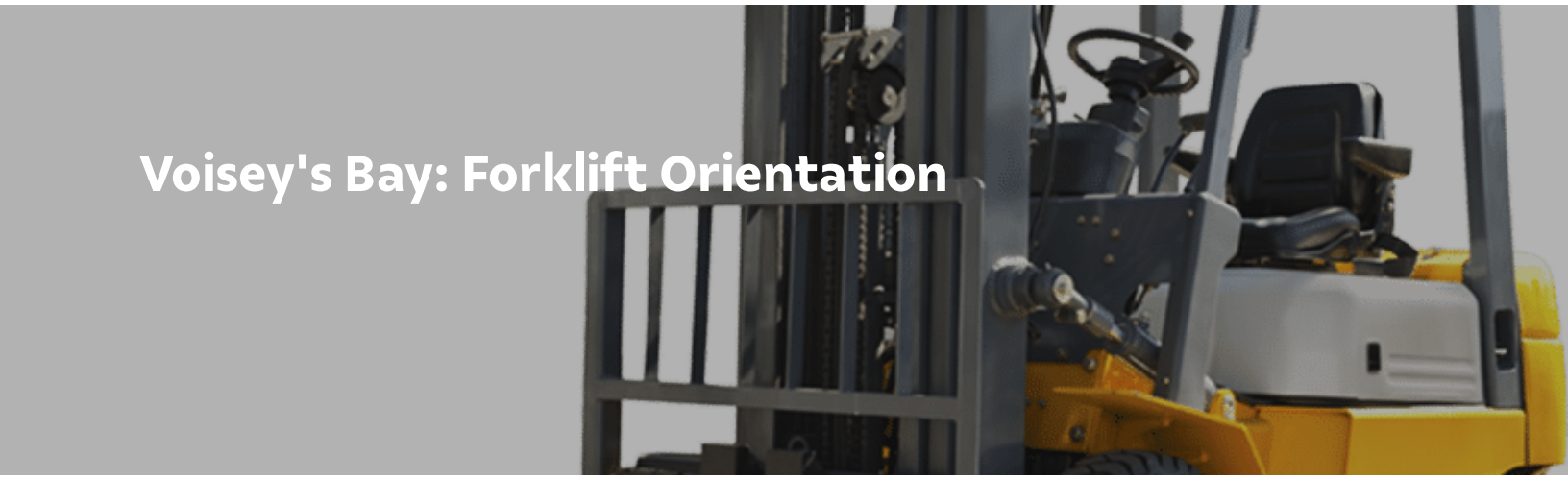
Voisey's Bay: Forklift Orientation



Hello, welcome to the **About Forklifts module.**
This course is a combination of two components, knowledge based instruction, this module, and skills based training on selected Forklifts.
The skill based component is where trainees will be expected to demonstrate specific skill sets as part of the evaluation process.
You must obtain a minimum score of 70% on the quiz as well as demonstrate a minimum acceptable level of skill on designated forklifts to be considered a qualified operator.
Enjoy the module.
Please note: Some terms or terminology contained within this module have been changed to reflect Vale's Diversity & Inclusion program and our commitment to valuing our diverse workforce and promoting an environment of respect and equal opportunities.

Revision date: August 12 2022
Module Duration: About I hour 40 minutes

Welcome

Context

Bowtie

Types, designations and areas of use

Equipment description

Principles of counterbalance

Controlling the equipment

Safe operation

Hazards and controls

Quiz

Conclusion

Welcome

Upon completion of each section of this module, you will be given an opportunity to submit questions to obtain clarification of any content you are not sure of.

You will also be required to complete a brief survey designed to support continual improvement to your Vale learning experience.

00:16

Got a Question?

Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

Watch the video in full to continue.

Context

This module is a general introduction to the forklift: its power source, controls and instruments, and their relative use in operational movements.
It provides equipment pictures and illustrations to help visualize the forklift and the interaction of its various parts. It explains what it does, what it consists of, and how it is controlled and operated. There are however, many models of forklifts used at Vale.
The principles are all the same and much of the information provided with respect to the physical hardware of the equipment also applies.

Important:

You must be both *Qualified and Authorized* prior to operating any forklift.

00:40

Complete the content above before moving on.

Activity

It’s time for a quiz!

Match the causes of forklift accidents to the box given, in the order of most frequent to least frequent.

Collisions	Frequent
Load Shifting or Falling	Somewhat Frequent
Tip Over or Roll Over	Least Frequent

SUBMIT

CONTINUE

Wrap Up:

You have reached the end of this section of the module! In the next section, you will learn how Bowties, assist in understanding some of the risks associated with operating

a forklift and the safe operating requirements to mitigate those risks.

00:14

Got a Question?

Submit your question here using Vale forms, be sure to include your first name last name and contact information.

CLICK HERE!

Complete the content above before moving on.

Bowtie

Important: this module addresses safety and operating procedures common to all types of Forklifts.

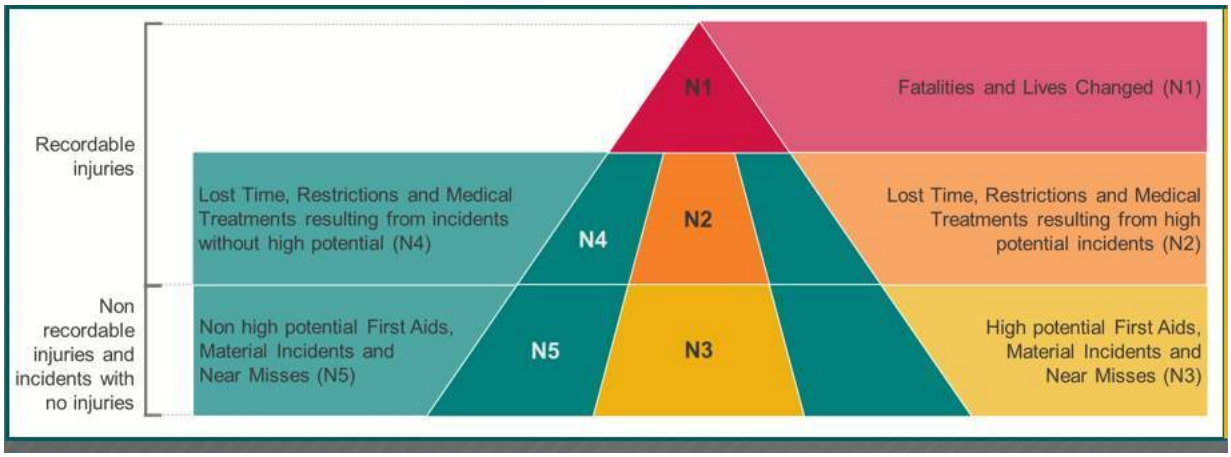
Not all requirements in this module will be present in the bowtie. Reading the document is essential.

00:11

Incident/Accident History

While the overall objective is to reduce or eliminate workplace hazards, it should be recognized that not all workplaces within Vale operations can be made free of all hazards.

Critical to safe operation is the ability to recognize and control hazards that may cause injuries, equipment damage, or even worse, fatalities.



Our injury and fatality index is updated monthly. It shows the numbers for Fatalities and Live Changed (N1), Recordable High-Potential Injuries (N2), Other High-Potential events (N3), Recordable Non-High Potential Injuries (N4), and Other Non-High Potential events (N5)

00:18

Do you know what a bowtie is?

It is a very efficient risk analysis tool that identifies the event, the barriers (controls) and the consequences.

For Forklifts, bowties assist in understanding the safe operating requirements. This module will show some bowtie diagrams about the main events related to the operation of Forklifts.

It is important that you are familiar with this tool!

00:23

Watch the video below and understand bowties better!

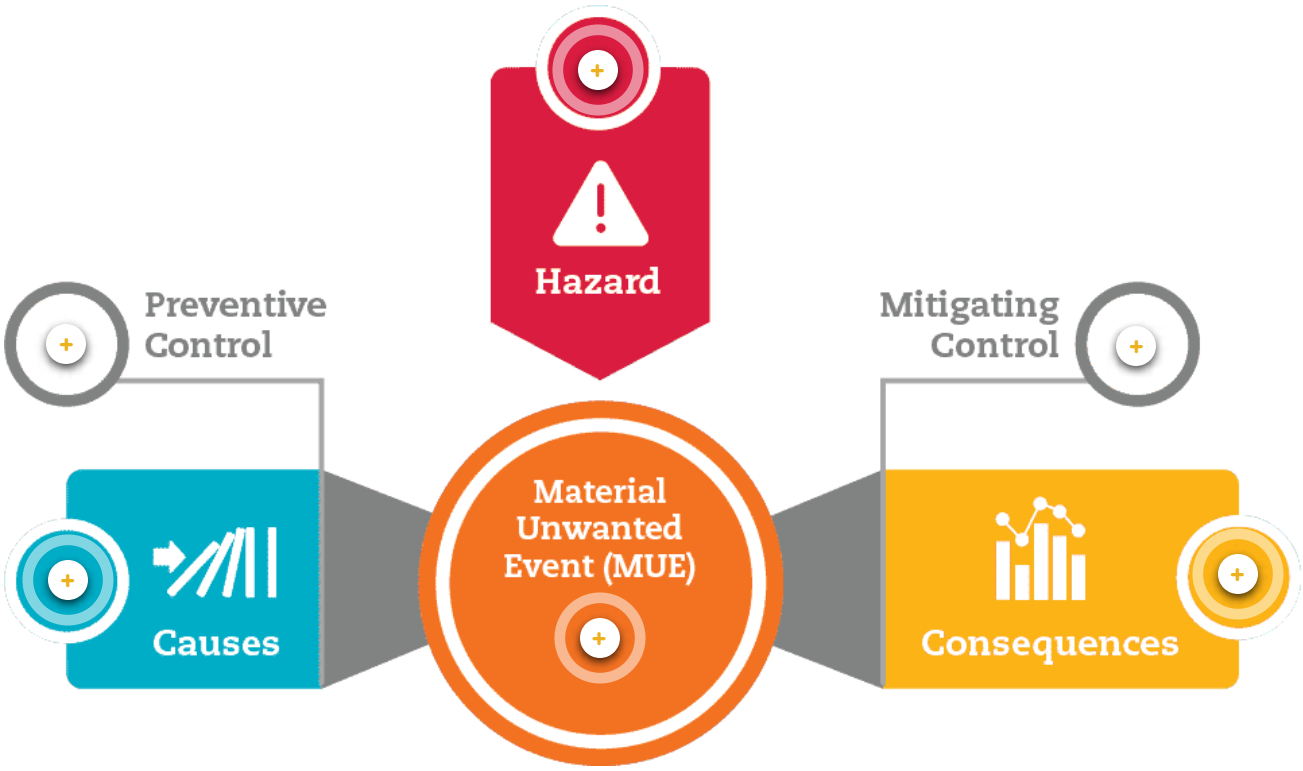
Watch the video in full to continue.

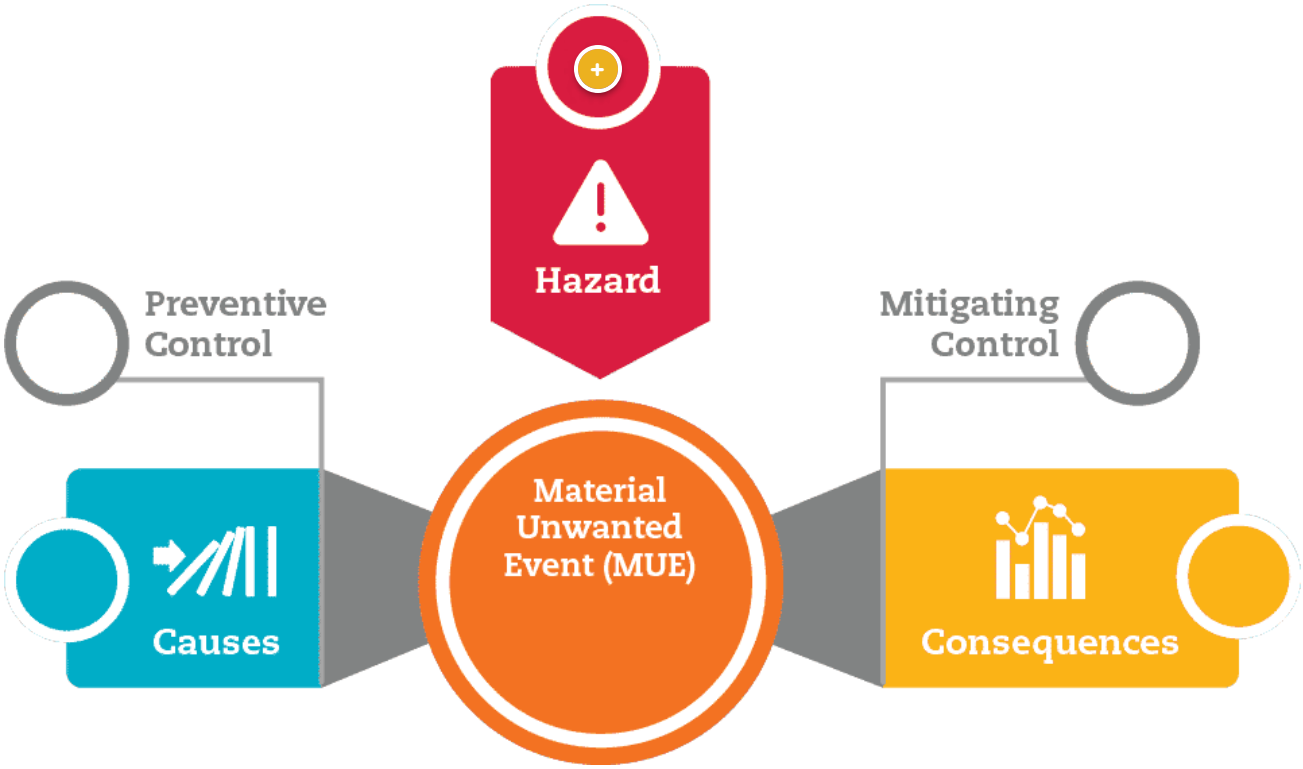
Review the bowties on the following slides related to events that may occur while working on or around Forklifts.

00:06

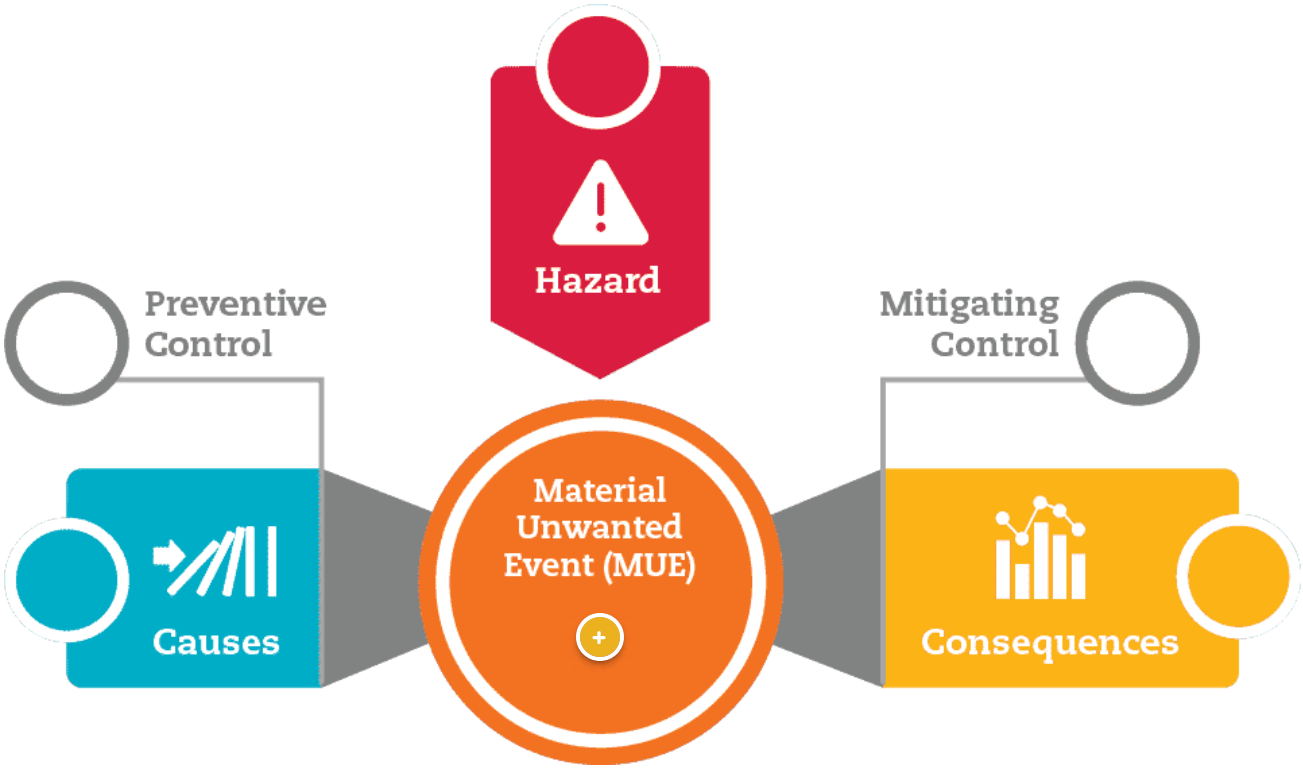
Collision

Click on the markers below and learn more:

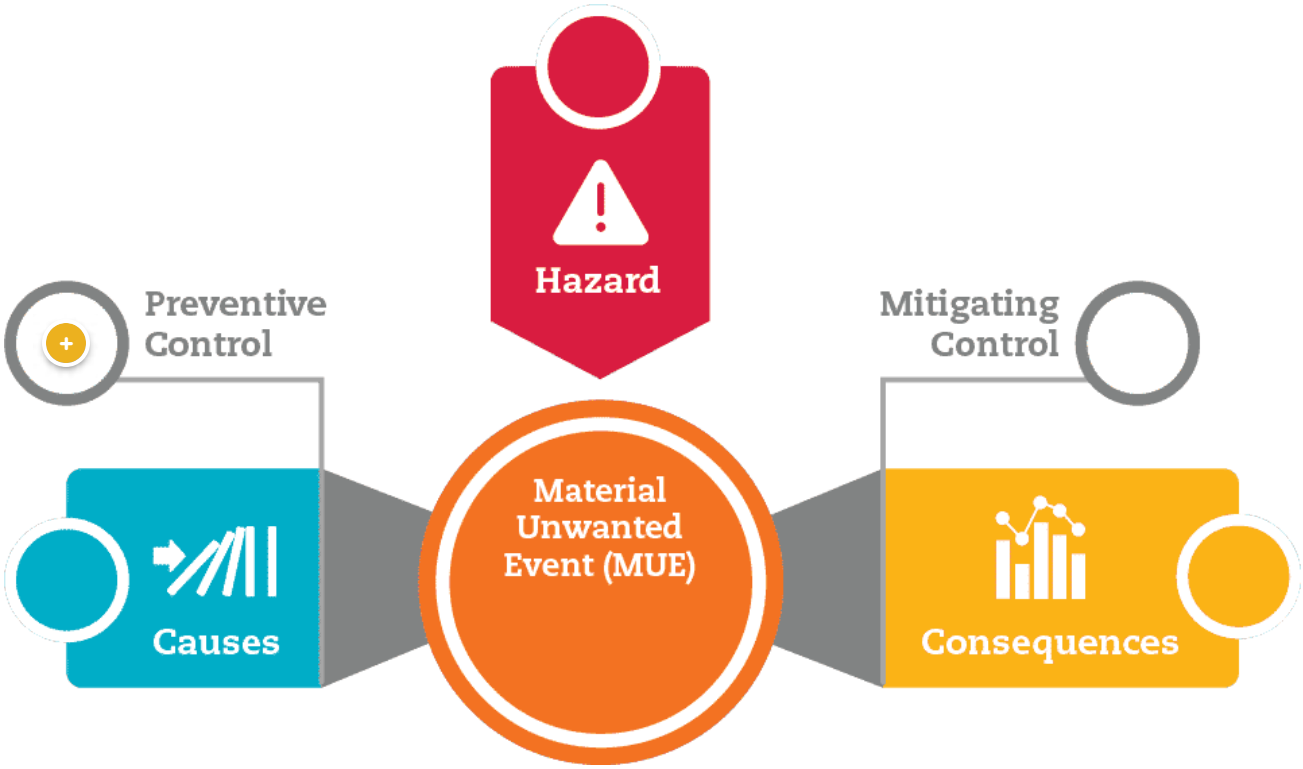




Operating Forklifts in congested areas of operations areas


Hazard
Preventive Control
Mitigating Control
Causes
Material Unwanted Event (MUE)
Consequences

Collision



Preventive Control

Poor visibility vehicle:

- Reflective striping;
- Roof mounted flashing, strobe light.

Proximity to heavy equipment:

- Delimitation of roads and parking lots;
- Communication system among vehicles and mobile equipment;
- Proximity alert sensor for heavy equipment, with audible alert sound.

Vehicles with inadequate conditions:

- Preventive maintenance;
- Inspection.

Driver fatigue:

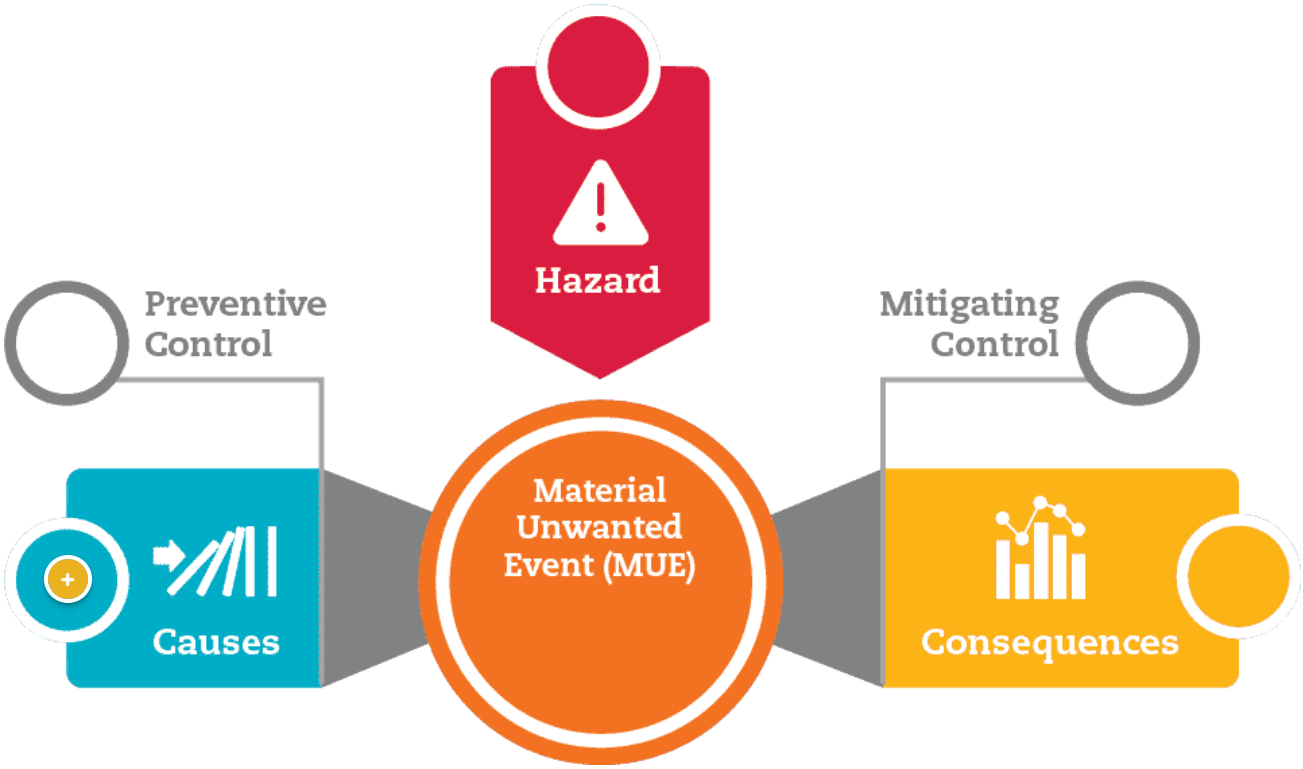
- Fatigue plan;

Lack of training:

- Hazard Awareness;
- Unaware of the risks associated with forklift operation. (Training verification incomplete).

