

# FORKLIFT TRUCK INFORMATION BOOK



Training support material for:

Licence to operate a  
forklift truck  
TLILIC0003



Produced by:



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# INTRODUCTION TO FORKLIFT TRUCKS



## Getting ready for your forklift licence test

Operating a forklift can be very dangerous.

This is why you must have a licence to operate a forklift in Australia.

The only way to get your forklift licence is to complete an accredited course. To pass and get your licence, you must do a practical test to show you have learnt the basics of operating a forklift. You also have to pass a written test.

This information book will help you learn everything you need to know to pass the written test. Good luck.



## What is a forklift truck?

A forklift is a powered industrial truck used to lift and move loads. It has a mast and an elevating load carriage with a pair of fork arms or other load-holding parts. As you can see below, there are different types of forklifts. The most common forklift is the counterbalance forklift truck.

This series of images were used with permission from Linde

**Counterbalance forklift truck**



**Order picking forklift truck (LO licence)**



**Walkie reach stacker**



**Rough terrain forklift truck**



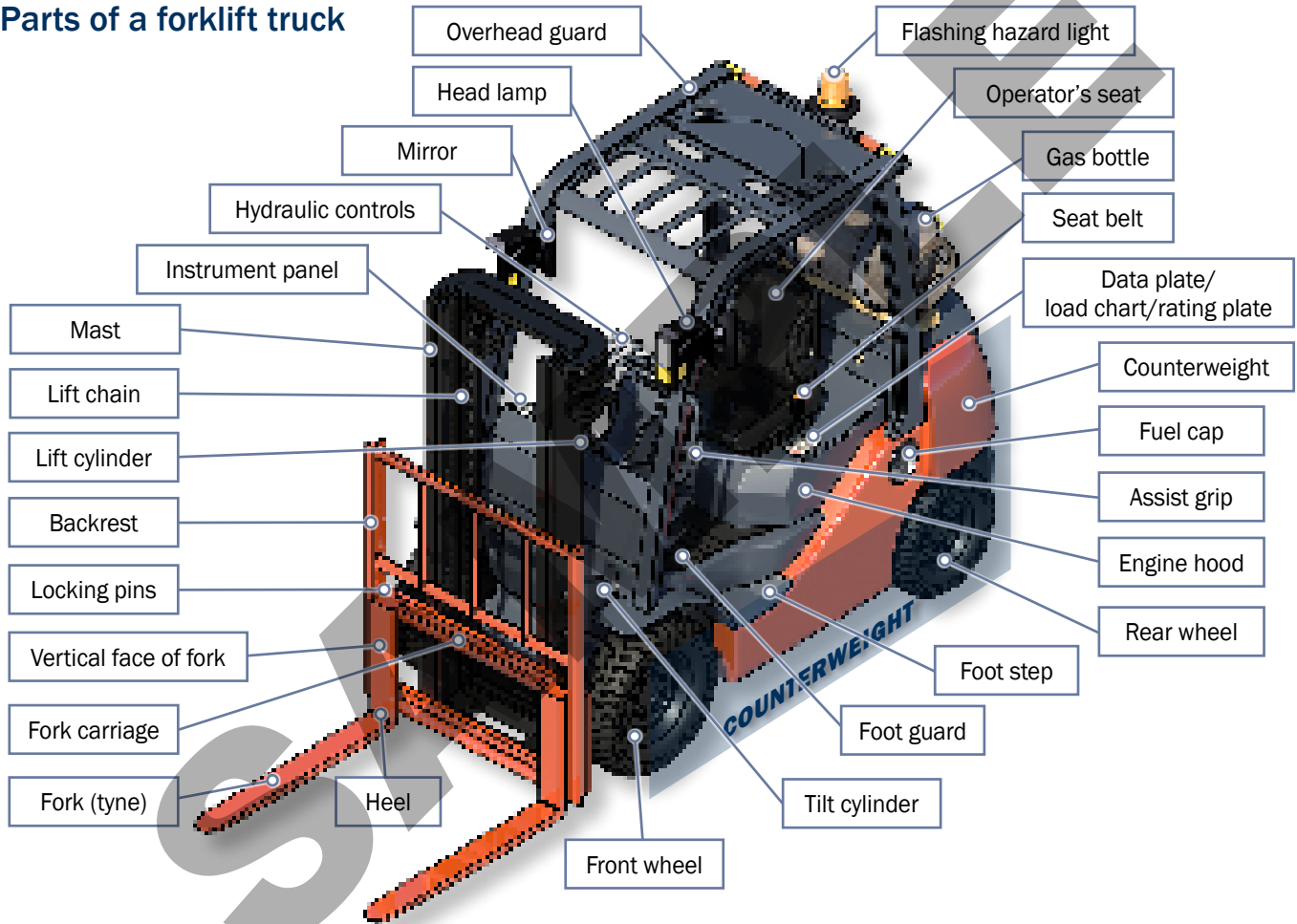
**Narrow aisle forklift truck**



**Sit-on reach forklift truck**



## Parts of a forklift truck

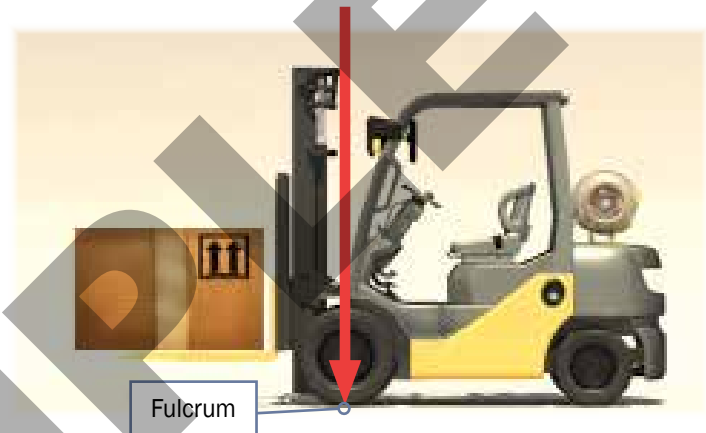


## Forklift stability

The most common forklift is the counterbalance type.

