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Importance of Training Methods in Safety: A Model Training Program

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Abstract: The retention of training program indicates the success of the training program. Poor retention of training program is indicated by poor performance of the training skills. Incidentally, many workplaces have experienced failure of the training programs because workers' did not perform an expected activity according to the training procedure. The reason behind this is often an inability to incorporate the skills into the activities. Also, rarely, the training programs focus on projecting that skills are part of the activities to finish a task. Safety is inaccurately projected as an "add-on" in training programs. An example of the scarcity in training programs is often experienced in forklift operations. Forklift operators get incomplete training as they are exposed to the visual projection of forklift operation and never gets a "hands-on" session. This is unacceptable because the safety of the operator and the pedestrians depend on the skills if the operator. The objective of this study is to build a training program model that includes instructional objectives, describes an intended outcome (as a skill) of instruction. The training model does not include an instructional procedure only. To develop the model, we have used the example of forklift training. Each task of forklift operation is described in separate statements and each statement described the main intent or performance that is expected from the operators. If the performance is a covert one, an indicator behavior was attached. The developed forklift Training Content is compared with other existing programs in order to find its efficacy in retaining the training material. While it is still encouraged that forklift training session will be include visual examples and hands-on demonstration, we strongly recommend a hands-on sessions with the training model that we have developed.

Keywords: Safety Training, Safety Skills, Training Objectives

1. Introduction

Most companies in many industries have the need for forklifts. Whether it is for stocking, transporting, or other, forklifts serve as an essential tool for many businesses around the world. As common as forklifts are found in workplaces everywhere, one would think that it is a very safe task to drive and operate this machinery. However, this is not the case at all. In fact, forklift accidents result in nearly 10% of all physical injuries in the workplace. This should not be this high because, according to OSHA, 70% of all forklift related injuries could be avoided with proper training and policy. Existing forklift training programs are poor in delivering the needed skills to the trainees and thus they get a partial knowledge about how to safely maneuver forklifts.

These statistics make one wonder as to why current forklift training programs aren't doing their job to protect workers from injuries. To answer this question, several forklift training manuals were researched, as well as several articles having to do with skill-based training. Using a skill-based approach to training could potentially be extremely beneficial to industries that rely on forklifts and things like it.

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2. Background

We began to research different training programs, several were found that were given less understanding of the tasks, steps and skills and contained a lot less importance on acquiring necessary skills. This does not mean that it is lacking information, but that other training programs were also excessive and repetitive. We were able to find six additional outside forklift training programs to compare to the one that we developed.

Table 1. Disadvantages of existing training programs

Training Program	Content of Training Program	Disadvantages	Advantages
"Forklift Safety Guide: State of Washington"	-Essay-style format -Included information about the different types of forklifts, training, how forklifts work, how to use a forklift, hazards, and maintenance -Occasional charts and diagrams	-Lengthy -Did not go as much into detail about skills as the formulated forklift training program -Too many pictures that distracted from the point	-Very thorough overall -Touched on very important subjects
"San Jose State University: Forklift Training Manual"	-Paragraph format -Touched on visibility factors, capacity of the vehicle, vehicle stability, controls, and proper inspections	-Lengthy -Covered less tasks than the given program -Minimal graphics	-Covered on several notable subjects -Not very difficult to follow
"Forklift Training for Trainers"	-Very thorough essay-type format -A large number of images and pictures	-Did not go as much into detail as the given program -The pictures and graphics drew away the attention from the subject matter	-Lightly hit on all the tasks covered in the given forklift training program -Some graphics were helpful -Covered a large scope of information
"Sample Forklift Safety and Powered Industrial Trucks Written Program"	-Paragraph form -Very lengthy	-No charts, images, or visuals -Difficult to follow -Lacked organization as well as some key details	-Contained some good information on forklifts -Contained a small quiz at the end
"Craven Community College Forklift Safety Program"	-Much longer than the given program -Paragraph format	-Heavily consisted on recording and evaluation forms -Went less into detail pertaining to certain skills -difficult to follow	-Touched on all of the tasks included in the given program

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Training Program	Content of Training Program	Disadvantages	Advantages
"University of Pittsburgh: Safety Requirements- Powered Industrial Truck Program"	-Essay-type format -Touched on many important factors of forklift training	-Did not include some graphics that may have been helpful -Did not include the steps or skills required for those steps	-Included all of the tasks that the given program contained -Not the hardest to follow

