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Uetz, David W. ***Evaluation of the Current Forklift Training Program Utilized at Company XYZ***

Abstract

Powered industrial trucks, commonly known as forklifts, are used in factories throughout the United States to move materials as well as finished goods. Research indicates that a failure to adequately manage the hazards/risks which are associated with the operation of a forklift, especially as it relates to providing employees with necessary training-based information, may lead to injuries ranging from minor wounds to a fatality.

As part of normal business operation, a high percentage of employees who are employed by Company XYZ are required to utilize forklifts on a routine basis throughout the facility. Past accidents which involved employees who were operating a forklift during the loss-producing event indicated the strong need for Company XYZ management to analyze the current forklift training program that is currently employed by the organization. In order to improve the practices set forth by Company XYZ, a literature review was first performed to determine the basis for a successful forklift training program. The literature review provided evidence that Company XYZ had deficiencies within the classroom pre and post-test as well as the hands-on training. The methodology utilized data collected within the literature review to construct a quiz. The quiz was then administered before and after three dissimilar styles of classroom training. The results were compared to determine which delivery method provided the strongest increase in classroom quiz scores. The methodology also included a performance evaluation to determine if training on a specific powered industrial vehicle would allow individuals to operate similar forklifts without operating deficiencies.

Upon completion of the analysis, it was determined that all three classroom delivery methods increased the test scores. It was also determined that there are deficiencies within the operation of powered industrial trucks in which operators were not originally trained on. Recommendations were proposed to Company XYZ regarding the effectiveness of the current program.

Recommendations included Company XYZ choosing one specific delivery method for classroom training rather than viewing a video followed by a lecture. Training operators on all of the lifts that they utilize on a daily basis and not using one specific forklift for training was also recommended. The intentions of the recommendations were to reduce and/or eliminate any gaps that were present within the current forklift training program utilized by Company XYZ.

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Chapter I: Introduction

For those who work in the business and industrial sectors, powered industrial trucks, better known as forklifts, are essential tools as it relates to the efficient handling of materials and finished goods (BYU, 2006.). During the movement of products and materials, there are numerous opportunities for injuries to forklift operators, bystanders, property damage, and therefore the risks that such material handling equipment introduce into the workplace can be considered a significant safety concern. As with any form of a powered tool, especially one which is designed to travel at significant speeds and lift fairly robust loads, the need for a successful forklift operator training program should be a high priority among those who make up the upper management in an organization that employs the use of these devices. It is reasonably foreseeable that any organization that fails to adequately train/prepare its workers to operate a forklift in a safe and efficient manner could expect to routinely sustain people, product, material and property-oriented losses which ultimately drain from the company's bottom line.

For the past twenty years, the primary focus of Company XYZ is to manufacture powdered food goods and subsequently package such into cans for retail sale. Throughout most of the processes that are performed within this facility, forklifts are common in almost all of the stages of raw material as well as finished product handling. Over 400 of the total 475 employees that are employed by Company XYZ operate a forklift at least once per week and therefore are required to possess a company-sponsored forklift license. This organization has been using the identical forklift operator training program since its inception and contrary to what might be expected, forklift-related accident rates for Company XYZ have actually increased in recent years. Most of the reported forklift-related accidents are minor, but there is suspicion among various management-based personnel that the increase in accident frequency is significantly

related to the outdated and thus inefficient operator training program. While there is some speculation that an improvement in the forklift training program may not reduce the number of accidents, there is an assumption that it will create a safer and more efficient work environment. None-the-less, there is a deep concern among Company XYZ personnel as to the reasons behind the increase in forklift-related accidents.

Purpose of the Study

The purpose of this study is to analyze the current forklift training program that is employed by Company XYZ.

Goals of the Study

1. To establish the most effective method to convey information to employees during the classroom portion of forklift training.
2. To determine whether or not employees are capable of operating each and every forklift utilized at Company XYZ after receiving vehicle specific training.
3. To determine if quiz scores are directly related to classroom delivery methods.

Background and Significance

A recent analysis of forklift related incidents at Company XYZ has revealed an increased amount of loss related incidents. The recent uncovering of these incidents has created a strong concern within the management team. This concern is directly related to the drain on the bottom line of the organization. Based on the types of incidents, it was determined by management that the incidents are directly related to the forklift training program utilized at Company XYZ. An overwhelming portion of the incidents are directly connected to employees who have been employed by Company XYZ for less than one year. There is fear that these minor incidents will eventually evolve into major accidents without proper changes to the forklift training program.

If the current program is not revamped to properly train individuals to safely operate powered industrial vehicles, Company XYZ is placing itself at an increased risk for a major incident. Since the potential problem has been identified, Company XYZ is now legally responsible to conduct an analysis of the situation. If Company XYZ neglects to conduct proper analysis, the legal exposures if a major accident were to happen are significant and potentially have the power to completely bankrupt the company. Company XYZ must analyze and increase the efficiency of their forklift training program before the occurrence of a major accident that could severely damage the company, its products, and the employees that work there.

Assumptions of the Study

1. The current forklift training program is not current and the applicable material presented applies to outdated practices, internal company standards and government-based regulations.
2. Gaps within the training program are creating forklift drivers who are unaware of common operating practices that are associated with the powered industrial vehicle.

Definition of Terms

Back Rest. "Attached to the carriage and prevents the load from shifting backwards, it protects the mast cylinders hoses as well as preventing any good from falling through the mast and hitting the operator" (Adaptalift, 2010, p. 1).

Carriage. "A support structure where the forks are attached and mounted" (Adaptalift, 2010, p. 1).

Counter Weight. "The weight installed by the manufacturerto give stability to the machine under load" (Adaptalift, 2010, p. 1).

Cushion Tires. "Used on compact model forklifts in warehouse applications" (Adaptalift, 2010, p. 4).

Extended Height. "The height to the top of the mast or load guard when mast is fully extended" (Adaptalift, 2010, p. 2).

Fork(Tynes). "The cantilevered arms attached to the load carriage, that engage the load" (Adaptalift, 2010, p. 1).

Free Lift. "Height the forks can be raised before the mast extends without increasing the mast height" (Adaptalift, 2010, p. 2).

Gradeability. "The angle of a ramp/slop a forklift can travel up/down on" (Adaptalift, 2010, p. 3).

Lift Cylinder. "Controls the amount by which the mast structure, forks and carriage may be raised or lowered in the vertical" (Adaptalift, 2010, p. 1).

Lift Height. "The height to which the top of the forks is raised when the mast is fully extended" (Adaptalift, 2010, p. 2).

Lowered Height. "Height from the floor to the top of the mast when it is lowered" (Adaptalift, 2010, p. 2).

Mast. "The mast is the vertical support that permits raising and lowering the load" (Adaptalift, 2010, p. 1).

Non-Marking Tires. "Tires made to eliminate black marks on the floor" (Adaptalift, 2010, p. 4).

Overhead Guard. "A framework/roof, providing overhead protection from the operator from falling objects" (Adaptalift, 2010, p. 1).

Pneumatic Tires. "used in unpaved yards on rough surfaces" (Adaptalift, 2010, p. 4).

Pneumatic Profile Puncture Proof Tires. "Used on sealed surfaces and areas where punctures may be an issue" (Adaptalift, 2010, p. 4).

Rating Plate. "This is used to inform users of the maximum load a forklift can legally carry" (Adaptalift, 2010, p. 1).

Right Angle Stacking Isle. "The right angle stacking isle is the terminology to describe the amount of load a forklift can carry and turn to a 90 degree angle" (Adaptalift, 2010, p. 3).

Tilting Angle. "The tilting angle is the maximum angle in which a mast can tilt forward and backward" (Adaptalift, 2010, p. 3).

Tilt Cylinder. "Control the amount by which the mast structure, forks and carriage may be tilted beyond the vertical position, forward or backward" (Adaptalift, 2010, p. 1).

Chapter II: Literature Review

The purpose of this research was to analyze the gaps which may exist within the forklift training program utilized at Company XYZ. Determining the gaps will consist of identifying the actual essentials of a successful forklift training program. After the gaps have been identified, there will be detailed consideration as to why these training methods do not work. This chapter will review material related to forklift training programs, forklift safety, and forklift regulatory compliance. Chapter II will also explore ideas as to why forklift accidents occur and review the regulatory based requirements as stated by the Occupational Safety and Health Administration. The first section of the literature review will include the dangers related to operating a forklift with minimal or no training at all. This will consist of factual data from numerous sources within the field, including educational institutions. The second section will most importantly include information related to OSHA regulations and inspection requirements. It will also involve providing industry standards for proper forklift operation along with training programs. The third section discusses in detail several crucial elements related to the classroom portion of forklift training programs. The fourth and final section will consist of a discussion regarding hands-on training including the essential elements that are required to be covered within this portion of the program. The hands-on training will also include several different theories as to why forklift accidents occur and elements related to minimizing/preventing these incidents from occurring.

Dangers related to forklifts

Forklifts present a hazard to not only the forklift operator, but also to other individuals within the workplace where the vehicles are operating. According to OSHA (2011), tens of thousands of injuries occur each year directly related to forklift operation. The top ten OSHA

violations for 2009 were unveiled at the 97th Annual National Safety Council Expo in Orlando, Florida. Forklift related accidents and injuries ranked eighth on the top ten list of violations in the United States with a frequency rate of 2,993 and this somewhat alarming number does not include the amount of forklift related injuries that likely went unreported during the same year. According to Richard Fairfax, the Director of OSHA Enforcement Programs, 81% of the recorded forklift related violations were serious in nature (Walter, 2009). The number of these violations increased over 30% from the number presented in 2008. The increase in number either shows that OSHA is taking a stern stance on creating a safer workplace by increasing enforcement or that industry isn't doing as well as it should to comply with the associated regulations.

With the 30% increase of forklift related incidents from 2008 to 2009, there are likely to be common trends with regard to these accidents that occur within everyday operations. The most frequent forklift related accidents that occur within the workplace include driving off loading docks, forklifts falling between unsecured docks or trailers, being struck by a lift, and falling off the tines when they are raised. According to Canadian OSHA (CCOHS, 2011), the number one contributing factor relating to forklift accidents is lacking or improper training of workers who are required to operate forklifts. Other factors which contribute to the occurrence of accidents include the age of the forklift, speed, poor maintenance, and the operator's overall level of awareness relating to his/her surroundings (OSHA, 2011, p.1; CCOHS, 2001 p.1).

Forklifts come in a wide variety of shapes and sizes and thus have different operational handling abilities, including dissimilar controls and turning radiuses. While certain vehicles may appear to be similar, it is essential to recognize that a slight difference in size potentially changes numerous operations within the vehicle. The lack of understanding within a company's staff

relating to the differences of forklift sizes and capabilities creates a potentially dangerous situation. No matter how experienced or inexperienced the driver, accident caused injuries can range from a minor scratch to a life ending event. Without the implementation of a proper training program, the level of risk will be on the rise (Digital 2000 INC., 1999).

OSHA Training Requirements

With the increased enforcement from OSHA, it is essential that companies know and understand the rules and regulations that are required within a forklift training program. While OSHA has an extraordinarily large set of standards relating to forklift training programs, knowing and implementing the most important elements within a program are essential components to a company's success. The first and most important element of an organization's written policy is that absolutely no one under the age of 18 be allowed to operate a forklift. By OSHA standards, anyone over the age of 18 will not be allowed to operate a forklift unless he/she has been properly trained and documentation of this training can be provided (OSHA, 2011).

