

The warehouse revolution

Articulated trucks explained

Second edition

Simon Brown

One of the world's leading experts on articulated truck design and application

Simple,
effective ways to
**SAVE SPACE,
TIME &
MONEY**



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The logo for Bendi is written in a stylized, cursive font. The letters are filled with a gradient of orange and red, and have a white outline. The 'B' is particularly large and prominent.

Introduction

Why bend a truck?

Why Bend a truck? What's the reason for the articulation? To understand this question one needs to be clear on the alternatives:

The humble four wheel counterbalance is the most widely used type of pallet stacking device the world over, because its original design proved practical, versatile and cost effective. The truck does, however, require a lot of space relative to the size of load to stack and 3-4m aisles and above are not uncommon.

Three wheeler counterbalance trucks were designed to reduce the stacking aisle size down to about 3m but in general these machines, whilst often being a more cost effective alternative, lift less weight and are generally less able to work on rough terrains and are more associated with internal warehousing and yard work than just outside duties.

Reach trucks have a mast or forks that 'reach' in or out from the body of the truck to further reduce aisles and can work in aisles from 2.5 – 3m wide offering a valuable saving. To enhance the aisle performance, reach trucks are designed in a compact manor and this necessitates harder tyres to overcome stability issues resulting from the high centre of gravity. It is probably fair to say that reach trucks show a reduction in productivity over engine counterbalance and even some of the more modern electric trucks. Also, the smaller, harder tyres dictate that the reach truck is only suitable for inside work or very smooth yards. Often an additional counterbalance truck is required to load vehicles from the warehouse.

VNA machines (very narrow aisle) trucks are capable of working in 1.5 – 2m aisles making the maximum use of storage space. This is the area in which designer Freddy Brown was responsible for many developments prior to designing the original Bendi articulated truck. Freddy recognised that these small aisles required compromise in other areas. The Bendi was developed to remove these compromises.

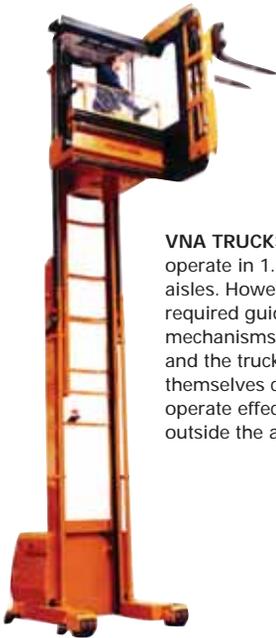
Compared with other warehouse truck types, articulated trucks present operators with fewer compromises:



COUNTERBALANCE TRUCKS are versatile, but they require a lot of working space relative to load size. 3 – 4m aisles are not uncommon



REACH TRUCKS can work in aisles from 2.5 – 3m. However, their hard tyres limit versatility and often additional counterbalance trucks are needed for outside work.



VNA TRUCKS are can operate in 1.5 – 2.0m aisles. However, the required guidance mechanisms are costly and the trucks themselves cannot operate effectively outside the aisles.



ARTICULATED TRUCKS offer the best of all worlds, operating in aisles down to 1.6m and capable of loading lorries in rough-surfaced exterior yards.

Freddy Brown explains: "Due to the close tolerances within the VNA aisle a number of criteria have to be met. Expensive floors are required to be laid within very fine tolerances to ensure the flatness required by VNA machines. Rail or wire guidance is used to enable the truck to be millimetre perfect whilst travelling up and down the aisle – and this guidance adds cost. Ironically, large spaces measuring 5 -7m at the end of each aisle have to be kept clear to allow the VNA trucks to transfer from one aisle to the next. Additionally the truck behaves like a duck out of water when out of the aisle so most warehouses that use VNA have additional forklift equipment to feed the VNA and take goods away. Often P & D (pick and drop) stations are placed at the end of the aisles where the support trucks collect and deliver loads using up additional warehouse space ineffectively. Other operational problems blighted the VNA", Freddy added. "Every truck is tailor made for each warehouse, product and rack which means that the product can't vary too much and the trucks cannot easily be relocated, short term hired or replaced in the event of a breakdown. For many companies this inflexibility combined with the operational costs limits the size of the VNA market place."

