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Class I, IV, V Operator Safety Training
Manual & Exam

Introduction

Note: The term lift truck is used to represent all types of class I, IV, V powered industrial trucks.

This training program is designed to assist you in becoming a trained and authorized lift truck operator. The counterbalance lift truck is a critical piece of equipment to a company that needs to move materials from point A to Point B. It can move thousands of pounds of products in a matter of minutes. The same job performed by manual labor could take hours or days. Imagine in your area how difficult it would be to do the same amount of work without a lift truck.

Information included in this pamphlet does not include all the training requirements or safety features of the program. This training program must include the CD, VHS tapes or Web based training, this manual, hands-on training, an operators evaluation and employer certification. Training should also include the Operator’s and Owner’s Manual(s) and the attachment manuals(s), for the specific lift truck(s) and attachment(s) the employee will be certified to operate.

Who can use a lift truck?

The Occupational Safety & Health Administration (OSHA) has very clear standards (29 CFR 1910.178(1)(6)) that employees must follow.

The **employer shall certify** that each operator has been trained and evaluated as required. Prior to the employer certifying the operator; the operator must receive classroom type training, hands-on training on the lift truck in its operating environment, and an evaluation.

Do not operate a lift truck unless you have been trained, authorized, and employer certified on the specific class of lift truck. Once you are a certified lift truck operator, you are responsible for always following the safety procedures outlined in this training, the lift truck manufacturers Owner’s and Operator’s manual, and your companies policies and procedures.

**Accident Data**

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Lift trucks, when used properly, are a great asset to any company, but can also cause a great deal of damage if used recklessly. Each year there are more than 119 fatalities and over 94,000 injured in accidents involving lift trucks. As a lift truck operator you must strive for 100% safe operation at all times. Anything less could result in serious injuries, fatalities and product damage.

Number of Fatalities by Year
(Powered Industrial Trucks)
U.S. Department of Labor

Causes of Fatalities
(Powered Industrial Trucks)
Looking for Hazards

Making the workplace safe involves everyone. Keep an eye open for hazards and report them immediately to your supervisor. This chart illustrates that safety hazards can be anywhere.

<table>
<thead>
<tr>
<th>People</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Untrained</td>
<td>-Unstackable</td>
</tr>
<tr>
<td>-Indifferent</td>
<td>-Stacked too high</td>
</tr>
<tr>
<td>-Stepping in Path</td>
<td>-Bulky</td>
</tr>
<tr>
<td>-Horseplay</td>
<td>-Blocks vision</td>
</tr>
<tr>
<td>-Human Error</td>
<td>-Unevenly distributed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Inadequate maintenance</td>
<td>-Congested Areas</td>
</tr>
<tr>
<td>-Design difference</td>
<td>-Poor lighting</td>
</tr>
<tr>
<td>-Wrong for job</td>
<td>-Layout</td>
</tr>
<tr>
<td>-Visibility restrictions</td>
<td>-Uneven floors</td>
</tr>
<tr>
<td>-No safety markings</td>
<td>-Weather</td>
</tr>
<tr>
<td></td>
<td>-Slippery floors</td>
</tr>
</tbody>
</table>

Operating Instructions, warnings and precautions

Prior to operating a lift truck you should have reviewed the Operator/Owner's Manual for that specific lift truck. The manual provides specific information for the operation of that specific lift truck. There may also be specific warnings or precautions for lift truck operations. These warning or precautions might be found in the operator's and owner's manual(s), attachment manual(s), or posted on the lift truck(s).

Differences between the lift truck and the automobile

A lift truck is a mobile, powered propelled truck used to carry, push, pull, lift, stack, or tier material. Lift trucks are significantly different from automobiles. Lift trucks operate on a variety of surfaces from smooth and level to rocky and uneven. Automobiles are designed to operate on asphalt and gravel roads.

Lift trucks are equipped with forks, clamps and other attachments designed to move material weighing several thousand pounds. Automobiles are not designed for this purpose. Automobiles are not designed to carry heavy loads at one end of the vehicle.
Lift truck steering is from the rear while automobile steer from the front.

To learn more about the differences between the lift truck and the automobile, please refer to the Truck Related Topics Section of the Operator Safety Training Program.

### Controls and Instrumentation

- Forward/Reverse Lever
- Parking Brake
- Inching Pedal
- Brake Pedal
- Accelerator
- Gauges
- Hydraulic Controls
- Steering Wheel
- Horn

The controls and instrumentation of the lift truck vary from manufacturer, Internal Combustion (IC) versus electric-powered, and stand-up versus sit down counterbalance lift trucks.

The specific controls and instrumentation of your lift truck should be discussed during the hands-on portion of the training and the specific trucks Operator's and Owner's Manual.

### Capacity

All lift truck capacities are required to be identified by a securely fastened and legible nameplate. The nameplate contains vital information about the truck's capacity. If the lift truck is modified in any way or has an attachment added, you must have prior written approval from the lift truck manufacturer. The nameplate will show the maximum weight the lift truck can lift and the maximum lifting height at a specific load center distance.
# Name Plate for Electric Trucks

## TOYOTA ELECTRIC FORKLIFT TRUCK

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SERIAL NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAST</td>
<td>BACK TILT</td>
</tr>
<tr>
<td>TYPE</td>
<td>VOLTAGE</td>
</tr>
<tr>
<td></td>
<td>Eq.</td>
</tr>
<tr>
<td></td>
<td>in</td>
</tr>
<tr>
<td>FRONT</td>
<td>TIRE FR</td>
</tr>
<tr>
<td>TREAD</td>
<td>SIZE RR</td>
</tr>
<tr>
<td>TRUCK WEIGHT</td>
<td>lb</td>
</tr>
<tr>
<td>W/O BATTERY</td>
<td>kg</td>
</tr>
</tbody>
</table>

### WARNING

Improper operation or maintenance could result in injury or death. Trained operators only. Read operator’s manual first.