OSHA has developed a safe operation standard with regard to forklift operation and training. The standard dictates the requirements that must be followed within the forklift training program. The safe operation standard requires employers to ensure that each powered industrial truck operator is capable to operate in a safe manner (OSHA, 2011). The regulation stresses that under no circumstances shall an employee operate a forklift until all of his/her training has been completed and documented. The only exception to that rule is if the trainer is present and instructing the trainee to perform operations that are required in the training program which has been set forth by the company (OSHA, 2011).

According to OSHA, trainees can only operate powered industrial trucks where there is no imminent danger to the trainee or the trainer (OSHA, 2011). The trainees may only operate under the direct supervision of a trained and competent individual. The associated training must consist of a formal classroom based process that would include a lecture, discussion, video tape, and written material. The training must also include practical training which consists of demonstrations administered by the trainer and practical exercises performed by the trainee. A crucial element that must be included is an evaluation of the trainee's performance throughout the training program. Additionally, the training must be conducted by an individual that has substantial knowledge and experience as well as the ability to evaluate the trainee's competence (OSHA, 2011). The ability to evaluate trainees is typically derived from the successful completion of a forklift training class. The training program's content is required to include a wide variety topics and activities unless the employer can prove that such is not applicable within the facility. This would include the exclusion of outdoor operations if the facility in question only operates its forklifts indoors. When excluding portions of training, it is essential to provide a superior rationale for the reason that OSHA takes training programs seriously and will request to see training records if/when this agency conducts an onsite inspection of a facility (OSHA, 2011).

Inspection

It seems likely that a portion of forklift accidents can be directly related to improper or non-existent pre-shift inspections of such vehicles. This is because the pre-shift inspection is an essential function that is required by OSHA prior to operating the vehicle. A thorough pre-shift inspection has the ability to tell the operator what could potentially go wrong with the powered industrial truck during operation prior to actually utilizing the forklift. The University of

California Agriculture and Natural Resources Center has developed a pre-shift inspection form that can be used within a variety of forklift settings. In an effort to promote the use of this important document, they have also developed three distinct rules that must always be followed with regard to completing the pre-shift inspection form.

- The checklist must be completed daily and retained for documentation purposes for at least one year.
- If the forklift is found to be unsafe, the condition must be reported immediately to the supervisor and repaired.
- No forklift shall be operated with a leak in the fuel system.

These three rules are essential elements within the forklift pre-shift inspection process. It should be noted that the second and third rules are the basis behind the development of the pre-shift inspection. If a forklift is deemed to be unsafe, under no circumstances shall it be operated until it is fixed. Prior to the development of the pre-shift inspection there was no way to identify if a forklift was unsafe prior to operation. Appendix D illustrates the pre-shift inspection form as developed by the University of California Agriculture and Natural Resources Department (University of California, N.D.). The nature of the pre-shift inspection created by the University of California was to allow the successful use of the form within any industrial setting. The structure created allows the user to understand and sequentially flow through the form until its completion.

The pre-shift inspection form allows each operator to track each area and have the option to determine if the respective area is acceptable or if the vehicle must be removed from service (BYU, 2006). Unfortunately, one of the deficiencies concerning the pre-shift inspection is that the user has the ability to falsify the information. This is a concern within industry because it has

the potential to be the root cause within an accident. Random samplings and reviews of completed pre-shift inspection forms is a possible deterrent to falsifying information. However, it is ultimately the responsibility of each individual operator. Upon completion of the pre-shift inspection, the employee is required to retain the document on the respective forklift until the shift is over. At the end of the week, all of the forms are collected and documented (DOSH, 2007). This provides the ability to review the forms at any time and observe the frequency of a specific forklifts downtime. The only exception to turning the inspection form in at the end of the week is if the lift is removed from service due to an identified issue. If the forklift does not pass the pre-shift inspection it is immediately taken out of service with the inspection form. The failed inspection form will provide the maintenance department with the issue that must be fixed. Once the forklift is repaired, the corrections are documented and the vehicle will be released back into service (BYU, 2006; DOSH, 2007).

Elements Related to Forklift Training Programs

It is likely that throughout industry today, a variety of presentation-orientated elements/strategies are included in forklift training programs. The overall success of the education process may heavily hinge on these elements/strategies and therefore various programs will be analyzed to determine what should be included in a successful forklift training system.

An important element to remember as it relates to analyzing training programs is that as long as OSHA guidelines are followed, companies can customize the curriculum to their respective needs (Washington State, 2008). Essentially, the content of this educational process can be changed with the only constant being that the training program must start off with classroom instruction (Workers Division of Compensation, 2004). This first stage in the training is frequently formal in nature and often consists of the employees watching video tapes that are

produced by professional organizations. The video tapes include sections on general forklift driving, hazard recognition, fundamentals, and operations (LSU, 2001). It has been observed that videos include worksheets which allow the trainees to look for possible hazards during the presentation and evaluate their findings later with the instructor. After the employees observe the video, there may be some formal instruction which includes a lecture followed by discussion (Powered Industrial Trucks; FLK., N.D.). The classroom portion should introduce topics that will be covered later on when the trainee goes to the floor for the hands-on instruction. Upon completion of the video presentation and discussion, the classroom focus typically shifts to a lecture. Now that the employees have a limited exposure to general forklift operation, they are better able to comprehend the information delivered by the instructor (Workers Division of Compensation, 2004; FLK., N.D.).

The final portion of the classroom training could consist of the trainer lecturing to the class while being assisted by a Power Point presentation. This is where several essential elements within each portion of the training may come into play. The first portion of the lecture will focus on the concept of the pre-shift inspection as well as when and how the associated form should be filled out. It will also reinforce the concept that if any deficiencies are present that the forklift must be removed from service immediately prior to any operation (Oregon OSHA, 1999; BYU, 2006). Possible examples of pre-shift inspection identified defects could include faulty back-up lights, hydraulic fluid leaks, a broken horn or mirrors, or damaged tires.

Upon the employees developing a reasonably complete understanding of the pre-shift inspection process, the instructor may move into the second phase of the lecture which may include more detailed information regarding the operation of the forklift. The operation section consists of general rules that must be followed when operating a forklift. The first and most

important rule of operation is that the seatbelt must be utilized at all times (Fasten Those Seatbelts, N.D.; BYU, 2006). The seatbelt is designed to keep the operator within the main cage of the forklift if there is a roll-over and thus prevent the operator from being crushed by the lift. Below is a series of other rules that must be followed during operation of a forklift.

- A hardhat must be utilized by the forklift operator.
- Forklifts are designed for single man operation and passengers are not permitted.
- All body parts must be kept within the main cage at all times.
- A forklift must never be used to lift anyone on the tines without an OSHA approved lifting cage with a full body harness.
- A safe travel distance of three truck lengths must always be maintained during operation.
- The operator must be fully aware of his/her surroundings.
- The operator must sound the horn at each and every intersection.
- The operator must obey all street signs

The rules stated above are very important elements that must be covered within classroom portion of the training program (DOSH, 2007; BYU, 2006). Based on the researcher's experience, all eight of these elements are extremely important to a forklift training program. One of the rules that should be considered alarming is that a forklift must never be used to lift anyone on the tines without an OSHA approved lifting cage with a full body harness. In past experiences, the researcher has observed the alteration of this rule within companies where an employee is lifted with an unapproved lifting cage. It appears common within industry to bend this rule where it is believed that it is ok to lift an employee that is wearing a harness. A best practice within industry is to not allow lifting humans with forklifts and purchase scissors lifts as an alternative. A scissors lift was created for lifting employees and is performed in a much safer

manner. All of the other seven rules should be considered the essentials to a safe working environment. They are all very basic as well as important as they relate to safety within industry as well as a forklift training program.

After the trainees have developed a more advanced understanding of the general operations of the forklift, they are more likely to comprehend additional advanced features of such powered vehicles. This portion of the training will typically consist of loading and unloading operations. It begins with the understanding and location of the data plate which indicates important information about the forklift including weight, lifting capacity, and fuel type. Each powered industrial truck will have its own data plate with personalized information relating to the particular forklift. One important point to remember is that forklifts come in all shapes and sizes and load capacities are dissimilar for different lifts. It is also crucial that instructors train the trainees on how to properly read the data plate prior to allowing them to operate the forklift. Lastly, it is required that the data plate is in readable condition on each forklift. Figure 1 can be observed below and is an example of a forklift data plate.

Figure 1. Forklift Data Plate

Note. From, OSHA 2011 *Powered Industrial Trucks* (OSHA 1910.178) Retrieved October 16, 2011 from http://www.osha.gov/dcsp/products/etools/pit/forklift/basicparts/nameplate.html.

The above data plate indicates that the capacity of the forklift is 5,000 pounds. It also states that the forklift weighs 8,680 pounds and is a LPS model. The label additionally indicates that this forklift has a 156" upright mast height in column A and a 24" load center in column B. When the side shifter attachment is utilized, the new capacity is 4,500 pounds (OSHA, 2011; Blagojevich, R. Lavin, J., 2003).

Shortly after the operator can interpret the limits of the forklift by utilizing the data plate, he/she must recognize how to appropriately handle a load. According to BYU (2006) in order to handle a load correctly, it must be centered and balanced on the forks. Once the load is properly centered and balanced, the operator must ensure that the forklift is engaged with the load. Engaging the load is a process that ensures the forklift tines are fully inserted under the load which is to be picked up. Once the load is engaged and properly balanced, the operator should lift the load two to four inches off of the ground and tilt the tines backwards to increase the stability of the load when maneuvering throughout the facility. The increased stability allows the operator to maneuver the forklift in a sharper motion without losing the load. While these techniques increase the stability, they do not permit the operator to handle loads at maximum speed when maneuvering around corners (BYU, 2006; Safework South Austrailia, 2010).

A misconception that may exist in various workplaces is that when operating a forklift, operators do not have to abide by or observe traffic signs as well as speed limits. Whether operating inside a closed factory or on an outdoor loading dock, forklifts have the same rules as motor vehicles in relation to speed control. If a stop sign is present, the forklift must come to a complete stop and scan the area for pedestrians or obstructions. Failure to obey any signage is

risking the company receiving a monetary penalty by OSHA. Most forklifts within industry have a maximum speed of 12 miles per hour, although some companies install regulators on the forklifts to reduce the maximum speed. This in turn decreases the likelihood of an accident within the workplace. If an accident were to occur, the reduced speed has the potential to decrease the severity of the incident. An additional significant point to consider is that lowering the speed helps to maintain the vehicle under control at all times when operating in tight areas (BYU, 2006; Digital 2000 INC., 1999).

Forklifts possess a tremendous amount of weight and thus require a moderated distance to stop. Lowering the speed allows the vehicle to stop faster in emergency situations. Table 1 illustrated below displays the stopping distance for an average forklift (Safework South Austrailia, 2010; Digital 2000 INC., 1999).

Table 1. Reaction Distance and Total Stopping Distance

Speed (Kilometers/Hour)	6	12	14	16	18	20	22
Speed (Meters/Second)	1.7	3.3	3.9	4.4	5	5.6	6.1
Distance traveled while driver reacts and begins to apply brake in (Meters)	2.5	5	5.8	6.7	7.5	8.3	9.2
Total Emergency Stopping Distance (Meters)	2.9-3.2	7-8	8-10	9.5-12	11-14	13-16.5	14.5-19

Note. From Safework South Austrailia, 2010

In the researcher's eyes, the information presented in Table 5 is under appreciated. As displayed in the table, the higher the speed, the additional distance needed for stopping the forklift. While most operators understand that it takes time for the vehicle to come to a complete stop, forklift

drivers don't realize how much distance is actually required. The table also includes the reaction time that an average operator needs to firmly apply the brake pedal. It takes a significant amount of time for the operator to apply the brake and have the vehicle come to a complete stop.

