



Rough Terrain Forklift

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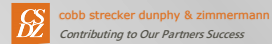
- Mentoring and coaching new and emerging safety professionals.
- Client-specific risk assessment, strategy development and implementation.

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Learning Objectives

- Distinguish construction-specific expectations from general industry requirements.
- Determine which forklift program elements are necessary and which are not.
- Develop a training program specific for your operations.
- Outline safe, efficient operating procedures.
- Discuss stability characteristics (lift and load) and limitations.



Notice:

- Simply showing employees a video or videos on some aspect of forklift safety does not meet the full requirements of the OSHA standard.
- Site specific and equipment-specific information must be conveyed as well as a method to evaluate the employee's acquired knowledge subsequent to the training.



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Construction-specific Expectations

Rough Terrain Forklift



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What is a Forklift?

- According to OSHA: Powered Industrial Truck.
 - ✓ **Any mobile power-propelled truck used to carry, push, pull, lift, stack or tier materials.**
- Earth moving and over the road haulage trucks are not included in the definition.
- Equipment that was designed to move earth but has been modified to accept forks are also not included.



Rough Terrain Forklift Compliance Standards

- 1910.178 – Powered industrial trucks.
- 1926.602 – Material handling equipment.
 - ✓ **The OSHA standard on training of forklift operators applicable to construction is 29 CFR 1926.602(d), which states that the requirements applicable to construction work are identical to those set forth at 1910.178(l).**
- ANSI B.56.6 – Safety standard for rough terrain forklifts.
- Manufacturer instructions, requirements and limitations listed in the operator's manual.



Classes of Forklifts

- Class 1 – Electric motor rider trucks.
- Class 2 – Electric motor, narrow aisle.
- Class 3 – Electric motor, hand trucks.
- Class 4 – Internal combustion, cushion tire.
- Class 5 – Internal combustion, pneumatic tire.
- Class 6 – Electric motor and internal combustion tractor.
- **Class 7 – Rough terrain.**

NOTE: If an operator will be expected to operate different types of forklifts, then training must address the unique characteristics of each type of vehicle the employee is expected to operate.



Rough Terrain Forklifts

Generic term for forklifts used on unimproved natural terrain and improved terrain on construction sites.

DANGER: Do not assume the name “Rough Terrain” implies a forklift can be safely operated with every load on all conceivable types of terrain, slope, incline, etc.



Class 7 Rough Terrain

- Variable reach - linkage type.
- Variable reach - boom type.
- Vertical mast - 2 wheel steer, 2 wheel or 4 wheel drive.
- Vertical mast skid steer.
- Vertical mast, articulated frame steer, 4 wheel drive.
- Vertical mast, 4 wheel steer, 2 wheel or 4 wheel drive.




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Rough Terrain Forklifts have Unique Operational Characteristics

- Put aside all past experience with other classes of forklifts.
- Equipment elements similar to other classes of forklifts:
 - ✓ **CARRIAGE** – supports the load when tilting or traveling.
 - ✓ **FORKS** – horizontal tine-like projections normally suspended from the carriage for engaging/supporting loads.
 - ✓ **BACKREST** – provides stability for the load.
- Specialized equipment on rough terrain forklifts:
 - ✓ Carriage tilt cylinders for picking/placing loads, retracting forks.
 - ✓ Inner and outer boom for extending loads into/onto a structure.
 - ✓ Boom cylinders or chain drives for raising and retracting loads.
 - ✓ Outriggers for stability while raising/lowering a load.
 - ✓ Cab tilt or frame leveling system.
 - ✓ Choice of steering modes – front, rear, circle, “crab crawl” lateral
 - ✓ Numerous attachment options.





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Necessary Program Elements for Contractors

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Basic Policy/Program Elements

- Goals and objectives.
- Roles and responsibilities.
- Defined expectations and desired outcomes.
- Meet or exceed all compliance regulations, rules and laws.
- Employee training, qualification, knowledge and skill.
- Methods of communication.
- Hazard identification.
- Control measures, necessary precautions and resources.
- Inspection and correction procedures.
- Incident or emergency response.
- Accountability.
- Documentation and/or recordkeeping.

What are Your
Defined Expectations?

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Roles and Responsibilities

- Operator
 - ✓ **Pre-shift inspection and safe operation.**
- Maintenance staff
 - ✓ **Responding to and correcting maintenance concerns.**
- Supervisor
 - ✓ **Daily implementation, accountability and documentation.**
- Management
 - ✓ **Defining expectations and program design.**
- Third-party vendors
 - ✓ **Rental company, outside maintenance personnel.**



What is Your Strategy?

Expectation → **Execution**

No amount of “*Safety*” can make up for ineffective leadership and poor project planning.

Written policies stuffed into a dusty safety manual do nothing for employees who lack knowledge & skill and do not prevent site leadership from directing employees to make wrong choices.