This means they carry the load on the front mounted tyres and use all the weight behind the front wheels to counterbalance the load.

The point of balance on a forklift is called the **fulcrum**. The fulcrum is where a vertical line drawn through the centre of the front axle would meet the ground. An easy way to remember this is the fulcrum is where the front wheels touch the ground.



Everything behind the fulcrum acts as a counterweight.

If you have more weight than counterweight the forklift will tip forwards. Think of a forklift as being like a see-saw.

You cannot add more counterweight to try to lift a heavier load. Forklifts are not designed for this. If you did this you could damage the forklift.



# PLAN WORK

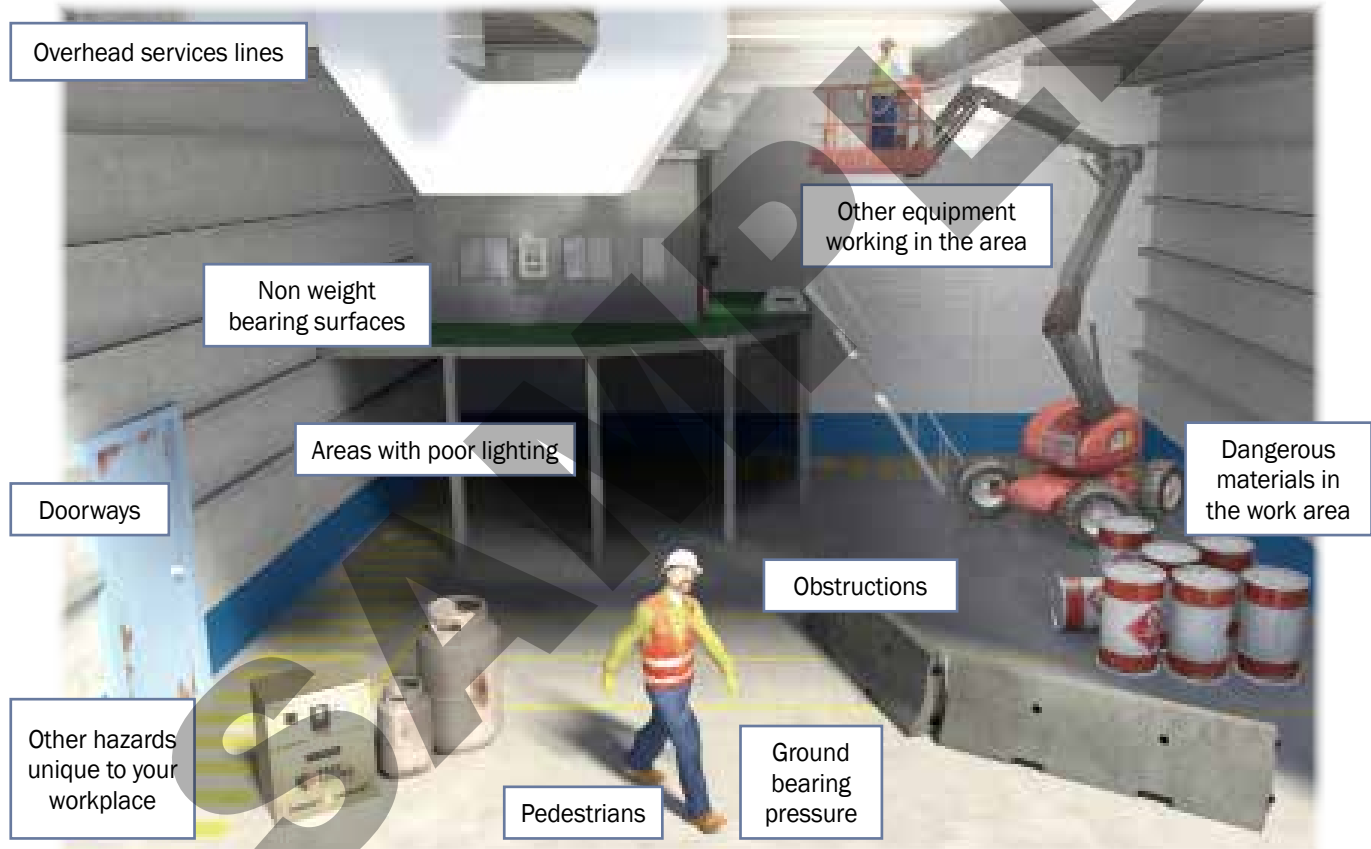
## Element 1





## Hazards – indoors

Before you begin work, you must be aware of hazards. If you are working indoors you must think about things like:



## Tiger tails

Tiger tails are **black and yellow pipes** that hang off powerlines. They are a **warning device** to make the powerlines easier to see.