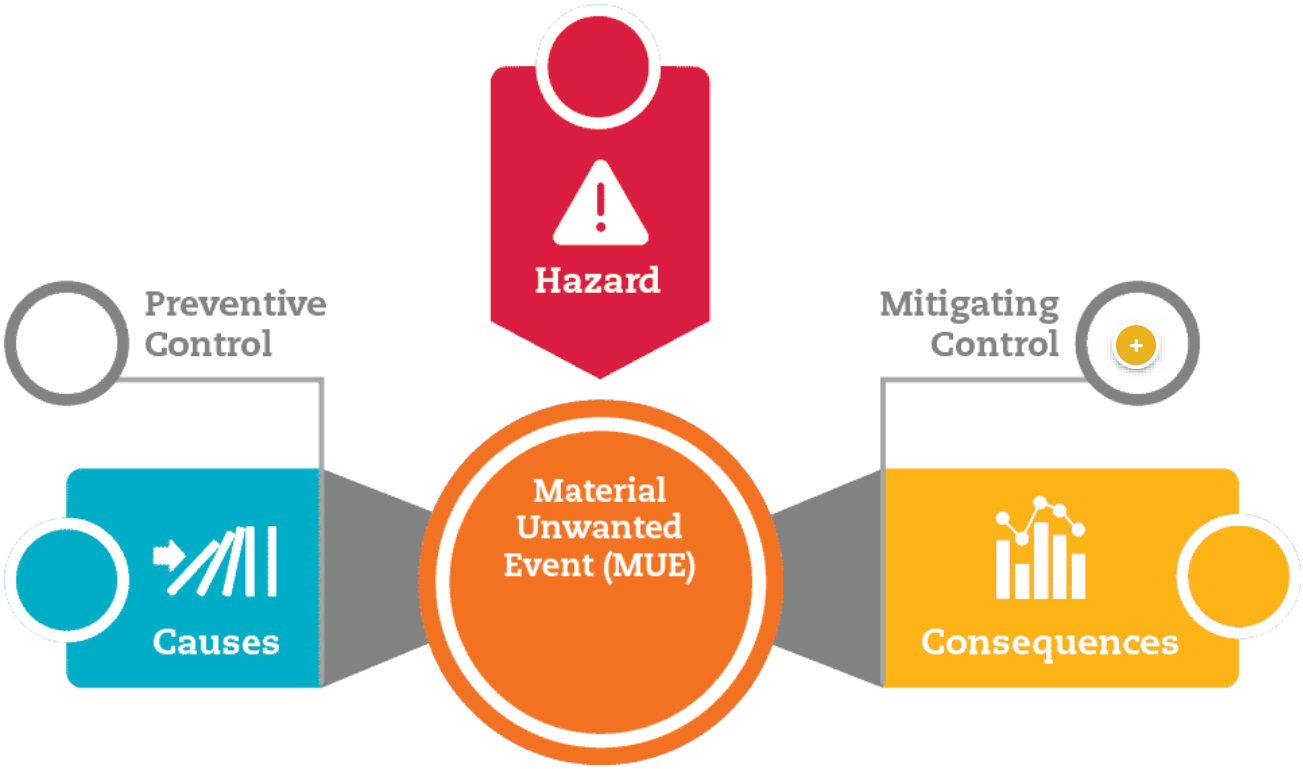
Driver distraction:

- Prohibition of TV / DVD, sound with headphones and cell phone while driving.



Causes

- Vehicle instability;
- Poor visibility;
- Proximity to heavy equipment;
- Vehicles with inadequate conditions;
- Lack of training;
- Operator distraction.



Mitigating Control

Person ejected:

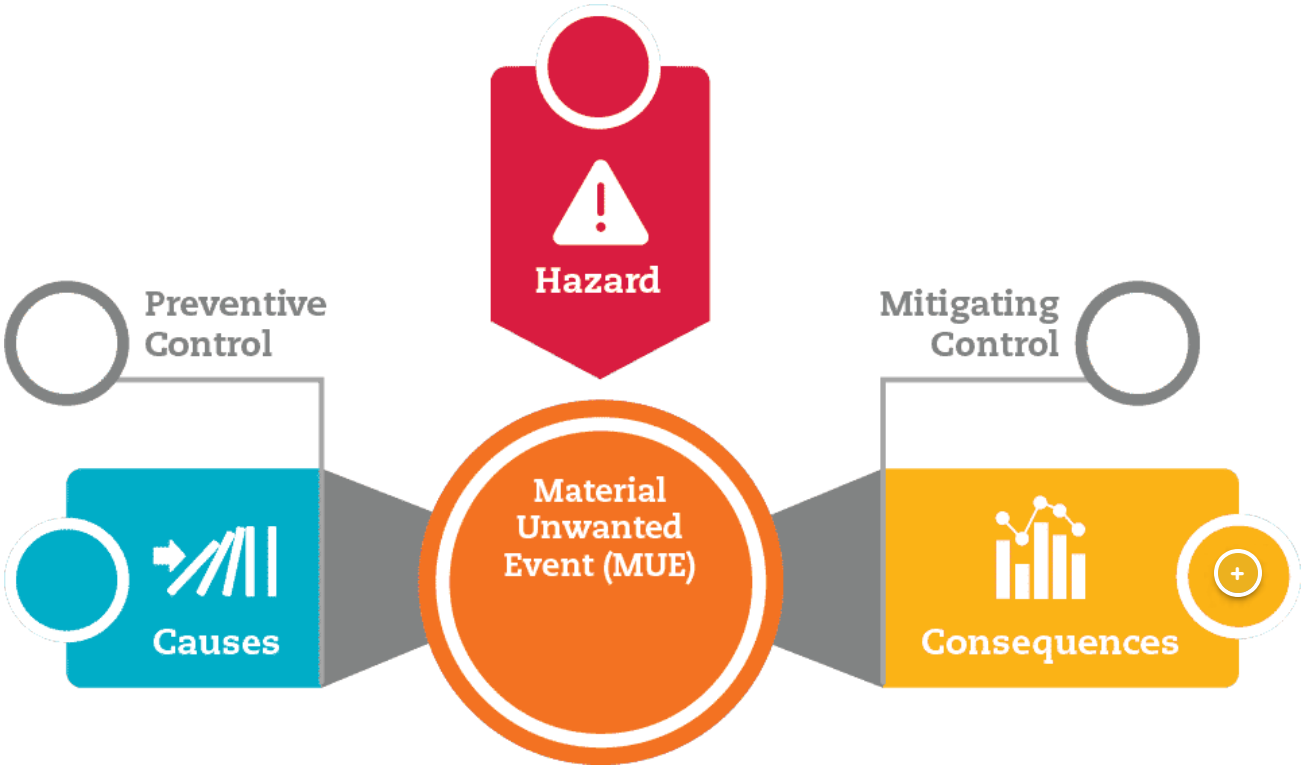
- ROPs restraint
- Emergency response plan.

Crushing:

- Emergency response plan.

Object hits the person:

- Emergency response plan.



Consequences

- Person ejected;
- Person hit his head;
- Crushing;
- Object hits the person.

Complete the content above before moving on.

Incident at Vale!

Incident location; Copper Cliff Mine South Side

March/26/2019 around 3:00 p.m., worker was in the process of offloading shotcrete from a boomtruck on 2050 Level in the 865 Ore Body.

As he backed the forklift away from the boomtruck, with the load in the raised position approximately 64 inches off the ground, the forklift pivoted on its front wheels.

The momentum caused the unit to articulate and fall over on its side.

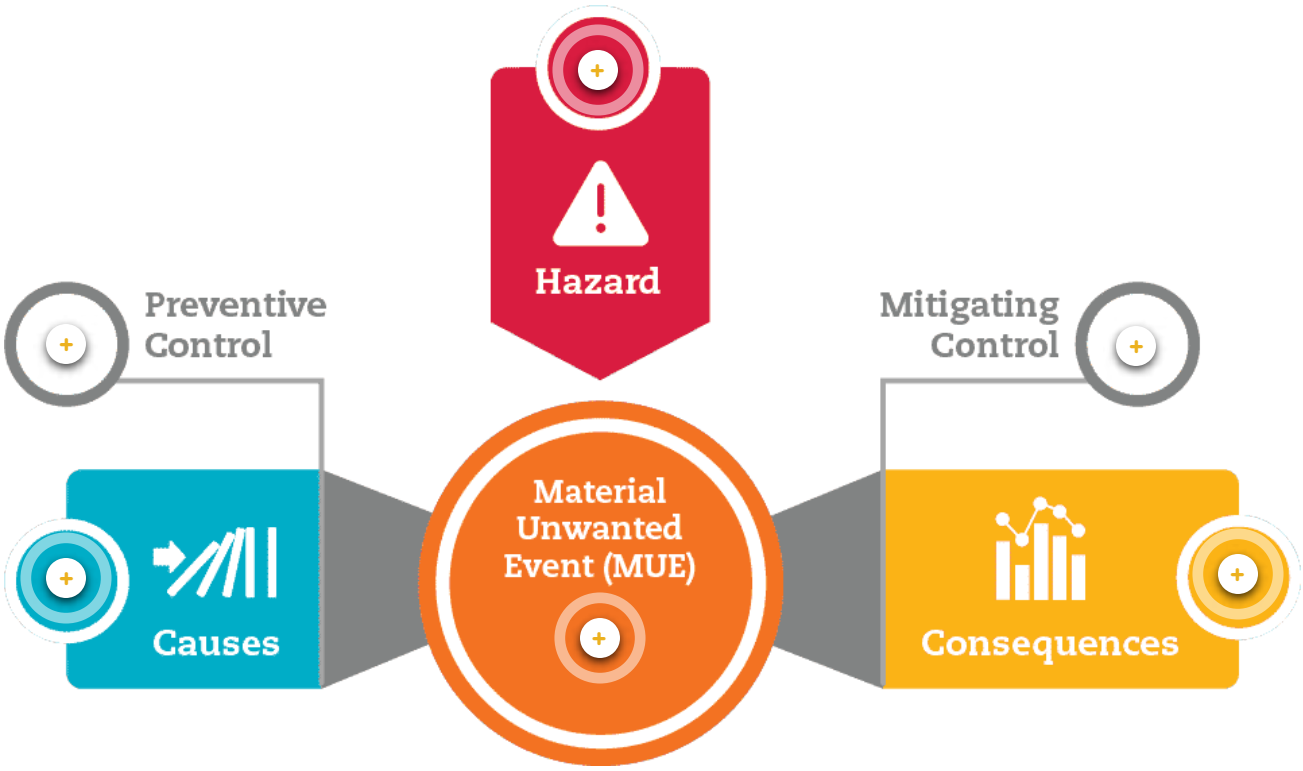
IMMEDIATE ACTION: The Supervisor was contacted, the worker was assessed for injuries and scene was secured.

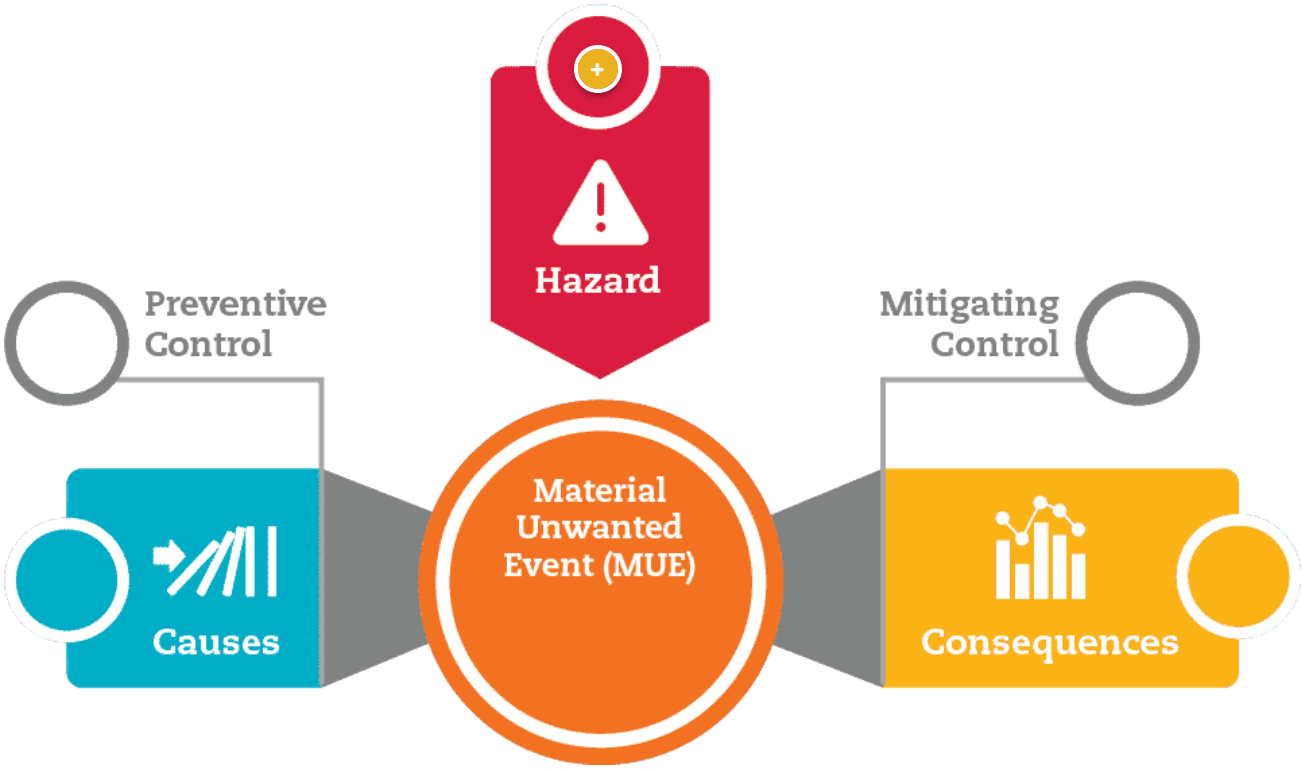
Kubota roll over incident

00:41

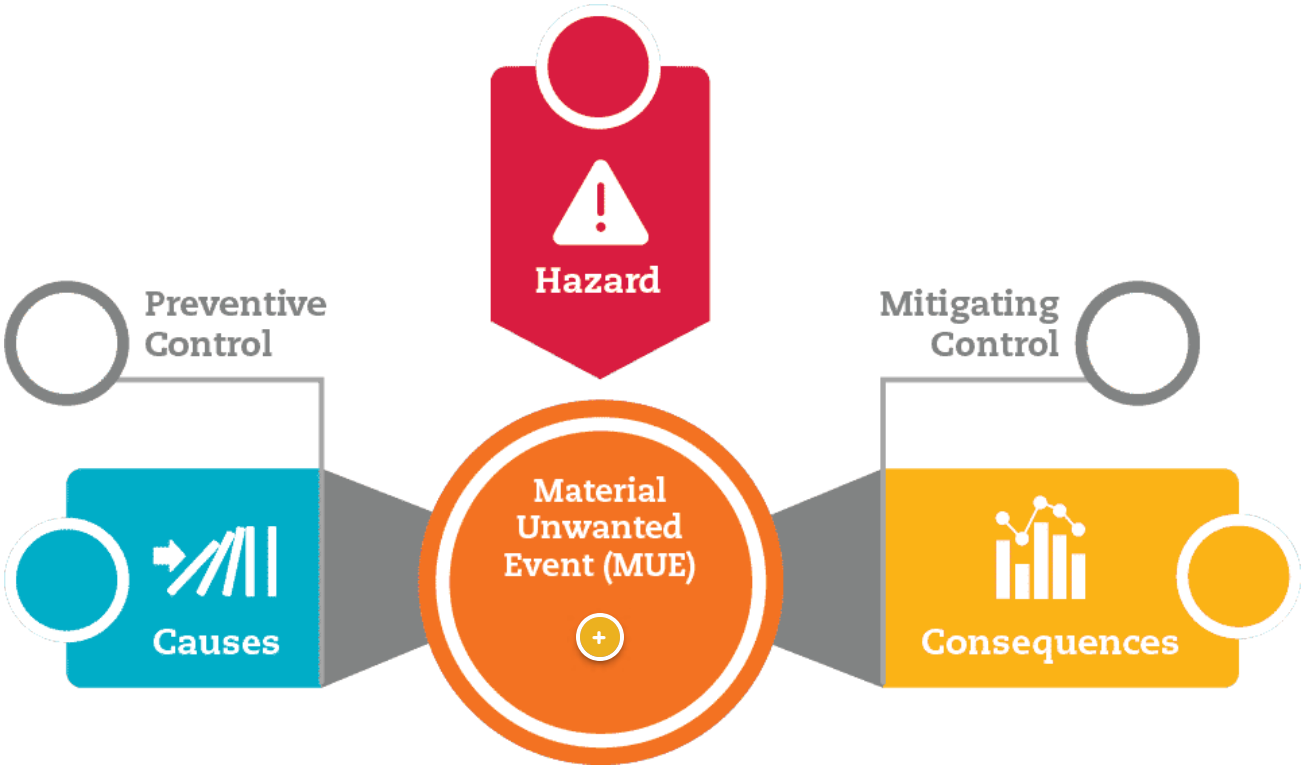
Roll over /tip over

Click on the markers below and learn more:

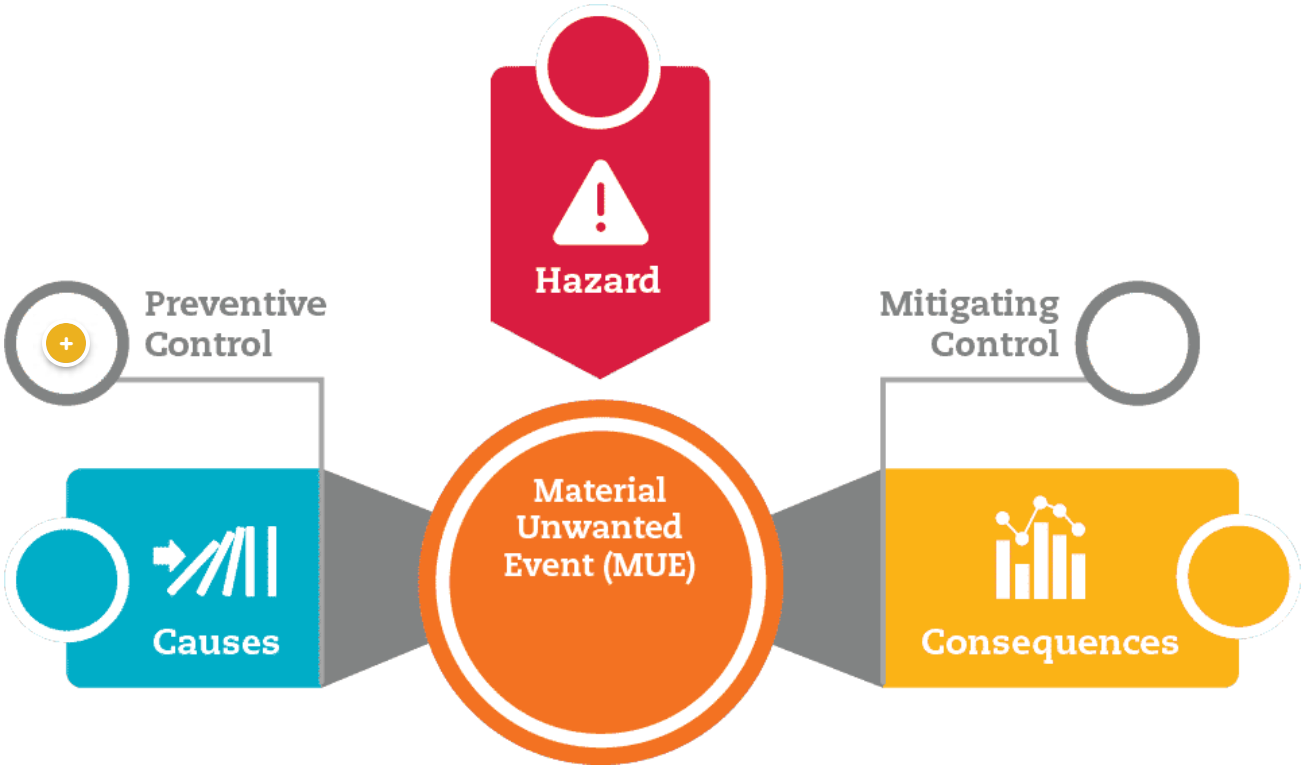




Unloading material in congested area



Forklift roll over or tip over



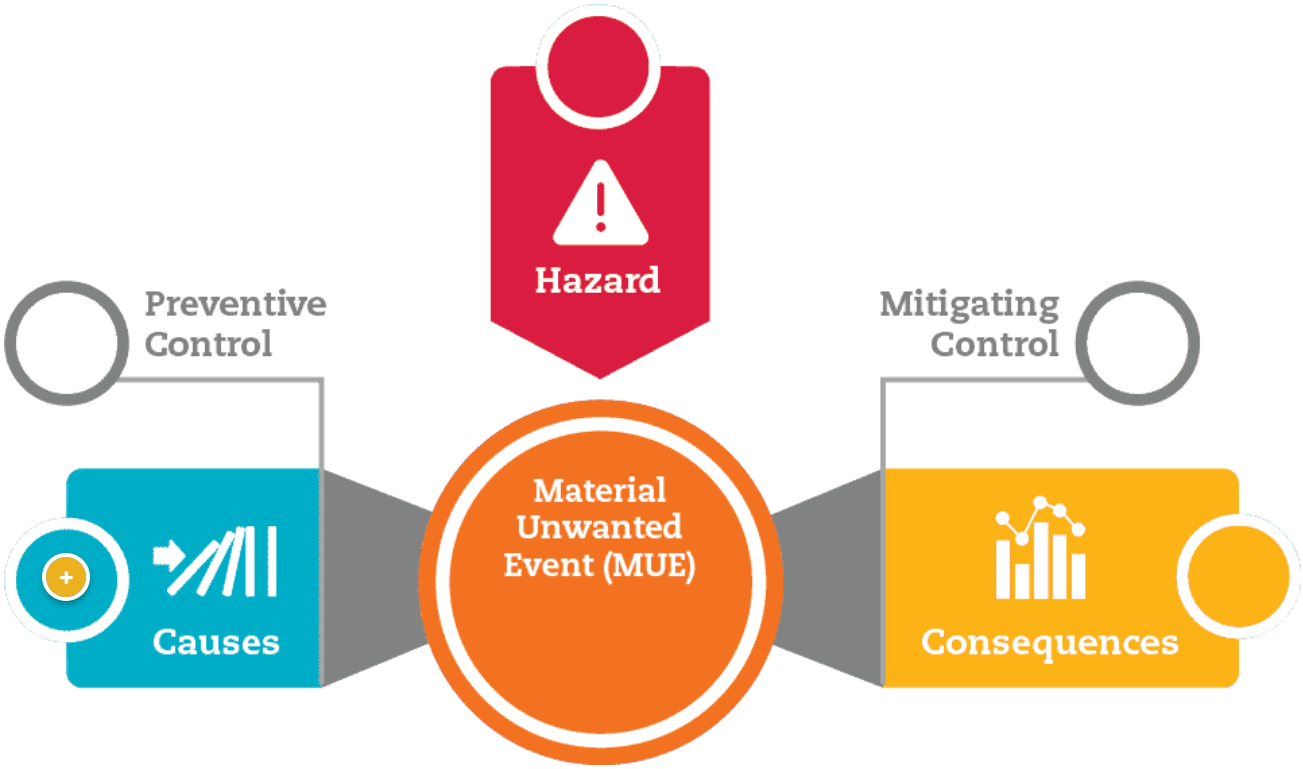
Preventive Control

Selection and operation

- The correct vehicle should be selected that has been designed to mitigate the risk of roll over / tip over;
- Be aware of the Forklift load and lifting capacity as identified on the capacity data plate;
- Full cage protective barrier;
- Situational awareness, no risk assessment completed prior to performing task;