Do You Tolerate Problems with:

- **Estimate?**
- **Schedule?**
- **Materials?**
- **Contract Expectations?**
- **Quality of Work?**
- **Client Expectations?**
- **Risk, Safety, Compliance?**

**What Problems are
You Tolerating?**



Inspection and Maintenance

- Federal OSHA:
 - A. **Forklift inspections are required at least daily, or after each shift when used around the clock.**
 - B. **Does not require that forklift inspections be documented.**
 - Undocumented inspections never occurred.
- Some state-plans may require documentation and retention.
 - ✓ **For example, in California, the daily inspection log can be considered a record of a scheduled inspection to identify unsafe conditions, such records must be retained for one year under Cal/OSHA regulation.**
- Using an inspection checklist, either written or electronic, is a sound practice for two reasons:
 1. **Ensure all essential features of the forklift are inspected routinely.**
 2. **Documentation provides verifiable evidence to an OSHA inspector that the forklift is being inspected as required by 1910.178(q)(7).**



Common Inspections before Operating a Rough Terrain Forklift

- Visual pre-start inspection.
- Fork inspection.
- Operational pre-start check.
- Work area assessment.



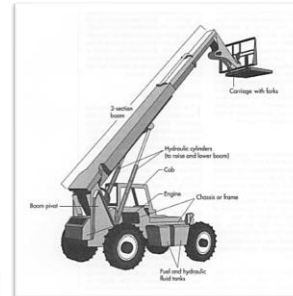
Thorough inspections should take roughly 10 to 15 minutes to complete.



ANSI B56.6-2016 Inspection

6.5.1 Before use each day, or at the beginning of each shift, the rough terrain forklift truck shall be inspected to check for proper operation and condition per the manufacturer's instructions, including but not limited to inspection of the following:

- (a) instructions, warnings, control markings are in place and legible;
- (b) operator's and safety manual(s) are in place and legible;
- (c) load charts are in place and legible;
- (d) no loose, damaged or missing parts;
- (e) all operating and emergency controls;
- (f) boom angle and chassis level indicators;
- (g) horn, backup alarm, mirrors, seat belt;
- (h) lights (if equipped);
- (i) brakes and steering mechanism;
- (j) lift and tilt systems and load-engaging means;
- (k) chains, cables and limit switches;
- (l) air and hydraulic systems;
- (m) electrical cables and wiring;
- (n) tires and their inflation pressure (if pneumatic);
- (o) wheels and corresponding hardware (i.e. lug nuts);
- (p) structural components, including stabilizing devices;
- (q) personal protective devices which are part of the truck;
- (r) fuel system(s);
- (s) any attachments to be used;
- (t) other items specified by the user and/or manufacturer.



6.5.1.1 If the rough terrain forklift truck is found to be in need of repair or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the user's designated authority, and the truck shall not be operated until it has been restored to safe operating condition.



Warning!
Hydraulic Oil
Under Pressure



Use A Board Or
Cardboard To
Check Hydraulic
Leaks. DO NOT Use
Your Hand!



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Tires

- Carry and support the load.
 - ✓ **Distribute the Weight.**
- Must all be the same type.
 - ✓ **Pneumatic, Solid Pneumatic, Foam Filled, Liquid Ballast, etc.**
- Pneumatic - *must all be at the same pressure.*
 - ✓ **Uneven Tire Pressure Increases the Risk of Rollover.**
- Liquid Ballast - *verify ballast levels are equal and must all be at the same pressure.*
 - ✓ **Ensure the Valve is at the Top of the Tire before Opening Valve.**
 - ✓ **Antifreeze Added during Cold Weather.**
- Check tread depth, sidewalls, gouges, flat spots, deterioration, visible wire/threads, visible damage.



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ANSI B56.6-2016 Inspection & Repair of Forks

7.15 Inspection and Repair of Forks

(a) Forks shall be inspected at intervals not greater than 12 months or whenever permanent deformation is suspected. Severe applications shall warrant more frequent inspection. Inspection records shall be kept.

(b) Fork inspection shall be performed by trained personnel. The forks shall be carefully examined for the following:

Examination	Criteria
(1) Surface Cracks	Visual check or nondestructive testing
(2) Straightness of blade and shank	Within 0.5% of length of blade or height of shank
(3) Fork angle from upper face of blade to load face of shank	Not greater than 93 deg. or within 3 deg. of original specification
(4) Relative height of fork tips in set when mounted on fork carrier	Difference in height not to exceed 3% of length of blade
(5) Operation of positioning lock (if provided)	Good repair and correct operation
(6) Wear, especially in the area of heel	Thickness shall be within 10% of original specification or not less than minimum thickness as specified by fork manufacturer
(7) Fit of fork arm mounting hooks or eyes	Visual check for fit with no excessive wear or deformation between hooks and carrier of fork eye and shaft
(8) Markings	Shall be legible



If any of the above criteria are not met, the fork shall be withdrawn from service and shall not be returned to service until it has been repaired in accordance with para. 7.2.15(c).

