



Government
of South Australia

SafeWork SA

High Risk Work

A guide to forklift safety



safe, fair, productive working lives

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Forklifts or industrial lift trucks are used to lift, stack and transfer loads in warehouses, factories, shipping yards, freight terminals and other workplaces across Australia.

While forklifts offer a practical materials handling solution for many businesses, each year they continue to be associated with workplace injuries and deaths.

The human and financial cost of forklift-related incidents for workers, industry and the community is substantial. However incidents can be prevented, especially when workers and Persons Conducting a Business or Undertaking (PCBUs) work together to improve health and safety outcomes at work.

This publication offers practical guidance for both businesses and workers on managing risks related to forklifts. It focuses on simple safety practices and the involvement of everyone in the workplace to help reduce the risk of forklift-related injuries, covering:

- the responsibilities of PCBUs, workers and others
- physical hazards and safety issues related to forklifts e.g. instability, body strain
- practical and safe ways to operate forklifts e.g. carrying loads, maintaining the forklift
- supporting workplace systems e.g. traffic management plans, incident reporting.

This guide is not intended to cover all duty holders' responsibilities or hazards and risks associated with industrial lift trucks. Where container forklifts are used, such as in shipping yards and freight terminals, additional risks exist that are not specifically covered.

Forklift dangers

As forklifts must be manoeuvrable, they are designed to be compact. However, when carrying loads, they can become unstable. Fully laden, a standard two tonne forklift can weigh approximately five tonnes. With lower stability and greater manoeuvrability, combined with uncontrolled traffic areas in workplaces, you'll understand why forklifts are involved in so many incidents.

Even at low speeds, forklifts can cause serious injuries and fatalities. It's not just the forklift operator who can be injured: pedestrians can be struck by a forklift or its load.

A forklift can be one of the most dangerous pieces of equipment in the workplace.

Safe practices

A big difference can be achieved by the adoption of simple, safe practices such as:

- observing speed limits and warning signs
- wearing correctly fitted seat belts
- slowing down
- sounding the horn at an intersection.

The risk of forklift-related injuries can be reduced by having:

- a safe work environment
- effective worker training
- well-maintained machinery
- a traffic management plan
- policies and procedures
- effective supervision.

Develop a safe system of work to control risks and help prevent forklift-related incidents.

Legal responsibilities

Workplace safety is everyone's responsibility.

PCBUs: reducing the risks

Under the *Work Health and Safety Act 2012 (SA)*, a PCBU must ensure, so far as is reasonably practicable, that workers are safe from injury and risks while at work. PCBUs are responsible for providing:

- a safe work environment
- safe systems of work
- safe and well-maintained machinery
- proper information, training and supervision.

Combined with the principles of hazard management and an effective traffic management plan (refer to page 11), these measures can help reduce the risk of forklift-related injuries.

Workers: reducing the risks

Workers also have responsibilities to ensure a safe workplace by:

- working with the PCBU and co-workers to improve safety
- complying with reasonable instructions, training and information given, and following safe work procedures
- not putting yourself or your co-workers at risk
- reporting incidents, near misses and hazards (including unsafe equipment) to your PCBU, supervisor or Health and Safety Representative (HSR)
- using Personal Protective Equipment (PPE) correctly.

Training and qualifications

To operate a forklift you must have a Licence to Perform High Risk Work or, if you are training for a forklift qualification, be under the competent supervision of a person with the same high risk work licence.

Training

A high risk work licence requires you to be trained by a Registered Training Organisation (RTO). For details, check with SafeWork SA.

Any further training provided in the workplace must be under the competent supervision of a person with the same high risk work licence.

If you do not have a high risk work licence, you can only operate a forklift under the direct supervision of an appropriately qualified forklift operator or assessor who holds the relevant high risk work qualification. Direct supervision means that the qualified forklift operator or assessor must be close enough that they can see what you are doing and provide appropriate verbal instruction.

Records of training (a logbook) must be maintained while your training is underway. RTOs provide logbooks for this purpose. Records should reflect the type of training undertaken to evidence both theory and practical training.

The operator should be competent to operate a forklift in the particular environment in which they are required to work.

Specific skills require additional training (e.g. before an operator starts using a forklift or an attachment that is different to the one used for training and gaining qualifications, further training and supervision is required).

Qualifications

Independent accredited assessors will evaluate skills against a national instrument of assessment.

Having a qualification indicates you have the basic knowledge and skills to operate a forklift without danger to yourself or others. More specific skills are necessary for specialised forklift types, attachments and worksite characteristics.

To operate a forklift in Australia, a standard age limit applies. A person wishing to be assessed for operation of a forklift must be 18 years of age. Contact SafeWork SA for further information about age requirements.

When you operate and/or drive a forklift on a public road, as well as needing a high risk work licence, you must hold a current driver's licence and the forklift must be registered.

Tips for PCBUs

PCBUs must:

- provide site-specific and refresher training to maintain and enhance their forklift operators' skills
- ensure forklift operators receive familiarisation training for any new forklift (it may have different controls or varying attachments)
- provide induction training for new or changed work environments, traffic management plans, policies and safe work procedures
- maintain a register of licensed forklift operators
- ensure that all contractors and any other persons using a forklift at your workplace hold the relevant forklift licences.

