The Safe Use of Fork Lift Trucks

Peter Corfield
NASS Director General
The Law...
Health & Safety at Work Act 1974

To ensure, as reasonable practicable, the health & safety of yourself and others who may be affected.
Management of Health & Safety at Work Regulations 1999

To carry out suitable and sufficient risk assessment to protect your employees and others
Provision and Use of Work Equipment Regulations 1998 (PUWER)

• Work equipment is suitable and is maintained and inspected regularly

• Where the use of work equipment poses a risk use is restricted to authorised personnel

• Authorised personnel, managers and supervisors require adequate training
Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)

- Properly planned by a competent person
- Appropriately supervised
- Carried out in a safe manner using suitable equipment
Workplace (Health, Safety and Welfare) Regulations 1992

• Organisation of traffic routes

• Sufficient lighting

• Floors and traffic routes constructed suitably to not expose risk
What happened?

An Aluminium Fabricator was sentenced after a worker was fatally crushed under a lifting truck which tipped over whilst extracting aluminium metal moulds from a racked storage system.
What happened?

The Company was fined £140,000 and ordered to pay £32,251.31 in costs after pleading guilty to

- 2(1) Inadequate Risk Assessment
- 3(1) Inadequate System of Work

breaching the Health and Safety at Work Act 1974.
Fork Lift Truck Operation

The Basics
Most fork lift trucks are rear wheel drive with the weight in the base of the vehicle to reduce instability.

The “centre of gravity” for a fork lift truck is pictured.
With a load on the forks this changes the weight distribution as the load also has its own centre of gravity.
The centres of gravity combine to create the Composite centre of gravity
The **higher** the balanced load

**the higher** the Composite centre of gravity
This is a plan view of a fork lift truck

The triangle in red shows the Stability Triangle
The rear wheels of an FLT are articulated.

This means that the rear axle is connected to the chassis in the centre.
So the triangle is measured from

the centre of the rear axle to
the centre of the front wheel tyres
If either the FLT centre of gravity or the Composite centre of gravity are outside the stability triangle the FLT is unstable.
A forklift does **not** have any suspension.

This means when the centre of gravity becomes higher on a stacked load - this can cause **Lateral Instability**

Approximately 75% of all truck turnovers are lateral
Ensure the load is *centrally* positioned

and the *fork spacing* is *distributing* the *weight* evenly
Turning sharply at speed will make the FLT highly unstable, especially when not carrying a load.
Backward tilt at height moves the centre of gravity towards the rear of the FLT
The thinner part of the stability triangle

Meaning the centre of gravity is more likely to move out of the stability triangle when turning
The FLT should **never be turned** whilst the load is elevated.

If this is not viable, a full risk assessment should be conducted and the FLT should only be turned very slowly and carefully.
Good house keeping

Floor obstructions can cause a FLT to tip over
Good house keeping

Floor obstructions can cause a FLT to tip over

- Debris
- Wrapping
- Chocks
- Slippery patches
- Drains/ potholes
- Kerbstones

Employers and operators should ensure that the traffic routes are in reasonable condition and free from obstructions
Group exercise

Identify ways an employee could cause lateral instability
Lateral Stability

- Turning at speed
- Turning with mast elevated
- Turning across a slope
- Floor obstructions
- Potholes
- Live loads
- Offset forks
- Offset side shift
- Offset load
- Edge of loading bay
The tipping /pivot point/ fulcrum is the front wheel of the FLT.
FLT’s have a specified rated capacity based on the weight of the FLT being heavier than the load.
The heavier the load, the more it will be affected by gravity and the more it will pull the composite gravity balance.
This pushes the gravity out of the stability triangle making it unstable.
If the load being carried is too heavy for the rated capacity of the truck, it will tip forward on the front wheel.
“undercutting”
The distance from the front face of the forks to the centre of gravity of the load is the load centre.
The FLT will become *unstable* if the load centre exceeds specification.
The **shape** of the load also affects the load centre.
The size of the load can obscure view, in this case drive in reverse.
Forward tilt at height can cause instability

Forward tilt is meant to assist the operator in withdrawing the forks from a load after the load has been stacked.
Forklift trucks can also turnover due to excessive emergency braking.