(c) Only the fork manufacturer or an expert of equal competence shall decide if a fork may be repaired. The repairs shall always be carried out by such qualified personnel to the recommendations and specifications of the fork manufacturer. If a fork is not repairable, it shall be cut in two at the heel area. Repairs are subject to the following restrictions:

- (1) Surface cracks or wear shall not be repaired.



Repair or Replace?

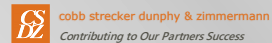
If one fork is damaged, should I replace just the one I need or both?

- Forks should be replaced in pairs. Not doing so will cause your load to be uneven and may cause a tip-over. Uneven loads also put stress on the mast and other major components of the forklift.



What are the guidelines for modifying forks (by drilling, welding, torch cutting, etc.) to install a chain, hitch, rigging, etc. ?

- Forks that have been altered without the manufacturer's approval/assistance have been compromised and no longer meet industry standards. Drilling a hole in your forks increases risk of accidents and OSHA compliance violations. Manufacturer approval must be gained in order to have a hole drilled in your forks.



Operational Pre-start Check

- Foot Brake - *pedal holds, unit stops smoothly.*
- Parking Brake - *holds against slight acceleration.*
- Lift Mechanism - *operates smoothly, check by raising forks to max height then lowering forks.*
- Tilt Mechanism - *moves smoothly and holds, check by tilting mast all the way forward and backward.*
- Leveling Device/Cab Tilt.
- Boom Angle Indicator.
- Data plate, labels and boom angle indicator.
- Backup alarm, beacon light and other warning devices.
- Deadman Seat Brake - *holds when operator rises from seat.*
- Clutch and Gearshift - *shifts smoothly, no jumping/jerking.*
- Cylinders and Hoses - *not leaking after above checks.*
- Dash Control Panel - *all lights and gauges are operational.*
- Steering - *moves smoothly.*



Warning!
Hydraulic Oil
Under Pressure



Use A Board Or
Cardboard To
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Leaks. DO NOT Use
Your Hand!



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Work Area Inspection

- Slopes, inclines, bumps, ramps.
- Excavations, drop offs or holes.
- High winds or severe weather.
- Overhead lines or obstructions.
- Other contractors and equipment.
- Ground conditions: *soil type, improved surfaces, dry, wet, pads/mats required*
- Vehicles and pedestrians – always look behind you.
- Standing water, slippery surfaces, snow, ice.
- Unstable surfaces, loose dirt, gravel.
- Underground utilities.



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Communication Methods

- Voice
- Hand Signals
- 2-way Radios
- Hands-free Device

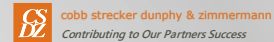


1926.1420 Signals

radio, telephone or other electronic transmission of signals.

(c) The operator's reception of signals must be by a hands-free system.

BEWARE: Ear Buds are Everywhere!!



Using a Spotter

- Picking a load.
- Lifting or lowering a load.
- Close maneuvering.
- Enclosed/congested work areas.
- Backing.
- Obstructed view.
- Overhead lines or obstructions.






Employee Training, Evaluation & Verification

Rough Terrain Forklift

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Training Requirements

- The OSHA standard on training of rough terrain forklift operators applicable to construction is 29 CFR 1926.602(d), which states that the requirements applicable to construction work are identical to those set forth at 1910.178(l).
- Training shall consist of a combination of:
 - ✓ **Formal instruction** – *lecture, discussion, interactive computer learning, written material, etc.*
 - ✓ **Practical training** – *demonstrations or exercises performed by the forklift operator trainee.*
 - ✓ **Evaluation of the operator's performance in the workplace.**
- Employers must certify that each operator has received the training and evaluate each operator at least once every 3 years.

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Performance-Oriented Requirements

- Rough Terrain Forklift 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 forklifts in operation.
- Before allowing an employee to operate a rough terrain forklift, the employer shall ensure each forklift operator:
 - ✓ **Is Competent to Operate a Rough Terrain Forklift Safely, as Demonstrated by Successful Completion of the Training and Evaluation specified by OSHA.**
 - ✓ **Each Operator has Successfully Completed the Required Training (or previously received appropriate training).**
 - ✓ **Is Trained and Evaluated for each Class and Type of Rough Terrain Forklift and Attachment He or She Operates.**



Evaluation of Operator's Performance

- An evaluation of each rough terrain forklift operator's performance must be conducted:
 - ✓ **After Initial Training,**
 - ✓ **After Refresher Training, and**
 - ✓ **At least Once every 3 Years.**
- Evaluation of an operator's performance can be determined by a number of ways, such as:
 - ✓ **Performance Test.**
 - ✓ **Observation of the Employee Operating the Forklift.**
 - ✓ **Written Documentation of Previous Training.**
 - ✓ **Discussion with the Employee.**



Certification

- The employer shall certify that each operator has been trained and has been evaluated at least every 3 years.
- Certification shall include:
 - ✓ **Name of operator.**
 - ✓ **Date of training.**
 - ✓ **Date of evaluation.**
 - ✓ **Identity of person(s) performing the training or evaluation.**

The OSHA standard does not require employees to be licensed. An employer may choose to issue licenses or cards to trained operators.