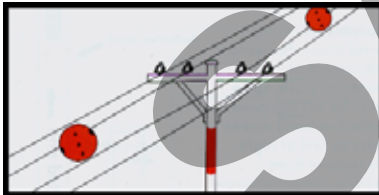
Be aware that tiger tails are very different to insulated powerlines.



### Tiger tails:

- **DO NOT** insulate wires
- **DO NOT** protect you from the risk of electrocution or electric shock
- **DO NOT** allow you to work closer to powerlines

## Power line marker



## Markers

Markers of different colors such as white and orange.



## Poles

Poles with the lower section painted up to 3m above ground.

## Warning / danger signs



## Planning for other problems

Other than hazards there are more things you need to plan for before you start work. For example:

Problems or challenges on the site. These might be shift times, movement of people etc.



Who are people you need to talk to and communicate with.



Are the doorways big enough to get in and out of?

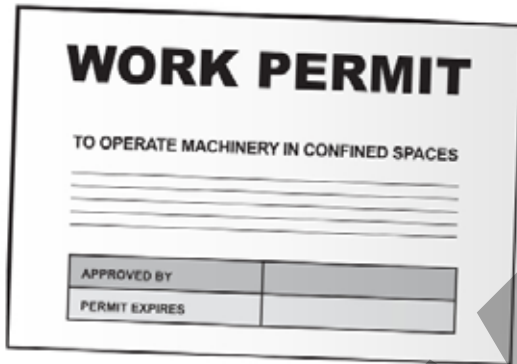


You will need to check the location and details of the work.



Planning for other problems — (continued)

You might need permits before you start work.



There might be areas (such as blind corners) that are hard to see around.



You must check that the loads you are moving are stable and well balanced. You also need to check the weight of the loads.



You must make sure the forklift has enough capacity for the loads you will be moving.



## Directing pedestrians

When operating a forklift, the forklift is a **hazard** to pedestrians. You might need to **control** the hazard, by warning and directing pedestrians or workmates. Some ways to do this are:

Barricades or safety fences.



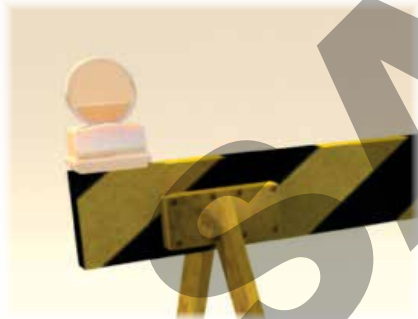
A flag person to direct people.



Warning signs.



Flashing yellow hazard lights.



Using a scaffold, hoarding or gantry.



## Directing traffic

Please note that you might need to be a licensed traffic controller to control traffic in your state or territory.

Traffic is a **hazard** in a forklift's work area. Some ways to **control** the traffic hazard around your worksite are:

Barricades and safety fences.



Flag person.



Warning signs.



Flashing yellow hazard lights.



Vehicle exclusion zones.



## Personal Protective Equipment (PPE)

The best way to make the workplace safe is to take away hazards altogether. But often you can't do this. This is where Personal Protective Equipment (or PPE) can help.

PPE is clothing or equipment worn on the body to protect you from hazards. PPE will not take away the risk of harm altogether, but it will help keep you safe. These are some examples of PPE.



**Note: Before starting any work all PPE should be checked to make sure it is in good working order.**

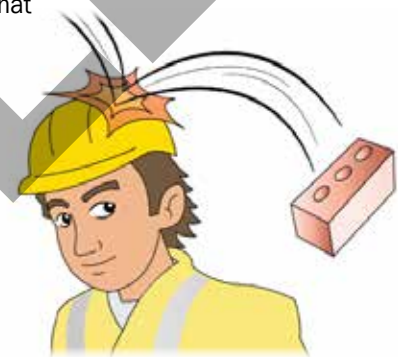
## PPE Examples

Here are examples of how personal protective equipment can protect you and your work mates:

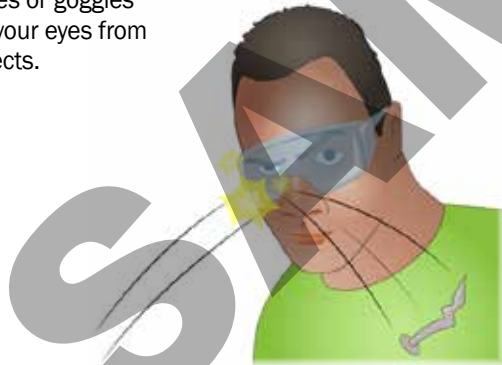
Safety shoes can protect your feet.



Safety helmet or hard hat can protect your head from falling objects.



Safety glasses or goggles can protect your eyes from harmful objects.



Dust masks can stop you from breathing in harmful dust.





## Confined spaces

Forklifts can be either:

- Internal combustion powered (eg. gas, petrol, diesel)
- Electric powered

You must use the right forklift for the job and work area.

For areas that are closed or partly closed you must use an electric forklift. This is because electric motors don't create gasses.



Forklifts with internal combustion engines give off carbon monoxide. This can build up in closed or partly closed areas without you knowing. This could cause you to lose consciousness. If you didn't get help you could die. That's why you **must choose an electric forklift** for work in confined spaces.