If your forklift operators are required to use purpose-designed attachments and specific forklifts, you must ensure that they have received sufficient instruction and training in a language they understand.

Ensure training manuals and manufacturer's information are available for forklift operators.

Consultation

To achieve a safe and healthy workplace, PCBUs, workers, managers, contractors and visitors need to communicate with each other and work together.

PCBUs can facilitate the consultation process by talking to forklift operators, as they have first-hand knowledge of any associated safety issues at the workplace.

PCBUs need to involve HSRs and health and safety committees in this process.

By tapping into their knowledge, solutions are more likely to be practical, accepted and adopted. In turn, your worksite is more likely to reduce forklift-related injuries.

Everyone in the workplace is responsible for workplace health and safety.

PCBUs should consult:

- when identifying specific hazards and assessing the risks associated with the forklifts in their workplace
- when developing a traffic management plan
- before implementing any action to control the risk
- before making any change to the worksite
- before buying or hiring any equipment
- once solutions have been implemented to ensure they are effective and practical.

Selecting a forklift

PCBUs should develop and implement a purchasing policy, and during the selection process consult with:

- other PCBUs
- supervisors
- forklift operators
- HSRs and the health and safety committee
- the purchasing officer
- the supplier.

The selection of a forklift should take into consideration the capacity and safety features specific to your workplace needs. Determining these needs before you buy or hire a forklift is the most effective way of reducing the risk of forklift-related injuries.

For example:

- If you need a forklift to work in a flammable or explosive atmosphere, ask the manufacturer or supplier if the machine can do this safely.
- If you need a forklift to work in poorly ventilated areas, make sure it's electric. There is a significant risk of poisoning or asphyxiation if fuel-powered forklifts are used in these environments. Forklifts with ever-increasing safety measures and features are always being released onto the market. However you need to ensure these features do not create additional risks in your workplace.

Consult with your workers, HSRs and others who may be affected by the selection of a new forklift before making a final decision.

Manufacturers and suppliers: reducing the risks

Manufacturers and suppliers need to provide workplaces with information about a forklift's capabilities and limitations.

Manufacturers should eliminate risks posed by forklifts during the design process. An example is introducing and promoting intelligent systems, such as making it impossible to start the forklift unless the seatbelt is fastened.

Suppliers or importers must provide information on:

- any hazards associated with forklifts
- conditions needed to ensure operators use forklifts correctly and safely
- correct and safe use of any attachments supplied specifically for a workplace
- specific workplace conditions the forklift was supplied to meet
- maintenance and servicing requirements.

If you hire out forklifts, ensure:

- each forklift is fit for the intended purpose for which it was designed, and is safe to use
- each forklift is maintained according to the manufacturer's specifications
- people hiring a forklift are appropriately licensed and know how to operate it safely.

Physical hazards and safety issues

Instability

Tipping over is the biggest danger for a forklift operator. If an operator jumps from a tipping forklift, the chances of serious injury are high. Seatbelts save lives and must be worn.

A forklift can tip over by rolling or overturning sideways, or by pitching forward when the back wheels lift off the ground. Forklifts can tip over if you:

- accelerate quickly in reverse
- brake too quickly, especially on a loaded forklift
- brake or accelerate while cornering
- brake or accelerate down a slope
- carry a load facing down a slope
- carry an unevenly balanced load
- collide with another vehicle
- drive across inclines or uneven ground, such as potholes (particularly with a height difference greater than 20mm across the front wheels)

- drive with the tines raised too high (loaded or unloaded)
- strike low doors or overhead structures
- turn too fast
- use a forklift that is not designed to tow (pushing or pulling).

Most tip-over incidents involve unloaded forklifts, which are more unstable than a loaded forklift with the load carried low.

Counter-balanced forklifts are usually supported at three points called the 'triangle of stability'. The front left wheel, the front right wheel and the middle of the rear axle at the pivot pin connected to the steer axle make an imaginary triangle (refer Figure 1).

This is important because the centre of gravity (COG) must remain within this triangle of stability. If the COG falls outside the triangle, the forklift will tip over.

This principle explains why an unladen forklift can easily tip over with a simple sharp turn, even on a level surface.