Refresher Training and Evaluation

- Refresher training and evaluation shall be conducted to ensure that the operator has the knowledge and skills needed to operate the rough terrain forklift safely.
- Refresher training required when:
 - ✓ **Unsafe Operation.**
 - ✓ **Accident or Near-miss.**
 - ✓ **Evaluation Indicates Need.**
 - ✓ **Different Type of Equipment Introduced.**
 - ✓ **Workplace Condition Changes.**

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Training Temporary Agency Employees

- OSHA has issued several letters of interpretations on the subject of training of temporary employees.
 - ✓ **Basically, there is a Shared Responsibility for Assuring Employees are Adequately Trained.**
- The responsibility for providing training should be spelled out in the contractual agreement between the 2 parties.
- The temporary agency or the contracting employer may conduct the training and evaluation of operators from a temporary agency as required by the standard.
- However, the host employer (*or other employer who enters into a contract with the temporary agency*) must provide site-specific information and training on the use of the particular types of trucks and workplace-related topics that are present in the workplace.



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Rough Terrain Forklift Attachments add Efficiency and Versatility

- Load Push Units
- Clamps: *Bale Clamp Drum Clamps, Attachment Clamp, Harbor Clamps, Appliance Clamps, Clamp For Cement Pipes, Paper Roll Clamp, Pipe Clamp, Brick And Block Clamps, Tobacco Clamps*
- Rotator
- Pallet Inverters, 360° Rotating
- Box Discharge Units
- Barrel Lifter
- Forks: *Fork Extension, Multi-pallet Handler, Telescopic Forks, Fork Positioners*
- Sweeper
- Shovels: *Tilting Device With Shovels, Hydraulic Scoops*
- Fork Clamps
- Push-pulls
- Crane: *Jib, Telescopic*
- Personal Basket Or Platform
- Load Stabilizers
- Personal Basket
- Round Timber Gripper
- Snow Pusher
- Side Shift & Tri-lateral Heads
- Hydraulic Rope Hoist

DANGER: Attachments increase risk.



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Attachments Increase Risk

- Forklift operators must know the capacities of the attachments, all necessary precautions and additional limitations imposed on the equipment.
 - ✓ **Operational Characteristics of the Attachment.**
 - ✓ **Changes in Center of Gravity.**
 - ✓ **Impact on Load Chart.**
 - ✓ **Use of Outriggers.**
- Every operator shall be trained and evaluated on each attachment that he or she will use.
 - ✓ **Formal Instruction** – *lecture, discussion, interactive computer learning, written material, etc.*
 - ✓ **Practical Training** – *demonstrations or exercises performed by the forklift operator trainee.*
 - ✓ **Evaluation of the Operator's Performance.**



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Stability and Limitations

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Stability and Load's Center of Gravity

Most rough terrain forklifts rated below 30,000 lbs. have a load center at 24-inches from the heel of the fork.

- ✓ 24-inch load center = 48-inch max fork length.
- ✓ 30-inch load center = 60-inch max fork length.

Center of Gravity

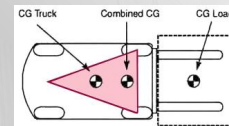
- *Place where the Weight is evenly Dispersed and all Sides are in Balance.*

Combined Center of Gravity

- *Intersection of Forklift's CoG and the Load's CoG.*

Center of Gravity of the Rough Terrain Forklift:

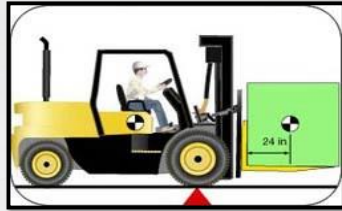
- ✓ **When unloaded, is near the rear wheels.**
- ✓ **Boom is raised but not extended, moves toward rear axle.**
- ✓ **Load is lifted and extended, moves to front axles and upward.**
- ✓ **Moves forward as the load moves forward.**



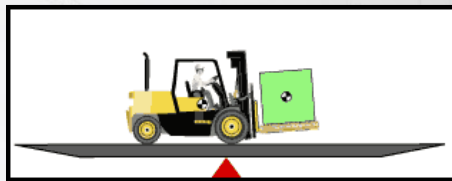
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Stability and Load's Center of Gravity

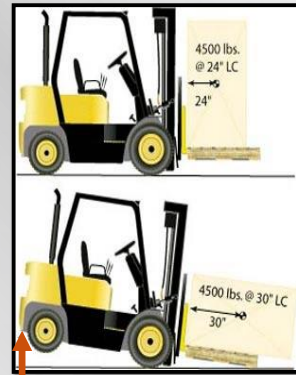
24-inch Load Center



Balanced Equation



Same Load with a Different Load Center is Unbalanced.

