

The Layman's Guide to Fork Lift Trucks

The aim of this guide is to provide a brief overview of the different types of fork lift truck and other related handling equipment in order to make the reader better aware of the enormous variety of equipment available on the market.

The guide is general in nature and cannot cover the wide range of products within each category. For example, one manufacturer alone lists more than 20 different electric pedestrian stackers within its current range.

We start off with counterbalance trucks and comment on their flexibility. They are indeed wonderful pieces of equipment. However, in the wrong hands and on the wrong task they can be as unsafe as a loaded gun without a safety catch.

As you browse through the guide think of your own operation and the equipment you use. Suitability and efficiency are both key considerations: it may be that you really need a counterbalance, sideloader, telescopic handler or reach stacker for the yard, and a pallet stacker or reach truck for inside use.

Modern trucks have many built-in safety features. There are other [safety devices](#) that can be added to most types of truck as optional extras. Knowledge of what is available and keeping up with good design and best practice helps to make your lifting operations as safe as possible.

Counterbalance Trucks

This is the most popular type of fork lift truck. The weight of the load (forward of the chassis at the front) is counterbalanced by a large weight built into the rear of the vehicle.

The vehicle is very flexible as it can be used indoors and outdoors and can be fitted with a wide range of [attachments](#). There are many variants and manufacturers, so like buying a car you can purchase anything from a Trabant to a Rolls Royce, with a similar variation in safety characteristics.

Popular models have a lifting capacity in the range of 1,000 to 3,000 kg and lift heights of 3 to 6 metres or more, depending on the mast



configuration. Some are designed with low masts in order to operate in containers or other confined

spaces. Intermediate trucks, with lifting capacities up to say 9,000 kg are also readily available. There are specialist heavy lift trucks with capacities much greater than this – see below. At the other extreme, small, three-wheel machines can deliver high levels of manoeuvrability and productivity.

An important early decision to be made when purchasing a counterbalance truck will be the power source. This decision brings its own safety issues, not least the issues of fumes and fuel storage. This subject is discussed in the [Power Sources section](#) of this guide.



Heavy Lift Trucks

A number of manufacturers produce heavy lift trucks, up to a limit of about 60,000 kg. Models include giant counterbalance fork lifts, reach stackers, full or empty container handlers and specialist equipment designed for specific applications. As an example, an empty container handler can stack empty containers up to 8 high.



Reach Trucks

These trucks are also very popular and can be found in many warehouses. The load is carried partially within the chassis with the mast “reaching” out and in to place and recover the load. With a capacity of 2,000 kg or more, they can be configured to lift loads up to about 12 metres.

Reach trucks are usually battery powered. The operator generally sits sideways, although there are also stand-on models. Reach trucks are particularly useful for flexible narrow aisle storage within racking systems. They are designed to operate indoors on smooth floors and have solid tyre wheels. A few models can be fitted with cabs and tyres suitable for yard use.

Order Pickers

As the name suggests, these are trucks designed to maximise order picking operations.

Some types are little more than adapted electric pallet trucks, for ground level operations, and may include long forks for carrying two or three pallets. They may be called horizontal or low level order pickers. Some have an elevating operator platform and others have forks that can be raised to an appropriate picking height for better ergonomics.

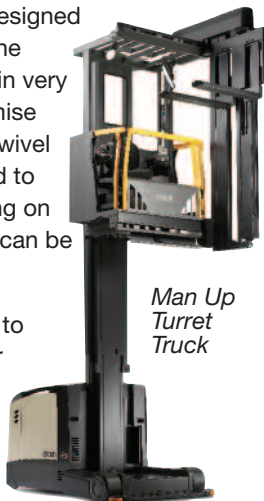
At the other extreme there are high lift or vertical order pickers, quickly and safely lifting 1,200 kg up to 11 metres. Operating in narrow aisles, this equipment gives operators access to both sides picking at these high levels. Additional equipment may include guide rails and radio-based positioning technology. Floor condition is critical for the safe operation of these trucks.



