

New Mexico Strategic National Stockpile (SNS) Site(s) Material Handling Equipment (MHE) Guidelines

Material handling equipment is all equipment that relates to the movement, storage, control and protection of materials, goods and products throughout the process of manufacturing, distribution, consumption and disposal. Material handling equipment is the mechanical equipment involved in the complete system. Material handling equipment is generally separated into four main categories: storage and handling equipment, engineered systems, industrial trucks, and bulk material handling



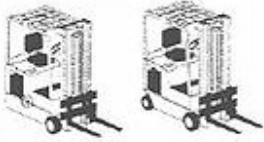






Forklifts are the most common type of industrial truck.

Industrial trucks

Industrial trucks usually refer to operator driven motorized warehouse vehicles, powered manually, by gasoline, propane or electrically. Industrial trucks assist the material handling system with versatility; they can go where engineered systems cannot. [Forklift trucks](#) are the most common example of industrial trucks but certainly aren't the extent of the category. Tow tractors and stock chasers are additional examples of industrial trucks.



Forklift Classes and Lift Codes

Class #	Type of Propulsion and Operation	Lift Code	Description	Picture
I	Electric Motor Rider	4	Counterbalanced, sit-down, 3-wheel	
		5	Counterbalanced, sit-down, cushion (solid) tire	
		6	Counterbalanced, sit-down, pneumatic tire	
III	Electric Motor Walkie	2	Low-lift pallet	
		5	High lift reach type	
		7	High lift counterbalanced	
IV	Internal Combustion Engine Rider	3	Counterbalanced, sit-down, cushion (solid) tire	
V	Internal Combustion Engine Rider	4	Counterbalanced, sit-down, pneumatic tire	
VII	Rough Terrain	1	All types	

Other types of MHE

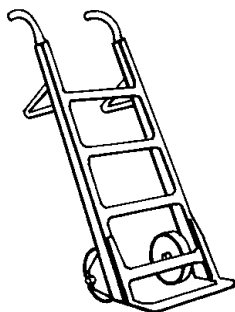


A Raymond reach truck. Note the [pantograph](#) allowing the extension of the forks in tight aisles. This electric machine weighs over 7000lbs and can lift 4000lbs to 24 feet in the air.

1. Hand Truck

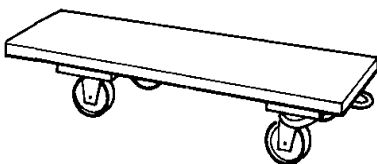
Non-pallet + manual + no stack

1(a) Two-Wheeled Hand Truck



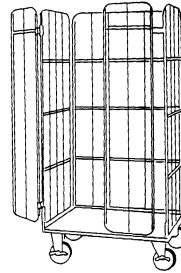
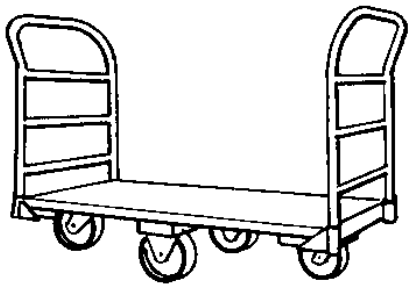
Load tilted during travel

1(b) Dolly



Three or more wheeled hand truck with a flat platform in which, since it has no handles, the load is used for pushing.

1(c) Floor Hand Truck



Four or more wheeled hand truck with handles for pushing or hitches for pulling

Sometimes referred to as a "cart" or "(manual) platform truck"

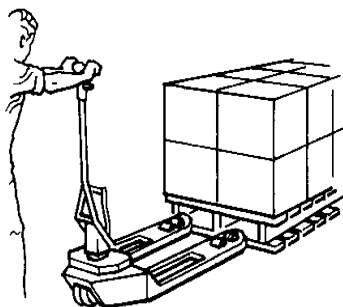
2. Pallet Jack

Pallet + walk + no stack

Front wheels are mounted inside the end of the forks and extend to the floor as the pallet is only lifted enough to clear the floor for subsequent travel