Freddy set out to design a truck that would work in narrow aisles but didn't need a flat floor, would work outside to load a delivery vehicle and was easy to drive so that it did not compromise on productivity. One truck that could do everything, inside, outside and was mass produced to fit all applications. The result was the Bendi, the original and still the world's most popular articulated truck.

Today's Bendi will work in 1.6m aisles, stack loads up to 12m high and beyond. With patents on front wheel drive, rear wheel drive and 4x4 all wheel drive in gas and electric, the Bendi offers a choice of truck for any operation.

Articulated truck benefits – a summary

Articulated trucks offer:

- The flexibility and speed of a counterbalance
- The high lifting capability of a reach truck
- The aisle performance of a VNA truck

Contrary to first impressions, articulated trucks allow much higher productivity, with better use of space

Operating articulated trucks in your warehouse means:

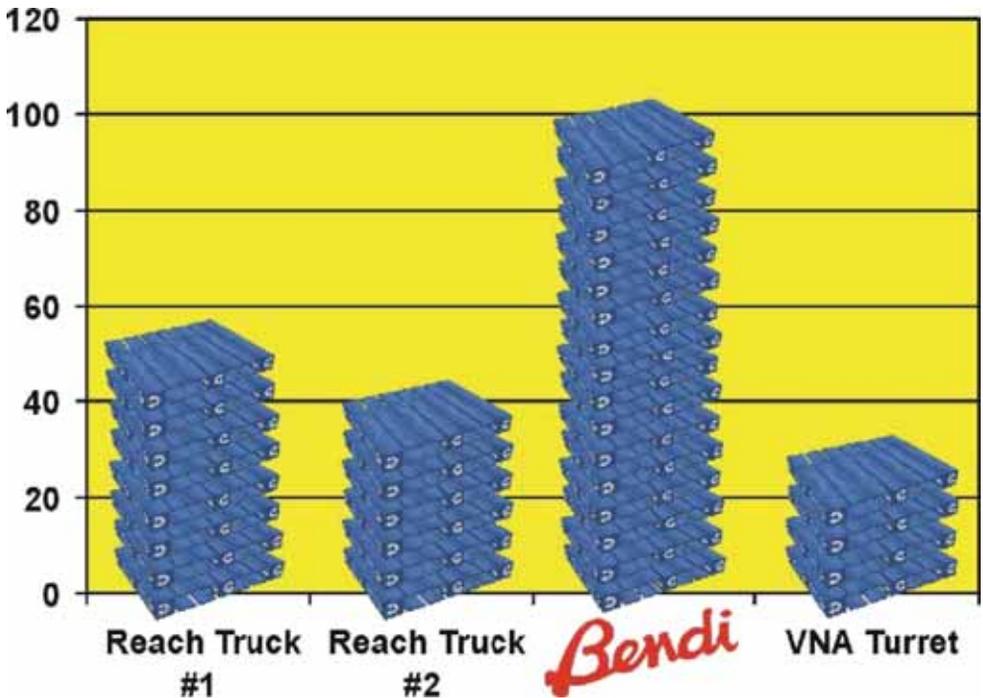
More speed

- More can be done in a given time, or...
- Less time is needed for a given task

More efficiency

- More can be stored in a given space, or...
- Less space is needed for the same storage capacity

Relative productivity of different truck types



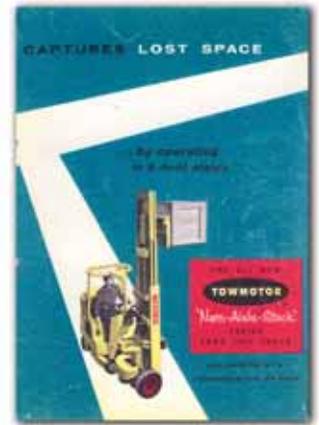
The graph shows the number of pallets moved during the same period by the different truck types, operating in a controlled warehouse environment at the Dynamic Warehouse. This data was supplied independently.

