Class.	4.65	4.68	0.957	0.338
There is a significant difference in the median score to response to the question "To what extent did the training improve your skills in preventing falls on the job?" between the Spanish-speaking and English-speaking Class.	4.65	4.68	0.310	0.756
There is a significant difference in the median score to response to the question "To what extent did the instructors answer your questions or concerns in a complete and courteous manner?" between the Spanish-speaking and English-speaking Class.	4.72	4.72	-0.029	0.977
There is a significant difference in the median score to response to the question "To what extent were the instructors well prepared to teach?" between the Spanish-speaking and English-speaking Class.	4.78	4.79	-0.196	0.844

7.2 Results of Trainee Competency Evaluations

Out of 742 trainees trained at the time of writing this thesis, the competency of 725 trainees was checked. Among them, 556 were English-speaking trainees and 169 were Spanish-speaking trainees. The competency of the workers in using personal fall arrest systems, guard rails, and ladders was assessed and graded as ‘competent’ or ‘incompetent’. Figure 12 shows the result of the workers’ competency assessments.

The results show that about 65% of the trainees had the skills to use personal fall arrest systems (PFAS), setup and check safety of guardrails, and check safety of ladders. About 85% of trainees were capable to set up ladders correctly. These percentages show that some of the trainees did not know safety systems for fall prevention. When the data were divided into English-speaking and Spanish-speaking trainees, it showed that the Spanish-speaking trainees were more competent in using PFAS, guard rails, and ladders.

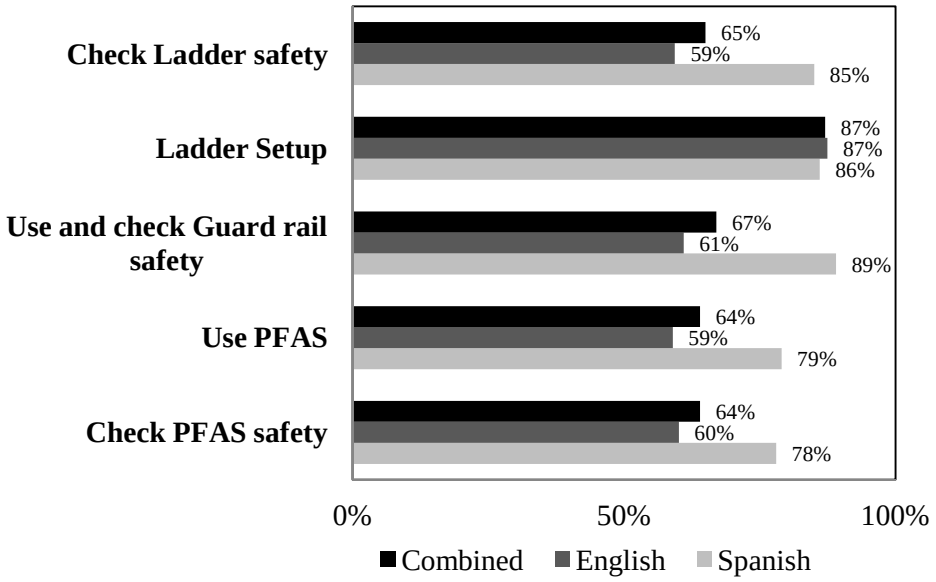

Figure 12. Results of Competency Assessment

Z test was conducted to determine the 95% confidence interval of the population proportion for each of these categories mentioned in the competency forms. The test was conducted separately for both English-speaking and Spanish-speaking workers. According to this test, at a 95% confidence interval, the competency of English-speaking and Spanish-speaking to use various fall safety equipments are as shown in Table 15.

Table 15. 95% Confidence Interval of competency of workers.

Skills	Trainees	
	English-speaking	Spanish-speaking
Check safety of personal fall arrest system	56%-64%	72%-84%
Use personal fall arrest system	55%-63%	73%-85%
Setup and check safety of guard rail	57%-65%	84%-94%
Set up ladders	85%-90%	81%-91%
Check safety of ladders	55%-63%	79%-90%

The results from the Chi-Square test for differences between proportions show that the competencies of the two populations are not same. Results showed Spanish- speaking trainees to be more competent than English-speaking trainees in all of above mentioned skills, except in setting up ladders. Both populations were found to be equally competent in setting up ladders. The summary of the Chi-Square tests is shown in Table 16.

The number of English-speaking trainees who participated in the competency test was three times more than the Spanish-speaking trainees (Table 11); this may be the primary reason for Spanish-speaking trainees to be seen more competent compared to the English-

speaking trainees. Due to the lack of time, during the hands- on training, the trainees were not tested individually to demonstrate skills mentioned in the competency form. However, the participants were asked whether they were competent or not to demonstrate the skills. The competency form was filled out merely based on their response, which may have caused some discrepancies in the results.

Table 16. Chi-square test for the difference between competency proportions of the two populations.

Research Hypothesis	**Chi-Square test statistic**	**P-Value**
The competency percentage of English-speaking and Spanish-speaking workers to check safety of "Personal Fall Arrest System" is not equal.	18.36**	<0.001
The competency percentage of English-speaking and Spanish-speaking workers to use "Personal Fall Arrest System" is not equal.	23.10**	<0.001
The competency percentage of English-speaking and Spanish-speaking workers to set up and check safety of "Guard rails" is not equal.	45.58**	<0.001
The competency percentage of English-speaking and Spanish-speaking workers to set up "Ladders" is not equal.	0.29	0.585
The competency percentage of English-speaking and Spanish-speaking workers to check safety of "Ladders" is not equal.	36.48**	<0.001

* Significant at alpha level 0.05 (2-tailed)
** Significant at alpha level 0.01 (2-tailed)

7.3 Results of Follow-up Interview

Follow-up interviews were made with the trainees eight weeks after the completion of the training. Interviews were conducted with only those trainees who provided consent to participate in the research. At the time of this thesis writing, consent for research was provided by 647 trainees. Successful telephone interviews were made to 350 trainees, 249 were English-speaking and 101 were Spanish-speaking (Table 17). The success rate of Spanish-speaking trainees was higher than English-speaking trainees. The overall success rate was 54.1%.

Table 17. Overview of number of follow-up interviews.

Trainees	No. of Trainees	No. of Consent	% of trainees providing consent	No. of Interview	Success Rate
English	562	499	88.8%	249	49.9%
Spanish	180	148	82.2%	101	68.2%
Total	**742**	**647**	**87.2%**	**350**	**54.1%**

Among the trainees who participated in the research, 88.8 % of English-speaking trainees consented to participate in the research; however, only 49.9% of them actually participated in the telephone interview. On the other hand, about 82.2 % of Spanish-speaking trainees consented to participate in the research and 68.2% of them participated. Some of the reasons for not getting responses from the trainees are:

- The telephone number provided was out of service.
- Trainees provided company their office phone number and they are field workers.

- A number of trainees said that they were at work and requested to be called later, and they did not answer when called back.
- Many hesitated to respond and hung-up.

7.3.1 Usefulness of topic covered in the class

The second question of the follow-up interview was asked to determine the most useful topic that was covered in the class, in the context of their work. The respondents were given some time to remember a particular topic; if they were not able to do so they were reminded the topics that were covered in the class. The results of the data analysis are shown in Figure 13. From the data collected it was seen that 44.9% of the total respondent found that “Fall Prevention Options and Use of Personal Fall Arrest Systems” was the most important topics covered in the class. “General Information about Fall Prevention” and “Portable Ladders” were the second and third most important topics, with a 39.1% and 36.6% response, respectively. Safety nets and temporary guard rails were the two least important topics covered, according to the responses. Figure 12 shows the summary of the responses to the second question.

The results indicate that the English-speaking trainees valued “Fall Prevention Options and Use of Personal Fall Arrest Systems,” “Portable Ladders,” and “General Information about the Fall Prevention System” the most. The Spanish-speaking trainees valued “General Information about the Fall Prevention System,” “Fall Prevention Options and Use of Personal Fall Arrest Systems,” and “Assertive Training” the most.

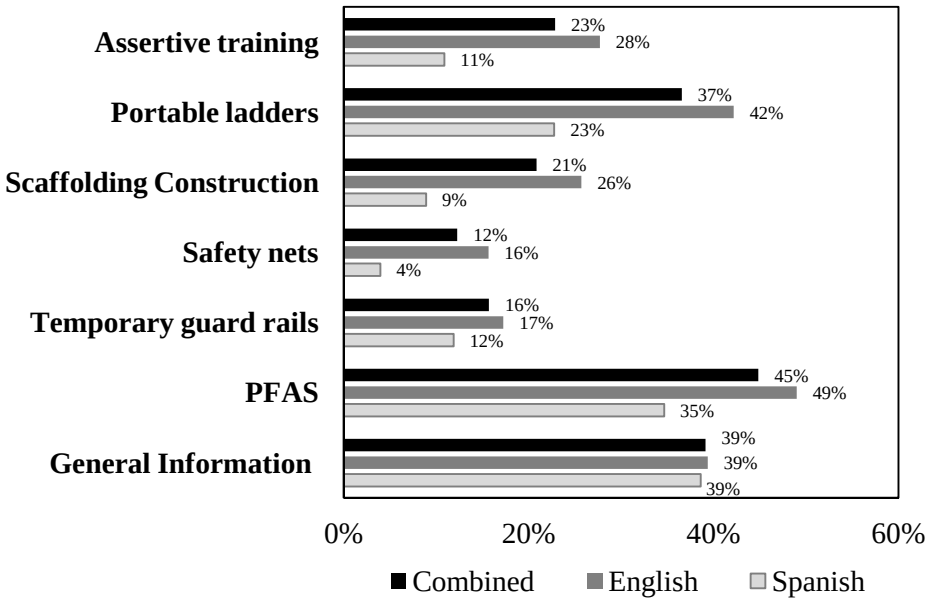

Figure 13. Comparison of usefulness of fall prevention training topics

Data obtained from Spanish-speaking and English-speaking trainees were tested using the non-parametric Z test to determine the significant differences between the two proportions at the 95% confidence interval. The test showed that an equal proportion of English-speaking and Spanish-speaking trainees gave importance to “General Information about Fall Prevention” and “Temporary Guard Rail” topics. A significant proportion of English-speaking trainees valued “Fall Prevention Options and Use of Personal Fall Arrest Systems,” “Safety Nets,” “Scaffolding Construction,” “Portable Ladders,” and “Assertive Training” more than did the Spanish-speaking trainees (Table 18).

Table 18. Z test for the difference between two proportions for usefulness of topic covered in the class

Research Hypothesis	**Z Test Statistic**	**P-Value**
More English-speaking Trainees found "General Information about Fall Prevention "topic to be more useful for their work.	0.301	0.763
More English-speaking Trainees found "Fall Prevention options and use of personal fall arrest" topic to be more useful for their work.	2.444**	0.007
More Spanish-speaking Trainees found "Temporary Guard Rail" topic to be more useful for their work.	1.255	0.209
More English-speaking Trainees found "Safety Nets" topic to be more useful for your work.	3.022**	0.003
More English-speaking Trainees found "Scaffolding Construction" topic to be more useful for their work.	3.503**	<0.001
More English-speaking Trainees found "Portable Ladder" topic to be more useful for their work.	3.414**	<0.001
More English-speaking Trainees found "Assertive Training" topic to be more useful for their work.	3.395**	<0.001

* Significant at alpha level 0.05 (2-tailed)
** Significant at alpha level 0.01 (2-tailed)

7.3.2 Importance and effectiveness of fall prevention training

The trainees were asked questions to determine the importance and effectiveness of Fall Prevention training. Figure 14 shows the results of the follow-up interviews. The results showed that the majority of trainees improved their fall prevention knowledge and made changes to their fall prevention behavior. About 75% of the trainees were involved in jobs that require fall prevention knowledge and skills, 97% of the trainees improved

their fall prevention knowledge and skills, and 61% of the trainees were able to avoid possible fall hazards at the site. The data analysis showed that a greater proportion of Spanish-speaking trainees avoided fall accidents and made changes to fall prevention behavior than did English-speaking trainees. It also showed that a greater proportion of Spanish-speaking trainees were involved in jobs that required fall prevention training than did English-speaking trainees. English-speaking trainees avoided 223 possible fall hazards, where as Spanish-speaking trainees avoided 206 possible falls after they had taken the training. However, 5 English-speaking trainees and 1 Spanish-speaking trainee fell at work after the training. These clearly indicates that after this training, most of the trainees were working in jobs where they were exposed to fall hazards and were able to implement the attributes learned from the training.

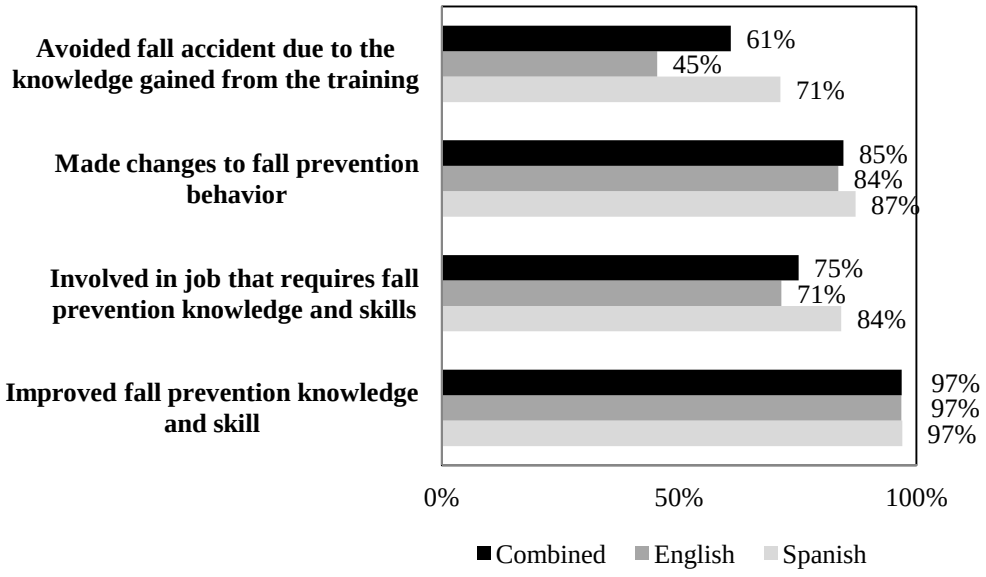

Figure 14. Impact of Fall Prevention training

Those who said they made changes to their fall prevention behavior as a result of the training were asked what kind of changes they made. The response of the trainees were analyzed and summarized as shown in Table 19. Among 296 trainees who made changes to their fall prevention behavior 208 were English-speaking and 88 were Spanish-speaking. Most of the trainees said that they became more aware and cautious about fall hazards after taking the training; additionally, they said that they became more concerned about their working environment, and developed the habit of checking equipment before use.

Table 19. Summary of responses regarding changes made in fall prevention behavior.

Made changes related to	**No. of Responses**		
	English-speaking Trainees (N=208)	**Spanish-speaking Trainees (N=88)**	**Combined**
General Information about fall prevention	58	15	73
Ladder			
Proper Installation	19	19	38
Safe Operation	26	25	51
Scaffolds			
Proper Installation	4		4
Safe Operation	4	3	7
Personal Fall Arrest Systems			
Proper Installation	15	3	18
Safe Operation	6	3	9
Guard rails			
Proper Installation	2	1	3
Safe Operation	2	1	3
Assertiveness	4	2	6
Overall Safety	94	34	128

The Chi-Square test for the difference between two proportions was conducted at 95% confidence interval to determine whether there was a significant difference in the importance and effectiveness of fall prevention training to the English-speaking and Spanish-speaking population. Results of the test are shown in Table 20.

The test results showed that there was no significant difference between the proportion of English-speaking and Spanish-speaking populations in improvement of fall prevention knowledge and skills. An equal proportion of both the groups made changes to their fall prevention behavior, and also was involved in situations at their job similar to those demonstrated in the class. It was found that the employers of both groups valued the Fall Prevention training provided by UNLV. However, the test showed that a significant proportion of the jobs held by Spanish-speaking trainees required fall prevention knowledge and skills, more than jobs for the English-speaking trainees. In addition, the Spanish-speaking trainees were able to avoid more possible fall accidents at their job site due to the knowledge gained from the training.

Table 20. Chi-Square test for the difference between two proportions of response to follow-up interviews.

Research Hypothesis	**Chi-square test statistic**	**P-Value**
There is a significant difference in improvement of fall prevention knowledge and skills between the English-speaking and Spanish-speaking trainees.	0.01	0.906
There is a significant difference in the job that requires fall prevention knowledge and skills (as measured by involvement in job that requires fall prevention knowledge and skills) between the English-speaking and the Spanish-speaking trainees.	5.93*	0.015
There is significant difference in changes made to the fall prevention behavior by the English-speaking and Spanish-speaking trainees as a result of the training.	0.71	0.399
There is a significant difference in the number of English-speaking and Spanish-speaking trainees involved in any of the situations at their job that were shown in the class.	0.11	0.742
There is a significant difference in the ability to avoid fall accidents due to the knowledge gained from the training between the English-speaking and Spanish-speaking trainees.	16.21**	<0.001
There is a significant difference in the value that the employer of English-speaking and Spanish-speaking trainees gave to the fall prevention training provided by UNLV.	0.34	0.560

* Significant at alpha level 0.05 (2-tailed)

** Significant at alpha level 0.01 (2-tailed)

7.4 Study Limitations

Because of the time constraint, while determining the competency of trainees, they were not asked to demonstrate their skills in using the safety equipment. Instead, they were asked whether or not they could use and check safety of the safety equipment. The

competency form was filled out according to their response. Therefore, the results regarding the trainees' competency assessment depended upon their response only. From the data, it was found that the Spanish-speaking trainees were comparatively more competent than the English-speaking population. This result may be influenced by the culture of the Spanish-speaking people and their respect to authority. Also, there is a chance of discrepancies in the results, if the trainees just pretended to know the skills.

The method of conducting follow-up interviews was not systematic; interviews were conducted without giving pre-notice about the time of interview. The trainees were just randomly called from 9 am to 6 pm on the weekday as well as on the weekends. During the interview, some of respondents hesitated to participate in the interview, while some just wanted to finish the interview quickly. A tendency to say "yes" to all of the questions, for instance, agreeing with the entire question, or else giving extreme responses was noticed during the interviews. There is a probability of non-response error and response bias in the follow-up interviews

This study only finds the immediate and intermediate outcomes of the training for the trainees. The immediate outcome of the training was to identify the changes in belief, knowledge, attitudes, and skills of the trainees. However, the intermediate outcome was to determine the behavioral changes made, new work practices adopted, and the number of accidents avoided at the workplace. The ultimate impact of the training was not studied in this research because it depends on several other factors independent of the training. The ultimate impact would be a reduction in injuries and deaths as well as the various associated direct and indirect costs.

CHAPTER 8

RECRUITING TRAINEES FOR FALL PREVENTION TRAINING

Southern Nevada experienced a residential and commercial building boom from 2005 to late 2007; after that, the current recession began, and construction stalled in Nevada, as in the rest of the country. These job losses represented an opportunity to attract unemployed construction workers to participate in fall prevention training classes in order to prepare them for the next increase in demand for construction jobs and to reduce the risk of deaths and injuries due to falls.