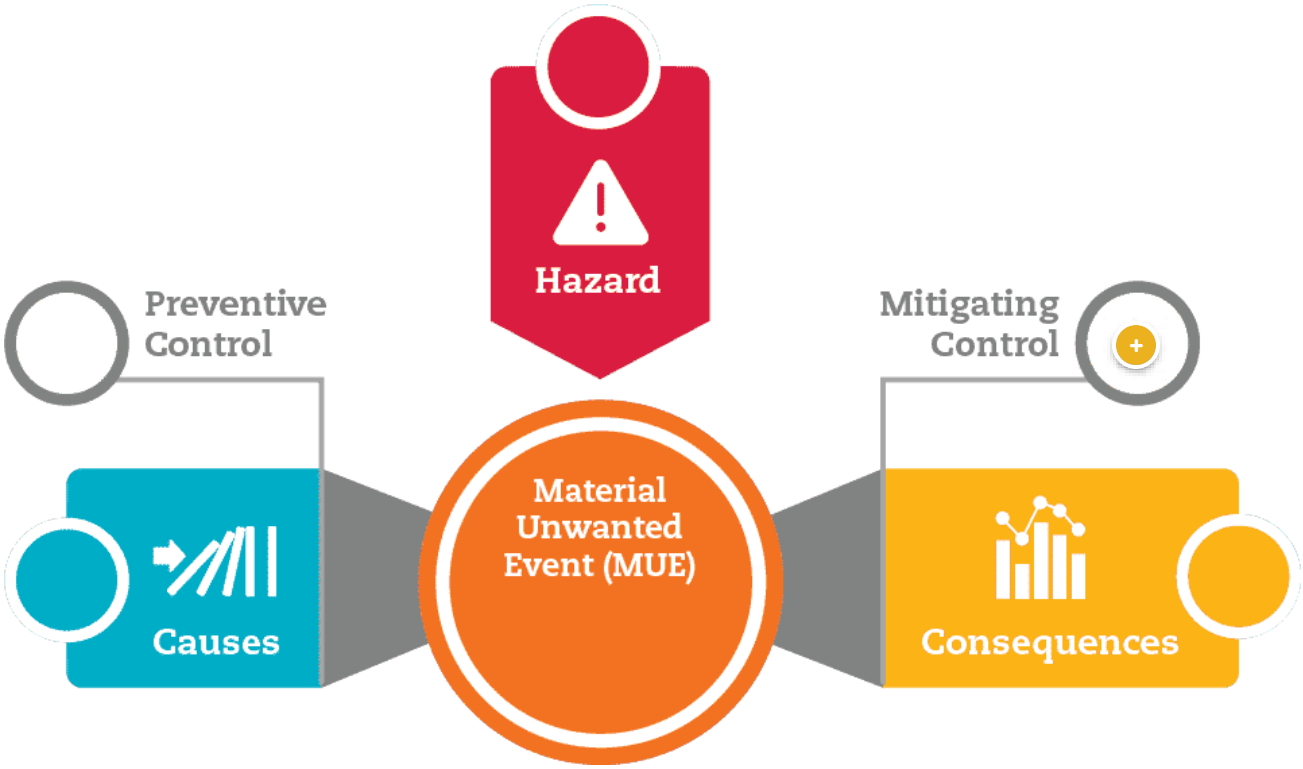
Lack of training

- Forklift awareness training was not provided to worker;
- Forklift was underrated for load being lifted;



Causes

- Load was 64" off the ground (stored energy) caused the forklift to pivot on front wheels;
- Forklift was underrated for load being lifted, forklift was a boom style 520 with a load rating of 1800 lbs;
- Proximity to heavy equipment;
- No risk assessment was completed prior to completing task;
- Worker was not aware of the risks associated with forklift operation. (Training verification incomplete);



Mitigating Control

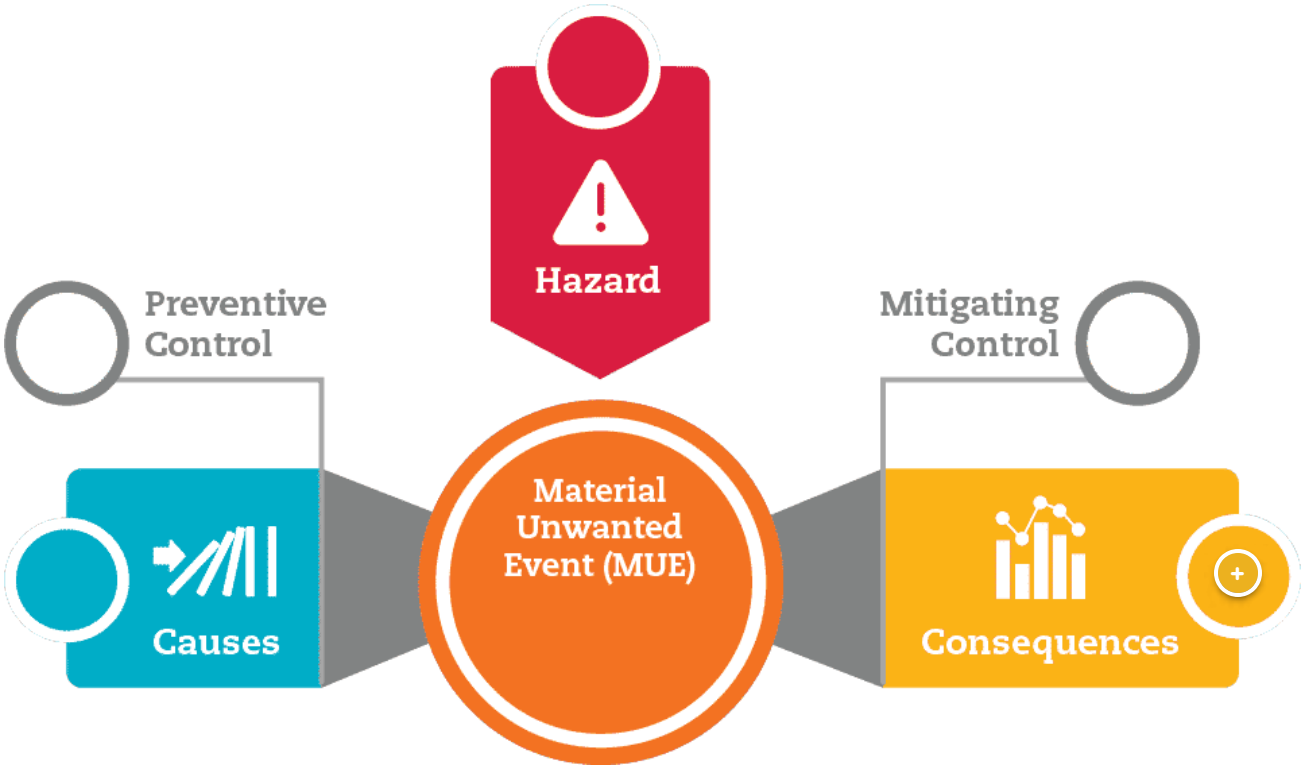
- ROPs protective device installed;
- Emergency response plan.

Crushing:

- Emergency response plan.

Object hits the person:

- Emergency response plan.



Consequences

- Person hit his head;
- Object hits the person;
- Crushing;
- Fatality;

Complete the content above before moving on.

Activity

Indicate the controls that could have contributed to preventing or mitigating this event:

Select all that apply.

Question

- [ ] Always be Aware of your surroundings.
- [ ] Know and understand the load and lifting capacities of the vehicle you are operating.
- [ ] Select the correct vehicle that has been designed to safety complete the task being performed.
- [ ] Never operate equipment unless you are trained, qualified authorized to do so.

SUBMIT

Got a Question?

Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

Complete the content above before moving on.

Types, designations and areas of use

CONTINUE

Types of Forklifts

A Breakdown of the Differences Between Types of Forklifts:

There are seven classes of forklifts, and each forklift operator must be trained, qualified *and* authorized to use each class of forklift that they'll operate.

Classification depends on factors such as applications or areas of use, fuel options, and features of the forklift.

Knowing the difference between them can help you decide on which type you will need to safely perform the work to get **HomeSafe**.

Class 1: Electric Motor Rider Forklift

00:22

Forklift classifications:

As mentioned earlier, forklifts are divided into seven classifications. Two factors determine how a truck is classified – the fuel used and the intended use for the truck. It is essential that forklift operators use the appropriate class of truck for their purposes.

Listed below are some of the common types of forklifts you may find in your workplace, click on the tabs to learn more.

00:21

Class 1: Electric Motor Rider Forklifts

These forklifts can be equipped with either cushion or pneumatic tires. The cushion-tired lift trucks are intended for indoor use on smooth floors. The pneumatic-tired models can be used in dry, outdoor applications.

These vehicles are powered by industrial batteries and use transistor motor controllers to control travel and hoist functions. They're very versatile and are found from the loading dock to the warehouse facility. They're generally used in applications where air quality needs to be considered

Class 2: Electric Motor Narrow Aisle Forklifts

This class of forklift is for use in very narrow aisle operation. This allows for maximize use of storage space. These vehicles have unique features that are designed to minimize the space occupied by the truck and to improve speed and efficiency.

Class 3: Electric Motor Driven Hand Trucks

These are hand-controlled forklifts, meaning the operator is in front of the truck and controls the lift through a steering tiller. All controls are mounted on the top of the tiller, and the operator moves the tiller from side to side to steer the truck. These vehicles are battery-powered, and the smaller capacity units use industrial batteries.

Classes: 4 and 5: Internal Combustion Engine Forklifts

Class 4 forklifts have internal combustion engines, they have solid, or cushion, tires, and are frequently counterbalanced, which means the rear of the truck is weighted to counter the weight of the load being lifted. These forklifts are used inside on smooth dry floors for transporting palletized loads to and from the loading dock and the storage area.

Class 5 forklifts also have internal combustion engines and are also typically counterbalanced. They differ from Class 4 lift trucks in that they have pneumatic or radial tires .
They can be used either inside or outside for virtually any type of application. Because of the large capacity range of this series of lift truck, they can be found handling small single pallet loads to loaded 40-foot containers.
These lift trucks can be powered by internal combustion engines and are available for use with LPG, gasoline, diesel, and compressed natural gas fuel systems.

Class 6: Electric and Internal Combustion Engine Tractors

Class 6 forklifts are towing tractor lift trucks. They can have either electric motor or internal combustion engines . Class 6 lift trucks are sit-down tractors that can pull loads over 1,000 pounds, in addition to being able to lift loads.

Class 7: Rough Terrain Forklift Trucks

Class 7 lift trucks are rough terrain forklifts. They are used the where ground is usually uneven and foreign objects are often present. They typically have internal combustion engines and pneumatic tires.

Type designations:

Forklifts are limited to specific areas of use because of their designation type.

Listed below in the following tables are all of the different type designations with their related acronyms. You will notice that there are actually four main types based on their fuel source (D, E, G and LP) and some specialized (S,Y, E and X) types that have additional safeguards to reduce or eliminate electrical sparking or fire hazards for use in hazardous locations.

00:21

Type Designation	Description
G	Gasoline powered
GS	Gasoline powered forklifts equipped with safeguards to protect against fire hazards.
LP	Liquefied propane gas-powered forklifts
LPS	Liquefied propane gas-powered forklifts equipped with safeguards to protect against fire hazards.
G/LP	Operates on liquefied propane gas or gasoline.
GS/LPS	Operates on liquefied propane gas or gasoline and is equipped with safeguards to protect against fire hazards.
EX	Designed and constructed to operate in hazardous atmospheres containing flammable vapours, dust and certain fibres.

Type Designation Table – Part 1

Type Designation	Description
D	Diesel Powered
DS	Diesel powered equipped with safeguards to protect against excessive sparking.
DY	Diesel powered forklifts equipped with all the safeguards of the DS units. They have no electrical or ignitions system and are equipped with temperature limiting devices.
E	Electrically powered
ES	Electrically powered equipped with temperature limiting and spark reducing devices.
EE	Electrically powered units that have all the safeguards provided on the E and ES, in addition all electric motors and other electrical equipment is completely enclosed.

Type Designation Table – Part 2

Wrap Up:

You have reached the end of this section of the module!

In the next section, you will learn about how having a sound knowledge of the forklift components will help you identify hazards in the workplace and implement risk mitigation strategies.

00:13

Got a Question?

Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

Continue

Equipment description

Components

CONTINUE

Activity

Click on the tabs below to learn more about what each component's purpose is and what it consists of.

00:05

Frame assembly

WHAT IS ITS PURPOSE? | WHAT IT CONSISTS OF | HOW IT WORKS

Contains all basic equipment of the forklift and protects them from the environment.

Is composed of the drive assembly, the hydraulic system, the fuel (if applicable) and cooling systems, the exhaust system, the braking and steering systems, and the electrical system.
It also includes the oil, coolant, and fuel tanks (if applicable).
The operator's compartment is located at the top of the frame assembly.

The forklift is moved and directed (forward/reverse) with the help of the drive assembly, which controls the speed of the wheel rotation as well as the direction.
The forklift is steered (left/right) by two hydraulic cylinders via the steering system, which controls the

wheel orientation.
The wheels are stopped or blocked from moving using the braking systems.

Operators compartment

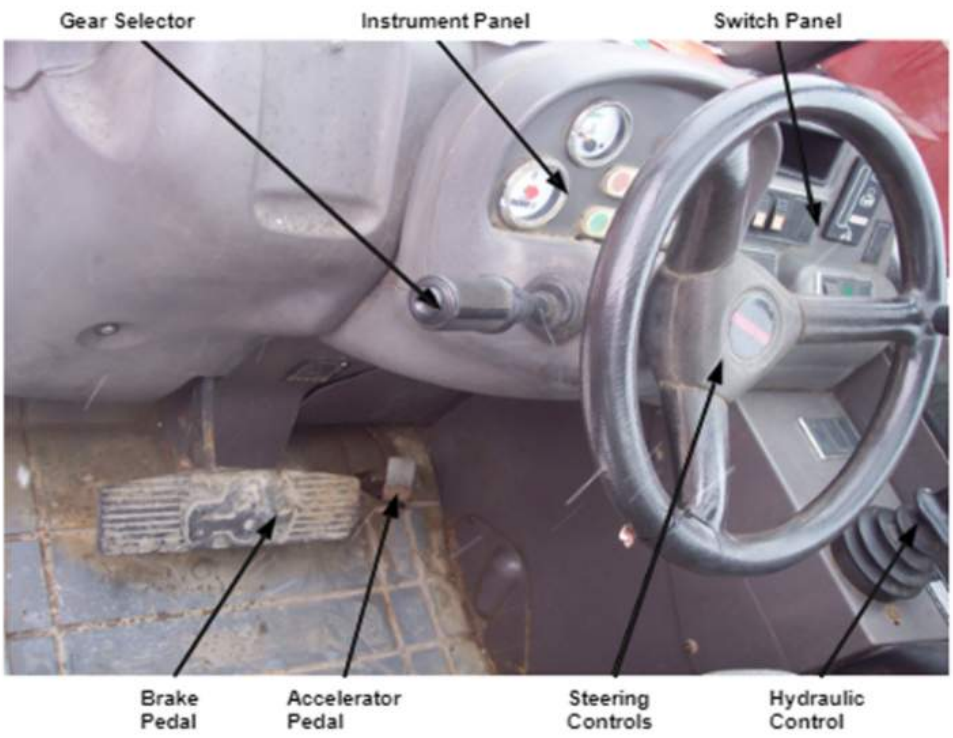
WHAT IS ITS PURPOSE?	WHAT IT CONSISTS OF

Ensures all controls are within easy reach of operator. Indicators provide vital information on the functions of the forklift.

WHAT IS ITS PURPOSE?

WHAT IT CONSISTS OF

The operators compartment Is composed of the: Steering wheel, Hydraulic control levers, Gear selector (if manual transmission), Direction control, Parking brake control, Instrument & switch panel(s), Accelerator pedal and Brake pedal.
It also includes the oil, coolant, and fuel tank indicators (if applicable).
The operator's compartment is located at the top of the frame assembly.



Load lifter assembly

WHAT IS ITS PURPOSE?

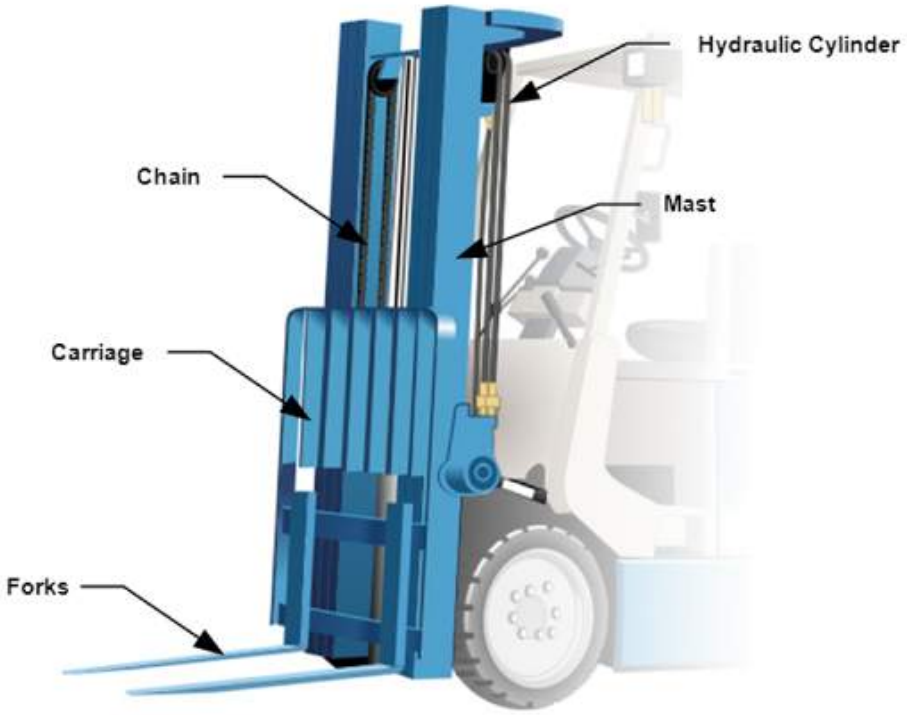
HOW IT WORKS

The Purpose:
Allows the operator to lift a load and carry it during transportation.
Consists of:
Two forks, a carriage, a mast or a boom, hydraulic cylinders (called "lift cylinders") and chains.

WHAT IS ITS PURPOSE?

HOW IT WORKS

The two forks are fixed to the carriage, which is fixed to the mast/boom. The forks are used to engage the load. The load rests on the forks and leans on the carriage during transportation.
The lift cylinders, which are hydraulic cylinders, are linked, in part, to the frame assembly and the mast/boom.
The lift cylinders, powered by the hydraulic system, control the mast/boom movements in order to raise, lower or tilt the carriage.
Some models can move left/right and/or rotate the carriage clockwise/counter clockwise.
These functions are controlled by the operator with the hydraulic control levers.


Hydraulic Cylinder
Chain
Mast
Carriage
Forks

Load Lifter Assembly – Mast Details

00:29

We will now continue to work through some terms specifically aimed at increasing your understanding of the types of forklift masts.
Before beginning there are a number of key words you need to be aware of:

Lift Height: The height to which the top of the fork is raised when the mast is fully extended.
Free lift: Height forks can be raised before the mast extends (e.g. Without increasing mast height).
Lowered Height or Collapsed Height: Height from the floor to the top of the mast when it is lowered.
Extended Height: The height to the top of the mast or load guard when mast is fully extended.

Step 1

Mast Types

00:07

There are a number of mast types which include:

Single Stage

Two Stage

Three Stage

Four Stage

Step 2

Single stage mast forklift

00:25

The single-stage mast has one channel with a limited lifting height. Free lift (the ability to lift the load and forks without moving the mast channels) is not available.

Due to this limitation, the mast must extend higher than other mast options in order to stack loads.

This type of mast is frequently used in outdoor applications where overhead clearance is not a concern, due to the lack of height clearance restrictions.

Step 3

Two stage mast forklift

00:14

The two-stage mast is more common and has a free lift available. These are typically used for stacking and double stacking for indoor applications with limited overhead clearance. They provide excellent visibility and are ideal for use in trailers and warehouses.

Step 4

Three stage mast forklift

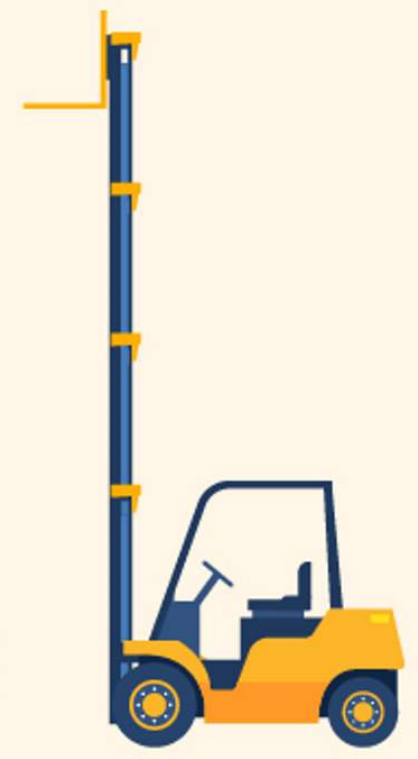
00:11

The three-stage mast is the most common and most versatile forklift mast available. Its free lift and greater heights provided by three stages make for a great lift for stacking in general warehouse applications.

Step 5

Four stage mast forklift

00:09



A four-stage mast provides the highest reach thanks to its four sets of moving rails. These are designed for very high stacking in specialized warehousing and other industries.

Fuel (if applicable) / Cooling system

WHAT IS ITS PURPOSE?

HOW IT WORKS

Fuel purpose: Provides fuel for the engine.
Internal combustion motors may be fueled by gasoline, diesel or liquid petroleum gas (LPG). Internal combustion powered forklifts must not be used in confined spaces, as people working in the confined space may be overcome by the fumes.