How it all started

A brief history of articulated trucks

The articulated truck is not a new concept and in fact has been around for several decades, albeit not in the form that the current market place enjoys. During the 1940's US Company Baker produced a machine that articulated to 45 degrees with the aim of reducing the stacking aisle width. Pallets were stacked in a chevron style to assist in speed and to achieve these smaller aisles.

In the early 1950's Towmotor (later Caterpillar) developed a machine to rotate the load a full 90 degrees much in the same way as modern articulated trucks. However, the truck retained all other counterbalance design characteristics so it required two rotating hydraulic support legs that were activated when stacking on either side of the truck. The "Narrow Aisle Stack" was a relatively successful machine as it facilitated 6' aisles. Linde and Still were amongst others that had filed patents on articulated machines but these did not impact the marketplace in the way that modern articulated trucks have done.



Towmotor sales brochure from the 1950s

Freddy Brown of Translift (now Translift Bendi) was inspired by the humble hand pallet truck back in 1982 and approached the problem from a different angle. Having previously pioneered the Man Rising Very Narrow Aisle (VNA) Turret truck in the 1960's and then the Narrow Aisle Rotareach in 1977, Freddy applied his knowledge to the new articulated concept. He found that by reversing the triangle of stability and changing the weight distribution (a principle that was almost unused in forklifts) he would solve the issue that had long eluded his pioneering forbears. This made the articulated truck a truly versatile replacement for conventional counterbalance and reach trucks. Then, with later developments, it would equal and eventually supersede the capabilities of traditional VNA machines.

The first Bendi

The Mark I Bendi, unveiled in prototype form at the IHSE show in March 1986, generated significant interest with the potential to reduce aisle widths by 1m. Intensive development work during 1986 saw the prototype refined to provide the final specification for the first production Mark I Bendi, which left Translift's Redditch plant in 1987. Conceived as a compromise between a reach truck and an inflexible narrow aisle stacker, the Mark I Bendi had the appearance of a reach truck body, with a stacker truck on its front end. The straddle arms projected some 250mm in front of the mast and the fork was mounted on a pantograph mechanism to provide adequate reach beyond the straddles to handle any load size.

The Bendi evolves

Huge space saving advantages, coupled with a price comparable with contemporary reach trucks, saw the Bendi achieve considerable sales success in its first few years. During this period, increasing acceptance and understanding of the concept of a single articulated truck performing two or even three distinct roles, also added to the popularity of the Bendi.

However, designer Freddy Brown saw opportunities for further enhancements to the design which would improve ease of operation and stability.

On the prototype, the mast was supported by a single drive wheel, plus two small rollers or castors. To turn the mast, the driver operated a hydraulic lever - a feature inevitably destined for change, since mast movement and steering had to be simultaneous while the truck was on the move.

The major difficulty was ensuring that, during loading and extraction, and with the truck and load at ninety degrees to each other, the pallet must follow a path parallel to the sides of the pallet location. On the Mark I, the pantograph mounted forks provided a solution, but were expensive to produce and detracted from the initial aim of simplicity. A more elegant solution followed the realisation that, during extraction, the necessary parallelism could be achieved by simply pointing the forks at the slots in the pallet and engaging the pallet while winding the steering round

appropriately as the truck was driven forwards. The resulting Mark II Bendi variants were much easier to operate, without the requirement for the driver to steer and reach the forks as separate operations.

During this period, designer Freddy Brown also addressed stability, which had been less than desired with the early Bendis. A mathematical model of the truck was created and computer testing was carried out on it, to optimise the centre of gravity. Aisle behaviour was tested via a series of closely monitored and exhaustive trial and error experiments.

The Mark II Bendis benefited from this research, with greater stability and generally enhanced handling. Larger 18" wheels at the rear and 14" wheels at the front also contributed to improved rough terrain performance.

In 1990, Translift Engineering applied for a patent covering its rear wheel drive configuration. In 1991, the Bendi received first place in the Toshiba 'Year of Invention' competition - the first of many prestigious design awards for the Bendi. 1991 was also the year in which Translift Engineering was granted a patent, protecting the unique design concept of the Bendi.