Once the classroom instruction is completed and the trainees are comfortable with general forklift operation, it is likely that they will go on to the final stage of the training which would include the hands-on portion. The classroom training can be extremely long or short depending on whether or not the trainees have operated a forklift in the past, but it is essential not to rush anyone through this portion of the educational process. Before the hands on portion of the training agenda, the trainee must complete a quiz related to the information presented during the classroom section of the program. Written and/or verbal quizzes can be changed to fit the needs of the company, although the quiz and such usually should take less than an hour to complete (OR-OSHA-221, 1999).

There are many different questions that could be asked of trainees on a forklift quiz. Appendix E is a compilation of questions that are commonly asked during the quiz section of the forklift training. The questions compiled were a combination from Oregon OSHA, (1999), Workers Division of Compensation, (2004) and BYU, (2006). Oregon OSHA, Workers Division of Compensation and BYU provided an assortment of appropriate questions related to forklift training programs. Based on experience, the researcher compiled the information from these institutions to reflect the essential questions. Upon completion of the quiz, the hands-on training can begin. According to BYU, (2006) if the trainee does not receive a satisfactory score, they must retake the quiz until they receive a passing grade. All classroom training should be completed prior to the operator performing the hands-on portion of this important education process.

Hands on Training

Hands-on training is the final element of standard forklift training program which provides the trainees with an opportunity to apply what they've learned in the classroom directly to powered industrial truck operation. The hands-on training may be conducted within the worksite and begin with a pre-shift inspection. The hands-on pre-shift inspection will allow the trainees take what was recently learned in the classroom and apply it to the production floor. After the completion of the pre-shift inspection, a trainer will walk the trainee through various operations on the forklift. This essentially allows the trainee to become familiar with the forklift and ask any question prior to operating it. Once the trainee is comfortable, they will mount the forklift and begin operation as instructed by the trainer. The trainer will be there to guide the trainee through every step of the process (LSU, 2001; DOSH, 2007).

Once the trainee becomes familiar with forklift operation, the performance evaluation will begin. The performance evaluation is typically scored utilizing a point system. In order to pass the training, the trainee may need to receive a satisfactory score, which is typically over 80% in most industries. The trainer will start the evaluation by instructing the trainee to complete very basic tasks. As the training goes on, the tasks requested will become increasingly difficult (DOSH, 2007). Tasks that are performed include basic maneuvering through the facility with and without a load, stacking pallets, and picking pallets from tight rack situations (LSU, 2006; DOSH, 2007). Below are several generalized questions that are typically included on the trainer performance evaluation sheet. The following items are worth one point a piece and are scored as the trainer instructs the trainee to perform various tasks around the workplace.

-Did the operator enter the racking without striking anything?

-Did the operator place the forks underneath the pallet properly?

-Was the load raised or tilted properly?

-Did the forklift strike any section of the racking when removing a pallet?

-Was the pallet lowered before traveling?

-Did the driver operate at a safe speed?

-Did the operator slow/stop at intersections?

-Did the operator sound the horn at cross isles?

-When dropping off a pallet, did the operator pull into the rack properly?

-Were any racks struck during the evaluation period?

-Did the operator back out and lower forks before moving?

-Did the operator look behind when backing up?

-Was proper safety equipment worn?

-Did the operator utilize three points of contact when entering and exiting the forklift?

-Was the seatbelt used while the operator was on the lift?

-Did the operator drive around track and pull over to pick it up and remove it from the travel area?

-Did the operator seem confident in their ability?

Note. From (LSU, 2001; DOSH, 2007).

Based on the researcher's experience, all of the questions presented are very important elements to a performance evaluation. Several of the questions including "did the operator enter the racking without striking anything?" and "was the load raised or tilted properly?" are somewhat generalized. While the questions are important, they need to be more specific. A more appropriate question could be "did the operator enter the racking to remove and/or return a pallet without striking anything?" or "after a load was secured, did the operator tilt the load to increase

stability?". These minor modifications could improve the value of these and other questions relating to a performance evaluation.

Once the trainee has completed the hands-on portion and scored a satisfactory mark on the performance evaluation, he/she would generally be fully certified to operate a forklift. If the trainee missed various questions, the trainer can review those with the trainee and allow him/her to be reevaluated on them. The trainee now has an official certification that will last three years unless he/she has an accident. If the trainee has an accident after being certified, their license will be pulled and they must be recertified prior to operating the forklift again. If the operator has no violations, they will only need a hands-on refresher training which includes a performance evaluation to become recertified for another three years. The classroom portion of the training is not required for refresher training (LSU, 2001; DOSH, 2007).

Summary

According to OSHA (2011), forklift training programs must cover two distinct areas, classroom and hands-on training. The material required to be presented in these areas can be determined by each individual company. Oregon OSHA (1999) and BYU (2006) recommend that classroom training should be conducted utilizing a lecture or a video presentation. However, with this recommendation, there is no information indicating the most efficient delivery method. The researcher has determined that the delivery method is an essential component within a successful forklift training program and intends to further investigate this issue.

LSU (2001) and DOSH (2007) suggest a series of questions that should be included in the hands-on training. They recommend scoring each trainee on these questions while operating a forklift to determine if they should complete their final training. Once an employee completes the hands-on training, they are certified to operate all of the forklifts within the facility. Based

on the researcher's experience, employees may be proficient on one type of forklift but practically incompetent on another. Although the literature review lacks information which supports this view, the researcher has determined that this perspective warrants additional investigation.

Chapter III: Methodology

The purpose of this study was to identify the gaps that are present within Company XYZ's forklift training program. The identification of these gaps has intentions to improve Company XYZ's forklift training program while lowering the incident rates involving forklifts. This will in turn decrease the downtime time for the forklifts while saving the company money related to repairing damage caused by the forklifts.

The study examined two separate parts of the forklift training program. These two distinct parts included the contents of the video/Power Point assisted lecture and the hands-on forklift training. The literature review reviewed requirements as set forth by OSHA as well as examined training standards set forth by the industry. The literature review also included an in-depth analysis of successful forklift training programs created by several credible universities across the country. The evaluation of Company XYZ's forklift training program assessed all elements of the current training program and compared it to the successful programs created by the educational institutions. This chapter's intentions are to lay the foundation as to how the data will be collected so that the researcher can make appropriate recommendations to management as to where the gaps might exist within Company XYZ's forklift training program.

Subject Selection and Description

Subjects were presented with the opportunity to assist with the research and were guaranteed the ability to withdrawal at any time for any reason while remaining completely anonymous throughout the research. The subjects were selected on a voluntary basis from a sample of new employees who were unfamiliar with Company XYZ's forklift training program. Company XYZ was experiencing a stage of expansion and groups of new hires were being brought in on a weekly basis to attend a forklift training program. The employee's lack of

knowledge within the company gives the researcher an excellent opportunity to locate and assess the gaps within the training program without receiving biased perspectives from currently/long-term employees.

Data Collection and Analysis Procedures

Several different procedures were used to collect the data necessary for this research. These two dissimilar procedures will be labeled as part A and part B. Part A involves the classroom portion of the training while part B will engage in the hands-on training.

Currently Company XYZ requires the trainees observe a training video followed by a Power Point presentation that repeats most of the information which is presented in the video. The current quiz is based on the information provided during the video and Power Point presentation. To evaluate the overall effectiveness of classroom training (part A), the researcher administered a written pre and post test to three separate groups of 10 randomly selected employees. The three groups received the same pre and post test within the three dissimilar scenarios. Each scenario was administered on a distinct color of paper to link the tests to their appropriate scenario. The participants in all three of the groups were instructed to apply a random number or marking to their pre and post tests. This assisted the researcher to evaluate the training based on an individual's score. While the identifying number linked the pre and post tests, it did not identify a specific individual in turn keeping the research completely anonymous.

In the first scenario, the researcher administered the pre-test to ten participants in the first group prior to receiving any training. The post-test was administered after the first group finished observing of the training video. The second group completed the pre-test without receiving any prior training and subsequently were administered the post-test after receiving the Power Point presentation. The third group was administered the pre-test prior to receiving any

training. Upon completion of the pre-test, the third group was administered the video and the Power Point training followed by the post-test. The pre and post test that was administered by the researcher can be viewed in Appendix A with the answers to the test located in Appendix B.

The second collection of the hands-on related data (part B) will determine if the training program should be vehicle specific. Once employees complete the entire forklift training program, they are automatically certified to drive all the forklifts within company XYZ. A voluntary group of ten individuals that successfully completed the forklift training program will be instructed to retake the performance evaluation in Appendix C using a forklift that they have not observed prior to the administration of the initial performance ride. The second performance ride will be administered the exact same way as the first, with a certified trainer present. The scores will then be compared to the group's previous performance ride that was administered on a different forklift. This approach will indicate whether or not each forklift should require separate hands on training.

The performance evaluation was conducted in an onsite environment within the property of Company XYZ. The forklifts used in this process are owned and operated on a daily basis within Company XYZ. The researcher used a black ink non smearing pen to record the data on the performance evaluation. All participants were kept completely anonymous with no names or identifiers recorded.

Limitations

The limitations to the study include new hires previous forklift training experience. The researcher must assume that most of the selected individuals received little or no forklift training from any other previous source. The strong union presence in the in workplace prohibited the

researcher from administering the performance evaluation on any individual who has been an employee for over 90 days.

Summary

The research was intended to locate and correct any gaps within the forklift training program at company XYZ. The two separate sections of training allow the researcher to evaluate the classroom style training as well as the hands-on portion. The test scores will be compared and the answers dissected to see where the deficiencies lie within the classroom training. The performance evaluation will also be diagnosed as to where the employees fail to achieve a passing score. While the study is intended to determine the gaps within the training program, it is possible that it might also identify areas where an excess level of training exists. This could potentially include the doubled up training from the administration of the video followed by the Power Point presentation.