Cooling system purpose: Maintains proper operating temperature.

WHAT IS ITS PURPOSE?

HOW IT WORKS

Fuel how it works:
Fuel from the fuel tank is pumped or compressed to the motor. The fuel characteristics in the tank are monitored by the use of gauges.

Cooling System how it works:
The coolant, a mix of water and antifreeze, flows through the piping around the engine to cool it down. As it cools down the engine, the temperature of the coolant increases. The heated coolant is then cooled down in the radiator, with the help of a belt driven or an electric fan. The cooled coolant then flows back through the engine section.

Hydraulic system

WHAT IS ITS PURPOSE?

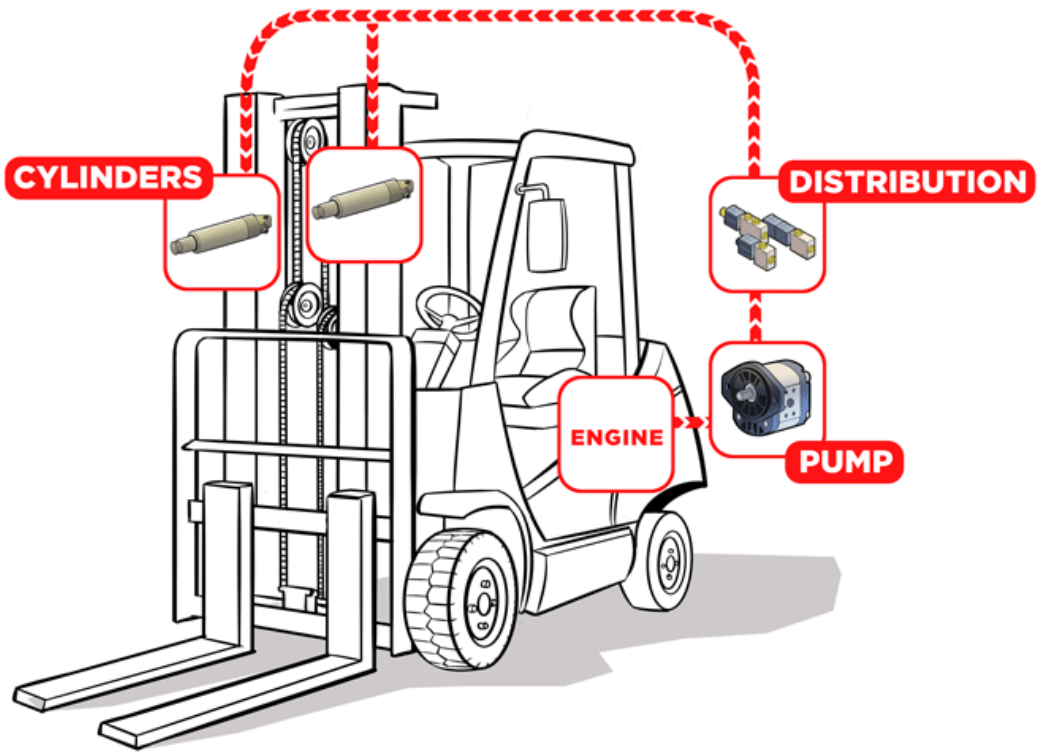
HOW IT WORKS

Purpose:
Powers the hydraulic cylinders of the steering system ("steering cylinders") and the load lifter assembly ("lift cylinders"). It also powers the service brake system.
A typical hydraulic system in a forklift consists of:
Hydraulic Tank, Hydraulic Pump, Main Control Valve (Directional Control Levers), Two Tilt Cylinders and One Lift Cylinder.

WHAT IS ITS PURPOSE?

HOW IT WORKS

Hydraulic system how it works: Hydraulic oil is pumped from the tank by the hydraulic pump to the Main Control Valves.
The Main Control Valves distribute the hydraulic oil to a selected cylinder by pulling on one of the Directional control levers. The Hydraulic oil is then returned to the tank via the return lines.



Exhaust system / Counterweight

WHAT IS ITS PURPOSE?

HOW IT WORKS

Purpose exhaust system
Reduces harmful elements from combustion gases.

Purpose counterweight
Enables the forklift to lift heavier loads by counter-balancing the load weight.

WHAT IS ITS PURPOSE?

HOW IT WORKS

Exhaust system how it works: The combustion gases are filtered through the scrubber or the filter, and then are released into the atmosphere via the exhaust pipe.

Counter weight how it works: The weight of the load carried outside the wheel base is counter balanced by the weight of the forklift. In counter balanced forklifts, the weight of the rear of the truck counterbalances the weight of the load being carried at the front of the forklift.

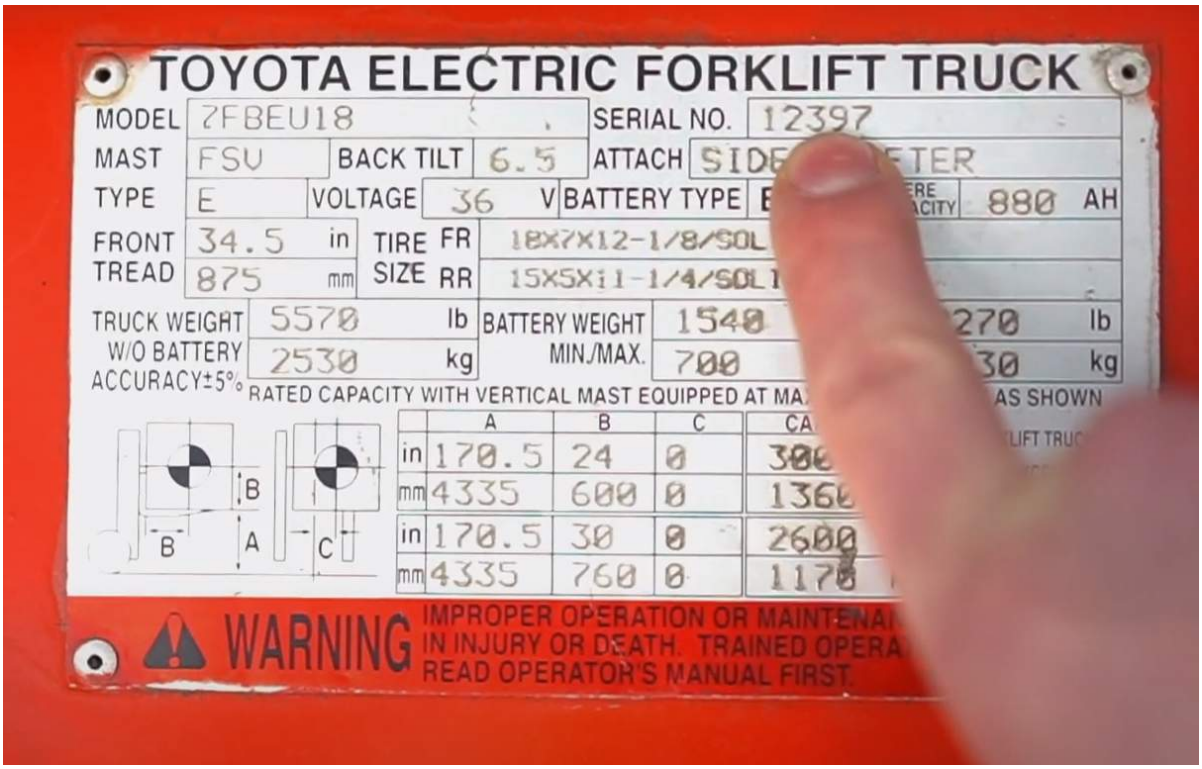
The front wheels can act as a pivot point on which the forklift and load can tip. The greater the weight of the counter balance of the forklift, then the heavier the load that can be lifted. Heavier loads can be lifted if the counter balance is further back in the forklift.
You will learn more about how counterbalance works in the next section; "Principles of counterbalance".

Capacity data plate

WHAT IS ITS PURPOSE?

HOW IT WORKS

Purpose capacity data plate:
Load Capacity refers to the maximum weight of the material that can be safely raised and moved by a forklift, taking into account a specific load center raised to a specific height.
Every operator must be able to read and understand a Capacity Data Plate!
This information defines the limit of the forklift.



WHAT IS ITS PURPOSE?

HOW IT WORKS

Capacity Data Plate how it works:

Line "A" states that a forklift with a lifting height, more commonly referred to as "mast height", of 182 inches can lift a maximum load of 3679 lbs. if the load center is 24 inches.

Line "B" indicates that with a lifting height 173 inches the maximum load is increased to 3839 lbs. if the load center is 24 inches.

Line "C" indicates that if the lifting height is 161 inches, the maximum lifting capacity is 3998lbs. if the load center is 24 inches.
Always remember, the higher the mast height, the lower the lifting capacity of the forklift!

Capacity Data Plate

MODEL	6 FGC 35		
SERIAL NO.	6 FGC 35 - 848476		
APPROX. WT.	861 LB.	TYPE	LP

RATED CAPACITY	CAPACITY	LOAD CENTRE	LIFTING HEIGHT	
	3679	24 IN.	182 IN.	A
	3839	24 IN.	173 IN.	B
	3998	24 IN.	161 IN.	C

CAPACITY BASED ON VERTICAL MAST EXCLUDING ATTACHMENT

Electrical system

WHAT IS ITS PURPOSE?

HOW IT WORKS

Purpose electrical system:
Generates required electrical energy and distributes it to the different electrical devices.

Consists of: Mainly, a battery and a belt driven alternator for forklifts with a fuel engine (Only a battery for forklifts with an electric engine).

WHAT IS ITS PURPOSE?

HOW IT WORKS

Electrical system how it works:

Fuel Engine:
The alternator is driven by a rotating belt. The rotation of the belt is powered by the fuel motor and generates electrical power in the alternator. This electrical energy is transferred through a wiring system to the various electrical devices and to the battery, which accumulates it ("recharges"). The battery stores this electrical energy and provides it to electrical devices when the motor is off.

Electric Engine: The battery recharges when the forklift is electrically plugged in. It stores electrical energy and provides it to the motor. Also, it provides electrical energy to electrical devices, when the motor is on or off.

Drive assembly

Purpose

The purpose of the drive assembly is to supply power and set the forklift in motion at a desired speed and direction.

There are two possible types of drives: mechanical or hydrostatic.

The main differences are found in the following basic functional components: the drive assembly (the power unit and the drive train), the hydraulic system and the braking systems.

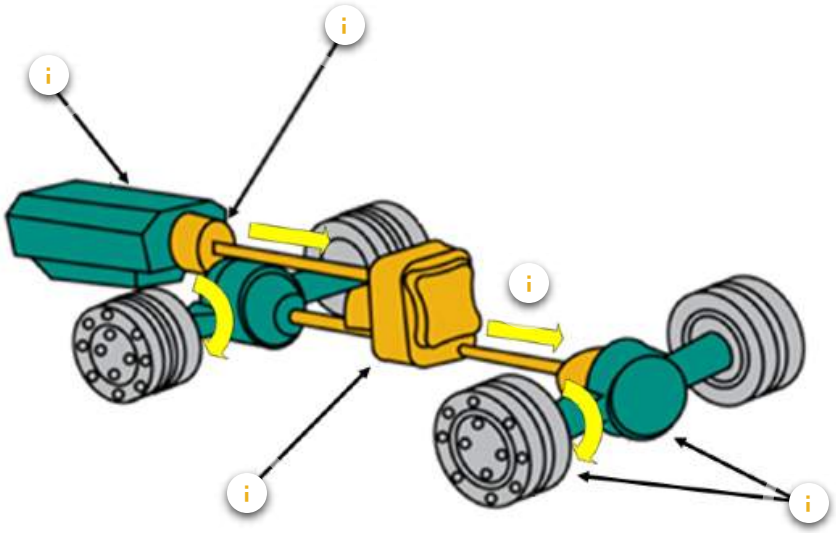
The types of drives will vary with each model, for example, most CAT models have a mechanical drive and most Kubota models are hydrostatic. *(see table below).*

00:30

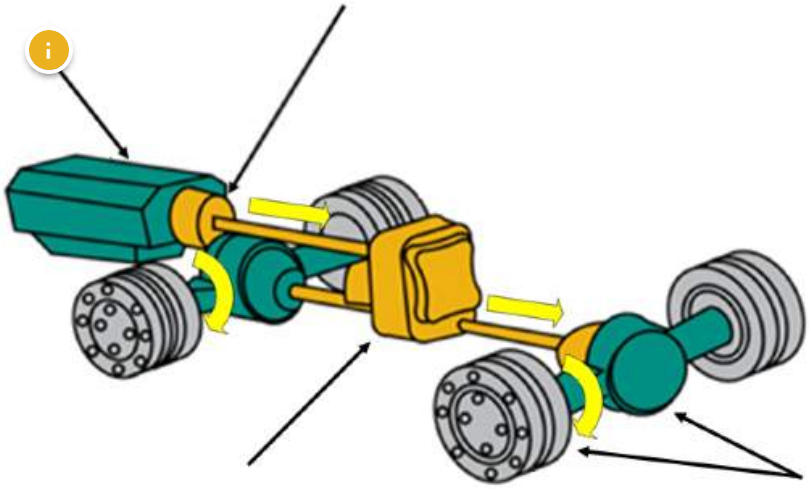
Drive	Mechanical	Hydrostatic
Power Unit *Consists of:*	Fuel Engine or Electric Motor	Fuel Engine or Electric Motor
Drive Train *Consists of:*	Torque Converter Transmission (manual or automatic)	Hydraulic Drive Pump and Motor Transfer Gear Case
Hydraulic System *Systems powered:*	Powers steering and mast movement	Powers steering, mast movement, drive
Braking Systems *Consists of:*	Service Brakes Parking Brake	Service Brakes Parking Brake

Click on the markers below to learn more about drive assemblies

Mechanical drive



Mechanical drive

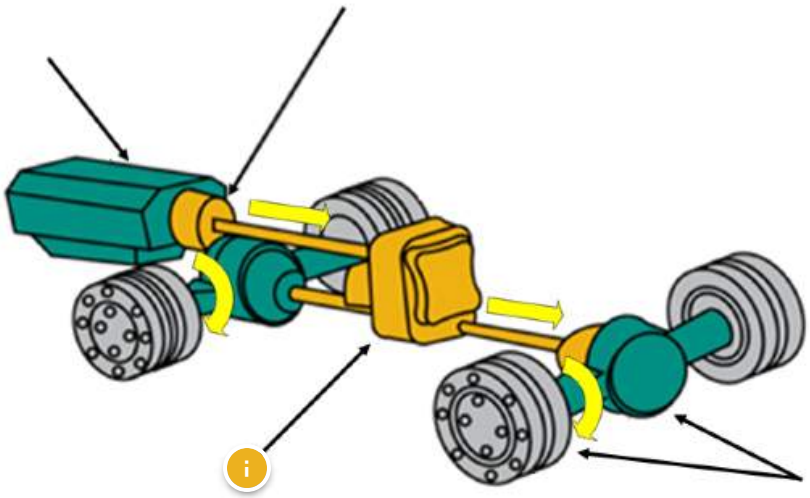


Engine

00:09

The forklift is powered by an internal combustion engine of varying horsepower, depending on the size of the forklift and is fueled by diesel fuel, gasoline or LPG (liquid petroleum gas).

Mechanical drive

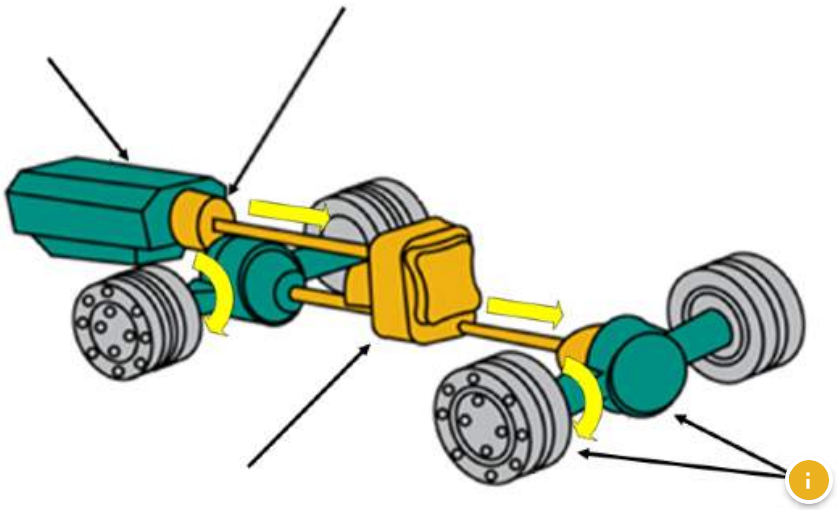


Transmission

00:04

The transmission provides forward and reverse gears that are manually selected.

Mechanical drive

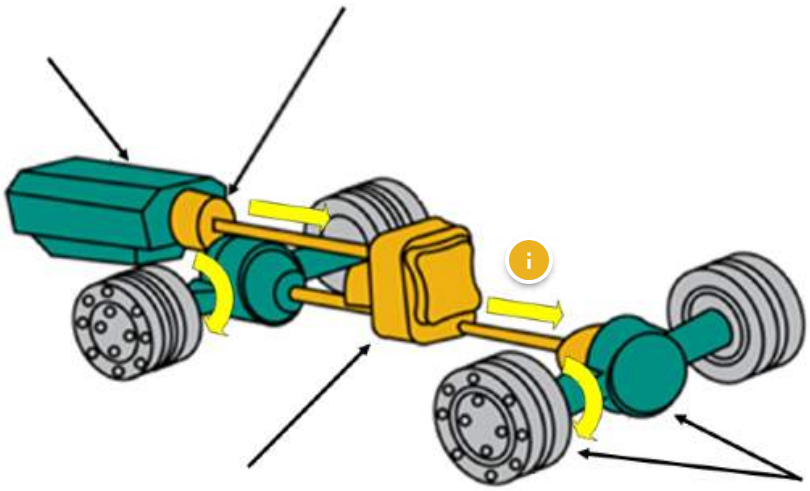


Differentials and Hubs

00:08

The transmission relays drive power to the front and rear differentials that, in turn, rotate the hubs and consequently the attached wheels.

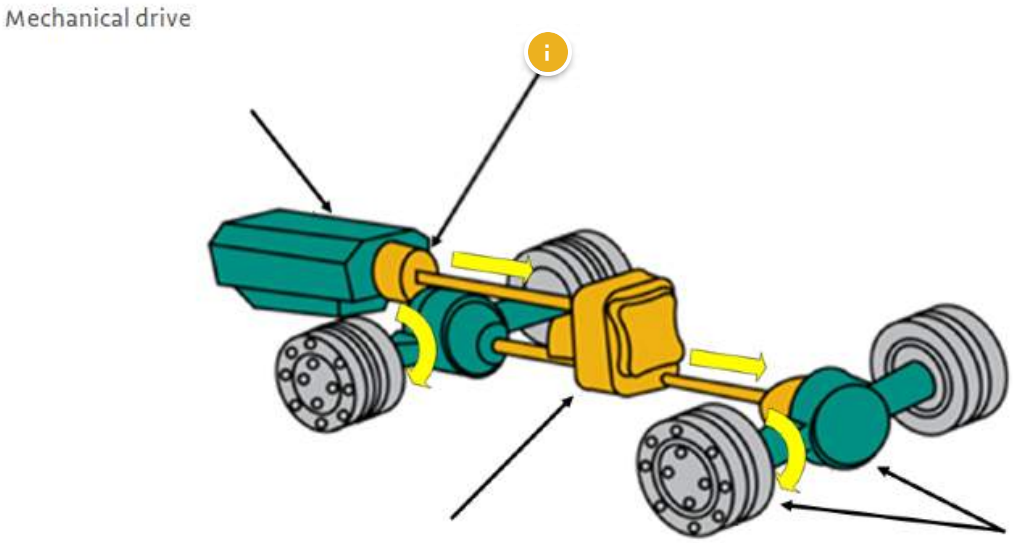
Mechanical drive



Drive line (2)

00:13

The driveline on a forklift transfers power from the engine and transmission to the wheels. It is composed of the axles, driveshaft, wheels, joints and differential(s). These components handle the full force of the forklift.

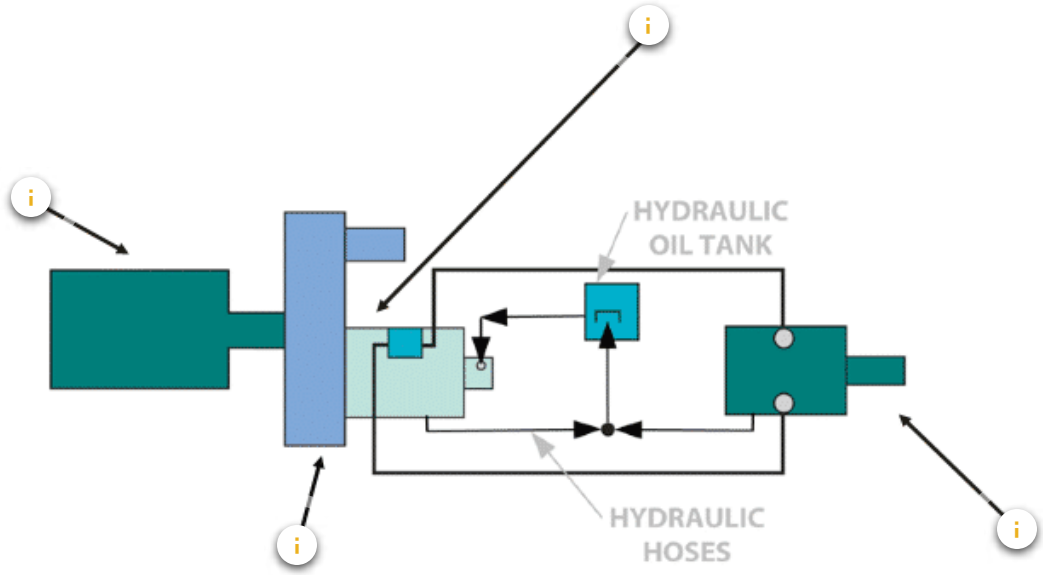


Torque Converter

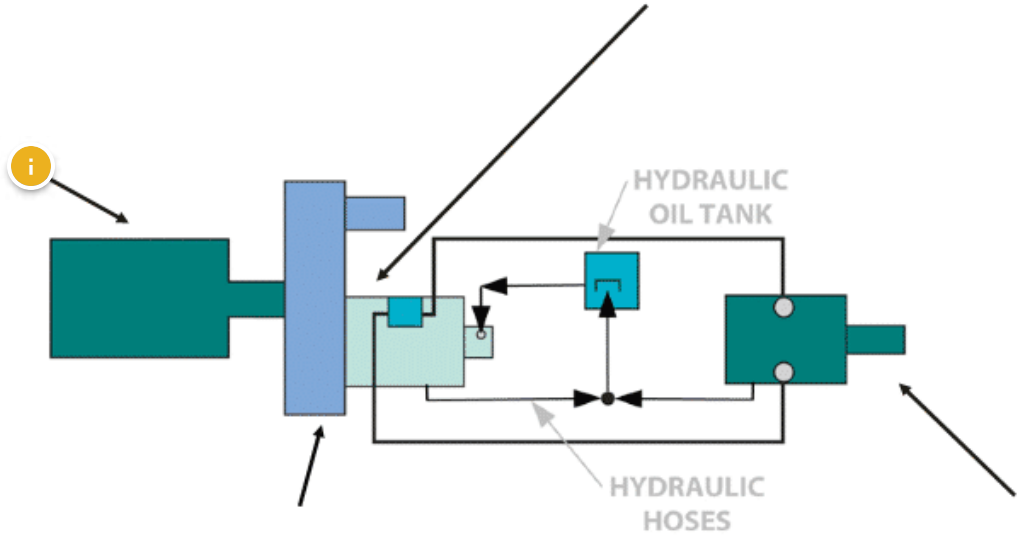
00:06

The torque converter multiplies the engine power and a driveline transmits this power to the transmission.