---

**MODEL** - The model of the truck  
**SERIAL NO.** - The frame number of the truck.  
**MAST** - The type of mast installed on the truck (V, FV, FSV, QFV, etc.)  
**BACK TILT** - The maximum allowable back tilt for this truck  
**ATTACH** - The attachment that is approved for this truck  
**TYPE** - The type of power needed to operate the truck as designed and safety rating.  
**VOLTAGE** - This is the operating voltage of the truck.  
**BATTERY TYPE** - This defines the minimum safety rating for the battery for this specific truck.  
**FRONT TREAD** - In both metric and inches.  

**TIRE SIZE** - The required tire size for both axles to meet the stability requirements is the truck was designed.  
**TRUCK WEIGHT W/O BATTERY** - The approximate weight of the truck without the battery including attachment weight. In both metric and pounds.  
**BATTERY WEIGHT MIN/MAX** - The minimum and maximum weight of the battery that can be installed in this truck to meet the design stability requirements. In both metric and pounds.

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RATED CAPACITY WITH VERTICAL MAST EQUIPPED AT MAX.
LIFT HEIGHT
"A" - Is the maximum lifting height. It is stated in both metric and inches.
"B" - Is the load center. It is stated in both metric and inches.
"C" - Any significant offset will be identified in this block. It is stated in both
metric and inches.

NAME PLATE FOR INTERNAL COMBUSTION TRUCKS

TOYOTA FORKLIFT TRUCK

MODEL

MAST

TYPE

FRONT TREAD

TREAD

APPROX. WT.

SERIAL NO.

BACK TILT

ATTACH

lb

kg

RATED CAPACITY WITH VERTICAL MAST EQUIPPED AT MAX LIFT HEIGHT "A" AS SHOWN

THIS FORKLIFT TRUCK
MEETS OR EXCEEDS DESIGN
SPECIFICATIONS ASME/ ANSI B56.1 IN EFFECT ON
THE DATE OF MANUFACTURE

WARNING
IMPROPER OPERATION OR MAINTENANCE COULD
RESULT IN INJURY OR DEATH. TRAINED OPERATORS
ONLY. READ OPERATOR'S MANUAL FIRST.

MODEL - The model of the truck
SERIAL NO. - The frame number of the truck.
MAST - The type of mast installed on the truck (V, FV, FSV, QFV, etc.)
BACK TILT - The maximum allowable back tilt for this truck
ATTACH - The attachment that is approved for this truck
TYPE - The type of power needed to operate the truck as designed and safety
rating.
FRONT TREAD - Measurement are in both metric and inches. Both dual drive
and single drive tire arrangements shown

TIRE SIZE - The required tire size for both axles to meet the stability
requirements as the truck was designed.
APPROX. WT. - Approximate weight of the truck including attachment weight.
Is stated in both metric and pounds.

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LIFTED CAPACITY WITH VERTICAL MAST EQUIPPED AT MAX. LIFT HEIGHT

A" - Is the maximum lifting height. It is stated in both metric and inches.
B" - Is the load center both horizontal and vertical. It is stated in both metric and inches.
C" - Any significant offset will be identified in this block. It is stated in both metric and inches.

Instability

Studies show that lift trucks are stable when properly operated. However, improper operations, poor housekeeping, and/or inadequate maintenance may contribute to instability.

In electric trucks, use only the battery having the service weights within the minimum and maximum range specified on the truck nameplate.

It is absolutely essential that you understand the basic principles of balance to keep all the wheels of the lift truck on the ground.

The stability of a lift truck is designed based upon a stability triangle. The ability triangle refers to the area of a vehicle, which is most stable. The center of gravity of an unloaded lift truck lies roughly underneath the operator, the stability triangle can be found between the two front wheels and the center of the axle of the steering wheels.

The stability triangle also has a third dimension. When viewed from the side, it looks similar to a three-dimensional pyramid. As the load is raised, the combined center of gravity of the load and truck will also rise.

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Tilting a raised load forward or back will similarly move the center of gravity of the load forward or back. Caution must be exercised when tilting the mast while the load is being raised. Notice how the top of the stability triangle becomes very narrow, therefore, causing the center of gravity to move outside the triangle if the mast is tilted excessively.

**Stability of a lift truck**

The weight of the truck itself counterbalances the load it is moving. To further understand how a lift truck handles loads, we will introduce some concepts in this module: Center of Gravity, Load Center, and the Stability Triangle.

![Forklift Diagram](image)

**Center of Gravity:** Simply put, it is the place at which an object will balance on a single point. Common sense dictates that the Center of Gravity is usually at the center of an object. But look at the diagram below:

![Center of Gravity Diagram](image)

**LOAD CENTER:** The distance between the front and load-carrying face of the forks and the center of gravity of the load. As you can see on the diagram (on the next page), the LOAD CENTER on the lift truck is the distance between point A and point B.
Center of Gravity Factors
The diagram below illustrates some factors that can move the center of gravity of a lift truck.