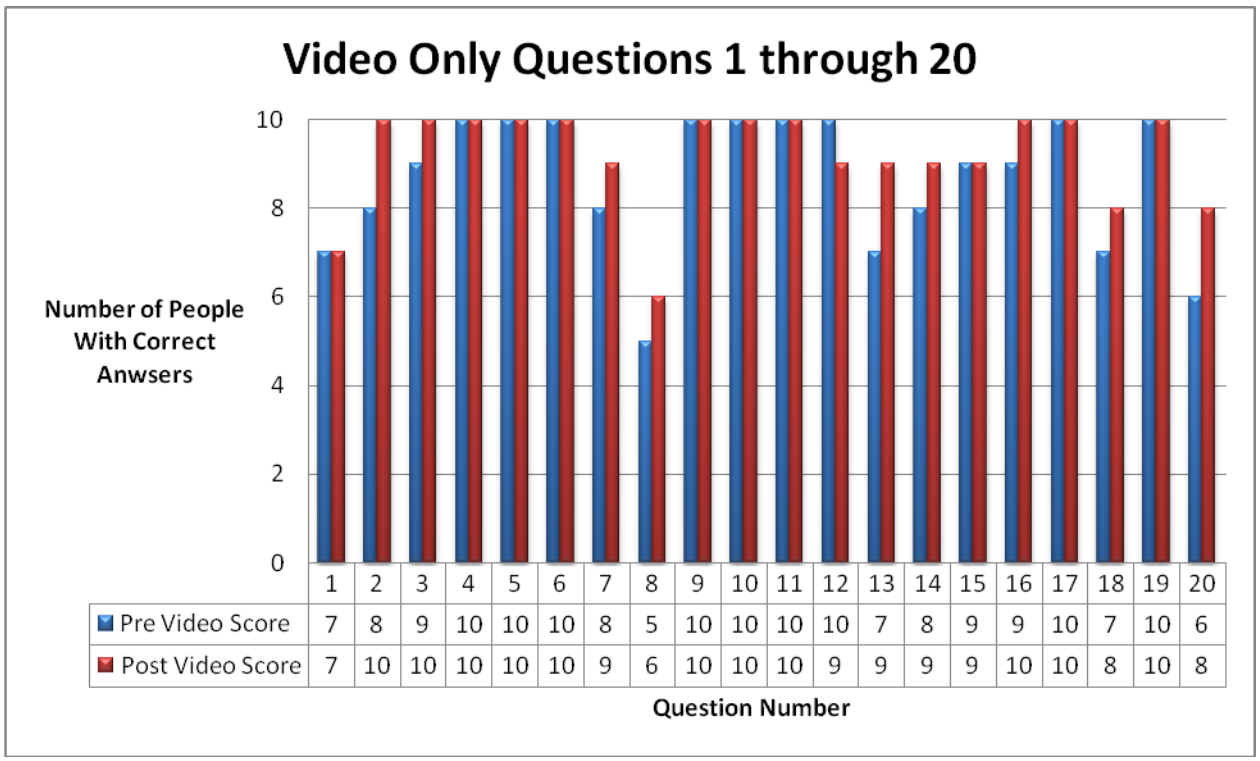
Chapter IV: Results

The purpose of this study was to analyze the current forklift training program that is employed by Company XYZ. The goals of the study included establishing the most effective method to convey information to employees during the classroom portion of forklift training, to determine whether or not employees are capable of operating each and every forklift utilized at Company XYZ after receiving vehicle specific training, and to determine if quiz scores are directly related to classroom delivery methods. The study segregated classroom and hands-on training into two separate areas of research. The classroom segment utilized pre and post test activities in an attempt to determine the best possible method to convey information to trainees. The results are reflected in parts A, B and C with A representing the video, B the Power Point assisted lecture and C a combination of both techniques. Each part was comprised of ten different individuals all participating in the pre and post test. The hands-on portion determined whether or not operators are capable of operating every powered industrial truck within the facility after receiving forklift specific training. The performance evaluation on the second forklift was compared to the scores received on the first to determine if the vehicle specific training is sufficient for all powered industrial trucks within the facility.

The hands-on portion of the research will be represented as part D. Similar to the pre and post test, the performance evaluation consisted of ten different individuals performing the activities on both forklifts. Chapter IV includes the data collected from the classroom training as well as the hands-on performance evaluation. The data included displays the inadequate and/or strong points of the forklift training conducted at Company XYZ. The data collected was evaluated in order to provide upper management with the proper recommendations that will be discussed in chapter V.

(Part A) 25 Minute Forklift Video

The first group of subjects were administered a pre-test prior to receiving any training related to forklifts. Upon completion of the pre-test, the sample group observed a 25 minute video on an overhead projector that was directly related to safe forklift operations and regulations. After the video was completed, the researcher administered the post-test which reflected the exact same questions as the pre-test. Figures 2 and 3 illustrate the increase and/or decrease in the correct scores relating to each individual question. The 40 question quiz was broken into two separate figures with 2 representing questions 1-20 and 3 demonstrating the results of 21-40. The questions asked relate directly to their corresponding number and can be viewed in Appendix A with the answers listed in Appendix B.

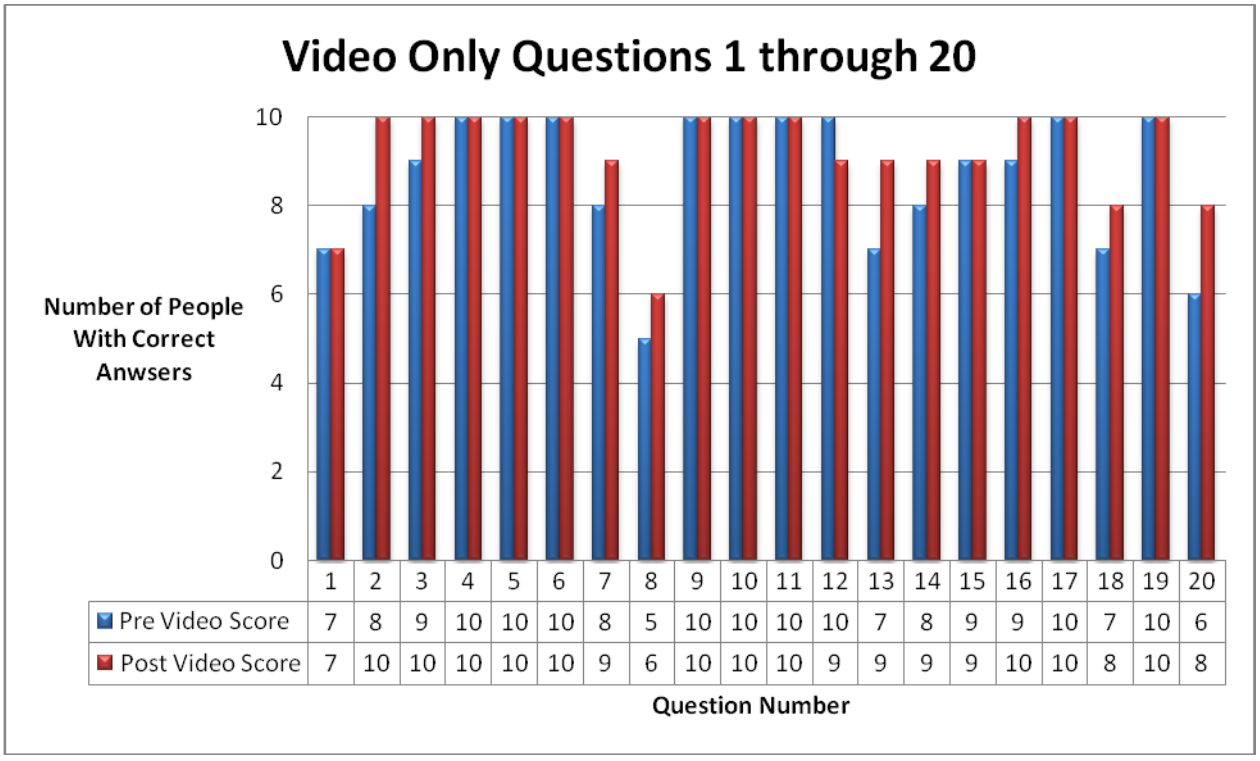


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre Video Score	7	8	9	10	10	10	8	5	10	10	10	10	7	8	9	9	10	7	10	6
Post Video Score	7	10	10	10	10	10	9	6	10	10	10	9	9	9	9	10	10	8	10	8

Figure 2. *Part A forklift video only questions 1-20*

(Part A) 25 Minute Forklift Video

The first group of subjects were administered a pre-test prior to receiving any training related to forklifts. Upon completion of the pre-test, the sample group observed a 25 minute video on an overhead projector that was directly related to safe forklift operations and regulations. After the video was completed, the researcher administered the post-test which reflected the exact same questions as the pre-test. Figures 2 and 3 illustrate the increase and/or decrease in the correct scores relating to each individual question. The 40 question quiz was broken into two separate figures with 2 representing questions 1-20 and 3 demonstrating the results of 21-40. The questions asked relate directly to their corresponding number and can be viewed in Appendix A with the answers listed in Appendix B.

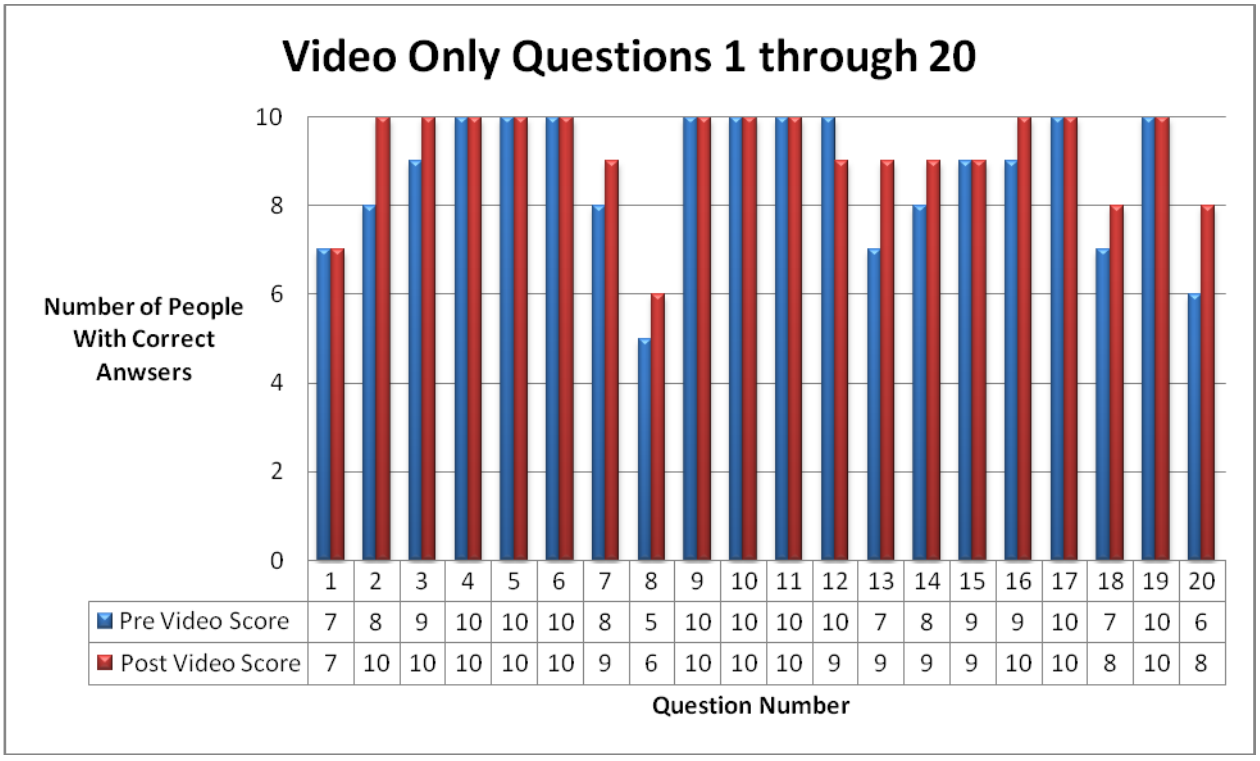


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre Video Score	7	8	9	10	10	10	8	5	10	10	10	10	7	8	9	9	10	7	10	6
Post Video Score	7	10	10	10	10	10	9	6	10	10	10	9	9	9	9	10	10	8	10	8