Pallet restrictions: reversible pallets cannot be used, double-faced nonreversible pallets cannot have deckboards where the front wheels extend to the floor, and enables only two-way entry into a four-way notched-stringer pallet because the forks cannot be inserted into the notches

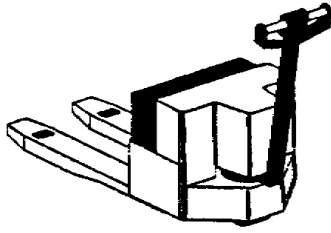
2(a) Manual Pallet Jack



Pallet + walk + no stack + manual

Manual lifting and/or travel

2(b) Powered Pallet Jack



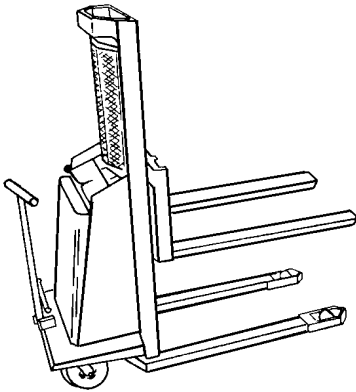
Pallet + walk + no stack + powered

Powered lifting and/or travel

3. Walkie Stacker

Pallet + walk + stack

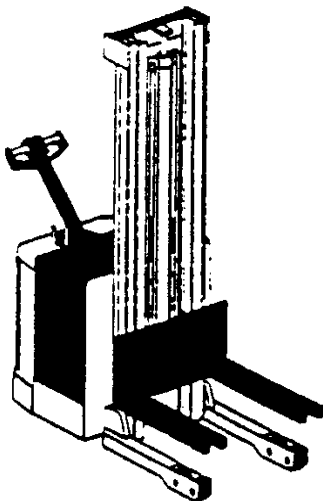
3(a) Manual Walkie Stacker



Pallet + walk + stack + manual

Manual lifting and/or travel (and straddle load support)

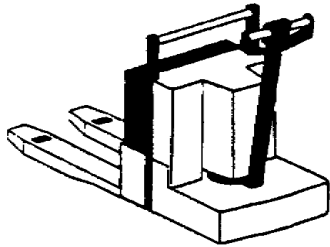
3(b) Powered Walkie Stacker



Pallet + walk + stack + powered

Powered lifting and/or travel (and either counterbalance or straddle load support)

4. Pallet Truck



"(walkie) pallet truck"

Pallet + ride + no stack

Same pallet restrictions as a pallet jack

Control handle typically tilts to allow operator to walk during loading/unloading

Powered pallet jack is sometimes referred to as a

5. Platform Truck

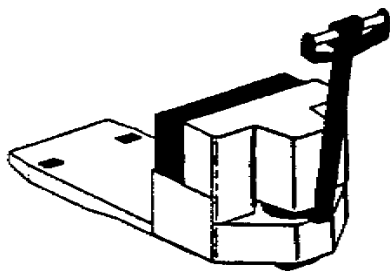
Non-pallet + powered + no stack

Platform used to provide support for nonpalletized loads

Used for skid handling; platform can lift skid several inches to allow it to clear the floor

Greater lifting capacity compared to fork trucks because the platform provides a greater lifting surface to support a load

5(a) Walkie Platform Truck

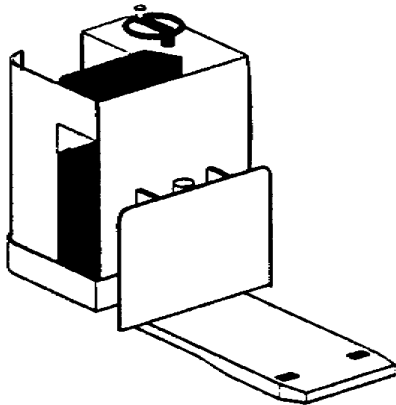


Non-pallet + powered + no stack + walk

Operator walks next to truck

Floor hand truck is sometimes referred to as a "(manual) platform truck"