This training program mainly targeted the population involved in occupations that had a higher rate of fatalities and injuries. The primary goal of this training program was to train 760 construction workers in Southern Nevada to improve their safety knowledge and to reduce occupational injuries or death from falls. This chapter discusses the various recruiting methods and strategies used, and also the challenges involved to achieve the target population of 760.

8.1 Methods used for recruiting

In order to recruit people for the training, advertisement of fall prevention training classes was essential. Advertisement of the classes was accomplished using following channels: outreach to unions, advertisements and news stories in print media, participation in radio talk shows, features on Spanish-language television, contracts with key informants, word-of-mouth referrals, English-language and Spanish-language flyers at the State of Nevada Unemployment Office, distribution of flyers to contractors of

different trades, and contacts with the Clark County School District's 'Adult English as a Second Language' program, Spanish-language social groups, and the Mexican Embassy.

Initially, the training program was designed to be held over two days, with 4-hour sessions on each day. An 8-hour-long training program provided in the evening, during the weekdays, was not able to attract many people. At the suggestion of the trainees, the training was provided on the weekends to attract more people. During a previous training class with two day, 4-hr a day format, we found that there was a tendency for trainees to show up only on the first day. Also, the trainees indicated that the duration of the training was too long. Therefore, the duration of the training was reduced to 5 hours, with the approval of OSHA. However, the content of the course was not reduced.

While registering callers for the Fall Prevention training class, two out of three trainees inquired whether or not we provided the OSHA-10 hour training class. In the State of Nevada, it is mandatory for workers to take the OSHA 10-hour training in order to work in the construction industry. As a result, we started to provide the OSHA 10-hour construction course for free to the trainees who completed the Fall Prevention class at UNLV. This turned out to be a good step to attract more people to the Fall Prevention class.

8.2 Analysis of training course registration data

The Fall Prevention training class started in mid-April 2010. By the time when this thesis was written, in order to train 742 trainees, it took 29 English classes and 11 Spanish classes, with an average of 18 trainees per class. During this period 562 English-speaking and 180 Spanish-speaking were trained, with an average of 18 and 16 per class,

respectively. The maximum number of trainees taught in one class was 70, and minimum was 2. An overview of the number of trainees in the Fall Prevention training class is shown in Table 21.

Out of 40 classes, 38 classes were conducted at UNLV and two classes were conducted at the Labor 872 Union Hall. At the Union Hall, 70 Spanish-speaking and 53-English-speaking trainees took the class. At UNLV only, the average number of attendees was 18 and 11 for English-speaking and Spanish-speaking classes, respectively.

Table 21. Overview of number of trainees in fall prevention training class.

Class	**Number of trainees**	**Number of class**	**Trainees per class**		
			Maximum	**Minimum**	**Average**
English	562	29	53	2	19.4
Spanish	180	11	70	7	16.4
Combined	742	40	70	2	18.6

For the first six months of training, from April 2010 to September 2010, 8-hour training classes were conducted with 205 trainees, 111 Spanish-speaking and 94 English-speaking. The average number of trainees per class was 13 and 18 for Spanish-speaking and English-speaking classes, respectively. During this period, two classes, one for each language, were conducted at the Labor 872 Union Hall, with 70 Spanish-speaking and 53 English-speaking trainees.

During this time period, and with the 8-hour training classes without considering the trainees from Labor 872 Union Hall, the average number of trainees for English-speaking and Spanish-speaking classes was 6 and 8, respectively (Table 22).

At that rate, it was very difficult to meet the target population within the project duration time frame. Restructuring of the class was proposed and implemented, upon approval by OSHA, to attract more trainees. This included reducing the duration from 8 hours to 5 hours. To entice more trainees, the state-required OSHA-10 construction course was offered for free to those trainees who completed Fall Prevention training. After this system was implemented, from October 2010 onward, the average number of trainees per class increased from 6 to 21 and 8 to 14 for English-speaking and Spanish-speaking classes, respectively (Table 22).

Table 22. Comparison of the average number of trainees, excluding trainees at the labor union hall.

Class		**Number of trainees**	**Number of Class**	**Average Trainees per Class**
8- hours without OSHA-10	English	41	6	6.8
	Spanish	41	5	8.2
	Combined	82	11	7.5
5-hours with OSHA-10	English	468	22	21.3
	Spanish	69	5	13.8
	Combined	537	28	19.2

The results showed that the decision to reduce the duration of the training and provide free OSHA-10 training was successful in attracting more trainees for the Fall Prevention training.

Throughout the training program, there were an overwhelming number of callers who registered for the Fall Prevention class; however, only less than half of the callers showed up on the training day. Adequate data of the number of people registering and actually showing up in the class was maintained for all English-speaking classes, which showed an average attendance rate of 48.1% (Figure 15). Unfortunately, this data for Spanish-speaking class could not be maintained; however, it is safe to say that the average attendance rate of those registered for the Spanish-speaking classes was below 25%. We had to cancel many Spanish-speaking classes because of this problem of no-show, even when there were more than 20 trainees registered for the class.

The trend of no-show continued with the OSHA-10 class too. We started to provide OSHA-10 from October 2010. During the period of October 2010 to October 2011 we provided 10 English and 2 Spanish OSHA-10 classes, in which we trained 344 English-speaking and 34 Spanish-speaking trainees. Average attendance rate for English OSHA-10 class was 76.61% and for Spanish OSHA-10 Class was 43.6%.

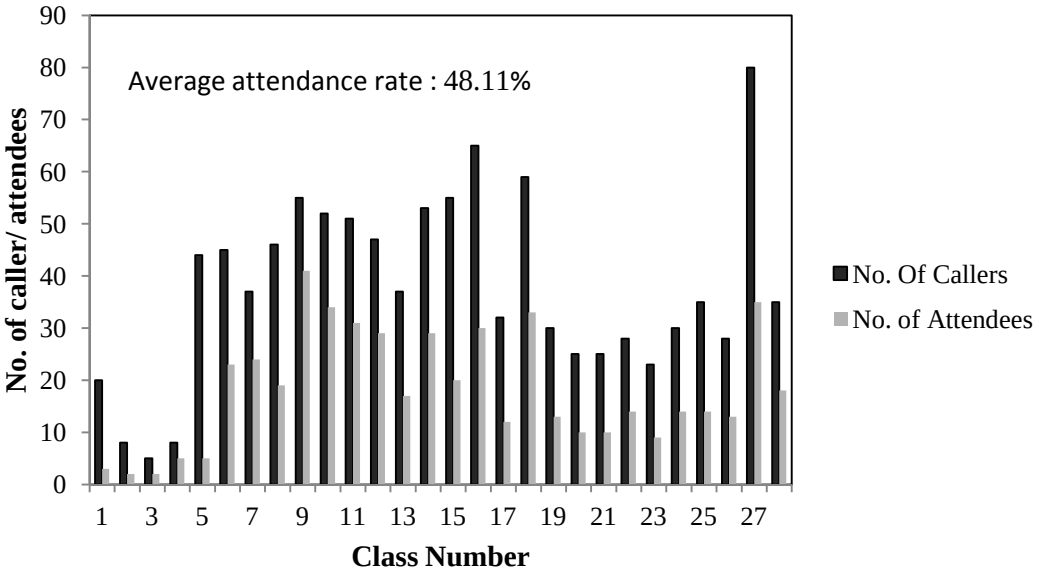

Figure 15. Comparison of the number of callers vs. the number of attendees for the English Fall Prevention class.

While registering for the Fall Prevention training, interested people had to provide their names and phone numbers. We randomly called 31English-speaking people who did not show up for the class to determine the reason for not showing up. The trainees made numerous excuses and gave several different reasons not attending. The top three reasons given by the trainees are as follows:

1. Forgot about the class was schedule.
2. Had to work on the day the class was scheduled.
3. Their employers did not require a Fall Prevention certificate, so they did not need to take the training.

From the training program, it was also found that the most effective way to reach construction workers was through labor unions and unemployment offices. It was also

found that it was very difficult to recruit Hispanic workers in outside training programs. We believe that this may be due their distrust to a government sponsored program. Therefore, unions can play a vital role in encouraging their Hispanic members to attend an outside training program.

CHAPTER 9

CONCLUSION

This thesis focused on evaluating the course, assessing the competency of workers, and determining the impact of training on the trainees' job-site behavior during the Susan Harwood Fall Prevention Training program. For this study, various research hypotheses were formulated, as discussed Section 1.5. The first research hypothesis was formulated to compare the effectiveness of course content and ability of instructor to teach. Three questions relating to the course content and two questions relating to the instructor ability to teach were tested statistically. From the test, it was found that there was no significant difference in the evaluation of English-speaking and Spanish-speaking class as far as the course content and ability of instructor to teach was concerned. The average class rating of the English-course content and instructors' abilities were 4.65 and 4.75, respectively. On the other hand, the average class rating of Spanish-course content and instructors' abilities were 4.67 and 4.76, respectively. This indicated that the course content was very much applicable to increase trainees' knowledge about risk of fall hazards and its preventive measures; it also indicated that the instructors were well prepared to teach and answer the trainees' concerns in a complete and courteous manner.

The second research hypothesis was formulated to compare the competency of English-speaking and Spanish-speaking trainees to use personal fall arrest systems (PFAS), guard rails, and ladders. It states that there is a significant difference in the competency of English-speaking and Spanish- speaking trainees to use and check safety of personal fall arrest systems, guard rails, and ladders. A chi-square test for the difference between proportions, conducted at a 95% confidence interval, showed

Spanish- speaking trainees to be significantly more competent than English-speaking trainees in all of above-mentioned skills, except in setting up ladders. Both the populations were found to be equally competent in setting up ladders. During the training, the instructor asked whether they knew how to use above mentioned equipment, but did not check each individual's skill level. The results of descriptive statistics show that about 65% of the trainees indicated that they had the skills to use personal fall arrest systems, set up and check safety of guardrails and safety nets, and check the safety of ladders. About 85% of the trainees said they were capable to set up ladders correctly. These percentages indicate that some of the trainees did not sufficiently know how to use safety systems for fall prevention.

Third research hypothesis was formulated to compare the usefulness of various topics covered in class to their work for both English-speaking and Spanish-speaking populations. The data was collected from interviews held eight weeks after the completion of the training class. The test showed that an equal proportion of English-speaking and Spanish-speaking trainees gave importance to the topics, "General Information about Fall Prevention" and "Temporary Guard Rail". A significant proportion of English-speaking trainees valued "Fall Prevention Options and Use of Personal Fall Arrest Systems," "Safety Nets," "Scaffolding Construction," "Portable Ladders," and "Assertive Training" more than did the Spanish-speaking trainees. Descriptive statics of follow-up interviews data showed that 44.9% of the total respondent found that "Fall Prevention Options and Use of Personal Fall Arrest Systems" was the most important topic covered in the class. "General Information about Fall Prevention" and "Portable Ladders" were the second and third most important topics,

with a 39.1% and 36.6% response, respectively. Safety nets and temporary guard rails were the two least important topics covered, according to the responses.

Fourth and final research hypothesis was formulated to compare the importance and effectiveness of Fall Prevention training to the English-speaking and Spanish-speaking populations. Test results revealed that there was no significant difference between the English-speaking and Spanish-speaking populations in the improvement of fall prevention knowledge and skills. An equal proportion of both the groups made changes to their fall prevention behavior, and valued the Fall Prevention training provided by UNLV.

In addition, it was observed that a significant proportion of the jobs held by Spanish-speaking trainees required fall prevention knowledge and skills than did jobs for the English-speaking trainees. Additionally, the Spanish-speaking trainees reported they were able to avoid possible fall accidents at their job site as a result of the knowledge gained from the training.

The result of the descriptive statistics showed that the majority of trainees improved their fall prevention knowledge and made changes to their fall prevention behavior. About 75% of the trainees were involved in jobs that require fall prevention knowledge and skills, 97% of the trainees improved their fall prevention knowledge and skills, and 61% of the trainees were able to avoid possible fall hazards at the site.

From the experience gained from the training program, it can be concluded that it is very difficult to reach construction workers to participate in on outside training program. It was also found that the most effective way to reach construction workers was through labor unions and unemployment offices. We found that it was very difficult to recruit

Hispanic workers to participate in outside training programs due to lack of trust. A large tendency of ‘no-show’ was seen during the training period. However, overall, the goals and objectives of Susan Harwood Fall Prevention Training program were achieved.

APPENDIX A

SAMPLE FORMS USED FOR DATA COLLECTION (ENGLISH VERSION)

Course Evaluation

Please check one of the boxes after each question. Thank you.

	Excellent	Good	Neutral	Fair	Poor
1. To what extent did the training increase your knowledge about dangers of falls on the job?					
2. To what extent did the training improve your knowledge of how to identify and prevent risks of falls on the job?					
3. To what extent did the training improve your skills in preventing falls on the job?					
4. To what extent did the instructors answer your questions or concerns in a complete and courteous manner?					
5. To what extent were the instructors well prepared to teach?					

6. What are your suggestions for improvement of the class?

_____

_____

_____

Trainee Name: _____ Date: _____

Trainee Competency Form

Please turn in this completed form to receive your Certificate of Completion.

Trainee will demonstrate the following skills:	**Competent?**
Personal Fall Arrest System	
• Check harness safety	
• Physically install horizontal lifeline/lanyard, anchor points, and connectors	
Guard rail setup and safety	
• Physically install a guard rail and check its safety	
Ladders	
• Set up	
• Check safety	

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INFORMED CONSENT

Department of Nursing

TITLE OF STUDY: Effectiveness of Fall Prevention Training for Southern Nevada Construction Workers

INVESTIGATOR(S): PI: Dr. Nancy Menzel

CONTACT PHONE NUMBER: (702) 895-5970

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to find out whether or not the training you are taking to prevent construction falls improves your safety skills on the job.

Participants
You are being asked to participate in the study because you are a construction worker who is attending the Fall Prevention Training classes at UNLV.

Procedures
If you volunteer to participate in this study, you will be asked to do the following: 1) provide your name and telephone number; 2) participate in a telephone survey 8 weeks after the class to see if your safety skills have improved.

Benefits of Participation
There *may not* be direct benefits to you as a participant in this study. We hope to learn whether the training improves your safety skills.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks. You may feel nervous when we ask you about your safety skills. You may worry that an employer might find out about your not working safely. However, we will not report your individual answers to anyone, including employers.

Cost /Compensation
There *will not* be financial cost to you to participate in this study. The study will take 30 minutes of your time. You *will not* be compensated for your time.

Contact Information
If you have any questions or concerns about the study, you may contact Nancy Menzel at **(702) 895-5970.** For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794.**

Approved by the UNLV IRB. Protocol #1002-3383
Received: 04-11-11 Approved: 04-12-11 Expiration: 04-11-12

TITLE OF STUDY: **Effectiveness of Fall Prevention Training for Southern Nevada Construction Workers**

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study. YOUR DECISION WHETHER OR NOT TO PARTICIPATE IN THE STUDY DOES NOT AFFECT YOUR ABILITY TO PARTICIPATE IN THE TRAINING PROGRAM IN ANY WAY. IF YOU DECIDE NOT TO PARTICIPATE IN THE STUDY, YOU MAY STILL ATTEND THE TRAINING PROGRAM.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be shredded. You will be asked to provide your name and telephone number on a contact information form for us to use to contact you in 8 weeks. We will not ask to see any proof of your identity. We will keep the forms in a locked cabinet until we complete the telephone survey or until 10 weeks have passed after the training. Then we will shred the contact information form.

Participant Consent:

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

Approved by the UNLV IRB. Protocol #1002-3383
Received: 04-11-11 Approved: 04-12-11 Expiration: 04-11-12

Research Study Contact Information

Name: _____ Tel. Number: _____

Post-Training Telephone Questionnaire

1. In what language did you take Fall Prevention Training at UNLV?
    a. English b. Spanish

2. During the Fall Prevention training, which topic did you find most useful for your work?

    _____

    Give respondent a little time to remember a particular topic. If unable to remember a topic, read from the list below to cue them.

    a. General Information about Fall Prevention
    b. Fall Prevention Options and Use of Personal Fall Arrest Systems
    c. Temporary Guard Rail
    d. Safety Nets
    e. Scaffolding Construction
    f. Portable Ladders
    g. Assertive Training

3. Do you think you improved your fall prevention knowledge and skills by completing the training?
    a. Yes b. No

4. Are you involved in a job which needs fall prevention knowledge and skills?
    a. Yes b. No

5. Have you made changes in your fall prevention behavior as a result of the training?
    a. Yes b. No

6. If you answered yes, please describe some changes you have made: _____

    _____

7. Have you been involved in any of the situations at your job that were shown in class (for example, working on ladders or at heights)?
    a. Yes b. No

8. If yes, did you handle the situation as it was shown in class or another way?
    a. Yes, as described in class
    b. Used a different way (Describe)

    _____

9. Did you think that you have avoided a fall accident due to the knowledge gained from the training?
    a. Yes b. No

10. If yes, how many fall accidents have you avoided due to the training?

    _____

11. How many times have you fallen at work after the training?

12. Did your employer value the Fall Prevention training that you took at UNLV?
    a. Yes b. No

Thank you.

This Certificate of Completion

Is hereby given to:

_____

On this date:

_____

For achieving the necessary requirements

To complete the University of Nevada, Las Vegas

8 Hour Fall Protection Training Program

Presented by:

_____

UNLV

UNIVERSITY OF NEVADA LAS VEGAS

APPENDIX B

SAMPLE FORMS USED FOR DATA COLLECTION (SPANISH VERSION)

Evaluación de Entrenamiento de Protección Contra Caídas

Por favor marque una de las cajas después de cada pregunta. Gracias.

	Excelente	Bueno	Neutral	Justo	Pobre
1. ¿Hasta qué punto el entrenamiento elevo su conocimiento sobre peligros de caídas en el trabajo?					
2. ¿Hasta qué punto el entrenamiento elevo su conocimiento de cómo identificar y prevenir peligros de caída en el trabajo?					
3. ¿Hasta qué punto el entrenamiento elevo su habilidad en prevenir caídas en el trabajo?					
4. ¿Hasta qué punto los instructores contestaron tus preguntas o intereses de manera completa y cortes?					
5. ¿Hasta qué punto estaban los instructores bien preparados para ensenar?					

6. ¿Cuáles son tus sugestiones para el mejoramiento de la clase?

_____

_____

_____

Nombre de Aprendiz:_____ Fecha: _____

Forma de Competencia de Aprendiz

Por favor entregue la forma completa para recibir su Certificado de Afinación.

Habilidad de el Aprendiz	**¿Competente?**
Sistemas Personales de Detención Contra Caídas	
• Verificar la seguridad del arnés	
• Físicamente instalar cuerudas salvavidas/cuerdas salvavidas de seguridad, puntos de anclaje, y conectores.	
Configuración de barandillas y seguridad	
• Físicamente instalar barandillas y verificar su seguridad.	
Escaleras	
• Configuración	
• Físicamente instalar una escalera y verificar su seguridad.	