Figure 2. *Part A forklift video only questions 1-20*

(Part A) 25 Minute Forklift Video

The first group of subjects were administered a pre-test prior to receiving any training related to forklifts. Upon completion of the pre-test, the sample group observed a 25 minute video on an overhead projector that was directly related to safe forklift operations and regulations. After the video was completed, the researcher administered the post-test which reflected the exact same questions as the pre-test. Figures 2 and 3 illustrate the increase and/or decrease in the correct scores relating to each individual question. The 40 question quiz was broken into two separate figures with 2 representing questions 1-20 and 3 demonstrating the results of 21-40. The questions asked relate directly to their corresponding number and can be viewed in Appendix A with the answers listed in Appendix B.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre Video Score	7	8	9	10	10	10	8	5	10	10	10	10	7	8	9	9	10	7	10	6
Post Video Score	7	10	10	10	10	10	9	6	10	10	10	9	9	9	9	10	10	8	10	8

Figure 2. *Part A forklift video only questions 1-20*

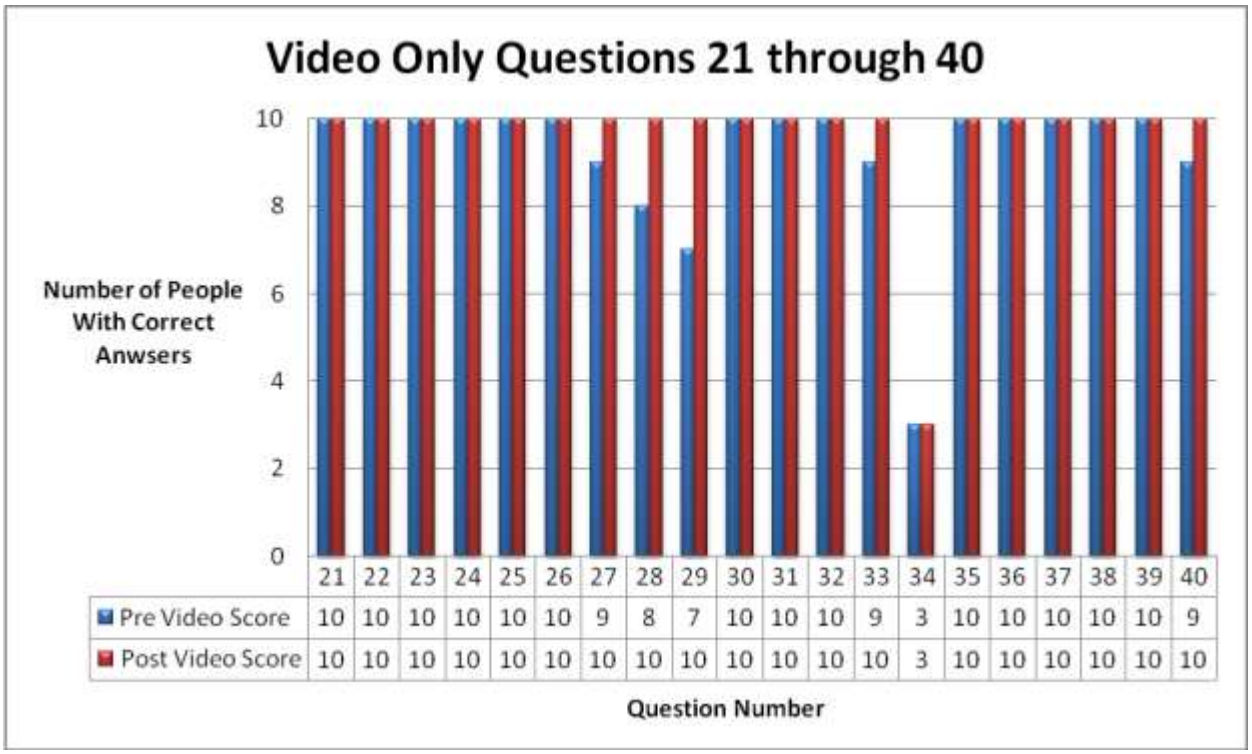


Figure 3. *Part A forklift video only questions 21-40.*

As stated in the literature review, the test is the final portion of the classroom training. The test creates an opportunity for trainees to demonstrate what they have learned as well as where they need additional training. The information provided in Figures 2 and 3 provide the number of correct answers chosen for the ten individuals participating in each question. According to the results, the forklift video increased the original scores substantially. Question number twelve was the only question that actually decreased with ten individuals recording the correct answer on the pre-test and only nine on the post-test. The results of other interesting questions were numbers eight and thirty four in which the employees received poor scores on the pre as well as the post tests. A possible explanation for the corresponding poor scores could be that the video did not sufficiently cover those questions. The remaining questions on the pre-test were correct for at least 7 of the 10 individuals participating with the majority of the scores increasing on the post-test. The overall score on the post-test was 377/400 compared to 358/400

for the pre-test. The total score was derived from ten individuals participating in 40 questions each for a grand total of 400.

Part B PowerPoint assisted Lecture

The second group of subjects were administered a pre-test prior to receiving any forklift-related training. After the pre-test was completed, the sample group was administered a thirty minute Power Point assisted lecture that included information directly relating to the forty question quiz. Upon completion of the lecture, the sample group was administered the post-test which was identical to the pre-test. Figures 4 and 5 illustrate the increase and/or decrease in the correct scores concerning each individual question. The 40 question quiz was broken into two separate figures with 4 representing questions 1-20 and 5 demonstrating the results of 21-40. The questions relate directly to their corresponding number and can be viewed in Appendix A with the answers listed in Appendix B.