Hydrostatic drive

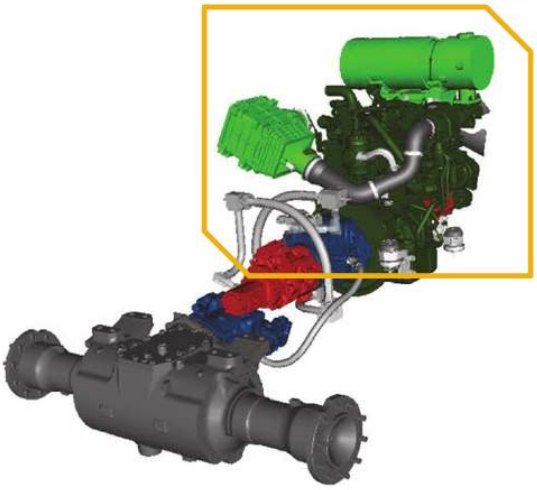


Hydrostatic drive



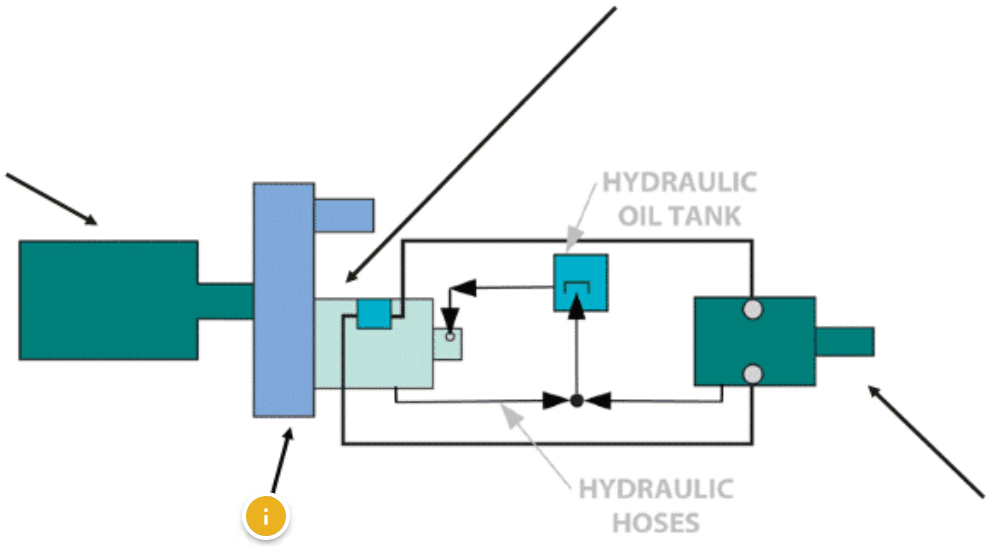
Engine

00:05



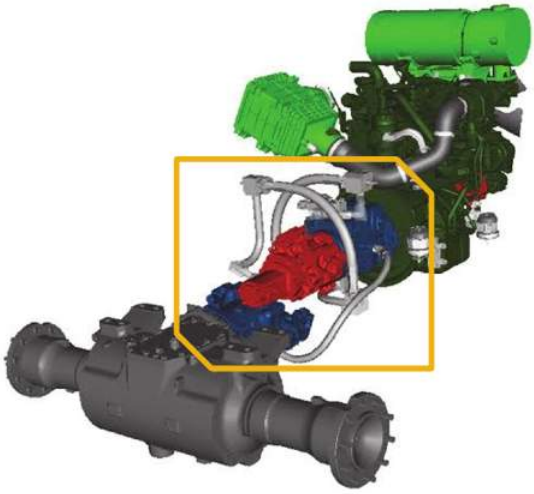
The engine powers the hydraulic pump and can be fueled by diesel fuel, gasoline or LPG (liquid petroleum gas).

Hydrostatic drive



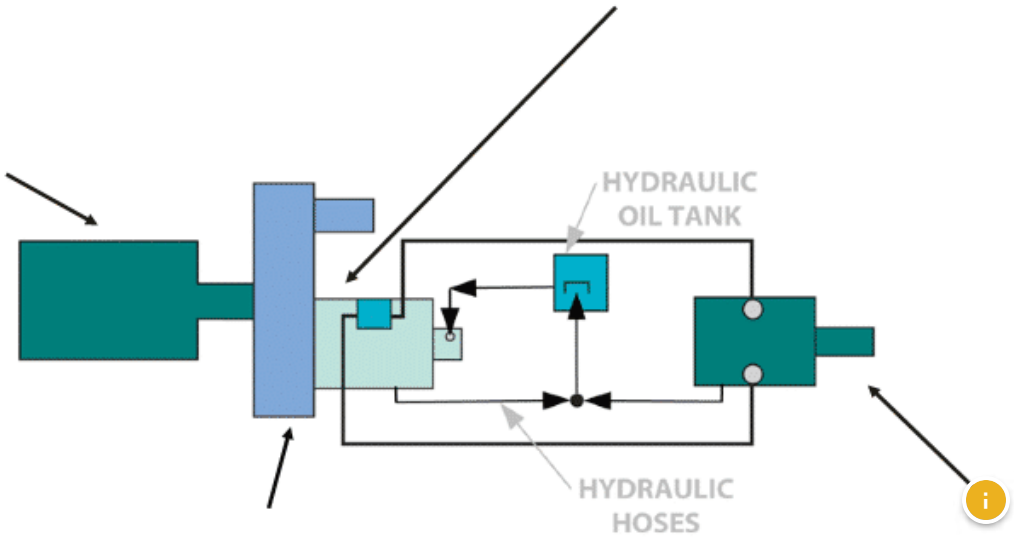
Transfer gear case

00:09



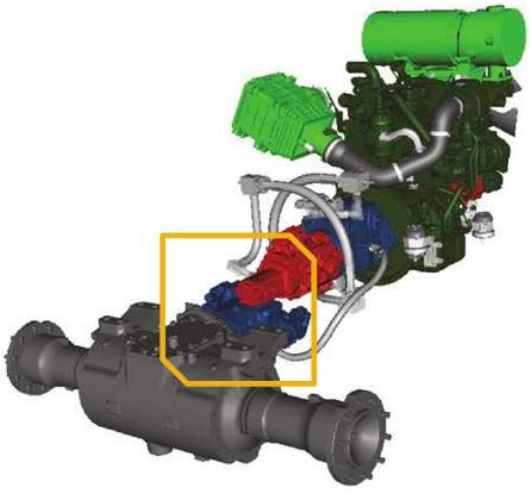
The transfer gear case reduces the input from the hydraulic motor and increases the power to the drive train. It also splits the drive power to the front and rear differentials.

Hydrostatic drive



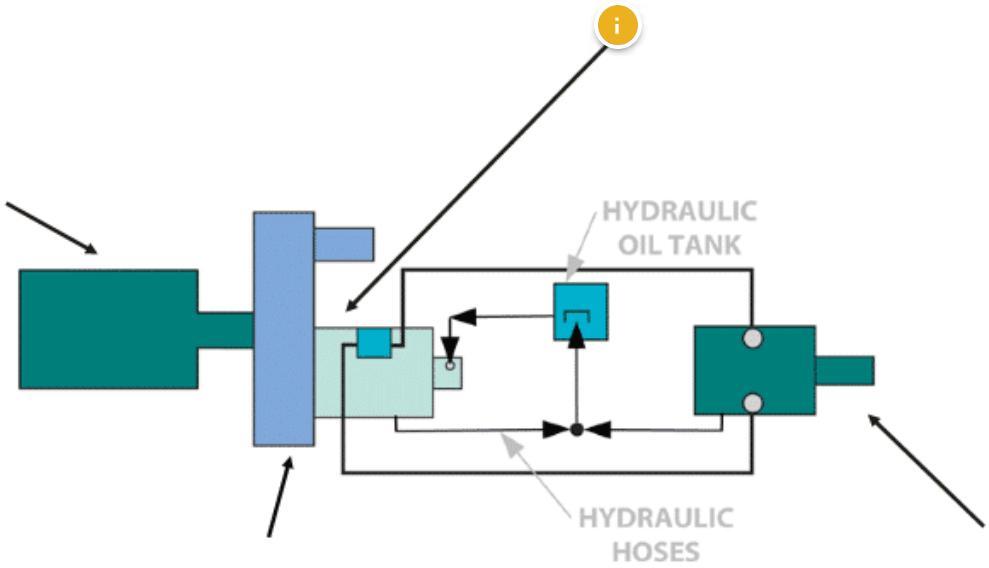
Hydraulic drive motor

00:05



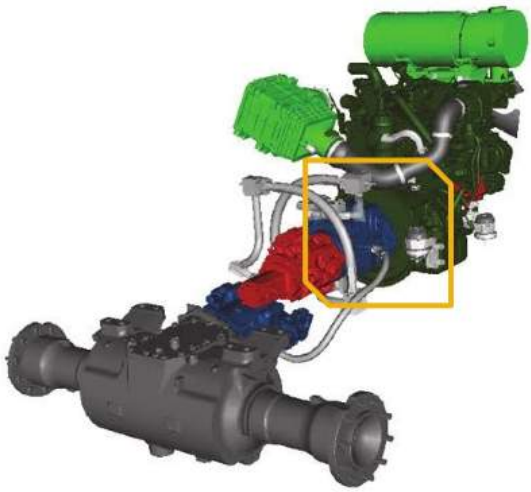
The hydraulic drive motor converts hydraulic power to mechanical power to drive the mechanical drive train.

Hydrostatic drive



Hydraulic drive pump

00:04



The hydraulic drive pump supplies hydraulic fluid under pressure to drive the motor.

Continue

Tires and wheels

Why forklift are tires important?

A forklift's tires can either reduce the chance of accidents or cause them. Tires are fundamental to a forklift's operation, providing cushion and stability. Additionally, forklift tires carry all the weight of the forklift, plus the load and the operator. You will learn more about tires and wheel assemblies during equipment specific/practical training.

Forklift tires are available in three types, which include:

00:36

- Cushion.
- Solid pneumatic.
- Air pneumatic.

Click on the tabs below to learn more about the different types of forklift tires you may encounter in your workplace.

CUSHION TIRES | PNEUMATIC TIRES (SOLID) | PNEUMATIC TIRES (AIR FILLED)

Cushion tires are composed of solid rubber and are directly pressed onto the wheel. They sit lower to the ground and offer a smaller turning radius, which provides an advantage in maneuverability. Cushion Tires are primarily suited for indoor or paved applications, as they can struggle on uneven surfaces, like gravel.

CUSHION TIRES | PNEUMATIC TIRES (SOLID) | PNEUMATIC TIRES (AIR FILLED)

Solid pneumatic tires are composed of solid rubber, much like a cushion tire and are the most common tire. Solid pneumatic tires are commonly used for a combination of indoor and outdoor applications. However, solid pneumatic tires do not offer the same comfortable ride a cushion tire does across paved surfaces.

CUSHION TIRES | PNEUMATIC TIRES (SOLID) | PNEUMATIC TIRES (AIR FILLED)

Air filled pneumatic tires are composed of rubber, but are air filled much like a car or truck tire. They have a deep tread and are made of strong, long-lasting rubber material. These tires are better for rough, outdoor terrain.

Activity

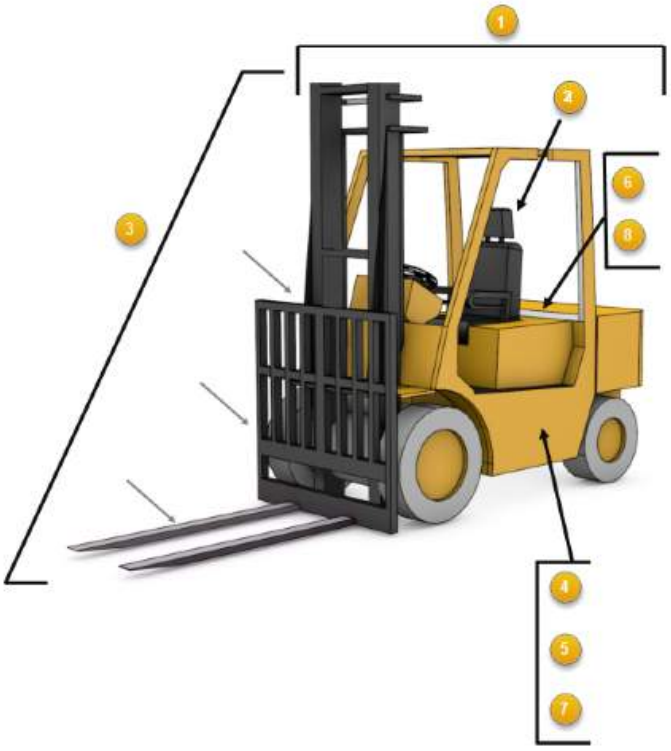
What is the function of each component? Match the component to the description.

Question

Load Lifter Assembly	Allows operator to lift material and carry it during transportation.
Hydraulic System	Powers steering and lift cylinders.
Counterweight	Enables the forklift to lift heavier loads.
Capacity Data Plate	Gives relevant information about the forklift.
Electrical Systems	Generates required electrical energy.

SUBMIT

Identify the components of the forklift by matching the labels on the left to the numbered labels on the forklift. *(Click on image to enlarge)*

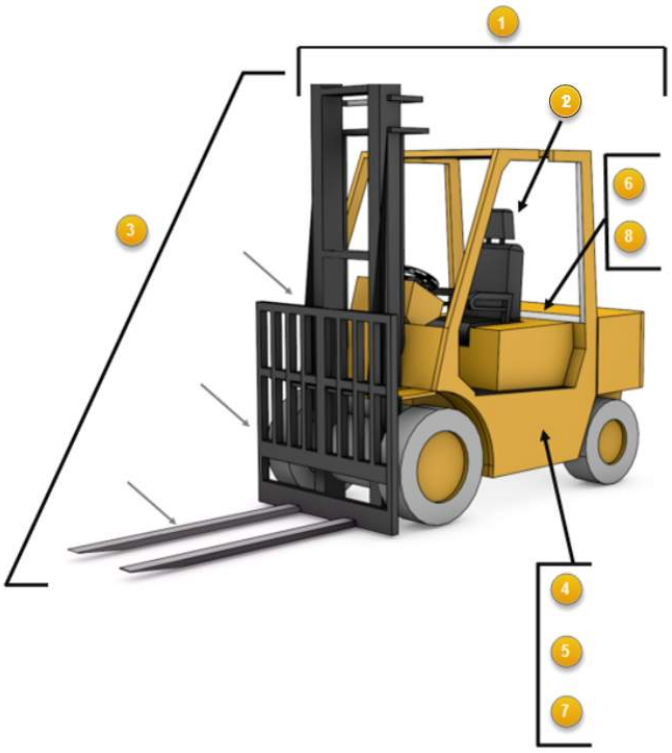


Operators Compartment	2
Hydraulic System, Fuel and Cooling Systems and Drive Assembly	4, 5 and 7
Exhaust System and Counterweight	6 and 8
Frame Assembly	1
Load Lifter Assembly	3

SUBMIT

Which components are part of the load lifter assembly? Select all that apply.

(Click image to enlarge)



- [ ] Mast/Boom
- [ ] Carriage

- [ ] Forks
- [ ] Steering cylinders
- [ ] Electrical system

SUBMIT

Got a Question?
Submit your question here using Vale forms, be sure to include your first name last name and contact information.

CLICK HERE!

Wrap Up:

You have reached the end of this section of the module! In the next section, you will learn about the three principles of counter

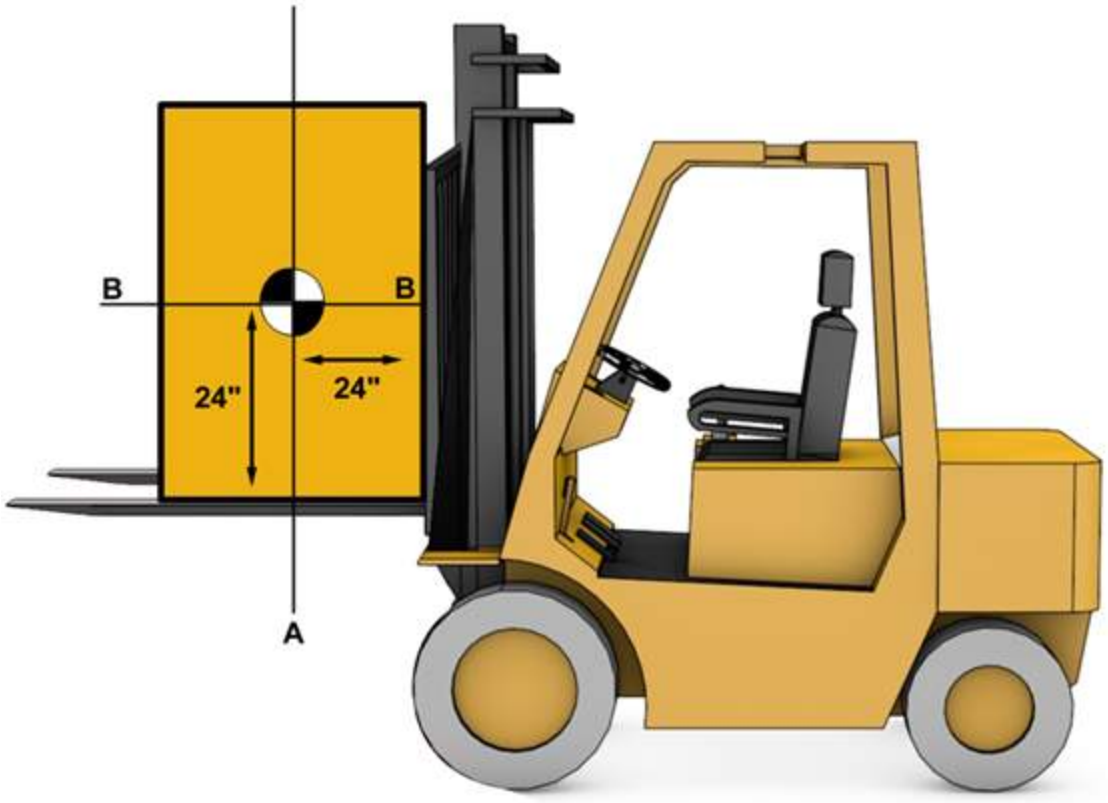
balance which include; the center of gravity, load center, and the stability triangle.

00:11

Complete the content above before moving on.

Principles of counterbalance

Center of gravity / load center

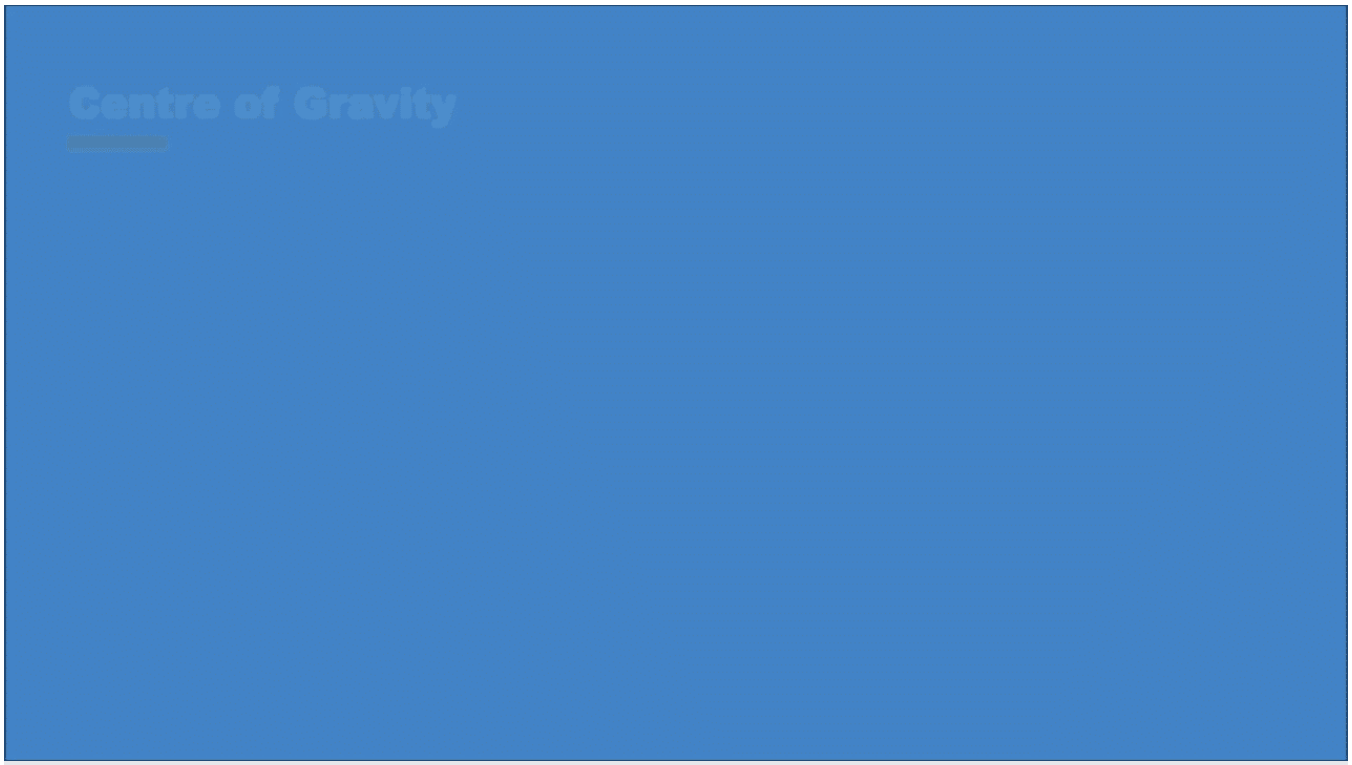


Every object on earth is affected by gravity. This is the force that pulls all matter towards the center of the earth. All objects have a center of gravity.

The center of gravity of an object is the point about which all forces of gravity are equal. This is vitally important to the Forklift Operator, as the center of gravity changes.

The operator must be knowledgeable about the concept of center of gravity and understand how operation can affect the center of gravity of the unit.