**Note: Carbon monoxide is an invisible, poisonous gas.**

In this illustration it is shown as green to illustrate how the gas can build up in a confined space.

## Load centre distance

Load centre distance is the distance measured from the vertical face of the forks to the centre of gravity of the load.

The load centre distance affects how much weight the forklift can lift.

The load centre distance will be marked on your forklift's data plate.



For example, this forklift is lifting a 1500 kg load. The forklift rated capacity is 1575 kg at a 600 mm **load centre** distance. It's okay to lift this weight. But the load centre distance must be checked first.

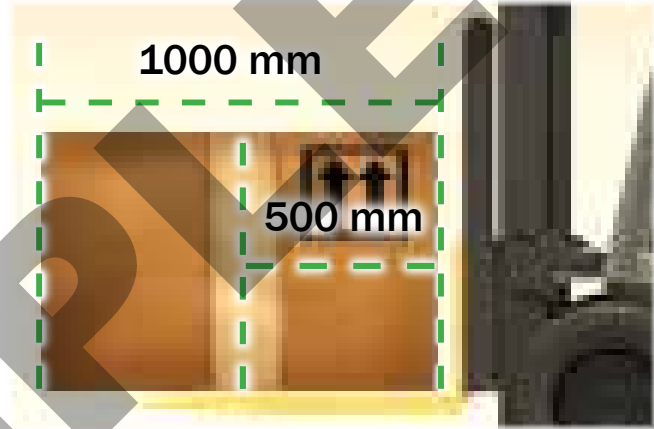


## How to work out the load centre distance

Measure from the vertical face of the forks to the front of the load.  
For this load the measurement is 1 metre (or 1000 mm).

Halve this measurement and you get the load centre distance.  
With this load it's 500 mm.

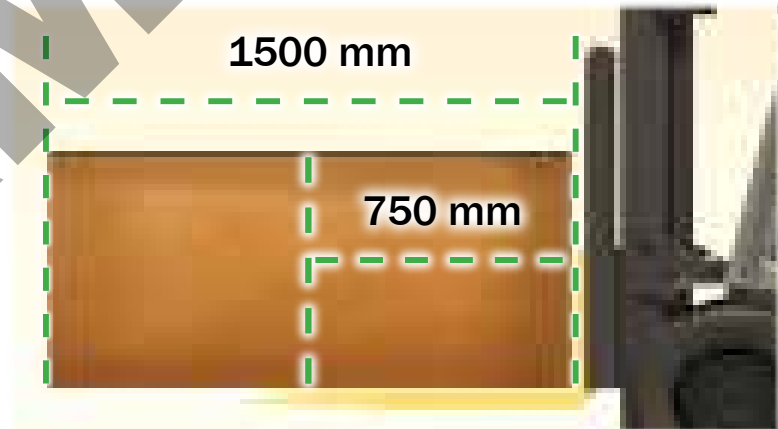
This forklift can safely lift and carry this load.



But watch what happens when we change the load centre distance of the same 1500 kg load.

The distance from the vertical face of the forks to the front of the load is now one and a half metres (or 1500 mm). This makes the load centre distance 750 mm. The maximum load centre distance for this forklift is 600 mm.

**This forklift cannot safely lift this load.** The forklift would be unstable. This might cause it to tip over.



## Things that affect load centre

The load centre distance might also change if the load is not pushed back against the backrest. If it is not, the load centre distance might increase. This will make the load unstable.



Non-standard loads can also have a different load centre. For example, the load pictured has an unusual shape. It has more weight at the top than the bottom. This changes the centre of gravity, which also changes the load centre distance.



## Rated capacity

When we talk about rated capacity, we're talking about the heaviest weight a forklift is designed to lift.

Forklifts lift loads in different ways:

There is a straight vertical lift.



There is a lift using mast tilt (where the mast needs to be tilted to place the load).



For each kind of lift the rated capacity is different.

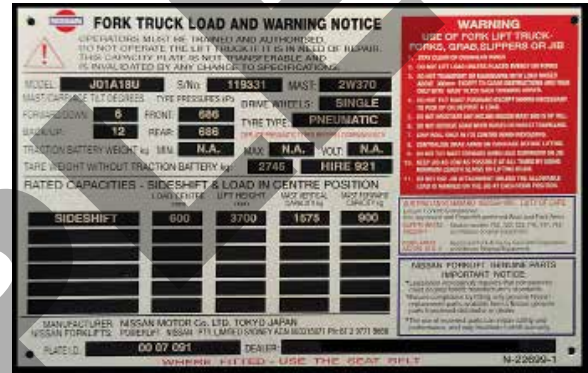
A vertical lift is more stable. So, more weight can be lifted with a straight vertical lift.

Using the tilt when lifting makes the load less stable. This means less weight can be lifted.

