

# Masted forklift truck

*Note: It is recommended that you read the Supporting Information page before you read this factsheet.*

## Preparation and fitting attachments *(Preparation)*

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- Masted forklifts (excluding telescopic handlers) come in a variety of types including industrial counterbalanced, side loader, reach truck and rough terrain. All are equipped with a hydraulically operated and tilting mast that allows loads to be lifted, carried and placed at height. This factsheet covers all these types; although the rough terrain version is the most commonly used within the construction and allied sectors.
- As with all plant and equipment, thorough pre-use checks must be undertaken which follow manufacturer's requirements. This information is usually found within the operator's manual, which should be with the machine, or on decals placed around the machine.
- Checks on the mast and forks are one of the many checks that should be taken before work starts.
- The forks are prone to wear, particularly through misuse, with wear mainly occurring at the heel, or back end, of the forks. This is a potential weak area and as one or both forks may bend or break, the wear must be measured against manufacturer's specifications.
- Checks also need to be made to the lift chains in the mast and must be of equal length, as unequal length chains could result in a load being lifted that is not level laterally.
- Where the operator notices a fault or is unsure whether the machine is safe to use, they must report any fault or defects immediately and place the forklift out of service.
- Using a machine with a defect, such as a leaking tilt hydraulic ram, could become rapidly worse during use and, although an operator may decide that the fault is minor and the forklift can be used, they may not be sufficiently qualified or experienced to make that judgement.
- Incidents have occurred with forklifts where the tyres, particularly the front set, are of different sizes or of different load-bearing capacities. This is usually because the tyres have been changed due to wear or damage, but they have not been replaced with the correct types. Different sized front tyres mean that the forklift may not be level when picking and placing loads, especially at height, so it may become unstable.
- Some masted forklifts use attachments such as buckets and clamps. The operator must have had relevant training on both how to safely and correctly fit the attachment, and how the attachment must be used.

## Working safely and with others *(Working safely)*

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- The majority of forklift operations occur within congested and confined areas where there are movements of other machines, vehicles and people for which the operator must be aware of these movements when operating the machine.
- Statistics show that collisions with pedestrians form a large part of forklift-related incidents. Where pedestrians need to share the same route as forklifts, or any plant or vehicle, then a segregated walkway must be provided. Signs warning of forklift movements are not a sufficient alternative, only an addition.
- Reversing any forklift is hazardous. The operator must ensure that the route they intend to take is clear of people and vehicles before they move. Operators should check all mirrors, then look over both shoulders before moving, and maintain all-round vision, looking particularly in the direction of travel.
- When travelling in the workplace, an appropriate speed must be kept for the conditions and environment, in order to allow the operator time to react to situations, such as slowing down if a pedestrian crosses the path of the forklift.
- If the operator brakes sharply, there is the additional danger, apart from possible collision, in that any load could slide from the forks.

- Masted forklifts operate in a variety of places which can contain overhead hazards such as power lines. The mast must be kept well clear of any overhead power lines. Guidance issued by the energy networks utilities indicates what minimum distances must be kept from overhead power lines and the higher the voltage in the power line, the greater the distance that must be kept. This is to reduce the danger of arcing if the mast is close to but not actually touching the power line.
- Operators regularly need to leave the operating seat to, for example, make adjustments to the forks for different types of loads. In all cases, the forklift's handbrake must be applied, transmission put in neutral and the engine switched off before the operator leaves their seat.
- It has been known for a transmission or operating lever to be inadvertently knocked into drive when the operator exits the seat, causing unintended machine movement.

## Lifting loads and using attachments *(Working tasks)*

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- Before any load is lifted, the operator needs to know the weight of the load, and to what height it can be safely lifted which is provided by the machines rated or lift capacity chart or decal.
- Using a forklift where the maximum lifting capacity is regularly reached for the desired height increases the risk of overloading the machine and can become unstable.
- The weight of any load is determined by its size and density – for example, a pack of house bricks will be heavier than a same-sized pack of aerated breeze-type blocks – meaning that operators can't establish the weight of a load by size, height, width and length alone.
- The operator must also be able to determine the load centre (the point that the load is in balance), and compare it with the forklift's load centre as indicated in the rated or lift capacity chart. In most cases, the load centre of a forklift is usually 500mm from the face of the forks, although some are rated at 600mm.
- If the centre of gravity of the load is more than the machine's load centre, the carrying capacity must be reduced for the reach and height.
- Before a load is lifted, both the forklift and load need to be on level ground to prevent damage to the load or supporting pallet where the forks are not level.
- Forks should be spaced so that they are of equal width from the forklifts centre line, and spaced so that a load is fully supported, particularly if it is on a wooden pallet. Fork spacing's that are too wide or too narrow can lead to an unsupported or unstable load.
- During all lifting and placing operations, the handbrake must be applied each time the machine is stopped and hydraulic functions used.
- Where operators have relied on holding the machine using the footbrake, incidents have occurred as the forklift has moved when the operator hasn't applied enough brake pressure. Even a slight movement can cause an incident.

