Powered Industrial Trucks - Operator Training

Objectives

- Describe the safe operation of a power industrial truck
- Perform a pre-use inspection of a power industrial truck
- Safely operate a power industrial truck

Powered Industrial Truck - Definition

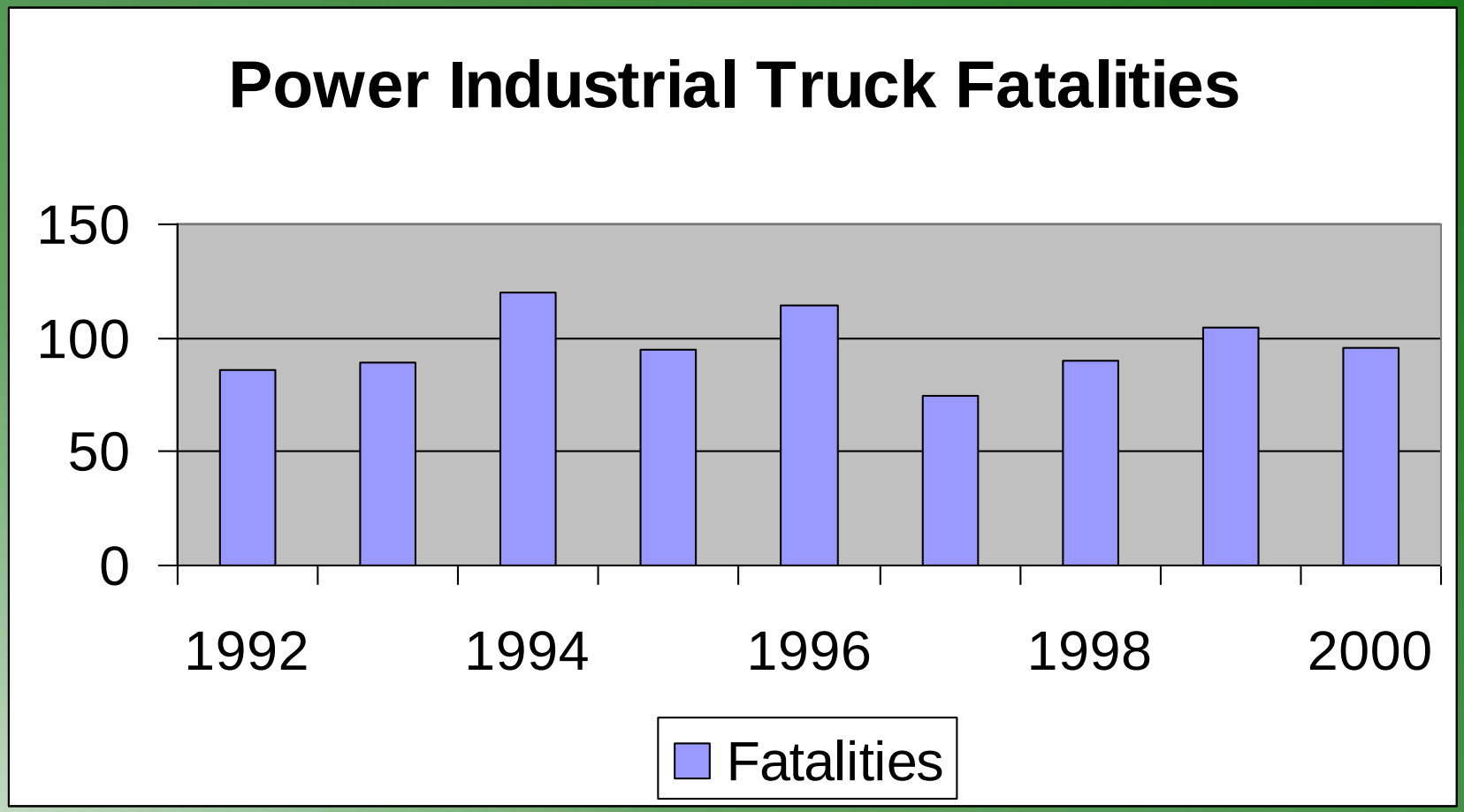
- A mobile, power-propelled truck used to carry, push, pull, lift, stack or tier materials. [American Society of Mechanical Engineers (ASME) definition]
- Excluded are vehicles used for earth moving and over-the-road hauling.
- Commonly known as forklifts, pallet trucks, rider trucks, forktrucks, or lifttrucks.
- Can be powered through electric or combustion engines.

Power Industrial Truck = Fork Truck = Fork Lift

Reasons for New Standard

- Powered industrial truck accidents cause approximately 100 fatalities and about 36,000 serious injuries in general industry and construction annually.
- It is estimated that 20 - 25% of the accidents are, at least in part, caused by inadequate training.

Forklift Fatalities, 1992 -2000



Nonfatal Occupational Injuries and Illnesses by Source, 1996

Type of Forklift	Total Cases
Forklift, unspecified	14,096
Hand/rider forklift truck	373
Order picker	126
Pallet lift truck	1,194
Platform lift truck	260
Straddle rider lift truck	131
Forklift, other types	1,182
TOTAL	17,362

Source: Bureau of Labor Statistics, Job Related Fatalities by Selected Characteristics, 1996.

Final Rule

- OSHA published the final rule for Powered Industrial Truck Operator Training on December 1, 1998.
- It applies to all industries except agricultural operations.
- OSHA estimates that the new rule will prevent 11 deaths and 9,422 injuries per year.

How Are People Hurt With Power Industrial Trucks?

Training Program Content

- Operators shall receive initial training in the following topics, except in topics which the employer can demonstrate are not applicable to safe operation in the employer's workplace.
  - Truck-related topics (General and Workplace Specific)
  - Workplace-related topics (General and Workplace Specific)
  - The requirements of the standard

Performance-Oriented Requirements

- The powered industrial truck operator training requirements are performance-oriented to permit employers to tailor a training program to the characteristics of their workplaces and the particular types of powered industrial trucks operated.

Training Program Content

Truck-related topics

- Operating instructions, warnings and precautions
- Differences from automobile
- Controls and instrumentation
- Engine or motor operation
- Steering and maneuvering
- Visibility
- Fork and attachment adaptation, operation, use
- Vehicle capacity and stability
- Vehicle inspection and maintenance that the operator will be required to perform
- Refueling/Charging/ Recharging batteries
- Operating limitations
- Other instructions, etc.

Forklift Categories

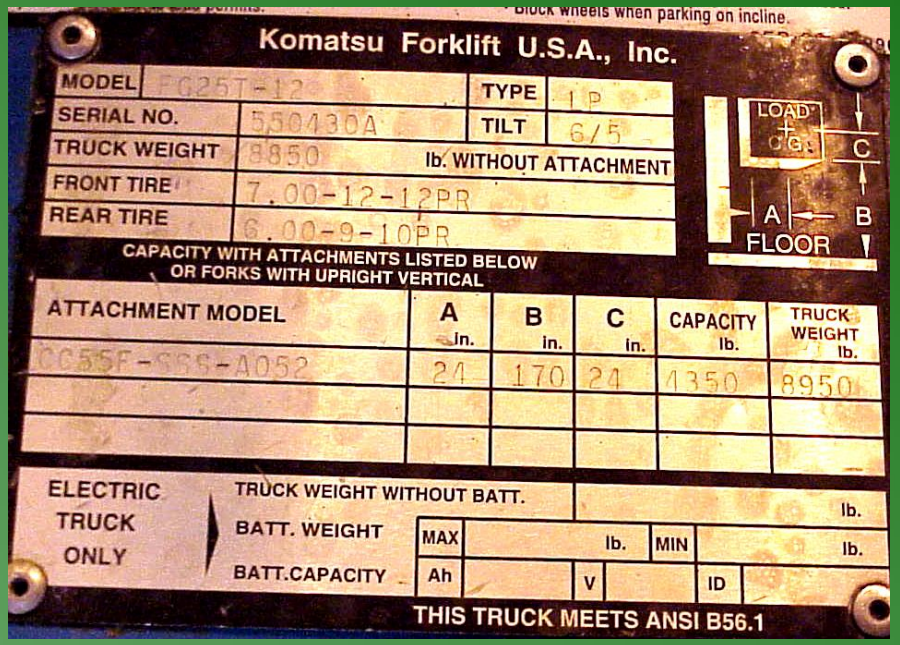
- Diesel Powered (D, DS, DY)
- Electric Powered (E, ES, EE, EX)
- Gasoline Powered (G, GS)
- Liquid Propane Powered (LP, LPS)

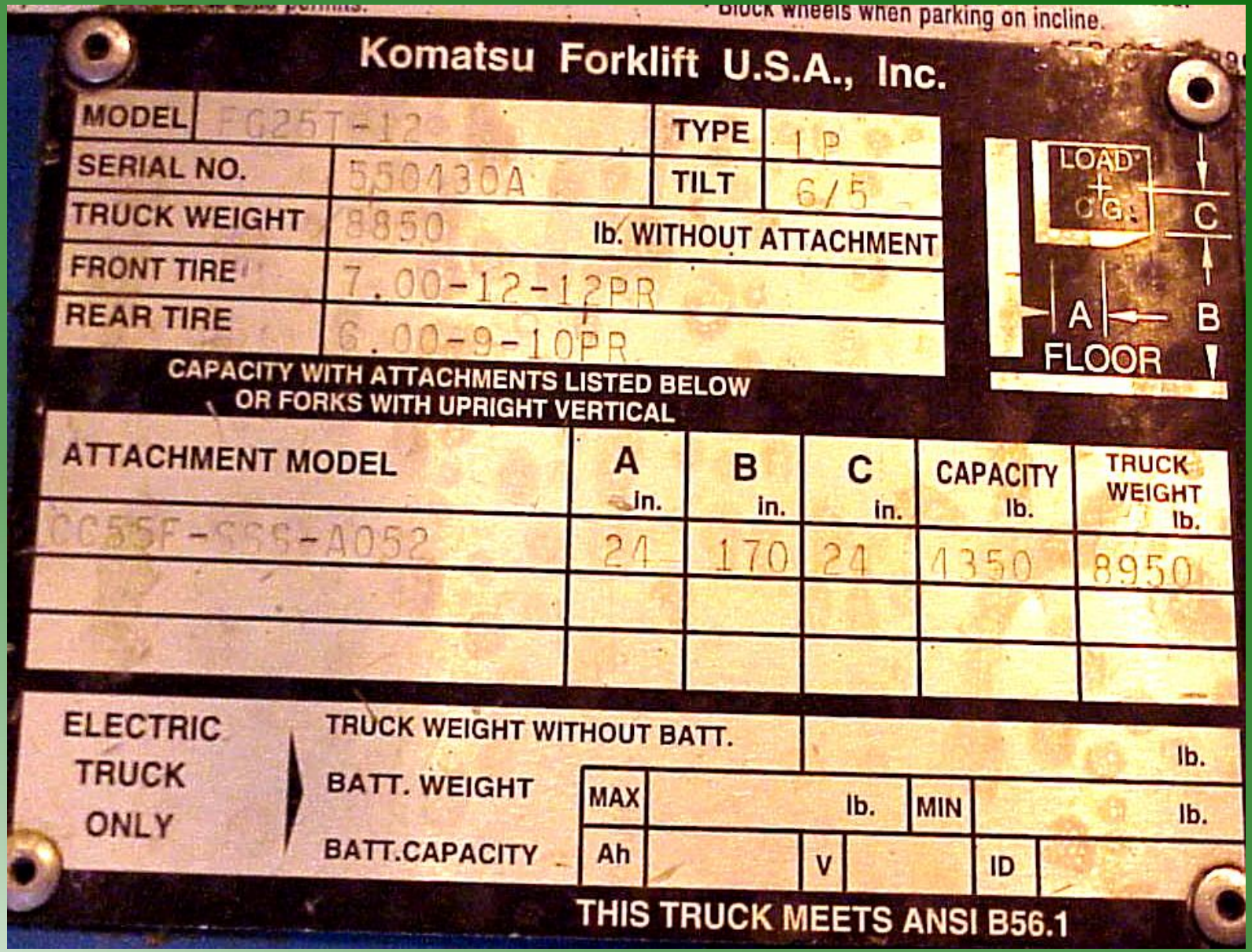
Operating Instructions

- Data Plate
- Operator’s Manuals

Data Plates

- All trucks must have data plates that may include the following
  - Manufacturer, Model
  - Type
  - Truck Capacity, Load Center
  - Truck Weight
  - Attachments





Block wheels when parking on incline.

