

Forklift Operator's “Knowledge & Skills Training”

Participant Workbook

WorkSafe Consulting Services

Instructor: _____



This workshop has been designed to meet all legislated requirements in training forklift operators to be "competent operators" as and detailed in the MOL Guideline for the Safe Operation and Maintenance of Powered Lift Trucks (July 1999, Updated June 2009).

Agenda

Knowledge to be acquired:

We will discuss and evaluate your ability to understand:

(As per Appendix III Page A-6 to A-8)

- All Applicable Legislation
- Lift Truck Operating Principles and Features
- Manufacturer's Specifications
- Hazards in the Workplace – Dangerous Activities
- Dangerous Conditions
- Emergency Procedures and
- Workplace Specific Rules and Procedures

Skills to be Acquired: Demonstrated by driving test and circle check

(As per Appendix III A-9 to A-15)

- Pre-operational Check (Circle Check)
- Start-Up
- Starting, Stopping and Turning
- Shut-Down/Parking
- Forward and Reverse Driving on Level Ground
- Forward and Reverse Driving on Inclines, Ramps or Uneven Terrain
- Operating Around Personnel
- Selection of Loads
- Load pick-Up and Placement
- Load Security and Integrity
- Stacking and De-stacking
- Lifting/Lowering/Supporting
- Loading Truck and Railcars
- Transporting loads in Elevators
- Unloading
- Re-fueling and Recharging

Module 1 Legislation

Learning Objectives:

By the end of this module the participant will be able to:

- Briefly discuss the background and structure of health and safety law.
- Identify and discuss duties of the employer, supervisors, workers under the Occupational Health and Safety Act.
- Identify the regulations associated with OHSA, their need and relevance to forklift trucks.
- List the other legislation applicable to forklift trucks available to extend and supplement the existing health and safety legislation.

Introduction

Regulations made under the Occupational Health and Safety Act (the Act) requires employers to ensure that a worker who is assigned to operate a powered lift truck is "competent" or "qualified to do so. However, the regulations do not indicate the knowledge skills an operator must demonstrate to satisfy this requirement. This definition for Competence to Operate Powered Lift Trucks (The Definition) sets out the knowledge and skills to a competent/qualified operator must demonstrate.

The definition indicates that a competent/qualified operator is one who knows not only how to operate the particular class of powered lift truck(s) to which he/she has been assigned but also knows the hazards associated with the work he/she has been asked to do and how to operate the truck(s) in a manner that protects his or her own safety and the safety of others in the specific workplace.

Establishing the Competence of Operators

To establish a worker's competence to operate a powered lift truck, an employer should ensure that the worker:

- a) Has been informed of the hazards associated with operating a powered lift truck in the particular workplace, including the hazards associated with the load, the design of the workplace, the environmental conditions;
- b) Knows how to protect him/herself and others from the hazards;
- c) Has demonstrated that he/she has acquired the skills and knowledge identified as final outcomes in the definition to a person whose training and experience provides him/her with expert knowledge on the safe operation of powered lift trucks.

Employers should maintain in the workplace a record of workers competence to operate powered lift trucks. For each worker, the record should indicate the skills and knowledge successfully demonstrated the class or classes of truck on which he/she was assessed, the name and affiliation of the assessor and the date the assessment was done. To facilitate identification of competent operators, employers may issue certificates to such workers.

If a medical condition affects a workers ability to operate a powered lift truck safely around other workers, he/she should not be assigned to operate this equipment.

Extracts from the Occupational Health and Safety Act

Definitions:

Competency

1 (1) In this Act, "competent person" means a person who,

- a) is qualified because of knowledge, training and experience to organize the work and its performance,
- b) is familiar with this Act and the regulations that apply to the work, and
- c) has knowledge of any potential or actual danger to health and safety in the workplace.

Duties of Employers and Other Persons

Duties of the Employer

25(1) An employer shall ensure that,

- a) The equipment, materials and protective devices as prescribe are provided;
- b) The equipment, materials and protective devices provided by the employer are maintained in good condition;
- c) The measures and procedures prescribed are carried out in the workplace;
- d) The equipment, material and protective devices provided by the employer are used as prescribed; and
- e) A floor, roof, wall, pillar, support or other part of a workplace is capable of supporting all loads to which it may be subjected without causing the materials therein to be stresses beyond the allowable unit stressed established under the Building Code Act

Idem

(2) Without limiting the strict duty, imposed under subsection (1), an employer shall,

- a) Provide information, instruction and supervision to a worker to protect the health and safety of the worker;
 - b) In a medical emergency for the purpose of diagnosis or treatment, provide upon request, information in the possession of the employer, including confidential business information, to a legally qualified practitioner and to such other persons as may be prescribed;
 - c) When appointing a supervisor, appoint a competent person;
 - d) Acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent;
 - e) Afford assistance and co-operation to a committee and health and safety representative in the carrying out by the health and safety representative or any of their functions;
 - f) Only employ in or about a workplace person over such age as may be prescribed
 - g) Not knowingly permit a person who is under such age as may be prescribed to be in or about a workplace
 - h) Take every precaution reasonable in the circumstances for the protection of a worker;
 - i) Post, in the workplace, a copy of this Act and any explanatory material prepared by the Ministry, both in English and the majority language of the workplace, outlining rights, responsibilities and duties of workers;
 - j) Prepare and review at least annually a written occupational health and safety policy and develop and maintain a program to implement that policy;
 - k) Provide to the committee or health and safety representative the results of a report respecting occupational health and safety that is in the employer's possession and if, that report
 - l) Advise workers of the results of a report referred to in clause
- (1) and, if the report is in writing, make available to them on request copies of the portions of the report that concern occupational health and safety

Additional Duties of the Employer

26 (1) In addition to the duties imposed by section 25, an employer shall,

- a) Establish an occupational health service for workers as prescribed;**
- b) Where an occupational health service is established as prescribed, maintain the same according to the standards prescribed;**
- c) Keep and maintain accurate records of the handling, storage, use and disposal of biological, chemical or physical agents as may be prescribed;**
- d) Accurately keep and maintain and make available to the worker affected such records of exposure of a worker to biological, chemical or physical agents as may be prescribed;**
- e) Notify a Director of the use or introduction into a workplace of such biological, chemical or physical agents as may be prescribed;**
- f) Monitor at such time or times or at such interval or intervals the levels of biological, chemical or physical agents in a workplace and keep and post accurate record thereof as prescribed;**
- g) Comply with a standard limiting the exposure of a worker to biological, chemical or physical agents as prescribed;**
- h) Establish a medical surveillance program for the benefit of workers prescribed;**
- i) Provide for safety-related medical examinations and tests for workers as prescribed**
- j) Where so prescribed, only permit a worker to work or be in the workplace, who has undergone such medical examinations, tests or x-rays as prescribed and who is found to be physically fit to do the work in the workplace; and**
- k) Where so prescribed, provide a worker with written instructions as to the measures and procedures to be taken for the protection of a worker; and**
- l) Carry out such training programs for workers, supervisors and committee members as may be prescribed.**

Duties of the Supervisor

27 (1) A Supervisor shall ensure that a worker

- a) Works in the manner and with protective devices, measures and procedures required by this Act and the Regulations; and**
- b) Uses or wears the equipment, protective devices or clothing that the worker's employer requires to be worn.**

Additional Duties of the Supervisor

2. Without Limiting the duty imposed by subsection (1) a supervisor shall,

- a) Advise a worker of the existence of any potential or actual danger to the health and safety of the worker of which the supervisor is aware;**
- b) Where so prescribed, provide a worker with written instructions as to the measures and procedures to be taken for the protection of a worker; and**
- c) Take every precaution reasonable in the circumstances for the protection of a worker**

Duties of the Worker

28 (1) A worker shall,

- (a) Work in compliance with the provisions of this Act and the Regulations;**
- (b) Use or wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn;**
- (c) Report to his/her employer or supervisor the absence of or defect in any equipment of protective device of which the worker is aware and which may endanger himself, herself or another worker; and**
- (d) Report to his/her employer or supervisor any contravention of the Act or Regulations or the existence of any hazard of which he or she knows;**

Idem

2 No worker shall,

- (a) Remove or make ineffective any protective device required by the regulations or by his or her employer, without providing an adequate temporary protective device and when the need for removing or making ineffective the protective device shall be replaced immediately;**
- (b) Use or operate any equipment, machine, device or thing or work in a manner that may endanger himself, herself, or any other worker; or**
- (c) Engage in any prank, contest, feat of strength, unnecessary running of rough and boisterous conduct**

Worksheet # 1
Legislated Responsibilities
Employer, Supervisor and Worker

Identify the Section Number and Clause where you would find the following:

- 1. List the duties of the employer, and where can they be found in the Act.**

- 2. List the duties of supervisors.**

- 3. List the duties of workers and where they can be found in the Act.**

Rights of Workers...