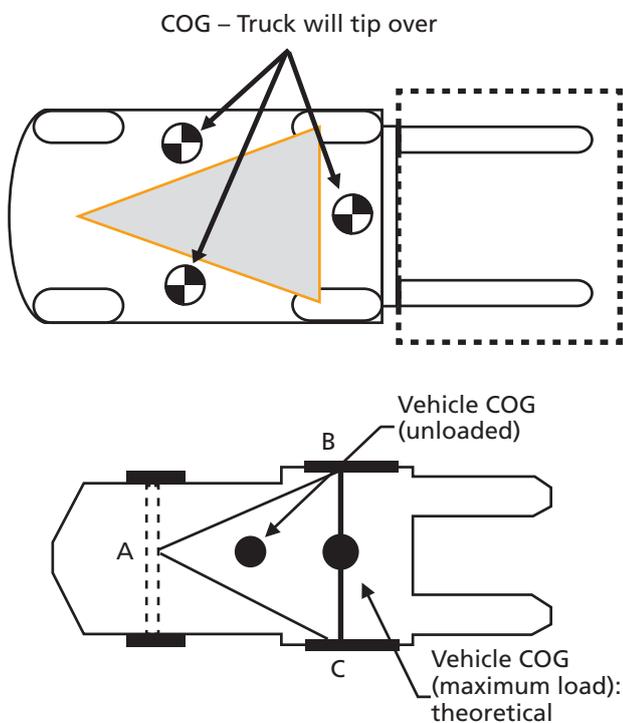


Figure 1: The triangle of stability

Stability tips

- To avoid a forklift tipping over, the most important specifications to consider are lift capacity, the maximum load supported and vertical lift travel.
- Stacking/raising off-centre loads at full height – on a surface with a 2% difference in gradient (20mm in 1 metre) – can significantly affect stability.
- Loads suspended from a jib or rotator attachment on a forklift make it more likely to tip forward when braking or sideways when turning.

Tips for PCBU's

- Conduct a risk assessment of the area where the forklift will be operating to determine a suitable forklift.
- Get the manufacturer's information about your forklift's limitations including:
 - the suitability of different types of tyres for your needs
 - capacities at different lift height and positions.
- Adjustments or alterations to parts of forklifts should not be made unless the manufacturer has been consulted. Changes to specifications of the forklift, including rated capacity and reach as a result of an alteration must be recorded by a competent person on the data plate.
- Make sure the operators do not load the forklift above the weight specified on the load capacity plate. Ensure the data plate is legible and help operators to understand the difference between the forklift's model numbers painted on the side of the forklift and the forklift's load capacity plate.
- Buy or hire forklifts with seatbelts, reversing beepers, flashing lights, intelligent systems, speed-limiting devices, load-weighing devices and other stability-enhancing features.
- Ensure seatbelts are correctly fitted and worn. By installing intelligent systems, the forklift can only be started if the seatbelt is fastened. Monitoring/supervision of these intelligent systems should be such that they cannot be easily or deliberately defeated. Seatbelts may be retro-fitted, but only in accordance with the manufacturer's specifications.
- Be aware that productivity incentives may encourage your employees to drive and work too quickly, which can increase the risk of incidents.
- Implement traffic control measures that account for the risks in the workplace to reduce the risk of instability (refer to 'Traffic management plans' on page 11).
- Reduce the speed limit at your workplace.
- Buy or hire forklifts with a greater load capacity than you actually need to safely perform the workplace tasks.

Tips for forklift operators

To ensure your own safety, and that of others, always drive and operate forklifts safely. However, if tipping occurs you should:

- stay in the cabin with the seatbelt on
- brace yourself with your feet pressing down and your arms pushing you back into your seat
- stay with the forklift and lean in the opposite direction of tipping.

Jumping from an overturning forklift often results in serious injury or death.

If the forklift touches an overhead power line, stay in the forklift and warn others to stay away. Keep still and avoid touching anything in the forklift. Wait as long as it takes for confirmation that the power has been disconnected/isolated before leaving the forklift. Then, if it is safe to do so, move the forklift off the power line.

Refer to 'Operate the forklift safely' on page 8 for more information.

Speed and stopping distances

Your hazard management process (refer to page 11) will determine the speed limits appropriate to your workplace. Consider the stability of the forklift under braking, its stopping distances and environmental factors.

Reduce speed to walking pace taking into consideration congestion, vision, other vehicles and pedestrians etc. Make sure speed limits are observed and enforced.

Buy or hire forklifts with speed limiting devices or have a competent person retrofit them to your current forklifts.

Stopping distances

You need to know stopping distances when you plan speed limits, forklift routes and your overall traffic management plan.

Table 1 (below) shows the typical distance it takes for a fully laden 2.5 tonne forklift to stop once the operator has applied the brakes. This is in optimal conditions: travelling on a dry, even surface with good traction, driven by an alert operator not distracted by other activities.

Even at six kilometres per hour (i.e. walking pace) a forklift needs at least three metres to stop. The distance at which a forklift can stop is affected by:

- the speed at which it is travelling
- the weight of the forklift and its load
- its mechanical and tyre condition
- the road or floor surface.

Table 1. Reaction distance and total stopping distance for fully laden 2.5 tonne forklift
(based on the range achievable without tip over for the majority of fully laden forklifts)

Speed (kilometres/hour)	Speed (metres/second)	Distance travelled (metres) – based on a typical reaction time of 1.5 secs	Distance travelled while decelerating (metres) – based on a deceleration rate of 1.9m/sec ²	Total stopping distance (metres)
6	1.7	2.5	0.73	3.2
8	2.2	3.3	1.3	4.6
10	2.8	4.2	2.03	6.2
12	3.3	5	2.92	7.9
14	3.9	5.8	3.98	9.8
16	4.4	6.7	5.2	11.9
18	5	7.5	6.58	14.1
20	5.6	8.3	8.12	16.5
22	6.1	9.2	9.83	19
24	6.7	10	11.7	21.7
26	7.2	10.8	13.73	24.6
28	7.8	11.7	15.92	27.6
30	8.3	12.5	18.27	30.8
32	8.9	13.3	20.79	34.1

A laden forklift cannot use its maximum braking capacity, because the load may slide or fall from the forklift tines, or the forklift will tip forwards.