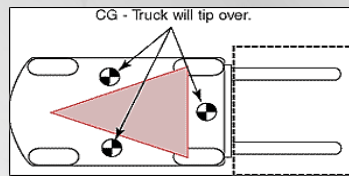
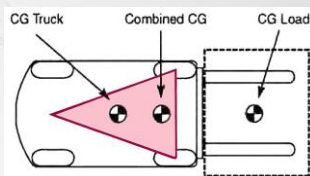
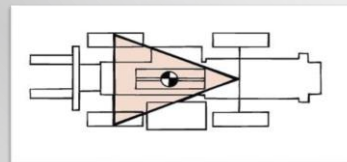


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Stability Pyramid and Combined Center of Gravity

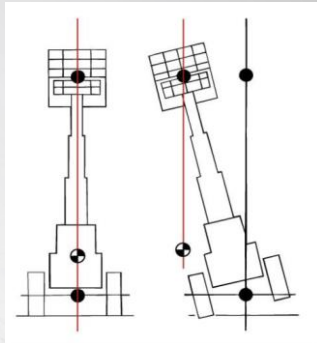
Representation of where a forklift and its load's combined center of gravity must remain in order to avoid an accident, tip-over or rollover.



DANGER: Accidents can occur even when the load is below the forklift's rated capacity.


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Stability on Slopes or Uneven Surfaces

- Always operate the frame sway of the forklift right or left until the indicator shows 0° (level).
- Adjust the frame leveling/cab tilt system before:
 - ✓ **Lifting or Lowering a Load.**
 - ✓ **Traveling across the Face of a Slope.**
- Never adjust the frame level with a load raised on the forks.
- As height increases, there is a smaller margin of error to keep the combined center of gravity in the stability pyramid.

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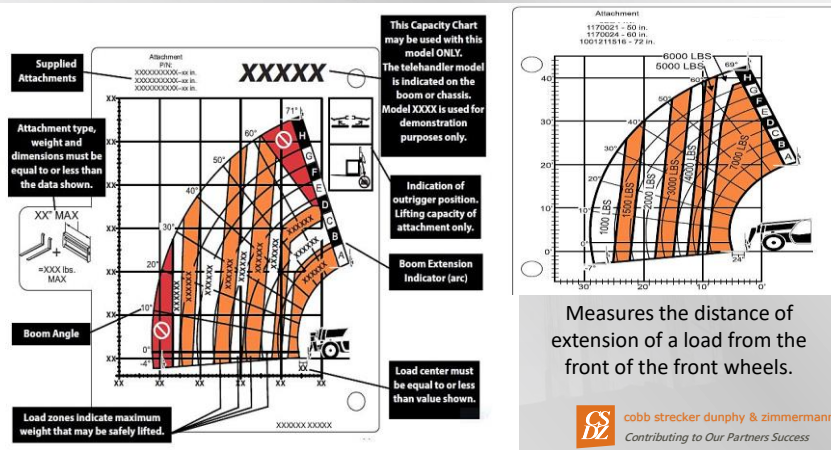


Load Chart


Essential elements to consider:

Capacity is based on:

1. **Boom Length/Extension.**
 2. **Boom Angle.**
- a. *Weight of the Product or Material.*
 - b. *Desired Height or Reach.*
 - c. *Specific Forklift Load Capabilities.*

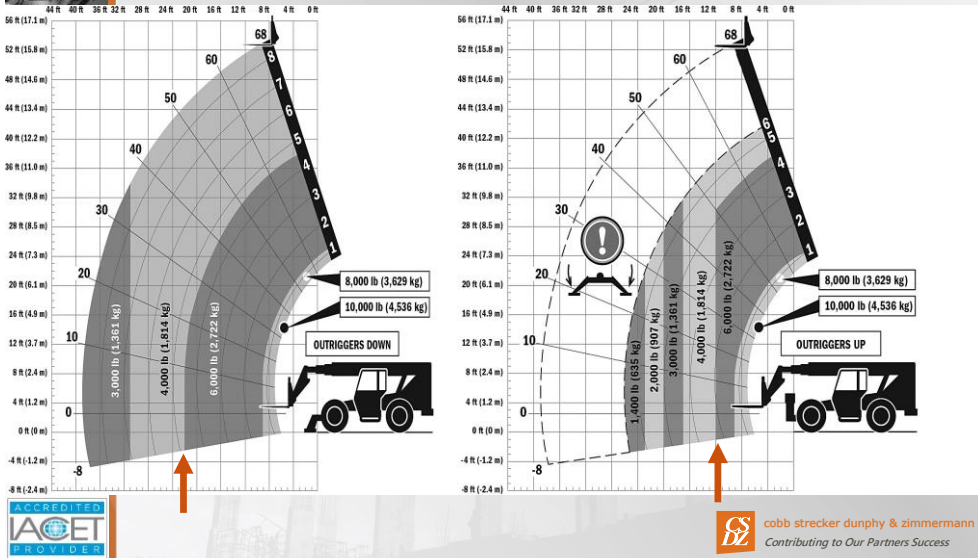


Measures the distance of extension of a load from the front of the front wheels.

