

Identify Hazardous Conditions in Fork Lift and Their Preventive Measures

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Abstract - A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. The forklift operator drives the forklift forward until the forks push under the cargo, and can then lift the cargo several feet in the air by operating the forks. The forks, also known as blades or tines, are usually made out of steel and can lift up to a few tones, depending on the capacity of the forklift and the forks. There are a wide range of forklifts, including pedestrian operated and ride on forklifts. Forklifts vary in size, ranging from one tone capacity for general warehouse type work, up to 50 tone capacity for shipping container work. It involved in numbers of material handling operations which is performed in industry now a days. So that in this paper work hazard identification is carried out on fork lift to identify the hazards related to forklift and their control measures also be given to prevent them. This study concludes that by implementing few new techniques and suggestions for safe working procedures can very much minimize the accidents in material handling.

Key skills - Operator's Safety, Safety Inspection, Hazard identification Material handling.

I. INTRODUCTION

Forklifts are most often used in warehouses, but some are meant to be used outdoors. the vast majority of rough terrain forklifts operate on gasoline, but some use diesel or natural gas. Rough terrain forklifts have the highest lifting capacity of all forklifts and have heavy duty tyres (like those found on trucks), making it possible to drive them on uneven surfaces outdoors.

1.1 Counter Balanced and Non-Counter Balanced Forklifts

Forklifts are divided into two types based on how they are able to remain stable when they are loaded. These types are Counter Balanced and Non Counter Balanced forklifts.

1.2 Counter Balanced Forklifts

Have the weight of the load carried outside the wheel base and are counter balanced by the weight of the forklift. In counter balanced forklifts, the weight of the rear of the truck counterbalances the weight of the load being carried at the front of the forklift. The front wheels can act as a pivot point on which the forklift and load can tip. The greater the weights of the counter balance of the forklift, then the heavier the load that can be lifted. Heavier loads can be lifted if the counter balance is further back in the forklift.

1.3 Non-Counter balanced Forklifts

Have the load carried inside the wheel base of the forklift. Non counter balanced forklifts keep their stability by having the wheels mounted on arms that are on either side of the load when it is being picked up and transported. These are often called straddle lift forklifts.

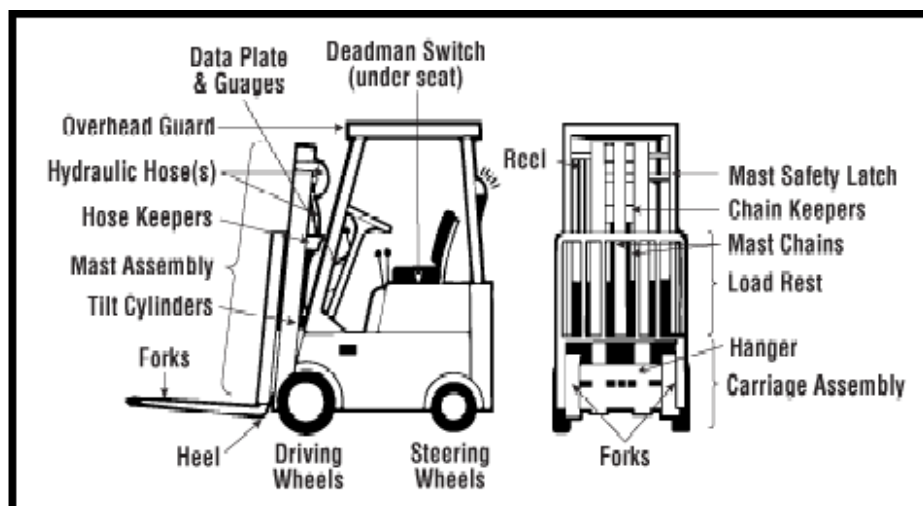


Figure: 1.1 Components of Forklift Truck.

II. HAZARDS ASSOCIATED WITH FORKLIFT TRUCK

In industry where the hazard identification is performed eight forklift trucks are used to transfer load from one place to another in which two trucks are used in main store the accidents/incidents data is collected from the industry related to forklift truck of past three years and identify the hazardous conditions based upon the previous data it is easy to take the previous hazards into account and then with the help of a through survey of forklift and checklist methodology numbers of hazards are identified. From previous data a comparison study is also be made to check the effectiveness of current safety and health program.