Komatsu Forklift U.S.A., Inc.

MODEL	FG25T-12	TYPE	1P
SERIAL NO.	550130A	TILT	6/5
TRUCK WEIGHT	8850 lb. WITHOUT ATTACHMENT		
FRONT TIRE	7.00-12-12PR		
REAR TIRE	6.00-9-10PR		

CAPACITY WITH ATTACHMENTS LISTED BELOW OR FORKS WITH UPRIGHT VERTICAL

ATTACHMENT MODEL	A in.	B in.	C in.	CAPACITY lb.	TRUCK WEIGHT lb.
CC55F-SSS-A052	24	170	24	4350	8950

ELECTRIC TRUCK ONLY

TRUCK WEIGHT WITHOUT BATT.						lb.
BATT. WEIGHT	MAX		lb.	MIN		lb.
BATT.CAPACITY	Ah		V		ID	

THIS TRUCK MEETS ANSI B56.1

TRUCK CAPACITY PLATE

Truck Model No. XYAF70GH121 Type LP

Serial No. Z890765 Truck Weight 7020 lb.

Width Over Load Tires 42" Back Tilt 8 Degrees

Pressure P.S.I. Load Tires SOLID Steer Tires SOLID

With Forks

Maximum Capacity Pounds	Dim A Load Center	Dim B Fork Height	Dim C Load Center
4,000	**24"**	**123"**	**24"**

With Attachment *Serial No.*

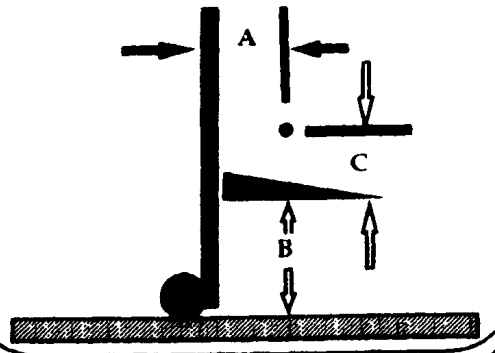
Capacity ratings for evenly distributed & laterally centered loads with mast vertical . Truck equipped as specified on this plate.

CAUTION

TRAINED OPERATORS & MECHANICS ONLY

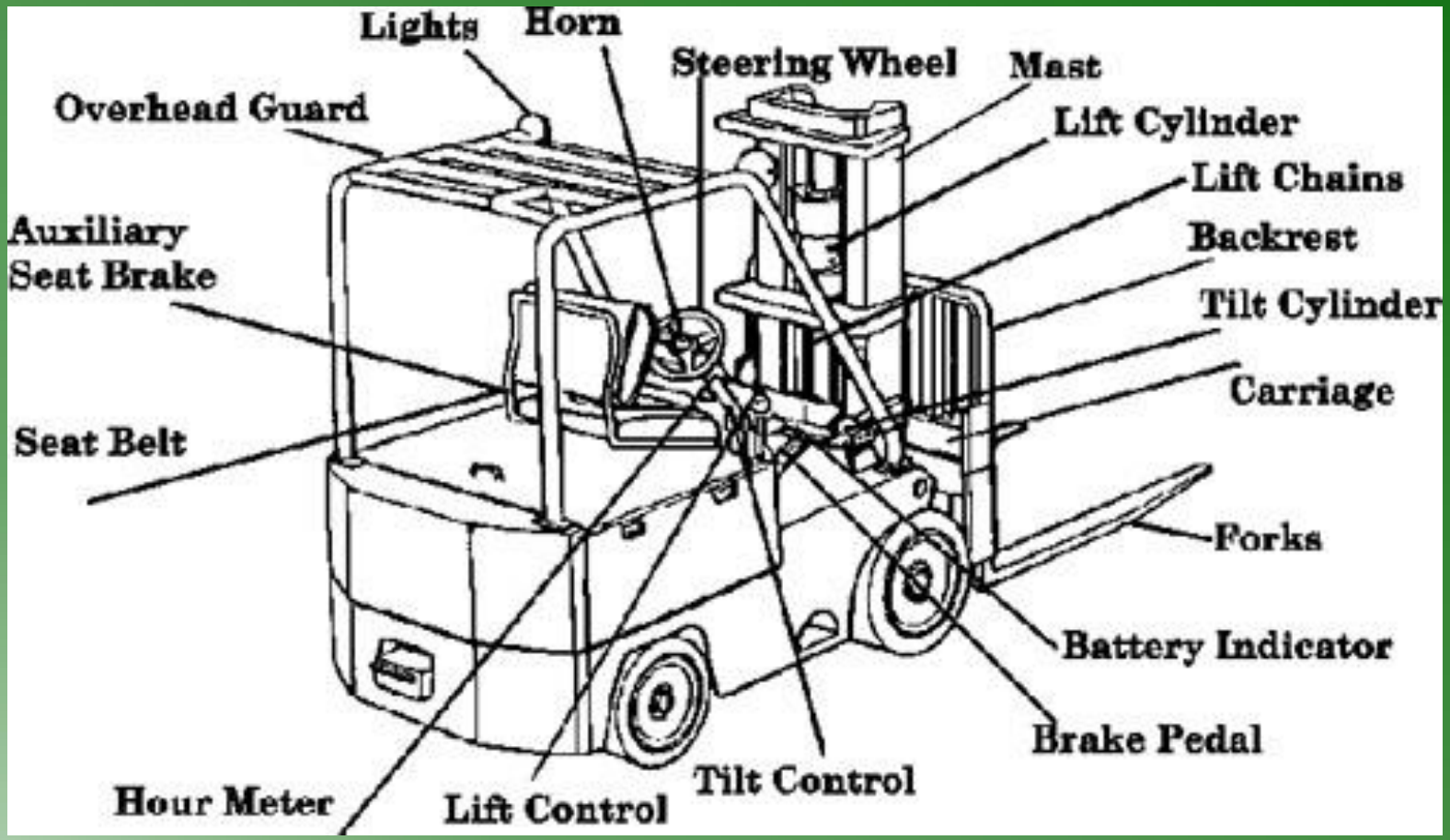
READ ALL CAUTION RULES & INSTRUCTIONS BEFORE OPERATING OR SERVICING THIS TRUCK

DO NOT OVERLOAD



Load Center
Distance from the back rest to the center of gravity of the load.

Components of a Forklift Truck*



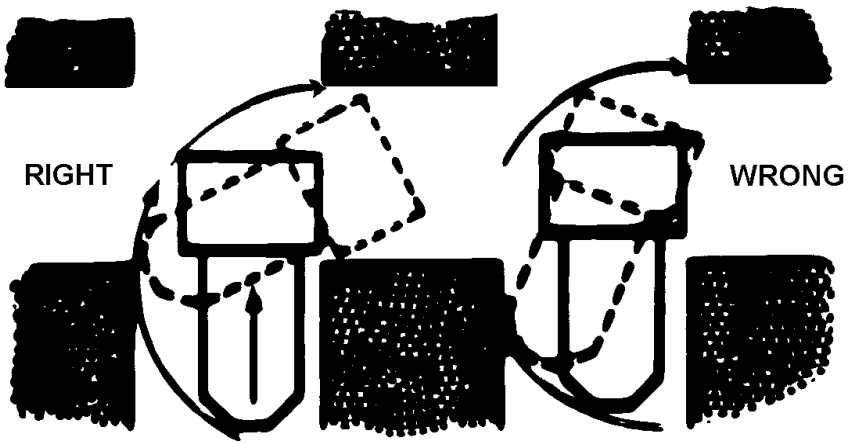
*One of the most common types of powered industrial trucks

What are some difference between a power industrial truck and the car or truck you drove to work today?

Differences between Forklift and Automobile

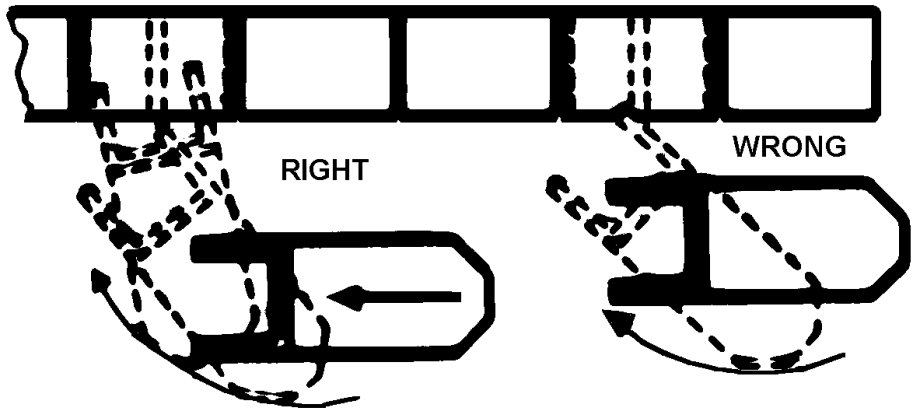
- Steering
- Controls
- Visibility
- Stability
- Suspension
- Purpose
- Weight

Steering



TURNING SHARP CORNERS

Netotiate turns by keeping close to inside corner and start to turn when drive wheels meet corner.