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Outriggers and Load Capacity

Know and apply the use of outriggers according the manufacturer instructions – *capacity can be significantly reduced!*



Boom Angle Indicator

Forklift Capacity is based on:

1. **Boom Length/Extension.**
2. **Boom Angle.**

- Must be visible from the operator's seat.
- If the unit is damaged, defective or missing, then an operator cannot accurately use a load chart.



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Necessary Precautions

DANGER: Combined center of gravity may shift (*possibly causing the load to drop, tipping or a rollover*) when the following occurs:

- ✓ **High winds.**
- ✓ **Shifting load.**
- ✓ **Sudden stops.**
- ✓ **Turning too quickly.**
- ✓ **Not using the outriggers.**
- ✓ **Tilting the load while lifting.**
- ✓ **Rapid acceleration or excessive speed.**
- ✓ **Adjusting frame leveling/cab tilt system.**

Smooth, controlled movements are the mark of safe, efficient forklift operation.



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Use of “Approved” Attachments

- Only attachments specifically approved by the manufacturer shall be used on a rough terrain forklift.
- The operator’s manual must state the approved use of attachments.
 - ✓ **If the manual is silent, then the employer must contact the manufacturer to confirm whether or not using such an attachment is approved.**
 - ✓ **If information is unavailable, try to obtain certification from a PE.**
- All attachments shall have a permanently attached nameplate or label.
 - ✓ **Name of the manufacturer, model number, serial number, year of manufacture, max weight of the attachment, distance from center of gravity, attachment capacity --- ANSI B56.6**
- Before operating the equipment, determine any attachment limitations, restrictions or impact on the capacity/load chart.
 - ✓ **Forklifts behave as if partially loaded even when operated without a load on the attachment.**




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Personnel Platform Requirements

- OSHA Subpart L 1926.451 General Requirements for Scaffolds are applicable to a platform used on rough terrain forklifts:
 - ✓ **Capacity, Construction, Access, Use, Fall Protection, Training.**
- **Secured:** entire platform must be secured to carriage or forks.
- **Emergency Shut-off:** means shall be provided so anyone on the platform can shut off power to the forklift.
- **Length Limitation:** total length of the platform must be less than or equal to the total width of the forklift wheelbase plus **10 inches**.
wheelbase = outside to outside of tires
- **No Traveling:** forklift must not be moved horizontally while the platform is occupied.
- Never leave the forklift unattended with anyone on the platform.
- Follow all manufacturer instructions.
- ANSI B56.6 *Personnel Work Platforms for Elevating Personnel*

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Definition of “Unattended Equipment”


- The standard §1926.600(a)(3) does not define the terms "not in use" or "parked." In light of the purpose of the standard and the context of this provision, "not in use," normally means when the equipment operator is not at the equipment's controls.
- Rough terrain forklift can be considered unattended:
 - ✓ **When the operator is 25 ft. or more away from the forklift which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.**
 - ✓ **When the operator of an forklift is dismounted and within 25 ft. of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.**

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Warning!
Forklift Roll Away
Can Cause Death
Or Serious Injury





Warning!
Forklift Tip Over
Can Cause Death
Or Serious Injury



DO NOT Jump!
If Forklift Tips,
Keep Seat belt ON
And Brace Yourself

Rollover Protection (ROPs) & Seatbelts

- ROPs are designed to support 1 ½ times the weight of the forklift in a roll over event.
- ROPs and seatbelts work together to protect the operator in the event of a rollover.
 - ✓ Safest place to be in a rollover is in the operator's seat.
 - ✓ Do not try to escape from a tipping forklift. Keep your seatbelt fastened, grab the steering wheel, lean away from the point of impact.
 - ✓ Many forklift fatalities result from the lift crushing the operator after they have fallen or tried to jump from the forklift.
- Is there any time when a seatbelt doesn't have to be worn?
 - ✓ OSHA does not distinguish based on the number of stops.
 - ✓ OSHA requires that if a seat belt is on the equipment, it must be used at all times while operating.

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- Necessary Precautions based on Task/Equipment.
- Accomplish More Work with Less Effort.

Safe and Efficient Operating Methods

Rough Terrain Forklift



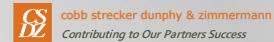
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Rough Terrain Forklift Considerations

Before lifting/placing material, define the following:

- Type of forklift to be used.
- Maximum lift capacity (*on rubber / on outriggers*).
- Travel restrictions related to lift.
- Weight of object to be lifted.
- Weight of all rigging and hardware.
- Boom angle and boom extension.
- Lift is _____ % capacity of forklift's total capacity.



Lift Plan Calculations

- Greater than 75% capacity equals **CRITICAL LIFT**.
 - ✓ **Reaching too far or too much weight.**
 - ✓ **Ask: Is this the right equipment for the job?**
 - ✓ **You may want to consider getting a crane.**
- When lifting material with a rough terrain forklift calculations should be documented as to the percentage of lift capacity (*less than 75% of rated capacity*) of the fork attachment and communicated to the operator and riggers prior to start of lift.
- Load chart, boom angle, boom extension and distance from center must be reviewed.
- Free rigging to the forks is prohibited.



