

When balance matters

Choosing the right unit load for a lift truck and ensuring the truck and load subsequently work safely together is a multi-faceted challenge for operators... John Osborne offers some advice.



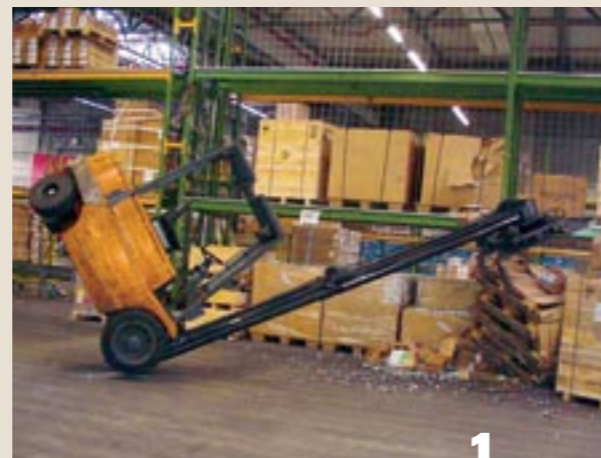
Working out which unit loads will best suit your operation is no simple matter – it involves not just the unit loads themselves, but also a consideration of the lift trucks being used and of the overall combination’s effects on vehicle stability.

Previous experience and existing practice in a particular industry sector will often be a good starting point. On top of that, any supplier of pallets, racking or materials handling equipment will give whatever advice it can - though often with differing degrees of expertise.

Sometimes, of course, the unit load itself isn't really the right starting point because certain racking or truck types can dictate particular unit load issues. Gravity racking, for example, requires good quality, unbroken pallets; very narrow aisle (VNA) trucks, meanwhile, often call for consistently loaded pallets that do not exceed strict dimensional limits.

The goods themselves and how they are distributed within the unit load can also have a great influence - irregular steel castings, for instance, may make for highly uneven distribution of weight across the unit load. Other loads – like printed material - may not be large enough to justify a standard pallet and instead require bespoke unit loads, often one-way pallets.

The use of non-standard pallets, however, can affect the specification of truck that you require. This is not an issue if you buy new vehicles, perhaps, but can be awkward if you are trying to rent a truck for a short period or buy second-hand.



1

Stability issues

The issue of stability, once a load is picked up by a truck, is paramount. Pallets are not commonly secured to the lift truck in any way – it would obviously be impractical to do so as loads are usually only carried for brief periods and in any case, well stacked unit loads can be very safely handled by forks alone in most situations.

Where load stability remains an issue, however, for example when cornering with high loads, the use of lift truck attachments – like clamps that grab a load from both sides – can sometimes provide better load retention than forks. This is particularly the case with tall loads (where the high centre of gravity comes into play) and light loads, says Bob Hine, technical consultant at the British Industrial Truck Association (BITA).

In terms of the vehicle itself, users are always advised to talk to their lift truck supplier about the loads to be carried before settling on a final truck specification. “Lift trucks are available in many different configurations in terms of power sources, size, weight and masts,” comments Kasper Blankensee, product manager for IC trucks at Cat Lift Trucks. “Before a truck is delivered to the customer, or even before the truck is used, the safe working load of the particular combination of truck, mast and attachment needs to be certified.”

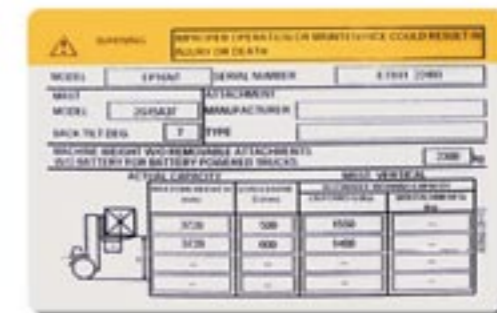
“Lift trucks should never negotiate a turn at speed or with a raised load, since centrifugal and gravitational forces can combine with disastrous results...”

When vehicles are rated for load, the rating is for a specified maximum weight and a specified forward centre of gravity. This limit – which is indicated on a plate on the truck by the vehicle manufacturer – must not be exceeded. In many countries it is illegal to remove or tamper with the plate without the explicit permission of the lift truck manufacturer.

If a lift truck attachment is used, a truck’s existing rating must be recalculated to take account both of the weight of the particular attachment in question and the effect on the load’s centre of gravity vis-à-vis the truck. Customers are strongly advised against doing their own capacity calculations, however.