Workers have the right to:

KNOW ABOUT HAZARDS IN THE WORKPLACE

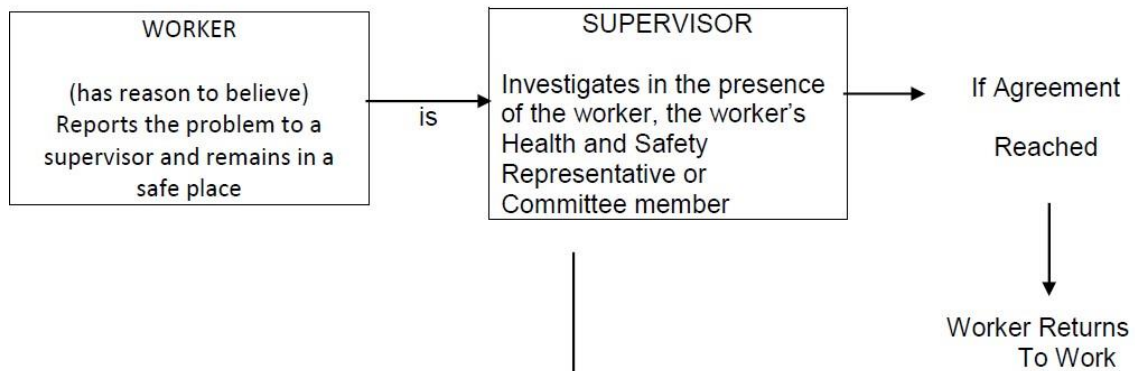
PARTICIPATE IN HEALTH AND SAFETY

REFUSE UNSAFE WORK IN THE WORKPLACE

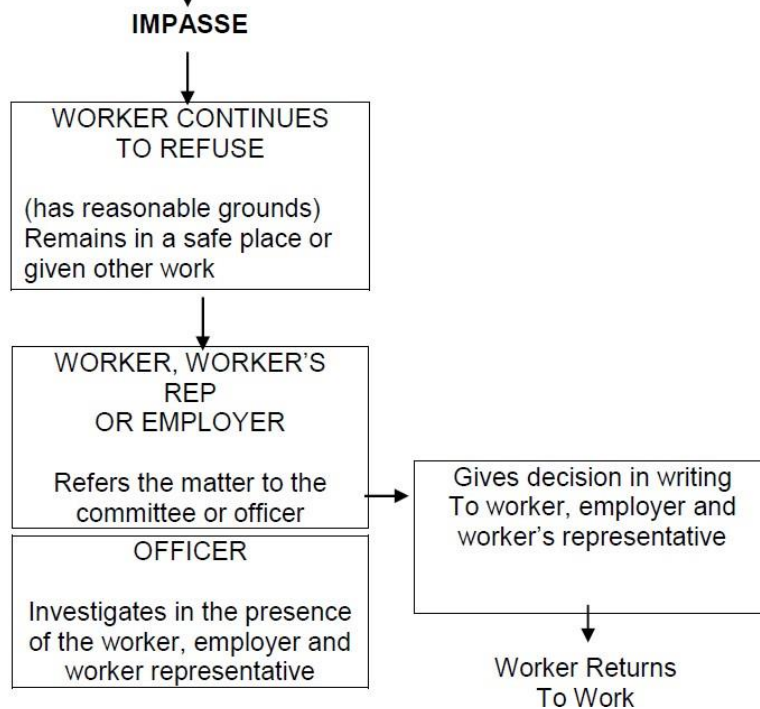
STOP WORK WHERE *DANGEROUS CIRCUMSTANCES EXISTS*

Certified Members of the Joint Health and Safety Committee

STAGE 1



STAGE II



Reprisals by Employer Prohibited

No Discipline, Dismissal etc. by Employer Shall,

50(1) No employer or person acting on behalf of an employer

- a) Dismiss or threaten to dismiss a worker;**
- b) Discipline or suspend or threaten to discipline or suspend a worker;**
- c) Impose any penalty upon a worker; or**
- d) Intimidate or coerce a worker,**

Onus of Proof

(5) On an inquiry by the Ontario Labour Relations Board into a complaint filed under subsection (2), the burden of proof that an employer or person acting on behalf of an employer did not act contrary to subsection (1) lies upon the employer or the person acting on behalf of the employer.

Offences and Penalties

Penalties

66(1) Every person who contravenes or fails to comply with,

- a) A provision of this Act or the regulations;**
- b) An order or requirement of an inspector or director; or**
- c) An order of the Minister, is guilty of an offence and on conviction is liable to a fine not more than \$25,000 or to imprisonment for a term of not more than twelve months, or to both**

Idem

(2) If a corporation is convicted of an offence under subsection (1), the maximum fine that may be imposed under the corporation is \$500,000 and not as provided therein.

Worksheet # 2
A Case Study

A lift truck operator is told by her supervisor that some materials from the warehouse are urgently needed in the plant, and that she must bring them all on one load. The materials are stored on shelves at the end of a narrow corridor. Although the driver can go forward to load the material, there is no room to turn around. Instead, she must back out into a busy pedestrian area. Once she has backed out, the load is too high for her to see around.

1. What duties does the workers employer have under the Act and regulations in this situation?

2. What rights does the worker have in this situation?

3. She refused unsafe work and was told by her supervisor that she was fired and to go home. Can her supervisor do this. Why or Why not? What can she do next?

4. How can the employer correct this situation and make sure the work is safe for all workers in the future?

Other Legislation that may pertain to Forklift Operators

- 1. WHMIS**
- 2. TDGA Transportation of Dangerous Goods Act**
- 3. Fire Code**
- 4. Designated Substances Regulations**
- 5. Chemical Spills Emergency Response – under the Environmental Protection Act.**

Regulations:

We have discussed the Act (Occupational Health and Safety Act) which describes the what. For example "what must happen in the workplace, for each workplace party, the employer, the supervisors and the workers. This lays out the framework of what we call "the Internal Responsibility System. This means that everyone is responsible to see to it that Safety is happening in the workplace.

The Regulations - describe the "How"

Environmental Hazards i.e. carbon monoxide, operating environment such as the floor or ground conditions, ramps and inclines with and without a load, trailers, railcars, dock boards (wheel chocks, jacks and other securing devices, fueling, battery charging, narrow aisle ways, doorways, overhead wires, areas around other vehicles, pedestrians etc. Elevators, working near the edge of a dock and other special operating conditions.



Operator did not consider "uneven ground" surfaces and rolled the forklift as a result.



Was speed a factor? Too close to the edge?

Extracts from the Industrial Regulations pertaining to Lifting Devices, Forklift Trucks etc.

Section 11, Floors and working surface requirements

- 11** A floor or other surface used by any worker shall,
- a) Be kept free of,
 - i. Obstructions,
 - ii. Hazards, and
 - iii. Accumulations of refuse, snow or ice, and
 - b) Not have any finish or protective material used on it that is likely to make the surface slippery. RRO. 1990, Reg 851 s 11.
- 20** Barriers, warning signs and other safeguards for the protection of all workers in an area shall be used where vehicle and pedestrian traffic may endanger the safety of any worker. RRO. 1990, Reg 851 s 20.

Section 45, Material Articles or Things,

- a) Required to be lifted, carried or moved, shall be lifted carried or moved in such a way and with precautions and safeguards, including protective clothing, guards or other precautions as will ensure that the lifting, carrying or moving, articles, things does not endanger the safety of any workers; and
- b) Shall be transported, placed or stored so that the material, articles or things, not tip, collapse or fall.

Section 47, Cylindrical objects storage procedure

47 Cylindrical objects stored on their shall be piled symmetrically with each unit in the bottom no chocked or wedged to prevent motion. RRO, 1990, Reg 851 s 47.

Section 48, Barrel, drum and keg storage procedure

48 Barrels, drums kegs that are piled on their ends shall have two parallel planks placed on each row before another is added. RRO. 1990, Reg 851 s 48.

Lifting Devices

51(1) A lifting device shall,

- a) Be so constructed of such strength and be equipped with suitable ropes, chains, and other fittings so as to adequately ensure the safety of all workers.
- b) Be thoroughly examined by a competent person to determine its capability of handling the maximum load as rated,
 - i. Prior to being used for the first time,
 - ii. Thereafter as often as necessary but not less frequently than recommended by the manufacturer and in any case, at least once a year.

And a permanent record shall be kept, signed by the competent person doing the examination;

- c) Be plainly marked with sufficient information so as to enable the operator of the device to determine the maximum rated load that the device is capable of lifting under any operation condition;
- d) Have a cab, screen, canopy guard or other adequate protection for the operator where the operator may be exposed to the hazard of falling material;
- e) When it is a pneumatic or hydraulic hoist, have controls that automatically return to their neutral position when released.