Bendi - the modern era

Throughout the nineties, the Bendi design was subject to further upgrades and enhancements, to improve performance and meet changing demands and legislation. Over the next decade virtually all the major components of the truck were to be updated and additional variants were added to the range.

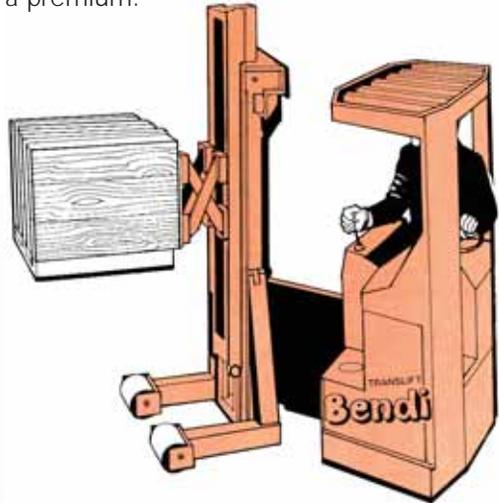
In 1995 the company introduced the first Gas powered Bendis to complement its growing range of electric trucks.

Today's Bendis are a technological tour de force, with advanced features and a new chassis design allowing operation in aisles down to 1.6m - the narrowest aisle width achievable by any articulated truck.

It's over a quarter of a century since Freddy Brown first realised the combination of geometry, dynamics and weight distribution that provide the Bendi's unique stability and traction characteristics. Today, the efficiency and versatility of the Bendi is even more appropriate to storage requirements for all kinds of companies, as warehouse space is increasingly at a premium.



Freddy Brown, inventor of the Bendi, with an early working model from which he developed the first Bendi prototype.



The Mark I Bendi had the appearance of a reach truck, with a stacker truck on its front end.



Cutaway view of the 1993 Bendi Mark II, showing the revised approach to mast rotation

Principles of operation

Stability, traction & aisle performance

Why are articulated trucks more stable than counterbalance trucks?

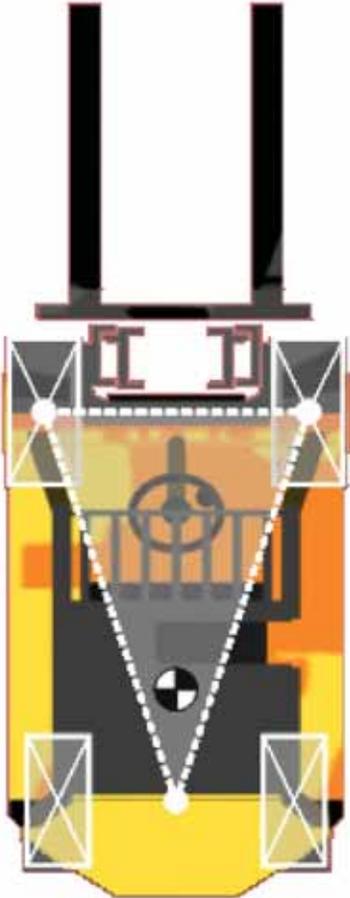
Modern articulated trucks like the Bendi have been developed to provide exceptional stability – far greater than that of conventional counterbalance trucks. With articulated trucks the same basic laws apply, but the dynamics of weight distribution are very different.

With counterbalance machines (and most other forklift truck types) the truck has two front wheels that are fixed to the chassis without suspension or movement. At the back there is either an axle to provide suspension or a centrally mounted wheel. Either way, this forms a triangle utilising the bar stool theory, that only three points can be in contact with the ground at any time. This triangle is known as the 'triangle of stability' (See diagram opposite). The forks are at the front and they are used to pick up the load. At the back of the truck is a weight, a lump of steel, known as the counterweight. This counters the effect of the load and balances the truck, hence the term 'Counterbalance'.