Sprains and strains

Sprains, strains and other soft tissue injuries to the neck, back and arms can cause long-term health problems. Common hazards that injure forklift drivers include:

- continuously and/or repeatedly looking up during high stacking
- continuously and/or repeatedly looking behind while reversing
- repeatedly hitting bumps or driving on uneven surfaces
- using poorly positioned or poorly maintained controls.

Tips for PCBU's

- Consider forklifts with swivel seats and/or closed circuit video systems to reduce neck craning and twisting.
- Fit mirrors if practicable.
- Ensure road surfaces and floor surfaces are even and in good condition.
- Ensure the forklift seat is in good condition and has sufficient cushioning so that it supports the back and minimises vibration and jolting.
- Ensure that the cabin is in good condition.
- Enable variety in forklift tasks so the operator can change their posture.
- Check that the controls are comfortable to reach and operate.
- Ensure the forklift is regularly serviced and maintained, including its controls and seating.

Save money and time by choosing and maintaining a forklift with features that prevent sprain and strain injuries.

Slips, trips and falls

Slips, trips and falls are common injuries related to getting on and off forklifts.

Minimise the number of times that operators need to get on and off their forklift to help reduce the number of slips, trips and falls. Refer to 'Get on and off safely' on page 8.

Tips for PCBU's

- Ensure forklifts have:
 - adequate access and egress to provide three points of contact (hands and feet) while getting on and off
 - steps with anti-slip surfaces and enough space to stand on firmly
 - grab-handles or rails that allow proper grip, and are positioned in an accessible location
 - suitable locations for controls and foot pedals to eliminate trip hazards.
- Buy or hire forklifts with the above features or retrofit them to your current forklifts.
- Repair or replace broken steps, rails and handles.
- Ensure road surfaces and floor surfaces are in good condition (maintain and repair) and clear of debris and other obstructions.
- Provide a location to park the forklift that is well lit so operators can clearly see the ground surface, and that is not muddy, slippery or uneven.
- Provide operators with information and training on the correct and safe way to get on and off forklifts.

Attachments

Forklift attachments include any side shift devices, jibs, extension forklift tines and specifically designed devices for load manipulation or carrying.

When an attachment is fitted to a forklift, its operating characteristics may change, making it necessary to de-rate the forklift capacity and restrict some operating controls. Attachments must have rated capacities.

Where an attachment is used, an effective control method is stamping the combined rated capacity on the forklift load capacity plate. This may require adding an additional capacity plate. Make sure a competent person determines the rated capacity of the combination of the forklift and the attachment.

An attachment should only be used on a forklift if it has been specifically designed for that forklift.

Make sure the attachment is secured correctly and safely on the forklift. Do not tilt the mast forward. If a load is suspended, drive slowly to avoid the load swinging, as this will increase the forklift's instability.

PCBU's must ensure that, where attachments are used, specific additional training is given to forklift operators and adequate supervision is provided.

Selecting attachments

Ask the manufacturer of the attachment whether it can be used safely on your forklift. Forklift attachments must be:

- designed by a 'competent person'
- manufactured by a 'competent person'
- safely used on the forklift.

For 'competent person' definition/clarification, refer to the *Work Health and Safety Regulations 2012 (SA)*.

Operation and maintenance

Check the forklift before you start

Before you start to operate the forklift, ensure it is in safe working order, ready to be used and capable of completing the task(s) required.

Develop and implement a system of work that nominates the person who will ensure that safety checking takes place e.g. a manager or supervisor.

Report any damage or problems to the PCBU, supervisor, manager or HSR immediately. If any damage or problems are noticed, isolate the forklift so it cannot be used.

Complete these checks as part of your pre-operational routine (refer example below). This is an important part of any effective maintenance program. If you are using a new or different forklift, these checks will help you become familiar with the machine.

Make sure the checks are done according to the manufacturer's instructions.

Pre-operational checklist

Forklift operators should carry out the following pre-operational checks before starting work.

- Tyres: check all tyres for wear or damage, and pressure (if applicable)
- Fluids: check oil, hydraulics, battery, fuel, coolant and brake fluid
- Seating: check the condition and adjustment
- Warning devices: check lights, horns, reversing beeper and flashing light
- Capacity: check that the load capacity data plate is fitted and legible
- Mast: check for any wear or damage to the lift chains and guides
- Hydraulic cylinders and hoses: check for any leaks

- Forklift tines: check for wear, damage, cracks or repairs
- Seatbelt: make sure it is in good working order
- Guarding: check that all guards are in place
- Controls: check that all pedals and controls operate correctly
- Brakes: check that all brakes (including parking brake) operate correctly

Check the workplace before you start

PCBUs must provide a safe work environment. The principles of hazard management (refer to page 11) plus your traffic management plan can help you do this.