Operation



Make Sure All Safety Labels Are Attached And Legible



Replace Worn And Illegible Safety Labels And Labels

- Labels, warnings and instructional decals.
 - ✓ **Must be legible to provide specific guidance, instruction, warnings, identification, capacities and limitations.**
 - ✓ **Do not provide all the necessary information for operation.**
- Operator's manual.
 - ✓ **Shall be provided on each forklift.**
 - ✓ **Shall be in a weather resistant container to prevent damage.**
 - ✓ **Shall be read and understood by the operator.**



Read Operator Manual Before Operating This Forklift



- **No Generic "Safety Manuals".**
- **Must be specific to the Manufacturer and Type of Forklift.**



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Assess the Load before Picking it Up

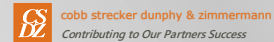
- Estimate the weight of the load.
 - ✓ **Manifests, rebar tags, reference books for material weights.**
- Estimate the load's center of gravity.
 - ✓ **Balanced, Stable and Secure – Wrap if Necessary.**
- Place the load at the heel of the forks for max capacity.
- Double-tiered are inherently unstable, avoid if possible.
- Suspended loads will require additional precautions.



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Picking Up a Load

- Use the correct load chart to review the rated load capacity and any limitations due to an attachment.
- Spread the forks as wide as possible for max capacity.
- Position your forklift perpendicular to the center of the load and stop the lift away from the load.
- Place the forklift in neutral, apply the parking brake.
- Adjust the frame leveling system, as necessary.
- Extend the forks into the load by extending the boom.
 - ✓ **Never Drive Into or Run Into a Load – Can Damage The Boom.**
 - ✓ **Never Use just One Fork to Lift a Load – Unbalance/Uneven Load.**
 - ✓ **Control “Feathering” may be Necessary – Adjusting the Position of the Boom and Angle of the Forks.**
- Insert forks under the load until it is against the fork frame.
- Tilt forks back and raise boom slightly to an angle of about 10 to 15 degrees to secure the load.



Work Area Inspection

- Slopes, inclines, bumps, ramps.
- Excavations, drop offs or holes.
- High winds or severe weather.
- Overhead lines or obstructions.
- Other contractors and equipment.
- Ground conditions: *soil type, improved surfaces, dry, wet, pads/mats required*
- Vehicles and pedestrians – always look behind you.
- Standing water, slippery surfaces, snow, ice.
- Unstable surfaces, loose dirt, gravel.
- Underground utilities.



Clearance Distances

TABLE A—MINIMUM CLEARANCE DISTANCES

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

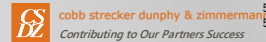
Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

Table T – Minimum clearance distances while traveling with no load

Voltage	Clearance
Up to 0.75 kV	4 ft
>0.75 to 50 kV	6 ft
>50 to 345 kV	10 ft
>345 to 750 kV	16 ft
>750 to 1,000 kV	20 ft
> 1,000 kV	*

*Established by owner or registered professional engineer/qualified person

OSHA 1926.1411
Power line safety
while traveling
under or near power
lines with no load



Traveling with a Load

- Level the frame before traveling with a load.
- Carry load as low as possible while maintaining ground clearance, visibility.
- Use first gear for highest torque and pulling power.
 - ✓ **Never travel in high gear when carrying a load.**
- If the load shifts, stop the forklift immediately.
 - ✓ **Lower and adjust the load to center its weight.**
 - ✓ **If the load shift is too great for adjustment, rearrange the load before attempting to move the forklift.**
- Use a spotter when view is restricted, close maneuvering, etc.
- Keep the load uphill on ramps or inclines

Traveling on Rough Terrain

- **SLOW DOWN!**
 - ✓ **Travel in First Gear.**
- Smooth, controlled movements are a telltale safe, efficient operation.

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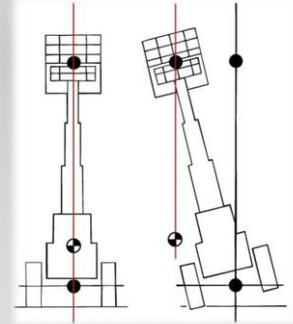


Suspended Loads & Free Rigging

OSHA LOI Standard Interpretations 10/22/1999

Forklifts: free rigging requires manufacturer approval.

- Free rigging is the direct attachment to or placement of rigging equipment (slings, shackles, rings, etc.) onto the tines of a powered industrial truck for a below-the-tines lift. This type of lift does not use an approved lifting attachment.
- Although free rigging is a common practice, it could affect the capacity and safe operation of a powered industrial truck. 29 CFR 1910.178(a)(4) requires that "Modifications and additions which affect the capacity and safe operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly." In addition, 1910.178(o)(1) requires that "Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered."