CONSENTIMIENTO INFORMADO

Departamento de Enfermería

TITULO DE ESTUDIO: INVESTIGADOR (ORA): Efectividad de entrenamiento de prevención contra caídas para trabajadores de construcción del sur de Nevada

INVESTIGADOR(S): INVESTIGADOR PRINCIPAL: Dr. Nancy Menzel

NUMERO DE TELEFONO DE CONTACTO: (702) 895-5970

Propósito del estudio
Usted está invitado a participar en un estudio de investigación. El propósito de este estudio es determinar si el entrenamiento que usted está tomando para prevenir caídas de construcción mejora sus habilidades de seguridad en el trabajo.

Participantes
Usted está siendo preguntado para participar en el estudio porque usted es un trabajador de construcción que está asistiendo clases de prevención contra caídas en UNLV.

Procedimientos
Si usted se ofrece para participar en este estudio, usted será preguntado a hacer lo siguiente: 1) disponer su nombre y número telefónico; 2) participar en una encuesta telefónica en 6 a 8 semanas después de la clase para ver si sus habilidades han mejorado.

Beneficios de participación
Pueden haber beneficios directos a usted como participante en este estudio. Nosotros tenemos la esperanza de aprender si el entrenamiento mejora su conocimiento y habilidad.

Riesgos de participación
Ahí riesgos involucrados con todos los estudios de investigación. Este estudio puede incluir solo riesgos mínimos. Usted puede sentirse nervioso cuando un instructor lo observa demonstrar una habilidad, como ponerse un arnés de seguridad. Sin embargo, no reportaremos respuestas individuales a nadie, incluyendo empleadores.

Costos/Compensación
No habrán costos finánciales para usted para participar en este estudio. El estudio tomara 30 minutos de su tiempo. Usted *no* será compensado por su tiempo.

Información de Contacto

Approved by the UNLV IRB. Protocol #1002-3383
Received: 04-11-11 Approved: 04-12-11 Expiration: 04-11-12

TITULO DE ESTUDIO: **Efectividad de entrenamiento de prevención contra caídas para trabajadores de construcción del sur de Nevada.**

Si usted tiene preguntas o intereses sobre el estudio, usted puede contactarse con Nancy Menzel al **(702) 895-5970.** Para preguntas con respecto a los derechos de los temas, alguna queja o comentarios con respecto a la manera en cual el estudio está siendo conducido usted puede contactar a **la UNLV Office of Research Integrity – Human Subjects al 702-895-2794.**

Participación Voluntaria

Su participación en este estudio es voluntaria. Usted puede rechazar de participar en este estudio o en cualquier parte de este estudio. Usted puede retirarse en cualquier momento sin prejuicio a sus relaciones con la universidad. Usted esta alentado a hacer preguntas sobre este estudio al inicio o a cualquier momento durante el estudio de la investigación. SU DECISIÓN DE PARTICIPAR O NO EN EL ESTUDIO NO AFECTA SU ABILIDAD DE PARTICIPAR EN EL PROGRAMA DE ENTRENAMIENTO EN NINGUNA MANERA. SI USTED DECIDE NO PARTICIPAR EN EL ESTUDIO, USTED AUN PUEDE ASISTIR AL PROGRAMA DE ENTRENAMIENTO.

Confidencialidad

Toda la información acumulada en este estudio será mantenida completamente confidencial. Ninguna referencia será hecha en escrito u orales a materiales que puedan enlazarlo a este estudio. Todos los records serán almacenados y cerrados con llave en una facilidad de UNLV por tres años después de completo el estudio. Después del tiempo de ser almacenados la información acumulada será deshilachada. Usted será preguntado a darnos su nombre y número telefónico en una forma de información de contactos para que nosotros la usemos para contactarlo en 8 semanas. No le preguntaremos para ver ninguna prueba de su identidad. Mantendremos las formas en un gabinete con seguro hasta que completemos la encuesta telefónica o hasta 10 semanas después de pasado el entrenamiento. Después deshilacharemos la forma de información de contactos.

Acuerdo de Participante:

E leído la información encima y acepto participar en este estudio. Tengo por lo menos 18 años de edad. Una copia de esta forma se me ha sido dada.

Iniciales de el Participante _____

Approved by the UNLV IRB. Protocol #1002-3383
Received: 04-11-11 Approved: 04-12-11 Expiration: 04-11-12

Estudio de Investigación Información de Contacto

Nombre: _____ Número de Teléfono: _____

Cuestionario de Teléfono después de Entrenamiento

1. En qué idioma tomo el entrenamiento de Prevención de Caídas en UNLV
   a. Ingles b. Español

2. ¿Durante el entrenamiento de Prevención de Caídas, que tema encontró mas útil para su trabajo?

   _____

   Dele al encuestado un poco de tiempo para acordarse del tema particular. Si no se puede acordar un tema, lea de la lista abajo para ayudarlos.

   a. Información general de Prevención de Caídas
   b. Opciones de Prevención de Caídas y uso de Sistemas Personales de Detención Contra Caídas
   c. Barandillas Temporales
   d. Construcción de Andamios
   e. Escaleras Portátiles
   f. Entrenamiento de Asertividad

3. ¿Usted cree que ha mejorado su conocimiento de prevención de caídas y habilidad después de haber completado el entrenamiento?
   a. Si b. No

4. ¿Usted está involucrado en un trabajo que necesita conocimiento y habilidad sobre prevención de caídas?

   _____

5. ¿Ha hecho cambios en su conducta sobre prevención de caídas al resultado del entrenamiento?
   a. Si b. No

6. Si usted contesto si, por favor describe algunos de los cambian que ha hecho: ____
   _____
   _____

7. ¿Usted ha estado envuelto en algunas situaciones en su lugar de trabajo que fueron demostradas en el entrenamiento (por ejemplo, trabajando en escaleras o alturas)?
    a. Si b. No

8. ¿Si contesto si, manejo la situación como fue demostrado en el entrenamiento o otra manera?
    a. Si, como descrito en el entrenamiento
    b. Uso una manera diferente (describe)_____ _____.

9. ¿Usted piensa que ha evitado un accidente de caída por el conocimiento del entrenamiento?
    a. Si b. No

10. ¿Si contesto si, cuantos accidentes ha evitado usted gracias a el conocimiento del entrenamiento?

    _____

11. ¿Cuántas veces se ha caído en el trabajo después del entrenamiento?

12. ¿Su empleador valoro el entrenamiento de Prevención contra Caídas que usted tomo en UNLV?
    a. Si b. No

Gracias.

Este Certificado de Afinación

Es por la presente dado a:

_____

En esta fecha:

_____

Por cumplir los requisitos necesarios

Para completar el **Programa de Entrenamiento de 8 Horas de Prevención de Caídas** de la Universidad de Nevada, Las Vegas

Presentado por:

_____

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

APPENDIX C

DATA SET

Response	Points
Excellent	5
Good	4
Neutral	3
Fair	2
Poor	1

Table C- 1. Class Evaluation Data of English Fall Prevention Training Class

S.No.	Training Date	Participants ID	Questions and Evaluation Grading					
			Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6
1	04/14/2010	1	5	5	4	5	5	Great Class Cover all safety and fall protection
2		2	1	1	1	2	1	
3	04/25/2010	1	5	5	5	4	5	Much needed class. Thank you
4		2	4	5	4	5	5	No Problems
5		3	5	5	5	4	5	
6	05/03/2010	1	4	5	5	5	5	Air Condition class room
7		2	5	5	5	5	5	May be more community participation
8	06/03/2010	1	5	5	5	5	5	Instructors and assistants were great
9		2	5	5	5	5	4	Use and find some video to show
10		3	5	5	4	5	5	Excellent
11		4	5	5	5	5	5	None
12		5	5	4	5	5	5	To get students more involved. Figure out other exhibit other than construction lab. But it was ok.
13		6	5	5	5	5	5	A/C was horrible
14		7	5	5	5	5	5	Well done
15		8	5	5	5	5	5	
16	06/23/2010	1	5	5	5	5	5	Excellent class on target
17		2	5	5	5	5	5	May be to have more on hands participations
18		3	4	4	5	5	5	No Comments
19		4	4	5	4	5	5	The instructor was well informed, and knows his stuff. It was a good class. Thanks

20		5	5	5	5	5	5	The person is every good teacher. He explains very good
21	07/12/2010	1	4	4	4	4	4	Less Stories
22		2	4	4	4	5	4	More Visuals
23		3	5	5	5	4	5	Less talking out of turn form the students and disruptions but very good instructor
24		4	5	5	5	5	5	
25		5	4	4	5	4	4	
26		6	5	5	5	5	5	
27		7	5	5	5	5	5	I would like to say sorry for all the union members' not behaving while in your class. You did a great job
28		8	4	4	4	4	4	Nothing Keep it up the good Work
29		9	5	5	4	4	5	
30		10	4	4	4	4	4	
31		11	5	4	4	4	5	No
32		12	4	4	4	5	5	The pictures were not taken well to show how good the safety was implemented or not
33		13	4	4	4	4	4	None
34		14	5	5	5	5	5	N/A Instructor is excellent.
35		15	5	5	5	5	5	N/A Instructor is excellent.
36		16	5	5	5	5	5	N/A Instructor is excellent.
37		17	4	4	4	5	5	The class was a good learning class
38		18	3	3	3	4	3	
39		19	5	4	4	4	5	No improvement needed.
40		20	3	3	3	3	3	Free Beer
41		21	5	5	5	5	5	None of all
42		22	5	4	5	5	5	Just keep teaching the right way. Thank you very much.
43		23	5	5	5	5	5	
44		24	5	4	5	4	5	Don't give up. The safety people will have to have the class.
45		25	5	5	5	5	5	
46		26	5	5	5	5	5	
47		27	4	4	4	5	5	None
48		28	4	4	4	4	4	Make the class shorter.
49		29	5	5	5	3	5	Need to talk to constructor.
50		30	5	5	5	5	5	Too much stories telling, not talking about what the class was about.
51		31	4	4	4	4	4	
52		32	3	3	3	3	3	Food, coffee.
53		33	5	5	5	5	5	Turn Cell phones off while in class.
54		34	4	4	5	5	4	Everything was great.
55		35	5	5	5	5	5	

56		36	5	5	5	5	5	Understand and follow OSHA Rules; wear safety equipment and report safety hazard in the work place.
57		37	4	4	4	4	4	
58		38	4	4	4	4	2	
59		39	5	5	5	5	5	Ok
60		40	5	5	5	5	5	
61		41	5	5	5	5	5	N/A
62		42	4	4	4	4	5	
63		43	5	5	5	5	5	
64		44	4	5	4	5	5	Shorter class, less short breaks with 2 or 3 longer breaks.
65		45	4	4	4	4	4	You are doing well in the class training.
66		46	5	5	5	5	5	
67		47	4	4	4	4	4	
68	8/2/2010	1	4	5	5	5	5	
69		2	5	5	5	5	5	Course was enlightening -learned new things.
70		3	4	4	5	5	5	Class went well, need more time on different subjects to take in quicker time frame.
71		4	5	5	5	5	5	
72		5	4	4	3	3	4	
73		6	5	5	5	5	5	Everything was excellent- thanks.
74	9/10/2010	1	5	5	5	5	5	
75		2	4	4	4	4	4	
76		3	5	5	5	5	5	
77		4	5	5	5	5	5	Best Class Ever.
78		5	5	5	5	5	5	
79		6	5	4	4	5	5	More hands on, otherwise very educational.
80		7	5	5	5	5	5	Nothing, everything is good with the class, I learned a lot.
81		8	5	5	5	5	5	
82		9	4	5	5	5	5	
83		10	5	5	5	5	5	
84		11	5	5	5	5	5	
85		12	5	5	5	5	5	Nothing.
86		13	5	5	5	5	5	
87		14	5	5	5	5	5	
88		15	5	5	4	5	5	Very well presented class.
89		16	5	5	5	5	5	None
90		17	5	5	5	5	5	
91		18	4	4	4	4	4	Tell people to park in the student parking lot.
92		19	5	5	5	5	5	More people need to come to this class.

93		20	5	5	5	5	5	None.
94		21	5	4	4	5	4	I think it's good.
95		22	4	4	4	5	5	I could do already.
96	10/9/2010	1	5	5	5	5	5	
97		2	5	5	5	5	5	
98		3	5	5	5	5	5	
99		4	5	5	5	5	5	
100		5	4	4	4	4	5	
101		6	5	5	5	5	5	
102		7	5	5	5	5	5	Nothing.
103		8	4	4	5	4	4	Keep up the good work.
104		9	5	5	5	5	5	No suggestions for improvement. Did a great Job.
105		10	5	5	5	5	5	Instructor was very well prepared to teach and helpful and excellent teacher.
106		11	5	5	5	5	5	
107		12	5	5	5	5	5	
108		13	5	4	4	4	4	
109		14	5	5	5	5	5	Instructor has a good explanation to me.
110		15	5	5	5	5	5	
111		16	5	5	5	5	5	It was great.
112		17	5	5	5	5	5	Give better suggestion on how to find the building.
113		18	5	5	5	5	5	Do not need to improve the class, did a good work. In the class he is excellent.
114		19	5	5	5	5	5	Should enforce to reject anyone coming in later than 15 minutes so that class would not be interrupted by those who did not respect the instructor and classmate.
115		20	5	5	5	5	5	No suggestions, This was very well organized and instructor was excellent. They were definitely qualified and prepared. I want to say thank you for this excellent opportunity. I truly appreciate being able to enroll in these classes and for the grant. Thank you very much to everyone for your time today and for the knowledge I gained. I am very happy to be on my way to completing the rest of my training that I have always wanted to accomplish.
116		21	5	5	5	5	5	Just keep up the good teaching and materials.
117		22	5	5	4	5	5	Keep up the good work.
118		23	5	5	5	5	5	
119	10/30/2010	1	5	5	5	5	5	
120		2	4	4	4	5	5	
121		3	5	5	5	5	5	Shortening up the time of class
122		4	5	5	5	5	5	
123		5	5	5	5	5	5	very work related situation and practical

124		6	5	5	5	5	5	Slow down a little bit. Start at 8:30 or 9:00am.Do not start too early.
125		7	5	5	5	5	5	
126		8	4	5	4	5	5	None.
127		9	5	5	5	5	5	None.
128		10	5	5	5	5	5	
129		11	5	5	5	5	5	
130		12	5	5	5	5	5	
131		13	5	4	4	5	5	
132		14	5	5	5	5	5	
133		15	5	5	5	5	5	None it was very knowledgeable.
134		16	5	4	5	5	5	
135		17	5	5	5	5	5	Class was excellent. The instructor in no way could improve the way class was conducted on his part. He was prepared for all questions asked of. I could tell he had lot more to give. Great Job.
136		18	5	5	5	5	5	To follow up on more classes so that I could be prepared for my job.
137		19	4	5	5	5	5	
138	11/5/2010	1	5	5	5	5	5	Nothing comes to mind, everything was excellent.
139		2	5	5	5	5	5	
140		3	5	5	5	5	5	
141		4	5	5	5	5	5	
142		5	5	5	5	5	5	Everything was good, no need for improvement.
143		6	5	5	4	5	5	I would like more hands-on training.
144		7	4	4	4	4	4	
145		8	5	4	5	3	5	None.
146		9	5	5	5	4	4	
147		10	5	5	5	5	5	Nothing.
148		11	5	5	5	5	5	It was good no improvement.
149		12	5	5	5	5	5	All information was presented correctly and easily understood.
150		13	5	5	5	5	5	All the information I needed to know was taught and they did a great job.
151		14	5	5	5	5	5	I liked everything about the class.
152		15	5	5	5	5	5	Make it later in the day, like afternoon.
153		16	5	5	5	5	5	I don’t have no suggestion he answered and went through everything I needed to know.
154		17	5	5	5	5	5	
155		18	5	5	5	5	5	Everything worked good, training could not been better.
156		19	5	5	5	5	5	
157		20	5	4	5	4	5	
158		21	5	5	5	4	4	
159		22	5	5	5	5	5	

160		23	4	4	5	4	4	Do not turn lights off too many people fall asleep.
161		24	5	5	5	5	5	None he did well.
162		25	5	5	5	5	5	Nothing great, instructor could not been better.
163		26	5	5	4	4	4	The cold air and darkness from the lights caused many of us to fall asleep, and it was a little hard to focus. Instead of 10 minutes breaks, it should be one big lunch break, on a empty stomach it is also hard to concentrate.
164		27	5	5	4	5	5	No everything was great.
165		28	5	5	5	5	5	
166		29	4	4	4	4	4	
167		30	5	5	5	5	5	Nothing.
168		31	4	4	5	5	4	
169		32	5	5	5	5	5	
170		33	5	5	5	4	4	I have no suggestions.
171		34	5	5	5	5	5	
172		35	5	5	5	5	5	None.
173		36	4	5	4	5	5	
174		37	5	5	5	5	5	
175		38	4	4	4	5	5	
176		39	5	5	5	5	5	Nothing is needed.
177	11/20/2010	1	5	4	5	4	4	Not Sure Exactly was very good to me, very good video pictures, good trade knowledge of materials, name, etc by Neil, Good Fall Prevention Knowledge and Prevention Safety.
178		2	5	5	5	5	5	None.
179		3	5	5	5	5	5	This Class made all my needs of learning about OSHA Construction Safety Guide lines, Thank you
180		4	5	5	5	5	5	Coffee and Donut.
181		5	4	4	4	4	4	
182		6	5	5	5	5	5	Great Course.
183		7	5	5	5	5	5	
184		8	5	5	5	4	5	The Breaks were not needed, I just Like to sit and just listen and make notes, I am grateful that I am given chance to get OSHA and understand how to protect myself, and this is a free class that’s going to benefit me and my safety.
185		9	4	5	5	5	5	More Hands-on with materials.
186		10	4	4	5	4	5	To continue giving this program helps everybody here. Thank you for helping all these people.
187		11	5	5	5	5	5	More You Tube Videos but overall class was good.
188		12	5	5	5	5	5	
189		13	5	5	5	5	5	None.