1. Lift truck is stopped and unloaded.
2. Lift truck is loaded and/or stopped quickly.
3. Lift truck is loaded on the right side and/or turning left.
4. Lift truck is loaded on the left side and/or turning right.
5. Lift truck is loaded and lifting a load with the mast tilted back.

Steering
Lift trucks steer differently than automobiles and often have a very tight turning radius. Lift trucks steer with the rear tires or tire, so you need to compensate for "tail swing" when you drive. Every operator should be aware of the distance needed between the front wheels and the tail to make safe turn. Always look for pedestrians and any other safety concerns prior to starting your turn.
Maneuvering

Driving the lift truck at excessive speed can result in loss of control, causing the vehicle to skid, tip over, fall off a loading dock or other elevated surfaces.

It is important to follow these basic rules in maneuvering the lift truck:
- When making a turn, reduce speed to a safe level, turn steering wheel in a smooth, sweeping motion.
- Only handle stable and safely arranged loads. Never move a load outside the truck's capacity.
- Even without a load, operate a lift truck with an attachment as if it were a partial load.
- Lift trucks shall not be driven up to anyone standing in front of a bench or fixed object.
- Observe all traffic regulations including the facility speed limits.
- Keep at least three truck lengths away from other trucks going in the same direction.

Visibility

When operating a lift truck, you must understand the potential hazards of obstructed visibility. There are many things that could impede visibility, such as: loads on forks, overhead guard, mirrors, fire extinguishers, lights, lift chains, hoses, masts, racks, building columns, blind intersections, tractor trailers and pedestrians to name a few.

When traveling with a load that blocks your forward view, you must travel in reverse or use a person to guide you.

Masts

There are several types of masts used on high-lift trucks. They are commonly referred to as:
Limited Free lift or Wide Visible Mast or V
Full Free lift or Wide Visible Full-Free Lift Two-Stage Mast or FV
Three-Stage or Wide Visible Full-Free Lift Three-Stage Mast or FSV
Four-Stage or Wide Visible Full-Free Lift Four-Stage Mast or QFV
Five Stage or Wide Visible Full-Free Lift Five-Stage Mast

FREELIFT - This is the distance the forks can be raised BEFORE any part of the mast, including the load backrest extension, begins to extend upward beyond the top of the mast stationary rails. This is an important feature in order to double stack inside a trailer. If a truck only has 16" of free lift, the mast will extend through the trailer roof before the forks are raised 48".
Forks
There are basically three types of forks: Pallet, Polished and Tapered, and Plywood.

PALLET FORK
This is the most common type of fork in use today. It is designed to handle pallets or skids. Some manufacturers put a taper on the bottom of the fork so that it can be used to chisel under certain types of loads.

POLISHED AND TAPERED FORK
This fork is basically used for a chiseling operation. It is a thin fork that has a very smooth finish and can be tapered either on the top or bottom depending on the type of chiseling operation. This fork can also be used for handling pallets or skids.

PLYWOOD FORK
This is a fork used primarily in the lumber business. It is wider and thinner than a regular fork and enables the operator to chisel between sheets of plywood.

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Inspect forks for cracks, heel wear, and/or tip wear. Remember a 10% worn fork means a 20% reduction in weight capacity and must be replaced. Fork stop devices are mounted at the ends of the fork bar. These along with the load backrest extension, prevent the fork from sliding off the ends. If the fork stops are missing, worn or broken, they must be repaired or replaced.

Too long
The forks that you use should always be shorter than the load you are handling. For example, when handling a 48" pallet you should use 42" forks. A fork protruding beyond the load may damage another load when stacking.

However, if the forks are too short, you will be operating under unstable conditions. A general rule would be that the forks should extend at least 2/3 of the distance under the load.

**Fork Extensions:** Fork extensions are generally used to handle long loads. They slide over the regular forks to provide additional length. ASME B56.1 2000 states that fork extensions should not be longer than 150% of the supporting fork's length.

**Attachments:**
Modifications and additions to a lift truck which could affect its capacity and safe operation shall not be performed by the customer or user without manufacturer's prior written approval.

Attachments, including fork extensions, affect the load capacity of the lift truck. All attachments must be identified on the lift truck's nameplate prior to installation and operation.

Attachments allow the lift truck to lift and carry specialized loads. When operating a lift truck adapted for a specialized task, you are responsible for understanding how to use the attachment safely.

Review the Attachment operator's manual for the correct use of the equipment. Hands-on training of any and all special lift truck attachments must be completed before certification.

Do NOT operate any attachments from other than the NORMAL lift truck operator position as outlined by B56.1. This includes self-dumping hoppers.

Operating Limitations

Lift trucks are used in almost all material handling applications. They can carry, push, pull, lift, stack or tier material.

Safe operation of a lift truck can be limited by factors such as: weight capacity, height limitations, surface grades, work environment, aisle width and presence of hazardous materials. All can limit the operation of a lift truck.

Any accidents have occurred because of operating a lift truck beyond its limits. Always review the nameplate to ensure that you are aware of the weight limitations.

Accessories & Other Precautions

A variety of quality accessories and optional equipment are available for your lift truck. Depending on your specific application, these may provide additional safety benefits in your workplace. These accessories include back up alarms of various sound levels, flashing/strobing lights in a variety of colors, and various apes and sizes of mirrors.