Very Narrow Aisle (VNA) Turret Trucks

The VNA turret truck or high rack stacker is a highly sophisticated piece of equipment designed to work in exacting conditions. As the name suggests, the truck operates in very narrow high aisles in order to maximise storage density. The operator can swivel the forks and reach the load forward to put it away in the racking. Depending on the specification, loads of 1,500 kg can be whisked up to 17 metres.

- **Man Down** is the name given to equipment where the operator remains at ground level
- **Man Up** is the name given to equipment where the operator's cab lifts up on the carriage, level with the forks



*Man Up
Turret
Truck*

Precision is key in all VNA operations. Rail, wire or radio guidance can assist with positioning, together with end of aisle control systems. Floor condition is critical for the safe operation of these trucks and specialist advice should be sought from appropriate truck manufacturers.



*Man Down
Turret Truck*

Rope Evacuation from Mechanical Handling Equipment

Users of VNA equipment and high lift order pickers should be familiar with guidance on rope evacuation. FLTA guidance is available in [Fact Sheet 14](#) within the popular [Fact Sheet section](#) of the Association's website. You can also read the [Health and Safety Executive's \(HSE's\) guidance](#).



Articulated Trucks

As indicated by the name, these trucks feature an articulated front end, allowing the front wheels, mast and fork assembly to twist to the side to put away pallets. This allows them to operate in very narrow aisles. However, they also have features

associated with a counterbalance truck, such as cushion tyres, and can readily leave an aisle to load or unload a lorry.

A number of different makes and models are available with chassis widths of 1 to 1.4 metres. Loads of 2,000 kg or more can be lifted to about 12 metres. They are usually electric powered, but there are some LPG variants and at least one pedestrian-controlled machine.

Sideloaders

Sideloaders are like a cross between a lorry and a reach truck, with the mast and forks mounted sideways and centrally. The forks reach out with the carriage to collect the load which is then drawn back to rest on the bed of the truck to travel around the yard. This concept is ideal for long or



protruding loads such as timber, steel rods, pipes, etc. Trucks can be powered by battery, LPG or diesel and may have 3 or 4 wheels depending on the requirement. Commonly, loads of about 5,000 kg can be lifted to heights of 8 metres, but specialist trucks with a capacity of 50,000 kg are available.



Multi-Directional Trucks

These trucks are similar to sideloaders but have the ability to drive in any direction giving them enormous flexibility. The capacity range is 2,000 to 25,000 kg, with lift heights up to 4 metres.

(The term omni-directional is used in the USA but tends to refer to hybrid designs such as the Airtrax Sidewinder. For a modest diversion, look [here](#).)

Rough Terrain Trucks

Rough terrain – sometimes called all-terrain – trucks are designed to operate on uneven ground such as construction sites, road maintenance areas, agriculture and forestry. They can be useful in unpaved yards and other such locations. Stability is an issue for all fork lift truck operations and this is an increasingly important safety factor when on soft or uneven ground. As for other specialist operations, the operator will need specialist training. Rough terrain trucks may be masted or telescopic and some lighter models may have skid-steer.

- **Masted trucks**

There are a number of nimble lightweight machines available, but the general range covers trucks lifting up to 5,000 kg to heights of 6 metres or more. At the heavier end there are trucks capable of lifting 32,000 kg up to 6 metres.



- **Telescopic**

With a telescopic handler the forks are attached to a sectioned boom which can be moved forward and up. There are a variety of configurations. There are lightweight models that can readily load pallets across the bed of a lorry, lifting 1,500 kg to 4 metres. Others can lift loads of 4,000 kg to over 16 metres, perhaps placing pallets of tiles on the roof of a building.



- **Skid-Steer**

Although typically a wheeled vehicle, this truck operates like a tracked vehicle and is steered by changing the speed of the left or right side wheels. As such it is highly manoeuvrable, albeit with limited lifting characteristics. It is particularly useful in some construction and agricultural applications. Maximum lifting capacity is just over 1,400 kg.