5(b) Rider Platform Truck



Non-pallet + powered + no stack + ride

Operator can ride on truck

6. Counterbalanced (CB) Lift Truck

Pallet + ride + stack

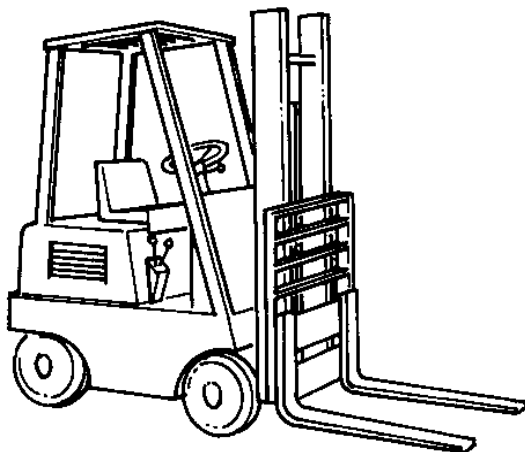
Also referred to as fork truck.

Weight of vehicle (and operator) behind the front wheels of truck counterbalances weight of the load (and weight of vehicle beyond front wheels); front wheels act as fulcrum or pivot point.

Rated capacity reduced for load centers greater than 24 in. and lift heights greater than 13 ft.

Workhorses of material handling because of their flexibility: indoor/outdoor operation over a variety of different surfaces; variety of load capacities available; and variety of attachments available—fork attachments can replace the forks (e.g., carton clamps) or enhance the capabilities of the forks (e.g., blades for slipsheets).

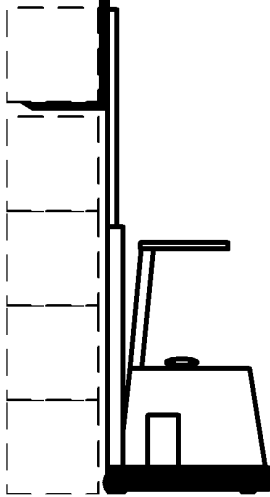
6(a) Sit-Down Counterbalanced Lift Truck



Operator sits down

12-13 ft. minimum aisle width requirement

6(b) Stand-Up Counterbalanced Lift Truck

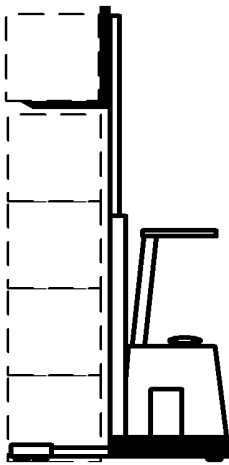


Operator stands up, giving vehicle narrow-aisle capability

9-11 ft. minimum aisle width requirement

Faster loading/unloading time compared to NA straddle and reach trucks

7. Narrow-Aisle (NA) Straddle Truck



Similar to stand-up CB lift truck, except outrigger arms straddle a load and are used to support the load instead of the counterbalance of the truck

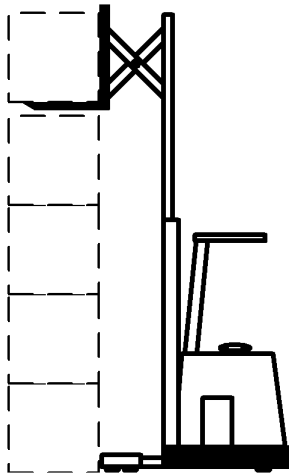
7-8 ft. minimum aisle width requirement

Less expensive than stand-up CB lift truck and NA reach truck

Since the load is straddled during stacking, clearance between loads must be provided for the outrigger arms

Arm clearance typically provided through the use of load-on-beam rack storage or single-wing pallets for load-on-floor storage