## Checking the rated capacity

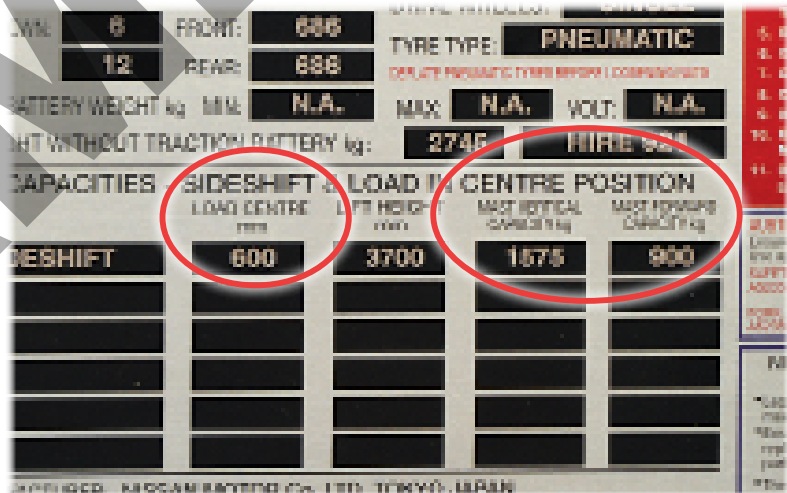
You must know the rated capacity for the forklift you are operating. You find this out by looking at the data plate.

It tells you the heaviest weight you can lift vertically – and when using the tilt.



On this forklift, the rated capacity is 1575 kg for a vertical lift with a 600 mm load centre. If you lift more than 1575 kg, the forklift will be unstable. This could make the forklift tip over.

For a lift where the tilt is used, the rated capacity for this forklift is 900 kg with a 600 mm load centre. If you tilted the mast when lifting a load more than 900 kg, the forklift could tip over.



**Remember:**  
**Always know the rated capacity of your forklift, and the weight (and load centre distance) of any load, before lifting.**

## Communication

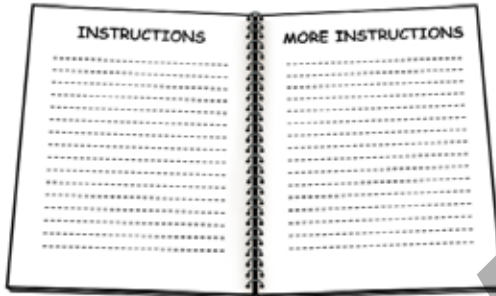
You need to communicate with people on a work site before you start work. This is important to help you follow the rules and work procedures for the site.



## Ways to communicate

There are many different ways you can communicate with workmates. Some examples are:

Written instructions



Signs



Hand gestures or signals



Listening and asking questions





# CONDUCT ROUTINE CHECKS

Element 2

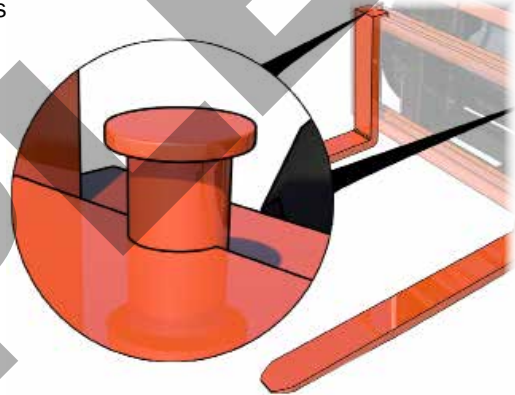


## Parts of the forklift – (continued)

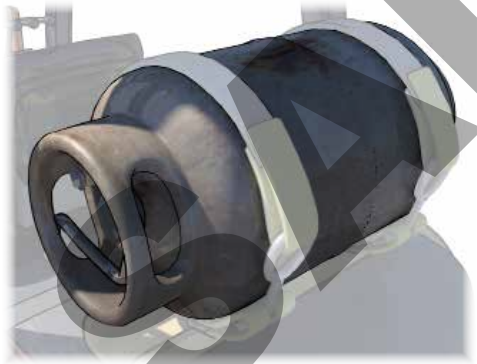
Seat and seat belt



Locking pins



Gas cylinders and compliance plates (gas forklifts only)



Mirrors (if fitted)

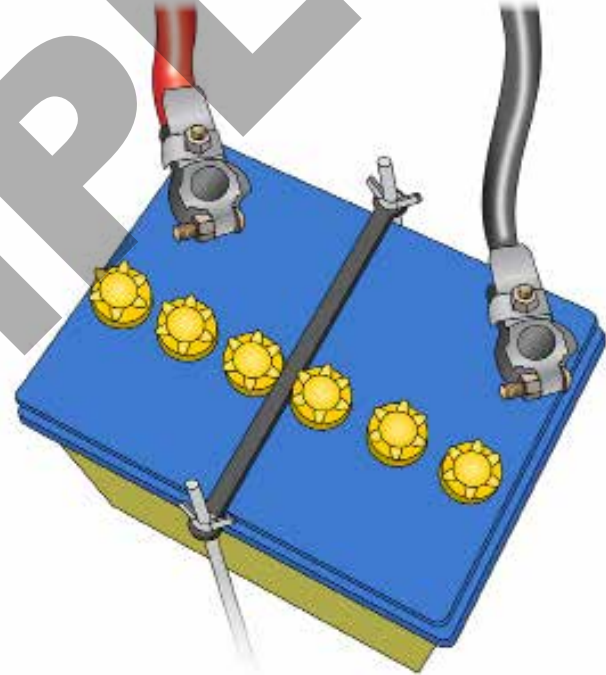


Parts of the forklift – (continued)

Warning decals or labels. (They alert you to dangers with operating the forklift.)