Lorry Mounted Trucks

These hybrid trucks are designed to be carried by special mountings on the back of lorries or trailers. They use their power and lifting mechanism to “mount” or “dismount” the lorry in less than a minute. This means that palletised goods can be delivered to



locations that do not have a fork lift truck in place, making for highly flexible deliveries. Trucks with capacities up to 3,500 kg can lift to heights of about 3 metres. Special safety considerations should include the likelihood of these trucks being used on public roads – see [FLTA Fact Sheet 08](#).

Tow Tractors

Tow tractors are mentioned here as towing trailers is often required where fork lift trucks operate. Most lift trucks are not designed to tow trailers and there are

safety implications if they are. See [FLTA Fact Sheet 26](#). Many fork lift truck manufacturers also produce dedicated tow tractors.



Note on Pedestrian Trucks

Training is important for the safe use of all types of pedestrian trucks described below. Take this opportunity to read [FLTA Fact Sheet 09](#) on this subject.

Electric Pedestrian Pallet Trucks

There are many types of electric pallet truck available for moving and picking goods, capable of lifting up to about 3,500 kg depending on the model. They can be designed for the operator to walk with, stand on or sit on the equipment. Some may have extra-long forks to carry three pallets or have a low level "dead" lift for order picking work. There are also rough terrain variants available for construction sites, etc.



Electric Pedestrian Stackers

There is a wide range of equipment available including double-decker variants. They provide a flexible means of moving and stacking within a warehouse or similar environment. Common models have a lifting capacity of about 2,000 kg and a lift height of 2.5 metres.

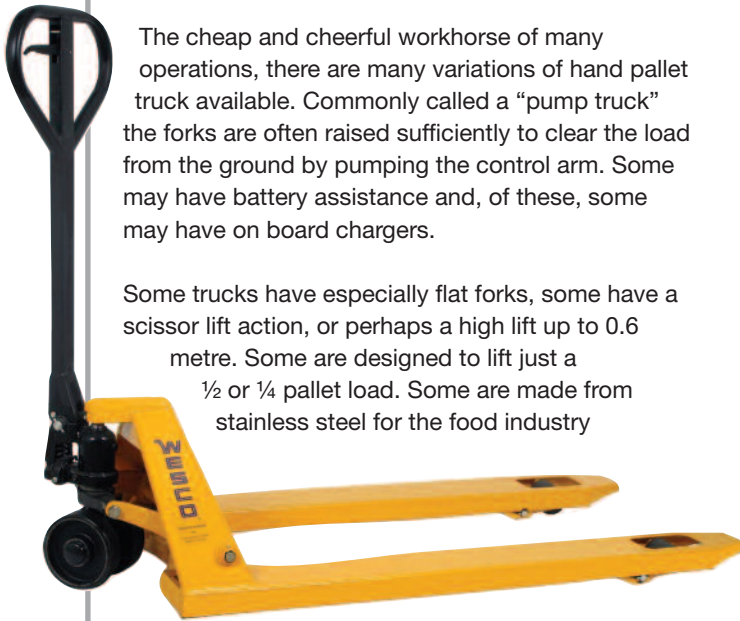


Pedestrian Controlled Counterbalance Trucks

This more bulky style of equipment removes the problem of intrusive straddle legs from traditional stackers and can deliver a lift of about 1,600 kg to over 5 metres. An articulated pedestrian-controlled truck is also available.



Hand Pallet Trucks



The cheap and cheerful workhorse of many operations, there are many variations of hand pallet truck available. Commonly called a “pump truck” the forks are often raised sufficiently to clear the load from the ground by pumping the control arm. Some may have battery assistance and, of these, some may have on board chargers.

Some trucks have especially flat forks, some have a scissor lift action, or perhaps a high lift up to 0.6 metre. Some are designed to lift just a ½ or ¼ pallet load. Some are made from stainless steel for the food industry



or may be corrosion protected. Some have a ramp lifter, to raise enough to negotiate a ramp, or on board weighing scales. Some models have an especially quiet operation to aid early morning deliveries.