MHIU strongly suggest that you consult with a safety professional familiar with your type of industrial setting when assessing your specific workplace safety requirements.
Workplace Related Topics

These topics are required to be discussed as per OSHA 29 CFR 1910.178(1)(3)(ii).

These topics should be discussed with your supervisor or the person responsible for safety or lift truck training.

These topics should include but not be limited to the following:
- Surface conditions where the vehicle will be operated;
- Composition of loads to be carried and load stability;
- Load manipulation, stacking, and unstacking;
- Pedestrian traffic in areas where the vehicle will be operated;
- Narrow aisles and other restricted places where the vehicle will be operated;
- Hazardous (classified) locations where the vehicle will be operated;
- Ramps and sloped surfaces that could affect the vehicle's stability;
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust;
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

OPERATOR CHECKLIST

1. SAFE OPERATING CONDITION
Any powered-operated industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel.

2. LOCATION
No repairs shall be made in Class I, II, or III Locations (hazardous materials areas).

3. FIRE HAZARDS
Repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated for such repairs.

4. ELECTRICAL
Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.

5. PARTS
All parts of any such industrial truck requiring replacement shall be replaced only by parts equivalent as to safety with those used in the original design.
6. ALTERATIONS
Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts. Additional counterweighting of the lift truck shall not be done unless approved by the truck manufacturer.

7. DAILY INSPECTION
Industrial trucks shall be examined before being placed in service and shall not be placed in service if the examination shows a condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined before each shift. Defects when found shall be immediately reported and corrected.

8. MUFFLERS
Water mufflers, if applicable, shall be filled daily or as frequently as is necessary to prevent depletion of the supply or water below 75 percent of the filled capacity. Vehicles with mufflers having screens or parts that may become clogged shall not be operated while screens are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system shall immediately be removed from service, and not return to service until the cause for the emission of such sparks and flames has been eliminated.

9. TEMPERATURE
When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle shall be removed from service and not returned to service until cause for such overheating has been eliminated.

10. CLEANING
Industrial trucks shall be kept in a clean condition, free from lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100°F) solvents shall not be used. High flash point solvents may be used. Precautions regarding toxicity, ventilation, and fire hazards shall be consistent with the agent or solvent used.

11. FUEL CONVERSION
Industrial trucks originally approved for the use of gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion results in a truck which embodies the features specified for LP or LPS designated trucks. Such conversion equipment shall be approved by the manufacturer.
TIP-OVERS
The operation of a class I, IV & V sit-down, counterbalanced, high lift truck with a non elevating operator requires special safety considerations, as follows:

(a) An Industrial truck, loaded or unloaded, may tip over if an operator fails to slow down to a safe speed before making turns. Indications that a truck is being driven at an excessive speed during turning maneuvers including:
(1) tire skidding;
(2) truck side sway;
(3) wheel lift; and,
(4) the need to grip the steering wheel tightly to keep from sliding out of the seat.

(b) The likelihood of a lateral tip-over is increased under any of the following conditions or combinations of them:
(1) overloading;
(2) traveling with the load elevated;
(3) braking or accelerating sharply while turning;
(4) rearward tilt or off-center positioning of the load;
(5) traveling on an uneven surface; and,
(6) traveling at excessive speed;

(c) Tipping forward can occur and its likelihood is increased under the following conditions or combinations of them:
(1) overloading;
(2) traveling with the load tilted forward and/or elevated;
(3) hard braking while traveling forward; and,
(4) suddenly accelerating while traveling in reverse

(d) The operator should stay with the truck if it falls off a loading dock or ramp. The operator should hold on firmly, brace feet and lean away from the point of impact. **Always wear the available seatbelt!** Seat belt usage will help the operator stay with the truck.

(e) Where the environment presents a severe hazard or there are other unusual operating conditions, the user may need to implement different and/or additional safety precautions and special operating instructions appropriate for the conditions.
Pre-operational Safety Check

SAFETY CHECKS

- Check the tires for excessive wear, deep cuts, and proper inflation.

- Check the horn and any other warning devices for proper operation.

- Check all lift, lower, tilt, and attachment controls for proper operation and any visual signs of hydraulic leakage.

- Check the parking and service brakes and familiarize yourself with their proper operation.

- Check the forks and fork retaining pins for damage.

- Check the general appearance of the mast, operator's seat and hydraulic hoses.

For an internal combustion truck, check the oil level, fuel level, (if the truck is equipped with L.P.G. check for secure mounting and condition of hoses), battery and radiator coolant each day. Also make a general inspection for leakage. Always turn off the engine while refueling. Keep a clean truck.
CLASSES OF FORKLIFTS:

Class 1- Electric motor, counterbalance, rider trucks (solid or pneumatic tires)

Class 2- Electric motor, narrow aisle trucks (solid tires)

Class 3- Electric motor hand trucks or hand/rider trucks (solid tires)

Class 4- Internal combustion engine trucks (solid tires)

Class 5- Internal combustion engine trucks (pneumatic tires)

Class 6- Electric and internal combustion engine tractors (solid and pneumatic tires)

Class 7- Rough terrain trucks (pneumatic tires)

UL Rating - Hazardous Materials

In many cases, lift trucks are required to work around materials that are highly flammable such as acetones or grain dust. A spark from the electrical or exhaust system could ignite this material, causing a serious fire.