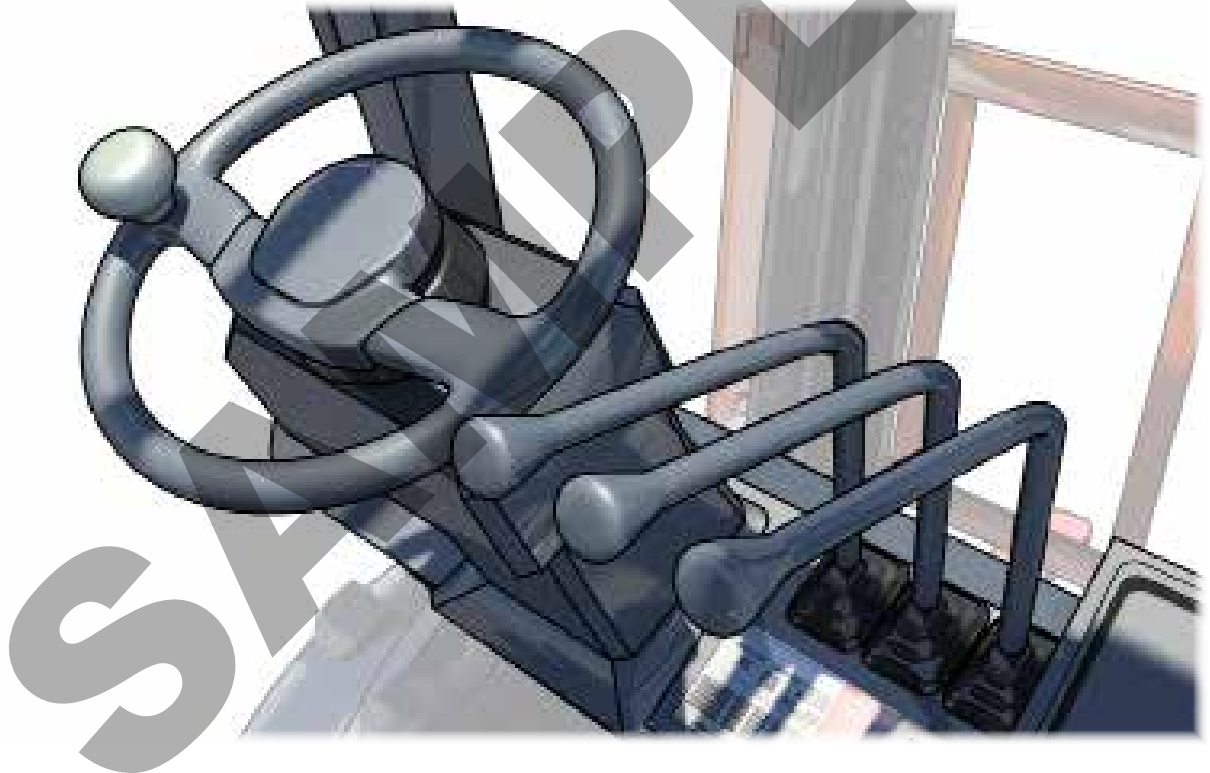
Battery, retaining clamp, connections and cable.



## Forklift controls

Different types of forklift trucks have different controls. It is important that you get to know the controls of your forklift before you start using it. You should check the controls in the operator's manual before you start using a forklift that you have not used before. Make sure you have a competent (experienced and trained) person show you the controls.

Take some time to practice using the controls before you start moving loads.



## Pre-operational checks

You must do a pre-operational check before you use your forklift. This is also called a pre-start check.

This involves looking over the forklift and making sure it is safe. You should check:

<p>The data plate</p> 	<p>Any leaks under the machine</p> 	<p>Warning decals</p> 
<p>Safety devices</p> 	<p>The fork arms (or other attachments) are OK</p> 	<p>Pins or other locking devices are secure</p> 

## Pre-operational checks – (continued)

Mast assembly



Lift and tilt systems



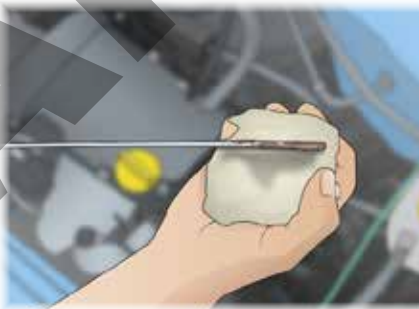
Load backrest is secure and in good condition



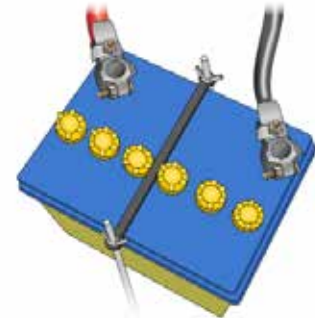
Overhead guard is secure and in good condition



Fluid levels – such as brake fluid, engine oil, hydraulic oil, power steering fluid, transmission oil and coolant.



Check that the battery is secure, connected properly and the fluid level is correct.



## Pre-operational checks — (continued)

Check the air filter



Check the seat and seat attachments



Mirrors are adjusted and clean



Make sure you are familiar with the controls of this particular forklift.



If the forklift is fitted with gas you should check that the LPG cylinder is secure. Check the date on the cylinder and that there is a compliance plate for the gas installation.



Post-start checks – (continued)

Make sure the flashing light is working



Test that the horn is working properly



Check the gauges



Look around and make sure the path is clear before you move. This makes sure no new hazards have entered the work area.





# SHIFT LOAD

## Element 3



## Data plate

Every forklift has a data plate. You must check the data plate before using the forklift. The data plate tells you important things about the forklift. This includes telling you how much the forklift can safely lift.