(2) A lifting device shall be operated,

- a) Only by,
 - i. A competent person or
 - ii. A worker being instructed who is accompanied by a competent person; and
- b) In such a way that,
 - i. No part of the load passes over any worker
 - ii. Where a worker may be endangered by the rotation or uncontrolled motion of a load, one or more guide ropes is used to prevent rotation or other uncontrolled motion, and

52 A crane, lift truck or similar equipment shall be used to support, raise or lower a worker only when,

- a) A worker is on a platform,**
 - i. Equipped with adequate safety devices that will automatically prevent the platform and load from falling if the platform's normal support fails,**
 - ii. Suspended from a boom that does not move, and the person is attached to a separate lifeline suspended from the boom or a fixed support capable of supporting at least four times the weight of the worker, or**
 - iii. Attached to a mast, or boom which,**
 - a. Is hydraulically or pneumatically operated, and**
 - b. Is equipped with a safety device that will prevent free fall of the platform in the event of pressure line failure;**
- b) where the equipment is not designed for the specific purpose of hoisting personnel, the load applied to the crane, lift truck or similar equipment is less than one half the maximum rated load;**
- c) the platform has a sign indicating the load described in clause (b);**
- d) where controls are provided at more than one location,**
 - i. each control station is provided with means whereby the operator can shut off power to the equipment, and**
 - ii. interlocks have been provided so that only one station can be operative at any time; and**
- e) except when the controls are operated from the platform, the controls are attended and operated by another worker, RRO, 1990 Reg 851 s 52.**

54(1) Mobile equipment shall,

- a) when lighting conditions are such that its operation may be hazardous, have headlights and taillights that provide adequate illumination;**
- b) when exposed to the hazard of falling material, have a screen or canopy guard adequate to protect the operator;**
- c) be used to transport a person, other than the operator, only when that worker is sealed in a permanently installed seat; and**
- d) subject to subsection (2), be operated only by a competent person,**

(2) Clause (1)(d) does not apply to mobile equipment operated by a worker while the worker is being instructed and accompanied by a competent person. RRO. 1990, Reg 851, s 54.

56 Where the operator of a vehicle, mobile equipment, crane or similar material handling equipment does not have full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment shall only be operated as directed by a signaler who is a competent person and who is station,

- a) in full view of the operator,**
- b) with a full view of the intended path of travel of the vehicle, mobile equipment, crane or similar material handling equipment and its load; and**
- c) clear of the intended path of travel of the vehicle, mobile equipment crane or similar material handling equipment and its load. RRO 1990, Reg 851, s 56.**

57 A vehicle left unattended shall be immobilized and secured against accidental movement, RRO 1990, Reg 851, s 57.

58 Powered equipment shall not be left unattended unless forks, buckets, blades and similar parts are in the lowered position or solidly supported. RRO, 1990, Reg 851, s 58.

59 Except for the purpose of a test of the material handling equipment shall be loaded in excess of its maximum rated load. RRO. 1990, Reg 851, s 59

60(1) Except as prescribed by subsection 42.2 where a vehicle, crane or similar equipment is operated near a live power line carrying electricity at more than 750 volts, every part of the equipment shall be kept at least the minimum distance from the live power line set out in column 2 of the Table for the particular voltage set out opposite thereto in column 1 of the table:

Minimum distance from live power lines for electricity	
Column 1	Column 2
Voltage of live power line	Minimum Distance
750 to 150,000 volts	3 metres
150,001 to 250,000 volts	4.5 metres
250,001 volts and over	6 metres

61 Gasoline engines on mobile equipment shall be refueled

- a) Outdoors;
- b) With the engine on the equipment stopped
- c) With no source of ignition, within three metres of the dispensing point; and
- d) With an allowable made for expansion of the fuel should the equipment be exposed to a higher ambient temperature. RRO. 1990, Reg. 851, s 61

Section 74, Temporarily Elevated Equipment

74 Machinery, equipment or material that is temporarily elevated and under which a worker may pass or work shall be securely and solidly blocked to prevent machinery, equipment or material from falling or moving. RRO. 1990, Reg. 851, s 61

Protective Equipment

79 A worker required to wear or use any protective clothing, equipment, device shall be instruction and trained in its care and use before wearing the protective clothing, equipment, device. RRO 1990. Reg. 851, s 79

80 A Worker exposed to the hazard of head injury shall wear head protection appropriate in the circumstances. RRO. 1990, Reg. 851, s 80

81 A worker exposed to eye injury shall wear eye protection appropriate in the circumstances. RRO. 1990, Reg. 851, s 81

82 A worker exposed to hazard to the hazard of foot injury shall wear foot protection appropriate in the circumstances. RRO. 1990, Reg 851, s 82

83 (1) Long hair shall be suitably confined to prevent entanglement with any rotating shaft, spindle, gear, belt or other source of entanglement

84 A worker exposed to the hazard of injury from contact of the worker's skin with,

- a) A noxious gas, liquid, fume or dust;**
- b) A sharp or jagged object which may puncture, cut or abrade the worker's skin;**
- c) A hot object, hot liquid or molten metal; or**
- d) Radiant heat**

Shall be protected by,

- a) Wearing apparel sufficient to protect the worker from injury, or**
- b) A shield, screen or similar barrier, appropriate in the circumstances. RRO. 1990, Reg 851, s 84**

Worksheet # 3
The Regulations

Using pages 18 – 23, look up the Regulations Sections for:

Be plainly marked with maximum rated load _____

No passengers _____

No load over workers _____

Module 2
Counter Balanced
Fork Lift Truck

Counterbalanced Forklift Truck, Longitudinal and Lateral Stability, ITA Classifications, Type Designations and use, and different methods of Powering Forklift Trucks.

Learning Objectives:

By the end of this module the participant will be able to:

- 1. Understand the counterbalanced forklift truck.**
- 2. Explain the principles of counterbalance theory, and how load capacity affects longitudinal and lateral stability.**
- 3. Discuss the different ITA Classifications and the type designation and use.**
- 4. Discuss different methods of powering forklift trucks.**

The Evolution of the Counterbalanced Forklift Truck

After World War II, forklift trucks were characterized by sturdy design. Parts on the forklift trucks were made deliberately stronger than necessary to increase their durability and longer life. By making the trucks stronger it increased the overall weight. The increased weight was a benefit when operating. However, because of the extra material required, they were very expensive to purchase.

The next period of forklift trucks attempted to significantly reduce costs. Unfortunately, these efforts also reduced the weight of the forklift truck, decreasing the amount of load it could safely carry.

The weight of a counterbalanced forklift truck is **CRITICAL** since the load carried is totally supported outside its wheelbase. Loads are carried on forks or clamps attached to the front of the vehicle. When the load is heavier than the weight of the truck, the front wheels act like a balance point of a teeter totter and the truck tips forward. The effect is minimal when the load is carried close to the ground but when load are elevated the effect may cause the truck to tip and roll over.



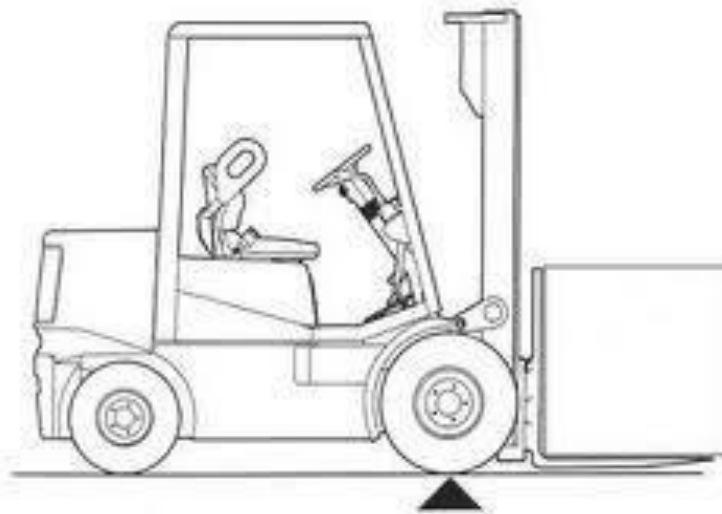
Photo # 80-G-330221 Fork lift in action at a Navy supply depot, Guam, 1945

Counterbalance Theory

By understanding how counterbalanced trucks react under certain conditions, the operator can learn how to operate in the safest manner possible.

Basic Operation

- Driven by the front axle
- Steered by the rear axle
- Load carried at the front, outside the wheel base... weight remains on the drive axle, thereby allowing frictional force between the ground and the front tires
- The greater the load weighs, the greater friction and traction on the drive axle, thereby reducing the turning radius.
- To improve the turning radius the forklift truck uses the rear wheels to steer the vehicle which allows the forklift truck to turn on a dime, using the front wheels as a pivot point.



Longitudinal Stability – Back to Front

- Weight is added to the rear of the truck to counterbalance the load being carried at the front. The greater the counter weight the more the truck can safely carry.
- The counterbalanced forklift truck is designed to work on the leverage principle, much the same as a child's teeter totter. The front drive axle is the point of balance or fulcrum. At the rear is the fixed counter weight, placed as far back from the centre of the front wheels as possible. It must be sufficient weight to hold the rear wheels on the ground when the machine is working at or near its maximum load capacity.
- The weight of the load must not exceed the forklift truck's rated capacity or the forklift truck will tip forward.
- To maintain "Longitudinal Stability" (back to front), the counter weighted end must weigh more than the load being carried.
- If the two ends are perfectly balanced the forklift truck will tip forward every time the breaks are applied. The condition occurs because of the tendency for the load to keep moving even the truck has stopped.



What is the moment? And what is the lever arm?

The distance from the centre of the gravity of a load to the drive axle is called the lever arm. Usually 24 inches for skids. The higher the load, the longer the lever arm thereby making the load heavier and easier to tip forward.