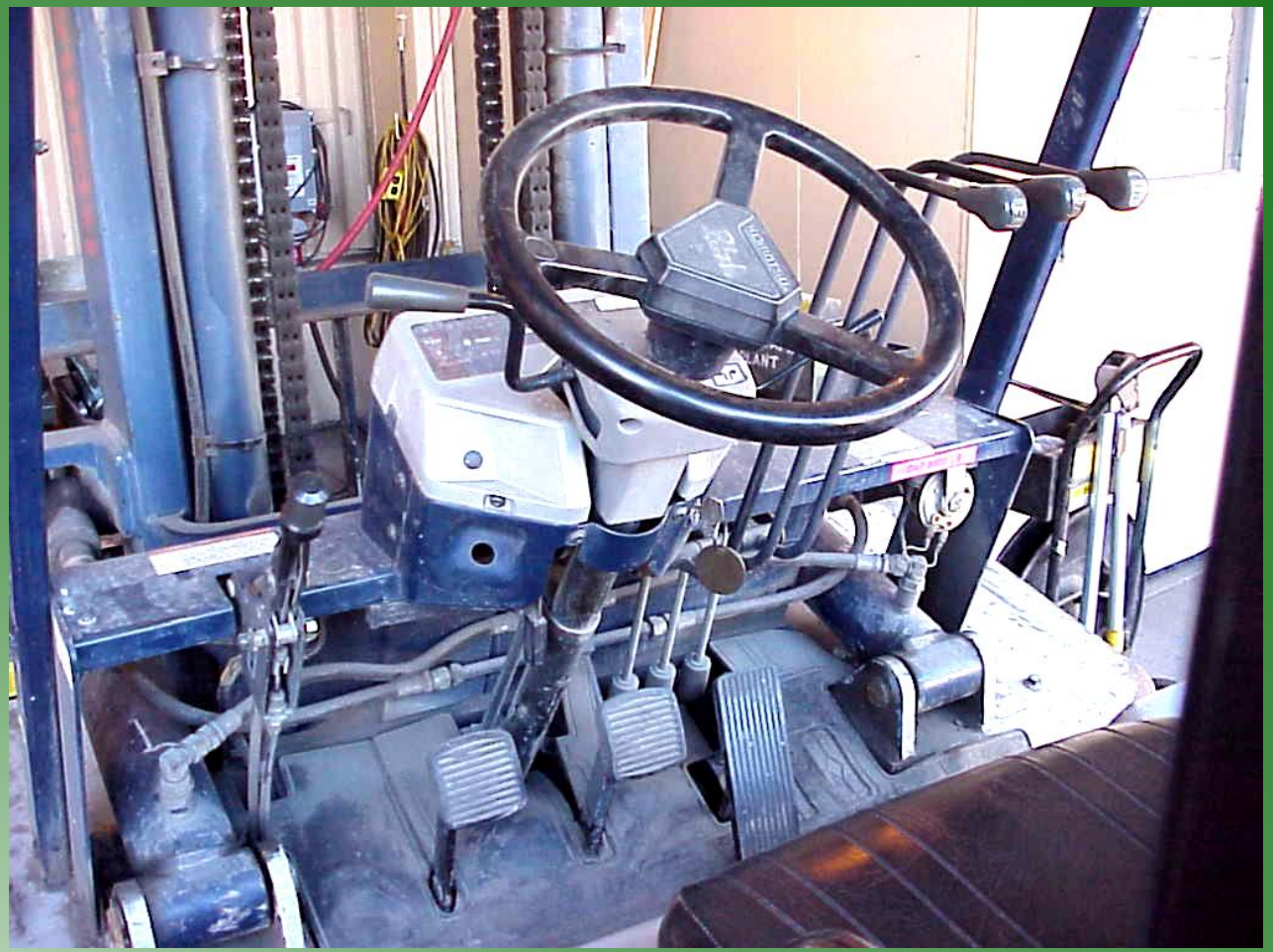


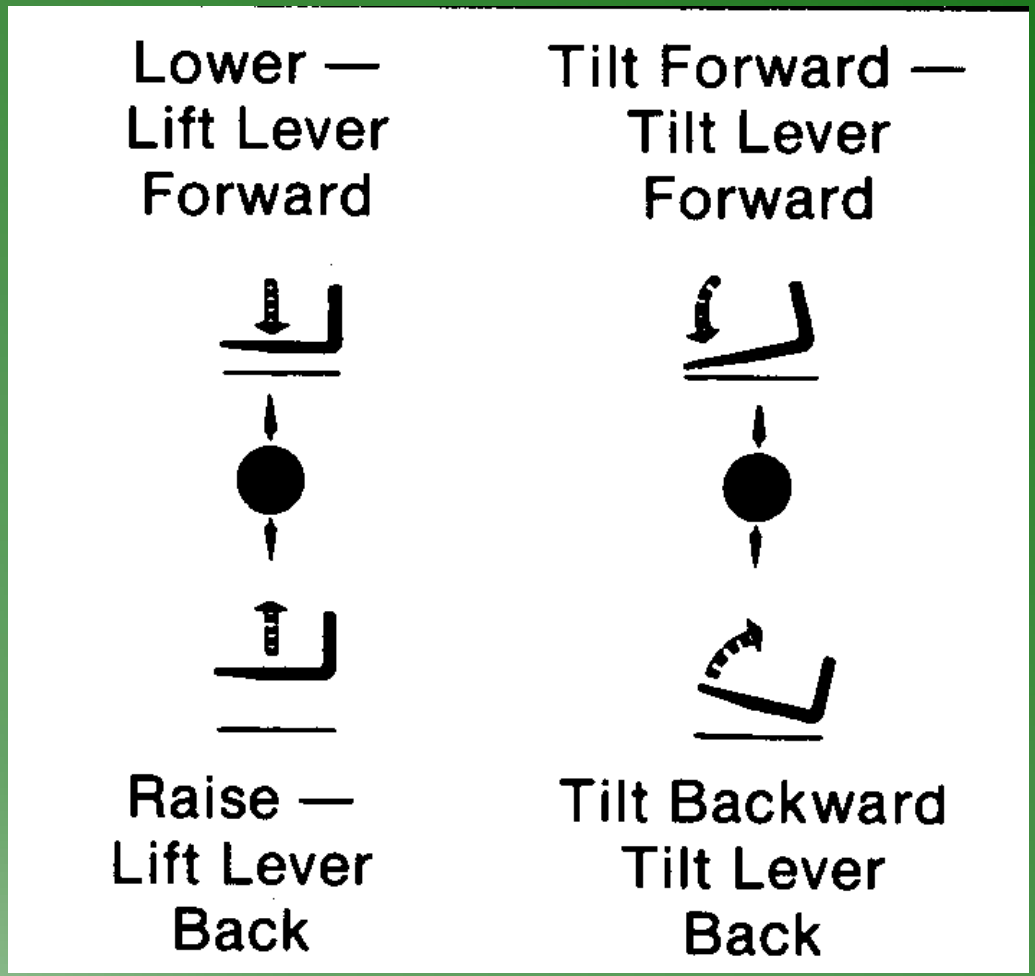
TURNING ACROSS NARROW AISLES

Approach turn as far away from stock pile or obstacle as possible, and begin turn early--before you reach the middle of the aisle.