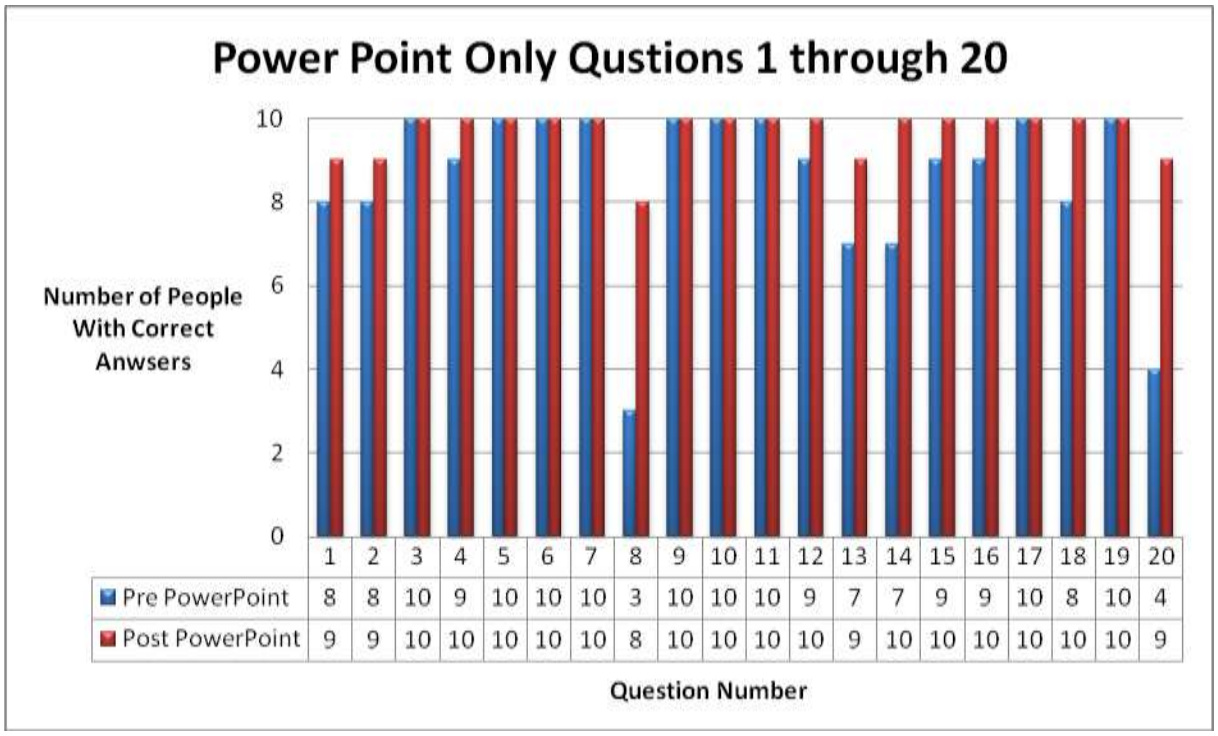


Figure 4. *Part B PowerPoint assisted lecture questions 1-20.*

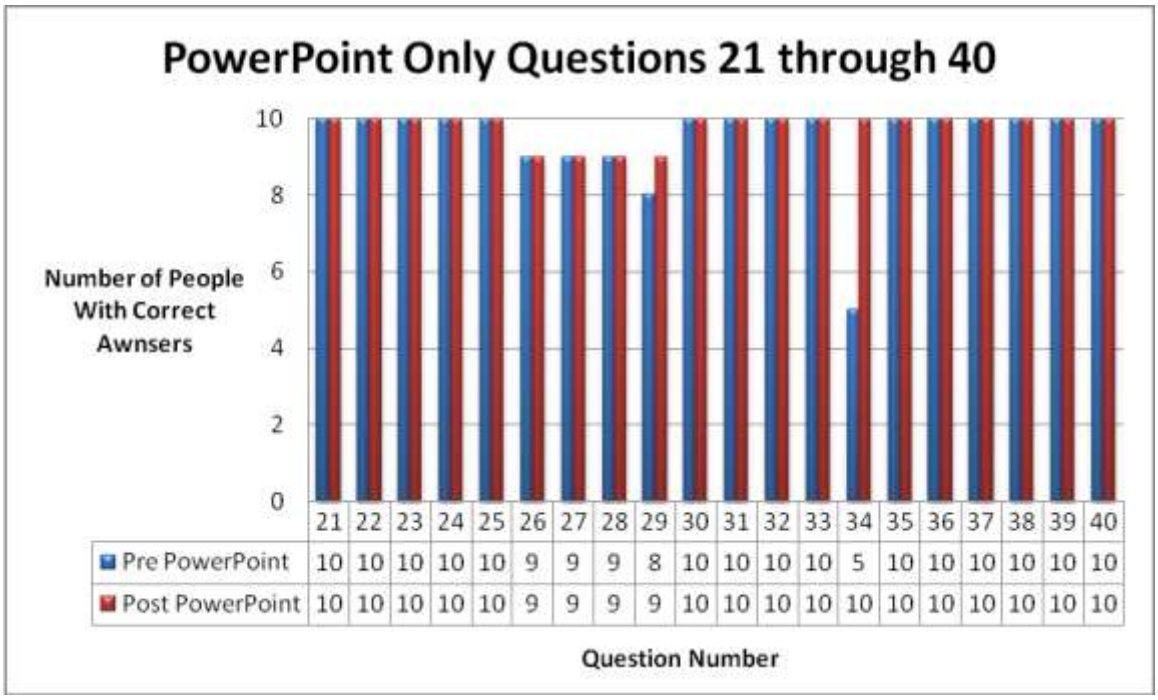


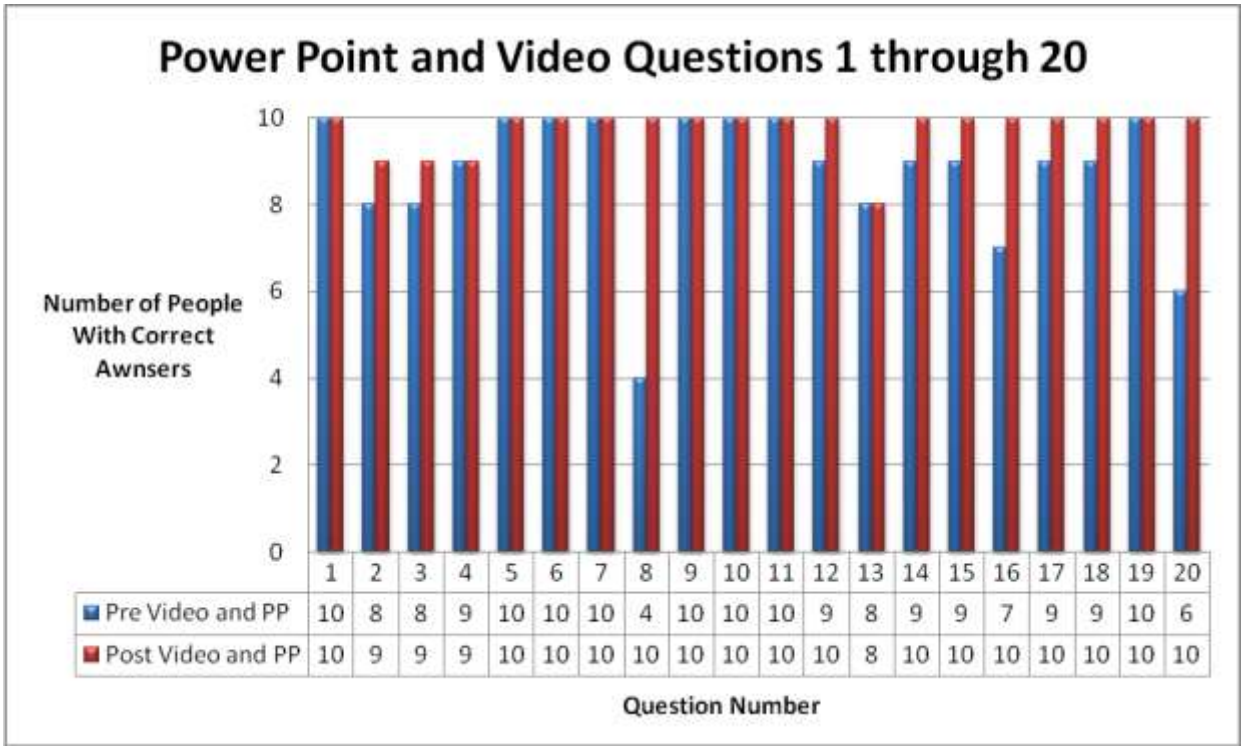
Figure 5. *Part B PowerPoint assisted lecture questions 21-40.*

Similar to the video, the Power Point assisted lecture increased the scores substantially. All of the scores on the post-test either increased or remained the same. Questions number eight, thirty four and twenty scored particularly low on the pre-test with a substantial increase on the post-test. It is believed that the substantial increase was directly related to the instructor lecturing on points relating to each question. Most all of the other questions scored high on the pre-test with an increase on the post-test. The pre-test score was 361/400 compared to the post-test score of 390/400. At this point it appears that the Power Point assisted lecture scored somewhat higher than the video with the overall post-test score of 390/400 compared to 377/400 for the video.

Part C Lecture and Video combination

The third group of subjects consisted of ten different individuals which were administered a pre-test prior to receiving any forklift related information. Upon completion of the pre-test, the sample group was administered the twenty five minute video in addition to the

Power Point assisted lecture. A large portion of the Power Point assisted lecture repeated information that was received from the video. After the video and lecture were completed, the researcher administered the post-test which was exactly the same as the pre test. Figures 6 and 7 illustrate the increase and/or decrease in the correct scores relating to each individual question. The 40 question quiz was broken into two separate figures with 6 representing questions 1-20 and 7 demonstrating the results of 21-40. The questions relate directly to their corresponding number and can be viewed in Appendix A with the answers listed in Appendix B.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pre Video and PP	10	8	8	9	10	10	10	4	10	10	10	9	8	9	9	7	9	9	10	6
Post Video and PP	10	9	9	9	10	10	10	10	10	10	10	10	8	10	10	10	10	10	10	10

Figure 6. *Part C Lecture and Video combination questions 1-20.*

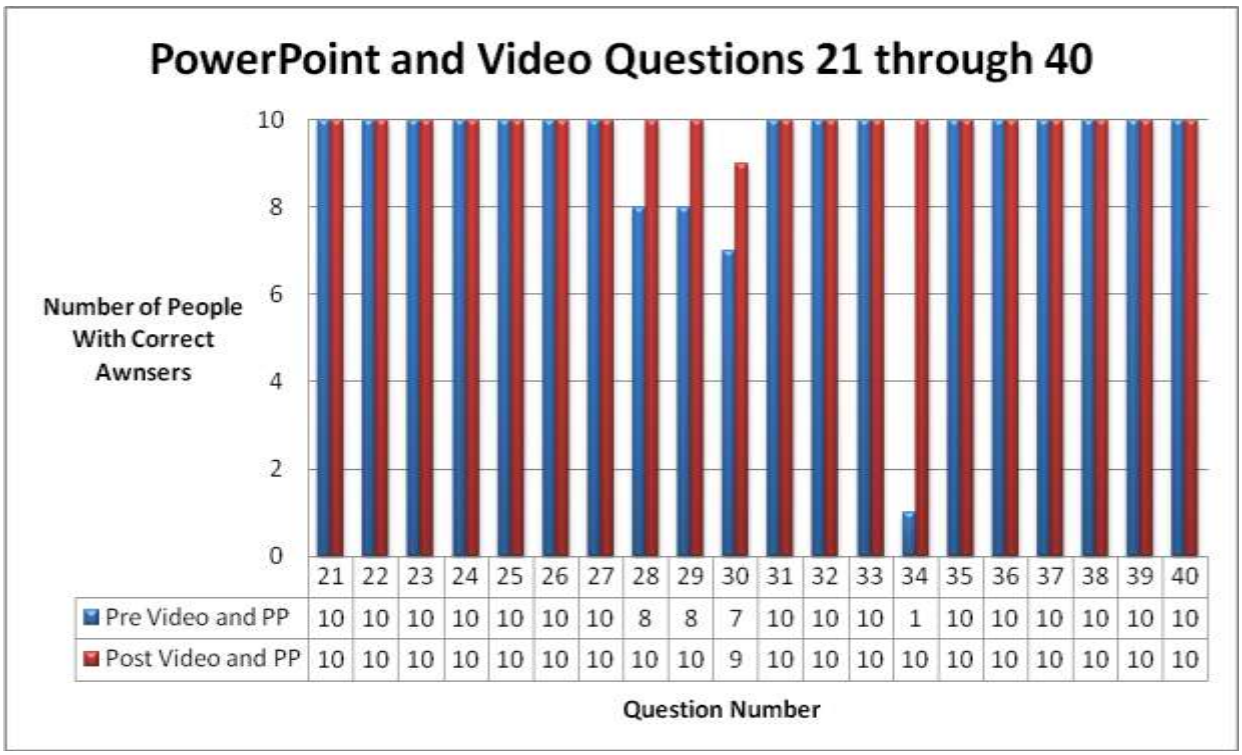


Figure 7. *Part C Lecture and Video combination questions 21-40.*

The combination of the video and Power Point assisted lecture scored the highest out of all three groups with a final post-test score of 394/400 compared to a pre-test of 360/400. The overall comparison of post-test scores was 377/400 for the video, 390/400 on the Power Point assisted lecture and the combination (part C) received 394/400. While the combination was expected to receive the highest score, it did not score as high as the researcher expected. Similar to groups A and B, all of the scores increased, but not all participants received 100%. With the doubled up training, the researcher expected the sample group to receive a perfect 400/400. Question number thirteen was a disappointment with only eight of the ten subjects choosing the correct answer. All of the other questions scored high with a minimum of nine participants choosing the correct answer. While the combination did not receive a perfect score, it demonstrated that participants received the highest scores from this training compared to the others.

Part D Forklift Performance Evaluation

While the literature review lacked information relating to the issue of automatically becoming certified on all powered industrial trucks after receiving vehicle specific training, the researcher believed that this could potentially be an underlying cause of forklift related accidents. The performance evaluation consisted of ten individuals that were trained specifically on a Yale forklift. The instructor walked the sample group through the general functions and operations of the Yale forklift. Once the sample group was comfortable with the Yale and all of the trainees questions had been answered, they proceeded to operate the forklift by performing exercises indicated by the instructor. Once all ten individuals completed this performance evaluation, they were taken to a Mitsubishi forklift that was smaller than the Yale. The sample group was instructed to mount the forklift and go through the same performance evaluation on the Mitsubishi. Figure 8 illustrates the increase and/or decrease in the acceptable scores relating to each individual component on the evaluation form. The evaluation relates directly to each corresponding number and can be viewed in Appendix C.

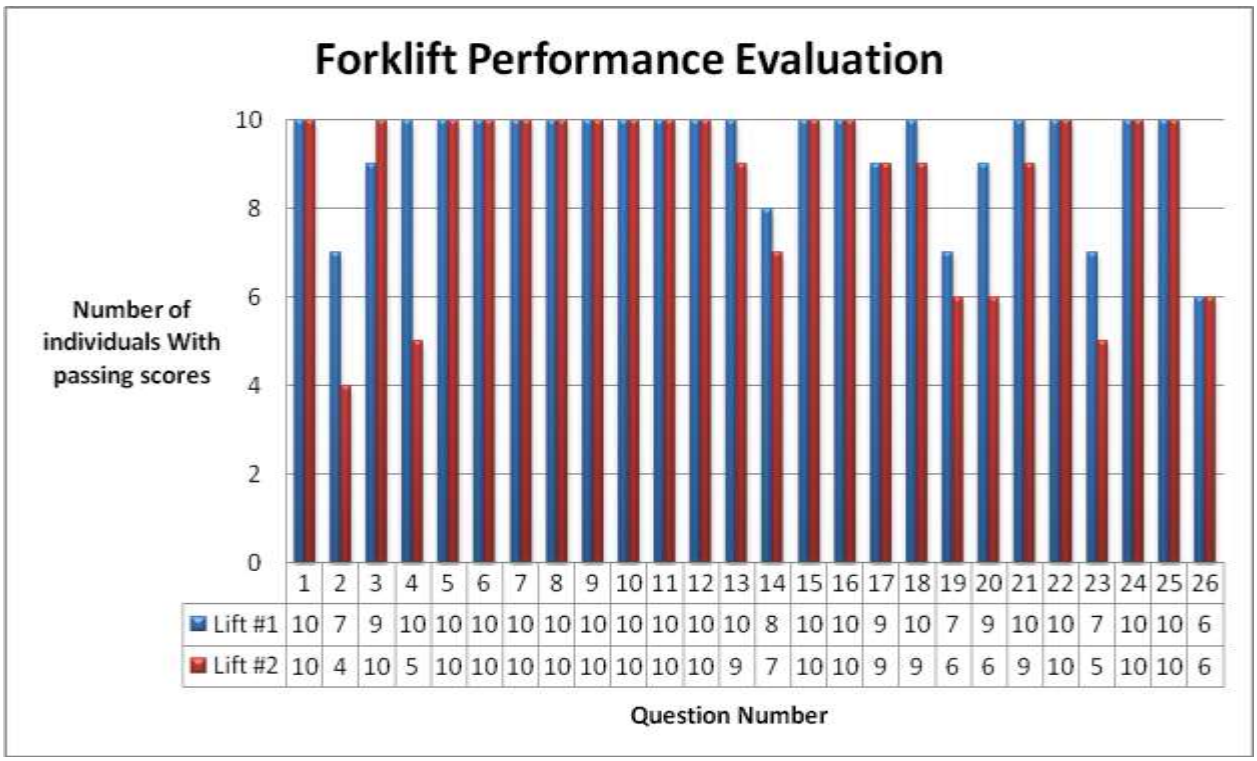


Figure 8. *Part D Forklift Performance Evaluation.*

As expected by the researcher, the results of the performance evaluation decreased on the second forklift. The overall score on the first forklift was 242/260 compared to 225/260 on the second forklift. Automatically allowing trainees to operate every powered industrial truck after receiving vehicle specific training should be considered a moderate risk. The difference in controls and operating procedures between different forklifts can be substantial and lead to an accident without proper training. While the scores were a perfect ten on the pre and post tests for fifteen of the recorded elements, nine of them decreased. Questions two, four, nineteen, twenty, twenty three and twenty six were areas of additional concern due to the fact that they scored six or less on the second forklift. The literature review provided important information directly relating to question number two. The second question ensured that the trainee verified that the data plate was present, the literature stressed the importance of this procedure. It was