To obtain maximum lifting capacity, the load being lifted must be as close to the ground as possible and the load must be positioned so that it rests tightly against the face of the forks.

There is a torque or twist created about the drive axle by the weight of the load. This condition is called the **MOMENT**. The moment is used to express the force exerted by the lever arm. The moment is measured in either foot pounds (ft lbs) or millimeter kilograms (mm kg).

To calculate the moment, simply multiply the load weight by the distance from the load centre of the drive axle (lever length).

MOMENT = WEIGHT OF LOAD X LENGTH OF LEVER ARM

The moment of a forklift truck with a 3500 lbs load that has a 24 inch centre is:

$$\begin{aligned}\text{Moment} &= 3,500\text{lbs} \times \frac{(24 \text{ inches})}{12 \text{ inches}} \\ &= 3,500 \text{ lbs} \times 2 \text{ feet} \\ &= 7000 \text{ ft lbs}\end{aligned}$$

To keep the truck in balance the moment between the drive axle and the steer axle has to be equal to or greater than the moment calculated in front of the drive axle and behind the load.

Sample Capacities at Various Load Centres

Load Center	Fork Length	Capacities (Mast Vertical)
Inches	Inches	Pounds
24	36	5000
28	42	4275
32	48	4100
36	54	3700
40	60	3400
44	66	3150
48	72	2900

Longitudinal Stability is the trucks resistance to tipping over, either forward or backward.

List some factors that may affect Longitudinal Stability.

Data Capacity Plate

Your most immediate source of information concerning the safe [load capacity](#) of a truck can be found on its data plate.

The plate will give you information concerning the load capacity of the truck in pounds and the [load center](#) in inches.

The lifting capacity described on this plate is 3200 pounds with an LC of 24 inches, up to a height of 188 inches from the floor.

MODEL NO. **TYPE**

SERIAL NO.

ATTACHMENTS

↓
C.G.
↓
A ← B
↑
FLOOR

APPROX. WT. ALL TRUCKS
APPROX. WT. ELECTRICS ONLY

BATTERY WT.
BATTERY CAPACITY

CAPACITY WITH ATTACHED LISTED ABOVE OR WITH FORKS - UPRIGHTS VERTICLE			
LBS	A	B	C
3200	24	188	24
LESS BATT. ELECTRICS		5800	
WITH MAX. BATT. WT.		8900	
MAX	3072	MIN	2250
AH		NO	
LBS		VOLT	36

FOR OTHER CAPACITIES - CONSULT MANUFACTURER
AS RELEASED FROM FACTORY THIS TRUCK MEETS THE
DESIGN SPECIFICATIONS ESTABLISHED IN AMERICA
NATIONAL STANDARD FOR POWERED INDUSTRIAL TRUCKS.
PART II, ANSI B56.1-1969 PART NO. 2315709

CAPACITY

The maximum load in kilos at any given load centre that a truck can safely transport and/or stack to a specified height.

LOAD CENTRE

Calculated by measuring the distance from the heel (back) of the fork to the centre of gravity of the load. The horizontal longitudinal distance from the intersection of the horizontal load carrying surfaces and vertical load engaging face of the forks (or equivalent load positioning structure) to the centre of gravity of the load.

WEIGHT

The overall weight of the lift truck is determined by adding the weight of the truck to the weight of the battery. The total of the two weights together then represent the weight rating. This is true in the case of electric powered trucks.

Truck Rated Capacity

The truck rated capacity is the term used to describe the **HEAVIEST** load a forklift truck can lift safely. The center gravity of the load must be within a specific distance from the face of the forks. The truck rated capacity is marked on the nameplate of all forklift trucks.

The truck rated capacity is stated in pounds or kilos, while the load center distance and fork height is measured in inches or millimeters. For instance, a truck with a capacity plate shows a maximum weight of 4000 pounds, must have a 24 inch load center and a maximum fork height of 82 inches. If the load center changes to 30 inches, the overall lifting capacity of the forklift is reduced.

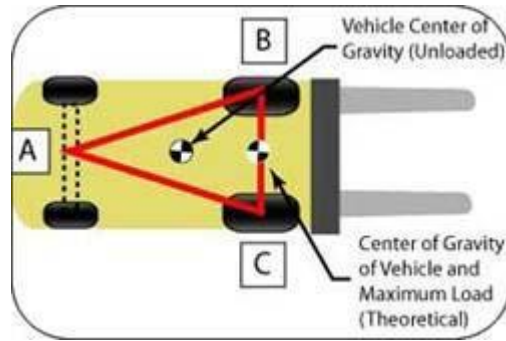
LOADS MUST NOT BE LIFTED IF THEY ARE GREATER OR HEAVIER THAN THE RATED CAPACITY

Lateral Stability (Side to Side)



Wide and Long Loads

Wide and long loads are more unstable than other loads. Wide loads require that you keep them low and watch the balance of the load. When lifting and carrying long loads, keep in mind the load center and lift capacity of your truck. With both wide and long loads, you will need more room to maneuver. So, slow down and watch your clearance.



Stability Triangle

If you were to raise a lift truck up and look at its underside, you would see that the support points for the truck are located at points A, B, and C. The triangle formed between points A, B, and C is called the **Stability Triangle**. The lift truck will not tip over as long as the center of gravity remains inside the triangle. (The center of gravity is the point within a lift truck where there is equal weight all around it.)

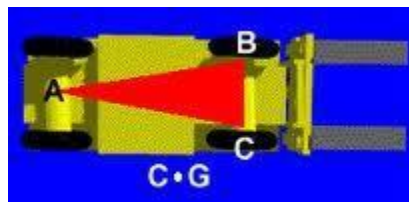
Counterbalanced forklift trucks do not always travel on level, even surfaces. Rough terrain, ramps, pot holes are always a concern in maintaining lateral stability.

Lateral stability is maintained by keeping the center of gravity of the forklift truck inside what is known as the "stability triangle". This triangle is formed by a line extending from the points where the drive tires make contact with the floor to a point under the steer axle.

However, if the center of gravity shifts outside the stability triangle, the lift truck will tip over.

The center of gravity within a lift truck can be moved by:

- Traveling with an elevated load;
- Trying to carry too heavy a load;
- Trying to turn the lift truck while it is moving too fast;
- Operating the lift truck on a hill or incline;
- Starting or stopping too fast;
- The jerky operation of the hydraulic system.



ITA Classifications**Equipment Type**

Class 1	Electric Motor Rider Truck Counterbalanced Lift
Class 2	Electric Motor Narrow Aisle Trucks Designed to carry load over wheels
Class 3	Electric Motorized Hand Trucks Pedestrian led or remotely operated
Class 4	Internal Combustion Engine Trucks Cushion Tire only
Class 5	Internal Combustion Engine Trucks Pneumatic Tire only
Class 6	Electric and Internal Combustion Engine Tractors Designed for pulling rather than lifting
Class 7	Rough Terrain Forklift Trucks

Counterbalanced forklift trucks can be divided into categories based on how they are powered. The two categories are electric and internal combustion engine forklifts. Forklift trucks can be further divided into gasoline, liquefied petroleum gas (LPG) and diesel.

TYPE DESIGNATIONS AND AREAS OF USE

NFPA 505, Fire Safety Standard for Powered Industrial Trucks, Including Type Designations. Area of Use, Maintenance and Operations, lists thirteen different type designations of industrial trucks or tractors. These designations are divided into power types.

The designation letter reflects the power type, as follows:

1. Type D units are diesel powered units having minimal acceptable safeguards against inherent fire hazards.
2. Type DS units are diesel powered units that, in addition to all the requirements for the type D units, are provided with additional safeguard to the exhaust, fuel, and electrical systems.
3. Type DY units are diesel powered units that have all the safeguards of the type DS units, and in addition, do not have any electrical equipment, including ignition. They are also equipped with temperature limitation features.
4. Type E units are electrically powered units having minimum acceptable safeguards against inherent fire and electrical shock hazards.
5. Type ES units are electrically powered units that, in addition to all of the requirements for the Type E units, are provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures.
6. Type EE units are electrically powered units that have, in addition to all of the requirements for the Types E and ES units, the electric motors and all other electrical equipment completely enclosed.
7. Type EX units are electrically powered units that differ from the Type E, ES, or EE units in that the electrical fittings and equipment are so designed, constructed, and assembled that the units may be used in atmospheres containing specifically named flammable vapours, dusts, and under certain conditions, fibres. Type EX units are specifically tested and classified for use in Class 1, Group D or for Class 11, Group G hazardous locations as defined in NFPA 70, National Electrical Code.

8. Type G units are gasoline powered units having minimum acceptable safeguards against inherent fire hazards.
9. Type GS units are gasoline powered units that, in addition to all the requirements for the Type G units, are provided with additional safeguards to the exhaust, fuel, and electrical systems.
10. Type LP units are liquefied petroleum gas powered units having minimum acceptable safeguards against inherent fire hazards.
11. Type LPS units are liquefied petroleum, gas powered units that, in addition to the requirements for the Type LP units, are provided with additional safeguards to the exhaust, fuel, and electrical systems.
12. Type G/LP units operate on either gasoline or liquefied petroleum gas having minimum acceptable safeguards against inherent fire hazards.
13. Type GS/LPS units operate on either gasoline or liquefied petroleum gas, in addition to all requirements for the type G/LP units are provided with additional safeguards to the exhaust, fuel, and electrical systems.