190		14	5	5	5	5	5	Break Down Course into two sessions, less hours.
191		15	4	4	4	5	5	Hand out some food or snacks, but everything was good, well I liked it.
192		16	4	4	4	4	4	Snacks.
193		17	5	5	5	5	5	
194		18	2	4	4	4	4	No comment.
195		19	4	4	4	5	5	All Good at this point.
196		20	5	5	5	5	5	Provide Food.
197		21	5	5	5	5	5	More hands-on training and demonstration.
198		22	5	5	5	5	5	Coffee and Donut.
199		23	5	5	5	5	5	
200		24	5	5	5	5	5	
201		25	4	5	5	2	5	
202		26	5	5	5	5	5	
203		27	4	4	5	5	5	
204		28	5	5	5	5	5	NA.
205		29	5	5	5	5	5	Everything was excellent.
206		30	5	5	5	5	5	Good Class.
207		31	5	5	5	5	5	
208		32	5	5	5	5	5	None.
209		33	5	5	5	5	5	None.
210	12/11/2010	1	5	5	5	5	5	
211		2	5	5	5	5	5	To extend the hands-on portion.
212		3	5	5	5	5	5	
213		4	5	4	5	5	5	
214		5	5	5	5	5	5	
215		6	5	5	5	5	5	
216		7	4	4	4	5	5	
217		8	5	5	5	5	5	Coffee and Donut.
218		9	5	4	5	5	5	Everything was clear and understandable; I would not change a thing.
219		10	5	5	5	5	5	
220		11	4	4	4	4	4	
221		12	4	5	4	5	4	
222		13	5	5	5	5	5	Everything was fine with me.
223		14	5	5	5	5	5	Please continue improving or gathering information to attract students.
224		15	5	5	5	5	5	None enjoyed the class, most of all the teacher.
225		16	4	4	4	4	4	
226		17	4	4	4	5	5	No comment.
227		18	5	4	4	5	5	

228		19	4	4	4	5	5	None, well done.
229		20	5	5	5	5	5	
230		21	5	4	4	5	5	
231		22	5	5	5	5	5	To Talk about walking around heavy equipment.
232		23	5	5	5	5	5	
233		24	5	5	5	5	5	Make it more hands-on.
234		25	4	4	4	4	4	Show videos less talking.
235		26	5	5	5	5	5	
236		27	5	5	5	5	5	
237		28	4	4	4	4	4	Play jeopardy every hour.
238		29	4	4	4	4	4	
239		30	4	4	4	5	4	
240		31	4	5	5	5	5	More instruction/detail for those who may not be familiar with actual const. equipments/materials, i.e. office personal required to take the course but who do not work on site.
241	1/15/2010	1	5	4	4	5	5	I have no suggestions. I liked the many signs on campus with room number and directional arrows pointing us to the room location.
242		2	5	5	5	5	5	
243		3	5	5	5	5	5	Nothing, offer OSHA- 30.
244		4	5	4	5	4	5	Class was great.
245		5	4	4	4	5	5	None excellent job.
246		6	5	5	5	5	5	
247		7	5	5	5	5	5	Offer OSHA-30.
248		8	5	5	4	5	5	Excellent info. It became a non issue by the end of the 2nd hour. Excellent class.
249		9	5	5	5	5	5	It was fine the way it was.
250		10	4	4	4	4	5	All good.
251		11	5	5	5	5	5	
252		12	5	5	5	5	5	
253		13	4	4	4	4	4	
254		14	5	5	5	5	5	
255		15	5	5	5	5	5	Accessible to more people.
256		16	5	4	5	4	5	Provide Food.
257		17	4	5	4	5	5	
258		18	5	5	5	5	5	
259		19	5	5	5	5	5	Have a coffee machine around.
260		20	4	5	5	5	5	A great and informative class.
261		21	5	5	5	5	5	Class was very informative well taught. No room for improvement.
262		22	5	5	5	5	5	The instructor was very informative.

263		23	4	4	4	5	5	
264		24	5	5	5	5	5	
265		25	5	5	5	5	5	It is a good class the way it is.
266		26	4	4	4	5	5	
267		27	4	4	4	4	4	
268		28	5	5	5	5	5	
269		29	4	5	4	4	4	All good.
270	02/12/2011	1	5	3	3	5	5	Include nursing, physical therapy. Present fall prevention from a medial point of view (from senior citizen point of view).
271		2	5	5	5	5	5	Very Good.
272		3	5	5	5	5	5	
273		4	5	5	4	4	5	None.
274		5	5	5	5	5	5	N/A
275		6	5	5	5	5	5	
276		7	5	5	5	5	5	Coffee and Donut.
277		8	5	5	5	5	5	
278		9	5	5	5	5	5	Nothing, it was a good class and I learned a lot more.
279		10	5	5	5	5	5	
280		11	4	4	4	4	4	Nothing at all.
281		12	4	4	4	4	4	Nothing.
282		13	5	5	5	5	5	Road trip to a construction job site.
283		14	5	5	5	5	5	
284		15	5	5	5	5	5	Learned vary valuable information, Great Class.
285		16	5	5	5	5	5	My only suggestion is maybe make the class easier to find.
286		17	5	5	5	5	5	It was a good class.
287	3/5/2011	1	4	5	5	5	5	More movies.
288		2	4	4	5	5	5	
289		3	5	4	4	5	4	May be a small worksheet about fall prevention.
290		4	4	4	4	4	4	
291		5	5	5	5	5	5	More demonstrations on fall safety involving harness, hooks, and scaffolds to ensure us it is safe. It will be better to actually do plus see it then to listen and read about it. We need the experience.
292		6	3	4	4	3	4	It is difficult to follow his pronunciation
293		7	5	5	5	5	5	
294		8	4	4	4	4	4	
295		9	4	5	5	5	5	
296		10	4	4	4	4	4	
297		11	4	4	4	4	5	
298		12	4	4	4	4	4	

299		13	5	5	5	5	5	
300		14	5	5	5	5	5	
301		15	5	5	5	5	5	
302		16	3	4	3	4	5	
303		17	5	5	5	5	5	
304		18	3	4	4	5	5	
305		19	4	4	4	5	5	The teacher was straight forward.
306		20	4	4	4	4	4	
307		21	4	4	4	4	4	
308		22	5	5	5	5	5	Nothing at this time.
309		23	5	4	5	5	5	
310		24	4	5	5	4	5	
311		25	5	5	5	5	5	
312		26	5	5	5	5	5	
313		27	5	5	5	5	5	
314		28	4	4	4	4	4	
315		29	4	4	4	4	4	
316		1	5	5	5	5	5	Just keep up the good work the instructor is doing.
317		2	5	5	5	4	5	Good teaching.
318		3	5	5	5	5	5	Nothing.
319		4	5	5	5	5	5	
320		5	5	5	5	5	5	
321		6	4	4	4	5	5	
322		7	5	5	5	5	5	None good job.
323		8	5	5	5	5	5	Good class thanks.
324		9	5	5	5	5	5	Have OSHA-10 class more often if the grants can continue.
325		10	5	5	5	5	4	
326		11	5	5	5	5	5	
327		12	4	4	5	5	5	
328		13	5	5	4	5	5	
329		14	5	5	5	5	5	
330		15	5	5	5	5	5	At times it gets a little boring, but instructor is good.
331		16	5	5	5	5	5	
332		17	5	5	5	5	5	Milk and coffee at the end.
333		18	5	5	5	4	5	
334		19	5	5	5	5	5	The class was really good. They should have more of these classes. He explained everything good.
335	4/23/2011	1	5	5	5	5	5	Very informative no need for improvement.
336		2	4	4	4	5	5	

337		3	5	5	5	5	5	
338		4	5	5	5	4	5	
339		5	5	5	4	5	5	More updated videos and pictures of actual accidents.
340		6	4	4	4	4	4	
341		7	5	5	5	5	5	
342		8	5	5	4	5	5	
343		9	5	5	5	5	5	Very informative, no need for improvement.
344		10	5	5	5	5	5	No suggestions class was OK.
345		11	4	4	4	5	5	This class is good information for construction.
346		12	4	4	4	5	5	Start OSHA-30 classes.
347		13	5	5	5	5	5	
348		14	5	5	5	5	5	
349		15	5	5	5	5	5	Coffee and Donut.
350		16	5	5	5	4	4	
351		17	4	5	5	5	5	
352		18	5	5	5	5	5	It was a lot of information.
353		19	5	5	5	5	5	
354		20	5	5	5	5	5	The class was excellent.
355		21	5	5	5	5	5	
356		22	5	5	5	5	5	Keep the classroom warmer.
357		23	4	3	3	5	5	
358		24	5	4	5	5	5	Do not change anything.
359		25	4	4	4	5	5	No suggestions.
360		26	5	5	5	5	5	No suggestions.
361		27	4	4	3	5	5	I believe the class is well planned.
362		28	5	5	5	5	5	More videos.
363		29	5	5	4	5	5	1) more actual on site photos.2) Illustrate distances, angles vs. what is required 3) emphasize on helmets, goggles, gloves.
364	5/21/2011	1	5	5	5	5	5	None very informative.
365		2	3	3	2	2	3	Make it shorter.
366		3	5	5	5	5	5	
367		4	4	4	5	5	5	
368		5	5	4	4	5	5	
369		6	3	4	2	5	5	
370		7	5	4	4	5	5	
371		8	5	5	5	5	5	
372		9	3	4	4	4	5	
373	6/4/2011	1	3	3	2	2	3	Make the class shorter.
374		2	3	4	4	4	5	

375	3	5	5	5	5	5	
376	4	5	4	4	5	5	
377	5	3	4	2	5	5	
378	6	5	4	4	5	5	
379	7	4	4	5	5	5	
380	8	5	5	5	5	5	
381	9	5	5	5	5	5	Very Informative.
382	1	5	5	5	5	5	
383	2	5	5	5	5	5	
384	3	5	5	5	5	5	
385	4	4	4	4	4	4	
386	5	4	4	4	4	4	Good Job I enjoyed the class.
387	6	4	4	4	4	4	None.
388	7	5	5	5	5	5	
389	8	5	5	5	5	5	No improvement needed. Excellent Class.
390	9	5	5	5	5	5	This is one of the top OSHA training coursed I have started. The instructor, Mr. Opfer, is extremely knowledgeable and is an excellent instructor, I could not ask for more than was provided in this course. Mr. Opfer effectively integrated his experience into the course to enhance his teaching effectiveness. UNLV needs to offer more training on other specialty safety topics.
391	10	4	5	4	4	5	
392	11	4	4	4	4	5	
393	12	5	5	5	5	5	
394	13	5	5	5	5	5	
395	14	5	4	5	5	5	Great Class.
396	15	5	5	5	5	5	
397	16	5	4	5	5	5	
398	17	4	4	5	5	5	
399	18	5	5	5	5	5	
400	19	5	5	5	5	5	
401	20	5	5	5	4	5	
402	21	5	5	5	5	5	Keep up the good work.
403	22	5	5	5	5	5	
404	23	5	5	4	4	5	
405	24	4	4	4	4	4	
406	25	5	5	5	5	5	
407	26	5	5	5	5	5	I have no suggestions for improvement.
408	27	3	3	3	4	4	

409		28	4	4	4	3	3	Less Lecture, more hands on training.
410		29	4	4	4	4	4	
411		30	5	5	5	5	5	Very good information.
412		31	4	4	4	4	4	
413		32	4	4	4	4	5	
414	6/11/2011	1	5	5	5	5	5	I would like to get some more safety classes for the future, any training for safety please contact me.
415		2	5	5	5	5	5	
416		3	5	4	5	4	4	None, they are great.
417		4	5	5	5	5	5	Great class thanks.
418		5	5	5	5	5	5	Very informative, wish you had an OSHA 30 class.
419		6	5	5	5	5	5	
420		7	4	4	5	5	5	
421		8	5	5	5	5	5	
422		9	5	5	5	5	5	
423		10	5	5	5	5	5	Was good and Excellent.
424		11	5	5	5	5	5	
425		12	5	5	5	5	5	
426	6/18/2011	1	5	5	5	5	5	None.
427		2	5	5	5	5	5	Post more information regarding the class. So, more people could attend and be aware of OSHA safety procedures.
428		3	5	5	5	5	5	It was an excellent class. The instructor was great.
429		4	4	4	4	4	4	
430		5	5	5	5	5	5	None the instructor was very good. Thank you.
431		6	4	5	4	5	5	Great class.
432		7	4	5	5	5	5	No improvement needs to be made.
433		8	4	4	4	4	4	None.
434		9	5	5	5	5	5	
435		10	5	5	5	5	5	
436	6/25/2011	1	5	5	5	5	5	
437		2	4	3	4	4	4	
438		3	5	5	5	5	5	
439		4	5	5	5	5	5	
440		5	5	5	5	5	5	Class was outstanding.
441		6	4	4	4	5	4	
442		7	5	5	5	5	5	The Class is perfect.
443		8	5	5	5	5	5	The Class is perfect, well executed by the instructor.
444		9	5	4	4	4	5	N/A
445		10	5	5	5	5	5	

446	7/9/2011	1	4	4	4	5	5	
447		2	5	5	5	5	5	Obey all OSHA rules.
448		3	5	5	5	4	4	Taking others suggestions about fall prevention.
449		4	5	5	5	5	5	Keep the best teacher Prof. Neil Opfer.
450		5	5	5	5	5	5	Keep up the good work.
451		6	5	5	5	5	5	
452		7	4	4	4	4	4	
453		8	5	5	5	5	5	
454		9	5	5	5	5	5	
455		10	5	5	5	5	5	
456		11	4	4	5	4	5	More videos.
457		12	5	4	5	5	5	
458		13	5	5	5	5	5	
459		14	4	4	4	4	4	To improve my fall prevention.
460	7/16/2011	1	5	5	5	5	5	Actual Training or Hands on training.
461		2	4	4	5	4	5	More hands on demonstration and materials.
462		3	5	5	5	5	5	
463		4	5	5	5	5	5	Thank you for this opportunity, it has been very informative.
464		5	5	5	5	5	5	
465		6	4	5	4	4	4	
466		7	4	3	4	4	5	
467		8	4	4	4	4	4	
468		9	5	5	5	5	5	
469	7/30/2011	1	4	4	5	5	4	I felt the class was conducted in a professional manner and very informative.
470		2	5	5	5	5	5	No the class was very knowledgeable and very well put together from beginning to end. Thank you very much, much success to you teacher Pramen Shrestha.
471		3	4	4	3	3	4	It is a very good class; it is very helpful when it come to identify what is not safe.
472		4	5	5	5	5	5	Perfect trainer for the job.
473		5	4	4	4	4	4	Good he is a pretty good instructor.
474		6	5	5	5	5	5	No comments.
475		7	5	5	5	5	5	
476		8	3	3	3	4	4	
477		9	5	5	5	5	5	
478		10	5	5	5	5	5	
479		11	4	4	4	4	4	Learned about fall prevention.
480		12	5	5	5	5	5	
481		13	4	4	4	4	5	

482		14	4	5	5	2	4	
483	8/6/2011	1	5	5	3	2	2	
484		2	4	4	5	5	5	Nothing, it is fine how it is.
485		3	5	4	5	5	4	
486		4	4	4	4	4	4	
487		5	5	4	5	5	4	
488		6	5	5	5	5	5	
489		7	4	4	4	4	4	
490		8	5	5	5	5	5	
491		9	4	4	4	4	4	
492		10	5	5	4	5	5	Shorten it up.
493		11	4	4	5	5	5	Nothing it is fine how it is.
494		12	4	4	4	4	4	
495		13	5	5	4	4	4	I have no suggestions.
496		14	5	5	5	5	5	
497	8/13/2011	1	4	4	4	4	4	Shorten presentation, fewer pictures, and more content.
498		2	4	4	5	5	5	
499		3	5	5	5	5	5	
500		4	5	5	5	5	5	
501		5	4	4	4	5	5	Nothing the class was great.
502		6	4	4	5	5	5	It was great the way I could see pictures to get the point.
503		7	5	5	5	5	5	It is good.
504		8	5	5	5	5	5	
505		9	5	5	5	5	5	
506		10	4	4	4	4	5	
507		11	5	5	5	5	5	
508		12	5	5	5	5	5	The class was excellent in training. Much needed for construction industry state wide.
509		13	5	5	5	5	5	More hands on and practice in fall prevention, and pizza.
510	9/17/20114	1	4	5	5	4	5	
511		2	5	5	5	5	5	The Class was really good on improving my fall prevention knowledge.
512		3	4	4	4	4	4	
513		4	5	5	5	5	5	More example of proper use of equipments.
514		5	4	4	4	5	5	
515		6	4	4	4	4	5	It was pretty good.
516		7	4	4	5	5	5	Liked the YouTube videos.
517		8	5	5	5	5	5	Start the class little late.
518		9	5	5	5	5	5	
519		10	4	4	4	4	4	None.

520		11	5	5	5	5	5	
521		12	5	5	5	5	5	Start the class little late.
522		13	4	4	4	5	5	Leave as it is.
523		14	4	4	4	4	4	
524		15	5	5	5	5	5	
525		16	5	5	5	5	5	Snacks.
526		17	5	5	5	5	5	Start the Class at 10 am
527		18	5	5	5	5	5	
528		19	5	5	5	5	5	
529		20	5	5	5	5	5	
530		21	4	4	4	4	4	
531		22	5	5	5	5	5	
532		23	4	5	4	5	5	
533		24	5	5	5	5	5	
534		25	4	5	4	4	5	
535		26	4	4	4	4	4	
536		27	4	5	5	4	5	
537		28	4	5	4	4	5	
538		29	5	5	4	5	5	
539		30	4	4	4	4	4	
540		31	4	5	4	4	5	
541		32	4	5	4	5	5	
542		33	5	5	5	5	5	
543		34	4	4	4	4	4	
543	10/1/2011	1	5	5	5	5	5	
544		2	5	5	5	5	5	I have no suggestions for this outstanding class
545		3	4	4	4	5	5	
546		4	5	4	5	5	4	
547		5	5	4	4	5	5	
548		6	5	5	5	5	5	
549		7	5	5	4	4	2	Encourage this class to all company etc, and also to anyone, thank you.
550		8	4	4	5	5	5	None needed.
551		9	5	5	5	4	5	
552		10	4	5	4	5	5	None
553		11	4	4	4	4	5	
554		12	5	5	5	5	5	
555		13	5	5	5	5	5	Show more procedures for what to do when someone falls.

Response	Points
Excellent	5
Good	4
Neutral	3
Fair	2
Poor	1

Table C- 2. Class Evaluation Data of Spanish Fall Prevention Training Class

S.No.	Training Date	Participants ID	Questions Numbers and Evaluation Grading					
			Q. 1	Q. 2	Q.3	Q. 4	Q. 5	Q.6
1	7/7/2010	1	5	5	5	5	5	If one or two hours were added and videos about the topic were played to reinforce what was taught.
2		2	5	5	5	5	5	Not any
3		3	5	5	5	5	5	N/A
4		4	4	5	5	5	5	Have practice about the class for better understanding thank you.
5		5	5	5	5	5	5	More practice and not only theory
6		6	5	5	5	5	5	Everything was very good excellent
7		7	4	4	4	5	5	Everything was very good
8		8	5	5	5	5	5	There is nothing to say everything was very good it was a very wide explanation about the problems of falls or of unsecure accidents
9		9	4	4	4	4	4	It was very good nothing should change
10		10	5	5	4	4	4	N/A
11		11	4	4	4	4	4	I think like that is very good
12		12	5	5	4	4	5	I feel it’s perfect
13		13	4	5	5	4	5	Without comments
14		14	5	5	5	5	5	Everything was good thank you
15		15	4	4	4	4	4	No comments
16		16	4	4	4	4	4	Everything was good there is no excuses
17		17	4	4	4	4	4	Be more active at the job and have more safety classes
18		18	4	4	4	5	5	Not allow the use of cell phones

19	19	4	5	4	2	4	Everything was good a good job from everyone of you guys congratulations partners
20	20	5	5	5	5	5	N/A
21	21	4	4	4	4	5	I think it would be better to make the classes a little longer for better understanding and learning
22	22	5	5	5	5	5	N/A
23	23	5	5	5	5	5	N/A
24	24	5	4	4	4	4	Free height I think it’s very good to have more understanding on the dangers of the jobs where we can be
25	25	5	4	4	4	4	Free height I think it’s very good to have more understanding on the dangers of the jobs where we can be
26	26	5	5	5	5	5	N/A
27	27	5	5	5	5	5	Everything good
28	28	5	4	4	5	5	My suggestion to give more frequently the safety classes. For the people who are working realize that constantly they are in danger. Every day and that the job is not a game. And that day to day they have to think of what they are doing. And that someone waits for him on his way back home everyday asking god for his return.
29	29	4	4	4	4	4	N/A
30	30	4	4	4	5	5	N/A
31	31	4	4	4	4	4	That the class go along with instructors that speak completely Spanish to avoid the translation since the person that spoke in Spanish I think was capable to do it like that and like that save time thank you a humble suggestion
32	32	5	4	4	5	5	N/A
33	33	5	5	5	5	5	N/A
34	34	4	4	4	5	5	That OSHA went out to the jobs to check the employees
35	35	5	4	4	5	4	Well to me you guys were very good
36	36	5	4	4	5	5	I don't have any comments everything was well explained
37	37	5	5	5	5	5	Perfect teacher good.
38	38	4	4	4	5	5	Show more videos of when they are working without protection and protection show the used harness to see the differences.
39	39	5	5	5	5	5	Nothing else to congratulate the speakers; specially the young man that explained in Spanish he was clear, precise and attentive. Also I suggest: there should be more physical practice, as seen in the picture do it in the field of action. I mean: not everything is in the class. Physically practice it. Ok.
40	40	4	4	5	4	4	Put in practice all that you taught us and practice to put order in the job and avoid accidents.