## Stability

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- Masted forklifts overturn when they become unstable for a wide range of reasons, and operators need to understand the conditions that can cause instability, both longitudinally (front and rear) and laterally (sideways).
- Before any load is carried, the operator must check the manufacturer's maximum rated capacity for the machine, the load centre that applies and where any de-rating must be undertaken.
- Where a large load is to be carried and the centre of gravity of that load exceeds the machine's load centre, then the carrying capacity must be reduced.
- Longitudinal stability of a forklift is maintained by the counterbalance effect, which is when the weight towards the rear of the machine overcomes the weight of the load on the forks. Increasing the load on the forks reduces the counterbalance effect, making the machine less stable.

- If a load is being lifted or placed where the forklift is facing downhill on a slope, the load overcomes the counterbalance effect due to a movement of the forklift's centre of gravity, and this could cause longitudinal instability and the forklift at risk of tipping forward.
- Raising a load can further affect stability. If a load is raised to full height with full back tilt of the mast applied, the machine's centre of gravity moves both upwards and rearwards.
- If a load is lifted and the forklift is leaning sideways, the machine is less stable. The higher the load is lifted, the greater the risk of the forklift turning over sideways.
- No loads should be lifted unless the forklift is level and the ground firm and stable enough to support the weight of the forklift and load.
- Most forklifts can carry a suspended load but carrying a load suspended from the forks can be hazardous and requires proper planning by a competent person.
- The effect of any load swing with a suspended load can cause the forklift to exceed safe limits which can be caused by travelling and turning too quickly, and external factors such as the effects of the wind on loads having a large surface area.
- Travelling with suspended loads can restrict forward vision, for which measures must be taken such as travelling in reverse and with suitable assistance.
- Even if travelling unladen or with light loads, forklifts have rolled over when the operator has turned too sharply and the sharper the turn e.g. when turning through 90 degrees, the higher the risk of an overturn. Instability of the forklift increases as either speeds or turning angle increases, whether loaded or not.
- Travelling with a raised mast is hazardous, and greatly increases instability, particularly on uneven ground and also when turning left or right, even if a turn is undertaken gently and on level ground.
- Where a load needs to be placed at height, the forklift must be on firm level ground and facing the placing point prior to raising the load.
- Travelling up and down slopes requires care and for which certain requirements need to be followed. In the first instance, the operator needs to know the maximum gradient of the slope the forklift can be travelled on, and the direction of travel, which can differ depending on whether it is carrying a load or is unladen.
- In principle, if the forklift is carrying a load up an incline then it would normally be driven forwards up the slope and reversed down the slope. If unladen, the opposite applies – the forklift is reversed up the slope and driven down the slope. When driving up a slope with a load, the mast needs to be slightly tilted back and the forks and load kept just clear of the ground but as low as possible.

## Sample questions

The following questions are based on the text within this factsheet and indicate how the questions and answers are structured. Based on the factsheet, there is only one correct answer. The correct answer to each question is indicated at the end of this factsheet.

**Q1. During pre-use checks, the operator notices a small oil leak in the tilt ram of the mast but decided it is minor and goes to work. Which of the following statements would apply?**



The operator can check the oil level at each break period



The operator may not be experienced or qualified enough to make that judgement



The operator can place a cloth around the leaking area and report at the end of the day



The operator can operate the tilt ram whilst keeping the engine at idle speed

**Q2. A load needs to be placed at height but the surrounding ground is uneven and the forklift would lean to one side. What course of action should be taken?**



No lifting should take place until the ground is levelled



The load can only be placed at 45% of the machine's maximum lift



A signaller should be used to assist the operations



The weight of the load must be reduced

## Study checklist

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### Do you know?

1. What actions to take if a defect on the machine is found.
2. What particular checks need to be made to the mast of the forklift.
3. What the consequences could be if using a forklift where the front tyres are of a different size or type.
4. What the major hazards are when forklifts are used in tight and confined areas.
5. Why full vision must be made before reversing a forklift.
6. What could occur if sudden and heavy braking is undertaken on a loaded forklift.
7. Why minimum distances need to be kept from overhead power lines.
8. What the procedures are when exiting the seat and cab of the forklift.
9. Why the weight of loads must be known and what can cause loads to be heavier than indicated.
10. Why the operator must know what the load centre of the load and the machine is.
11. How a load can be affected if the fork spacing is incorrect.
12. Why the handbrake must be applied at all times when operating the mast.
13. The difference between longitudinal and lateral stability.
14. How the counterbalance of the forklift affects the load that can be lifted.
15. What happen to the forklift's centre of gravity when travelling with and raising a load to height.
16. What the hazards are when carrying a suspended load from the forks.
17. What the consequences if steering, braking and driving are undertaken too quickly or harshly.
18. How the forklift should be travelling both up, along and down slopes, both unloaded and loaded.

This checklist aims to act as a study aid to ensure that the reader has identified and understood the relevant parts of this factsheet

**Answers to sample questions: Q1: B and Q2: A**