Steering

Controls & Instrumentation

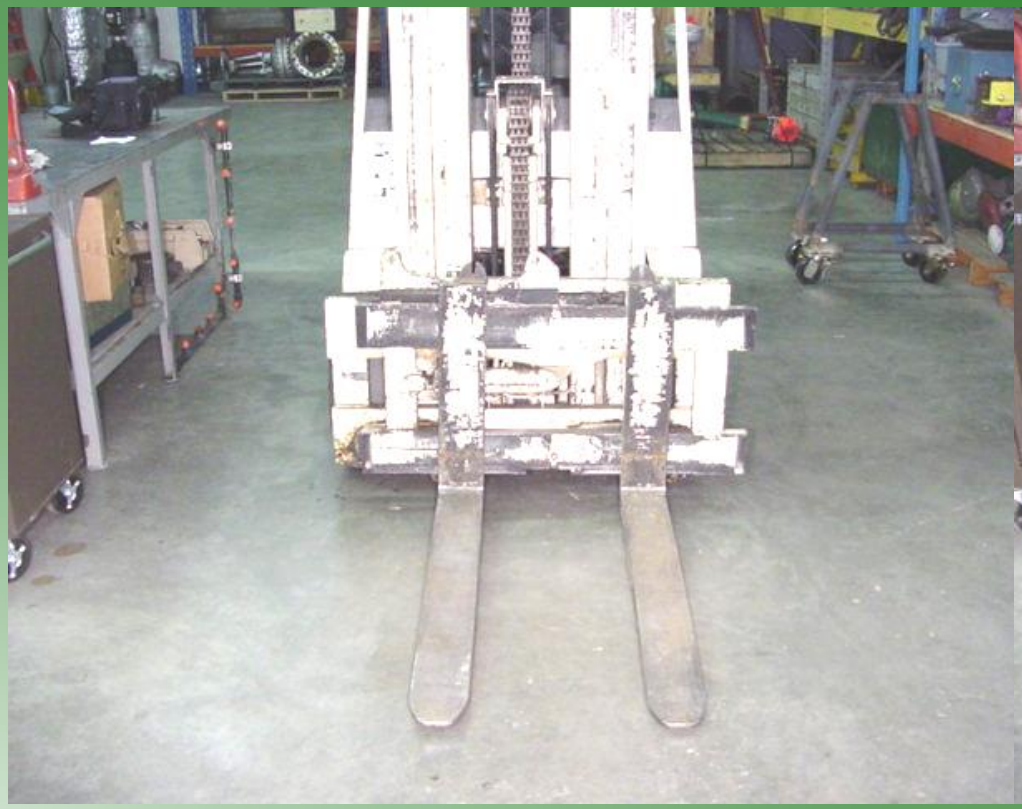


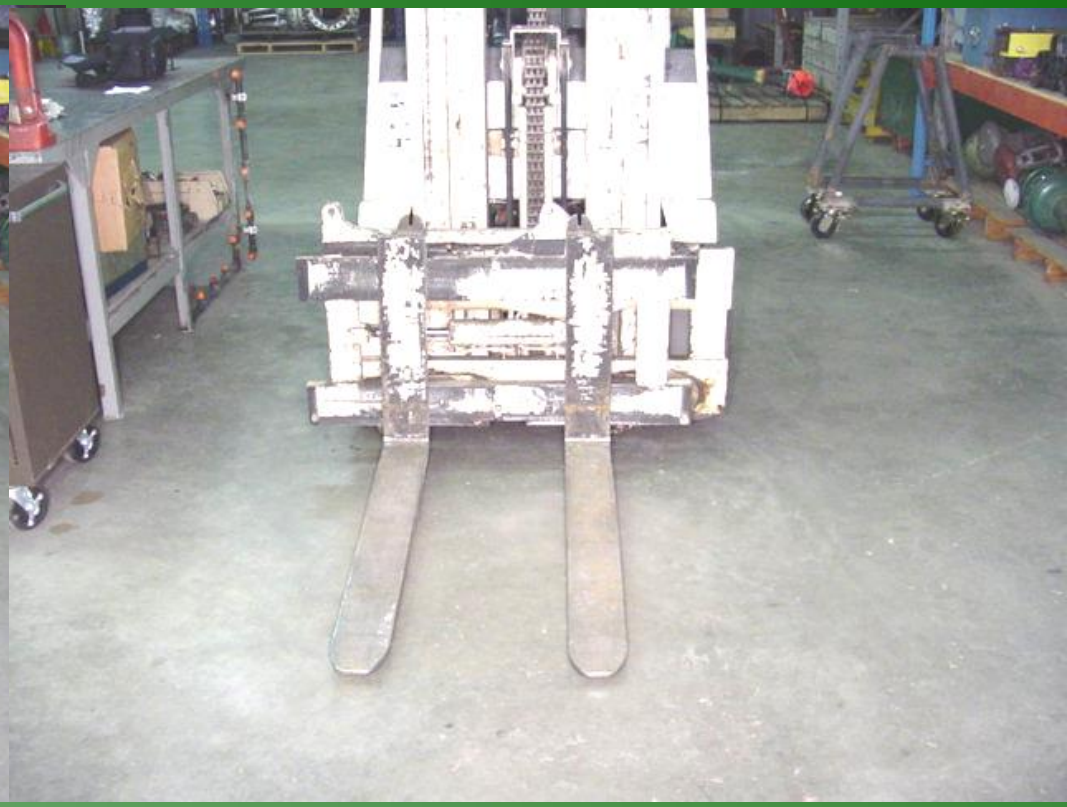


Fork Lift Control

Tilt Control

Fork Sideshift Control

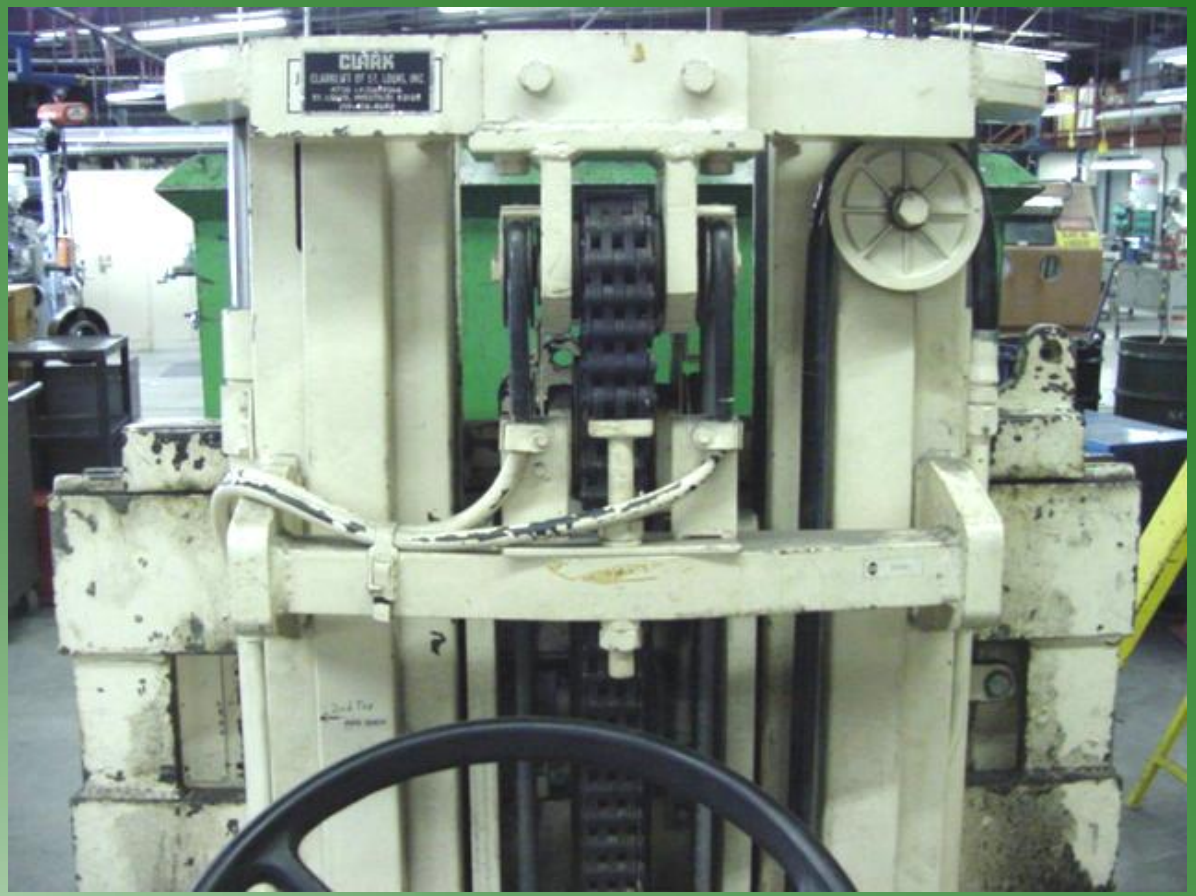




Fork Sideshift Control

Visibility

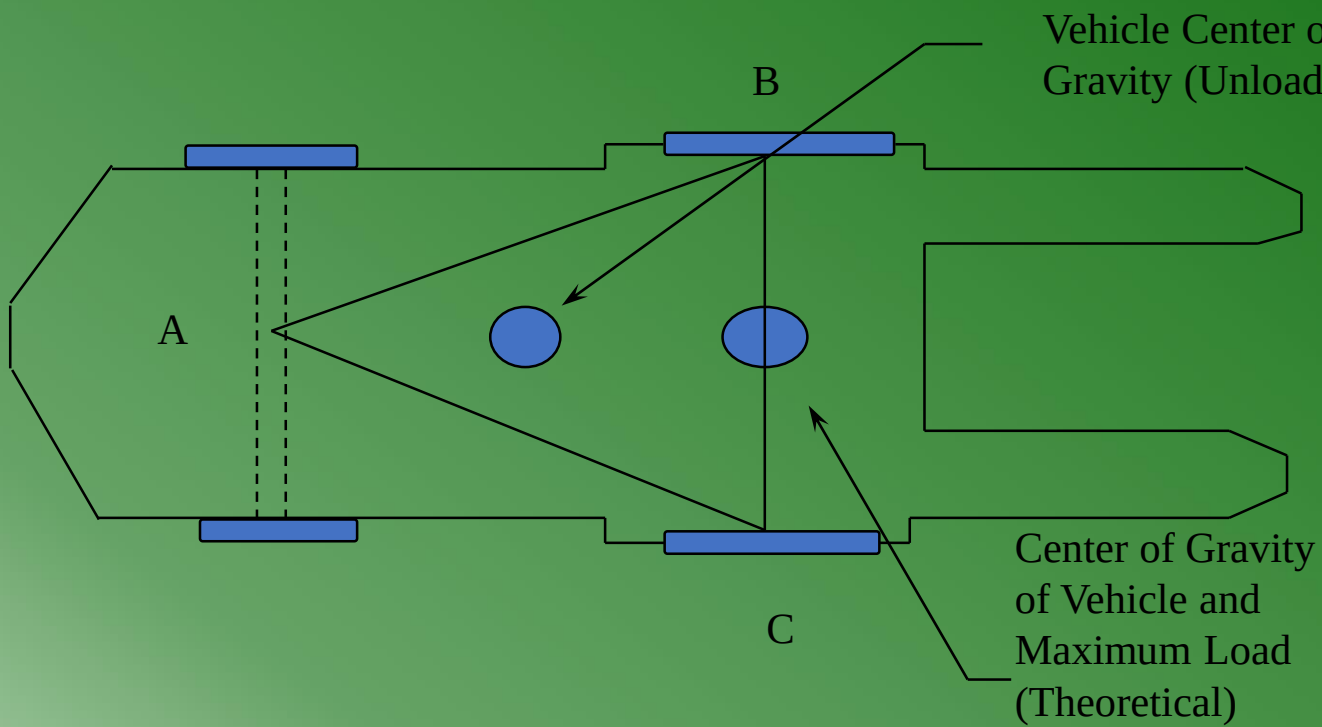
Visibility



Appendix A - Stability of Powered Industrial Trucks

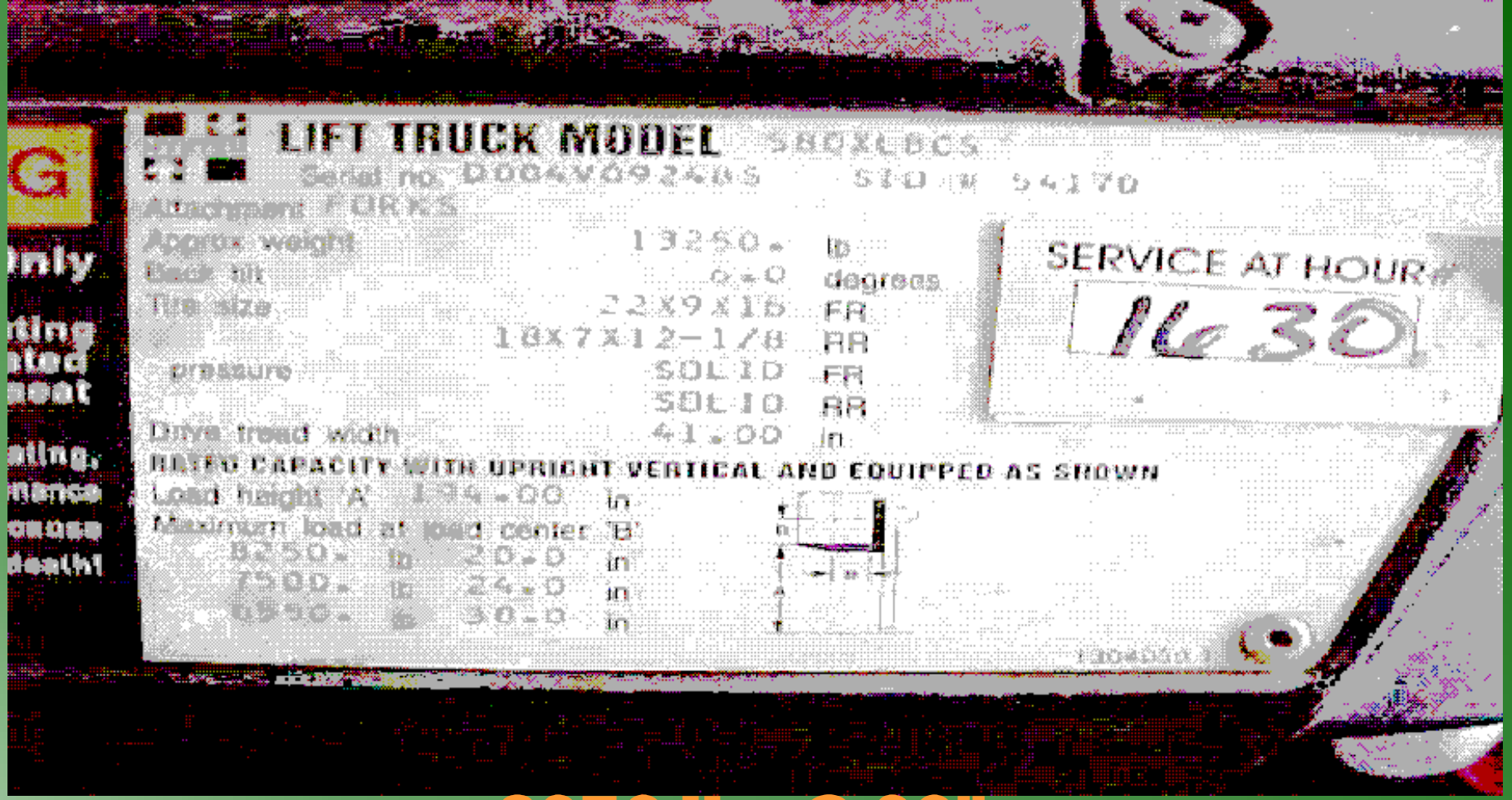
- Definitions
- General
- Basic Principles
- Stability Triangle
- Longitudinal Stability
- Lateral Stability
- Dynamic Stability