unacceptable that only four of the ten individuals actually verified the presence of the data plate. Question number four was related to the trainee demonstrating familiarity with controls on the forklift. It was expected that most of the trainees would receive poor scores on the second lift for this question. Question number twenty six related to dismounting, it was unexpected that only six trainees dismounted properly on the first as well as second forklift. Question number nineteen involved traveling with the forks at an acceptable height of 2-4 inches off the ground. It was surprising that only six participants had the forks at a proper height on the second forklift. The results of question number twenty were somewhat expected, where with the operation of an unfamiliar forklift, trainees were unable to smoothly raise and lower the load. Question number twenty three was the remaining area of concern where the participants did not stack the load neatly or evenly. This was expected due to the smaller size of the Mitsubishi forklift in comparison to the Yale powered industrial truck.

Summary

Chapter IV analyzed the data collected in an attempt to determine deficiencies that may exist within the classroom as well as hands-on forklift training programs utilized Company XYZ. The research conducted in parts A, B and C were derived from the literature review. The literature determined that classroom training with a quiz is essential to any forklift training program. While the literature verified this importance, it did not provide a superlative method of delivery. The method of delivery is able to be chosen by each individual company. The pre and post test activities were designed to determine the most efficient form of delivery. While the results were close, it was found that a combination of the Power Point assisted lecture and the video proved to be most effective.

The literature review lacked information related to automatically certifying trainees to operate any and powered industrial vehicle after receiving forklift specific training. Based on experience, the researcher determined that this could be an underlying issue. The performance evaluation (part D) was designed to determine if there is an issue relating to this automatic certification. It was determined that there is an issue and companies should establish hands-on training to cover forklifts that each individual will be operating.

Chapter V: Conclusions and Recommendations

The purpose of this study was to analyze the current forklift training program that is employed by Company XYZ. The goals of the study included establishing the most effective method to convey information to employees during the classroom portion of forklift training, to determine whether or not employees are capable of operating each and every forklift utilized at Company XYZ after receiving vehicle specific training and to determine if quiz scores are directly related to classroom delivery methods. The methodology analyzed the classroom training through the administration of a pre and post test that determined the most efficient form of conveying information to employees. A performance evaluation was utilized to determine whether or not successful training on a specific powered industrial vehicle allows employees to successfully operate all other forklifts within the facility. The literature review provided exceptional information that allowed the researcher to create a study that provides unknown and/or relevant material related to forklift training programs.

Conclusions

The following conclusions were based on the information gathered from the methodology and are supported by the literature review:

- The superior method used to conduct classroom training was brought to light by the pre and post test activities. According to the literature review, the method of delivery is up to each individual company. While most classroom forklift training programs consist of a video presentation or a lecture, the researcher conducted a study to determine which delivery method is most efficient. The results determined that the combination of the two delivery methods provides the highest test scores. The research also determined that the administration of a video provides the least effective results.

- The results of the performance evaluation concluded that powered industrial vehicle related accidents could potentially result from operators utilizing unfamiliar forklifts. The decreasing scores related to basic operation and handling of the second forklift supports this theory. Although the literature review lacked information regarding this issue, it was determined by the researcher that the decrease in scores provides insight that could be directly related to forklift accidents.

Recommendations

The literature review points out the fact that each company is responsible for creating and implementing its own forklift training program. This provided the researcher with an excellent opportunity to determine the most effective form of delivery. The current method of classroom training at Company XYZ is a combination of a video and a Power Point assisted lecture. The hands-on training is performed on a specific vehicle and upon completion the training, operators are allowed to utilize every forklift within the facility.

- Based on the literature review and results of the research, it is recommended that Company XYZ utilize the Power Point assisted lecture in addition to the video for classroom forklift training. While this may appear to be excessive, the results of the research demonstrated that this is the most effective way to convey the necessary information. If management would like to eliminate the combination, it is strongly suggested that the Power Point assisted lecture be reevaluated to address areas of insufficient test scores. This reevaluation has potential to reduce the classroom training by twenty minutes while providing the same information.
- The results of the hands-on training provide an excellent opportunity for Company XYZ to reduce forklift related losses. The research determined that the accidents at Company

XYZ could potentially be related to the hands-on training. It is recommended that Company XYZ provide vehicle specific training on the forklifts that each individual will be operating. If the operators receive training on the vehicles that they will be utilizing, it is unlikely that there will be any issues related to unfamiliarity of the controls or general forklift operation that were present in the research. It is believed that this disconnect is where a strong portion of the accidents occur at Company XYZ.

- Once a forklift training program is setup, it is easy to become complacent in updating the material. It is recommended that Company XYZ create a scheduled yearly evaluation of their forklift training program. This will provide Company XYZ with an opportunity to update the training on a yearly basis as well as ensure that their training program is up to date with OSHA regulations.

Areas for further research

This study proved essential in identifying performance-based gaps within Company XYZ's forklift training program. However, a more in depth study could be conducted to determine the root cause of each individual forklift related accident at Company XYZ. While the research suggests that the hands-on training could be the potential reason behind the increasing number of accidents at Company XYZ, further investigation into the root cause of each individual accident could provide more insight relating to this issue.

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Appendix A: Powered industrial truck classroom quiz

#	QUESTION	TRUE	FALSE
1	STUNTS AND GAMES, IF PROPERLY SUPERVISED, ARE AN EXCELLENT WAY TO BUILD POSITIVE EMPLOYEE MORALE.		
2	REGULAR TRAFFIC RULES IN THE PLANT DO NOT APPLY TO INDUSTRIAL TRUCK DRIVERS.		
3	IT IN NOT NECESSARY FOR A DRIVER TO CHECK HIS TRUCK AT THE START OF THE SHIFT.		
4	IT IS NOT NECESSARY TO SLOW DOWN AT BLIND CORNERS IF THE DRIVER USES HIS HORN.		
5	AN OCCASIONAL OIL SPOT IN THE AISLE ISN'T HAZARDOUS AND CAN BE IGNORED.		
6	A FORKLIFT DRIVER IS RESPONSIBLE FOR WATCHING OUT AND AVOIDING PEDESTRIANS.		
7	THE EMERGENCY BRAKE SHOULD BE SET EACH TIME THE DRIVER GETS OFF THE SEAT OF THE TRUCK.		
8	A GOOD RULE OF THUMB IS TO KEEP A DISTANCE OF APPROXIMATELY ONE TRUCK LENGTH BEHIND THE TRUCK AHEAD.		
9	OSHA SECTION 1910.178 REQUIRES THAT FORKLIFT BE SAFETY-INSPECTED AT THE BEGINNING OF EACH AND EVERY SHIFT.		
10	IT IS SAFE TO CARRY LOADS THAT WEIGH MORE THAN THE CAPACITY OF THE TRUCK.		
11	IT IS SAFE TO LET PEDESTRIANS PASS UNDER A HIGH LOAD WHEN THE TRUCK IS NOT MOVING.		
12	A DRIVER SHOULD ALWAYS WATCH FOR OVERHEAD OBSTRUCTIONS AND AVOID THEM.		
13	MOST ELECTRIC FORKLIFTS HAVE GENERATORS THAT CHARGE THE BATTERY WHILE THE FORKLIFT IS RUNNING.		
14	A DRIVE SHOULD REPORT ALL SAFETY OR MECHANICAL DEFECTS AT THE		

	END OF THE SHIFT.		
15	IT IS ALRIGHT TO MOVE AN IMPROPERLY MADE UP LOAD IF IT DOESN'T EXTEND ABOVE THE CARRIAGE.		
16	IT IS ALRIGHT TO BUMP LOADS INTO POSITION ON A STACK IF THE STACK IS NOT OVER 2 TIERS HIGH.		
17	A LOAD SHOULD ALWAYS BE POSITIONED BACK AGAINST THE CARRIAGE AND CENTERED ON THE FORKS.		
18	IF YOUR FORKLIFT IS IN NEED OF SAFETY REPAIR, IT IS BEST TO STOP IMMEDIATELY AND TAKE IT OUT OF SERVICE.		
19	A FORKLIFTS REAR SWING WILL FOLLOW THE PATH OF THE FRONT WHEELS.		
20	A FORKLIFT WILL LIFT A RATED MAXIMUM CAPACITY LOAD REGARDLESS OF WHERE IT IS POSITIONED.		
21	ALWAYS BACK UP RAMPS TO AVOID SPILLING A LOAD.		
22	A LOAD SHOULD BE CARRIED HIGH SO A DRIVER CAN SEE UNDER IT.		
23	AN OPERATOR SHOULD EVALUATE HIS LOAD WHILE IN MOTION TO SAVE TIME.		
24	IT IS SAFE TO CARRY A LOAD WITH THE MAST TILTED FORWARD.		
25	YOU MAY HAVE PEOPLE SIT ON OR ADD WEIGHT TO YOUR TRUCK TO MOVE A HEAVIER LOAD.		
26	FORKLIFTS MUST BE DRIVEN SLOWLY, ESPECIALLY WHEN TRAVELING THROUGH DOORS, ON DOCKS, OR NEAR PERSONNEL.		
27	ANOTHER PERSON MAY RIDE ON YOUR TRUCK IF THERE IS ROOM.		
28	A FORKLIFT DRIVER SHOULD ENSURE THE DOCK LOCK IS IN PLACE BEFORE ENTERING A HIGHWAY TRAILER.		
29	LOADS MAY BE TEMPORARILY STACKED IN FRONT OF FIRE EXITS.		
30	DRIVERS SHOULD CHECK THAT DOCK BOARDS ARE PROPERLY SECURED BEFORE DRIVING ON THEM.		
31	DRIVERS SHOULD CHECK THE CONDITION OF THE TRAILER BEFORE		

	ENTERING.		
32	PERSONNEL MAY BE ELEVATED ON THE FORKS IF THERE IS AN ENCLOSED CAGE WITH CERTAIN SAFETY FEATURES.		
33	ALL TRAFFIC SIGNS MUST BE OBEYED. STOP MEANS STOP.		
34	E, ES, AND EE ARE ALL RATINGS FOR ELECTRIC FORKLIFTS THAT INDICATE DIFFERENT DEGREES OF FIRE HAZARD PROTECTION.		
35	ALWAYS KEEP HANDS AND LEGS WITHIN THE RUNNING LINES OF THE LIFT.		
36	ONLY TRAINED AND AUTHORIZED OPERATORS MAY BE PERMITTED TO OPERATE POWERED INDUSTRIAL TRUCKS.		
37	A FORKLIFT SHALL BE DRIVEN IN REVERSE IF YOU CANNOT SEE OVER THE LOAD.		
38	LOADS WHEN LIFTED WILL REDUCE THE TRUCKS STABILITY EVEN IF IT IS WITHIN THE WEIGHT LIMIT.		
39	THE TINES MUST BE LOWERED COMPLETELY WHEN THE LIFT IS UNATTENDED.		
40	ONLY FORKLIFT OPERATORS CAN FILL OUT A WORK ORDER TO REPAIR A FORKLIFT.		