If you're a forklift operator, check the area in which you'll be working before you start your forklift, as well as the 'no go' zones for pedestrians or forklifts. If you notice any problems, immediately report them to your PCBU (or supervisor or manager).

Workplace environment checklist

Forklift operators should carry out the following workplace environment checks before starting work.

- Are 'no go' zones clearly marked with signs and fences?
- Is there sufficient lighting and ventilation for you to work safely?
- Is there a lot of noise (e.g. from other machines) that may impair your ability to hear?
- Are road surfaces even and clear of obstructions? Are there features such as ramps and rail tracks?
- Are there overhead features such as low doorways, fittings, cables and power lines?
- Are there any other obstructions?
- Are there wet and dry areas? Are there any spills?
- Are loading docks clear? Do they have edge protection?
- Is there sufficient room or capacity on storage racking?
- Are forklift operating paths clear? Are they wide enough?
- Are there any congested areas?
- Are there any blind spots?
- Is there any interaction with pedestrians or other traffic?

These checklists are not exhaustive, and do not replace the principles of hazard management (refer to page 11). The issues identified during that process should guide you.

Get on and off safely

Around a quarter of all forklift-related injuries occur when operators are getting on or off forklifts.

Tips for forklift operators

- Lower the forklift tines to ground level; ensure the parking brake is set, and the controls are in neutral.
- Do not jump from your forklift. Face the forklift and maintain three points of contact (hands and feet) when you get on and off.
- Minimise how many times you need to get on and off.
- Work and park in well-lit areas so that your vision of road surfaces and other traffic (including pedestrians) is clear.

PCBUs should ensure that all forklifts are fitted with anti-slip surfaces and grab-rails. Refer to 'Slips, trips and falls' on page 6.

Operate the forklift safely

You should only start using a forklift after you have checked the equipment and the work environment.

Safety basics

- Only use a forklift for the purpose for which it was designed. Dangerous work practices include bumping pallets, pushing piles of material out of the way, and moving heavy objects by using makeshift connections and attachments.
- Wear a seatbelt.
- Obey speed limits and warning signs. Drive at speeds suitable to the road surfaces and traffic conditions.
- Wear safety glasses or goggles to protect your eyes from dust and debris when you move stored products from overhead shelving as necessary.

Operating basics

- Use extra caution and avoid turning when negotiating grades, ramps and inclines.
- Take particular care not to damage pallet racking. Report damaged racking to your manager/supervisor so that it can be repaired.
- Slow down and sound your horn before going through a doorway, before entering or crossing a main aisle and when approaching an intersection or corner (especially blind corners).
- Always travel at a safe distance behind another forklift or other vehicles.
- When travelling, forklift tines should be just below axle level but must be kept clear of the road/floor surface.

- Be aware of blind spots created by the mast and other parts of the forklift. Even small parts may block out large areas of your view of the workplace.
- Do not reach through the mast or place parts of your body outside the forklift while it is in operation.
- Be aware of any overhead hazards and maintain a safe distance from powerlines and electrical cables.

People

- Do not carry passengers unless the forklift is designed to carry more than one person. An additional seat, footrest and seatbelt should be provided.
- Do not raise people on forklift tines or pallets.
- Do not allow anyone to stand, work or walk under raised forklift tines.
- Be conscious of people working around you e.g. tail-end swing. Do not allow people to walk beside you or be in close proximity to a travelling forklift.
- Do not allow people to be near stacked loads being loaded or unloaded. High stacked loads can become unstable and topple.

Work environment

- Do not drive over spilled liquids or powders as this reduces the traction of the tyres and spreads the substance, causing problems for other traffic and/or pedestrians.
- Remove hazards or obstructions from the floor rather than drive around or over them. Report any dangerous surface conditions to your supervisor immediately.
- Be aware that driving from a wet to dry surface or dry to wet affects tyre traction, braking and stability.
- Allow enough time for your eyes to adjust when you move from dark to light areas and vice versa.

Refer also to 'Workplace environment checklist' on page 7.

Order-picking forklifts

- An order-picking forklift truck licence is required to operate this type of forklift.
- Order-picking forklifts must have guardrails to prevent falls.
- If it is possible for someone to extend their body over the guard or step from the platform of an order-picking forklift, then a safety harness must be provided and worn. The harness, fitted with a fall arrester, must utilise two independent designated anchor points.
- Working through the principles of hazard management (refer to page 11) will help you determine the type of travel restraint or fall prevention system appropriate to your workplace and the work you do.

Work platforms

While forklifts were not designed to lift people, work platforms may be used for raising people performing short-term tasks e.g. changing a light bulb. Activities such as order-picking, however infrequent, are not regarded as short-term tasks.