00:27



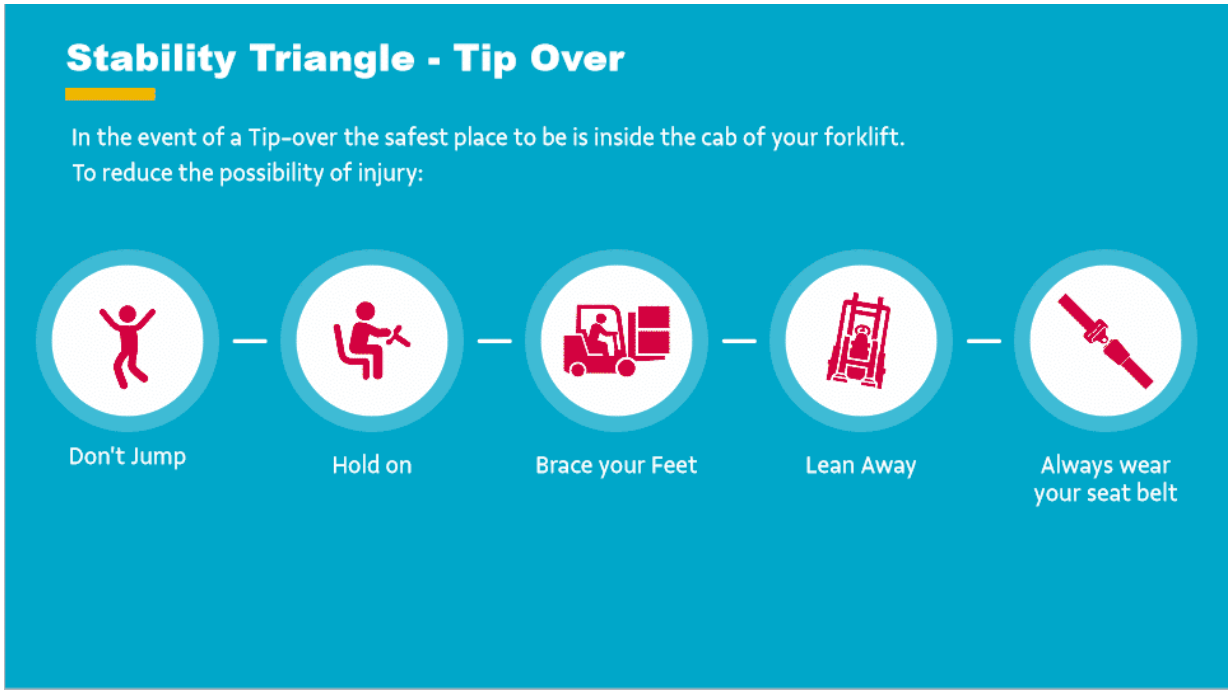
Stability triangle

Stability is a function of height, weight support, and surface conditions. The goal is to keep the center of gravity as low as possible, and as close to the center of the chassis as possible.

Stability Triangle

Let's now look at some operating practices and conditions and how they can affect the stability triangle.

00:05



00:15

Complete the content above before moving on.

Activity

It is critical that every operator knows how much their forklift can lift safely.

How would you find this information on your forklift?

Question

- ○ In the glove compartment?
- ○ Using the stability triangle?
- ○ Using the capacity data chart?

SUBMIT

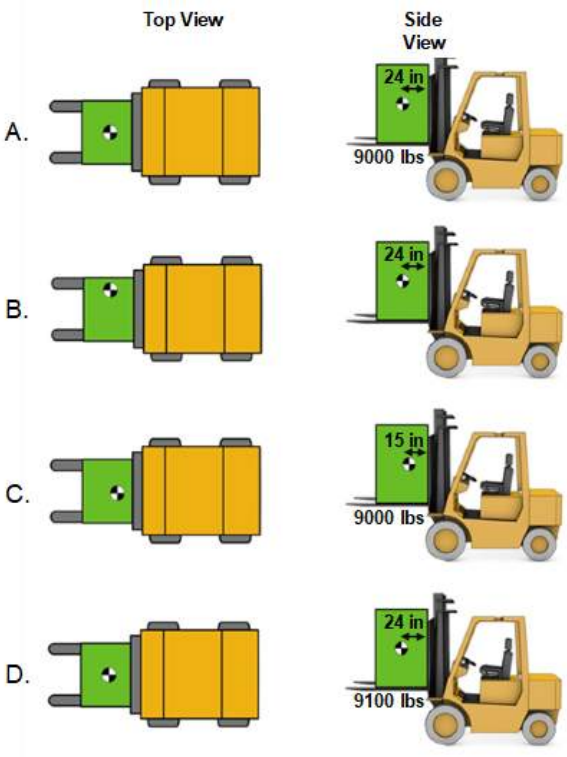
The "Combined Center of Gravity" is formed by the:_____.

- ◯ Center of gravity of the load and pallet?
- ◯ Combination of the center of gravity of the forklift and load?
- ◯ Center of gravity of the forklift?

SUBMIT

Which forklift(s) will not tip over, knowing that the load capacity is 9000 lbs. at a load center of 24 in. from the carriage?

Select all that apply.



- [ ] Choice A.
- [ ] Choice B.
- [ ] Choice C.
- [ ] Choice D.

SUBMIT

Wrap Up:

You have reached the end of this section of the module! In the next section, you will learn how the forklift is controlled.

00:06

Got a Question?
Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

CONTINUE

Controlling the equipment

The Controls

What is controlled?

As the operator, you have direct control of the following:

Typical forklift control levers

00:14

- Speed of the forklift.
- Direction (forward/reverse) of the forklift.
- Steering (right/left) of the forklift.
- Raising, lowering, tilting and rotation/side moving (if applicable) of the carriage.

How is it controlled?

The Controls and Engine Instrumentation

00:13

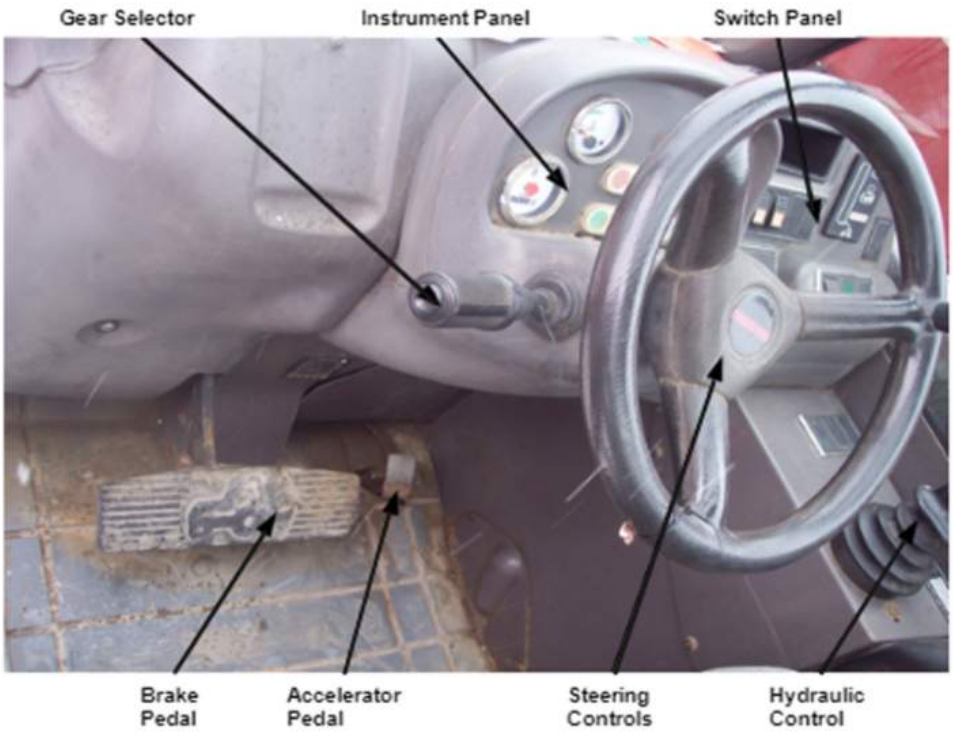
Control	Mechanical drive	Hydrostatic drive
Speed	Controlled by gear selection and accelerator pressure. Stopping of the vehicle is through application of the brake pedal or an emergency/park brake.	Controlled by the flow rate of fluids and the gear selectors.
Direction	Controlled by shifting the transmission to the forward or reverse direction.	Controlled by the direction of fluids and the gear selectors to the forward or reverse direction.
Steering	Controlled by turning the steering wheel either left or right, which extends or retracts the steering cylinders.	Controlled by turning flow of hydraulic oil through the steering control valves to the hydraulic motors.
Raising, lowering, tilting, rotation and side movememnt of the carriage	Controlled by operating the hydraulic control levers, which extend or retract the lift cylinders.	Controlled by hydraulic fluid through the hydraulic control levers, which extend or retract the lift cylinder.

The forklift is controlled through the use of the various controls in the operator's compartment. These controls are listed in the table above along with their operational characteristics. Click the start button to learn more about the controls and engine instrumentation.

Step 1

Gear Selector – For speed:

00:30



This is only available in forklifts equipped with a manual transmission, it is used to select the speed gear, according to loading and road conditions.

Depending on the machine, the transmission can be shifted from one speed to another, from first to second gear, while the gear selector is in neutral.

It can also be set up to 4 different gears, which are different control positions.

Note: Always lower engine RPM, (e.g. release accelerator pedal) before shifting the speed gear.

Step 2

Gear Selector – For direction:

00:33

The Gear Selector for direction has three different positions, forward, neutral and reverse and is used to determine the forklift direction of traveling, according to loading and road conditions.

Note: For a mechanical drive, it is recommended to stop the unit before shifting directions to avoid transmission damage.

The selection of transmission speed and direction can be part of the same lever. If not, the gear selector will also have a "neutral" position. When the gear selector is in reverse mode, a back-up alarm should sound to alert workers that the forklift is moving backwards.

Step 3

Hydraulic Control Levers

00:18

The Hydraulic Control Levers work by either pushing or pulling the lever to extract or retract the lift cylinders, to displace the mast in order to raise, lower, tilt, and if applicable, move left or right, or rotate the carriage clockwise or counter clockwise.

Booms and certain types of masts can also be telescoped in or out.

Step 4

Steering Control

00:11

When you turn on the steering wheel, the wheel at the rear axle starts to turn back and forth. This is intentionally designed to allow operator to take greater degree of rotation and precision while handling a cargo.

Step 5

Pedals

01:00

Here are the other controls you must familiarize yourself with:

- Accelerator Pedal: Depress the pedal to increase speed.
  Release the pedal to decrease speed.

- Brake Pedal: Depress the pedal to apply the service brakes.
  Release the pedal to release the service brakes.

- Clutch Pedal: Some types of forklifts are equipped with a clutch pedal that gives the operator more driving acceleration by shifting from gear to gear. Such forklifts equipped with clutch are those used outdoors and with an internal combustion engine.

- Inching Pedal: The inching pedal is usually operated by the left foot. Its purpose is to make a very slow and little movement for maneuver with full engine power for lifting. Inching pedal

is used commonly to maneuver forklift in tight spaces or corridors.

- Parking Brake: Push the lever or switch on the button to apply the parking brake, which blocks the wheels and keeps the forklift stationary.
  Pull the lever or switch off the button to release the parking brake. When parking in an inclined floor surface, engage the parking brake and block the wheel(s) to make it more secure.

Step 6

Instrument Panel(s) and Gauges

00:37

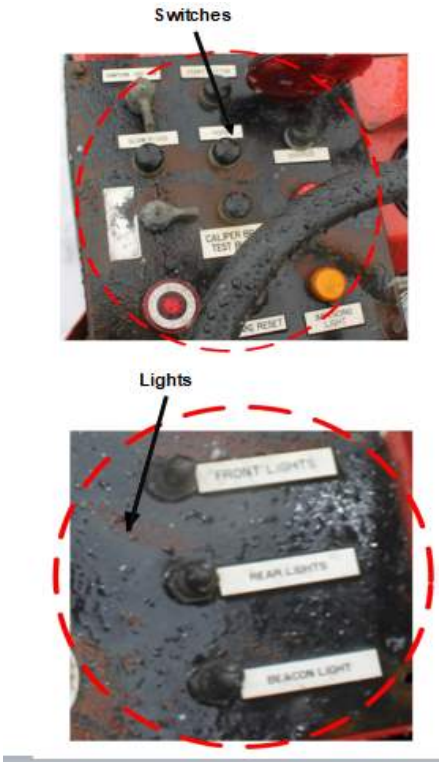
The instrument panel display enables the operator to monitor a number of important temperature and pressure readings.

Fuel Level Gauge Indicates the level of fuel left in the tank.
Temperature and Pressure Gauge/Light Indicator/Warning Light Gauge or light indicator: indicates the operating temperature or pressure of a certain component (e.g. oil).
Warning light: turns on when the temperature or pressure of a certain component reaches a certain value. Engine should be operated within the safe temperature/pressure range.
Hour Meter: Monitors the total number of hours of the engine operation.
Periodic maintenance work is based on hour meter readings.

Step 7

Switches

00:09



The switch panel contains switches, buttons and light indicators. In some units the instrument and switch panel may be separate and in others they can be part of the same panel.

CONTINUE

Evidence of good control

Evidence of good control is shown through the operator's care of the equipment and observance of all safety rules and operating procedures.

In addition, the following should be observed;

00:28

- All instruments on the forklift are indicating normal during operation.
- Cooling, fuel and hydraulic fluid levels are all normal.
- All forklift moving parts are operating normally.
- All items are properly stacked before moving. This means bags and containers are evenly arranged and will not be subject to damage.

Which of the following statements are indicators of good performance; and observance of all safety rules and operating procedures? Select all that apply.

- [ ] All instruments on the forklift are indicating normal during operation.
- [ ] Cooling, fuel and hydraulic fluid levels are all normal.
- [ ] All forklift moving parts are operating normally.
- [ ] All items are properly stacked before moving. This means bags and containers are evenly arranged and will not be subject to damage.
- [ ] Observance of all safety rules and operating procedures.
- [ ] Operators care of the equipment.

SUBMIT

As the operator, you have direct control of the care and preventative maintenance of the forklift, the actual operation of the forklift and the movement of materials.

- ○ True
- ○ False

SUBMIT

CONTINUE

Wrap Up:

You have reached the end of this section of the module! Click Continue to proceed to

learn about the basic operating procedures before actually operating the unit.

00:08

Got a Question?

Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

Complete the content above before moving on.

Safe operation

Prepare to start-up procedures

Introduction

One of the responsibilities of every forklift operator is to perform a preoperational inspection. This inspection is to be performed prior to starting the engine and using the machine to perform work. The preoperational inspection determines the machine's suitability to operate. It is also a major component in the preventative maintenance program.

Let's watch the following video to learn more about the importance of performing a through pre-operational inspection.

00:24

CONTINUE

Note: Refer to the Operators Manual for your type of equipment.

Why Perform a Pre-Operational Inspection?

Now that you know what to inspect, you also need to know how to determine when the forklift is safe or unsafe to operate. Click on the start button below to learn more about how to perform a pre-operational inspection.

00:11

Pre-Operational Inspection

00:13

Shown below are the sub-sections of a pre-operational inspection.

- Fuel Source
- Tires
- Forks and Carriage Assembly
- Engine Compartment
- Battery
- Operators Compartment

- After Starting Engine

Step 1

Fuel Source

00:14

Begin your inspection at the fuel source:

Check to ensure there are no leaks present and there is sufficient fuel in the tank.

Inspect the appearance and condition of the propane cylinder, cylinder hoses and connection.

Ensure the cylinder relief valve is in the 12 o'clock position and that cylinder straps are securely fastened.

Step 2

Tires

00:13

The tires must be in good condition, *check for* wear or damage and proper air pressure.

Check the lug nuts for proper tightness.

Look for shiny spots on the wheel around the wheel studs, this could indicate that lug nuts are working loose.

Step 3

Forks and Carriage Assembly

00:20

When inspecting the forks, *pay particular attention* to the heels.

Cracks can sometimes develop on the underside and can go unnoticed if not closely inspected.

Mast channels should have sufficient oil and grease and no obvious damage on the sides or front.

The chain tension should be equal on both chains and all hoses and fittings should show no obvious signs of wear.

Step 4

Engine Compartment

00:20

When inspecting the engine compartment *look for* any signs of oil leakage on the ground.

Check engine oil, hydraulic oil, brake fluid and transmission fluid levels and add fluids if required.

Inspect the air filter and tension of the drive belts.

All mobile equipment must be equipped with a fire extinguisher. *Ensure* that it is fully charged and has been recently inspected.

Step 5

Battery

00:08

Check the battery cables for signs of wear. A battery cable rubbing against the frame of the forklift could cause a spark and possibly cause a fire.

Step 6

Operators Compartment

00:19

The overhead guard should be in good condition. *Look for* dents or cracks in the welded joints.

Sound the horn, if it does not work, tag the forklift out of service and have it repaired.

Windows should be in place and have no cracks. A cracked window restricts visibility, creating an operating hazard.

Seat belts *must be present* and in good working order.

Step 7

After Starting Engine

00:16

After starting the engine listen for any abnormal noises or vibrations.

Monitor the gauges, temperature and engine oil should be normal.
Test the horn, back up alarm and operating lights.

Test the service and parking brakes. The service brake should have no excess play in the pedal.

Step 8

After Starting Engine – Hydraulic controls

00:27

Try the Hydraulic controls, they should be functioning smoothly.

Ensure the Lift Mechanism operates smoothly, raise the forks to maximum elevated height then lower the forks completely. Visually verify that all stages of the mast have returned to the maximum collapsed height.

Check the Tilt Mechanism by tilting the mast all the way forward and backward, it must move smoothly and hold in position.

After the above checks are complete, *inspect* the cylinders and hoses to verify there are no leaks.

Step 9

After Starting Engine – Parking Brake Test

00:16

With the engine running or power switch on, engage the parking brake.
Depress the accelerator slightly.

The parking brake should prevent the forklift from moving.

Should the parking brake fail to hold the forklift in position, tag it out of service, and have it repaired as soon as possible.

Step 10

After Starting Engine – Service Brake Test

00:18

To test the service brake, release the parking brake. With your left foot depress the service brake.

With your right foot depress the accelerator slightly. The service brake should prevent the forklift moving.

Should the service brake fail to hold the forklift in position, tag it out of service, and have it repaired as soon as possible.

Step 11

After Starting Engine – Steering Test

00:14

To check the steering, turn the steering wheel fully to the right then fully to left.

There should be no vibration or stiffness, check for excessive play.

Drive the forklift in reverse for a short distance. Check the steering again for excessive play.

Step 12

After Starting Engine – Warning Systems Test

00:14

With the vehicle's engine running, test the horn.

Place the forklift in reverse and back up slowly, listen for the back up warning alarm.

With the parking brake engaged, turn the lights on. Ensure all lights are secure and are in working order.

Pre-Operational Inspection - Summary

00:05

Remember:

If the forklift fails your Pre-Operational Inspection, follow the Tag Out procedure.

CONTINUE

Start-up / follow-up procedures

Mounting and dismounting

One of the most common causes of worker injury results from improperly mounting or dismounting vehicles and equipment. Forklift operators must make safety their primary focus and be aware of all aspects of their job. Potential hazards of mounting a forklift include:

- Slips, trips, and falls.
- Hitting your head on the overhead guard.
- Accidentally moving one of the forklift's controls.

00:25

When entering or exiting a forklift, you should:

- Always use the hand holds and steps that have been provided by the manufacturer for safe entry and exit.
- Keep three points of contact *(both hands and one foot or both feet and one hand)* at all times and always face the machine for safe entry or exit.
- Do NOT use the controls as hand holds for entry or exit.
- Do NOT jump on or off any machine. NEVER mount or dismount a moving machine.
- Be aware when conditions are wet or slippery. Ensure all steps and platforms are free of mud and scrape your boots off before mounting the machine.

01:09

- Always be seated when starting the machine with seatbelt fastened.
- Check that the park brake is engaged.
- Check that transmission control lever is in the neutral position and the safety locks on (if equipped).
- Check that the throttle control or accelerator pedal is pushed past any constriction that may be fitted and is in the low idle position.

Note: Never attempt to operate any of the controls unless you are properly seated inside the operators compartment!

Once the pre-operational inspection is complete and the fork lift is in safe operating condition, you can begin to start the fork lift using the following procedure. Click on the start button below to learn more.

Start-up procedure

00:19

Please note: The procedures identified here apply to internal combustion powered forklifts only. Upon completion of this module, you are required to complete at least one specific equipment module where you will learn about the specific safe operating procedures and how they apply to the forklift you will be operating.

Step 1

Start-up

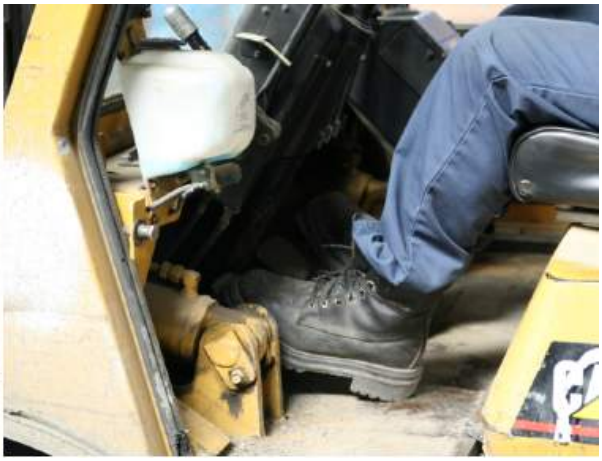
00:12

1. Turn the propane tank valve to the open position (if diesel, ensure fuel level in tank is full).
2. Put shift lever in neutral position.

Step 2

Start-up

00:11

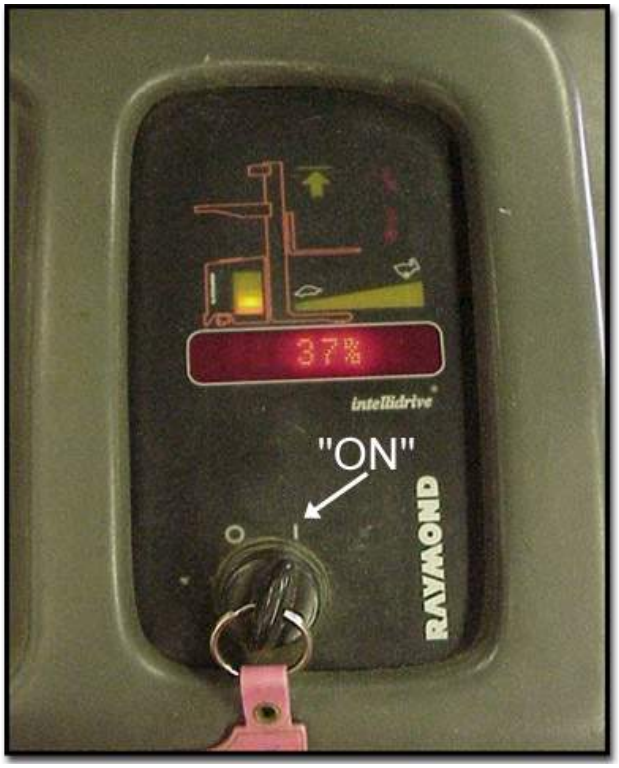


3. Insert the ignition switch key and turn clockwise to the on position.
4. Depress the accelerator pedal approximately 1/3 of its travel.

Step 3

Start-up

00:24



5. Turn the ignition switch key all the way to the start position to actuate the starter motor. Release the key as soon as the engine starts.

CAUTION!

Do not operate the starter motor for more than 30 seconds at a time. If the engine fails to start on the first attempt, allow the starter motor to cool for approximately 2 minutes before attempting to restart.

Step 4

Follow-up

00:19

Once the engine is running listen for any unusual noises.

Visually check the oil and ammeter gauges to ensure the lubrication and electrical systems are functioning normally.

Operate all control levers to ensure the hydraulic system is functioning normally and that there are no visible hydraulic oil leaks.

Normal shutdown

To safely shutdown the forklift during normal operating conditions, follow the procedures listed below.