Numbers of accidents and incidents which occurred from 2011 to 2015 are shown with the help of graph.

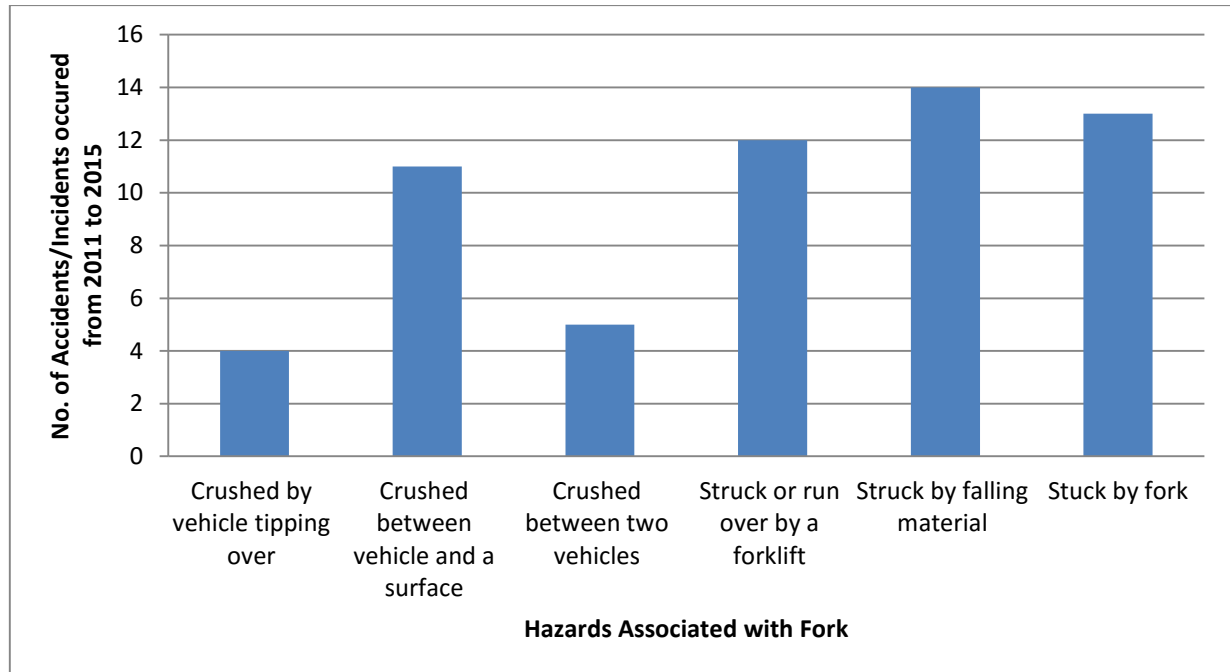


Figure: 1.2 Graph of occurrence of forklift

Accidents Hazards

1. Fall of truck operator, due to slip or incautious step, while climbing to or descending from the operator's seat
2. Fall of truck from an upper level to a lower level, due to careless driving, slip or collapse
3. Fall of improperly loaded cargo.
4. Overturning of truck due to overload or incorrect positioning of the center of gravity
5. Overturning due to cargo lifting to an excessive height, or due to careless steering
6. Overturning of truck, esp. 3-wheel, while making an extremely sharp and speedy turn
7. Overturning due to driving on a too steep slope, or at excessive driving speed, or on an unsafe track (esp. in the event of spills on floors with loss of traction), or due to use of improper equipment/accessories.
8. Rolling-down of truck due to insufficiently applied handbrake
9. Injury from rotating parts of the truck, not fully protected against accidental
10. contact
11. Collision with stationary or moving objects.
12. when field of vision is obstructed by the cargo
13. Collapse of a stack (mostly a stack of poorly stacked goods, when hit by a
14. truck or due to vibration from a nearby truck)
15. Electric shock resulting from contact with overhead electric cables
16. Acute exposure to hazardous chemicals as a result of fall and crush of fragile
17. containers; also potential injury from broken glass
18. Spill of acid during battery charging.

Physical Hazards

1. Exposure to excessive noise levels (esp. when operating diesel trucks or working inside closed structures), with resulting hearing impairment
2. Exposure to whole-body vibration caused by rigid construction of truck (particularly wheels), inadequate shock-absorbing properties of operator's seat (e.g., lacking or improperly adjusted suspension), and prolonged driving on rough grounds
3. Exposure to harsh climatic conditions (heat, cold, rain, winds, etc.) while working outdoors.