8. Narrow-Aisle (NA) Reach Truck



Similar to both stand-up CB lift truck and NA straddle truck

8-10 ft. minimum aisle width requirement

Load rests on the outrigger arms during transport, but a pantograph (scissors) mechanism is used for reaching, thereby eliminating the need to straddle the load during stacking

Reaching capability enables the use of shorter outrigger arms (arms $> 1/2$ load depth) as compared to NA straddle truck (arms = load depth)

Counterbalance of the truck used to support the load when it extends beyond the outrigger arms

Although the NA reach truck requires slightly wider aisles than a NA straddle truck since its outrigger arms do not enter a rack during storage, it does not require arm clearance between loads (arm clearance is still required when the truck must enter a storage lane when block stacking or drive-in or -through racks are used)

Extended reaching mechanisms are available to enable double-deep storage

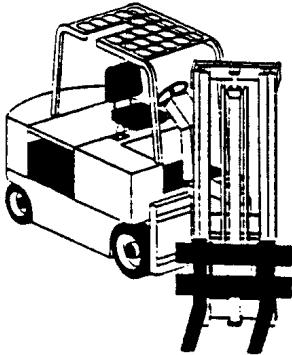
9. Turret Truck

Greater stacking height compared to other narrow-aisle trucks (40 ft. vs. 25 ft.), but greater investment cost

Forks rotate to allow for side loading and, since truck itself does not rotate during stacking, the body of the truck can be longer to increase its counterbalance capability and to allow the operator to sit

Can function like a sideloader for transporting greater-than-pallet-size load.

9(a) Operator-Down Turret Truck

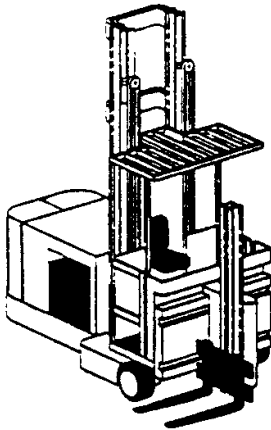


Operator not lifted with the load

5-6 ft. minimum aisle width requirement

Termed a *swingmast truck* (picture shown) when, instead of just the forks, the entire mast rotates (thus can store on only one side of a aisle while in aisle)

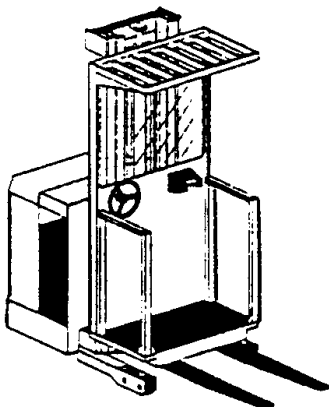
9(b) Operator-Up Turret Truck



Operator lifted with the load to allow precise stacking and picking

5-7 ft. minimum aisle width requirement

10. Order Picker



Similar to NA straddle truck, except operator lifted with the load to allow for less-than-unit-load picking

Typically have forks to allow the truck to be used for pallet stacking and to support a pallet during less-than-pallet-load picking

"Belly switch" used for operator safety during picking

Materials Handling Guidelines:

**Preventing Injuries and Deaths of Workers
Who operate or Work near Forklifts.**

WARNING!

Workers who operate or work near forklifts may be struck or crushed by the machine or the load being handled.

Workers: If you operate or work near forklifts, take these steps to protect yourself.

Do not operate a forklift unless you have been trained and licensed

Use seatbelts if they are available

Report to your supervisor any damage or problems that occur to a forklift during your shift

Do not jump from an overturning, sit-down type forklift. Stay with the truck, holding on firmly and leaning in the opposite direction of the overturn

Exit from a stand-up type forklift with rear-entry access by stepping backward if a lateral tip over occurs

Use extreme caution on grades or ramps

On grades, tilt the load back and raise it only as far as needed to clear the road surface

Do not raise or lower the forks while the forklift is moving

Do not handle loads that are heavier than the weight capacity of the forklift

Operate the forklift at a speed that will permit it to be stopped safely

Slow down and sound the horn at cross aisles and other locations where vision is obstructed