Stability Triangle - Figure 1



Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

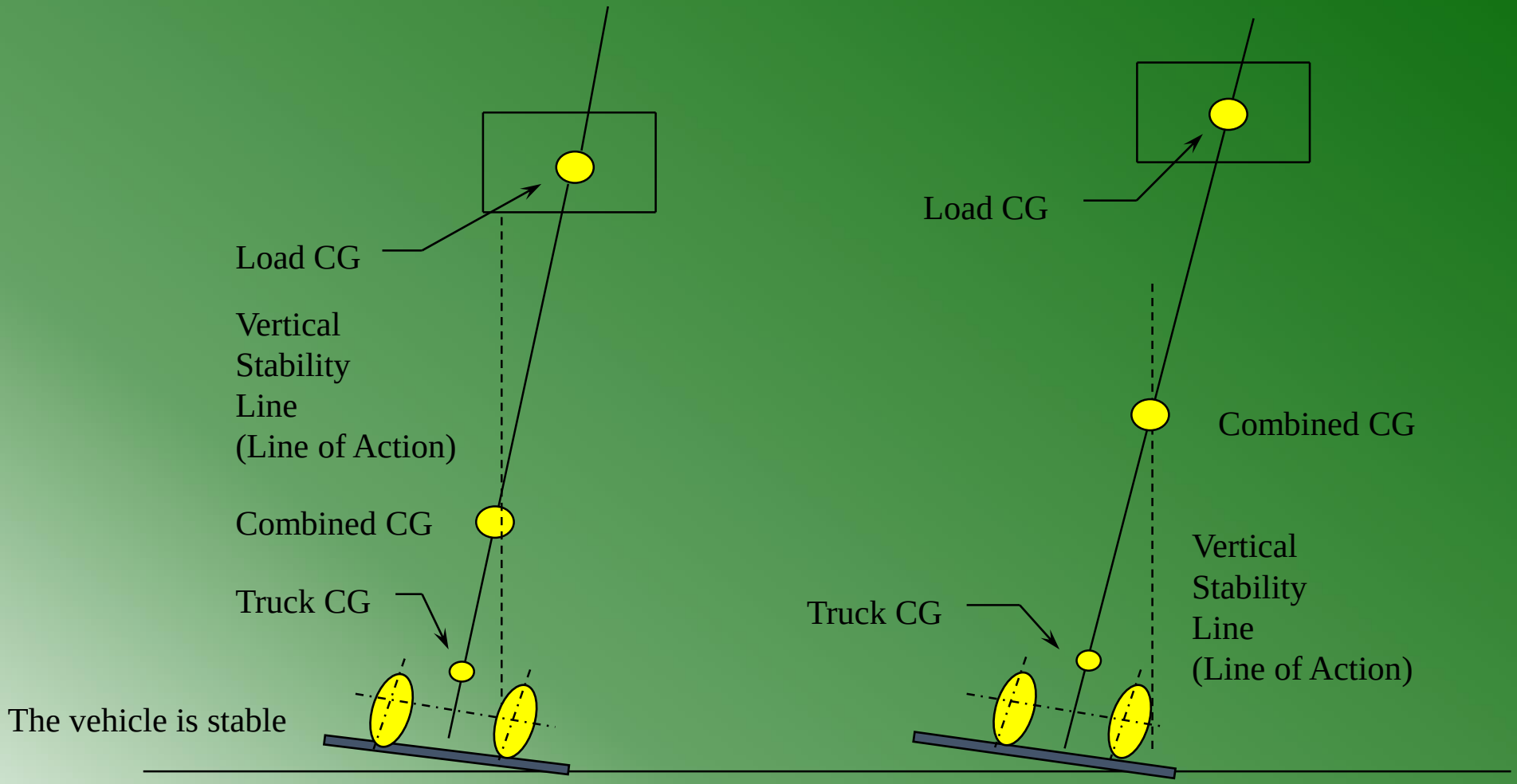


8250 lbs.@ 20"

7500 lbs.@ 24"

6550 lbs.@ 30"

Stability Triangle - Figure 2



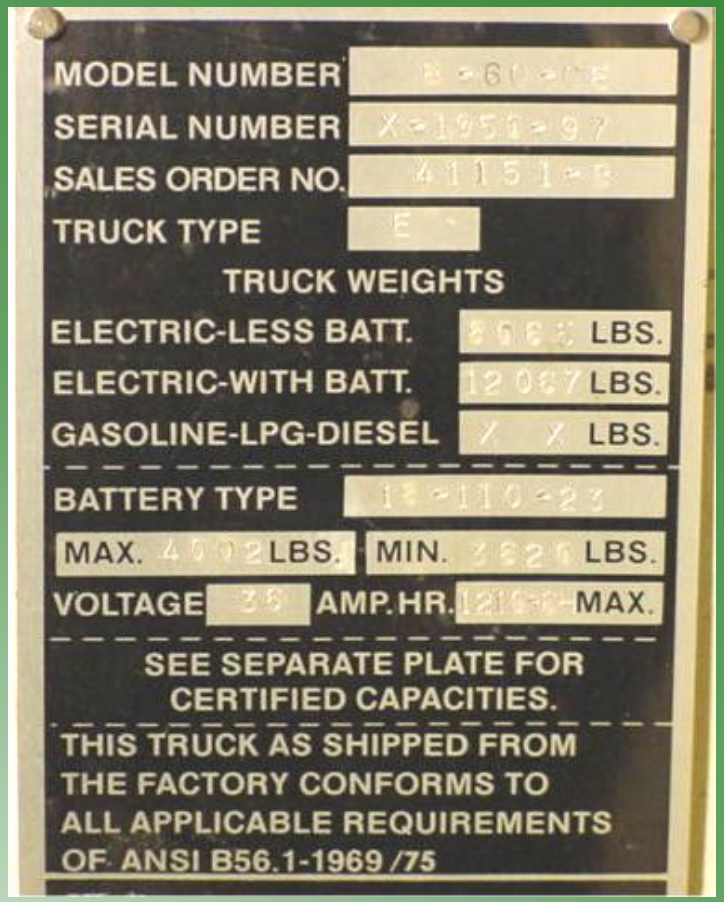
Tips for Increasing Stability

- Keep the load as low as possible
- Tilt the load back
- Travel slowly to avoid sudden stops
- Keep the load uphill
- Stay within the capacity of the truck

Suspension

Purpose of fork lift

Weight

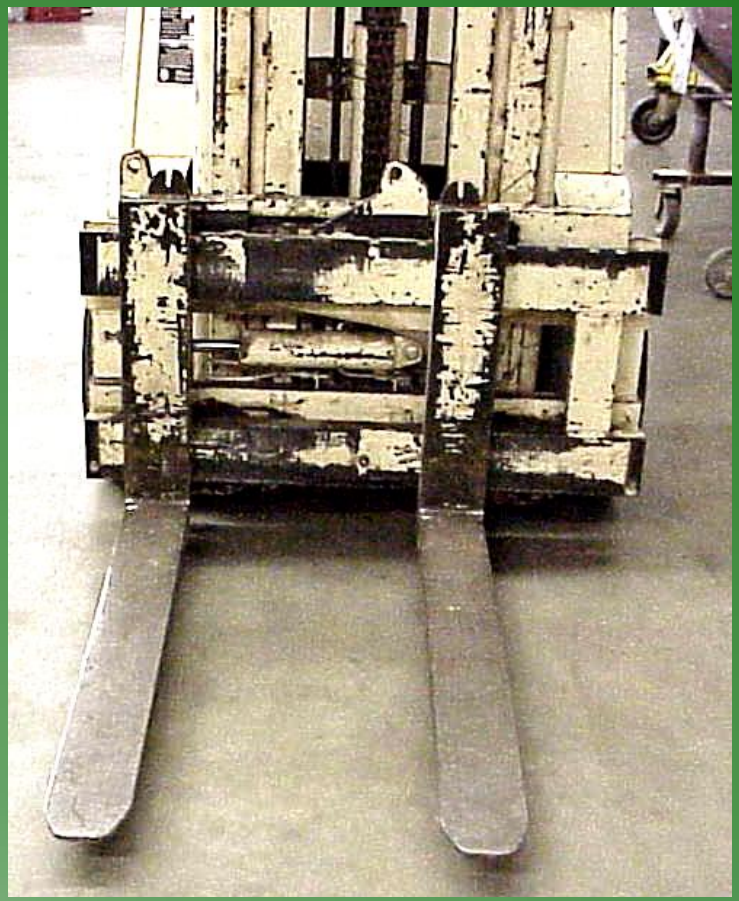


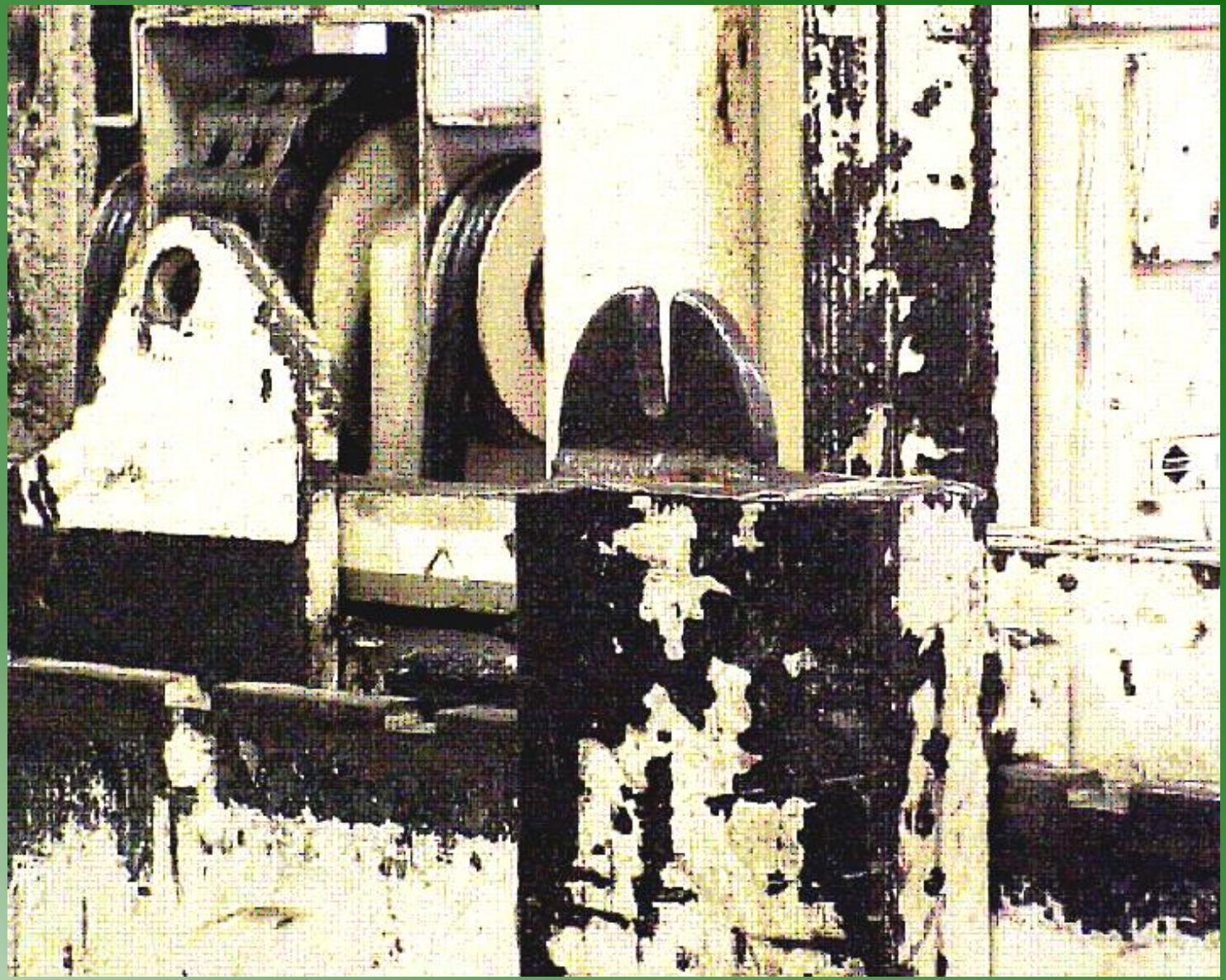
Without battery 8065 lbs
With battery 12067 lbs
Max Load 6000 lbs