Like all vehicles, this truck has a centre of gravity: a point where if it were possible to place the whole truck onto a single point, it would theoretically balance. If this point was to move outside the triangle, the truck would become unstable. For example, attempting to lift 10 tonnes with a 2 tonne capacity machine would bring the centre of gravity so far forward that the truck would fall forwards. With this type of truck, the centre of gravity is very close to edge of the machine under normal conditions, so very little is required to move the weight outside the triangle. In fact, turning a corner with the mast elevated is enough to bring it over.

With Bendi articulated trucks the front axle not only steers but articulates to give suspension. This has the effect of reversing the triangle of stability. With the counterbalance at the rear of the truck, the centre of gravity is in a very safe place at the broadest point of the triangle, just ahead of the rear axle, providing an excellent platform for stability (See diagram, opposite).

Four wheel counterbalance truck

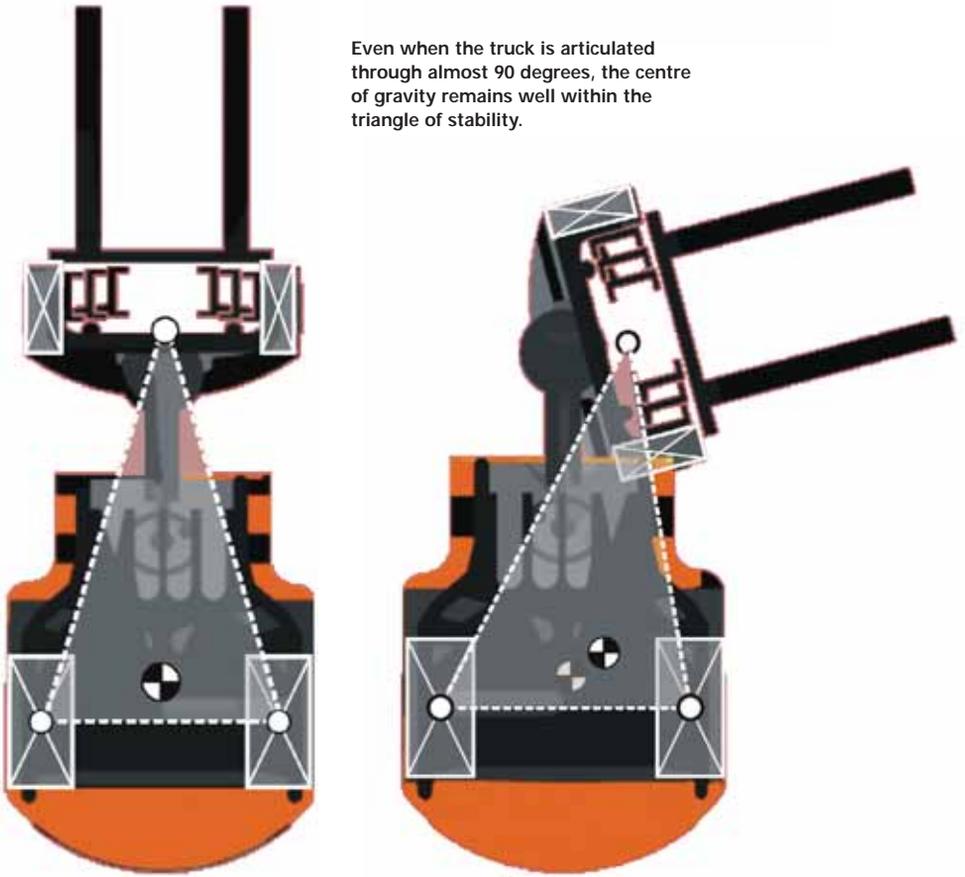


On a typical 4 wheel counterbalance truck, the centre of gravity is ahead of the rear axle at the narrowest point of the triangle of stability.

Four wheel articulated truck



On a Bendi articulated truck, the triangle of stability is reversed, with the centre of gravity at the broadest point of the triangle.



Even when the truck is articulated through almost 90 degrees, the centre of gravity remains well within the triangle of stability.