00:40

1. Come to a full stop using the service brakes.
2. Shift the gear selector and all levers to neutral.
3. Apply the parking brake with the service brakes still depressed.

4. Lower the forks down to the ground.
5. Allow the engine to idle for about 2 minutes in order to cool down.
6. Shut down, do a visual walk around, looking and listening for anything unusual.
7. Report damage or oil leaks to your supervisor.
8. Turn off the ignition switch and master switch.
9. Place wheel chocks under the wheels and turn the strobe light on if in a dark area.

Emergency shutdown

If during operation of the forklift the service brakes do not respond you must immediately bring the forklift to a stop using the emergency stop procedures as listed below.

00:28

1. Push the emergency button, or, if not equipped, apply the parking brake.
2. Secure the forklift using proper procedure and then report to your supervisor or mechanic.
3. If unable to secure the forklift using the proper shutdown procedure, lower the forks with load to the floor and drag load off the forks.

When should the inspection of the forklift be performed?

- ◯ Beginning of each shift.
- ◯ Beginning of each day

- [ ] Every 40 hours
- [ ] When strange noises are heard.

SUBMIT

If the forklift develops mechanical problems, what should you do?

- [ ] Operate the forklift until the mechanic arrives.
- [ ] Repair the problem to the best of their ability.
- [ ] Apply a status tag and report the mechanical problem to your supervisor.

SUBMIT

Wrap Up:

You have reached the end of this section of the module! In the next section, you will learn about some of the potential hazards and controls of those hazards that operators may encounter while operating a forklift.

00:10

Got a Question?
Submit your question here using Valeforms, be sure to include your first name last name and contact information.

CLICK HERE!

Complete the content above before moving on.

Hazards and controls

Introduction

Let's examine a variety of potential hazards that operators may face while performing work using a forklift and the control methods and work practices you should use in order to reduce the risk of an incident occurring. Some potential hazards include;

00:31

- Steel storage systems (Racking and Shelving).
- Propane handling.
- Safe re-fueling.
- Battery care and recharging.
- Restricted or limited visibility.
- Pedestrians.

- Overhead objects/low clearances.
- Dock loading.
- Ramp travel.
- Loading/unloading.

Steel storage systems (Racking and Shelving):

Divisional Sops – Sudbury

Why is racking important?

Storage rack systems have the potential to cause serious injury and even death. While employees are trained on how to work safely around racking systems, inadvertently, damage to racking does occur.

Understanding the risks related to damaged racking and what to do when damage occurs is an important first step in racking safety.

Careful design, professional installation, regular inspections by competent people and proper damage reporting processes can reduce the risks of accidents and incidents.

00:36

August 23, 2003

A 57 year old Brampton man was pronounced dead after five racks filled with skids of frozen food collapsed and buried him under a nine metre mountain of heavy, frozen foodstuffs.

The man was a half-hour from finishing his midnight shift when the racks collapsed.

VersaCold: Brampton, Ontario

00:50

As the racks tumbled, they dropped hundreds of skids of frozen food that each weighed 816 kilograms (more than ¾ ton each). A portion of the roof caved in and a support beam in the building buckled, causing a seam in the building's siding to split, leaving a meter-wide gap that revealed crates and skids piled to the ceiling.

During the MOL investigation into why the 15-metre-high, 30-metre-long racks collapsed it was revealed that the racks lacked recommended supports and that the company had no procedures in place to mitigate the risks to workers.

So, how serious is the issue of pallet-racking safety?

Prior to 1997, there were no effective standards for racking.

Racking is not normally viewed as “part of a building” therefore provincial building codes don’t always apply – installations vary.

Pallet racking systems are typically designed with a 40% safety factor (for those built to meet current standards).

00:36

It should always be noted that, while steel pallet rack uprights are designed to take a high vertical load, they are not strong to lateral loading. Forklifts and other warehouse equipment are capable of applying much higher forces than racks are able to withstand.

Pre-Use Inspection

Keeping pallet racking safe is vitally important.

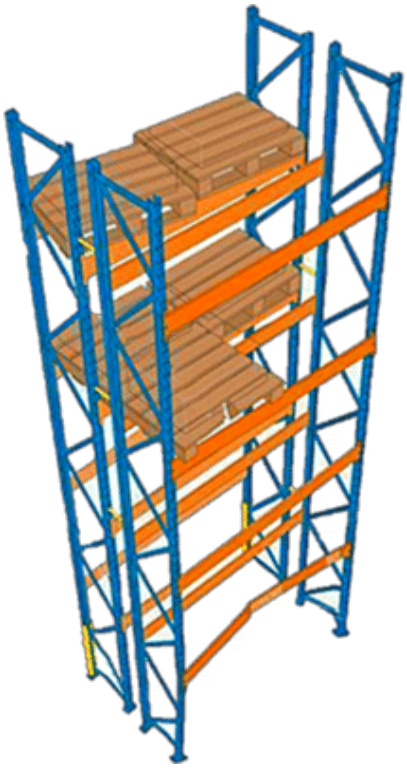
In addition to recurring rack safety inspections by competent persons in accordance with MPROC - 8 2 0 0 2, workers need to carry out daily inspections of their equipment and work area.

But what should you check?

00:18

What to look for during your inspection...

00:21



- Broken or unbalanced pallets
- Damaged uprights, bracing, beams or footplates
- Missing row spacer, guard, safety lock, or floor anchors
- Ensure the lighting is adequate to safely complete your work

Click the start button to learn more about items to be aware of during the inspection.

Step 1

Column damage:

00:09

Closely inspect the columns, look for rips, tears or any deflection that could compromised the integrity of the racking.

Step 2

Horizontal and diagonal brace damage:

00:11

Missing horizontal or diagonal braces or braces with any rips, tears or braces with deflection must also be addressed.

Step 3

Foot plate damage:

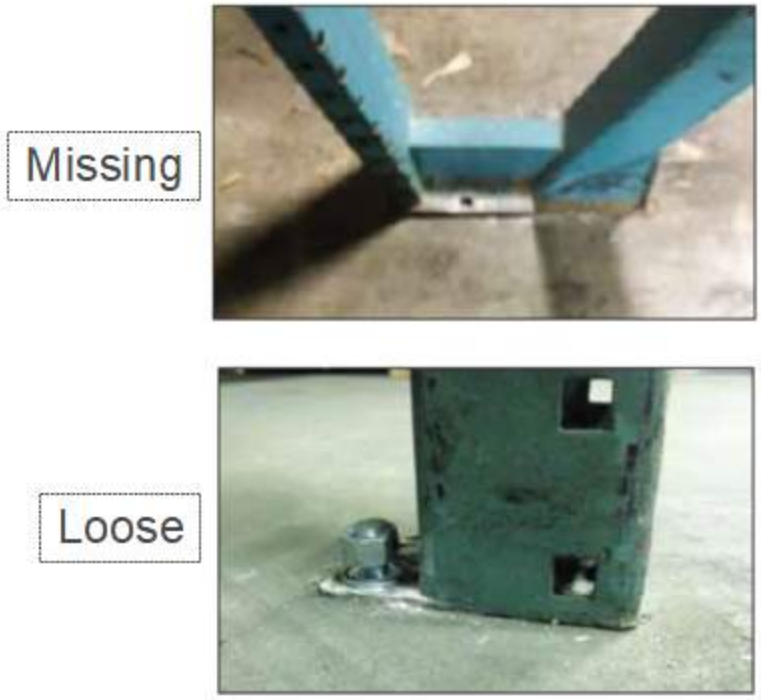
00:06

Look for any broken, torn or twisted welds on the footplates.

Step 4

Anchor damage:

00:09

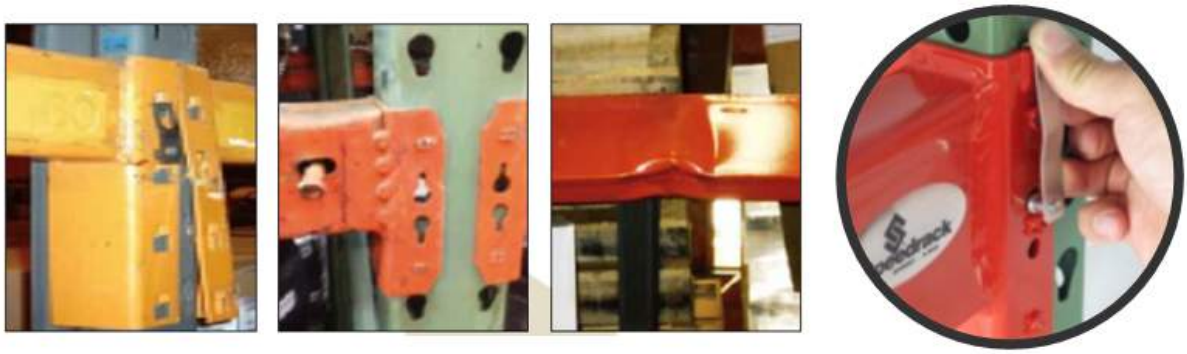


Each footplate of uprights (front and back) must be anchored to the floor. Check for missing, loose and sheered anchors.

Step 5

Beam damage:

00:15



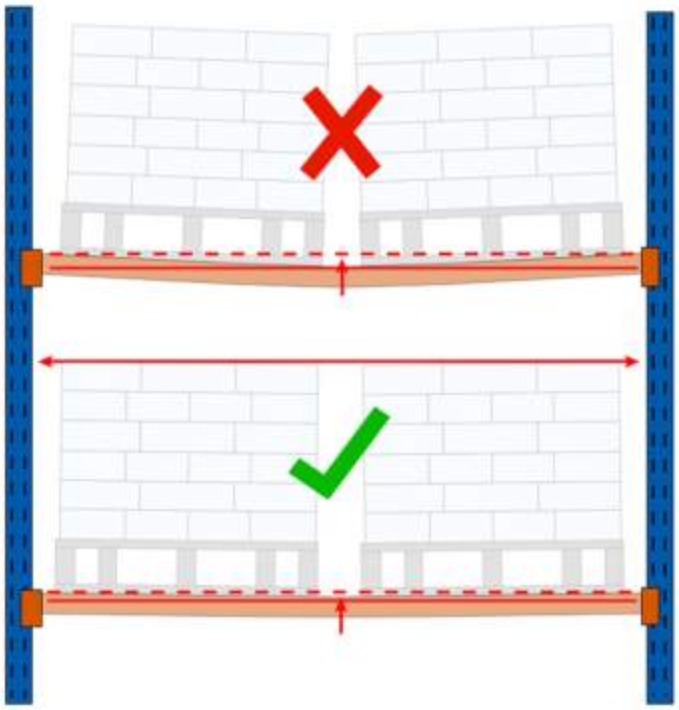
Beam damage or missing or improper beam connectors/safety clips:

Look for beams that are not not fully engaged or not installed with proper safety locks or beams with visible deformation or cracking of the beam end connectors.

Step 6

Overloaded beams:

00:19



Look for deflection of beams or twisting of the beams in the frame connection. Beams are intended to deflect temporarily when loaded, but when the load is removed they should recover.

The acceptable amount of deflection when loaded should be no more than the length of the beam divided by 180 (L/180).

Example: $\frac{96\text{" beam}}{180}$ = .53" allowable

Step 7

Signage

00:10

Each manufacturer publishes frame capacity charts. Applicable information to racking systems should be displayed in close proximity to aisles.

Step 8

Frame alignment:

00:10

Frames need to be plumb, square, straight and level. Sometimes with uneven floors, shimming is required to keep racking systems aligned.

Summary

00:32

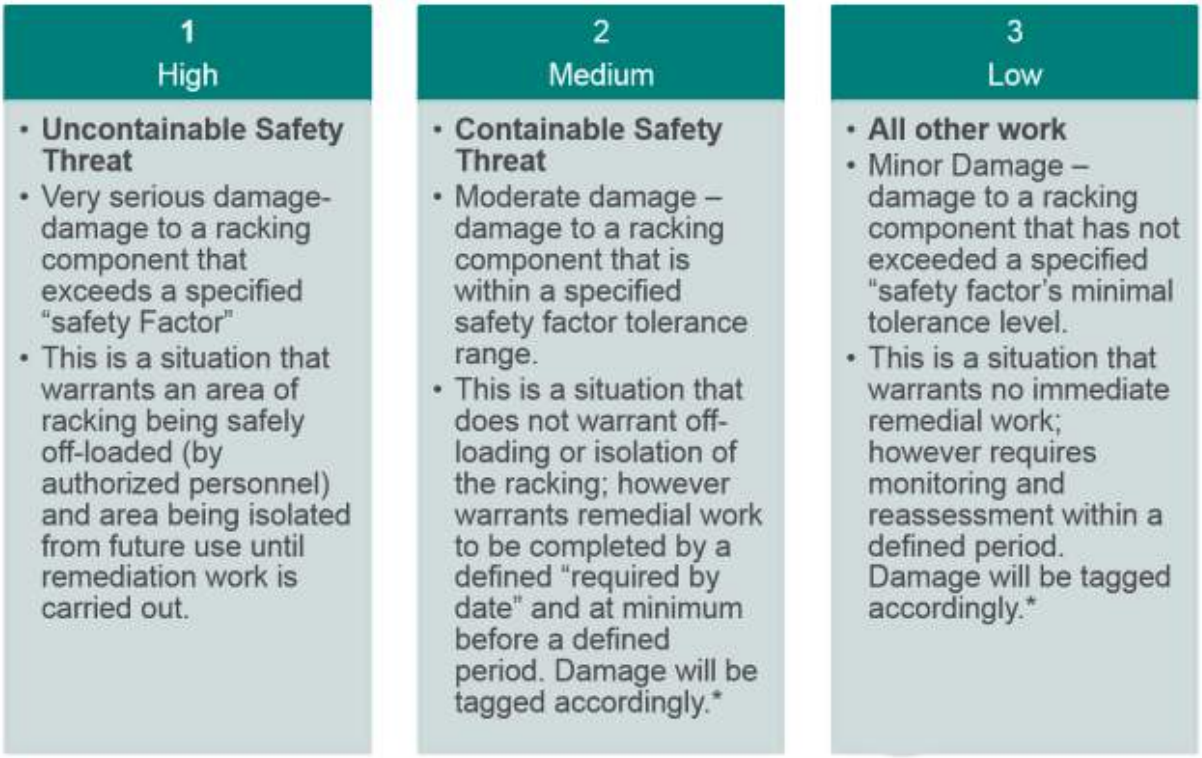
So what do you do if damage is discovered?

If you discover damage, cause damage, or a near miss occurs, it must be immediately reported to a supervisor so that its effect on safety can be immediately assessed and the hazard eliminated or risks reduced.
If you are uncertain about the severity of the damage, err on the side of caution and secure the area prior to notifying the supervisor.
At no time should you load or unload racking that is known to be damaged or that has been discovered to have damage in the process of loading or unloading.

CONTINUE

What do you do if damage is discovered...

Once hazards are reported, depending on the severity – the hazard will need to be investigated by an authorized, competent inspector and will be assigned a priority code as shown here.



Priority code assignments

00:13

Racking damage tags

Any damage to racking assessed as a Priority 2 or Priority 3 damage that has not yet been remediated shall be identified with a Racking Damage Notice Tag. The tag provides workers with the information on reported damages, the level of damage and the corrective action being taken to ensure the racking

structure's integrity remains intact and safe to use. Any safety factors that need to be "monitored" to ensure damage does not progress to a Priority 1 level will be identified on the tag.

Racking damage notice

00:41

Tags are placed so that they're visible – on the LEFT or RIGHT FRONT post frame at eye level, whichever is closest to the location of the acceptable damage to be repaired.

Maintenance:

Because of the legislative and engineering controls associated to pallet racking, only qualified and

authorized individuals may perform maintenance work on pallet racking systems. It is important to note that:

00:31

- No unauthorized "field repairs" are allowed.
- Damaged components must be replaced with parts in kind, as opposed to attempting to repair them.
- All replacements and approved modifications must adhere to the racking manufacturer's specifications and instructions for the racking system.

CONTINUE

Propane handing:

Section 1: IDENTIFICATION

Product Name:	Propane
Synonyms:	LPG (Liquefied Petroleum Gas); LP-Gas.
Product Use:	Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.
Restrictions on Use:	Not available.
Manufacturer/Supplier:	Superior Propane Suite 400, 6750 Century Avenue Mississauga, ON L5N 2V8
Phone Number:	1-877-873-7467
Emergency Phone:	CANUTEC 1-888-CAN-UTEC (226-8832) or 613-996-6666 or *666 on a cellular phone
Date of Preparation of SDS:	August 8, 2016

Section 2: HAZARD(S) IDENTIFICATION

GHS INFORMATION

Classification: Flammable Gases, Category 1
Gases Under Pressure - Compressed Gas
Simple Asphyxiant

LABEL ELEMENTS

Hazard Pictogram(s):

Signal Word: Danger

Hazard Statements:
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary Statements

Prevention: Keep away from heat, sparks, open flames, and hot surfaces. No smoking.

Response: Leaking gas fire: Do not extinguish unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.

Storage: Store in a well ventilated place.

Disposal: Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients with Unknown Toxicity: None.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200). This material is considered hazardous by the Hazardous Products Regulations.

Many fork lifts are powered by propane. Propane is plentiful, easy to use and fairly economical. But propane is also highly combustible and can cause a fire or an explosion if improperly handled. This section of the module will deal with safe handling procedures of propane.

00:23

Let's now watch the video below to learn more about safe propane handling procedures.

CONTINUE

Gasoline and diesel refueling:

Before refueling any forklift, as the operator you must

never refuel while the engine is running (the engine has the potential to ignite the fuel), and you must also ensure that the forklift is properly parked following safe parking procedures.

Open flame, smoke and any potential source of ignition are prohibited.

To safely refuel a gasoline or diesel forklift always follow the procedures listed below.

00:59

- Always be sure to wear personal protective equipment such as gloves appropriate for the task and safety glasses.

- Ensure the proper type of fuel is being used for the equipment and be careful not to overfill the tank or allow fuel to leak on the ground.
- Ensure that dirt or foreign material does not get into the tank.
- Ground the nozzle by ensuring it is in contact with the fill hole.
- Should a spill occur, inform your supervisor, and follow Vale's spills management procedures.
- Always report any defective refueling equipment to your supervisor immediately.

CONTINUE

Battery care and recharging:

Forklift batteries can cause injury or death if not handled safely. That's why it's important to learn proper safety procedures when working with them.

Some of the hazards associated with forklift batteries include:

01:05

- **Crushing:** Forklift batteries can weigh 2,000 to 5,000 lbs. – or even more. Improper handling can crush fingers, hands, and feet.
- **Chemical burns:** Battery acid can spill and cause burns when in contact with the skin.
- **Shocks:** Stored electricity in lift truck battery cells can short and electrocute if handled improperly.
- **Explosions:** Forklift batteries emit flammable hydrogen gas during charging. An ignition source can cause an explosion if the gasses aren't vented.
- **Thermal burns**. Forklift batteries can operate at high temperatures. Exposure to these temperatures could result in burns.

Let's now watch the video below to learn about the safe handling procedures while working with or around forklift batteries.

This video is for demonstration purposes only! Always ensure to wear the correct personal protection for the task at hand.

CONTINUE

Activity

In the following interactions you will learn about about the hazards of working on or around forklifts and how to mitigate those risks to get HomeSafe. Remember you must be both qualified and authorized to prior to operating any forklift.

00:12

Hazards and controls – part 1

Click the start button to begin.

Step 1

Restricted or limited visibility

00:27

Limited visibility ahead of forklift equipment is always a problem for operators. The view is partially obstructed by the mast and carriage assembly, the headlight brackets and, if so equipped, by the load being carried. Preventing serious incidents and fatalities takes the right combination of:

- Good communication
- High pedestrian and vehicle visibility
- Following strict procedures when in areas where forklifts may be operating

Step 2

Restricted or limited visibility

00:35

The following safe operating practices will help reduce risk of any incidents occurring due to restricted visibility.

- Always travel with the load low to the floor, this allows for good forward visibility; however do not drive in the forward direction when the load restricts your visibility.
- Operate the forklift in reverse to improve visibility, except when traveling on ramps.
- Drive carefully when moving forward or reversing – Before moving off, tilt the forks back completely, visually confirm that all of the mast sections have completely returned to their maximum collapsed mast height. and confirm that the load is secure.

Step 3

Pedestrian safety

00:24

Pedestrians will always be given the right of way!

Under all travel conditions, the forklift will be operated with complete control at all times.

All traffic regulations shall be observed including authorized plant speed limits.

You must always stop and sound the horn at blind corners, railway crossings, elevators or whenever your vision is obscured.
Operators must always yield the right of way to pedestrians.

Step 4

Overhead objects/low clearances

00:37

A number of control measures are available to minimize the risk of incidents involving contact between forklifts and overhead objects, or while operating in areas where there is risk of low clearance.

All involve careful operating habits, staying alert at all times, and keeping a safe distance from any overhead hazards in your work area, they include;

- Never lift or travel with any load, before checking the area for overhead hazards, such as, pipes, electrical wiring or installations, high pressure air lines, etc..
- Visually verify all of the mast sections have fully returned to their maximum collapsed height before traveling.

Step 5

Surface conditions

00:22

Always travel with forks as low as possible, whether the fork lift is loaded or unloaded. The forks should clear the floor by about 4 inches (10 cm.)

It is your responsibility to maintain a safe driving speed at all times. Reduce speed on wet or on uneven road surfaces.

Avoid driving over loose objects or holes in the floor, this can cause your load to shift making the forklift unstable.

Step 6

Steering

00:43

Forklifts have rear wheel steering for greater maneuverability, which can confuse the inexperienced operator.

When traveling forward on a forklift and turning the steering wheel, the speed of the rear end swing will be three times the forward speed of the forklift. This sideways movement creates a hazard, particularly for pedestrians.

Turn the steering wheel in a smooth, sweeping motion to help maintain control through your turn.

When you turn a car around a corner the steering will self center; on a forklift this will not occur. In fact the turning circle may decrease, therefore, it is imperative that one hand be on the steering wheel at all times and speeds be kept at a safe level.

When traveling in reverse the forklift will steer like a typical automobile.

Step 7

Ramp travel

00:23

Operation on ramps 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.

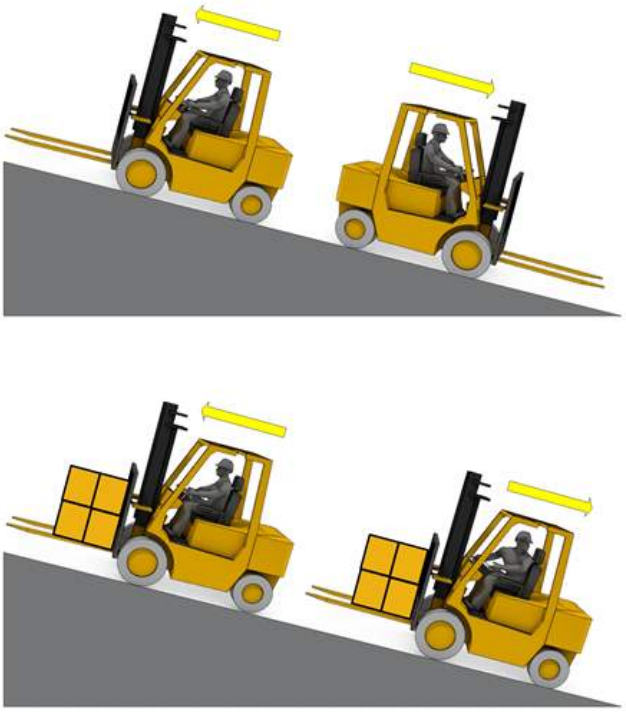
No person shall be permitted to walk down ramps ahead of the forklift.