- Work platforms must be securely attached to the forklift.
- Work platforms should only be attached to a compliant forklift, with a load capacity data plate stating the attachments that may be used.
- A flow restrictor should be fitted to a forklift that lifts a work platform to control the rate of descent in the event of a hydraulic hose burst.
- Ensure your traffic management plan deals with tasks involving work platforms.
- Before starting work ensure:
 - the parking brake is set
 - the controls are in neutral
 - the mast is vertical
 - all controls are immobilised except lift and lower.
- The forklift operator must remain at the controls at all times. The forklift operator should perform an initial trial lift without a person inside to ensure the work platform has a clear path.
- Workers must be trained in the safe use of work platforms, including emergency procedures to ensure occupants can be rescued if an incident or breakdown occurs.
- Workers must stand on the floor of the work platform, not on a ladder, the guardrails or other object. They must stay within the confines of the work platform unless engaged in an emergency situation.
- Do not use work platforms to transport people or to exit at height e.g. mezzanine floor.

Develop and implement incident procedures (including forklift breakdown). Make sure everyone knows what these are and what to do. Refer to 'Incident reporting' on page 13.

Finishing work

- Before getting off the forklift, lower the forklift tines to ground level, ensure the parking brake is engaged, and the controls are in neutral. Refer to 'Get on and off safely' on page 8.

- If the forklift is liquefied petroleum gas (LPG) powered, turn off the LPG at the cylinder.
- Do not park the forklift near a source of ignition, a doorway or a pit.
- Park the forklift in a well-lit area under cover and on a level and even surface. Make sure the forklift is at least three metres away from a power line or rail line.
- Remove the ignition key and secure the forklift at all times when not in use. This will stop unauthorised people from using the forklift.

Carry and handle loads safely

Forklift capacity

- PCBUs and supervisors should be involved in knowing how loads and loading are being controlled.
- A forklift's capacity (also known as the rated capacity) is the maximum weight it can safely carry at a specified load centre. Overloading can damage the forklift and increase the risk of forklift-related injuries.
- The model number of some forklifts may be confused with its lifting capacity. Ensure you use the load capacity data plate to accurately determine the capacity.
- The weight, shape, size and composition of a load affect the way it should be lifted.
- When a load is raised, the forklift is less stable; stability is decreased further if the load is off-centre. Tilting forwards or backwards with a raised load will also affect stability.
- Driving with a raised load is dangerous. It makes the forklift less stable and leads to tipping over, particularly if the forklift is being driven at speed, around a corner, or on an uneven surface.
- Take the time to familiarise yourself with each new type of load before you start work.

Carrying the load

- Know how to read load capacity data plates. Load capacity data plates detail the load each forklift can safely lift at different mast orientations, or when fitted with an attachment.
- Know the capacity of your forklift and do not exceed it. Check the marked weight of an object, or use a weight gauge or scale to weigh loads. Do not pick up a load if you do not know its mass.
- If the load is not placed safely and correctly, reload it.
- If the pallets are damaged, remove them.
- If the load is particularly long or wide, see if you need to take an alternative route.

- If the load comprises different lengths of material, ensure the point of balance is in the middle of the forklift tines when the load is lifted.
- Set the width of the forklift tines to provide the greatest support for the load, and position the load so that it is balanced evenly on the forklift tines. Take special care with irregular loads or loads that may slide e.g. steel on steel. Ensure the tines and the loads are centred
- Insert the forklift tines fully beneath the load.
- Check around the load before lifting to ensure it does not affect anything or anyone around it.
- Ensure each load is carried, lowered and set down according to the manufacturer's recommendations and your safe work procedures.
- When operating the forklift on an incline, the load must be tilted back and raised only as far as needed to clear the road surface. The load must be facing up the incline. Do not try to turn on an incline.

Forklift operators **SHOULD NEVER:**

- drive with a raised load (always lower the load to forklift axle height to clear the road/floor surface before moving or turning)
- lift a load that extends above the forklift tine backrest unless the load is secured (so it can't fall back on you)
- attach a towrope to the mast to pull or drag loads
- tow (pull or push) with a forklift unless a proper towing connection is fitted and designed to do so in accordance with the manufacturer's recommendations
- use a forklift to push or bump other loads into position
- add any additional counterweight to the forklift
- sling loads from forklift tines, as there may be a risk of the load sliding off the tines (always use a jib or load shifting equipment).

Driving onto trucks

Develop and implement a safe work procedure.

Before driving onto the back of a truck, make sure:

- the truck's tray is sound, and it can support the forklift and load
- the truck wheels are chocked
- the parking brake is on
- the key is secured
- the access ramp is sufficiently locked so it won't come adrift, and that it can support the forklift and load.

Procedures should also be implemented to ensure a rigid truck is not driven away until loading is finished.

When a truck trailer is being used, it should ideally remain attached to the truck so that it does not collapse or tilt when a forklift is operating inside it.

A trailer disengaged from a prime mover must be supported by sturdy supports.

When a trailer remains attached to the prime mover, ensure a system is used so the prime mover does not pull away from the loading dock during loading or unloading.