Shuttle Pallet Carriers

Remote control carriers are for the independent movement of pallets, usually in a high capacity storage environment. These are specialist items for particular functions.



Specialist Requirements

Explosion Proofing

Industries that produce, store, or distribute flammable materials need to be aware of the risk of an explosive atmosphere being generated during normal operation. Unprotected fork lift trucks operating in such an area may cause an explosion. Pyroban Ltd is one of a number of companies that offer appropriate protection for diesel and electric trucks used within such areas, protecting the people and the site. Their products remove the sources of ignition whilst retaining the original ergonomics and performance of each vehicle, and comply with the European Directive ATEX 94/9/EC.

If you think this requirement may apply to your operation you should seek professional advice.



Cold Stores

Many manufacturers will supply battery-powered trucks especially adapted for cold store operations, including special heated cabs. This can include equipment that will operate in temperatures down to -35°C.



Special Build Equipment

It is worth noting that a number of manufacturers, including attachment manufacturers, may be able to adapt or design new equipment to meet specific operational needs. Depending on the requirement, the FLTA may be able to suggest which companies may be able to assist you. Contact the [FLTA](http://www.fork-truck.org.uk) for more details.

Attachments

Before reading about attachments it is really important to understand load rating and the need for de-rating. This is explained in [FLTA Fact Sheet 11](#).

There is a wide range of fork lift truck attachments available for purchase or hire, for trucks large and small. The following list provides a selection of equipment but is by no means exhaustive:

- Brick/block grabs
- Carpet booms
- Crane jibs
- Double pallet handlers
- Drum handling equipment – lifting, rotating etc.
- Fork clamps
- Fork extensions and sleeves
- Lifting beams
- Load stabilisers
- Pallet rotators/tippers
- Pusher forks
- Roll handling
- Rotating fork clamps
- Scoops and buckets
- Sideshifts
- Snow ploughs and salt spreaders
- Sweeping equipment
- Telescopic forks
- Tipping skips/bins
- Weighing systems
- Wide load stabilisers
- Working platforms/safety cages



Working Platforms

There are specific rules for the use of working platforms or safety cages. These are covered in an HSE document called PM28: [Working platforms \(non-Integrated\) on forklift trucks](#).

If you intend to use a working platform we recommend you first look at the FLTA guidance in [Fact Sheet 18](#), and then read the [HSE's Guidance Note PM28 on working platforms](#).

Safety Equipment

There is an ever-increasing range of safety equipment available for fitting to, or using with, fork lift trucks. In addition to improving safety, this equipment will often enhance productivity, making for a “win-win” situation. When you are considering the purchase or hire of a fork lift truck you should aim to discuss which systems would be of benefit to your operations with your selected dealer – just as you would for a car or lorry.

The range of such safety equipment includes the following:

- **Cabs and canopies** for outdoor use – to protect operators from inclement weather
- **Enhanced lighting** – to see and be seen
- **Flashing beacons**
- **Reversing alarms** including low noise directional alarms which can be more environmentally friendly than “bleepers”
- A wide range of **specialist mirrors** to enhance visibility
- **Cameras** – either as movement or visibility aids, especially for large trucks, or to help position forks
- **Proximity alarms** to warn the operator of the presence of people or other obstacles, or to warn others of the presence of fork lift trucks (there are a number of different systems available)
- **Speed inhibitors** capable of use with speed zones
- **Speed cameras** and other monitoring systems – some with public displays
- **Key control systems**
- **Operator recognition systems** – to block inappropriate use
- **Fork positioning systems**
- **Data logging systems**, including speed, operator efficiency, accident logging, immobilisation post collision, etc.
- **Maintenance reporting**, including pre-shift checks (with go or no-go), routine maintenance, Thorough Examination log, etc.
- **Fleet management systems**
- **Various guidance systems** for VNA equipment
- **On board weighing systems**
- **Ergonomic enhancements** such as joystick controls, special seating, stowage, etc.
- **Rotating seats** to aid reversing and reduce strain

Providers of Safety Equipment

Some providers advertise in the trade magazines such as *SHD Magazine*, *Handling & Storage Solutions* or *Warehouse & Logistics News*. Those that are Members of the FLTA are listed according to speciality [here](#).