41	41	5	5	5	5	5	Everything was excellent.
42	42	4	4	4	5	4	N/A
43	43	5	5	5	5	5	Everything is perfect
44	44	5	5	5	5	5	None everything excellent
45	45	5	5	5	5	5	Perfect
46	46	5	5	5	5	5	You guys aren't missing anything everything is very good you guys were ready for any question we had…to me it was very good
47	47	5	5	5	5	5	More modern equipment for the practice
48	48	4	4	5	4	4	Practice in the field, visual of equipment in the field, installation of equipment (practice), Note: we learn or remember a lot from the processes, but I think this course is better for people who do not have sufficient experience (new apprentices). Thank you.
49	49	4	4	4	4	5	Show a used harness so that the students see the difference. Show some videos of the dangers that are found at the jobs
50	50	5	5	5	5	5	Microphone
51	51	3	4	4	5	5	Nothing to add it seems to me that the instructors explained everything to us. Very good.
52	52	5	5	5	5	5	N/A
53	53	4	5	4	5	5	N/A
54	54	5	5	4	5	5	Not any everything was very excellent
55	55	5	5	4	5	5	It can be suggested that the phones can be silenced or turned off. Also that the people keep silent when the professor is talking. On my side the people were talking and on the back side others did the same and distracted the rest of us.
56	56	5	5	4	5	5	More authority should be put in place in the classes and to prohibit the cell phones in the class.
57	57	4	4	4	5	5	N/A
58	58	5	5	5	4	4	N/A
59	59	4	4	4	4	4	Its good the training is good to avoid the falls and there is not suggestions
60	60	5	5	5	5	5	N/A
61	61	5	5	5	5	5	Keep giving classes in Spanish and like that keep getting better learning
62	62	4	4	5	5	4	N/A
63	63	4	4	4	5	5	N/A
64	64	5	4	4	4	4	The class was very interesting. The translator did an excellent job. Could have brought more equipment for ladders and harness etc. Total was good
65	65	4	5	5	4	4	N/A
66	66	4	5	4	5	3	N/A

67		67	4	4	4	4	4	N/A
68		68	5	5	5	5	5	Microphone to hear better
69		69	4	5	5	5	5	That all should put more attention
70	7/19/2010	1	5	5	5	5	5	The course is good but it could focus in other areas: like the commercial where they unload product of different sizes (load and unload)
71		2	5	5	5	5	5	Everything perfect, there is no suggestions
72		3	5	5	5	5	5	All the training was 100% ok
73		4	5	5	5	5	5	N/A
74		5	5	5	5	5	5	I liked the class everything good
75		6	5	4	5	4	5	This class is very good, because many of us do not know the risks that exist on the job and how to avoid these risks. The truth it was excellent
76		7	5	5	5	5	5	Everything perfect.
77		8	5	5	4	5	5	Everything perfect.
78		9	5	5	5	5	5	Not any.
79		10	4	4	4	4	4	Go to work to practice it.
80	8/9/2010	1	5	5	5	5	5	
81		2	5	5	4	4	5	
82		3	5	5	5	5	5	
83		4	5	5	5	5	5	
84		5	5	5	5	5	5	
85		6	4	5	5	4	4	
86		7	5	5	5	5	5	
87		8	5	5	5	5	5	
88	8/21/2010	1	4	5	5	4	5	Continue bettering for better security and performance.
89		2	5	5	5	5	5	Do evaluations at places of work.
90		3	5	5	5	5	5	I don't have any suggestions about the topic, everything was very good.
91		4	5	5	4	5	4	Everything good maybe the use of the laboratory could be more to try to experiment.
92		5	5	5	5	5	5	Everything very good.
93		6	5	5	5	5	5	Everything good.
94		7	5	5	5	5	5	None, very good lecture and presentation. Excellent schedules.
95	9/17/2010	1	5	5	5	5	5	Teach the appropriate use of fire extinguishers, types of fires, what the labels mean on containers and extend excavations.
96		2	4	4	4	4	4	Speak less English.
97		3	4	4	4	4	4	Speak less English.
98		4	2	2	4	5	5	N/A
99		5	2	4	5	5	5	To me, it was very good. Thank you
100		6	5	5	5	5	5	Not any, every was very good.
101		7	5	4	5	5	5	N/A

102		8	5	5	5	5	5	Everything was excellent.
103		9	5	5	5	5	5	The way the class was handled was excellent
104	10/16/2010	1	5	5	5	5	5	The class should stay how it is because it was very good.
105		2	5	5	5	5	5	N/A
106		3	5	5	5	4	5	
107		4	5	5	5	5	5	Perfect
108		5	5	5	5	5	5	
109		6	5	5	5	5	5	Everything was perfect.
110		7	5	5	5	5	5	
111	11/6/2010	1	5	4	5	4	5	
112		2	5	4	5	5	4	
113		3	5	5	5	5	5	
114		4	5	5	5	5	5	
115		5	5	5	5	5	5	
116		6	4	4	2	5	5	
117		7	5	5	5	5	5	
118		8	5	5	5	5	5	
119		9	5	5	5	4	4	
120		10	5	5	5	5	5	
121		11	5	5	5	5	5	
122		12	5	5	5	5	5	
123		13	5	5	5	5	5	
124		14	5	5	5	5	5	
125		15	5	5	5	5	5	
126		16	5	5	5	5	5	
127	12/4/2010	1	5	5	4	5	5	
128		2	5	5	5	5	5	
129		3	5	5	5	4	5	
130		4	5	5	5	5	5	
131		5	5	5	5	5	5	
132		6	5	5	3	3	2	
133		7	5	5	5	5	5	
134		8	5	5	5	5	5	
135		9	5	5	5	5	5	
136		10	5	5	5	5	5	
137		11	5	5	5	5	5	
138		12	5	4	5	5	5	
139		13	4	5	5	5	5	

140		14	5	5	5	5	5
141		15	5	5	5	5	5
142		16	5	5	5	5	5
143		17	5	5	5	5	5
144		18	5	5	5	5	5
145	2/5/2011	1	4	4	4	4	4
146		2	4	5	4	4	5
147		3	5	5	5	5	5
148		4	3	3	3	3	3
149		5	5	5	5	5	5
150		6	4	4	5	3	5
151		7	4	5	4	4	5
152		8	5	5	5	5	5
153		9	5	5	5	5	5
154	9/10/2011	1	5	5	5	5	5
155		2	4	3	4	3	4
156		3	5	5	5	5	5
157		4	5	5	5	5	5
158		5	5	5	5	4	5
159		6	4	5	5	5	5
160		7	5	5	5	5	5
161		8	5	5	5	5	5
162		9	5	4	5	5	5
163		10	4	5	5	5	5
164		11	5	5	5	5	5
165		12	5	5	5	5	5
166		13	5	5	5	5	5
167		14	5	5	5	5	5

Coding:

Competent	1
Incompetent	0

Table C- 3. Competency data of English Fall Prevention Class

S.No.	Training Date	Trainee ID	Q.1		Q. 2	Q.3	
			a	b	a	a	b
1	4/4/2011	1	1	1	1	1	1
2		2	1	1	1	1	1
3	4/28/2011	1	1	1	1	1	1
4		2	1	1	1	1	1
5		3	1	1	1	1	1
6	5/3/2011	1	1	0	1	1	1
7		2	1	1	1	0	0
8		3	1	0	1	1	1
9	6/3/2011	1	1	1	1	0	1
10		2	1	1	1	1	0
11		3	1	1	1	0	1
12		4	1	1	1	1	0
13		5	1	1	1	0	1
14		6	1	1	1	0	1
15		7	1	1	1	1	1
16		8	1	1	1	0	0
17	6/21/2011	1	1	1	1	1	0
18		2	1	1	1	1	1
19		3	0	0	1	1	0
20		4	1	0	1	1	1
21		5	1	1	1	1	1
22		6	0	0	0	1	0
23	7/12/2011	1	1	1	1	1	1
24		2	1	1	1	1	1
25		3	1	1	1	1	1
26		4	1	1	1	1	1
27		5	1	1	1	1	1
28		6	1	1	1	1	1
29		7	1	1	1	1	1
30		8	1	1	1	1	1
31		9	1	1	1	1	1
32		10	1	1	1	1	1
33		11	1	1	1	1	1
34		12	1	1	1	1	1
35		13	1	1	1	1	1
36		14	1	1	1	1	1
37		15	1	1	1	1	1
38		16	1	1	1	1	1
39		17	1	1	1	1	1
40		18	1	1	1	1	1
41		19	1	1	1	1	1
42		20	1	1	1	1	1

43		21	1	1	1	1	1
44		22	1	1	1	1	1
45		23	1	1	1	1	1
46		24	1	1	1	1	1
47		25	1	1	1	1	1
48		26	1	1	1	1	1
49		27	1	1	1	1	1
50		28	1	1	1	1	1
51		29	1	1	1	1	1
52		30	1	1	1	1	1
53		31	1	1	1	1	1
54		32	1	1	1	1	1
55		33	1	1	1	1	1
56		34	1	1	1	1	1
57		35	1	1	1	1	1
58		36	1	1	1	1	1
59		37	1	1	1	1	1
60		38	1	1	1	1	1
61		39	1	1	1	1	1
62		40	1	1	1	1	1
63		41	1	1	1	1	1
64		42	1	1	1	1	1
65		43	1	1	1	1	1
66		44	1	1	1	1	1
67		45	1	1	1	1	1
68		46	1	1	1	1	1
69		47	1	1	1	1	1
70		48	1	1	1	1	1
71		49	1	1	1	1	1
72		50	1	1	1	1	1
73		51	1	1	1	1	1
74		52	1	1	1	1	1
75		53	1	1	1	1	1
76	8/2/2011	1	1	1	1	1	1
77		2	1	0	1	1	1
78		3	1	1	1	1	1
79		4	1	1	1	1	1
80		5	1	1	1	1	1
81		6	1	1	1	0	0
82	9/10/2011	1	1	1	1	1	1
83		2	0	0	1	1	1
84		3	1	1	1	1	1
85		4	1	1	1	1	1
86		5	1	1	1	1	1
87		6	1	1	1	1	1
88		7	1	1	1	1	1
89		8	1	1	1	1	1
90		9	1	1	1	1	1
91		10	1	1	1	1	1
92		11	1	1	1	1	1
93		12	1	1	1	1	1
94		13	1	1	1	1	1
95		14	1	1	1	1	1

96		15	1	1	1	1	1
97		16	1	1	1	1	1
98		17	1	1	1	1	1
99		18	1	1	1	1	1
100		19	1	1	1	1	1
101		20	1	1	1	1	1
102		21	1	1	1	1	1
103		22	0	0	1	1	1
104		23	0	1	1	1	1
105	10/9/2010	1	1	1	1	1	1
106		2	1	0	1	1	0
107		3	1	1	1	1	0
108		4	1	1	1	1	0
109		5	1	0	1	1	1
110		6	1	1	1	1	1
111		7	1	1	1	1	0
112		8	1	1	1	1	1
113		9	1	1	1	1	1
114		10	1	1	1	1	0
115		11	1	0	1	1	1
116		12	1	0	1	1	1
117		13	1	0	1	1	0
118		14	1	1	1	1	0
119		15	1	0	1	1	0
120		16	1	0	1	1	0
121		17	1	0	1	1	1
122		18	1	0	1	1	1
123		19	1	1	1	1	1
124		20	1	1	1	1	1
125		21	1	0	1	1	1
126	10/30/2011	1	1	0	1	1	1
127		2	0	0	0	1	1
128		3	1	1	1	1	0
129		4	1	1	1	1	0
130		5	1	1	1	1	0
131		6	1	1	0	1	1
132		7	1	1	1	1	0
133		8	1	1	1	1	1
134		9	1	1	1	1	1
135		10	1	1	1	1	0
136		11	1	1	1	1	1
137		12	1	1	1	1	1
138		13	1	1	1	1	1
139		14	1	1	0	1	1
140		15	1	1	0	1	1
141		16	1	1	1	1	1
142		17	1	1	1	1	1
143		18	1	1	0	1	1
144		19	1	1	1	1	0
145	11/5/2011	1	1	1	1	1	1
146		2	1	1	1	1	1
147		3	1	1	1	1	1
148		4	0	0	0	0	0

149		5	0	0	0	0	0
150		6	0	0	0	0	0
151		7	0	0	0	0	0
152		8	0	0	0	0	0
153		9	0	0	0	0	0
154		10	0	0	0	0	0
155		11	0	0	0	0	0
156		12	0	0	0	0	0
157		13	0	0	0	0	0
158		14	0	0	0	0	0
159		15	0	0	0	0	0
160		16	0	0	0	0	0
161		17	0	0	0	0	0
162		18	0	0	0	0	0
163		19	0	0	0	0	0
164		20	0	0	0	0	0
165		21	0	0	0	0	0
166		22	0	0	0	0	0
167		23	0	0	0	0	0
168		24	0	0	0	0	0
169		25	0	0	0	0	0
170		26	0	0	0	0	0
171		27	0	0	0	0	0
172		28	0	0	0	0	0
173		29	0	0	0	0	0
174		30	0	0	0	0	0
175		31	0	0	0	0	0
176		32	0	0	0	0	0
177		33	0	0	0	0	0
178		34	0	0	0	0	0
179		35	0	0	0	0	0
180	11/20/2010	1	1	0	0	1	0
181		2	0	0	0	1	0
182		3	0	0	0	1	0
183		4	1	1	1	1	1
184		5	1	1	1	1	1
185		6	1	0	1	1	1
186		7	1	1	1	1	1
187		8	1	1	1	1	0
188		9	1	0	0	1	0
189		10	1	0	0	1	0
190		11	1	1	1	1	1
191		12	1	0	1	1	0
192		13	1	0	0	1	0
193		14	1	0	1	1	1
194		15	1	1	1	1	1
195		16	1	1	0	1	1
196		17	1	0	1	1	1
197		18	1	1	0	1	1
198		19	1	1	1	1	1
199		20	1	1	1	1	1
200		21	1	1	1	1	1
201		22	0	0	0	1	0

202		23	0	0	0	1	0
203		24	1	1	0	1	0
204		25	1	1	0	1	0
205		26	1	1	1	1	1
206		27	1	1	1	1	1
207		28	1	1	1	1	1
208		29	0	1	0	1	1
209		30	1	1	1	1	1
210	12/11/2010	1	1	1	0	0	0
211		2	1	1	0	1	1
212		3	1	1	1	1	1
213		4	1	1	1	1	1
214		5	1	0	1	1	0
215		6	0	0	0	0	0
216		7	1	1	1	1	1
217		8	0	0	0	0	0
218		9	0	0	0	0	0
219		10	1	1	1	1	0
220		11	1	1	1	1	1
221		12	1	1	1	1	1
222		13	1	1	1	1	0
223		14	1	1	1	1	1
224		15	1	1	1	1	1
225		16	1	0	1	1	1
226		17	1	1	1	1	1
227		18	1	1	1	1	1
228		19	0	0	0	0	0
229		20	1	1	1	1	1
230		21	1	1	1	1	1
231		22	1	1	0	1	0
232		23	1	1	1	1	1
233		24	1	1	1	1	1
234		25	0	0	0	0	0
235		26	1	1	0	1	1
236		27	1	1	0	1	1
237		28	1	1	1	1	1
238		29	1	1	1	1	1
239		30	1	1	0	1	1
240		31	1	1	0	1	1
241	1/15/2011	1	1	1	1	1	1
242		2	0	1	1	1	1
243		3	1	1	1	1	1
244		4	1	1	1	1	1
245		5	1	1	1	1	1
246		6	1	1	1	1	1
247		7	0	0	0	1	0
248		8	1	1	0	1	0
249		9	1	1	1	1	1
250		10	1	1	1	1	1
251		11	1	1	1	1	1
252		12	0	0	0	1	0
253		13	0	0	0	1	0
254		14	1	0	1	1	1

255		15	1	0	0	1	0
256		16	1	0	1	1	0
257		17	0	1	1	1	1
258		18	1	1	1	1	1
259		19	0	1	0	1	1
260		20	0	0	0	0	0
261		21	1	0	1	1	1
262		22	1	0	1	1	1
263		23	0	0	0	1	1
264		24	0	0	0	1	0
265		25	1	1	1	1	1
266		26	1	1	1	1	1
267		27	0	1	0	1	1
268		28	0	0	0	1	0
269		29	1	1	1	1	1
270	2/12/2011	1	1	1	1	1	1
271		2	1	1	0	1	1
272		3	1	1	1	1	1
273		4	0	1	0	1	1
274		5	0	1	1	1	0
275		6	1	1	1	1	1
276		7	0	1	0	1	1
277		8	1	1	1	1	0
278		9	0	0	0	0	0
279		10	0	1	1	1	0
280		11	0	1	1	1	0
281		12	1	1	0	1	0
282		13	1	1	1	1	1
283		14	1	1	0	1	0
284		15	0	1	0	1	0
285		16	1	1	1	1	1
286	3/5/2010	1	0	0	0	1	1
287		2	0	0	0	1	0
288		3	1	1	1	1	1
289		4	1	1	1	1	1
290		5	1	1	1	1	1
291		6	0	0	0	0	0
292		7	0	0	0	1	0
293		8	0	0	0	0	0
294		9	1	1	0	1	1
295		10	1	1	1	1	1
296		11	0	0	0	1	0
297		12	1	1	1	1	1
298		13	0	0	0	1	0
299		14	0	0	0	1	1
300		15	0	0	0	0	0
301		16	0	0	0	0	0
302		17	0	0	0	1	1
303		18	0	0	0	1	1
304		19	0	0	0	1	0
305		20	1	0	0	1	1
306		21	0	0	0	1	1
307		22	0	0	0	1	0