Appendix B: Powered industrial truck classroom quiz answers

#	QUESTION	TRUE	FALSE
1	STUNTS AND GAMES, IF PROPERLY SUPERVISED, ARE AN EXCELLENT WAY TO BUILD POSITIVE EMPLOYEE MORALE.		X
2	REGULAR TRAFFIC RULES IN THE PLANT DO NOT APPLY TO INDUSTRIAL TRUCK DRIVERS.		X
3	IT IN NOT NECESSARY FOR A DRIVER TO CHECK HIS TRUCK AT THE START OF THE SHIFT.		X
4	IT IS NOT NECESSARY TO SLOW DOWN AT BLIND CORNERS IF THE DRIVER USES HIS HORN.		X
5	AN OCCASIONAL OIL SPOT IN THE AISLE ISN'T HAZARDOUS AND CAN BE IGNORED.		X
6	A FORKLIFT DRIVER IS RESPONSIBLE FOR WATCHING OUT AND AVOIDING PEDESTRIANS.	X	
7	THE EMERGENCY BRAKE SHOULD BE SET EACH TIME THE DRIVER GETS OFF THE SEAT OF THE TRUCK.	X	
8	A GOOD RULE OF THUMB IS TO KEEP A DISTANCE OF APPROXIMATELY ONE TRUCK LENGTH BEHIND THE TRUCK AHEAD.		X
9	OSHA SECTION 1910.178 REQUIRES THAT FORKLIFT BE SAFETY-INSPECTED AT THE BEGINNING OF EACH AND EVERY SHIFT.	X	
10	IT IS SAFE TO CARRY LOADS THAT WEIGH MORE THAN THE CAPACITY OF THE TRUCK.		X
11	IT IS SAFE TO LET PEDESTRIANS PASS UNDER A HIGH LOAD WHEN THE TRUCK IS NOT MOVING.		X
12	A DRIVER SHOULD ALWAYS WATCH FOR OVERHEAD OBSTRUCTIONS AND AVOID THEM.	X	
13	MOST ELECTRIC FORKLIFTS HAVE GENERATORS THAT CHARGE THE BATTERY WHILE THE FORKLIFT IS RUNNING.		X
14	A DRIVE SHOULD REPORT ALL SAFETY OR MECHANICAL DEFECTS AT THE		X

	END OF THE SHIFT.		
15	IT IS ALRIGHT TO MOVE AN IMPROPERLY MADE UP LOAD IF IT DOESN'T EXTEND ABOVE THE CARRIAGE.		X
16	IT IS ALRIGHT TO BUMP LOADS INTO POSITION ON A STACK IF THE STACK IS NOT OVER 2 TIERS HIGH.		X
17	A LOAD SHOULD ALWAYS BE POSITIONED BACK AGAINST THE CARRIAGE AND CENTERED ON THE FORKS.	X	
18	IF YOUR FORKLIFT IS IN NEED OF SAFETY REPAIR, IT IS BEST TO STOP IMMEDIATELY AND TAKE IT OUT OF SERVICE.	X	
19	A FORKLIFTS REAR SWING WILL FOLLOW THE PATH OF THE FRONT WHEELS.		X
20	A FORKLIFT WILL LIFT A RATED MAXIMUM CAPACITY LOAD REGARDLESS OF WHERE IT IS POSITIONED.		X
21	ALWAYS BACK UP RAMPS TO AVOID SPILLING A LOAD.		X
22	A LOAD SHOULD BE CARRIED HIGH SO A DRIVER CAN SEE UNDER IT.		X
23	AN OPERATOR SHOULD EVALUATE HIS LOAD WHILE IN MOTION TO SAVE TIME.		X
24	IT IS SAFE TO CARRY A LOAD WITH THE MAST TILTED FORWARD.		X
25	YOU MAY HAVE PEOPLE SIT ON OR ADD WEIGHT TO YOUR TRUCK TO MOVE A HEAVIER LOAD.		X
26	FORKLIFTS MUST BE DRIVEN SLOWLY, ESPECIALLY WHEN TRAVELING THROUGH DOORS, ON DOCKS, OR NEAR PERSONNEL.	X	
27	ANOTHER PERSON MAY RIDE ON YOUR TRUCK IF THERE IS ROOM.		X
28	A FORKLIFT DRIVER SHOULD ENSURE THE DOCK LOCK IS IN PLACE BEFORE ENTERING A HIGHWAY TRAILER.	X	
29	LOADS MAY BE TEMPORARILY STACKED IN FRONT OF FIRE EXITS.		X
30	DRIVERS SHOULD CHECK THAT DOCK BOARDS ARE PROPERLY SECURED BEFORE DRIVING ON THEM.	X	
31	DRIVERS SHOULD CHECK THE CONDITION OF THE TRAILER BEFORE	X	

	ENTERING.		
32	PERSONNEL MAY BE ELEVATED ON THE FORKS IF THERE IS AN ENCLOSED CAGE WITH CERTAIN SAFETY FEATURES.		X
33	ALL TRAFFIC SIGNS MUST BE OBEYED. STOP MEANS STOP.	X	
34	E, ES, AND EE ARE ALL RATINGS FOR ELECTRIC FORKLIFTS THAT INDICATE DIFFERENT DEGREES OF FIRE HAZARD PROTECTION.	X	
35	ALWAYS KEEP HANDS AND LEGS WITHIN THE RUNNING LINES OF THE LIFT.	X	
36	ONLY TRAINED AND AUTHORIZED OPERATORS MAY BE PERMITTED TO OPERATE POWERED INDUSTRIAL TRUCKS.	X	
37	A FORKLIFT SHALL BE DRIVEN IN REVERSE IF YOU CANNOT SEE OVER THE LOAD.	X	
38	LOADS WHEN LIFTED WILL REDUCE THE TRUCKS STABILITY EVEN IF IT IS WITHIN THE WEIGHT LIMIT.	X	
39	THE TINES MUST BE LOWERED COMPLETELY WHEN THE LIFT IS UNATTENDED.	X	
40	ONLY FORKLIFT OPERATORS CAN FILL OUT A WORK ORDER TO REPAIR A FORKLIFT.		X

Appendix C: Powered industrial truck evaluation form

1	PERFORMED PRE-SHIFT INSPECTION	YES NO
2	VERIFIED FORKLIFT RATED CAPACITY PLATE IS PRESENT	YES NO
3	MOUNTS FORKLIFT PROPERLY	YES NO
4	SHOWS FAMILIARITY WITH CONTROLS	YES NO
5	KEPT A CLEAR VIEW OF DIRECTION OF TRAVEL	YES NO
6	SLOWED DOWN AT INTERSECTIONS	YES NO
7	DROVE AT A SAFE SPEED AT ALL TIMES	YES NO
8	SOUNDED HORN AT INTERSECTIONS AND BLIND CORNERS	YES NO
9	VERIFIED AREA WAS CLEAR BEFORE MOVING FORKLIFT	YES NO
10	STOPPED AT STOP SIGNS	YES NO
11	TURNED CORNERS CORRECTLY-WAS AWARE OF REAR SWING	YES NO
12	YIELDED TO PEDESTRIANS	YES NO
13	DROVE UNDER CONTROL AND WITHIN PROPER TRAFFIC ISLES	YES NO
14	MAINTAINS PROPER SPACING FROM STACKS AND LOADS	YES NO
15	APPROACHED LOAD PROPERLY	YES NO
16	LIFTED LOAD PROPERLY	YES NO
17	REMOVED LOAD FROM RACK POSITION	YES NO
18	MANEUVERED PROPERLY	YES NO
19	TRAVELED WITH LOAD/FORKS AT A PROPER HEIGHT	YES NO
20	LOWERED LOAD SMOOTHLY/SLOWLY	YES NO
21	LOAD BALANCED PROPERLY	YES NO

22	FORKS UNDER LOAD ALL THE WAY	YES NO
23	STACKED LOAD EVENLY AND NEATLY	YES NO
24	DROVE BACKWARDS WITH LOAD WHEN VIEW WAS OBSTRUCTED	YES NO
25	FOLLOWED PROPER PARKING PROCEDURE	YES NO
26	PROPERLY DISMOUNTED FORKLIFT	YES NO
TOTAL=		

Appendix D Forklift pre-shift inspection

	Mon.		Tues.		Wed.		Thurs.		Fri.		Sat.		Sun.	
Date:														
Inspectors initials:														
Item Inspected	Ok	Repair	Ok	Repair	Ok	Repair	Ok	Repair	Ok	Repair	Ok	Repair	Ok	Repair
Forks, Backrest, Carriage														
Mast, Chain, Hydraulic Lines														
Tires, Axles														
Overhead Guard/ROP														
Fuel Tank and Connections														
Engine Oil Level														
Radiator Wheel Level														
Fuel level														

Leaks Under Forklift														
Seat and Seat Belts														
Horn/Backup Alarm														
Lights														
Gauges and Instruments														
All Brakes														
Hydraulic Controls and Lifts														
Steering														

Appendix E Common questions asked on a forklift quiz

-T ***F*** Forks should enter the pallet halfway.

-***T*** F Operators should inspect their lift before each shift.

-***T*** F The data plate should be checked prior to lifting anything.

- ***T*** F You should always travel up a ramp with the tines in front and down a ramp with the tines trailing.

-***T*** F Forklift attachments can change the rating on the forklift data plate.

- T ***F*** Personnel other then the operator is always welcome to hitch a ride on the forklift.

- ***T*** F You should always estimate the load you are about to lift so you don't exceed the forklifts rated capacities.

-***T*** F Off center loads must never be handled by a forklift.

-***T*** F Forklift drivers must obey all traffic signs.

-***T*** F Do not pass other forklifts at intersections or blind corners.

A forklift is attended when:

A. The operator is within 25 feet from the forklift.

B. The operator is further than 25 feet from the forklift.

C. The operator is within view of the forklift.

D. The operator is not within view of the forklift.

E. A and C above

F. B and C above

When traveling across aisles or around blind corners:

A. Yell "coming through"

B. Slow down and honk the horn

C. Slow down and look in all directions

D. B and C above

E. All of the above

If the load is high and is obstructing the forward view:

A. travel in reverse

B. Reduce the load

C. Stand up so you can see ahead

D. Use the guide person to help you

E. Hire a very tall operator

Note. From OR-OSHA-221, 1999; Workers Division of Compensation, 2004