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JLG Industries, Inc. • 13224 Fourteenth Plaza, Nazareth, PA 18802 • Telephone: 249-420-2961 • Fax: 249-420-0119 • www.jlg.com

Product Safety & Reliability Department
Telephone: 877-JLG-SAFE
Facsimile: 201-745-3713
E-mail Address: product.safety@jlg.com



Attn: Safety Manager or Service Manager
Subject: JLG Lifting Hook Attachments
Date: March 16, 2010

Per your request, JLG Industries, Inc. submits the following:

You have inquired as to approved attachments for JLG manufactured telehandlers to lift and place a suspended load.


The use of chains and/or straps attached directly to the forks, load bar, carriage or quick attach is not authorized as the quick attach or mast carriage could be damaged due to improper loading and the load could come in contact with or slide off of the forks causing damage or loss of the load.

To lift suspended loads using an existing carriage, JLG Industries, Inc. requires the use of the approved JLG Lifting Hook Attachment, with the following provisions:

- The Lifting Hook's maximum capacity is shown on the serial number plate of the lifting hook.
- The appropriate carriage capacity chart for the telehandler model must be used. Weight of lifting hook and rigging must be included as part of total load being lifted.
- Pallet/lumber forks of an appropriate load rating must be used. Do not use with cubing/block forks.
- Pins are provided on the attachment that must be used to secure the lifting hook behind the heel of each fork. This will help protect against the attachment from being disengaged from the forks.
- Refer to the appropriate Operation and Safety Manual for the telehandler model the lifting hook will be used on. This literature provides information regarding appropriate methods for lifting suspended loads.
- Do not use the lifting hook attachment on 6 ft. masts or 8 ft. towers.
- Do not use the lifting hook attachment with carriages capable of rotating (i.e. side tilt and swing carriages) without disabling the rotation feature(s).



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Fork or Carriage Mounted Hook

Use only manufacturer approved attachments.

✓ Forks or carriage must be centered above the load.




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Suspended Load



- Verify weight does not exceed capacity.
 - ✓ **Weight of all Rigging Must be Included in the Load.**
- Tether all suspended loads to restrict movement.
- BEWARE of WIND: can cause load to swing side to side.
- NEVER use the frame-leveling mechanism to compensate for load swing.
- NEVER drag or pull a load – only lift vertically.
- ALWAYS keep heaviest part of load closest to attachment.
- When driving with a suspended load:
 - ✓ **Do Not Extend the Boom.**
 - ✓ **Do Not Raise the Boom more than a Foot Off the Ground.**
 - ✓ **Do Not Exceed Walking Speed.**

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Stability Concerns:

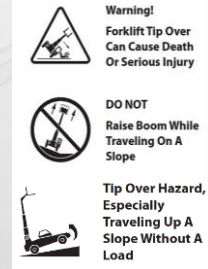
- Loads become less stable when raised to greater heights and longer extension of the boom.

Height and Boom Extension Examples:

- ✓ **At 30-feet, sway or movement of 1.5 feet can cause the forklift to tip over or rollover.**
- ✓ **At 42 feet, sway or movement as little as 6 inches can cause the forklift to tip over or rollover.**

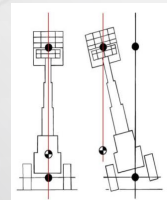
Practical Methods to Prevent Unstable Loads:

- ✓ **Proper Load Set-up and Placement.**
- ✓ **Load Control: Raising, Lowering, Extension, Retracting.**
- ✓ **Smooth and Controlled Operation.**



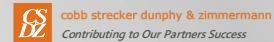
Lifting/Placing a Load or Unloading

- Before placing a load at any height or extension, verify load capacity chart for safe boom angle and extension.
- Position forklift in the best location to lift/place a load.
 - ✓ **Ground conditions suitable to support the weight?**
- Set the parking brake and transmission in NEUTRAL.
- Set the outriggers, if equipped.
- Move the boom so the load is about 1 foot above the ground surface or the boom is raised less than 45 degrees.
- Observe level indicator, determine if the forklift is level before lifting the load.
- Align the forks at the level the load will be placed.
- Extend boom slowly until load is just above the area where it is to be placed.
 - ✓ **Dunnage or Cribbing may be Necessary.**
- Lower boom until load rests in position and forks are free to retract.
 - ✓ **Control "Feathering" may be Necessary – Adjusting the Position of the Boom and Angle of the Forks.**
- Retract the forks slowly from under the load.



Parking and Shutdown

- About half of the reported accidents with forklifts involve operators who slip/trip/fall off the equipment.
 - ✓ **Always use 3-points of contact when entering or exiting cab.**
 - ✓ **Do not grab the steering wheel, it may cause you to lose control.**
- If possible, avoid parking on an incline.
 - ✓ **Chock the wheels, if necessary.**
- Retract the boom, place carriage on the ground and forks level with ground.
- Controls in neutral.
- Set the parking brake.
- Turn the engine off and secure the keys.
- Operate the controls to release any stored energy.



- Distinguish construction-specific expectations from general industry requirements.
- Determine which forklift program elements are necessary and which are not.
- Develop a training program specific for your operations.
- Discuss stability characteristics (lift and load) and limitations.
- Outline safe, efficient operating procedures.

In Closing...





Thank you.



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