The forks would likely dig in to prevent overturn unless they were raised.

Progressive braking will keep stability.
The FLT should be driven forwards up the slope and in reverse when going down the slope.

Travelling with the load pointing down the slope can cause the truck to overturn or the loss of a load.
If vision is blocked by a large load,

use a **banks man**
Group exercise

Identify ways an employee could make the FLT flip forward on its tipping point
Forward Stability

- Overloading the FLT
- Increasing the load centre
- Carrying a load that is too long
- Using forward tilt at height when laden
- Incorrect use of the truck on slopes
- Harsh braking
- Traveling with the mast extended
This is a capacity plate.

The column on the right-hand side shows the normal lift height.

This truck will stack to a height of 3890 mm without de-rating but the maximum stacking height is 7890 mm.
The load centre is shown in the horizontal column at the bottom of the capacity plate.

The smallest load centre, 500 mm, is the standard load centre that is used on most forklift trucks.

A huge container handler on the dockside might have a standard load centre of 1000 mm or more.

Notice how the truck's capacity reduces as the load centre increases.
This slide shows the way the capacity plate should be read by the operator.

There are two parts to ascertaining the trucks capacity.

The load centre in use (500mm) and the stacking height (3890mm)

The basic capacity of this truck therefore is 1600 kg

The greater the load centre or the higher the height, the less the truck will lift.
recap

Identify ways an employee could make the FLT centre of gravity and the Composite centre of gravity fall outside the stability triangle
Factors affecting a loaded fork lift truck

• Weight of load
• Size of load
• Shape of load
• Position of load on forks
• Height to which the load is elevated
• Amount of forward mast tilt
• Forces created when braking
In the event of a forklift truck overturning

• under no circumstances try to jump off the machine!

• grab something firmly such as the steering wheel

• try to brace feet in the foot well of the compartment.

• lean away from the direction in which the truck is tipping.

• Under LOLER and PUWER, counterbalanced forklift trucks must mandatorily be fitted with seatbelts to be worn at all times
What happened?

An FLT driver was moving a large metal coil with the forks in the raised position, restricting the driver's vision.

The driver was unaware two other employees were in the warehouse and hit one of the workers knocking him to the ground and running over his leg.

The other worker shouted to the driver who panicked and reversed the FLT over his co-worker's leg once again.
What happened?

The Company was fined £36,000 after pleading guilty to breaching Section 2 of the Health and Safety at Work Act.

Corrective measures were made to working procedures after this accident totalling £4,500.
Pedestrians can be kept safe through safer systems of work.
It is the FLT OPERATOR'S RESPONSIBILITY to watch out for pedestrians, not the other way around.
Provide sufficient **clear and unambiguous warning signs** at strategic locations to inform people forklift trucks operate in the area.
Define, designate and clearly mark pedestrian routes and crossing places
Pedestrians, where possible should be segregated from vehicle routes by a physical barrier.
use the manually operated horn in several short bursts at blind corners to attract attention
Flashing beacons / safety lights are effective as a warning device especially to other FLTS.
high visibility clothing or light coloured overalls for both operators and pedestrians
Employees should also stand clear behind the FLT where they may not be fully visible to the driver.
It is forbidden to carry passengers
drive at least three truck lengths behind another FLT
“Cherry picker”

The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998

PROHIBIT

planned maintenance operations
to be carried out by an FLT
• Painting
• Cleaning
• Maintenance
• Stocktaking
• Order Picking
The heel of the forks should be 10 to 15 cm above the floor with the forks tilted back on an unladen FLT to prevent • digging into obstructions • hitting a pedestrians ankle on a laden FLT to create • stability
Ensure the forks are lowered and tilted forward when parked

Parking brake on

Turned off with the key taken out to prevent unauthorised personnel from using the FLT
The Perfect Difference.....

Perfect Fork Lift Experience Impact results 2014

Project launch week 27