Using ramps

Develop and implement a safe work procedure. Ramps must:

- be wide enough and strong enough to take the forklift and load
- be maintained in good condition
- have good traction in wet weather
- have side rails to prevent wheels slipping off
- allow a smooth weight transfer on and off the ramp
- have a gradient that does not exceed the angle recommended for safely operating the forklift.

All variable level ramps that a forklift is required to work on must be provided with locking and interlocking facilities.

Portable ramps must be secured according to the manufacturer's instructions and have the appropriate load rating attached.

Seeing clearly

- If the load obstructs your view while travelling up an incline, get another worker to guide you from a safe position. Ensure all other people are in full view at all times. If you lose sight of them, stop immediately.
- Drive in reverse if a bulky load obscures your forward view. However, the load must lead when travelling up inclines. Use another worker, safely positioned, as a spotter in this instance.

Maintain the forklift

Forklift maintenance programs should include a regular schedule of servicing, preventative maintenance, inspection and cleaning.

- Maintenance programs and pre-operational checks (refer to page 7) should be completed according to the manufacturer's recommendations and relevant standards.
- Components added to the forklift (e.g. attachments, control and warning devices) must also be maintained and serviced.
- Only licensed gas fitters may repair and/or replace parts on LPG powered forklifts.

- Only suitably qualified and trained persons may inspect, maintain or repair forklifts. Unauthorised changes to forklifts (e.g. drilling holes in forklift tines) should not be undertaken.
- Only qualified tyre fitters should remove and fit tyres. To prevent injury should the assembly fail, use a safety cage when inflating and/or fitting tyres on split rim wheel assemblies. Fit the hose for the compressed air with a clip-on chuck so the fitter does not have to be in front of the wheel rim while inflating the tyre.

Fuel-powered forklifts are noisy and, if poorly maintained, produce higher concentrations of carbon monoxide.

Record keeping

PCBUs should keep records of all maintenance and servicing, including testing and commissioning, as well as any alterations made to the forklift. Keep these records for the life of the forklift.

If a forklift is sold, transfer the records to the new owner (unless the forklift is being sold as scrap or spare parts).

Unsafe forklifts

Develop and implement a procedure for your workers to follow if they discover an unsafe forklift. This should include isolating and tagging the forklift, and reporting the matter to the appropriate person immediately.

Where the function or condition of a forklift is impaired or damaged to such an extent that it poses a risk to safety, a suitably qualified and trained person must:

- inspect and assess the forklift
- advise the nature of any faults, wear or damage
- advise of the repairs that should be carried out to safely operate the forklift.

Supporting systems

Traffic management plans

A traffic management plan is a set of rules for managing the safest and most efficient movement of traffic at your workplace. It contains practical, workable controls and should cover all vehicles, not just forklifts.

The plan should also be specific to the workplace.

The best way to reduce the risk of forklift-related injuries is to separate pedestrians and forklifts. This should be the most important aim of your traffic management plan.

Everyone affected by the traffic management plan must understand and follow it.

PCBUs and supervisors should develop traffic management plans in consultation with forklift operators and others in the workplace, and by using the following principles of hazard management.

Principles of hazard management

1. Identify the hazards

Identify the hazards associated with the movement of forklifts, other vehicles and pedestrians.

- Study the way forklifts, other vehicles and pedestrians move or need to move around in all areas of your workplace.
- Identify the places where there is the potential for a collision to occur.
- Consider the physical structure of your workplace. Look at floor surfaces, exits, driveways and housekeeping standards.
- Ask your workers about any problems they have noticed.
- Review your incident and injury records (including near misses), as well as the manufacturer's information.

'Practical issues to consider' (refer to page 12) can help you decide what needs to be in your traffic management plan.

2. Assess the risks

Assess the risks caused by these hazards. PCBUs, supervisors and operators should ask the following questions:

- What is the potential impact of the hazard?
- How severe could an injury be?
- What is the worst possible damage the hazard could cause to someone's health?
- Would it require only simple first aid? Could it cause permanent ill-health or disability? Could it kill? How likely is the hazard to cause someone harm?
- Could it happen at any time or would it be a rare event?
- How frequently are workers exposed to the hazard? How many people are exposed to the hazards?

3. Control the risks

The most effective way to control risks is to eliminate them in the first place. If this is not practical, consider other risk minimisation measures.

When considering potential control measures and deciding which to use, follow the priority order set out in the Hierarchy of Control:

- (1) **elimination** (most effective control) e.g. consider options to eliminate the use of forklifts
- (2) **substitution** e.g. use a safer type of forklift
- (3) **isolation** e.g. provide an overhead pedestrian walkway
- (4) **engineering/redesign** e.g. use speed limiting devices on forklifts
- (5) **administration** e.g. training and/or warning signs
- (6) **personal protective equipment** (least effective control) e.g. high visibility vests.

Once you have considered potential control measures in the correct order, implement the most effective controls practicable, or a combination of controls e.g. can you eliminate risks by removing forklifts from your workplace completely?

If that is not practical, can you replace them with more people-friendly load shifting equipment e.g. a pallet jack or conveyor system?

Other control measures might include creating more efficient routes and traffic flows, creating 'no go' zones, and using signs and barriers.