3. Method

A task analysis of the entire training subject (forklift training) was carried out as the first step. For each of the tasks identified within the job of forklift training, a terminal objective was written. This was the second step for developing the training program. The third step was to identify the skills associated with the correct performance of the task that have been selected. For most tasks, there were between 2-6 skills. Fewer than that was an indication that the task was actually a skill and was part of another task. More than that was an indication that several tasks were combined into one and they needed to be broken up into better defined tasks. The fourth step was to write clear and properly stated objectives for each of the skills identified. Each objective (of the skills) was written using the format a) action, b) behavior and c) conditions and d) degree. Where the action/behavior was cognitive, it was written in such a manner that used an observable behavior, or indicator behavior, to demonstrate what was expected. Special focus was given that the verb that was used to describe a desirable behavior was observable. The fifth step was to write criterion item(s) for each of the skills/objectives and to write a skill check (test question, observation, etc.). This was necessary to demonstrate that the trainee has learned the skill.

Table 2. The Forklift Maneuvering: Task Analysis

Task #	Task	Terminal Objectives/Understanding	Skill
1.	Operating Instructions, Warnings, and precautions	**1.1** Instructions for Safe Operation **1.2** Warnings and Precautions	**1.1.1** Ability to identify all the instructions that are needed to be abided **1.2.1** Ability to abide by all warnings and precautions provided by OSHA
2.	Differences between the Lift Truck and an Automobile	**2.1** Steering Differences **2.2** Load Position	**2.1.1** Ability to differentiate the backwards steering in a lift truck to forward steering in an Automobile **2.2.1** Knowledge that a lift trucks load is in front and automobile's load is kept in back
3.	Controls & Instrumentations	**3.1** Control functions **3.2** Instrumentations	**3.1.1** Knowledge of forklift controls pertaining to location, function and how to use **3.2.1** Knowledge of forklift Instrumentations pertaining to location, function and how to use
4.	Engine or Motor Operations	**4.1** Engine Controls	**4.1.1** Knowledge of the basic Engine/motor functions of your lift truck

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Task #	Task	Terminal Objectives/Understanding	Skill
5.	Steering and Maneuvering	**5.1** Steering **5.2** Maneuvering	**5.1.1** Ability to use backwards steering **5.1.2** Knowledge of when and how to turn **5.2.1** Ability to safely travel with load **5.2.2** Ability to be aware of surroundings at all times for people, objects and equipment.
6.	Visibility	**6.1** Visibility with Load **6.2** Visibility for looking for pedestrians **6.3** Visibility for other Forklifts or people to see you	**6.1.1** Ability to maintain visibility when traveling with a load **6.1.2** Knowledge of when a spotter is needed or when to travel in reverse **6.2.1** Ability to stay aware and look for pedestrians **6.3.1** Ability to make yourself known by sounding horn and ensure backup lights work so that bystanders and other lifts are aware of your location
7.	Fork and attachment adaptation, operation, and use limitations	**7.1** Forklift Attachment Adaptation **7.2** Forklift Attachment Operation	**7.1.1** Knowledge of Forklift Manufacturer Attachment Approvals **7.1.2** Ability to properly attach an attachment to forks of lift truck **7.2.1** Ability To safely use and operate a forklift with an attachment **7.2.2** Knowledge of how the specific attachment now changes lifting capacity and center of gravity
8.	Vehicle Capacity	**8.1** Vehicles lifting capacity **8.2** Capacity of vehicle it's self	**8.1.1** Knowledge of Vehicles lifting capacity and how to calculate **8.2.1** Knowledge of the capacity of vehicle it's self
9.	Vehicle Stability	**9.1** Center of gravity **9.2** Traveling with a load **9.3** Crossing Railroad tracks	**9.1.1** Knowledge of how the vehicles center of gravity changes depending on different situations **9.1.2** Ability to stay aware of center gravity and when it changes **9.2.1** Knowledge of how traveling with a load effects the vehicles stability **9.2.2** Ability to maintain stability while traveling with a load **9.3.1** Knowledge of how to cross railroad tracks while operating a forklift
10.	Any Vehicle inspection and maintenance that the operator will be required to perform	**10.1** Pre-Operation Inspection **10.2** Maintenance	**10.1.1** Ability to perform a pre-operation Inspection. Visual and checklist inspection **10.2.1** Knowledge of general maintenance that is required to keep lift truck operating safely
11.	Refueling and/or Charging and recharging of Batteries	**11.1** Safe refueling practices **11.2** Refueling PPE **11.3** Safe Battery Handling	**11.1.1** Knowledge of how to safely refuel a forklift **11.1.2** Knowledge of safe refueling zones/areas **11.2.1** Knowledge of proper PPE needed to safely refuel a forklift. **11.3.1** Knowledge of Safe Battery Handling