The data plate tells you:

**Make and model of the forklift** points to: MODEL: J01A18U

**Serial number** points to: S/N: 119331

**Forklift weight** points to: TARE WEIGHT WITHOUT TRACTION BATTERY: 2745

**Load centre distance** points to: SIDSHEIGHT: 300

**Maximum lift height** points to: LIFT HEIGHT: 3700

**Rated capacity - both vertical and tilt** points to: 1575

**Other data plate fields:**  
 MA31: 2W370  
 TYPE PRESURES (PSI):  
 FORWARD/DOWN: 6 FRONT: 686  
 BACKUP: 12 REAR: 686  
 DRIVE WHEELS: SINGLE  
 TYRE TYPE: PNEUMATIC  
 TRACTION BATTERY WEIGHT kg: N/A MIX: N/A VOLT: N/A  
 RATED CAPACITIES - SIDSHEIGHT & LOAD IN CENTRE POSITION  
 LOAD CENTRE (mm) LIFT HEIGHT (mm) MAX. TOTAL LIFT CAPACITY (kg) MAX. TILT (degrees)  
 300 3700 1575 900  
 MANUFACTURER: NISSAN MOTOR Co. LTD. TOKYO JAPAN  
 NISSAN FORKLIFTS: FORKLEIFT NISSAN FTR LIMITED SINGAPORE ADM 8601301 Pte 01 2 971 8008  
 DATE I.D.: 00 07 001 DEALER: N-226000-1

## Load weight

You must always know the weight of the loads you are moving. There are many ways to find out the weight of a load. For example, you could:

Check the weighbridge note, consignment note, or similar information.



Weigh the load



Sometimes the weight is marked on the load



You can calculate the weight of the load



## Calculating load weight – Example 1

You have a load of 16 boxes.

To work out the weight you could weigh one box.

If one box weighs 10 kg then 16 of them would weigh 160 kg.

The pallet weighs 35 kg.

$$16 \times 10 = 160$$

$$160 \text{ kg} + 35 \text{ kg} = 195 \text{ kg}$$

The total weight of the load is **195 kg**.



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## Calculating load weight – Example 2

There is a load of stacked cartons on a pallet.

There are 6 cartons per layer and there are 3 layers.

Each carton weighs 20 kg.

The pallet weighs 35 kg.

To work out the total weight of the load.

$$6 \times 3 \times 20 + 35 = 395 \text{ kg}$$

The total weight of the load is **395 kg**.



## Rear-end swing

Forklift trucks steer with their rear tyres. This causes a **hazard** called 'rear-end swing'.

Rear-end swing is where the rear of the forklift swings sideways very quickly.



People working around forklifts are in danger of being hit by rear-end swing. It could injure or kill someone.

To **control** the hazard of rear-end swing, do not operate a forklift near people.

If people are in the area where you need to work, you must tell them that they are causing a hazard. You must explain that to control the hazard they must leave the work area.

**Remember:**  
**Pedestrians and forklifts do not mix.**



The way the load is carried can also cause the forklift to tip over forwards. For example:

If the load is not balanced properly



The load centre is too far forward



The load is not up against the heel of the forks



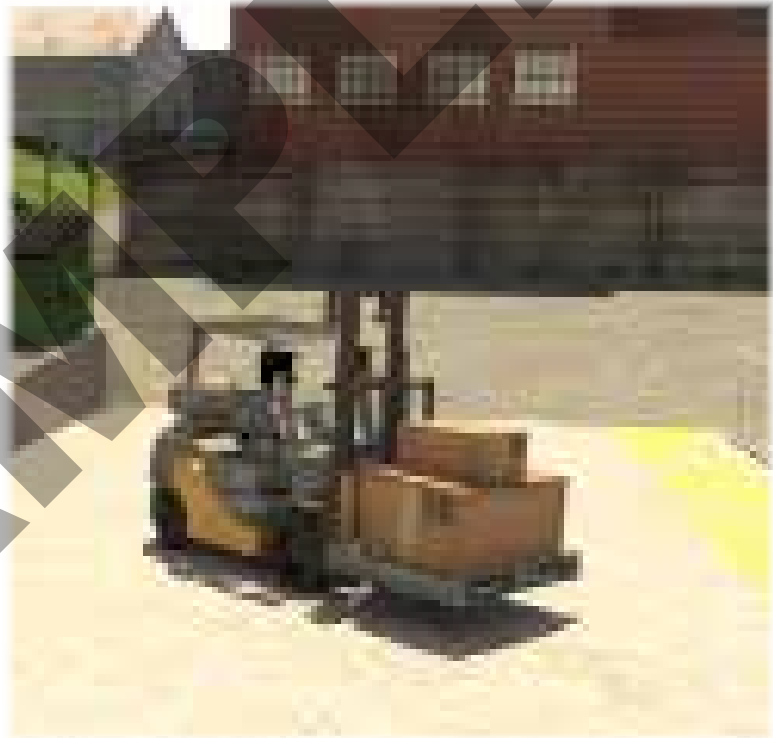
## Causes of tipping – Sideways

Forklifts can tip over sideways. Again this can be caused by the way you drive. For example if you:

Drive too fast when turning



Drive on uneven or sloping surfaces



Drive with an under inflated tyre



## Safely moving loads

Only pick up a load that is within the rated capacity of the forklift.