308		23	0	0	0	1	0
309		24	0	0	0	1	1
310		25	0	0	0	0	0
311		26	1	1	1	1	1
312		27	0	0	0	1	0
313		28	0	0	0	0	0
314		29	0	0	0	0	0
315	4/2/2011	1	1	1	1	1	1
316		2	0	0	0	1	0
317		3	1	1	1	1	0
318		4	1	1	1	1	0
319		5	1	1	1	1	1
320		6	1	1	1	1	1
321		7	1	1	1	1	1
322		8	0	0	0	0	0
323		9	0	0	0	1	1
324		10	1	1	1	1	1
325		11	1	1	1	1	1
326		12	1	1	1	1	1
327		13	1	1	1	1	1
328		14	0	0	0	1	1
329		15	1	1	1	1	1
330		16	0	0	0	0	0
331		17	1	1	1	1	1
332		18	0	0	1	1	0
333		19	1	1	1	1	1
334	4/23/2011	1	1	1	1	1	0
335		2	1	1	1	1	1
336		3	1	1	0	1	0
337		4	1	1	0	1	0
338		5	1	1	0	1	1
339		6	0	0	1	1	1
340		7	0	0	0	1	0
341		8	1	0	1	1	0
342		9	1	0	1	1	0
343		10	1	1	1	1	1
344		11	0	1	1	1	0
345		12	1	0	1	1	1
346		13	1	1	1	1	1
347		14	1	0	0	1	0
348		15	0	0	0	1	0
349		16	0	0	0	1	0
350		17	0	0	0	1	0
351		18	0	0	0	1	0
352		19	0	0	1	1	1
353		20	1	0	1	1	1
354		21	1	0	1	1	0
355		22	1	0	1	1	1
356		23	0	0	0	0	0
357		24	0	0	1	1	0
358		25	0	0	1	1	0
359		26	1	0	1	1	0
360		27	1	1	1	1	1

361		28	1	1	1	1	1
362		29	1	1	1	1	1
363	5/21/2011	1	1	1	1	1	1
364		2	1	1	1	1	1
365		3	1	1	1	1	1
366		4	1	1	1	1	1
367		5	1	1	0	1	1
368		6	0	0	1	1	0
369		7	0	0	0	1	1
370		8	0	0	0	1	0
371		9	0	0	0	1	0
372	6/4/2011	1	1	1	1	1	1
373		2	1	1	1	1	1
374		3	1	1	1	1	1
375		4	1	1	1	1	1
376		5	1	1	0	1	1
377		6	0	0	1	1	0
378		7	0	0	0	1	1
379		8	0	0	0	1	0
380		9	0	0	0	1	0
381		1	1	1	1	1	1
382		2	0	1	1	1	1
383		3	0	0	0	1	1
384		4	0	0	0	0	0
385		5	0	0	0	1	0
386		6	1	1	1	1	1
387		7	0	1	0	1	0
388		8	0	1	1	1	0
389		9	0	0	0	1	0
390		10	0	0	0	1	0
391		11	0	0	0	1	1
392		12	0	0	0	1	1
393		13	0	0	0	1	0
394		14	0	1	0	1	0
395		15	0	0	0	1	0
396		16	0	1	0	1	0
397		17	0	1	0	1	0
398		18	0	1	0	1	0
399		19	0	0	0	1	0
400		20	0	1	0	1	0
401		21	0	1	0	1	0
402		22	0	0	0	1	1
403		23	0	1	0	1	0
404		24	0	0	0	1	0
405		25	0	1	1	1	1
406		26	1	1	1	1	1
407		27	0	0	0	1	0
408		28	0	0	0	1	0
409		29	0	0	1	1	0
410		30	0	0	0	1	0
411		31	1	1	1	1	1
412		32	0	1	1	1	0
413	6/11/2011	1	0	0	0	1	0

414		2	0	0	1	1	0
415		3	0	0	0	1	0
416		4	0	0	0	1	0
417		5	1	1	1	1	1
418		6	0	0	0	1	1
419		7	1	1	1	1	1
420		8	1	1	1	1	1
421		9	1	1	1	1	1
422		10	0	0	1	1	0
423		11	1	1	1	1	0
424		12	1	1	1	1	1
425		13	0	0	0	1	0
426	6/18/2011	1	1	1	1	1	1
427		2	0	0	0	1	0
428		3	1	1	1	1	1
429		4	0	0	0	1	0
430		5	1	1	1	1	1
431		6	0	0	0	1	0
432		7	1	1	1	1	1
433		8	1	1	1	1	1
434		9	0	0	0	0	0
435		10	1	1	1	1	1
436	6/25/2011	1	0	0	0	1	0
437		2	1	1	1	1	1
438		3	1	1	1	1	1
439		4	1	1	1	1	1
440		5	0	0	0	1	0
441		6	1	1	1	1	1
442		7	0	0	0	1	0
443		8	0	0	0	1	0
444		9	0	0	0	1	0
445		10	0	0	0	1	0
446	7/9/2011	1	1	1	1	1	1
447		2	0	0	0	1	0
448		3	1	1	1	1	1
449		4	0	1	0	1	0
450		5	1	1	1	1	1
451		6	0	1	1	1	0
452		7	1	1	1	1	1
453		8	0	0	0	1	0
454		9	1	1	1	1	1
455		10	0	0	0	1	0
456		11	0	0	1	1	0
457		12	1	0	1	1	0
458		13	0	0	0	1	0
459		14	0	0	0	1	0
460	7/16/2011	1	1	1	1	1	1
461		2	0	0	0	1	1
462		3	1	1	1	1	1
463		4	0	0	0	1	0
464		5	1	1	1	1	1
465		6	0	0	0	1	0
466		7	1	1	1	1	1

467		8	0	0	0	1	1
468		9	0	0	1	1	1
469	7/30/2011	1	1	1	1	1	1
470		2	0	0	0	1	0
471		3	1	1	1	1	1
472		4	0	0	0	1	0
473		5	1	1	1	1	1
474		6	1	1	1	1	1
475		7	1	1	0	1	0
476		8	1	1	1	1	1
477		9	0	0	0	1	0
478		10	1	1	1	1	1
479		11	0	0	1	1	0
480		12	0	0	1	1	0
481		13	0	0	1	1	0
482		14	0	0	0	1	0
483	8/6/2011	1	1	1	1	1	1
484		2	0	0	1	1	1
485		3	0	0	0	1	1
486		4	1	1	1	1	1
487		5	1	1	1	1	1
488		6	0	0	0	1	0
489		7	0	0	0	1	0
490		8	0	0	0	1	0
491		9	1	1	1	1	1
492		10	0	0	1	1	1
493		11	0	0	1	1	0
494		12	1	1	1	1	1
495		13	1	1	1	1	1
496		14	0	0	0	1	0
497	8/13/2011	1	1	1	1	1	1
498		2	1	1	1	1	1
499		3	0	0	0	1	0
500		4	0	0	0	1	0
501		5	1	1	1	1	1
502		6	0	0	0	1	0
503		7	1	1	1	1	1
504		8	0	0	0	1	1
505		9	0	0	0	1	0
506		10	0	0	0	0	0
507		11	0	0	0	1	0
508		12	0	0	0	0	0
509		13	0	0	0	1	0
510	9/17/2011	1	1	1	1	1	1
511		2	0	0	0	0	0
512		3	0	0	0	1	0
513		4	1	1	1	1	1
514		5	1	1	1	1	1
515		6	1	1	1	0	0
516		7	0	0	0	1	1
517		8	0	0	0	0	0
518		9	0	0	0	1	1
519		10	1	1	1	1	1

520		11	1	1	1	1	1
521		12	0	0	0	1	1
522		13	0	0	0	1	1
523		14	0	0	0	1	1
524		15	1	1	1	1	1
525		16	0	0	0	1	1
526		17	1	1	1	1	1
527		18	0	0	0	1	1
528		19	1	1	1	1	1
529		20	0	0	0	0	0
530		21	0	0	0	0	0
531		22	1	1	1	1	1
532		23	0	0	1	1	1
533		24	0	0	0	1	1
534		25	1	1	0	1	0
535		26	0	1	1	1	1
536		27	1	0	1	0	1
537		28	1	1	1	1	1
538		29	1	0	0	1	1
539		30	0	0	1	1	0
540		31	1	1	1	1	0
541		32	0	1	1	1	1
542		33	1	1	0	1	0
543		34	0	0	1	0	1
544	10/1/2011	1	1	1	1	1	1
545		2	1	1	1	1	1
546		3	1	1	1	1	1
547		4	0	1	0	1	0
548		5	0	1	0	1	0
549		6	0	1	0	1	0
550		7	0	0	0	0	0
551		8	0	0	0	0	0
552		9	0	1	0	1	0
553		10	0	1	0	1	0
554		11	0	1	1	1	1
555		12	0	1	1	1	1
556		13	0	0	1	1	1

Coding:

Competent	1
Incompetent	0

Table C- 4. Trainee Competency data of Spanish Fall Prevention Class.

S.No.	Training Date	Trainee ID	Q.1		Q. 2	Q.3	
			a	b	a	a	b
1	7/7/2010	1	1	1	1	1	1
2		2	1	1	1	1	1
3		3	1	1	1	1	1
4		4	1	1	1	1	1
5		5	1	1	1	1	1
6		6	1	1	1	1	1
7		7	1	1	1	1	1
8		8	1	1	1	1	1
9		9	1	1	1	1	1
10		10	1	1	1	1	1
11		11	1	1	1	1	1
12		12	1	1	1	1	1
13		13	1	1	1	1	1
14		14	1	1	1	1	1
15		15	1	1	1	1	1
16		16	1	1	1	1	1
17		17	1	1	1	1	1
18		18	1	1	1	1	1
19		19	1	1	1	1	1
20		20	1	1	1	1	1
21		21	1	1	1	1	1
22		22	1	1	1	1	1
23		23	1	1	1	1	1
24		24	1	1	1	1	1
25		25	1	1	1	1	1
26		26	1	1	1	1	1
27		27	1	1	1	1	1
28		28	1	1	1	1	1
29		29	1	1	1	1	1
30		30	1	1	1	1	1
31		31	1	1	1	1	1
32		32	1	1	1	1	1
33		33	1	1	1	1	1
34		34	1	1	1	1	1
35		35	1	1	1	1	1
36		36	1	1	1	1	1
37		37	1	1	1	1	1
38		38	1	1	1	1	1
39		39	1	1	1	1	1
40		40	1	1	1	1	1
41		41	1	1	1	1	1
42		42	1	1	1	1	1

43		43	1	1	1	1	1
44		44	1	1	1	1	1
45		45	1	1	1	1	1
46		46	1	1	1	1	1
47		47	1	1	1	1	1
48		48	1	1	1	1	1
49		49	1	1	1	1	1
50		50	1	1	1	1	1
51		51	1	1	1	1	1
52		52	1	1	1	1	1
53		53	1	1	1	1	1
54		54	1	1	1	1	1
55		55	1	1	1	1	1
56		56	1	1	1	1	1
57		57	1	1	1	1	1
58		58	1	1	1	1	1
59		59	1	1	1	1	1
60		60	1	1	1	1	1
61		61	1	1	1	1	1
62		62	1	1	1	1	1
63		63	1	1	1	1	1
64		64	1	1	1	1	1
65		65	1	1	1	1	1
66		66	1	1	1	1	1
67		67	1	1	1	1	1
68		68	1	1	1	1	1
69		69	1	1	1	1	1
70		70	1	1	1	1	1
71	7/19/2010	1	1	1	1	1	1
72		2	1	1	1	1	1
73		3	1	1	1	1	1
74		4	1	1	1	1	1
75		5	1	1	1	1	1
76		6	0	0	1	1	1
77		7	1	1	1	1	1
78		8	1	1	1	1	1
79		9	1	1	1	1	1
80		10	0	0	1	1	1
81		11	1	1	1	1	1
82	8/9/2010	1	1	1	1	1	1
83		2	1	1	1	1	1
84		3	1	1	1	1	1
85		4	0	1	1	1	1
86		5	0	1	1	1	1
87		6	1	1	1	1	1
88		7	1	1	1	1	1
89		8	1	1	1	1	1
90	8/21/2010	1	1	1	1	1	1
91		2	1	1	1	1	1
92		3	1	1	1	1	1
93		4	1	1	1	1	1
94		5	1	1	1	1	1
95		6	1	1	1	1	1

96		7	1	1	1	1	1
97	9/17/2010	1	1	1	1	1	1
98		2	1	1	1	1	1
99		3	1	1	1	1	1
100		4	1	1	1	1	1
101		5	1	1	1	1	1
102		6	1	1	1	1	1
103		7	1	1	1	1	1
104		8	0	0	1	1	1
105		9	1	1	1	1	1
106	10/16/2010	1	1	1	1	1	1
107		2	1	1	1	0	0
108		3	1	1	1	1	1
109		4	1	0	1	1	1
110		5	0	0	1	0	1
111		6	0	0	1	1	0
112		7	0	0	1	0	1
113	11/6/2010	1	1	1	1	1	1
114		2	1	1	1	1	1
115		3	1	1	1	1	1
116		4	1	1	1	1	1
117		5	1	1	1	1	1
118		6	1	1	1	1	1
119		7	1	1	1	1	1
120		8	0	0	0	0	0
121		9	1	1	1	1	1
122		10	0	0	0	0	0
123		11	0	0	1	0	0
124		12	0	0	0	0	0
125		13	1	1	0	0	0
126		14	1	1	0	0	0
127		15	0	0	0	0	0
128		16	0	0	0	0	0
129	12/4/2010	1	0	0	1	1	1
130		2	0	1	1	1	1
131		3	0	0	1	1	1
132		4	1	1	1	1	1
133		5	1	1	1	1	1
134		6	1	1	1	1	1
135		7	1	1	1	1	1
136		8	1	1	1	0	0
137		9	1	1	1	0	0
138		10	1	1	1	1	1
139		11	1	1	1	0	0
140		12	1	1	1	0	0
141		13	0	0	1	0	0
142		14	0	0	1	1	1
143		15	0	0	1	1	1
144		16	0	0	1	1	1
145		17	0	0	1	1	1
146		18	1	1	1	1	1
147	2/5/2011	1	0	0	1	0	0
148		2	0	0	0	1	0

149		3	1	1	1	1	1
150		4	1	1	1	0	1
151		5	1	1	1	1	1
152		6	1	1	1	1	1
153		7	1	1	1	1	1
154		8	1	1	1	1	1
155		9	0	0	1	0	1
156	9/11/2011	1	0	0	0	1	1
157		2	0	0	0	0	0
158		3	0	0	0	1	1
159		4	0	0	0	1	1
160		5	0	0	0	0	0
161		6	1	1	1	1	1
162		7	0	0	1	1	0
163		8	0	0	0	1	0
164		9	0	0	0	1	0
165		10	0	0	0	1	1
166		11	0	0	0	0	0
167		12	0	0	0	0	0
168		13	1	1	1	0	0
169		14	0	0	0	1	0

Coding:

English	0
Spanish	1
Yes	0
No	1

Table C- 5. Follow-up interview data.

S.N.	Trainee ID.	Question																	
		1	2.a	2.b	2.c	2.d	2.e	2.f	2.g	3	4	5	6	7	8	9	10	11	12
1	1	0		0						0	0	0	More careful with edges, make sure there are guardrails.	1	None	0	None		0
0	0	0					0			0	0	0	Tied off all the times.	0	0	0	0	0	0
0	4	0	0				0			0	1	0	Check Scaffolds more in depth.	0	0	0	0	0	0
4	6	0		0						0	0	0	Erect scaffold correctly.	0	0	1	None	0	0
5	5	0			0	0	0			0	0	0	Watchful while doing work.	1	None	1	None	0	0
6	8	0						0		0	0	0	More cautious and taught others too.	0	None	0	0	0	0
7	9	0	0			0		0		0	1	0	More Cautious.	1	None	0	4	0	0
8	10	0	0							0	0	0	Aware	0	0	0	0	0	0
9	11	0		0						0	0	0	Heads up about everything.	1	None	0	0	0	0
10	10	0	0			0				0	0	0	More aware.	0	0	0	1	0	0
11	10	0	0							0	0	0	More aware.	1	None	1	None	0	0
10	14	0	0							0	0	0	More aware.	0	0	0	0	0	0
10	15	0				0	0			0	0	0	Check ladders more often.	0	0	0	0	0	0
14	16	0		0	0			0		0	0	0	Developed habit of checking equipments before use, and using them in right way.	0	0	0	0	0	0

15	17	0					0	0	0	1		0	0	0	0	0	0
16	18	0			0	0	0	0	0	1		0	0	0	0	0	0
17	19	0		0			0	0	0	0	More cautious while working in ladders.	1		1	None	0	0
18	00	1	0					0	0	1		1		0	1	0	0
19	00	1	0					0	0	0	Inspecting all equipments and being careful while going up and down.	1		1	None	0	0
00	04	1		0				0	1	0	More patience at work to check hazards.	0	0	0	0	0	0
01	08	1	0					0	0	0	use ladders better	0	0	0	0	0	0
00	01	1	0					0	0	0	Pay more attention in ladders will installation and using.	1		0	5	0	0
00	00	1		0				0	1	1		1		1	None	0	0
04	05	1		0			0	0	0	0	Check ladders more often.	0	0	0	4	0	0
05	06	1		0				0	0	0	Attention to surroundings and inspection of ladders.	0	0	0	0	1	0
06	07	1	0		0			0	0	0	Pay more attention to fall prevention at job site.	0	0	0	0	0	0
07	08	1	0		0			0	0	0	No longer think that he cannot hurt or that he is too strong for fall prevention.	1		1	None	0	0
08	09	1		0				0	0	0	How to watch out for trip hazards and be more careful on ladders.	0	0	0	7	0	0
09	40	1					0	0	1	1		1		0	0	0	0
00	41	1		0				1	1	1		1		0	9	0	0
01	40	1		0				0	1	1		1		0	1	0	0
00	40	1					0	0	0	0	More aware of hazards and take time	0	0	0	1	0	0

													to cancel hazards.						
00	44	1	0						0	0	0	Tie up ladder, and extend 3' over landing.	0	0	0	5	0	0
04	45	1	0			0			0	0	0	Attention when going up and down the ladders.	0	0	0	None	0	0
05	46	1	0						0	0	0	Think more about the job I am going to do.	1		1	None	0	0
06	47	1		0					0	0	0	Inspect work are prior to work.	0	0	0	0	0	0
07	48	1	0						0	0	0	Not take things so lightly	0	0	0	6	0	0
08	49	1	0						0	0	0	Keep more things in mind while using ladders.	0	0	0	5	0	0
09	50	1	0						0	0	0	More Cautious about surroundings.	1		1	None	0	0
40	50	1		0			0		0	0	0	Using the right ladders	0	0	0	4	0	0
41	50	1				0	0		0	0	0	Take more care of myself, position ladder better, and use scaffolds properly.	1		1	None	0	0
40	54	1					0		0	0	1		1		0	1	0	0
40	55	1	0						0	0	0	More cautious about work.	0	0	0	0	0	0
44	56	1		0					0	0	0	Give my opinions to my peers to prevent accidents.	0	0	0	6	0	0
45	57	1	0						0	0	1		1		0	0	0	1
46	59	1		0					0	0	1		1		1	None	0	0
47	60	1				0	0		0	0	0	Clean shoes and check ladders before going up, also in scaffolds.	0	0	0	4	0	0
48	61	1				0			0	0	0	Pay more attention.	0	0	0	0	0	0
49	60	1					0		0	0	0	more attention	1		0	0	0	0
50	60	1					0	0	0	0	0	Do not take as many	0	0	0	0	0	1

													risk as before(climbing to top of ladders)						
51	64	1		0	0					0	0	0	More Cautious	0	0	1	None	0	0
50	65	1			0				0	0	0	0	More aware of surroundings.	1		1	None	0	0
50	68	1			0					0	0	0	Letting Forman know if there are any hazards.	1		1	None	0	0
54	69	1	0							0	0	0	More Cautious.	1		0	1	0	0
55	70	1	0						0	0	0	1		1		1	None	0	0
56	70	1		0					0	0	0	0	More Watchful.	0	0	1	None	0	0
57	70	1					0			1	1	1	More attention.	0	0	0	0	0	0
58	75	1	0							0	0	0	Try to be more cautious.	1		0	0	0	0
59	76	1	0							0	0	0	Going up and down, handling ladders.	0	0	1	None	0	0
60	77	1						0		0	0	0	More Cautious.	1		0	0	0	0
61	78	1			0					0	0	1		0	0	1	None	0	0
60	79	1			0					0	0	0	More cautious, do not ignore Hazards anymore.	1		1	None	0	0
60	80	1	0							0	0	0	Check Harness and ladder Safety.	1		1	None	0	0
64	81	1		0						0	0	0	Take in account weight limit in ladders.	1		1	None	0	0
65	80	1	0							0	0	0	Inspect scaffolds more before using them.	1		0	0	0	0
66	80	0					0		0	0	0	0	Think twice and check.	0	0	1	None	0	0
67	84	0	0							0	0	0	Always look for slip, strip and fall hazards.	0	0	0	1	0	0
68	85	0	0							0	0	0	More aware and cautious in handrail and aware.	0	0	1	None	0	0
69	86	0	0	0	0	0	0	0	0	0	0	0	Think twice before doing any job.	0	0	0	1	0	0