Use extreme caution when operating near the edge of ramps, docks or anywhere there is a risk of the forklift falling from one level to another.

Step 8

Ramp travel

00:10



Always travel straight up or straight down a ramp, never try to turn the vehicle while on a ramp.

A forklift carrying a load must always be driven up a ramp and backed down a ramp or a grade.

Step 9

Dock loading

00:33

When dock loading always ensure:

- Bridge plates or dock levelers have correct capacity, height differential, sufficiently strong and are clean and dry.
- Railway cars, transport trucks or trailers must have their wheels blocked. Dock locks or other methods for securing transport trailers must be used wherever available.
- The floors of railway cars and trailers should be inspected before entering and any unsafe condition, reported to your supervisor.
- Fixed jacks may be needed to support a semi- trailer during loading or unloading when the trailer is not coupled to a tractor.

Hazards and controls – part 2

Click the start button below to begin.

Step 1

Loading and unloading

00:19

Too Short

Too Long

Correct

Setting up the Forks:

The forks that you use should always be shorter than the load you are handling.

The reason is that a fork protruding beyond the load will damage another when stacking.

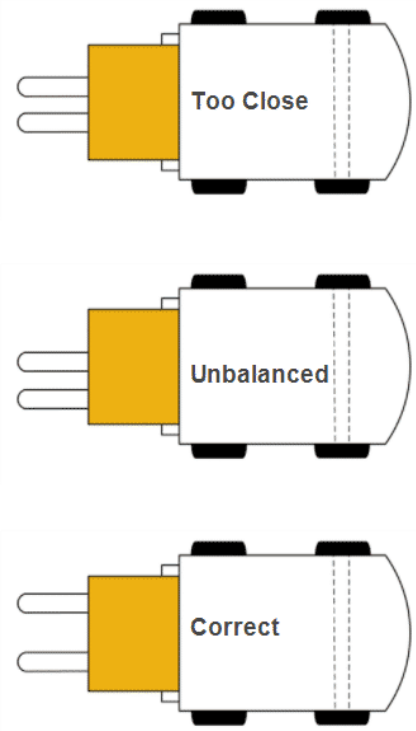
However, if the forks are too short, this would cause the load to be unstable.

A general rule is that the fork should extend at least 3/4 of distance under the load.

Step 2

Loading and unloading

00:09



Forks, which are adjustable, shall be placed at the outer edges of the load.

Always ensure the locking pin is properly secured, before attempting to lift a load.

Step 3

Approaching a load

00:27

1. Approach the load squarely with the forks level. While not part of the forklift, attention should be given to the pallet.
   Example: Loose nails, slivers, bent or jagged metal, etc. A damaged pallet can greatly reduce load stability.
2. Stop when the tips of your forks are about one foot away from the load.
3. Level the forks slowly, then drive forward until the load is resting against the backrest.
4. Lift the load high enough to clear whatever is under it.

Step 4

Picking up a load

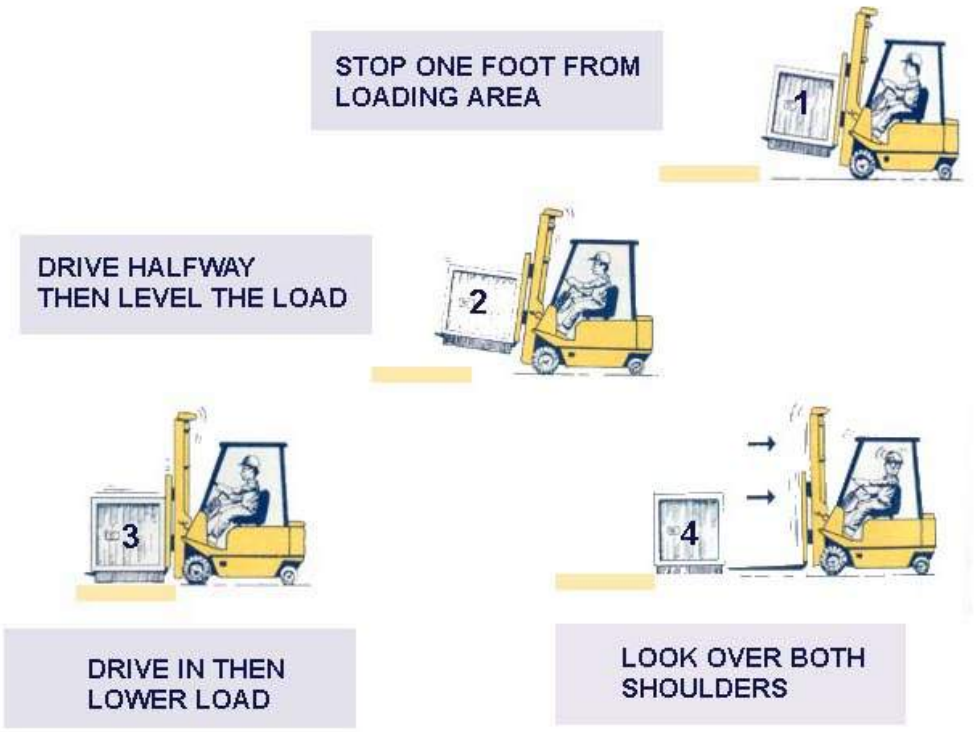
00:17

1. Raise the load no more than 4 inches from the ground. This is commonly called the "traveling position".
2. Look over both shoulders to make sure you're clear and back out about one foot.
3. Carefully tilt the mast back to stabilize the load.
4. Weight should never be placed on the rear of the lift truck to increase the lifting capacity.

Step 5

Putting the load down

00:21



1. Drive squarely to the location and stop about one foot away.

2. Square up and Level the forks and drive half of the way in.

3. Drive the rest of the way in, then lower the load to the floor.

   OPERATING TIP! To make sure you won't hook your forks on a load when pulling out, tilt your forks slightly forward.

4. Look over both shoulders and back out straight until the forks have cleared the pallet.

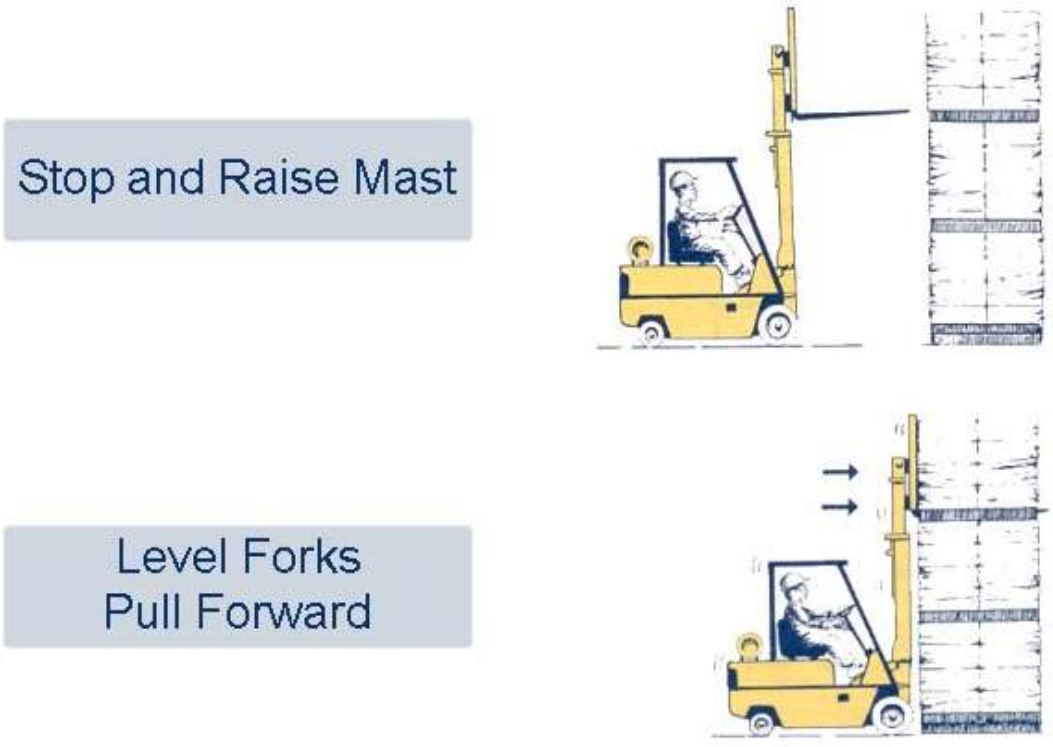
Hazards and controls – part 3

Click the start button below to begin.

Step 1

Stacking a load

00:28



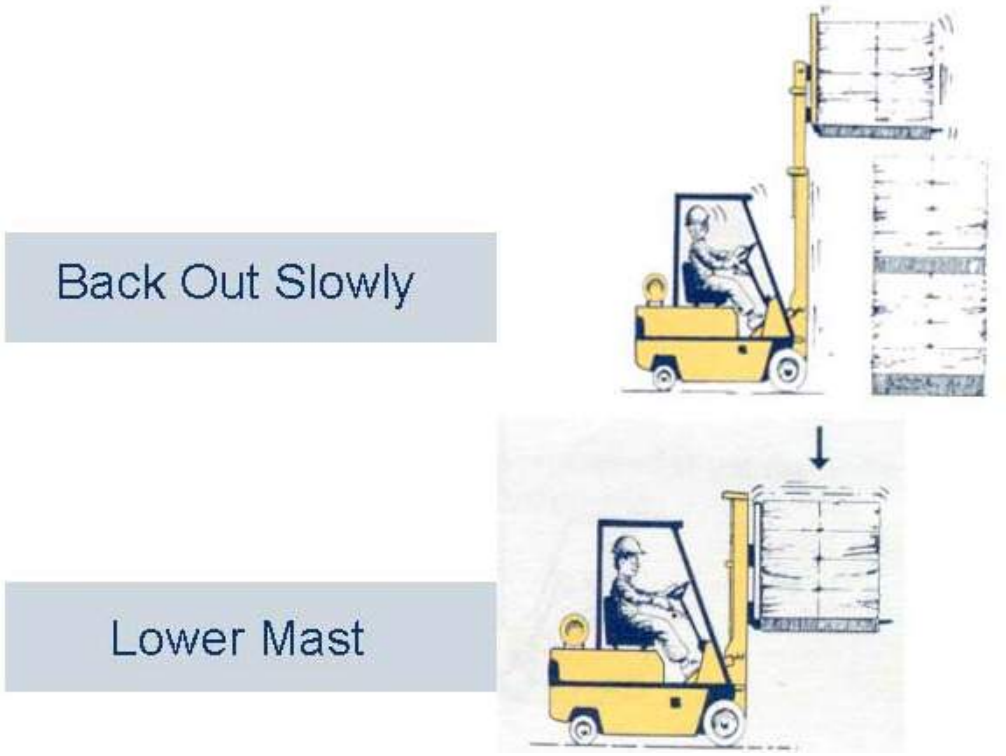
When you are stacking or unstacking loads, keep in mind that the higher the load is positioned, the less stable your forklift becomes.
If the stack area is not level, the approach must be made from down hill side and the truck must be level laterally before the load is raised.

- Approach the load slowly and squarely with the forks in the traveling position.
- Stop about one foot away from the load and raise the forks to the correct height.
- Level the forks and drive forward until the load is flush against the backrest.

Step 2

Unstacking a load

00:12



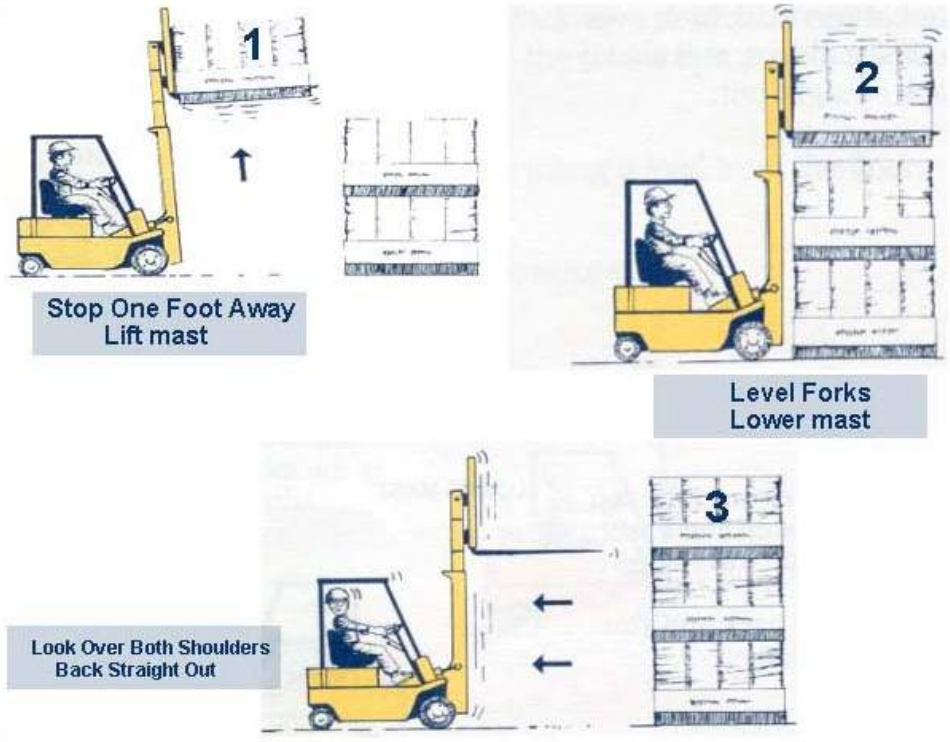
- Lift high enough to clear the bottom load, look over both shoulders, then slowly back out.
- Once you have cleared the top of the stack, stop and lower the mast to the traveling position.
- Tilt the forks and you are ready to go.

Hazard Alert!
Before lifting any load, always check the area for overhead hazards such as, pipes, electrical wiring, high pressure air lines, etc..

Step 3

Stacking one load on top of another

00:28



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1. Approach the load slowly and squarely with the forks in the traveling position.
2. Stop about one foot away from the load and raise the forks to the correct height.
3. Level the forks and drive forward until the load is flush against the backrest.

Hazard Alert!
Never lift a load while you're moving, always wait until you are completely stopped

before you raise the mast. Be sure that the top load sits squarely on the bottom load. If you are just slightly off, the stack could topple over.

CONTINUE

Vale safe operation key behaviors

The operation of any forklift
is subject to certain hazards that can only be protected against by following, safe work procedures and practicing situational awareness.
That is, being aware of where you are, where you are supposed to be, and what is happening around you.
More importantly, is there anyone or anything around you that can cause harm to you or others?

00:35

It is the responsibility of the operator to comply with the safety programs of the company. You are responsible for your own safety as well as the safety of your co-workers. Flip over the flash cards below to learn more about key behaviors forklift operators must know and follow.

Being alert, using good judgment and foresight in your daily work.

Learning and complying with safety rules and procedures.

Suggesting safety improvements to your supervisor.

Calling attention to any hazards that require correction.

Vale Safe Operation Standards

It is the responsibility of the operator to comply with the safety programs of the company. You are responsible for your own safety as well as the safety of your co-workers. Click the start button to learn more about the safety rules and operating procedures you, as forklift operator must follow while operating a forklift.

Step 1

As a Forklift Operator you must know and observe the following safety rules and operating procedures.

- Only authorized personnel shall be permitted to operate a forklift.
- The operator must know the rated capacity of his/her forklift.
- Does the forklift have an overhead guard? Forklifts must have an overhead guard unless operating in conditions that do not permit it.
- Any malfunctions should be reported immediately.
- Know the location of any low clearances such as pipes, low doorways, overhead electrical hazards etc.
- Be sure the floor, including railroad cars & trailer trucks can support the weight of your forklift & load.
- Use only approved forklifts for hazardous locations.
- Travel with forks low to the floor when loaded or empty.
- Always face in the direction of travel.

Step 2

As a Forklift Operator you must know and observe the following safety rules and operating procedures.

- Neutralize the controls, shut off power, set the brakes and dismount when in an elevator.
- No personnel in addition to the operator shall be allowed on an elevator with a forklift on board.
- Travel backwards when carrying a large or bulky load that restricts visibility.
- Do not drive over objects on the floor or on roadways.
- Reduce speed to a safe level when turning.
- Never drive alongside another lift truck and keep a safe distance when behind other trucks.
- Slowdown and sound your horn at blind corners and doorways.
- Avoid sudden stops.
- Cross railroad tracks diagonally – never park within 12 feet of the center of railroad tracks.
- Don't lift unstable loads.

Step 3

As a Forklift Operator you must know and observe the following safety rules and operating procedures.

- Don't overload your forklift – know its capacity.
- Be sure the forks are all the way under the load – Never tilt the load forwards unless directly over the area to be set down.
- Never straighten stacks by pushing with the end of the forklift.
- Keep your hands and feet within the forklift.
- Never reach through the uprights of the mast.
- Watch for pedestrians and never let anyone under the forks whether loaded or empty.
- Never smoke when checking the battery or when refueling.
- Smoking is permitted only in designated areas.
- Slow down during wet or slippery conditions.

Step 4

As a Forklift Operator you must know and observe the following safety rules and operating procedures.

- Use runway boards when crossing over electrical cables, hoses and lines.
- Avoid parking on an incline.
- Always drive forward up and backwards down an incline.
- Do not operate internal combustion engine forklifts for long periods of time in an enclosed area.
- No horseplay will be tolerated.
- The operator shall maintain a safe distance from the edge of ramps, platforms and elevated docks.
- The operator shall not use the truck for opening or closing freight car doors.
- The wheels must be blocked or the brakes set on the railroad cars and trucks when loading or unloading with a forklift.

Step 5

As a Forklift Operator you must know and observe the following safety rules and operating procedures.

- Dockboards or bridge plates shall be properly secured before using.
- Never exceed their rated capacity.
- All traffic regulations in the plant shall be observed.
- All accidents must be reported immediately.

Summary

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Putting What You Know Into Practice:

The activities below will give you an opportunity to practice using the information you have just learned.

00:07

CONTINUE

When operating a loaded lift truck on a ramp, the operator must:

Select all that apply.

- [ ] Drive in reverse coming down the ramp
- [ ] Drive forward going up the ramp
- [ ] Do not turn while on a ramp

SUBMIT

If the load is too big to see around, you should:

- Lean to one side of the truck so that you can see
- Repair the problem to the best of their ability.
- Lift the load high enough so that you can see underneath
- Drive in reverse and have someone direct your path.

SUBMIT

When picking up a load, the forks must be spaced?

Question

- As close together as possible.
- As wide apart as the load will allow.
- Does not matter as long as the load is stable.

SUBMIT

It is the lift truck operator's responsibility to make sure no one walks or stands under raised loads or forks. True or false?

Question

- True
- False

SUBMIT

Wrap Up:

You have completed your review of the content for the About Forklifts module! Click the continue button below to proceed to the quiz section of this module.

00:08

Complete the content above before moving on.

Got a Question?

Submit your question here using Vale forms, be sure to include your first name last name and contact information.

CLICK HERE!

Complete the content above before moving on.

Quiz

You will now take an evaluative test regarding the content of this training.

The test contains 18 questions about the safe operation of Forklifts.

You must obtain a score of 70% or greater to successfully complete this module.

Good luck.

Question

01/18

Who is allowed to operate a forklift?

- Anyone with a valid drivers license.
- Someone who has 3 months experience.
- Only those who have read the operator's manual.
- Only trained and authorized personnel approved by their employer.

Question

02/18

Once a person has been trained to operate a lift truck, they are authorized to use any type of lifting device.

- ◯ True
- ◯ False

Question

03/18

The Combined Center of Gravity is formed by:

- ◯ The center of gravity of the load and pallet.
- ◯ The center of gravity of the forklift.
- ◯ The combination of the center of gravity of the truck and load.

Question

04/18

What will happen if the Combined Center of Gravity moves outside the stability triangle?

- The fork lift will remain stable.
- The fork lift will not be able to lift the load.
- The forklift will tip over.

Question

05/18

In the event of a tip-over, the operator of a fork lift should:

Select all that apply.

- [ ] Hold on firmly.
- [ ] Brace their feet.
- [ ] Lean away from the point of impact.
- [ ] Stay with the forklift.

Question

06/18

Operators using a lift truck must use the available seat belt

- ◯ True
- ◯ False

Question

07/18

When should the inspection of the fork lift be performed?

- Beginning of each shift.
- Beginning of each day.
- Every 40 hours.
- When strange noises are heard.

Question

08/18

If the fork lift develops mechanical problems, the operator should:

- Operate the fork lift until the mechanic arrives.
- Repair the problem to the best of their ability.
- Follow the tagging procedure and report the mechanical problem to your supervisor.

Question

09/18

When picking up a load, the forks must be spaced?

- ◯ As close together as possible.
- ◯ As wide apart as the load will allow.
- ◯ Does not matter as long as the load is stabl.

Question

10/18

Oil leaks are unsafe because a very small amount can cause a pedestrian to slip and fall.

- ◯ True
- ◯ False

Question

11/18

If the load is too big to see around, you should:

Select all that apply.

- [ ] Lean to one side of the truck so that you can see.
- [ ] Lift the load high enough so that you can see underneath.
- [ ] Drive in reverse.
- [ ] Have someone direct your path.

Question

12/18

When picking up a load, it should be tilted:

- ◯ As far forward as possible.
- ◯ As far back as possible.
- ◯ Tilted back enough to stabilize the load.
- ◯ Tilting has no effect on stabilizing the load.

Question

13/18

When operating a loaded lift truck on a ramp, the operator must:

Select all that apply:

- [ ] Drive in reverse coming down the ramp.
- [ ] Drive forward going up the ramp.
- [ ] Do not turn while on a ramp.

Question

14/18

Railway tracks should be crossed:

Select all that apply.

- [ ] At approved crossings.
- [ ] Diagonally, so that one wheel at a time crosses the tracks.
- [ ] Slowly and carefully.

Question

15/18

It is the forklift operator's responsibility to make sure no one walks or stands under raised loads or forks.

- ◯ True
- ◯ False

Question

16/18

It is not necessary to sound the horn at cross aisles and blind spots if you are traveling forward slowly.

- ◯ True
- ◯ False

Question

17/18

How is the capacity affected by mast height?

- The lower the lift, the lower the capacity.
- Lifting height does not affect lifting capacity.
- The higher the lift, the lower the capacity.

Question

18/18

How is capacity affected by Load Center?

- The longer the Load Center, the higher the capacity.
- Load Center does not affect capacity.
- The longer the Load Center, the lower the capacity.

Conclusion

Congratulations.
You have successfully completed the About Forklift Operation module. You have learned how to;

- Perform effective vehicle inspections.
- Monitor vehicle operating conditions.
- Describe the training required before you may operate a forklift.
- Recognize hazards associated with forklift operation.

00:36

You are now ready to proceed to the Class Specific Equipment Module for the type of forklift you will be operating. You will also be asked to complete the skills based component of your training, where you will be expected to demonstrate specific skill sets as part of the evaluation and qualification process.

Online Training Survey

Submit your evaluation here using Valeforms, all submissions are anonymous.
Thankyou.

CLICK HERE!

Click on the button beside to exit.

SAVE AND EXIT

Thank you for completing the Vale Online Module Training.

Complete Your Module Validation

PLEASE CLICK HERE