Tyres

Use of the correct tyres is important for stability, braking and traction. The correct type of tyre to use will depend on the truck, the application and the operating conditions. This needs to be discussed with your truck and/or tyre provider. Tyres need to be checked regularly as part of the pre-shift check regime, and replaced when worn or damaged. Further guidance on tyre safety is available in [FLTA Fact Sheet 20](#).



Power Sources

The best or more appropriate power source for your fork lift trucks will depend on your application and perhaps your budget. Importantly, there will be health and safety implications for whatever power source you use, and these need to be considered too. The main points are considered below.

Diesel

Advantages

- Flexibility
- Good for outdoor use – can be used indoors (with caution)
- Fuel efficient
- Good if attachments are to be used
- Good on gradients
- Cheaper to buy than electric
- Relatively easy and cheap to maintain
- Quick and easy to refuel
- Long life with a good residual value

Disadvantages

- Exhaust fumes
- Not ideal for indoor use
- Can be noisy
- Tend to be bulkier than other types
- Require greater operator skill than electric

Safety

- Fume and particulate hazard. See [FLTA Fact Sheet 22](#). More detailed guidance from the HSE is available [here](#)
- Fuel storage and security need to be considered
- Fuel spillage – need company rules for immediate clear up, etc.
- Hot exhausts

LPG

Advantages

- Flexibility
- Suitable for outdoor and some indoor use
- Can be more manoeuvrable than diesel trucks
- Good overall performance
- Much reduced air particulates compared to diesel
- When fitted with three-way catalyst contains virtually zero carbon monoxide and hydrocarbons
- Quieter than diesel
- Cheapest to buy

Disadvantages

- Can be fume issues
- Relatively high fuel costs
- Relatively high maintenance costs
- Can be more difficult to refuel
- Lack of fuel gauge can be a problem
- Lowest residual value
- Requires greater operator skill than electric

Safety

- There can be a fume hazard in confined spaces such as containers and underneath mezzanine floors. See [FLTA Fact Sheet 22](#)
- Fuel storage and security are important considerations. See [FLTA Fact Sheet 13](#) on LPG storage
- Hot exhausts

Electric

Advantages

- Environmentally friendly – no fumes when operating
- Quiet
- Highly manoeuvrable
- Relatively cheap to run
- Cheapest to service and maintain
- Easiest to operate

Disadvantages

- High purchase and set up cost
- Space required for charging area
- Possibility of power cuts needs to be considered
- Time and space for battery changing
- Need a good smooth floor surface
- Limited outdoor application
- Not good for gradients

Safety

- Fumes during battery charging can be a hazard. See HSE publication: [Using electric storage batteries safely](#), which includes a section on calculating ventilation requirements
- Your battery supplier should also provide appropriate safety instructions and other material
- Staff need additional training and PPE
- Quiet operation of trucks could be a hazard in some environments

Fuel Cells

For general information on fuel cell use for fork lift trucks, look on the Wikipedia site [here](#).

Where Can I Get Further Advice?

The largest and most respected organisation in this sector is the Fork Lift Truck Association (FLTA). Since 1972, FLTA Members have built, supplied, supported or maintained over 1.5 million fork lift trucks.

Its Members abide by a strict Code of Practice which acts as the industry's benchmark for integrity, professionalism and high quality customer service.

If you would like a list of FLTA Members in your area, please visit the FLTA website at fork-truck.org.uk where you can conduct an online search, or contact the FLTA secretariat directly using the details listed on the website.