70	87	0			0	0				0	0	0	Use PPE equipment frequently.	1		1	None	0	0
71	88	0		0				0		0	0	1		1		0	0	0	0
70	89	0		0						0	0	0	Be more aware.	0	0	0	1	0	0
70	90	0	0							1	0	1		1		0	0	0	0
74	91	0						0		0	1	0	Made sure everything is set up properly before use.	1		0	1	0	0
75	90	0		0				0		0	0	0	Examine safety equipment before using and strictly follow 3 point rule in ladders.	0	0	1	0	0	0
76	90	0			0				0	0	0	0	Remember to apply safety measures.	0	0	1	None	0	0
77	94	0		0					0	0	0	0	Try to be assertive and do job in more safe way.	0	0	0	0	0	0
78	95	0						0		0	0	0	Have danger in mind more.	0	0	1	0	0	0
79	96	0	0	0	0	0	0	0	0	0	0	0	Analyze the possible hazards and taking prevention.	0	0	1	None	0	0
80	99	0	0							0	0	0	More cautious about Hazards.	0	0	0	0	0	0
81	100	0	0	0	0	0	0	0	0	0	1	0	Putting ladder 3' above landing, check harness before use.	1		1	None	0	1
80	100	0		0			0	0		0	0	0	More aware and watchful of trip and fall hazards, falling object hazards, and always wear hardhat and proper dress.	0	0	0	4	0	0
80	100	0							0	1	0	1		0	0	1	None	0	1
84	104	0				0		0		0	0	0	Don’t go high up in the ladder, use 3 point rule.	0	0	0	0	0	0
85	105	0	0							0	0	1		0	0	0	0	0	0

86	107	0	0	0	0	0	0	0	0	0	0	0	Check all the safety equipment before using	0	0	1	None	0	0
87	108	0	0	0						0	1	0	More cautious in heights	0	0	1	None	0	0
88	109	0		0	0	0				0	0	0	More aware and watch out for Places that need to be protected like ducts, holes and unprotected circulation areas.	0	0	0	10	0	0
89	110	0	0						0	0	0	0	More protected and more assertive.	1		0	1	0	0
90	111	0		0	0			0	0	0	0	0	Check everything before starting work.	1		1	None	0	0
91	110	0					0	0		0	0	0	Check harness, scaffoldings and ladders.	1		1	None	0	0
90	110	0							0	0	0	0	Ask for safety equipments before going to work.	0	0	1	None	0	0
90	114	0	0							0	0	1		1		0	0	0	0
94	115	0		0						0	0	0	More aware of what and how I do things.	1		1	None	0	0
95	116	0		0	0	0	0	0	0	0	0	0	show the employers rights and wrongs	0	0	0	None	0	1
96	117	0		0				0		0	0	0	More aware of what’s going on and tied to right spot that gives 5000 pounds.	0	0	1	0	0	0
97	118	0			0	0		0	0	0	0	1		0	0	0	0	0	0
98	119	1		0						0	0	0	More safe at work.	0	0	1	None	0	0
99	101	1	0							0	0	0	More Cautious.	1		0	0	0	1
100	100	1							0	0	0	0	More cautious, keep fall prevention in mind.	0	0	0	0	0	0
101	104	1		0						0	0	0	Think more about working safely.	1		0	0	0	1
100	105	1	0							0	0	0	Keep work area clean	0	0	0	1	0	0

												to avoid fall hazards.						
100	106	1					0		0	0	0	Check area and equipment before working.	0	0	0	5	0	0
104	107	1		0					0	1	0	More Cautious about working on ladders at home.	1		0	0	0	1
105	108	1				0			0	0	0	Safer on ladders, more cautious.	0	0	0	1	0	0
106	101	0	0		0			0	0	0	0	More aware when working at heights and roofs.	0	0	0	0	0	0
107	100	0				0	0		0	0	0	More cautious at work.	0	0	1	None	1	0
108	100	0	0						0	1	1		1		1	None	0	1
109	104	0	0						0	0	0	More aware of fall hazards.	0	0	0	0	0	0
110	105	0		0					0	0	0	Careful about trench egress spacing, and ladder tied or not.	1		1	None	0	1
111	106	1					0		0	1	0	Using 3 point rule.	0	0	0	0	0	0
110	108	1				0			0	0	0	More attention to the work.	0	0	1	None	0	1
110	141	1		0					0	0	0	More Cautious.	0	0	0	0	0	0
114	140	1				0			0	1	0	safer when working at heights	0	0	1	None	0	1
115	140	1		0					0	0	0	Be safer and more cautious.	1		0	0	0	1
116	144	1					0		0	0	0	More cautious of where is set the ladders.	0	0	0	0	0	1
117	145	1		0					0	1	0	More Cautious about working on ladders.	0	0	0	4	0	1
118	146	1			0				0	0	0	Pay more attention to guardrails and harnesses.	0	0	0	1	0	0
119	147	1		0					0	0	0	Use ladders better and correctly.	0	0	0	0	0	0
100	148	1		0					0	0	0	More cautious.	0	0	0	1	0	0

101	149	1	0							0	0	0	More attentive.	1		1	None	0	1
100	154	0	0	0	0	0	0	0	0	0	1	0	Do not climb too high without harness, not to walk across beam, check ladder 0 point rule.	1		1	0	0	0
100	156	0				0		0		0	0	0	More aware and cautious and keep safety in mind as it is matter of life and death.	1		1	None	0	1
104	158	0		0				0	0	0	0	0	Go out at site and look what kind of job is and what are the safety measures to be implemented.	0	0	0	0	0	0
105	160	0					0	0		0	0	0	Keep myself away from heights and work in ground if possible and always use PPE.	0	0	1	None	0	0
106	161	0		0				0	0	0	0	0	Try to be safer as possible by eliminating the need of fall prevention as far as possible and If needed use right type of equipment.	0	0	0	0	0	0
107	160	0		0					0	0	0	0	I watch everything in detail before working, the conditions and find out the rescue plan.	0	0	1	None	0	0
108	160	0		0					0	0	1	1		1		1	None	0	0
109	164	0	0	0	0	0	0	0	0	0	1	0	More observant what you have to do and not to do.	1		1	None	0	0
100	168	0	0	0	0	0	0	0	0	0	0	0	Try to eliminate risk and use right type of fall prevention	0	0	1	None	0	0

													system.						
101	171	0		0						0	1	0	More Cautious.	1		1	None	0	0
100	170	0		0	0					0	0	0	More aware and cautious at work.	0	0	1	None	0	0
100	170	0	0	0				0		0	0	0	Identify safety measures to be implemented before starting work.	0	0	0	1	0	0
104	174	0		0			0			0	1	0	Every minor things like small holes, falling objects, nails can lead to accidents so be watchful at work.	1		1	None	0	0
105	176	1	0				0	0		0	0	0	Check things before using them.	0	0	0	1	0	1
106	178	1	0						0	0	0	0	How to talk to people better and be more assertive.	0	0	0	0	0	0
107	179	1	0							0	1	0	Pay more attention to hazards at work.	1		1	None	0	1
108	181	1		0						0	0	0	Think more about different things I can use to protect myself.	0	0	0	0	0	0
109	180	1	0							0	0	0	Better Inspection of ladders.	0	0	0	0	0	0
140	180	1	0	0					0	0	0	0	Use ladders and harness correctly.	0	0	0	1	0	0
141	184	1	0							0	0	0	Thinking more about working safely.	0	0	0	10	0	0
140	185	0		0						0	1	0	Acquire better safety equipments.	1		1	None	0	0
140	186	0				0	0			0	0	0	More aware of accidents.	0	0	1	None	0	0
144	187	0		0					0	0	1	1		1		1	None	0	1
145	188	0		0				0		0	0	0	Check harness and ladders before using and avoid violating rules.	0	0	1	None	0	0

146	189	0	0		0		0			0	0	0	More aware of Minor things also that can lead to accidents.	0	0	0	10	0	0
147	190	0		0						0	1	0	More aware	1		1	None	0	0
148	191	0		0				0		0	0	0	More attentive towards self as well as co-workers safety.	0	0	0	1	0	0
149	190	0			0			0		0	0	0	Concerned about ladder safety.	0	0	0	1	0	0
150	190	0	0					0	0	0	0	0	Aware people about safety at job site.	0	0	0	0	0	0
151	196	0								1	1	1		1		1	None	0	1
150	000	0		0						0	1	0	Wear harness before working at heights.	1		0	0	0	0
150	001	0		0	0				0	0	0	0	Think for safety first.	0	0	1	None	0	0
154	000	0	0			0				0	1	1		1		1	None	0	1
155	004	0						0	0	0	0	0	Use Ladders following all the rules and regulation and developed habit of assertiveness.	0	0	0	0	0	0
156	005	0	0	0						0	1	0	Noticed that I was more aware to use hardhat, safety shoes and belts and never sit back to question supervisors.	1		1	None	0	0
157	006	0	0	0						0	0	0	Much more aware to use equipment before using it.	0	0	0	0	0	0
158	008	1	0							0	0	0	Look around more to avoid hazards at work. Defend my right and myself.	1		1	None	0	0
159	009	1						0		0	0	0	More aware of hazards, try to help co-workers to understand hazards.	0	0	0	0	0	0
160	010	1						0		0	1	0	More cautious about Hazards.	1		0	5	0	0

161	010	1		0						0	0	0	More aware.	1		1	0	0	0
160	010	1	0							0	1	0	Keep in mind everything I learned.	1		0	0	0	1
160	014	0	0	0						0	1	0	Keep eyes open on everything.	1		1	None	0	1
164	015	0					0			0	0	0	Watch out, be more careful about your and others' safety.	0	0	0	1	0	0
165	017	0					0			0	1	0	Aware of lot of things like, guardrails, caution tape, and 3 point rule.	0	0	0	1	0	0
166	019	0			0				0	0	0	0	Stick on to the basic principles and use right things at right place and correctly.	0	0	1	None	0	0
167	000	0	0		0					0	1	0	Aware about slip and trip hazard.	1		1	None	0	0
168	001	0	0							0	1	1		1		1	None	0	1
169	000	0	0			0	0	0		0	0	0	Using ladders harness and scaffolds only after checking it properly.	0	0	1	None	0	0
170	004	0		0				0		0	1	0	More aware to setup ladders and more aware of regulations.	1		1	None	0	1
171	006	0		0				0	0	0	0	0	Check the safety equipments before using it, and do things in proper and safe way.	0	0	1	None	0	0
170	007	0	0	0	0	0	0	0	0	0	0	0	See things in a different way.	0	0	0	1	0	0
170	008	0	0							0	1	0	More aware.	1		1	None	0	1
174	000	0		0					0	0	0	0	Feel better that I have knowledge of fall prevention and feel safer at work.	0	0	0	1	0	0
175	001	0		0	0		0			0	0	0	Always kept eyes open for safety and u	0	0	0	1	0	0

													maintain good work environment.						
176	005	0				0				0	0	0	I don't go over 6 feet.	0	0				
177	006	0	0	0	0	0	0	0	0	0	0	0	Better use of a ladder.	0	0	0	0	0	0
178	007	0		0						0	0	0	Keep your working area clean to avoid tripping hazard, setup ladder properly.	0	0	0	0	0	0
179	008	0					0			0	0	0	More aware and alert of what's going on in the surrounding.	0	0	0	0	0	0
180	009	0		0						0	0	0	I am more aware at site.	1		0	None	0	0
181	040	0						0		0	0	0	Check all ladders and trip hazards.	0	0	0	1	0	0
180	040	0				0				0	0	0		1		1	None	0	0
180	040	0				0				0	0	0	I don't play around.	0	0	0	None	0	0
184	044	0						0		0	0	0	Being safe on the job, having ladders properly set up.	0	0	0	0	0	0
185	045	0		0						0	0	0	I try to be more alert and I watch out.	0	0				
186	046	0	0							0	0	0	I am more aware at site.	0	0	0	0	0	0
187	047	0	0							0	0	0	Watch out for people around me.	0	0	0	1	0	0
188	048	0				0				0	0	0							
189	049	0	0	0	0	0	0	0	0	0	0	0		1					
190	050	0	0	0	0	0	0	0	0	0	0	0	Work safely.	1					
191	051	0	0	0					0	0	0	1		0	0	0	10	0	1
190	050	0	0							0	0	0	My safety.	0	0				
190	055	0					0			0	0	0	Understanding the importance of everyday safety, having better knowledge and preplanning when using scaffolding,	0	0	0	5	0	0

													ladders etc.								
194	056	0	0					0		0	0	0	I use the three point rule on the ladder.	0	0						
195	057	0					0			0	0	0		0	0						
196	061	0	0	0						0	0	1		1		1	None	0	0		
197	060	0	0	0	0	0	0	0	0	0	0	0	Looking for trip hazards and bad ladders.	0	0	0	1	0	0		
198	068	0	0		0		0			0	0	0	Staying focused while working with failing situation.	0	0	1	None	0	0		
199	070	1			0					0	0	0	More cautious about ladders.	0	0	0	1	0	0		
000	070	1		0						0	0	0	Make my crew work safer; make sure to inspect all equipment before use.	0	0	0	0	0	1		
001	070	1		0						0	0	0	More cautious and feel more prepared.	0	0	1	None	0	1		
000	075	1		0						0	0	0	More cautious when starting work, I inspect all equipment.	0	0	1	None	0	0		
000	076	1						0		0	0	0	Make sure I set up ladders right. And inspect the tag on the side for weight items.	0	0	0	8	0	0		
004	077	1		0						0	0	0	More careful.	0	0	0	0	0	0		
005	079	1	0							0	0	0	Wear harness more often.	0	0	0	0	0	0		
006	080	0		0						0	0	0	Check work area, check equipment daily.	0	0	0	1	0	1		
007	080	1						0	0	0	0	1		1		1	None	0	0		
008	084	1						0		0	0	0	More cautious with ladders.	0	0	0	0	0	0		
009	085	1		0						0	0	0	Check the equipment before use.	0	0	0	1	0	0		
010	088	0					0	0		0	0	0	More careful while	0	0	0	1	0	0		

													working with ladders, its placement, proper extension.						
011	089	0	0	0	0	0	0	0	0	0	0	0	More cautious and aware in tripping hazard.	1		1	None	0	0
010	094	0		0				0		0	0	0	Do not go on top of the ladder. Follow 0 point rule.	0	0	0	0	0	0
010	096	0						0		0	0	0	More aware of the surroundings.	0	0	0	10	0	0
014	097	0	0	0				0		0	0	0	Wear harness, tie up ladders, were PPE and more safety cautious.	0	0	1	None	0	0
015	098	0						0	0	0	0	0	More cautious while you are working in heights and in ladders also.	0	0	1	0	0	0
016	099	0		0				0		0	0	0	More cautious about harness, falling and tripping hazards.	0	0	0	1	1	0
017	001	0	0							0	1	0	Developed attitude of awareness.	1		1	None	0	1
018	000	0						0	0	0	0	0	Made habit of learning the safety environment of the jobsite and use safety equipment wherever necessary.	0	0	0	0	0	0
019	004	0	0	0	0	0	0	0	0	0	0	0	Look things closely and carefully.	0	0	0	1	1	0
000	006	0	0							0	1	0	More aware and cautious and helped develop confidence.	1		1	0	0	0
001	007	0		0			0	0		0	0	0	More cautious and select right type of safety system to protect.	0	0	0	1	0	0
000	008	0		0				0		0	0	0	I changed the way I	0	0	1	0	0	0

													look and do the work.							
000	009	0		0				0		0	1	0	More aware of environment and cautious.	0	0	0	0	0	0	
004	010	0	0	0	0	0	0	0	0	0	0	0	Cautious alert and aware.	1		0	1	0	0	
005	011	0					0	0		0	0	0	Double check on angle of extension ladder.	0	0	0	0	0	0	
006	014	0								1	1	1		1		1	None	0	1	
007	015	0						0	0	0	1	0	More cautious and aware.	1		1	None	0	1	
008	017	0	0	0						0	1	1		1		1	None	0	1	
009	018	1		0						0	0	0	Use ladders better and inspect them before use.	0	0	0	0	0	0	
000	000	1	0							0	0	0	Clean Workplace.	0	0	0	1	0	0	
001	000	1	0							0	0	0	Be more careful at ladders, not get up to the last steps.	0	0	0	0	0	1	
000	005	1						0		0	0	0	Be safer on ladders, check the angle, and don’t use the last.	0	0	0	10	0	0	
000	009	1	0							0	1	0	Watch out for trip hazards.	0	0	0	0	0	1	
004	000	1		0						0	0	0	Work slower but I am more cautious.	0	0	0	0	0	0	
005	000	1	0							0	0	0	More cautious, watch tools and labels.	0	0	1	None	0	1	
006	005	0		0						0	0	0	Not allow coworkers and myself to work in height without protection and use ladders following all rules and regulation.	0	0	0	10	0	0	
007	006	0						0		0	0	0	More careful about distance of ladders to be set near power cable and its position.	0	0	0	1	0	0	