4. Review control measures

Review your control measures to ensure they have been implemented and are not creating new hazards.

Repeat the hazard management process at regular intervals and also whenever there is a change at your workplace or after a near miss or incident.

Practical issues to consider

- Designate exclusion zones for pedestrians and forklifts. Use impact barriers to separate pedestrians and forklifts.
- Less permanent or less sturdy barriers, such as bollards or expandable fences, may be adequate for temporary demarcation.
- If less sturdy barriers are used, factor in the likely stopping distances by considering the weight of the forklift and its expected load, and the likely speed of the forklift. For an example of how speed affects stopping distances refer to Table 1 on page 5.
- Audio-visual warnings can supplement controls in areas of partial separation. A mix of high volume alarms and horns coupled with flashing lights will best warn pedestrians of approaching forklifts. Flashing lights are imperative in areas of high levels of ambient workplace noise.

- Consider using proximity devices.
- Intersections and blind corners can be managed with devices that ensure pedestrians slow down or stop, such as swinging or interlocked gates and chicanes. These controls can be enhanced by the addition of overhead mirrors. Avoid placing bins, racks or storage units that obstruct a forklift operator's view at intersections or around corners.
- Use signs, containment fences, boom gates and even overhead walkways. Install signs that indicate who must give way. Implement and enforce procedures that cover when and how pedestrians and forklifts must give way to each other.
- Create 'no go' zones for forklifts (pedestrian-only areas) e.g. around tearooms, time clocks, amenities and entrances. Create clearly marked pedestrian crossings.
- Assess traffic destination, flow, volume and priorities e.g. rail traffic.
- Consider high-visibility or reflective clothing for pedestrians and forklift operators, and high-visibility markings for forklifts. However, this is no substitute for physically separating pedestrians and forklifts. Make sure that any high-visibility clothing does not blend in with other brightly coloured objects in your workplace.
- Consider speed limits and speed-limiting devices.
- Examine the forklift and its characteristics: movement, stability, attachments and braking distances.
- Examine the loads being moved: their height and type.
- Look at security measures.
- Be alert for black spots caused by stationary equipment and vehicles. Black spots must be controlled.
- Make sure roads are well formed, and clearly marked. Consider making roads two-way carriageways.

This list is not exhaustive and does not replace the principles of hazard management. The issues identified during that process should guide you.

Record your traffic management plan

You should now be able to identify traffic flow, speed limits, parking areas, manoeuvring and loading areas, 'no go' zones, pedestrian crossings, required 'give ways', and areas requiring actions in your workplace.

Detail this information in a site map, and display it in your workplace. Everyone in your workplace, including contractors and visitors, must know your traffic management plan.

Use induction and training sessions, and post information at workplace entrances and notice boards.

Creating a site map can help you analyse the workplace while developing the traffic management plan. Once the plan is developed, the finalised site map will help reinforce and communicate the traffic management plan.

Review and monitor the traffic management plan at pre-determined and regular intervals.

Policies and safe work procedures

Policies and safe work procedures ensure everyone who uses forklifts understands how to do so safely and correctly. Policies should cover the hazard management process, selecting a forklift, training and licences, incident reporting and investigation.

Safe work procedures (or operating procedures) should cover many of the topics discussed in this guide e.g. checking the forklifts and the workplace, using attachments, operating the forklift, carrying loads and maintenance. Other issues you should consider include fatigue, manual handling, refuelling and battery charging.

As with your traffic management plan (refer to page 11), everyone in your workplace, including contractors and visitors, must know your policies and safe work procedures.

Use induction and training sessions, and post information at workplace entrances and on notice boards.

Provide contractors with the same level of training on traffic management as direct workers.

Manage visitors so there is no possibility of them entering forklift operating areas. If this is not possible, inform visitors of 'no go' areas or ensure they are accompanied by a worker.

You should also review policies and procedures regularly to ensure they remain appropriate and that people are complying with them.

Incident reporting

Develop and implement an incident reporting procedure. Incidents involving forklifts must be reported immediately to the manager or supervisor. Reporting incidents enables you to:

- find out what went wrong and why
- improve work practices or the physical environment
- prevent similar incidents happening again.

Near misses must also be recorded and followed up. Reporting near misses can give you the chance of preventing a severe accident, so treat them seriously. You may use the principles of hazard management in this process. Refer to page 11 for more information.

In the event of a serious injury, illness, dangerous incident or fatality, PCBUs are legally obliged to notify SafeWork SA of the incident as soon as it is practical. Telephone 1800 777 209 (24 hours/7 days per week).

Further information

Code of Practice – Managing Risks of Plant in the Workplace

Australian Standard AS 2359: Powered Industrial Trucks

AS/NZS 1891: Industrial Fall-arrest Systems and Devices

LUEZ: Loading, Unloading Exclusion Zones Guidelines

General Guide for Industrial Lift Trucks – Safe Work Australia

Forklifts information sheet for owners and operators – Safe Work Australia

High Risk Work: Forklift work platforms – SafeWork SA Safeguard

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