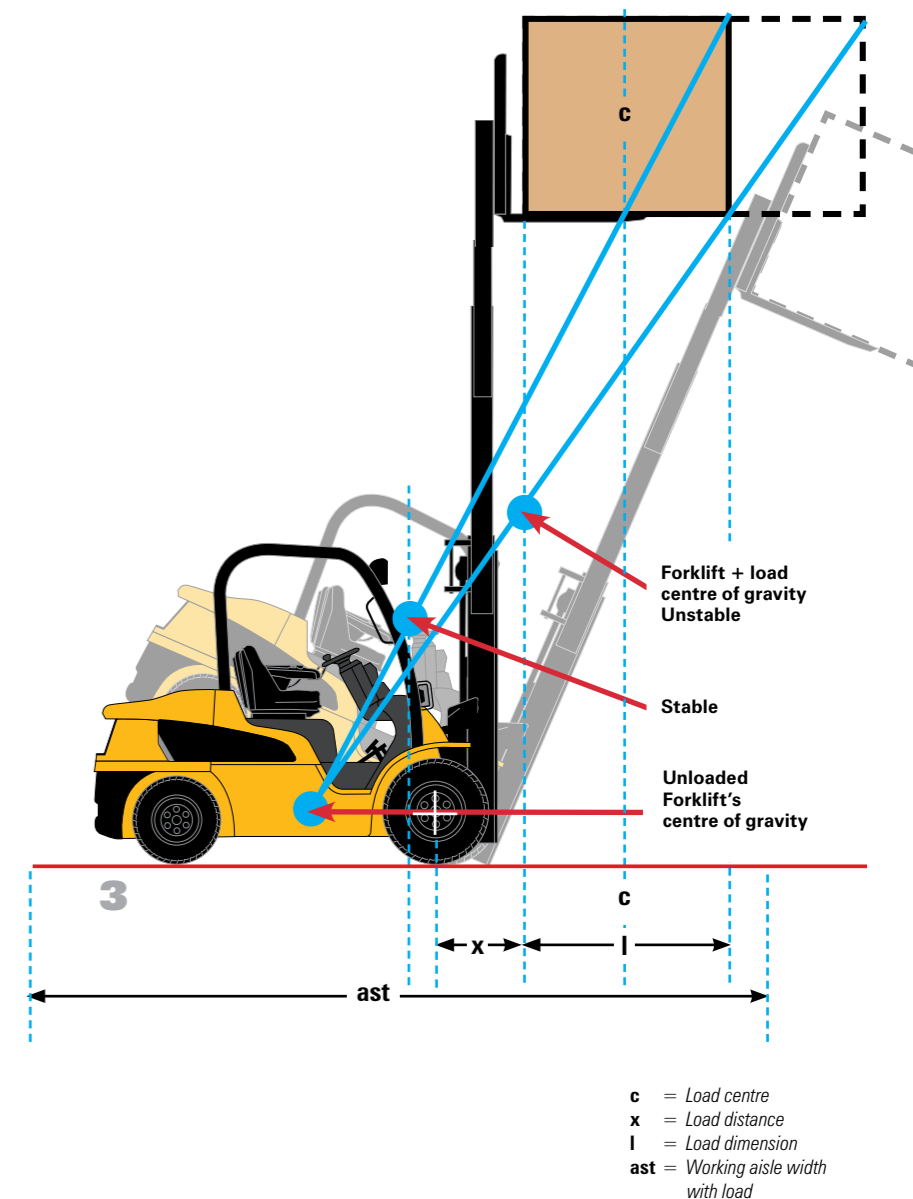
“Capacity calculations are based on the tests described in ISO 1074,” says Blankensee. “This standard is part of the overall CE requirements for lift trucks together with standards for noise emission and whole body vibrations.”

The standard hasn’t been updated since 1991 but a new version is currently →



2

1. Modern lift trucks have a high level of manoeuvrability which can be a problem in stability terms, especially if drivers are in too much of a hurry. (Image courtesy of Allan Sloan, Alberta Forklift Safety Council, Canada).
2. The maximum load weight limit is indicated on a capacity plate fitted on the truck by the vehicle manufacturer – this capacity must not be exceeded.
3. When vehicles are rated for load, the rating is for a specified maximum weight and a specified forward centre of gravity.





4

→ being produced, he says.

Cat Lift Trucks uses a complicated calculation tool for truck ratings, adds Blankensee. “The standard describes in detail how to test the truck on a tiltable platform and we have written a calculation program to simulate this test.”