All vehicles should be selected, outfitted, maintained, and operated in accordance with the hazards of the locations.

Different Methods of Powering Forklift Trucks

Electric Forklift Trucks

Electric forklift trucks are driven by electric motors which are energized by storage batteries. The storage batteries are designed to operate a forklift truck for eight to twelve hours before recharging. Electric trucks are preferred over internal combustion engine trucks for some inside operations because they do not give off hazardous fumes and are not as noisy. Some electric trucks are specially built to operate in hazardous atmospheres where fire or explosion potential exists.

Disadvantage: Is the recharging of batteries. Workers are exposed to heavy industrial batteries. (1000 – 2000 pounds), corrosive chemicals such as sulphuric acid and highly explosive mixtures of hydrogen and oxygen given off by gassing batteries.

Battery-charging installations must be in designated areas only and provide for:

- Flushing and neutralizing spilled electrolyte
- Fire protection
- Protecting charging apparatus from damage by trucks
- Adequate ventilation to disperse vapors
- Eyewash and deluge safety showers
- PPE such as chemical goggles, face shield, rubber gloves, aprons and boots.

Internal Combustion Engine Forklift Trucks

Gasoline – is readily available, easy to store and comes in a liquid state.

Disadvantage – is the number of different hydrocarbons and additives used. The exhaust from vehicles powered by gasoline is polluted with un-burnt hydrocarbons, carbon monoxide and oxides of nitrogen. High levels can accumulate indoors and cause acute and chronic effects for workers. (liver, kidney, lung and brain damage, it also a central nervous system depressant and a respiratory irritant, workers may suffer loss of coordination, drowsiness or dizziness) For this reason gasoline powered forklift trucks should be used outdoors only.

Liquefied Petroleum Gas (LPG)

Liquefied Petroleum Gas is a general term that refers to propane, butane or a mixture of both. These gases are pure, LPG burns much cleaner than gasoline. LPG are not free of pollutants such as carbon monoxide, are present in trace amounts.

Disadvantages – Changing of cylinders. Must be done outside and only by qualified trained persons in propane cylinder exchange.

Diesel

There are good reasons why companies are turning to diesel powered forklift trucks. Diesel is less expensive to buy, engine requires less maintenance and diesel is inherently safer than gasoline and LPG.

However, the use of diesel powered forklift trucks/tractors inside building are not recommended. Some workers have allergic reactions to even trace amounts of diesel exhaust, and there is increasing evidence that diesel emissions are cancer causing.

Diesel emissions are a complex mixture of oxides of nitrogen, sulphur dioxide, carbon monoxide, aldehydes and carbonaceous particulates. The carbon particles are of particular concern for workers because they are respirable (small enough to enter the lungs). These particles also contain polynuclear aromatic hydrocarbons (PAHs) that have been shown to be mutagenic (can cause changes to the DNA or reproductive cells) and possibly cancer causing.

For this reason, diesel forklift trucks must only be used for outdoor where the effects of emissions are minimized.

Worksheet # 4
Counterbalanced Forklift Truck

- 1. List some advantages of a counterbalanced forklift truck.**

- 2. Explain the teeter totter concept of a counterbalanced forklift truck design.**

- 3. Factors that affect longitudinal stability.**

- 4. What is the lever arm? Why is it important for operators to understand this concept?**

- 5. What is the moment? What is the moment of a forklift truck with a 4000 pound load that has a 24 inch load center?**

- 6. What are some factors that affect lateral stability?**

- 7. Explain what the term "truck rated capacity". How do you know what your truck rated capacity is?**

Module 3 Safe Operating Principles

Learning Objectives:

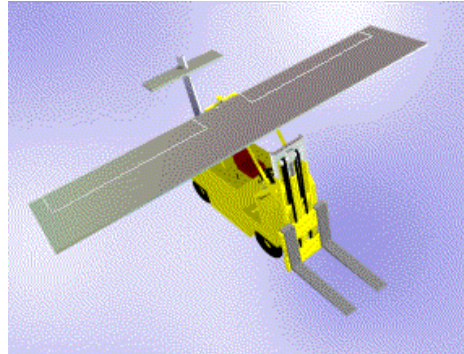
By the end of this module the participant will be able to:

- **Understand safety concerns and safe operating principles as a “competent operator” of a forklift truck.**
- **Understand safety concerns and safe operating principles as a “competent operator” of a forklift truck.**
- **Discuss and identify Dangerous conditions.**
- **Demonstrate how to conduct a pre-operational circle check.**

Other Safety Concerns and Safe Operating Principles

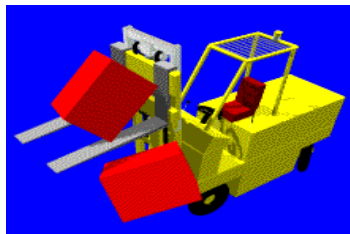
Lift Truck Operation Speed

Keep in mind that you are operating a lift truck, not a race car or jet fighter. In case of an accident, you don't have an ejection seat. Always start and stop smoothly, and **KEEP YOUR SPEED DOWN**



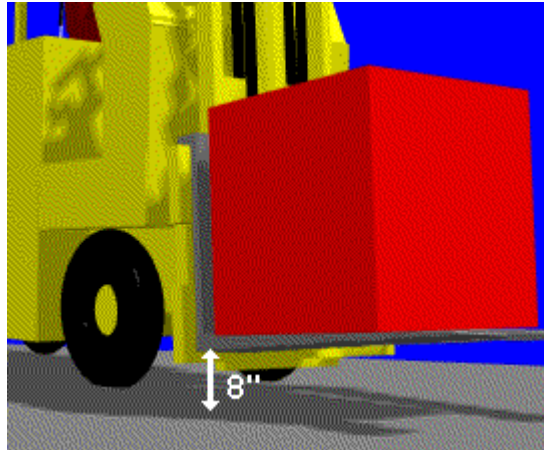
Sharp Turns

The higher you lift a load, the more unstable it becomes. Always take extra care when making sharp turns with a raised load.

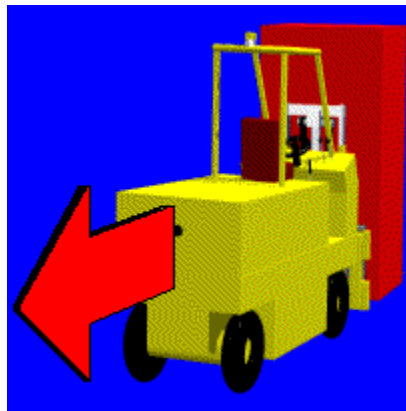


Tilting the Load Back – 8 Inch Rule

When transporting loads, you should never raise your load more than 8 inches from the ground. Keep your load tilted back.

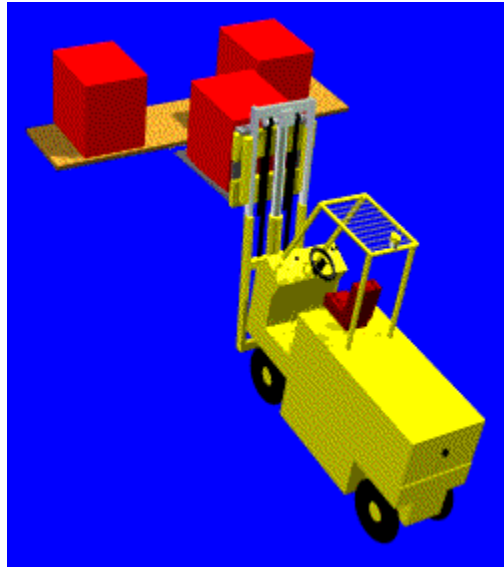


If a load blocks your view, travel in reverse.



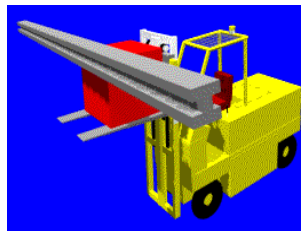
Right Angle Stacking

There are times when you need to move your truck with a raised load, such as when you are right angle stacking. **SLOW DOWN**. Keep in mind that the higher you raise your load, the less stable it is.



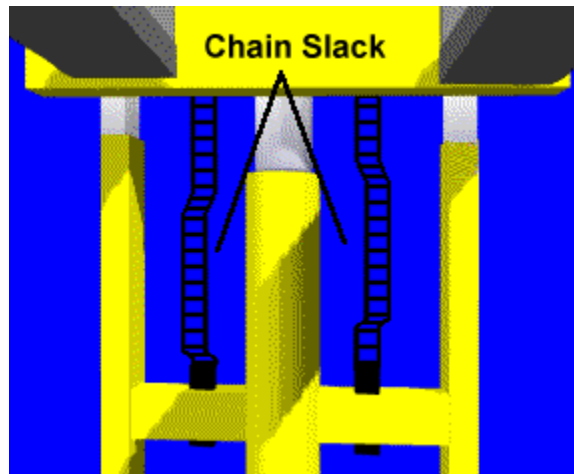
Watch For Overhead Obstructions

As you lift and transport loads, it is important to watch for overhead obstructions such as beams and cables.