Chemical hazards

1. Allergic skin reactions as a result of contact with fuel and/or solvents
2. Eye injury due to splashes of corrosive materials
3. Intoxication by exhaust gases, esp. asphyxiation by carbon monoxide resulting from incomplete combustion of fossil fuel, which are emitted from the exhaust pipe and their concentration is rising rapidly inside closed and inadequately ventilated structures
4. Exposure to nitrogen oxides emitted together with the exhaust gases inside relatively closed and inadequately ventilated structures

Biological hazards

1. Exposure to aerosols containing microorganisms, fungi, etc., raised into the air with the dust as result of truck movement

Ergonomic and psychological hazards

1. Cumulative trauma disorders of hands and arms pains resulting from their overexertion while driving a non-laden truck presenting higher resistance to steering
2. Low-back pain, muscle contraction and other disorders caused by prolonged seating (in a rigid and often awkward posture) in an ergonomically inadequate seat
3. Neck pains as a result of frequent back-turning of head and neck stretching during reverse driving and while transporting bulky load obstructing operator's field of vision
4. Vision problems (eyestrain, eye burn, other kinds of irritation, double vision, etc.) due to prolonged work under condition of insufficient lighting, difficulty of adaptation to abrupt changes in visual environment (e.g., from darkness to bright lighting), blinding effect of other vehicles' headlights and floodlights, etc.
5. Psychological stress associated with increased risk of accidents involving other vehicles and suddenly appearing pedestrians.
6. Psychological problems with coworkers (e.g., caused by their requests of a ride)

III. RECOMMENDATIONS

Numbers are hazards identified with the help of survey and checklist method in which point wise observations are recorded and their control measures are as follows.

1. Stop when anyone crosses the route being travelled. Lower the load to the floor, and wait until clear.
2. Operate only as fast as conditions safely permit.
3. Wear leather gloves when moving or shifting loads.
4. Wear fully laced safety boots to give impact protection when moving loads or skids and to provide ankle support
5. When mounting and dismounting lift truck. Remain alert and prepare for the unexpected.
6. Note anything that affects the normal operation of the forklift and tell the supervisor immediately.
7. Protect hands, arms, head, feet and legs inside the confines of a moving forklift.
8. Stay in the truck in case of overturn.
9. Report any collisions, damage or near-miss incidents to a supervisor immediately.
10. Do not allow anyone under 18 years old to operate a forklift;
11. Drive safely, never exceeding 5 mph and slow down in congested areas or those with slippery surfaces.
12. Provide employees with task-oriented ergonomic training;
13. Follow safe procedures for picking up, putting down and stacking loads;
14. Forklifts are properly positioned and brakes applied before workers start to change or charge batteries.
15. Vent caps are properly functioning.
16. Precautions are taken to prevent smoking, open flames, sparks or electric arcs in battery charging areas and during storage/ changing of propane fuel tanks.
17. Tools and other metallic objects are kept away from the top of uncovered batteries.
18. Concentrations of noxious gases and fumes are kept below acceptable levels.
19. Forklift operators are competent to operate a vehicle safely as demonstrated by successful completion of training and evaluation conducted and certified by persons with the knowledge, training and experience to train operators and evaluate their performance.
20. The training program content includes all truck-related topics, workplace-related topics and the requirements of 29 CFR 1910.178 for safe truck operation.
21. Refresher training and evaluation is conducted whenever an operator has been observed operating the vehicle in an unsafe manner or has been involved in an accident or a near-miss incident.
22. Refresher training and evaluation is conducted whenever an operator is assigned to drive a different type of truck or whenever a condition in the workplace changes in a manner that could affect safe operation of the truck.
23. Evaluations of each operator's performance are conducted at least once every three years.

IV. CONCLUSION

Warehouse operations need a lockout/tag out program to prevent equipment from being accidentally energized and injuring employees. Employees required to perform these operations should be trained and all employees should have a working knowledge of the program. Finally, management of forklift operations needs to conduct a site hazard assessment to determine what personal protective equipment (PPE) must be worn based on the hazards present and train warehouse employees on proper PPE selection, use and maintenance. Further and continuously improvement in safety and health program with the help of checklist and survey based data will be suggested for fork lift safety.

V. REFERENCES

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