For this reason, a nationally recognized testing laboratory, Underwriters Laboratories (UL), has designed specifications for manufacturers to meet in order for lifting equipment to work in hazardous locations.

If you are working with materials that are Flammable, be sure that the lift truck you are using has the proper designation and is in good working order.
<table>
<thead>
<tr>
<th>Classes</th>
<th>Description of Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclassified</td>
<td>Locations not possessing atmospheres as described in other columns</td>
</tr>
<tr>
<td>Class I</td>
<td>Locations in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures.</td>
</tr>
<tr>
<td>Class II</td>
<td>Locations which are hazardous because of the presence of combustible dust.</td>
</tr>
<tr>
<td>Class III</td>
<td>Locations where easily ignitable fibers or flyings are present but not likely to be in suspension in quantities sufficient to produce ignitable mixtures.</td>
</tr>
</tbody>
</table>

**How does the rating system work?**

An area where flammable material is stored is broken down into two classifications. First, determine the *Group* the material is classified under. Gasoline and acetone are grouped together because they react similarly in conditions needed to ignite them. Second, the *Class* determines the amount of materials exposed. The greater amount present in the air, the more safeguards that need to be in place.

For additional information regarding powered industrial trucks rating please review National Fire Protection Agency 505 "Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation".
OPERATING SAFETY RULES AND PRACTICES

Outlined per ASME B56.1 2000 section 5.1

Operator Responsibility

-Safe operation is the responsibility of the operator.
-The operator shall develop safe work habits and also be aware of hazardous conditions in order to protect themselves, other personnel, the truck and other materials.
-The operator shall be familiar with the operation and function of all controls and instruments before undertaking to operate the truck.
-Before operating any truck, operators shall have read and be familiar with the operator's and owner's manual for the particular truck being operated and they shall also abide by all safety rules and practices.

General Safe Operation

-Unauthorized personnel shall not be permitted to operate material handling equipment.
-Do not start or operate the truck, any of its functions or attachments, from any place other than from the designated operator's position.
-Keep hands and feet inside the operator's designated area or compartment. Do not put any part of the body outside the operator compartment of the truck.
-Never put any part of the body into the mast structure or between the mast and the truck.
-Never put any part of the body within reach of mechanism on the truck or other attachment.
-Do not allow anyone to stand or pass under the elevated portion of any truck, whether empty or loaded.
-Never lift a person using a lift truck, not on the forks, not in a cage and not even in a so called "OSHA approved" man-lift basket.
-Report defects, leaks, etc., to the supervisor immediately.

Safe loading/unloading

1. Approach the load squarely with forks level. While not part of the lift truck: attention should be given to the condition of pallets.
2. Loads should not be shifted by butting with the truck.
3. Forks, which are adjustable, shall be placed at the outer edges of the load.
4. The forks should be placed under the load and as wide apart as necessary for maximum support of the load. The load should also be placed against the fork carriage.
5. After the load has been picked up, the mast should be tilted rearward only enough to stabilize the load.
6. It is the responsibility of the operator to ensure that a load is properly and neatly stacked, and where applicable, secured.
7. Place the heaviest objects nearest the bottom of the load.
8. Round objects should be blocked.
9. It is the responsibility of the operator to know the capacity and gross weight of their loaded truck. The operator must know the maximum fork height and the vehicle's load center rating. Operate and travel only in areas approved for your load.
10. Weight should NEVER be placed on the rear of the lift truck to increase lifting capacity. Lift trucks should be used only for the weight they were designed to carry.
11. All towing should be accomplished from the rear of the truck if the proper draw bar pin is provided from the manufacturer. The operator must be aware of the lift truck's draw bar pull capacity, as rated by its manufacturer.
12. The operator will always carry loads in the lowered position with enough rearward tilt to stabilize the load.
13. The operator will come to a complete stop at the stack area before elevating the load; brake, and raise the load to stack height.
14. If the stack area is not level, the approach must be from the downhill side and the truck must be LEVEL laterally before the load is raised.
15. Stop at the front of the stack, place controls in neutral, apply parking brake, or inch forward as required.
16. When the load is above and clear of the stack, place vehicle in gear. Move slowly forward by releasing parking brake, or begin lifting left foot off, inching the brake pedal slowly, until the load is over the stack or rack.
17. Move the mast forward to the vertical position until the forks and load are parallel to the rack or stack. Lower the load to the stack or rack.
18. The mast should never be tilted forward unless the load is directly over the intended place for unloading. Lower the forks to clear the load and reverse truck to withdraw forks.
19. When clear of the stack, lower the forks to about 4" (100mm) from floor level.
20. All lifting, tilting or lowering motions will be done slowly.
OPERATING A LIFT TRUCK SAFELY
Traveling