Engine & Motor Operation

Fork - Attachments

Forks, Attachments, Use

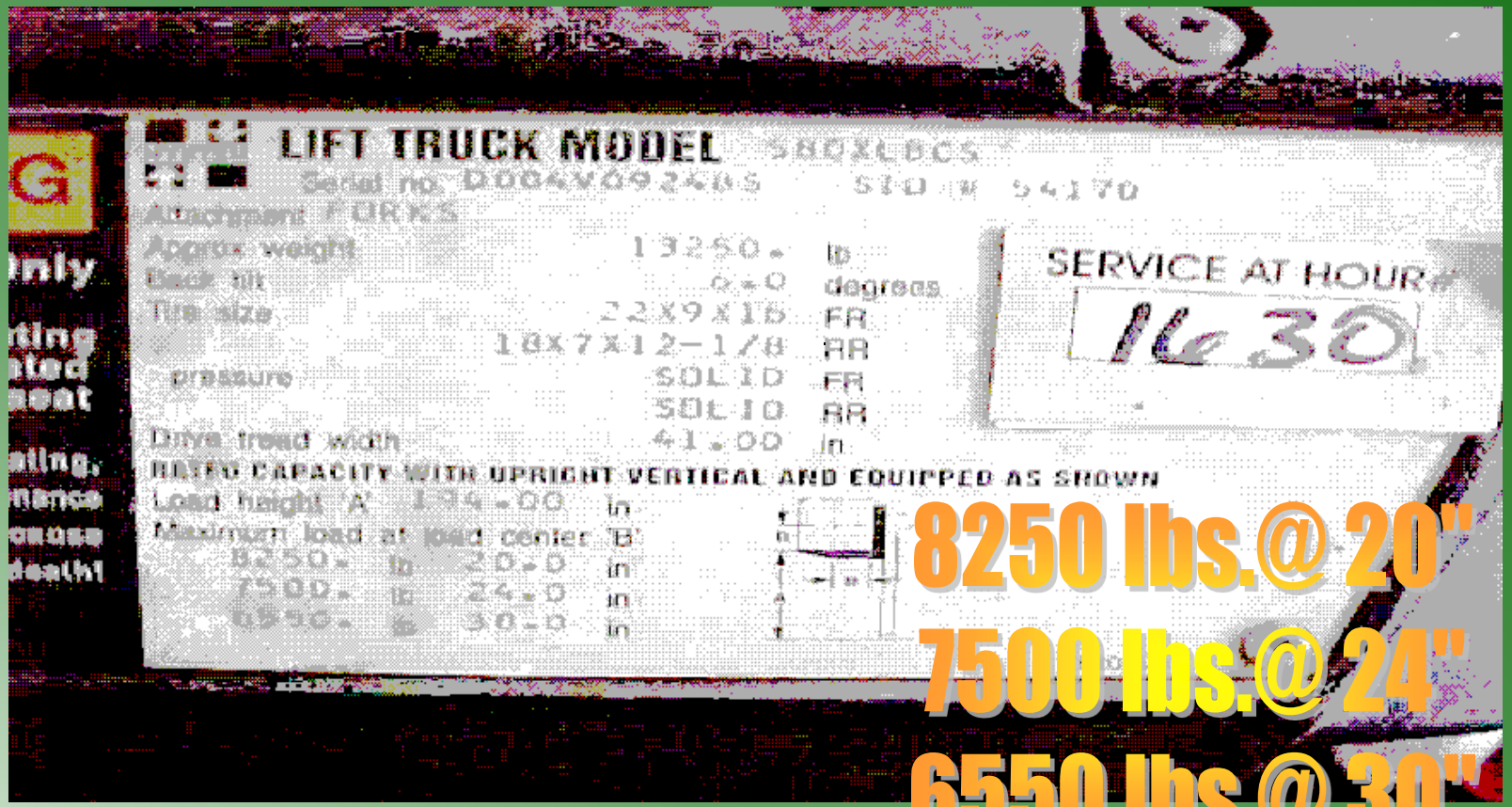





CAP. 2 TON

Capacities

Load Centers, Load Height, Attachment, Truck Weight.



How does having this device attached affect the load center?

How does having this device attached affect the load center?

Pre-Use Inspection

- Must be performed before you drive truck at start of your shift.
- The operator is responsible for insuring the truck is safe to operate.
- Always follow the checklist.

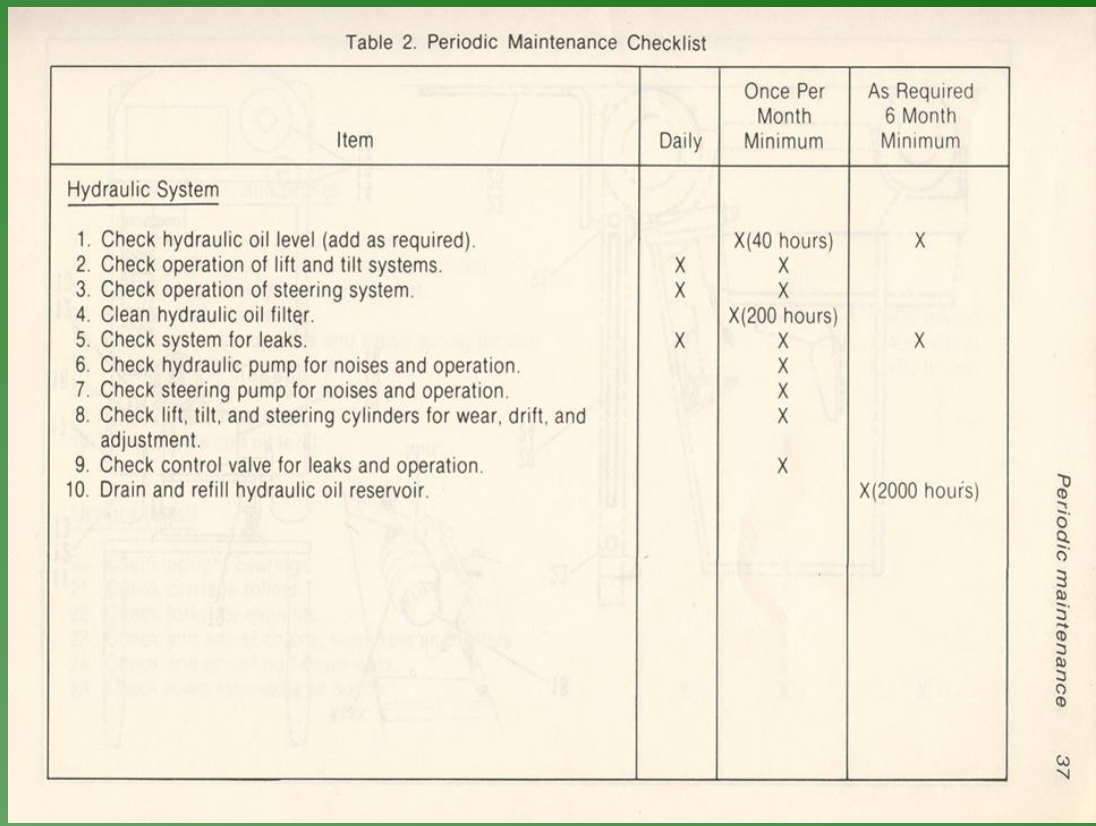


Table 2. Periodic Maintenance Checklist

Item	Daily	Once Per Month Minimum	As Required 6 Month Minimum
Hydraulic System			
1. Check hydraulic oil level (add as required).		X(40 hours)	X
2. Check operation of lift and tilt systems.	X	X	
3. Check operation of steering system.	X	X	
4. Clean hydraulic oil filter.		X(200 hours)	
5. Check system for leaks.	X	X	X
6. Check hydraulic pump for noises and operation.		X	
7. Check steering pump for noises and operation.		X	
8. Check lift, tilt, and steering cylinders for wear, drift, and adjustment.		X	
9. Check control valve for leaks and operation.		X	
10. Drain and refill hydraulic oil reservoir.			X(2000 hours)