Look toward the travel path and keep a clear view of it

Do not allow passengers to ride on forklift trucks unless a seat is provided

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When dismounting from a forklift, set the parking brake, lower the forks or lifting carriage, and neutralize the controls

Do not drive up to anyone standing in front of a bench or other fixed object

Do not use a forklift to elevate workers who are standing on the forks

Elevate a worker on a platform only when the vehicle is directly below the work area

Whenever a truck is used to elevate personnel, secure the elevating platform to the lifting carriage or forks of the forklift

Use a restraining means such as rails, chains, or a body belt with a lanyard or deceleration device for the worker(s) on the platform

Do not drive to another location with the work platform elevated

Only forklift operators may operate the forklift!!!

PRE-USE INSPECTION

Do not use the forklift if any of the following conditions exist:

The mast has broken or cracked weld-points;

The roller tracks are not greased or the chains are not free to travel;

The forks are unequally spaced or cracks exist along the blade or at the heels;

Hydraulic fluid levels are low;

The hydraulic lines and fittings have excessive wear or are crimped;

Fluid is leaking from the lift or the tilt cylinders;

The hardware on the cylinders is loose;

The tires are excessively worn or split, or have missing tire material;

Air filled tires are not filled to the operating pressure indicated on the tire;

The batteries have cracks or holes, uncapped cells, frayed cables, broken cable insulation, loose connections or clogged vent caps.

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STARTING THE FORKLIFT

Apply the foot brake and shift gears to neutral before turning the key

PICKING UP A LOAD

"Square up" on the center of the load and approach it straight on with the forks in the travel position

Stop when the tips of your forks are about a foot from the load

Level the forks and slowly drive forward until the load is resting against the backrest of the mast

Lift the load high enough to clear whatever is under it

Back up about one foot, then slowly and evenly tilt the mast backwards to stabilize the load

PUTTING A LOAD DOWN

"Square up" and stop about one foot from the desired location

Level the forks and drive to the loading spot

Slowly lower the load to the floor

Tilt the forks slightly forward so that you do not hook the load

When the path behind you is clear of obstructions, back straight out until the forks have cleared the pallet

STACKING ONE LOAD ON TOP OF ANOTHER

Stop about one foot away from the loading area and lift the mast high enough to clear the top of the stack

Slowly move forward until the load is squarely over the top of the stack

Level the forks and lower the mast until the load is no longer supported by the forks

Look over both shoulders for obstructions and back straight out if the path is clear

FORKLIFT SAFETY RULES

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Do not use bare forks as a man-lift platform

Approach railroad tracks at a 45 angle when driving the forklift

Steer the forklift wide when making turns

Sound the forklift horn when approaching blind corners, doorways or aisles to alert other operators and pedestrians

LIFTING

Do not exceed the lift capacity of the forklift; read the lift capacity plate on the forklift if you are unsure

Follow the manufacturer's guidelines concerning changes in the lift capacity before adding an attachment to a forklift

Lift the load an inch or two to test for stability; if the rear wheels are not in firm contact with the floor, take a lighter load or use a forklift that has a higher lift capacity

Do not raise or lower a load while you are en route; wait until you are in the loading area and have stopped before raising or lowering the load

After picking up a load, adjust the forks so that the load is tilted slightly backward for added stability

Raise the forks an additional two inches to avoid hitting or scraping the ramp surface as you approach the ramp

DRIVING

Obey all traffic rules and signs

Drive with the load at a ground clearance height of 4-6 inches at the tips and 2 inches at the heels in order to clear most uneven surfaces and debris

Drive at a walking pace and apply the brakes slowly when driving on slippery surfaces such as icy or wet floors

Do not drive into an area with a ceiling height that is lower than the height of the mast or overhead guard

Do not drive up to anyone standing or working in front of a fixed object such as a wall