1. Lift trucks shall not be driven up to anyone standing in front of a bench or other fixed object.
2. Operators shall ensure that no passengers ride on the lift truck.
3. Keep legs and feet inside the confines or guards of the lift truck. Operator must never place any part of the body between the mast rails.
4. Operators must look around before starting to move.
5. It is the responsibility of the operator to avoid the striking of overhead electrical fixtures, valves, sprinkler systems, etc., during high lift operations.
6. A safe distance will be maintained from the edge of ramps or platforms while on any elevated dock.
7. Always travel with the forks as low as possible, whether the lift truck is loaded or unloaded. Forks should clear the floor by about 4" (10 cm).
8. Avoid driving over loose objects or holes in the floor.
9. Always look in the direction of travel before moving, particularly when traveling in reverse. This includes the short reverse movement which is required when turning the truck around in confined spaces.
10. Watch the rear end swing of the lift truck when turning corners. While negotiating turns, reduce speed to a safe level. Turn the steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the steering wheel shall be turned at a moderate even rate.
11. An extreme hazard exists when making short radius turns with an elevated load. DO NOT HURRY!
12. It is the responsibility of the operator to maintain a safe speed at ALL times. It is the responsibility of the operator to reduce vehicle speed when traveling on uneven road surfaces.
13. The operator will reduce speed on wet and slippery floors, in congested areas, when descending ramps or inclines, when crossing bridge plates, when vision is restricted, when carrying a load or when traveling over uneven surfaces.
14. All starts, stops and turns should be easy and gradual, particularly when the truck is loaded.
15. Keep to the right when passing. Operators must be sure the operator of another vehicle is aware of his presence and intended action.
16. Maintain a distance of 20 feet (6m) behind another truck going in the same direction.
17. Slow down and sound horn (short blasts) at cross aisles, doorways, or when approaching other trucks.
18. Always be aware of Pedestrians.
19. The operator will stop and sound the horn at blind corners, railway crossings, elevators or whenever vision is obscured. Operators must always be alert and look for pedestrians.
20. The operator will travel in reverse if the load being carried obstructs forward view.
21. Other lift trucks traveling in the same direction at intersections, blind spots, or other dangerous locations, shall not be passed.
22. The operator shall be required to look in the direction of travel and keep a clear view of the intended path of travel.
23. All traffic regulations shall be observed, including authorized plant speed limits.
24. Under all travel conditions, the truck will be operated with complete control at all times, inside or outside of the plant.

**25. Stunt driving and horse play will not be permitted.**

26. Railway tracks must always be crossed slowly and diagonally.
27. Operation on ramps or inclines requires special attention. Brakes should be tested and speed reduced before descending. Where applicable, the correct gear should be used for the load being transported. No person shall be permitted to walk down ramps ahead of the truck. Extreme caution is required when operating near the edge of ramps, docks, etc.
28. The operator will always travel straight up and straight down ramps. Never attempt to turn the vehicle while on a ramp.
29. The operator will always transport the load on the up-side of a ramp or grade.

**Example:** A lift truck carrying a load should be driven up and backed down a ramp or grade.

The reverse is to be applied to empty trucks.

**Example:** Empty lift trucks should be backed up and driven down ramps.

Gradability of vehicle may be found in the manual provided by the vehicle's manufacturer.

**Example:** The percentage of grade the vehicle can ascend and descend safely.

30. When the operator is traveling in reverse, because the load being carried obstructs their forward view, and a ramp is to be attempted, the operator will turn the vehicle around and operate vehicle with the load upgrade. There must also be a "signaler or spotter" at the top of the grade in complete view of the operator guiding them up the ramp.
Dock

1. Make sure that bridge plates are clean and dry, sufficiently strong and properly secured to prevent sliding.
2. Railway cars or transport trucks must have their wheels blocked. Dock locks or other devices for securing transport trailers to loading docks must be used whenever available. The floor of trucks and railway cars should be checked before entering, and worn or unsafe conditions should be reported to the supervisor.
3. Fixed jacks may be necessary to support a semi trailer during loading or unloading when the trailer is not coupled to a tractor.

Parking

1. When leaving the truck for any reason, all the controls of the lift truck will be placed in neutral and the BRAKES applied. The forks will be lowered to the floor and power shut off.
2. Lift trucks should be parked away from aisles, doorways, railway tracks or fire routes and fire equipment.
3. Correct parking is particularly important when stopped near elevators, ramps, docks, etc. Parking in this case will be done parallel with the edge.
4. If necessary to park on an incline, the wheels must be blocked.
5. At the end of a shift or day, the lift truck will be returned to its designated storage area.

Special Requirements

1. An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
2. A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling.
3. Only approved industrial lift trucks shall be operated in hazardous locations.
4. Only stable or safely arranged loads shall be handled.
5. When attachments are used, particular care should be taken in securing, manipulating, positioning and transporting the load. Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.
6. Any industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel only.

7. Industrial trucks shall be examined before being placed in service and where industrial trucks are used on a round-the-clock basis, they shall be examined before each shift. Defects, when found, shall be immediately reported.

8. Vehicle stability is greatly affected by the types of tires used. Each design of tire has its specific purpose.

Example: Pneumatic tires are mainly used for outside plant operations (increased traction). Solid, cushion type tires are for inside use on smooth, clean dry surfaces.

**PROPAINE, GASOLINE AND DIESEL REFUELING**

**Propane Cylinder Changing**

Many lift trucks run on propane. Propane is plentiful, easy to use and fairly economical. But propane is also a highly combustible fuel which can cause a fire or even explode if improperly handled. This module will concentrate on the safe handling of propane.

**Some facts to remember**

When propane is in the cylinder, it is in a liquid form. But because it has an extremely low boiling point of -44°F, propane will immediately turn into gas when it is released into the air. One cubic foot of liquid propane expands 270 times when converted into a gas, so there is no such thing as a "small" propane leak. Propane is also heavier than air and will travel along the floor and will stay there if there is no ventilation. A large leak may travel a long distance to an area of open flame, ignite and travel back to the source.

**Detecting Propane**

There are three ways to detect a propane leak.