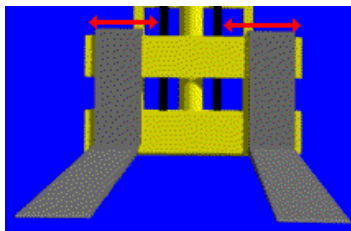


Lift Chains should be sturdy and not leaking hydraulic fluid.

Chain slack means there is a problem in the lift mechanism. You should always stay alert to any problems with the lift mechanism of your lift truck. When problems do occur, **DO NOT ATTEMPT** to repair the chains or hydraulic system. Call maintenance at once.

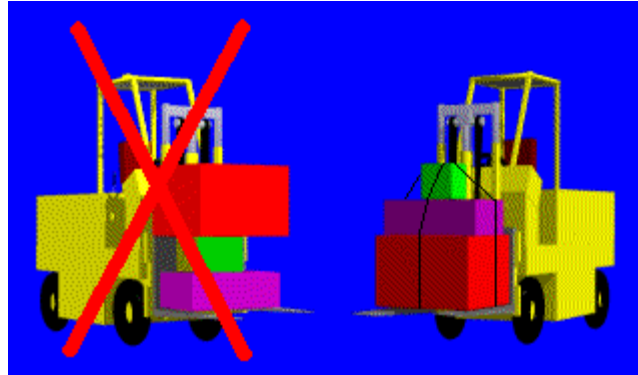


Take time to adjust the forks on your lift to fit the load you will be carrying. Adjusting the forks outward for wide loads, helps you to center the load, and make it more stable. Forks are stable as far out as possible under the load.

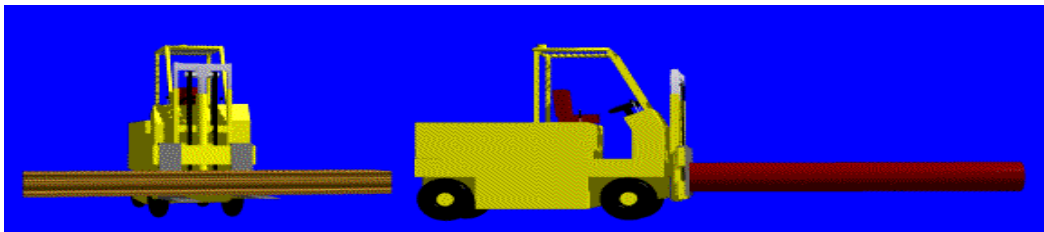


Loose Loads

Never try to lift or carry loose or poorly stacked loads. Correctly stack and bind loads to prevent an accident that could damage the load, your truck, pedestrians or YOURSELF.

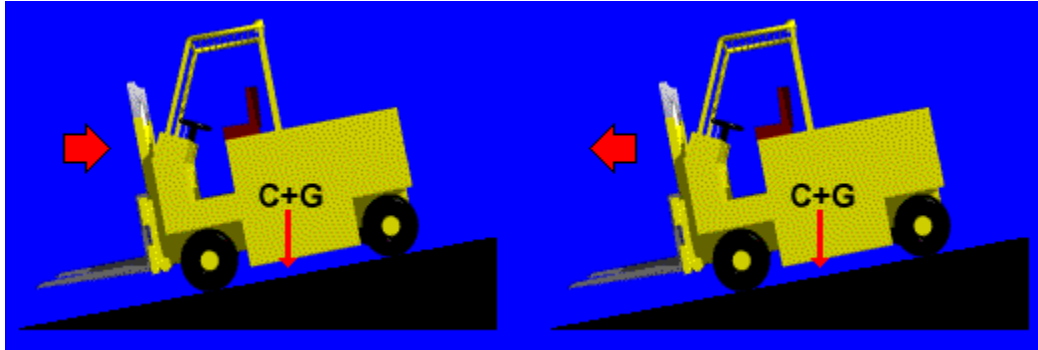


Wide and long loads are more unstable than other loads. Wide loads require that you keep them low and watch the balance of the load. When lifting and carrying long loads, keep in mind the load center and lift capacity of your truck. With both wide and long loads, you will need more room to maneuver. So, slow down and watch your clearance.



Driving on Ramps and Inclines

If you are driving an empty truck, travel in reverse up an incline, and forward down an incline. Note that the center of gravity for the truck is above the front drive wheels.



Operating Forklift Trucks on ramps and inclines:

1. No turning or ramps
2. Empty and Loaded trucks are driven in opposite directions
3. Empty driven with forks on the downhill side
4. Back up the ramp
5. Loaded trucks driven with the load on the uphill side
6. Driven up forward and back down.

NEVER turn while driving up or down a ramp or incline. **NEVER** drive across a ramp or incline. Because lift trucks are built "narrow," the center of gravity can quickly shift outside the stability triangle, causing the truck to tip over.

Dangerous Conditions

An unloaded truck is as likely to tip-over as a loaded truck. Never turn on a ramp. Slow down for turns. Don't travel with forks elevated. Don't make any quick starts, stops, turns or movements with a load in an elevated position.

Emergency Stops

Emergency stops must be practiced. The best method for stopping quickly is to have the forklift under control at all times. To make an emergency stop, when driving forward, apply the brakes and drop the load to the ground. This may result in toppling the load if it is not secure. When driving in reverse, drag the forks on the floor or ground while applying the brakes.

Tip-Overs

If the forklift truck begins to tip sideways, stay in the truck. Hold on to the steering wheel and grab the bars of the overhead protector. Brace your feet and lean away from the direction of the tip. Never try to jump out. There is not enough time to clear the truck. Remember, your momentum is in the same direction as the falling truck.

Free Turning

Counterbalanced forklift trucks have a peculiarity known as free turning. Once a turn has started, the truck has a tendency to turn in smaller and smaller circle. To counteract this phenomenon, the steering wheel must be turned in the opposite direction to slow down the sharpness of the turn. When driving a firm grip must be maintained on the steering wheel at all times.

Rear Wheel Swing

A forklift truck is steered by the rear wheels, this may cause the truck to swing, therefore turns must allow for the rear end swing of the truck.

Load Capacity

Load capacity of the truck must always be observed. Check the nameplate of the truck. If an attachment has been added and you unsure whether it changes your truck rated capacity, check with your supervisor and manufacturer's specifications.

Racking Systems

Rated capacity is critical for racking systems, as well as inspecting racking systems for structural integrity, bolts, braces, degradation of the steel, dents etc. Rated capacity should be placed on the outside of each section of the racking system.

Name some others:

Pedestrians, Ramps, Uneven Work Surfaces, Moving vehicles, Cars, Racking Systems, Loading Dock, Flat Bed Trailers, Heavy Awkward Lifts, Working around busy dealership.

Safety Equipment

The horn is one of the most powerful pieces of safety equipment on the forklift truck, because it is readily available as a warning device. Several short blasts warn other workers that the forklift truck is near, around corners, pedestrian areas etc.

Beepers warns workers that the forklift truck is backing up.

Overhead guards prevent material from falling on the operator.

"Deadman" switches can be installed under the seat of a forklift truck that automatically shuts the truck down where there is no weight to hold the switch on. This prevents operators from leaving the truck running when they get off the truck for any reason. It also prevents the operator from being run over by his/her own truck if the driver falls off.

Seat belts are another type of safety device found on the forklift truck.

Lights on the forklift truck are also important safety features. Red flashing lights on the top of the overhead guard. They serve as a constant reminder to workers that there is a forklift truck approaching nearby, particularly if the workplace is noisy. Headlights and backup lights are needed to see in dark areas.

Environmental Hazards

When hazardous conditions exist, operators must follow appropriate speed limits. Slow down or stop at doors, corners and exits when vision is obscured and sound horn. Stop signs should be present in all doorways, passageways and blind corners.

Drive slowly on wet or slippery surfaces, rough ground or when crossing railroad tracks. Railroad tracks should be crossed at a 45 degree angle.

Forklift trucks must not be driven into areas where there may be flammable or explosive dust or vapors unless the vehicle is designed and approved for such hazardous use. Wet Floors, greasy surfaces can cause the operator to lose control of the vehicle.

BASICS OPERATION

The basic components of any forklift truck are:

- Mast
- Load backrest extension
- Fork carriage
- Hydraulic system
- Overhead guard
- Operator's compartment
- Counterweight
- Steer axle and
- Drive axle
- Tires

Mast

The first five components are part of the overall mast assembly. Together these parts are responsible for the forklift being able to pick up loads to desired heights.

Masts are available in partial and free lift versions. The forks of a full free lift mast can be elevated to the full lowered height of the mast, without increasing the overall height of the vehicle. This helps with height restrictions in the workplace. Partial free lift allows a foot or so of fork elevation before mast is engaged. Triplex mast allows the load to be lifted higher but create more of a hazard to workers, operators etc.

The inspection and maintenance of the mast assembly is critical to the safe operation of a forklift truck. If these chains fail, the fork carriage and load have nothing to support them. For this reason forklift manufacturers recommend changing after every 200 hours of operation.