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Do not drive along the edge of an unguarded elevated surface such as a loading dock or staging platform

Do not exceed a safe working speed of five miles per hour. Slow down in congested areas when driving the forklift

Stay a minimum distance of three truck lengths from other operating mobile equipment

Drive in reverse and use a signal person when your vision is blocked by the load

Look in the direction that you are driving; proceed when you have a clear path

Do not drive the forklift while people are on the attached man-lift platform

Drive unloaded forklifts in reverse when going up a ramp and forward when going down a ramp

Drive a loaded forklift in a forward gear when going up a ramp; upon approaching the ramp, raise the forks an additional two inches to avoid hitting or scraping the ramp surface

Do not attempt to turn the forklift around on a ramp

Do not use a gear for the opposite direction of travel as a means to slow down or stop the forklift

Lower the mast completely, turn the engine off and set the parking brake before leaving your forklift

LOADING DOCKS

Keep the forklift clear of the dock edge while vehicles are backing up to the dock

Do not begin loading or unloading until the supply truck has come to a complete stop, the engine has been turned off, the dock lock has been engaged and the wheels have been chocked

Do not drive the forklift into the truck until the bridge or dock plate has been attached

Do not drive the forklift into a truck bed or onto a trailer that has "soft" or loose decking or other unstable flooring

Drive straight across the bridge plates when entering or exiting the trailer

Use dock lights or headlights when working in a dark trailer

PALLET JACK USE

Only pallet jack operators may operate pallet jacks

Do not exceed the manufacturer's load rated capacity; read the lift capacity plate on the pallet jack if you are unsure

Do not ride on pallet jacks

Start and stop the pallet jack gradually to prevent the load from slipping

Pull manual pallet jacks; push them when going down an incline or passing close to walls or obstacles

If your view is obstructed, ask a spotter to assist in guiding the load

Stop the pallet jack if anyone gets in your way

Never place your feet under the pallet jack

DOCKS (NON-FORKLIFT)

When stocking shelves by hand, position the materials to be shelved slightly in front of you, so you do not have to twist when lifting and stacking materials

Visually inspect for sharp objects or other hazards before reaching into containers such as garbage cans, boxes, bags or sinks

Remove or bend nails and staples from crates before unpacking the crates

When cutting shrink wrap with a blade, always cut away from you and your co-workers

Do not try to kick objects out of pathways; push or carry them out of the way

Do not let items overhang from shelves into walkways

Move slowly when approaching blind corners

Place heavier loads on the lower or middle shelves

Remove one object at a time from shelves

Place items on shelves so that they lie flat and do not wobble

HAND TRUCK OPERATIONS

When loading hand trucks, keep your feet clear of the wheels

Do not exceed the manufacturer's load rated capacity; read the capacity plate on the hand truck if you are unsure

Place the load so that it will not slip, shift or fall; use the straps, if they are provided, to secure the load

For extremely bulky or pressurized items such as gas cylinders, strap or chain the items to the hand truck

Tip the load slightly forward so that the tongue of the hand truck goes under the load

Push the tongue of the hand truck all the way under the load that is to be moved

Keep the center of gravity of the load as low as possible by placing heavier objects below the lighter objects

Push the load so that the weight will be carried by the axle and not the handles

If your view is obstructed, ask a spotter to assist in guiding the load

Do not walk backward with the hand truck, unless going up stairs or ramps

When going down an incline, keep the hand truck in front of you so that it can be controlled at all times

Move hand trucks at a walking pace

Store hand trucks with the tongue under a pallet, shelf, or table

For More Information on MHE

http://en.wikipedia.org/wiki/Material_handling_equipment

Source: NIOSH [2001]. *NIOSH Alert: Preventing Injuries and Deaths of Workers Who operate or Work near Forklifts*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, ADH (NIOSH) Publication No. 2001-109. Fax: 513-533-8573 or visit the NIOSH Web site at <http://www.cdc.gov/niosh> for a copy.