Once you pick up the load you should lower the load close to the ground. About axle height is a good rule of thumb.



If the load blocks your vision, ask someone to help direct you, or travel in reverse.



Never pick up a load on only one fork. This is dangerous. It can make the forklift and the load unstable. It can also damage the forklift.





*Safely moving loads – (continued)*

Always keep the side shift in the middle while carrying a load. If the side shift is to one side, the forklift will be unbalanced. This might cause the forklift to tip over.



If you are stacking loads you must make sure the stack is stable.



*Safely moving loads – (continued)*

Always stack goods on a solid level surface. Stack the heaviest goods at the bottom. Again, make sure the stack is stable and balanced.



If you have a load that isn't packed right, straighten or re-pack the load before moving it.



## Incidents and emergencies

If there is an incident and one or more emergency services vehicles attend, you must give way to the emergency services vehicles.



## What to do if your forklift tips over

If your forklift starts to tip over:

Stay on the forklift – **do not jump off.**



Lean away from the direction the forklift is tipping.



Brace your feet



Hold the steering wheel and wait till the forklift stops.



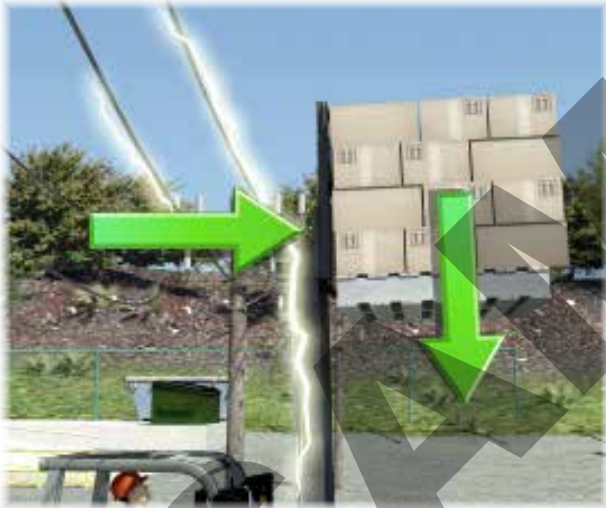
Then, undo your seatbelt and get off.



## What to do if your forklift hits powerlines

If the forklift you are driving hits powerlines you should follow these steps:

**Warn others to stay away.** Try and break the contact with the powerlines by moving the forklift, lowering the arms or moving the mast.



If you can't break the contact stay in the forklift. **Do not touch** any metal parts of the forklift. Call for help.



What to do if your forklift hits powerlines — (continued)

If you can't stay in the forklift because it is not safe (for example, there is a fire) you must check the area around the forklift. Make sure there are no obstacles or water. Jump clear of the forklift.



**Do not touch** the ground and the forklift at the same time.



What to do if your forklift hits powerlines — (continued)

Hop or shuffle away from the forklift. Make sure you keep both feet together.



Warn other people to stay at least 8 metres away until the power has been turned off.



Your work site will have rules you will need to follow to report what happened. Tell your supervisor and fill out any paperwork.



You must **not use** the forklift until it has been checked by a competent person.



# SHUT DOWN AND SECURE FORKLIFT TRUCK

Element 4





## Where you should not park the forklift

Your forklift can be dangerous if you park it in the wrong place. **Never park** the forklift near:

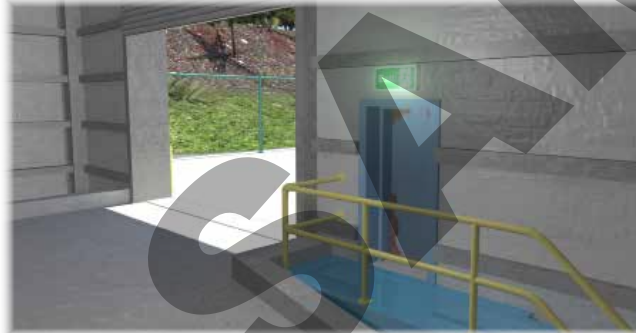
Emergency exits



Fire-fighting equipment (fire extinguishers, water hoses).



Doorways and exits



Ramps and slopes



Where you should not park the forklift – (continued)

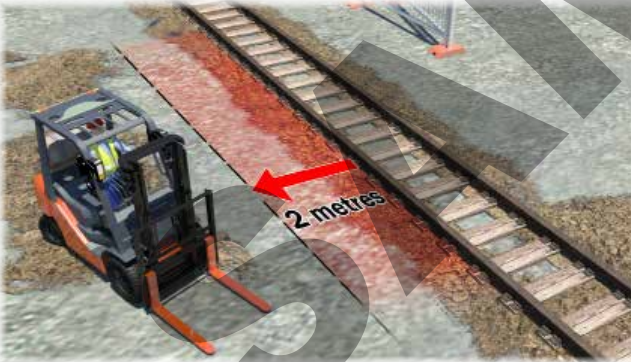
Pedestrian walkways



First aid stations



Less than 2 metres from train and rail tracks



Anywhere the forklift might block traffic or people



Shutting down and parking the forklift safely – (continued)

Get off the forklift making sure you maintain three (3) points of contact.



If the forklift is gas – turn off the valve on the gas cylinder.



Recharge the battery if necessary



Update the logbook and do a post-operational check of the forklift.



Follow any other rules for your worksite.