Loads in motion

Another important factor when choosing the correct unit load and considering how goods will actually be transported is what happens to the load when the lift truck is moving.

The way a pallet is stacked with goods obviously has some effect on this. So too does the way the truck is driven and this is something that should involve not just truck drivers but also their supervisors.

Users should bear in mind that modern lift trucks are highly manoeuvrable, thanks largely to their rear-wheel steering, and while this is of great benefit in many ways, their high level of manoeuvrability can be a problem in stability terms, especially if drivers are in too much of a hurry.

Lift trucks should never negotiate a turn at speed, for example, or with a raised load, since centrifugal and gravitational forces can combine with disastrous results – right up to full truck tip-over. It’s also vital that lift trucks are properly loaded in the first place with the forks fully inserted into the unit load to avoid ‘undercutting’ - a practice which can make load spill much more likely.

“It’s vital that lift trucks are properly loaded in the first place with the forks fully inserted into the unit load to avoid ‘undercutting’.”

Users should remember, also, that the braking characteristics of many trucks change with time, as the brakes themselves wear out. Some lift trucks, however, including the latest electric counterbalance machines, have non-wearing, oil-immersed brakes that ensure braking performance remains consistent. Such brakes are also usually fail-safe, adding to the safety net still further.

Stopping distances, too, are a vital issue – indeed a new brake performance standard (ISO 6292) that is currently under revision and expected to be published in the next few months now measures braking performance in terms of stopping distance rather than mere braking force, as was previously the case.

The amount of load carried clearly affects the braking performance of a truck, but the requirements of ISO 6292 must be met in all conditions, both laden and unladen.

The new standard also incorporates

a so-called ‘heat fade’ test. This is designed to measure the capability of the brakes to withstand continuous use and measures the stopping distance after five continuous bursts of acceleration and braking. The requirement is that the stopping distance after the five applications should not be increased by more than 25%.

“Making sure you choose the right unit load and that the unit load is subsequently loaded and transported properly is something every user should be highly concerned about.”

In actual fact, of course, the required brake performance in such standards is set out for emergency situations and during normal driving, brake systems never work near their limit. Ideally, industrial trucks will be operated smoothly, without sudden acceleration or braking, and the brakes should never overheat. In many cases – with electric trucks, in particular – the service brake system is rarely even used, as simply releasing the accelerator pedal is normally enough to stop the truck at a reasonable rate.

Key considerations

Users don’t need to worry too much about such technical aspects of their lift trucks – the

truck manufacturer has, after all, designed the truck with both its load and its working environment in mind, as well as any current legislative requirements.

But making sure you choose the right unit load and that the unit load is subsequently loaded and transported properly is something every user should be highly concerned about – someone’s life could depend on it.

For more on the use of lift truck attachments, see page 8. For more help and guidance on the selection and use of appropriate unit loads, talk to your local Cat lift truck dealer. ■

4. It’s vital that lift trucks are properly loaded in the first place with the forks fully inserted into the unit load to avoid ‘undercutting’.

5. Lift trucks should never negotiate a turn at speed, for example, or with a raised load, since centrifugal and gravitational forces can combine with disastrous result.

(Image courtesy of Allan Sloan, Alberta Forklift Safety Council, Canada).



5

Events calendar

Date, Event, Location, Website	Overview
2-4 December Intermodal 2008 Hamburg, Germany www.intermodal-events.com	Claimed to be the world’s leading container event, Intermodal combines a large trade exhibition with a high-level conference on all matters intermodal.
2-5 December Siberian Logistics Novosibirsk, Russia www.sibfair.ru	International fair highlighting a wide range of logistics and distribution solutions.
9-10 December RFID Paris, France www.rfid-show.com	Radio frequency identification exhibition featuring over 70 exhibitors and covering all areas of RFID technology, from services to systems integration and from hardware to software.
12-15 January Promat Chicago, USA www.promatshow.com	Massive international exhibition of handling, storage and warehousing technologies. Preceded on 26 May by special CeMAT conference, Future of Logistics.
2-4 February Logicon Europe Brussels, Belgium www.wbresearch.com/logicon europe	Fast-moving consumer goods (FMCG) and retail supply chain conference, to include papers on driving forecasting accuracy, reducing total costs in the supply chain, planning supply chain strategy and benchmarking transport operations, including third party logistics services.
16 February Food & Beverage Logistics Forum Rimini, Italy www.fblogistics.com	Specialist event looking at latest supply chain trends and issues in the food and beverage sector.