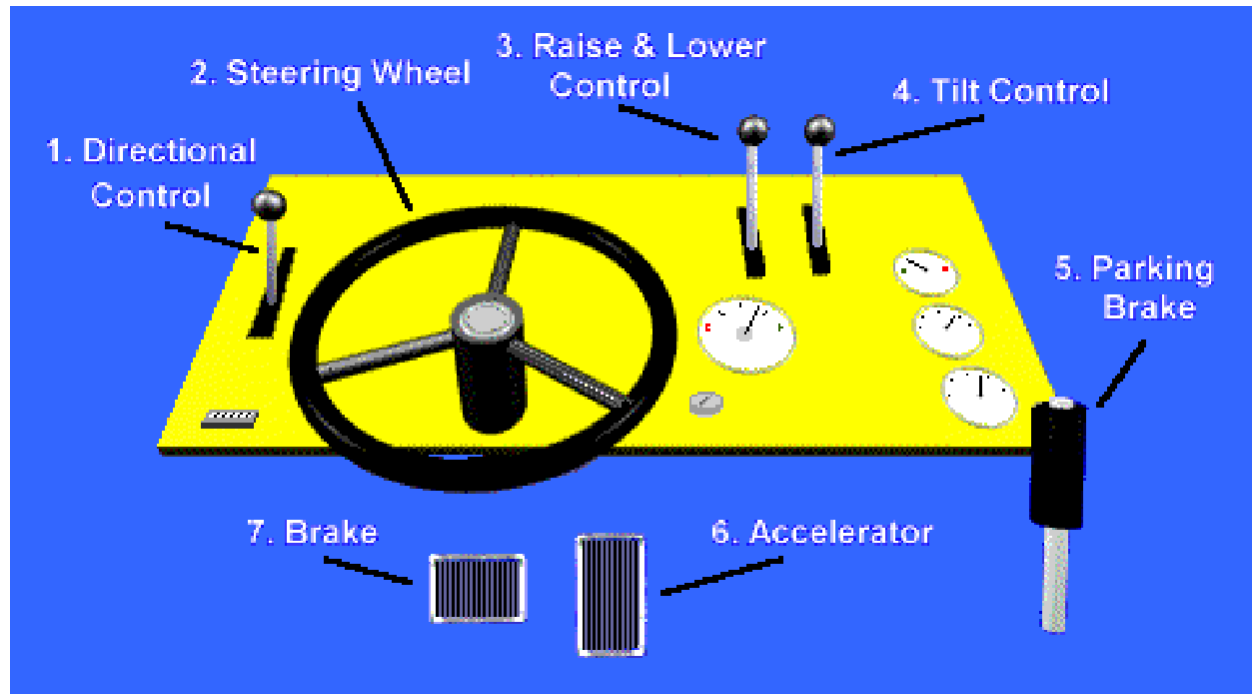
Forklift operators must place the load as far back as possible on the forks, up-tight against the load backrest extension, and tilt the forks back. This load placement offers greater truck stability.

Another important component of the mast assembly is the fork carriage. As the name implies forks or other attachments are mounted to it. There are four carriage classes that determine the lift capacities of the truck to which they are attached. These classifications permit interchanging of forks and attachments to any forklift truck within its class. All forks must be designed to prevent unintentional hooking and/or excessive lateral movement on the fork carriage. Each fork must be stamped with a load rating.

Operator's Compartment

There is only one seat and only room enough for one person in the compartment. Passengers are not allowed at any time on the forklift truck.

The operator must recognize and use the following controls:



The accelerator pedal, service brake, key switch, seat with seat belt, know and has read the operator's manual, hood latch, parking brake lever, directional control lever, horn, steering wheel, hoist control lever, tilt control lever and instrument panel.

Use of controls have to be smooth no jerky movements allowed as this may topple the load.

Inspections should include checks for:

- Broken welds, cracks, loose fittings
- Cracks, structural damage or evidence of bending (angle greater than 90 degrees) at the heel of the fork;
- Signs of twisting, bending, cracking or wear; and
- Fork tips are split, cracked or worn shorter from use

The Industrial Truck Association recommends retiring a fork from service when the thickness is reduced by 90 per cent of its original thickness.

Forklifts can be fitted with a number of attachments to do specific jobs.

Attachments used regularly in the manufacturing sector are:

- Revolving carriage – rotates the load 360 degrees in either direction to transfer the load
- Bale Clamp – picks up and deposits all types of bales by the use of hydraulic clamps
- Shovel – scoop type – for handling small bulk materials
- Crane Arm – handles heavy machinery, crates and many other bulky materials
- Barrel Forks for rotating Clamps – for handling and stacking drums
- Side Shifter – hydraulically shifts the carriage to either side for exact positioning of the forks in picking up or depositing a load
- Safety Cage for elevating personnel – used to raise workers to various heights to perform such work as changing light bulbs or working on overhead lines.

Hydraulic System

The hydraulic system consists of several components – reservoir, pump, pressure-control, tilt control, check and relief valves, cylinders, filter, magnet, accumulators, seals and of course hydraulic oil. Dirt, water, or air can have a disastrous effect on the hydraulic system.

Overhead Guard

The overhead guard is an important piece of safety equipment. It protects the operator from falling objects when lifting loads. Sometimes, you may have to remove the overhead guard ie when loading transports and railcars, all material to be loaded, unloaded must be at floor level before taking the guard off.

Counterweight

The counterweight for the counterbalanced forklift truck is located at the rear of the forklift truck. The actual weight added to the truck is determined in the overall design. All forklift trucks have a maximum rated capacity. Forklift operators need to confirm that the capacity of their forklift truck is sufficient to lift the required loads.

Steer and Drive Axle

The steer axle of the counterbalanced forklift truck is at the rear of the truck. The drive axle is located at the front of the truck. Rear wheel steering gives the truck more maneuverability, allowing the forklift truck to move in and out of tight spots. The drive axle best location is at the front, because as loads are carried, the weight remains on the tires which improves traction and frictional force between the floor surface and the tire to move the forklift truck.

Types of Tires

Four types:

- Pneumatic tires
- Pneumatic design solid tires
- Solid tires
- Cushion tires

Pneumatic Tire – is air-filled, softer and larger than solid or cushion tires, to be used in adverse environmental conditions, these include wet, dirty, sandy or muddy conditions as well or uneven surfaces. They provide greater traction and floatation than solid tires. Forklift trucks fitted with pneumatic tires are generally larger in size than other forklift trucks to provide greater stability for outdoor use.

Pneumatic Solid Tire – filled with soft rubber instead of air to eliminate flats or punctures during use. The kind is most associated with forklift trucks and the most widely used. These tires are designed for indoor use. Indoor trucks are generally short to enable them to maneuver in narrow spaces.

Cushion Tires – is a solid rubber tire with a soft rubber crown added to give a cushioning effect. Cushion tires are slightly thicker than solid tires and sometime have treads. The cushion tire provides the operator with a smoother, more comfortable ride. Like solid rubber tires, cushion tires are best suited for indoor use. Can be used outdoors on even terrain.

Pre-Operating Checks

As part of your regular routine. Daily inspections are usually completed by the forklift truck operator prior to operating or working with the equipment. The pre-operational check takes into account the many facts of the operation as a whole. The pre-operating safety check must include such factors as:

- Equipment
- Loads; and
- Location of other workers;
- The work environment

Many factors can contribute to hazards for forklift operators and their co-workers. For instance, lack of procedures for handling bulky material can result in damage to equipment or injury to a worker.

Equipment

Use pre-approved checklists to help cover off all that needs to be tested and looked at prior to using the forklift truck. (See Example checklists) The JHSC should have input on contents of checklists and whether adequate or appropriate based on the equipment being used.

Loads

Items that must be considered are:

- The size and shape of the load
- The container the material is in
- Proper weight labeling
- Type of pallet

Work Environment

Perhaps the most important aspect on the checklist is the work environment.

- Is the work space adequate?
- Is lighting well placed and operational?
- Are aisle ways and roads marked for pedestrian and forklift truck use?
- Are floor capacities adequate?
- Are docks well marked, with all safety equipment present?
- Is housekeeping an issue?
- Are areas noisy?

Daily inspection for Forklift Trucks

Perform pre-operating checks on equipment, loads, the location of other workers and the work environment.