Periodic maintenance 37

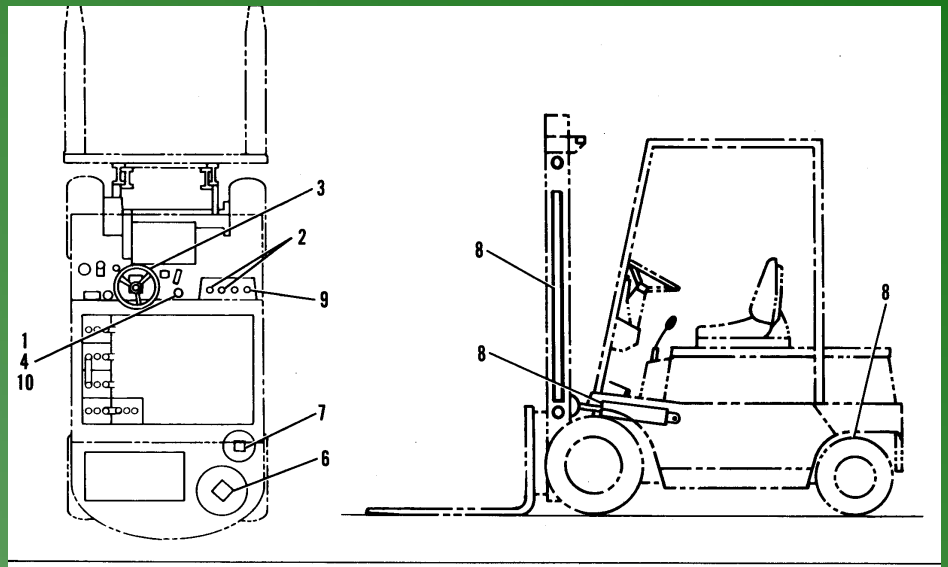
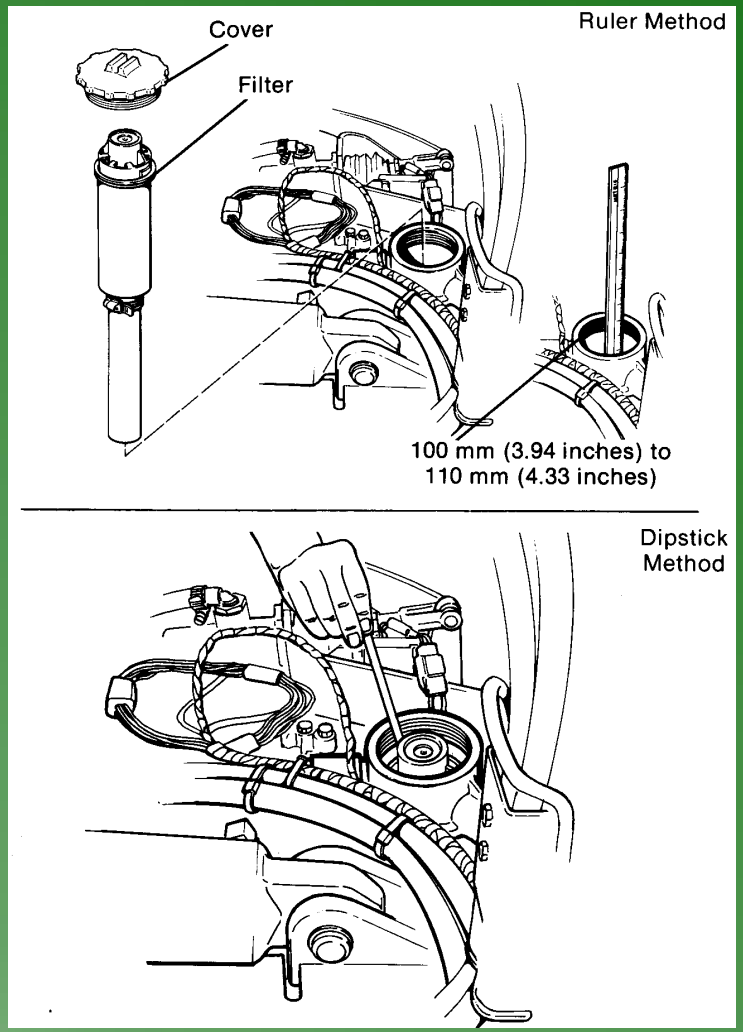
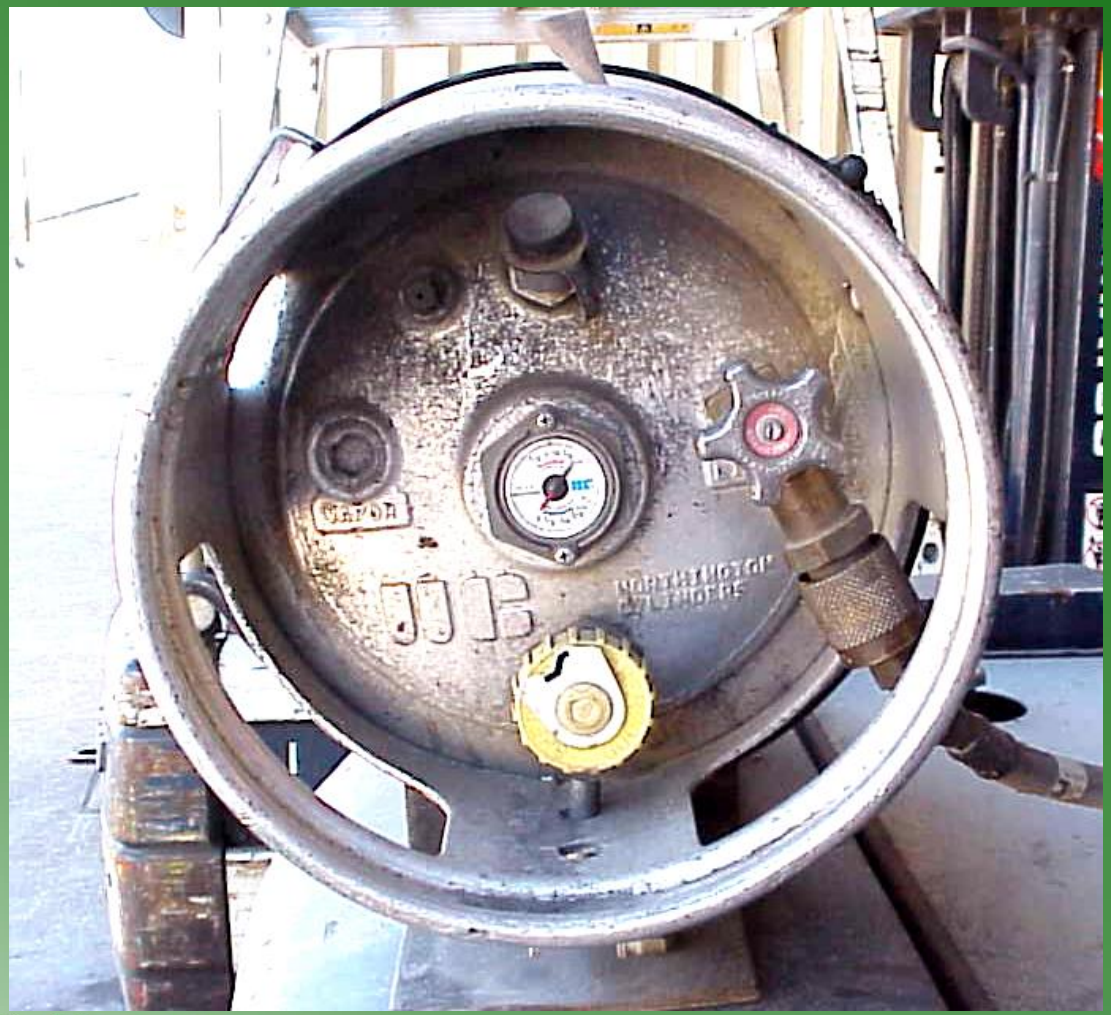


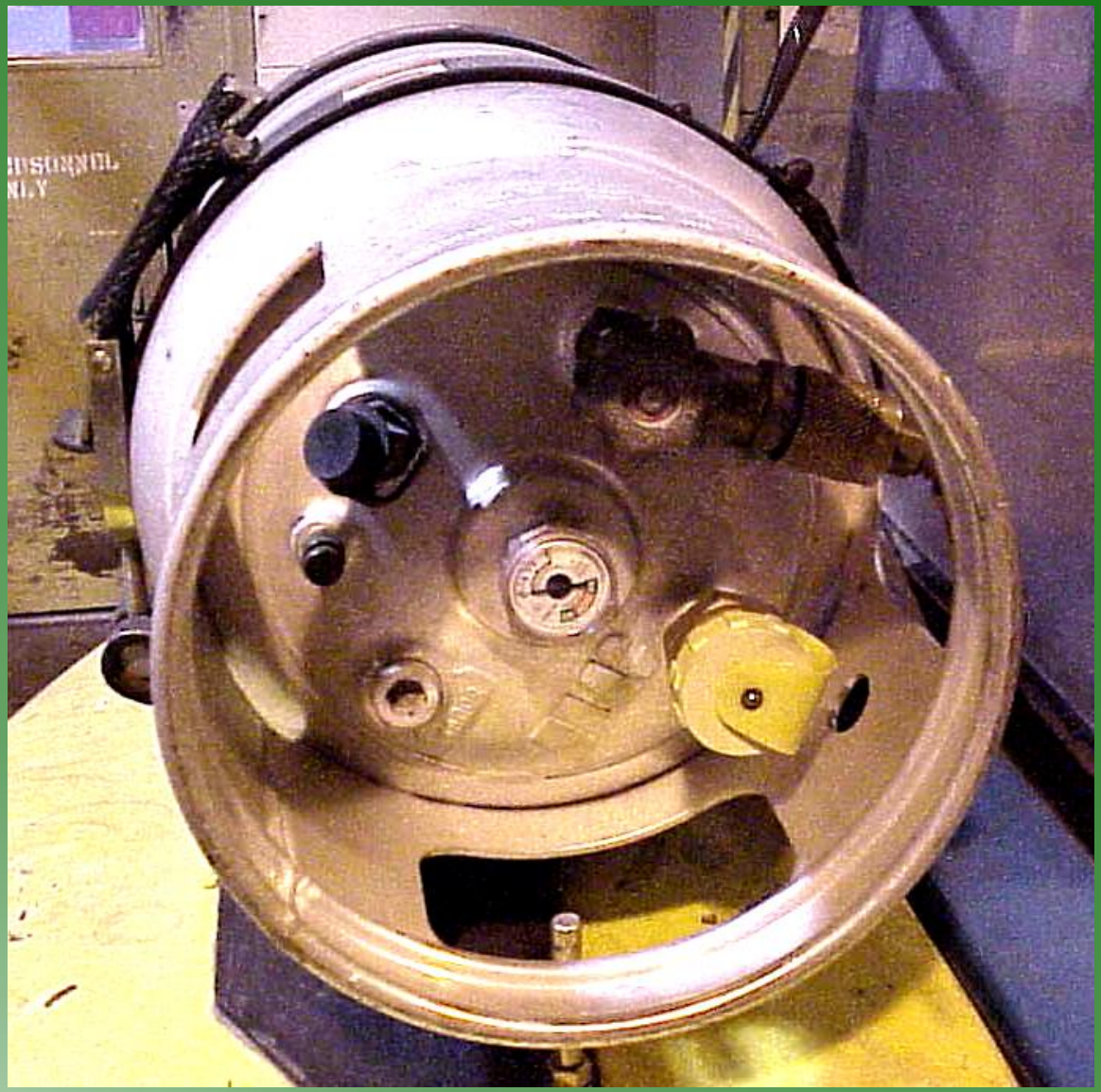
Table 2. Periodic Maintenance Checklist

Item	Daily	Once Per Month Minimum	As Required 6 Month Minimum
Hydraulic System			
1. Check hydraulic oil level (add as required).		X(40 hours)	X
2. Check operation of lift and tilt systems.	X	X	
3. Check operation of steering system.	X	X	
4. Clean hydraulic oil filter.		X(200 hours)	
5. Check system for leaks.	X	X	X
6. Check hydraulic pump for noises and operation.		X	
7. Check steering pump for noises and operation.		X	
8. Check lift, tilt, and steering cylinders for wear, drift, and adjustment.		X	
9. Check control valve for leaks and operation.		X	
10. Drain and refill hydraulic oil reservoir.			X(2000 hours)



Refueling, Recharging Batteries





Recharging Batteries

Battery Charger-
Do not plug in or energize charger until lift battery is plugged into charger

Check for electrolyte level

Unplug battery

Plug battery into charger – Charger must not be energized

Turn Charger On

Before unplugging battery when charging is complete – Disconnect charger first

To remove fork lift from charger:

- Disconnect charger from power source
- Unplug lift battery
- Check electrolyte level in all cells
- Clean electrolyte that may have spilled from cap vents
- Connect battery to motor lead
- Close battery compartment

Operating Limitations

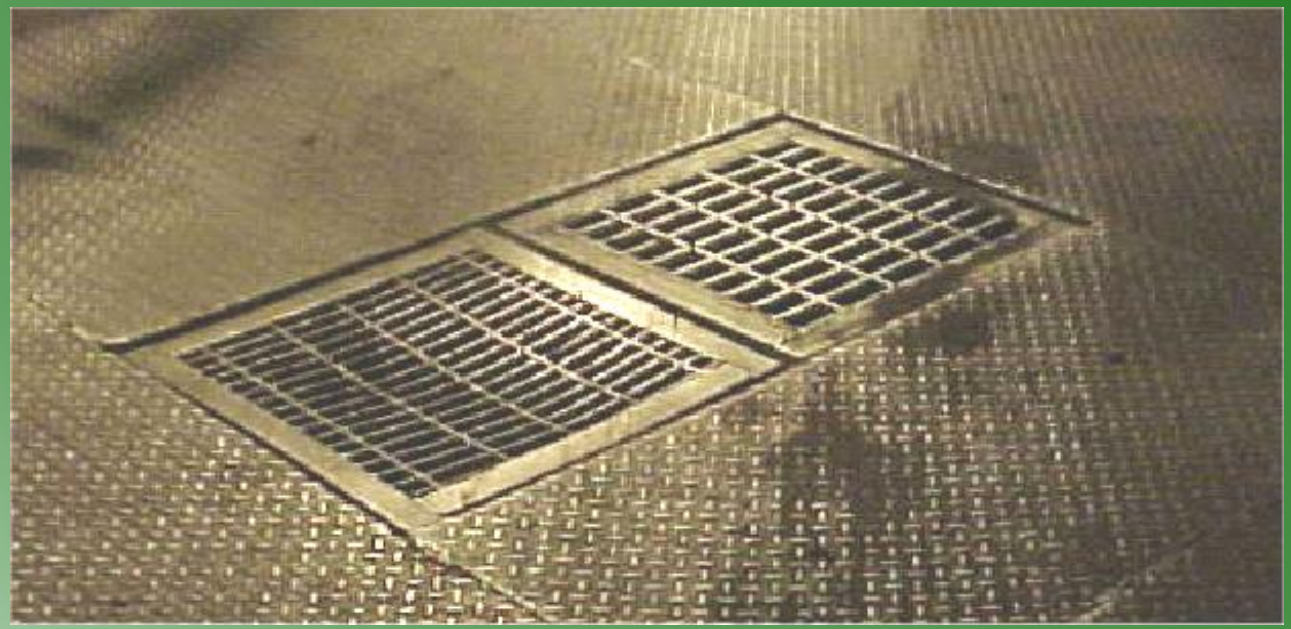
- Data Plate
- Operator's Manual
- Warnings on Decals on Truck