**Smell:**
Propane has a distinct odor that is added during the manufacturing process.

**Hear:**
A hissing noise can sometimes be heard when propane is escaping.

**Look:**
Sometimes frost can be seen around the area where gas is escaping. If you know gas is leaking but are not exactly sure where, spread liquid dish washing soap over the area. Bubbles will form where there is a leak.
Warning: Consult the manufacturer's manual before proceeding to handle or change propane cylinders.

Propane Safety Rules

Always wear safety glasses and appropriate gloves when changing a propane cylinder.

Before changing a cylinder, you must let the engine run while the valve on the cylinder is turned off. This reduces the pressure in the line. If you do not do this, propane may be released when loosening the coupling, causing serious frost burn.

Don't smoke near the cylinder changing area.

Store cylinders in a safe and approved method. Check your local regulations for the correct procedure.

Ensure the pressure relief valve points up when installing the cylinder. Use your eyes, ears and nose to inspect for leaks.

Propane in a cylinder is under pressure, treat it with respect.

Propane Cylinder

A propane cylinder is built and marked to the specification of:

<table>
<thead>
<tr>
<th>I.C.C.</th>
<th>Interstate Commerce Commission</th>
<th>USA</th>
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</thead>
<tbody>
<tr>
<td>D.O.T.</td>
<td>Department of Transportation</td>
<td>USA</td>
</tr>
<tr>
<td>B.T.C.</td>
<td>Board of Transport Commission</td>
<td>CANADA</td>
</tr>
<tr>
<td>C.T.C.</td>
<td>Canadian Transport Commission</td>
<td>CANADA</td>
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</table>

A (I.C.C.- D.O.T.) (B.T.C. - C.T.C.) propane cylinder must show all of the following markings (T.W.), (W.C.), serial number, manufacturer's name, manufactured date, test date.

The T.W. (tare weight) and W.C. (water capacity) is necessary on a propane cylinder when filling the cylinder by weight.

A fixed liquid level gauge on a container is not a legal filling device. A float gauge on a container is for the user to determine the amount of propane in the container at any given time. A propane cylinder containing liquid or vapor propane shall not be exposed to temperature in excess of 125°F.
C.T.C.- D.O.T. cylinders are not allowed to be a fuel supply source for the engine on any over the road vehicle.

When a propane gas leak is suspected in a confined area, your first responsibility is to clear the area of all personnel.

When changing lift truck cylinders, the truck ignition must be off and safety glasses or a face shield, gloves and a long sleeved shirt should be worn.

When the temperature of the liquid propane in a container increases, the vapor pressure in the container will increase. The pressure relief valve on a cylinder is set to discharge at 275 psi.

Cylinders in storage shall have the valve closed.

Any cylinder, either empty or filled, which requires a cylinder valve protecting cap shall have such a cap in place while in storage.

Cylinders that are damaged, leaking or corroded, or are due for the prescribed reexamination, shall not be filled or used by anyone and shall be removed from service.

Cylinder testing: 10 years after date of manufacture.

Re-stamped and re-tested 10 years after last date.

**Procedure For Changing A Propane Cylinder**

1. Check for date of manufacture or the last valid inspection date (10 years or less).
2. Visually inspect the cylinder for cuts, gouges, dents and rusting.
3. Inspect for leakage which may render cylinder defective.
4. Check that the relief valve fitting is approximately 180° from the locating pin and secure.
5. Check service valve for defects (handle broken, spindle bent, defective or missing "0" ring or back up ring).
6. Fill valve cover in place (if applicable).
7. Install and secure tank in the lift truck tank bracket.
8. Secure LP line to LP tank.
10. Tag defective cylinder, noting defect and report to a supervisor.
Outline of LP Gas Fuel System

LPG in liquid form from the cylinder passes through the filter in the engine compartment to remove foreign matter and reaches the regulator through the solenoid valve. LPG pressure is reduced and gasified in the regulator, then forced into the carburetor.

Engine cooling water is fed to the regulator as the heat source for LPG gassification.

Gasoline and Diesel Refueling

Ensure there is no smoking, sparks or other sources that could ignite the fuel.

Be sure to wear protective equipment such as gloves and eyewear. Do not overfill the tank or allow fuel to leak on to the ground. Ensure the proper type of fuel is being used for the equipment. Refer to the owner's manual if not certain.

Clean up any spills and ensure that dirt or foreign material does not get into the tank. Report any defective refueling equipment to your supervisor immediately.

BATTERY CARE AND RECHARGING

Batteries

Batteries are an extremely efficient and clean method of providing power to a lift truck. However, like any energy source, batteries can also cause damage and injury if improperly handled.

This module will focus on the safe handling of batteries, since poor maintenance practices can also reduce the life of the battery by 50%.

How a Battery Works

Basically, each cell consists of a positive plate (+) and a negative plate (-) immersed in a solution of sulfuric acid and water. This solution is called "electrolyte". Each cell produces about 2 volts of power. As the battery is discharged, the acid becomes weaker to a point where it cannot produce a current. To recharge the battery, the terminals are connected to an AC source (charger) which restores the acidity of the electrolyte, enabling the battery to be used.
Changing and Charging Batteries

1. LOCATION
   Battery charging installations shall be located in areas designated for that purpose.

2. FACILITIES
   Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

3. HANDLING
   A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.

4. REINSTALLING
   Reinstalled batteries shall be properly positioned and secured in the truck.

5. ELECTROLYTE
   A carboy tilter or siphon shall be provided for handling electrolyte.

6. CHARGING
   Match the correct charger to the battery and verify if it has the correct voltage and capacity. It should be rated to charge the battery in an eight hour time period or less.