Forklift Truck

Key off Procedures

The Walk around inspection

		Comments
Overhead guard and mountings	☐	_____
Hydraulic Cylinders	☐	_____
Mast assembly	☐	_____
Lift chains and rollers	☐	_____
Carriage and carriage bolts and brackets	☐	_____
Forks and fork locks	☐	_____
Tires, rims and wheel bolts	☐	_____
Fire extinguisher and bracket	☐	_____

Examine the battery

All caps are on the battery	☐	_____
Fluid level	☐	_____
Cables are not cracked	☐	_____
Connections are all secure	☐	_____

Check the hydraulic fluid level	☐	_____
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Key on Procedures

Check the gauges

Key switch is not defective	☐	_____
Hour meter	☐	_____
Battery discharge indicator (light or gauge)	☐	_____

Masts

1. Roller tracks are greased
2. No broken welds or obvious damage on sides and front
3. Number of stages
4. Free lift (mechanically) if any

Tires

1. Rubber/tread wear
2. Chunks/pieces missing around periphery or splitting
3. Rim separating from the rubber
4. Nuts/studs installed and tight
5. Rim condition
6. Tire pressure (pneumatic only)
7. Type/style of tire and recommended use

Guards

1. Overhead guard – broken welds and mounting bolts or welds
2. Side and/or top panel assembly for visual damage or secure mounting problems

Propane

1. Pressure relief valve – facing straight up 12 noon with cap
2. Fixed level indicator (bleed valve) closed
3. Floating indicator (fuel gauge)
4. Liquid service valve (angle valve) and wheel – main fuel nozzle
5. Liquid service valve (angle valve) – "O" ring and flat washer in nozzle end
6. Coupling connection
7. Fill valve with cap and chain
8. Damaged and/or outdated tank
9. Secure mounting of tank
10. Propane leaks – using leak detector and scent

PREVENTATIVE MAINTENANCE INSPECTION

Forks

1. Centered of the carriage – equally spaced
2. Tips in good condition
3. Spring loaded locking pins /"U" bolt for shaft type carriage
4. Blades are straight
5. No heel cracks/other visible damage
6. Wear analysis and/or fatigue test analysis
7. Capacity rating
8. Load center rating
9. Style and fork type
10. Fitting for mountings are tight, no cracks

Carriage

1. Straight across carriage – not bent on ends
2. Visible damage – broken welds
3. Carriage mounting to the mast

Chains

1. Cleanliness and lubrication (oil)
2. Visible wear (flat shiny area)
3. Equal tension in both chains
4. Chain pitch checked periodically
5. Chain type – generally single – strand roller on most tracks

Cylinders

1. Visual damage/leads both lift and tilt cylinders
2. Mounting and/or tilt pins and keepers
3. All hydraulic lines, hoses and connections at fittings
4. Hydraulic fluid level in the tank
5. Mechanical operational of all hydraulic functions.

Module 4

Loading and Unloading Procedures

Learning Objectives:

By the end of this module the participant will be able to:

- **Understand how accidents happen while loading and unloading.**
- **Understand loading dock proper procedures.**
- **Discuss and identify procedures for loading and unloading trucks safely.**

Introduction

Many accidents and near misses occur while loading and unloading trucks and railcars. Forklift operators can fall through the rotted floor boards of poorly maintained trucks and railcars, they can drive off or slide off the side of docks, into railroad tracks, rivers and truck wells, they can back out of a truck and end up between the truck and the dock, because the truck driver assumed the loading or unloading was complete and pulled the truck away from the dock to close the trailer doors; they are sometimes carried away in trucks and railcars when signals are crossed with the truck driver or railroad engineer. These types of incidents can and do happen all over the province.

All workers who are required to work with or around forklift trucks, or to load or offload trucks or railcars, need to be trained in dock safety and any special equipment to be used. Workers need to understand how potentially dangerous docks are and how equipment such as wheel chocks, truck-restraint systems, portable and permanent dock plates work. They must also know the dangers of working in limited spaces with exhaust gases present in varying levels.

Docks

Most docks in use today were not built with safety in mind. They exist solely for the purpose of having a place for trucks and railcars to load and unload. Most are very narrow, have very few doors, and are not marked properly. Many are sloped towards truck wells to allow rain to run off, and have no barriers to keep forklift trucks from driving or sliding off the edge. Usually poorly lit and left cluttered with pallets and other debris.

Many workers have died as a result of injuries sustained when using forklift trucks in and around docks. A Simcoe area man had his arm amputated after the forklift truck he was servicing tipped from a loading dock. In Sarnia Ontario, a forklift truck operator was killed when his machine fell from the back of a transport-trailer, crushing him. The truck driver has moved his truck forward without notifying the forklift operator. A forklift operator was killed in Toronto (Consumer's Gas) when he drove off a dock board.

Docks must be designed and or re-designed to address present and future needs of the workplace. Some changes that can make your docks safer are:

- More room to maneuver
- More doors and less congestion
- Well organized, orderly without skids or debris
- Improve visibility
- Warning signs
- Keep pedestrians off docks and visitors
- Get rid of "Just In Time Scheduling"
- Yellow lines around edges, barriers, guardrails
- Lighting
- Hard
- Tires can slide right off the dock
- Improve storage areas for pallets
- Docks that adjust to transport trucks height requirements
- Vehicle restraint systems, wheel chocks, truck jacks, dock pates truck and dock levelers

Procedures for Loading and Unloading TRUCKS

Signs posted shipping/receiving area, only authorized personnel.

Signal person to give proper direction.

Once truck is parked, have driver set the park brake, turn off the engine and turn over the keys to the forklift operator during unloading and loading operation.

Ensure the trailer is secured to prevent movement ie wheel chocks.

If trailer is moved, jacks, leg supports or dollies must be in place on the ground, under the front of the trailer and locked in place.

Safety Training for Lift Truck Operator's Knowledge Verification

Name: _____ Date: _____

Company: _____

Circle the most correct answer...

1. You are the first person to operate your truck on your shift.
Before you begin a pre-operational check is required. T F

2. Having completed an operational check, a defect is noted.
By law, you are required to report this to your:
a) Supervisor/Employer
b) Joint Health and Safety Committee
c) Maintenance Department

3. Driving up to someone in front of a fixed object is a safe practice. T F

4. You should know how to use your lift truck fire extinguisher. T F

5. If the load is unstable you should have some one walk alongside
to steady it. T F

6. It is dangerous to travel in reverse with a load that blocks your
forward view. T F

7. It is not an important safety issue to smoothly raise or lower forks
and start and stop. T F

8. Overhead mirrors or warning signs replace the need for sounding
your horn at blind corners, cross aisles, or when approaching pedestrians. T F

9. Is the operator responsible for?

Completely stopping the truck before dismounting	Y	N
Ensuring the load is properly stacked	Y	N
Knowing the load capacity of your truck	Y	N
Maintaining a safe operating speed	Y	N
Looking in the direction of travel	Y	N
Pedestrian safety	Y	N
Adding extra weight to counterbalance a load	Y	N
Keeping all parts of the body inside the operators compartment	Y	N

10. Lowering or lifting a load while traveling affects your:
- path of vision
 - stability
 - safety
 - all of the above
11. Whose ultimate responsibility is it to ensure the trailer at the loading dock is secured, wheels chocked and safe to load?
- Supervisor
 - The Lift Truck Operator
 - The truck driver who placed the trailer
12. When the lift truck is parked, the forks must be placed:
- about eye level
 - 8" above floor level
 - on the floor with tips down
13. Providing forks are centered to the vehicle, forks should be spaced:
- as close together as possible under the load
 - as wide apart as possible under the load
 - Neither a or b
14. When picking up a load, it should be tilted:
- as far back as possible
 - tilting the load is not important
 - back enough to stabilize the load
15. Are the following practices safe?

Leaving the lift truck unattended and running, as long as the parking parking brake is set	Y	N
using 3 point contact to mount/dismount	Y	N
allowing pedestrians to walked under raised load	Y	N
turning the lift truck on a ramp	Y	N
reversing without looking behind and to both sides	Y	N
leaving a lift truck running inside a trailer while you count the number of pallets	Y	N
stunt driving and horseplay	Y	N
loading a trailer without choking the wheels	Y	N

16. To lift someone approximately 10 feet, you should

- a) ask them to stand on the forks
- b) have them stand on the pallet
- c) use a platform attachment

17. Most counterbalanced lift trucks have:

- a) four point suspension
- b) two point suspension
- c) three point suspension

18. Three point suspension shows:

- a) stability triangle
- b) centre of gravity
- c) neither of the above

19. If you were to lift a load weighing 3000 lbs, 60 in load centre and your truck was rated at 4000 lbs with a 24 in load centre this would affect the truck's ability to lift it safely.

T F

20. Safe working limits of the load capacity plate indicate the higher you lift the load, the _____ weight you can safely lift.

- a) more
- b) less
- c) same

21. During your work day, you note a hazardous situation that could cause an accident to occur. You should report it immediately to your Supervisor.

T F

22. Are the following statements true or false?

Pedestrians have the right of way

T F

Operating on wet slippery surfaces could be hazardous

T F

You should sound your horn at blind corners

T F

You should drive on the left side of the aisle

T F

You should park the truck in the aisleway

T F

You should check the dock plate before loading a truck

T F

23. It is okay to have forks bind when inserting into or withdrawing from a pallet.

T F

24. A lift truck does not require a load capacity plate stating the maximum load which the truck is capable of lifting.	T	F
25. A lift truck carrying a load on a ramp, should be driven up and backed down.	T	F
26 When parking your lift truck, it is a safety hazard if you:		
Block a fire exit	T	F
Park in the aisleway	T	F
Block access to firefighting equipment	T	F
27. Adjusting to adverse conditions required the operator to see, think and do.	T	F
28. Operator skills and knowledge are important in reducing damage to materials and equipment.	T	F

Please mark and hand back

Mark is out of 50

Please put the mark on the Front page