008	007	0		0					0	0	1		1		1	None	0	0
009	008	0				0			0	0	0	Much more careful of what you do.	0	0	0	1	0	0
040	009	0				0			0	0	0	Strictly use PPE and PFAS at work.	0	0	0	8	0	0
041	041	0		0			0	0	0	1	1		1		1			
040	040	0	0		0		0		0	0	0	Set ladder properly and secure it before use.	0	0	1	None	0	0
040	044	0	0	0					0	0	0	Check equipments carefully before using.	0	0	0	1	0	0
044	046	0		0					0	1	0	More aware of surroundings.	1		0	5	0	0
045	047	0				0			0	1	0	More careful and aware.	1		1	None	0	1
046	048	0		0					0	1	1		1		1	None	0	1
047	049	0	0	0			0		0	0	0	Before getting on ladder use 3 point rule.	0	0	0	0	0	1
048	050	0	0						0	1	0	Wear your safety equipment before working in non-construction related job also.	1		1	None	0	1
049	050	0	0	0		0			0	1	1		1					
050	054	0		0			0		0	1	0	More aware.	1		1	None	0	1
051	056	0				0			0	1	0	Be more aware in doing work.	1		1	None	0	1
050	057	0		0					0	0	0	Lot more aware in thing I do and made me more safety concentrated.	0	0	0	4	0	0
050	058	0					0		0	0	0	More careful about fall from ladders and placing equipment in ladders.	0	0	0	1	0	0
054	060	0	0				0		0	0	0	Make sure that I am properly tied off.	0	0	0	1	0	0

055	060	0	0							0	1	0	Careful while walking down the street.	1		1	None	0	1
056	060	0		0					0	0	1	1		1		1	None	0	1
057	065	1	0	0	0	0	0	0	0	0	0	0	More careful while using ladders and scaffolds.	0	0	0	1	0	0
058	066	0					0			0	1	0	Keep in mind to use PFAS while working above 6'.	1		1	None	0	1
059	069	0					0		0	0	0	0	Make sure that all the wheels of the scaffolds are properly locked.	0	0	0	1	0	0
060	071	0						0		0	1	1		1		1			
061	075	0		0						0	0	0	More Cautious	0	0	0	None	0	0
060	076	0		0						0	1	1		1		1	None	0	1
060	077	1		0						1	0	1	More aware.	1		1	None	0	0
064	079	0		0					0	0	1	0	Lot more aware of what going on around you.	1		1	None	0	1
065	080	1	0	0	0	0	0	0	0	0	1	0	More aware.	1		0	1	0	1
066	085	1			0			0		0	1	0	When going down the ladder use, 3 point.	0	0	0		0	1
067	086	1	0						0	0	0	0	A lot of precaution.	0	0	0	None	0	0
068	089	0	0							0	0	1		1		1	None	0	1
069	091	0		0						0	1	0	Wear Safety Glasses, 3 points on ladders, harness.	0	0	0	0	0	0
070	090	0	0							0	1	0	More aware.	1		1	None	0	1
071	096	0						0	0	0	0	0	Use ladders more carefully and aware.	0	0	1	None	0	0
070	097	0					0	0	0	0	0	0	Plan for safety equipment before going to work.	0	0	1	None	0	0
070	098	0		0				0	0	0	0	0	Understand the working environment and work safely.	0	0	1	None	0	0

074	099	0	0	0			0		0	0	0	0	Check equipments before using it and do not work in a hurry.	0	0	1	None	0	0
075	400	0		0				0	0	0	0	0	More careful and aware.	0	0	0	1	0	0
076	400	0		0						0	1	1		1		1	None	0	1
077	404	0	0	0					0	0	0	0	More aware and cautious.	0	0	1	None	0	1
078	405	0						0		0	0	1		0	0	0	1	0	0
079	409	0	0					0	0	0	1	0	Setup Ladders correctly before using it.	0	0	1	None	0	0
080	411	0			0					0	1	0	Look out for being safe at job in time and in a good way.	1		1	None	0	1
081	414	0	0				0		0	0	0	0	I never forget to tie off while working at height.	0	0	0	1	0	0
080	416	0	0	0	0	0	0	0	0	0	0	0	Tie off more often than usual.	0	0	0	0	0	0
080	418	0		0						0	0	0	I knew more about safety, and keep myself safe.	0	0	1	0	0	0
084	401	0	0	0	0	0	0	0	0	0	0	0	Use ladders according to rules.	0	0	0	1	0	0
085	400	0		0				0	0	0	0	0	More aware of height of work, aware of surroundings like holes.	0	0	1	0	0	0
086	400	0		0	0			0	0	0	0	0	More careful and think about stuffs more.	0	0	1	0	0	0
087	404	0	0							0	1	0	More aware.	1		1	None	0	1
088	407	0							0	0	0	0	More aware of surrounding and other co-workers.	0	0	1	None	0	1
089	400	0	0				0		0	0	0	0	More careful and aware.	0	0	0	1	0	0
090	401	0	0	0			0	0		0	0	0	Take necessary	0	0	0	1	0	0

												precaution before working.						
091	400	0		0		0		0		0	0	0	Never forget to tie up while working at heights.	0	0	1	None	0	0
090	400	0		0						0	0	0	More aware about fall hazards.	0	0	1	None	0	0
090	404	0	0	0						0	0	0	Secure the ladders before use.	0	0	0	1	0	0
094	406	0		0		0				0	10	0	Keep safety in mind always.	1		1	None	0	1
095	407	0		0		0	0			0	0	0	More aware of surrounding and coworkers.	0	0	0	1	0	0
096	408	0	0							0	1	1		1		1	None	0	1
097	440	0		0						0	1	0	With ladders use three point rules.	1		1	None	0	1
098	441	0	0							1	1	0	Care at my non-construction related work.	0		1	None	0	1
099	440	0					0			0	0	1		1		1	None	0	1
000	440	0	0	0			0			0	0	0	More aware at work and also look for what's' going-on on the surrounding.	0	0	1	None	0	0
001	444	0		0						0	1	0	Make sure that I keep safety issues in mind.	1		1	None	0	0
000	445	0	0							0	1	0	More cautious and aware.	1		1	None	0	1
000	446	0		0			0	0		0	0	0	Use harness while working at heights and follow 0 point rule in ladder.	0	0	0	1	0	0
004	447	0				0	0			0	0	0	Make sure every equipment is in good shape before using.	0	0	0	0	0	0
005	448	0		0						0	0	0	More aware.	0	0	1	None	0	0
006	449	0		0						0	0	0	Look my harness for cut and tears.	0	0	0	1	0	0

007	450	0	0							0	1	0	More aware.	1		1		0	
008	451	0					0	0	0	0	0	Learnt to ask worker's right.	0	0	1	None	0	0	
009	450	0					0		0	0	0	Make sure surface is not slippery and the work environment is also safe.	0	0	0	1	0	0	
010	455	0	0						0	1	1		1		1		0	1	
011	458	0				0			0	0	0	Using safety requirement while using access and egress to roof.	0	0	1	None	0	0	
010	459	0	0				0		0	0	0	More cautious about everything.	0	0	1	0	0	0	
010	461	0	0	0			0	0	0	0	0	Use ladders properly, proper extension, use three point rule.	0	0					
014	460	0	0						0	1	0	More Aware.	1		1	None			
015	465	0		0		0	0		0	0	0	Follow rules and regulations properly while working.	0	0	0	1	0	0	
016	466	0		0		0		0	0	1	0	More Aware.	1		1	None	0	1	
017	467	0		0		0	0	0	0	0	0	More aware at work	0	0	1	None	0	0	
018	468	0	0					0	0	0	0	Watch out for surrounding.	0	0	1	None	0	0	
019	469	0		0			0		0	1	0	More Cautious.	1		1	None	0	1	
000	470	0	0						0	1	1		1		1	None	0	1	
001	471	0	0						1	1	1		1		1	None	0	1	
000	470	0	0						1	1	1		1		1		0	1	
000	474	0	0				0		1	1	1		1		1	None	0	1	
004	475	0	0	0			0	0	0	0	0	Take precautions while working at heights.	0	0	0	0	0	1	
005	476	0	0					0	0	1	1		1		1	None	0	1	
006	477	0	0					0	0	0	0	Always be careful at work.	0	0	0	1	0	0	
007	478	0		0					0	0	0	I am more alert at work.	0	0	1	None	0	0	
008	491	0	0	0	0	0	0	0	0	0	0	0	More aware of safety	1		0	Many	0	0

														hazards.						
009	494	0	0	0				0		0	0	0	Always tie up while working at heights and use ladders properly.	0	0	0	1	0	0
000	496	0			0					0	0	0		1		0		0	0
001	499	0					0			0	1	0	Paying closer attention to things overhead, checking to make sure areas are in good working shape.	1		0	5	0	1
000	500	0						0		0	0	0	Safety on ladders and scaffolding.	1		0	None	0	0
000	501	0			0					0	0	0	More aware of the surroundings.	1		0	1	0	0
004	505	0		0						0	0	0	Being more careful where my ladder is set up.	0	0				
005	506	0	0							0	0	1		0	0	0		0	0
006	508	0						0		0	0	0	Setting ladders properly.	0	0	0	None	0	0
007	510	0		0						0	0	0	I am more conscious of safety option.	0	0	0	1	0	0
008	510	0					0			0	0	1		1		1	None	0	0
009	515	0	0	0	0	0	0	0	0	0	0	0	Being more aware.	0	0	0	Many	0	0
040	516	0		0						0	1	0	More aware of Safety.	1		0	1	0	1
041	500	0		0						0	0	1		1		1		0	1
040	501	0		0						0	1	0	Be always careful and mindful of everyone's safety.	1		1	None	0	
040	500	0					0			0	1	0	Take precautionary measures, check equipments regularly.	1		0	1	0	0
044	508	0	0					0		0	0	1		1		1	None		0
045	509	0	0				0			0	0	1		1		1	None		0
046	501	0	0							0	0	0	Always look for not violation safety rules.	0	0	1	None	0	0

047	504	0	0				0	0	0	More aware of paying more attention.	0	0	0	None	0	0
048	506	0		0		0	0	1	0	I will be more observant of daily situations.	1		1	None	0	
049	507	0		0		0	0	0	0	Precautions, for construction safety.	1		0	1	0	0
050	509	0		0	0	0	0	0	0	More cautious, and watch for co-workers safety.	0	0	0	1	0	0

APPENDIX D

HUMAN RESEARCH CURRICULUM COMPLETION REPORT

CITI Collaborative Institutional Training Initiative

Human Research Curriculum Completion Report
Printed on 8/23/2010

Learner: Vedaspati Joshi (username: vedjoshi)
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Group 2. Social / Behavioral Research Investigators and Key personnel.: If you have any questions regarding your requirements you may contact the UNLV OPRS by phone at 702.895.2794 or by email at OPRSHumanSubjects@unvl.edu

Stage 1. Basic Course Passed on 08/20/10 (Ref # 4778626)

Required Modules	Date Completed	
Introduction	08/18/10	no quiz
History and Ethical Principles - SBR	08/19/10	4/4 (100%)
Defining Research with Human Subjects - SBR	08/19/10	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	08/19/10	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	08/19/10	5/5 (100%)
Informed Consent - SBR	08/20/10	4/5 (80%)
Privacy and Confidentiality - SBR	08/20/10	3/3 (100%)
Research with Prisoners - SBR	08/20/10	4/4 (100%)
Research with Children - SBR	08/20/10	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBR	08/20/10	4/4 (100%)
International Research - SBR	08/20/10	3/3 (100%)
Internet Research - SBR	08/20/10	3/4 (75%)
Group Harms: Research With Culturally or Medically Vulnerable Groups	08/20/10	3/3 (100%)
Workers as Research Subjects-A Vulnerable Population	08/20/10	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	08/20/10	2/2 (100%)
UNLV	08/20/10	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

APPENDIX E

TRAINING PHOTOGRAPHS

Classroom Instruction

Hands-on Training

BIBLIOGRAPHY

Anderson, J.T., Hunting, K.L., and Welch, L.S. (Feb 2000).”Injury and employment patterns among Hispanic construction workers.*” Journal of Occupation and Environmental Medicine*, 42(2), 176-186.

Baker, R. S., Wilson, M. R., Flowers, J., C.W., Lee, D. A., and Wheeler, N. C. (1999). "A population-based survey of hospitalized work-related ocular injury: diagnoses, cause of injury, resource utilization, and hospitalization outcome." *Neuro-Ophthalmology*, 6(3), 159-169.

Brown, M., and Nguyen-Scott, N. (1992). "Evaluating a training-for-action job safety and health program." *Am.J.Ind.Med.*, 22,739-749.

Brunette, M.J. (2004). "Construction safety research in the United States: targeting the Hispanic workforce." *Injury Prevention*, 10(4), 244.

Brunette, M. J. (2005). "Development of educational and training materials on safety and health: Targeting Hispanic workers in the construction industry." *Fam.Community Health*, 28(3), 253.

Carbone, E. T., Lennon, K. M., Torres, M. I., and Rosal, M. C. (2005). "Testing the feasibility of an interactive learning styles measure for US Latino adults with type 2 diabetes and low literacy." *International Quarterly of Community Health Education*, 25(4), 315-335.

Christopher, B. (2002).” Hispanic worker fatalities rise: improved training in needed.” *Professional Safety*, 46(12).

CPWR Data Center. (2007). " The construction chart book." CPWR – The Center for Construction Research and Training, Silver Spring, MD.

CPWR Data Center. (2009). "Hispanic Employment in Construction." CPWR – The Center for Construction Research and Training, Silver Spring, MD.

Dong, X.S., Entzel, P., Men, Y., Chowdhury, R., and Schneider, S. (2004). "Effects of safety and health training on work-related injury among construction laborers." *Journal of Occupational and Environmental Medicine*, 46(12), 1222.

Dong, X.S., and Platner, J.W. (Jan 2004).”Occupational fatalities of Hispanic construction workers from 1992 to 2000.” *American Journal of Industrial Medicine*, 45(1), 45-54.

Dong, X.S., Men, Y., and Haile, E. (2005). "Work-Related Fatal and Nonfatal Injuries among U.S. Construction Workers, 1992-2003." CPWR Data Center, Silver Spring, MD.

Dong, X.S, Wang, X., and Daw, C. (2010). "Fatal and Nonfatal Injuries among Hispanic Construction Workers, 1992-2008." *Rep. No. 2,* CPWR – The Center for Construction Research and Training, Silver Spring, MD.

Ellis, J. (2001). "Introduction to Fall Protection." American Society of Safety Engineers, Des Plaines, IL.

Fleming, S. H. (Spring 2001). "OSHA at 30: Three Decades of Progress in Occupational Safety and Health." *Job Safety and Health Quarterly*, 12(3), 23-32.

Goodrum, P.M., and Dae, J. (2005).”Difference in occupational injuries, illnesses, and fatalities among Hispanic and non-Hispanic construction workers.” *Journal of Construction Engineering and Management*, 131(9), 1021-1028.

Grzywacz, J. G., Arcury, T. A., Márin, A., Carrillo, L., Burke, B., Coates, M. L., and Quandt, S. A. (2007). "Work-family conflict: Experiences and health implications among immigrant Latinos." *J.Appl.Psychol.*, 92(4), 1119-1130.

Hinze, J., and Appelgate, L. L. (1991). "Costs of construction injuries." *J.Constr.Eng.Manage.*, 117(3), 537-550.

Hsiao, H., and Simeonov, P. (2001). "Preventing falls from roofs: a critical review." *Ergonomics*, 44(5), 537-561.

Keller, J. J. &. A. (1993). *OSHA compliance manual.* J.J Keller & Associates, Inc., Neenah, WI.

Kilborn, P. (1992). "For Hispanic immigrants, a higher job-injury risk." *New York Times.*

Levine, D. M., Stephan, T.C., Krehbiel, T.C., and Berenson, M.L. (2011). “Statistics for managers using Microsoft Excel.” 6th Ed., Pearson Education, New Jersey.

Lincoln, F., and Rademacher, B. (2006). "Learning styles of ESL students in community colleges." *Community College Journal of Research and Practice, 30,* 5(6), 485-500.

Marin, G., Van Oss-Marin, B. (1991). “Research with Hispanic population.” *Applied Social Research Methods Series*, 23, Newbury Park, CA.

Menzel, N. N., and Gutierrez, A. P. (2010). "Latino worker perceptions of construction risks." *Am.J.Ind.Med.*, 53(2), 179-187.

Moran, M.M. (1996). “OSHA Construction Standard Simplified.” Construction Safety Handbook, Government Institutes, Inc., Rockville, MD.

National Research Council. (2003). *Safety is Seguridad, A workshop summary.* The National Academies Press, Washington, D.C.

NIOSH, National Institute for Occupational Safety and Health. (2000). " Worker Deaths by Falls." Department of Health and Human Services, Center for Disease Control and Prevention, Cincinnati, OH.

O'Connor, T. (2003). " Reaching Spanish-speaking workers with occupational safety and health information." *Safety is Seguidad*, National Academy of Sciences, Washington, D.C.

Plog, B.A. (1976). "Overview of Industrial Hygiene." Fundamentals of Industrial Hygiene, National Safety Council, Itasca, IL, 3-32.

Smith, G. S., Timmons, R. A., Lombardi, D. A., Mamidi, D. K., Matz, S., Courtney, T. K., and Perry, M. J. (2006). "Work-related ladder fall fractures: Identification and diagnosis validation using narrative text." *Accident Analysis & Prevention*, 38(5), 973-980.

Sokas, R. K., Nickels, L., Rankin, K., Gittleman, J. L., and Trahan, C. (2007). "Trainer evaluation of a union-based ten-hour safety and health hazard-awareness program for US construction workers." *International Journal of Occupational and Environmental Health*, 13(1), 56-63.

Thompson, P., and Siddiqi, K. (2007). "Best Practices for Improving Safety among Hispanic Construction Workers." *43rd Annual International Conference of Associated Schools of Construction*, 12-14.

U.S., Department of Labor, Occupational Safety and Health Administration. (1992). "All about OSHA." Washington, D.C.

U.S., Department of Labor, Occupational Safety and Health Administration. (2000). "All About OSHA (OSHA 2056)." Washington D.C. <http://www.nccer.org/documents/safety/allaboutosha2000osha2056.pdf> (Mar. 5, 2011).

U.S., Department of Labor, Occupational Safety and Health Administration. (2006). "All About OSHA (OSHA 2056-07R)." Washington D.C. <http://www.osha.gov/Publications/all_about_OSHA.pdf> (Mar. 4, 2011).

U.S., Department of Labor, Bureau of Labor Statistics. (2011). "Employment Situation Summary." <http://www.bls.gov/news.release/empsit.nr0.html> (Mar. 15, 2011).

U.S., Department of Labor. "Summary of the Major Laws of the Department of Labor." <http://www.dol.gov/opa/aboutdol/lawsprog.htm> (Jun. 7, 2011).

Vojtecky, M. A., and Schmitz, M. F. (1986). "Program evaluation and health and safety training." *J.Saf.Res.*, 17(2), 57-63.

Webster, T. (2000, Spring). “ Workplace Falls.” Compensation and Working Conditions, Washington, D.C.

Wojcik, S., Kidd, P., Parshall, M., and Struttmann, T. (2003). "Performance and evaluation of small construction safety training simulations." *Occupational Medicine,* 53(4), 279.

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Publication:

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