7. TRUCK POSITION
   Trucks shall be properly positioned and the parking brake applied before attempting to change or charge batteries.

8. VENT CAPS
   Care shall be taken to assure that vent caps are in place and functioning. The battery (or compartment) cover(s) shall be opened to dissipate the heat and hydrogen gas.

9. SMOKING
   Smoking shall be prohibited in the charging area.

10. OPEN FLAMES
    Precautions shall be taken to prevent open flames, sparks, or electrical arcs in battery charging areas.

11. TOOLS
    Tools, jewelry and other metallic objects shall be kept away from the top of uncovered batteries.

12. BATTERY RESTRAINT SYSTEM
    After replacing a battery into a lift truck, install the battery restraint system. This will secure the battery in place in case of an accident such as a tip-over situation.
Terminology of Batteries

CELL:
A unit in the battery consisting of one positive (+) plate and one negative (-) and plate. Each cell has its own vent cap.

CHARGING:
When a battery has been discharged, a charger must be connected to the battery. Charging returns the battery to its maximum ability to deliver current.

CYCLE:
A cycle consists of one discharge and one charge. There are a limited number of cycles that a battery can take. Charging a battery for only an hour will use up one of those cycles. Therefore, it is best to fully discharge a battery and allow it to fully recharge in order to obtain maximum life.

ELECTROLYTE:
The solution that is found in the battery. It consists of sulfuric acid and water.

GASSING:
When a battery is being charged, hydrogen gas is produced. This is why smoking, open flames and other forms of ignition are not allowed in the area.

HYDROMETER:
The instrument that measures the density or specific gravity of the electrolyte. A full charge measures approximately 1.290 (high acid content). A discharged battery will indicate approximately 1.120 (low acid content). Review the battery manufacturer's manual for specific readings for that specific battery.

VENT CAP:
Each cell has a vent cap to allow the gases to escape while keeping foreign material out of the cell.
Ten Tips For Safe Battery Handling

1. FOLLOW THE MANUFACTURER'S INSTRUCTIONS
   Neglecting the manufacturer's maintenance instructions can shorten battery life.

2. INSPECT THE CONNECTORS
   A loose or pitted connector can cause dangerous arcing or sparking. Don't use the connector as a circuit breaker. Always shut off the charger when connecting or disconnecting the battery.

3. WATER REGULARLY... AFTER CHARGING
   Only add water to battery prior to charging if the fluid level is below the plates. Add water only to plate level. After charging is completed, top-off with water. Charging increases the electrolyte level in cells and can cause overflowing if watered level is above plate level. Overflowing means a loss of electrolyte.

4. KEEP IT CLEAN
   Batteries should be kept clean and dry. If electrolyte is spilled on top of the battery, neutralize it immediately with a solution of baking soda and water or a neutralizing solution. Always wear a face shield, rubber gloves and a rubber apron when cleaning batteries.

5. DON'T LAYTOOLS ON TOP
   Battery gases are explosive. Short circuits can cause sparks which may result in an explosion and possible damage to the battery and surrounding area.

6. KEEP VENT CAPS IN PLACE
   Vent caps allow gases to escape and they keep foreign objects from falling into the cell. Remove vent caps only to add water or to take hydrometer readings. At all other times, keep them securely in place, especially during charging and cleaning.

7. KEEP IT COOL
   A normal charge can increase the temperature of a battery by 15 degrees or more. Operating hot batteries shortens their overall life, so allow them to cool down before putting back into service.

8. DO NOT OVER CHARGE
   No amount of overcharging will increase battery output beyond its rated capacity. In fact, overcharging will substantially reduce battery life.

9. NO SMOKING
   Always charge batteries in a well-ventilated area. Do not smoke and make sure there are no sparks or open flames in the area.

10. IN CASE OF AN ACCIDENT
    If electrolyte comes in contact with your eyes or skin, rinse thoroughly with water for at least 15 minutes and seek medical attention immediately.
TOYOTA
Material Handling, U.S.A.
www.toyotaforklift.com

Electric Lift Truck Checklist
Check NO where problems are detected

Visual Inspection

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<td>Connector Covers ____________________</td>
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<td>Cables ______________________________</td>
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<td>□ Battery Connectors _________________</td>
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<td>21.</td>
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Operational Inspection

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<td>J.</td>
<td>□ Oil Spots on Floor ___________________</td>
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Signature________________________________________

Comments________________________________________

CAUTION: this is not a complete list of all items which may require attention. Operators are responsible for ensuring that the lift truck is in proper working condition in accordance with the manufacturer's specifications.

DO NOT operate a lift truck if a problem is detected. Remove the keys, tag "Out of Operation," and report immediately.

Walkaround

Copyright 2001 Toyota Material Handling, U.S.A.,
## Internal Combustion Lift Truck Checklist

Check NO where problems are detected

### Visual Inspection

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<td>3.</td>
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<td>4.</td>
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<td>6.</td>
<td>Seat Belt</td>
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<td>7.</td>
<td>Engine Compartment Battery Oil Radiator</td>
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<td>Overhead Guard (left)</td>
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### Walkaround

![Diagram of lift truck]

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Signature

Comments
Part Number
00727-OSTME-145