Training Program Content (continued)

- Workplace-related topics

- Surface conditions
- Composition and stability of loads
- Load manipulation, stacking, unstacking
- Pedestrian traffic
- Narrow aisles and restricted areas
- Operating in hazardous (classified) locations
- Operating on ramps and sloped surfaces
- Potentially hazardous environmental conditions
- Operating in closed environments or other areas where poor ventilation or maintenance could cause carbon monoxide or diesel exhaust buildup

Surface Conditions



Composition and Stability of Loads

Load Stability

- Loose objects should be attached to pallets
- Do not raise loose loads above your head
- Use special devices for some loads

Load Manipulation, Stacking, and Unstacking

- Make sure loads are stable
- Stack only loads that may be stacked
- Use caution if fork tips stick out the back of the load

Stacking on Racks

Pedestrian Traffic

Narrow Aisles and Restricted Areas

Hazardous Locations

Watch Weight on Freight Elevators

Weight of Load + Weight of Fork Truck + YOU

Ramps and Slopes

Hazardous Environmental Conditions

- Slick conditions outside – ice, snow, rain

Closed Environments

- Carbon Monoxide

Training Program Content

- The requirements of the OSHA standard on powered industrial trucks must also be included in the initial operator training program.

Unattended Trucks

- A Truck is unattended if:
  - The operator is more than 25 feet away from the truck.
  - The operator can not see the truck.
- A Truck that is unattended must:
  - Have the load lowered.
  - Controls neutralized.
  - Engine shut off.
  - Brakes set.
  - Wheels chocked (in on an incline)

Using a Fork Truck To Lift Personnel

- Must use a platform designed for this purpose.
- Platform must be attached to the forks.
- Driver must remain on the truck at the controls.
- All personnel (on platform and driver) must be protected against falling objects.

Docks, Trailers, Railcars

- Each Year there are about 7,000 Drop-Off Accidents
- Trailers and Railcars must be chocked and brakes set
- Inspect and know how the dock plates/boards work
- Make sure floor will support weight of truck and load
- Insure front of trailer is supported by tractor or adequate jackstands
- Stay safe distance from edge

Refresher Training and Evaluation

- An evaluation of each powered industrial truck operator's performance must be conducted:
  - After initial training,
  - After refresher training, and
  - At least once every three years

Refresher Training and Evaluation

- Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely.
- Refresher training required when:
  - Unsafe operation
  - Accident or near-miss
  - Evaluation indicates need
  - Different type of equipment introduced
  - Workplace condition changes

General Driving Rules

Engaging, Transporting, and Dropping a Load

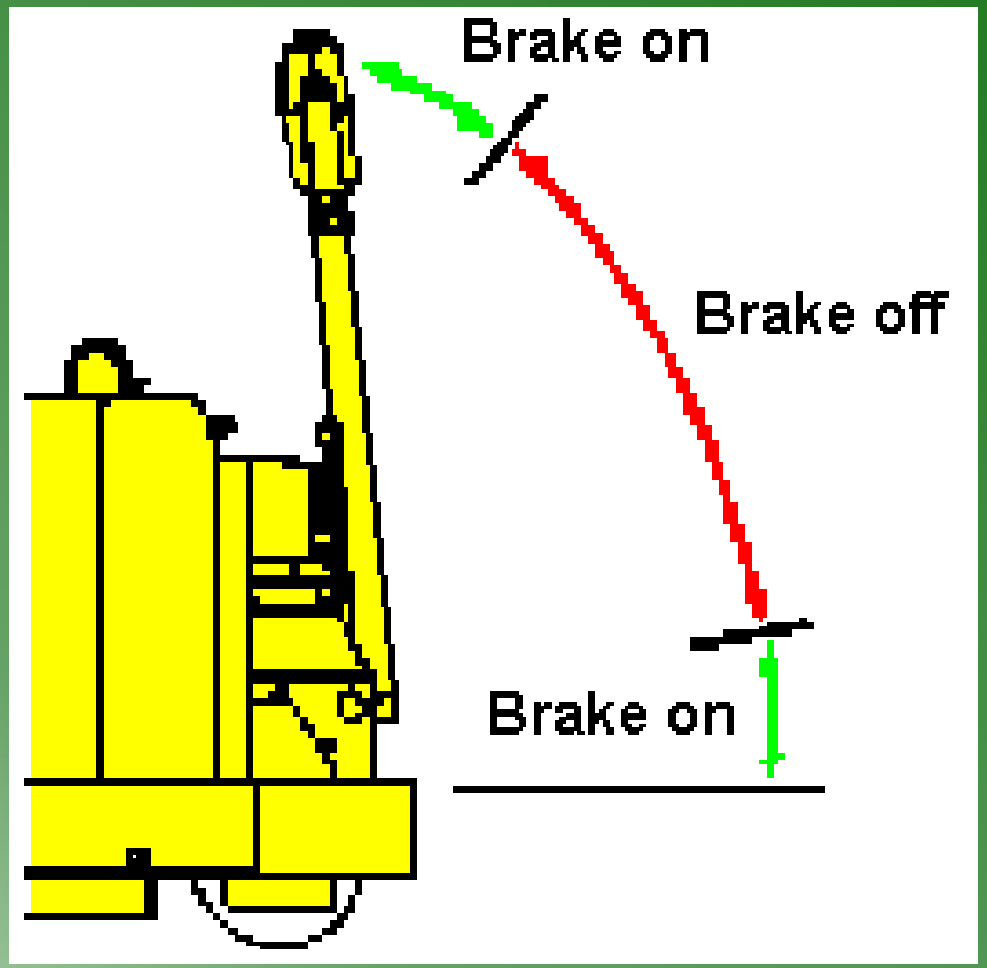
- Get square on load
- Lower & level forks
- Get load as close to backrest as possible
- Lift straight up 6 – 8 inches, tilt mast back
- Carry load as low as possible
- Drive into position, be alert if fork tips extend past back of load
- Level forks, set load on floor
- Back straight up until clear of load, look in direction of travel

Parking the lift

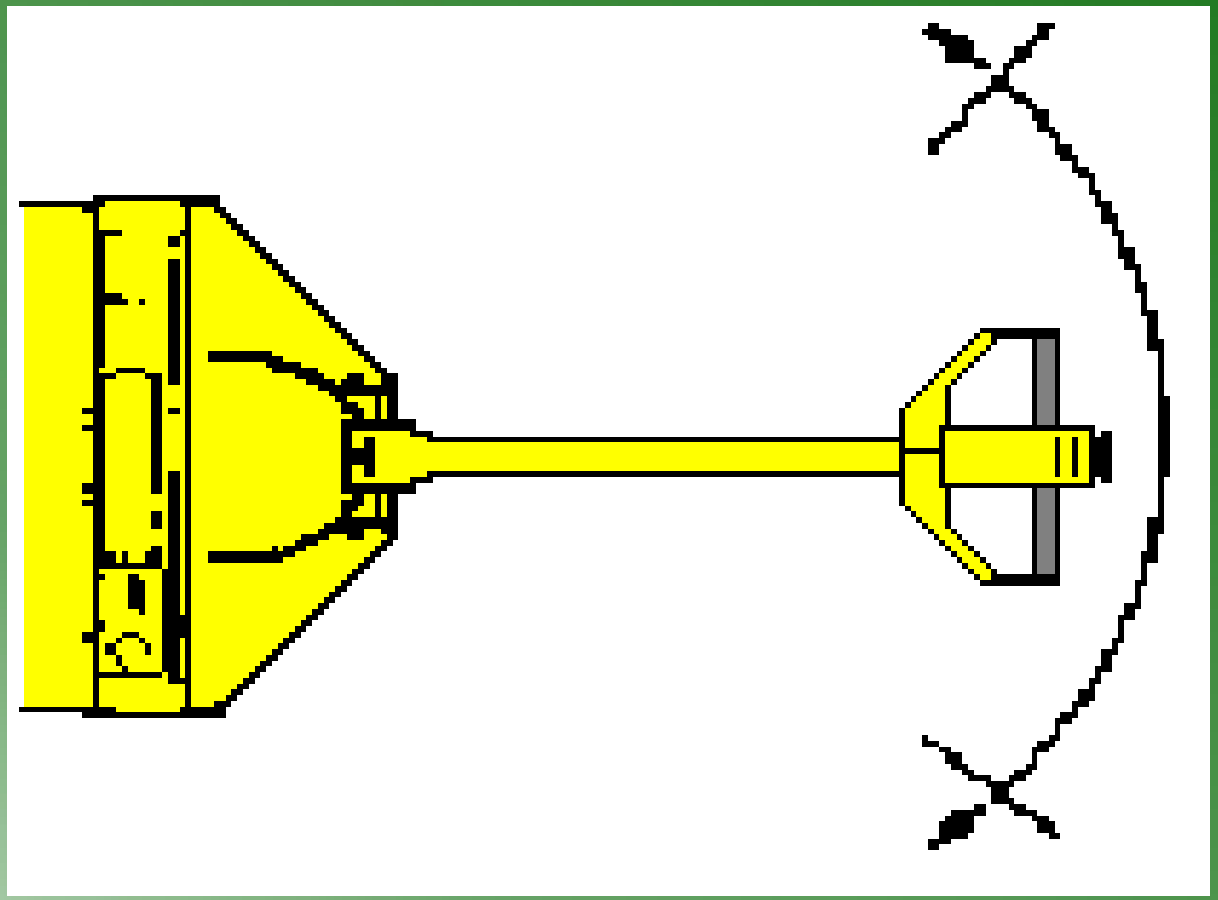
- Lower forks and tilt mast slightly forward to put tips on ground
- Neutral
- Set parking brake
- Turn off
- Chock if on incline

Pallet Jacks

Brake Operation



Steering



Pallet Jack Operation

- Many of the fork lift principles of operation apply to the pallet jack
- Since you are not on the truck, watch footing, control the load, and do not get between the pallet jack and a fixed object
- Be familiar with how your pallet jack operates
- Always keep forks downhill

Pallet Jack

Summary

- Do not carry passengers
- Wear your seatbelt, stay on truck if it overturns
- Keep fork tips low
- Yield to pedestrians
- Do not “trap” anyone between your truck and fixed object
- Keep load uphill
- Do not allow anyone under raised loads or forks

THE END