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Task #	Task	Terminal Objectives/Understanding	Skill
			11.3.2 Knowledge of Battery charging area
12.	Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate	**12.1** Review of manufactures manual	**12.1.1** Knowledge of manufactures operating instructions, warnings, or precautions
13.	Determine the type of forklift	**13.1** Recognize the importance of knowing the different power source for the forklift by selecting power source such as the propane source. **13.2** Classify the type of tire on the forklift **13.3** Calculate the center of gravity triangle when carrying a load	**13.1.1** The user should be able to determine what the forklift is powered by **13.2.1** The user should be able to identify the differences in tires of a forklift **13.3.1** The user should be able to understand the center of gravity triangle with carrying a load
14.	Pre-trip walkaround inspection	**14.1** Identify by looking for and reacting when seeing leaks from a forklift **14.2** Recognize what to look for one the wire and hydraulics by showing which wires are in the best condition **14.3** Recall what a tire should look like to perform work by selecting any stresses on a tire	**14.1.1** The user should be able to understand the knowledge of where leaks can happen **14.2.1** The user should be able to understand what to look for with inspecting the wires and hydraulics **14.3.1** The user should be able to understand the stresses a tire can show and report them
15.	Drive safely	**15.1** Apply a safety practice for climbing onto the forklift **15.2** Identify the proper sound that the forklift should be making **15.3** Demonstrate an ability to drive the forklift in the shipping area **15.4** Recognize possible problems with the while operating the forklift **15.5** Demonstrate the ability to drive the forklift in reverse	**15.1.1** The user should be able to climb onto the forklift using three points of contact **15.2.1** The user should be aware of possible unusual noises **15.3.1** The user should be able to have the ability to maneuver **15.4.1** The user should be able to show ability to be aware of possible malfunctions in the forklift. **15.5.1** The user should be able to drive in reverse

Task #	Task	Terminal Objectives/Understanding	Skill
16	Handle materials with the forks	**16.1** Operate the forklift slowly and safely when approaching a load **16.2** Demonstrate the ability to lift a load with the forks **16.3** Demonstrate the ability to drive the forklift in reverse with a load **16.4** Illustrate how to load a load onto a higher shelf **16.5** Demonstrate the ability to unload a load with the forks **16.6** Illustrate how to unload a load from a higher shelf **16.7** Demonstrate ability to exit safely from a shipping container **16.8** Demonstrate ability to exit safely from a shipping container **16.9 I**llustrate how to unload a load from a shipping container	**16.1.1** The user should be able to know to approach a load safely **16.2.1** The user should be able to show ability with the forks **16.3.1** The user should be able to move a load in reverse **16.4.1** The user should be able to move a pallet to higher location **16.5.1** The user should be able to understand how to successfully unload a pallet with the forks **16.6.1** The user should be able to understand how to unload a pallet on a high shelf **16.7.1** The user should be able to maneuver in a shipping container with a load **16.8.1** The user should be able to load a pallet in a container and exit safely **16.9.1** The user should be able to understand how to unload a shipping container
17	Return the forklift to parking spot or charging station	**17.1** Demonstrate ability on how to park properly **17.2** Apply ability to turn off the forklift **17.3** Understand the importance of putting the forklift on charge and ability on how to do so	**17.1.1** The user should be able to understand how to properly park **17.2.1** The user should be able to operate how to turn off the forklift **17.3.1** The user should be able to know the importance of putting the forklift on charge and how to do so

4. Results

Data collection is ongoing. In addition, after initial analysis of the existing forklift training data, the authors intend to collect semi-structured interview data to gather evidence of the discussed forklift training program's effectiveness. The authors are continuing data collection efforts with the intent of completing the study in time to present meaningful results at the conference.

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