In the straight ahead position, the Bendi is immensely stable. In this position, the heavy counterweight and battery plus the length of the truck provide excellent stability. As the forks are rotated, the triangle of stability changes shape and the centre of gravity moves closer to the edge of the triangle. With the forks at almost 90 degrees, the truck is in its tilt test position. This is where the centre of gravity gets closest to the edge of the triangle of stability. It is in this position that the Bendi truck has been extended to full height and tested for lifting capacity.

This design allows Bendis to lift to over 12m and retain a degree of stability that's impossible with counterbalance machines.



Safe, stable operation at maximum height: Bendis lift to over 12m.

Choosing the right drive configuration for your application

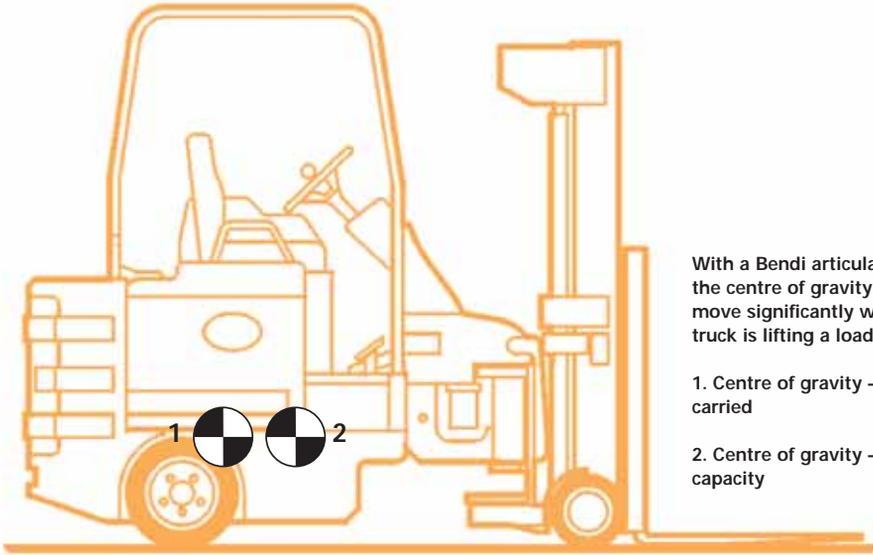
Over the last few years, the articulated truck concept has been developed in different ways to suit a variety of requirements. Today, you can choose between three and four wheel articulated trucks, with front drive, rear drive or four wheel drive configurations. So which is best for your application?

Four wheel articulated trucks – for optimum versatility & performance

To understand the operating principles of a four wheel articulated truck, it's useful to make a comparison with counterbalance machines.

With counterbalance machines, the counterweight is normally about 1500mm to 1800mm long, from the centre of the load wheel and often weights no more than 1 tonne to 1.5 tonnes, bringing the total rear end mass to about 2500k. If a 2000kg load is lifted, the truck remains stable but the centre of gravity moves forward to the front axle. If the truck is loaded to more than its capacity, the rear wheels can come off the ground. With loads approaching the truck's capacity, almost all of the weight of the truck and load (a total close to 6 tonnes) could be on the front wheels. This is why they are bigger than the back wheels. On the basis that greatest traction is achieved by driving the wheels carrying the greatest load – front wheel drive is the obvious choice for this type of truck.

With Bendi articulated trucks, there is approximately twice the weight at the back and the truck itself is approximately 1 metre longer than an equivalent counterbalance truck. But with both trucks designed to lift 2000kg, in the case of the Bendi, the effect of moving the centre of gravity when lifting the load, is dramatically reduced (See diagram opposite). This is because the weight over the back wheels still remains much greater than the front wheels when carrying a load. For this reason, rear wheel drive is superior to front wheel drive for articulated trucks, as maximum traction is gained. Rear wheel drive also provides the Bendi with two other important advantages: excellent manoeuvrability; and compact design of the front of the truck, the key to operating in very narrow aisles. For external applications, where there may be uneven ground, loose surfaces or gradients, four wheel drive is the recommended option.



With a Bendi articulated truck, the centre of gravity does not move significantly when the truck is lifting a load

1. Centre of gravity - no load carried

2. Centre of gravity - loaded to capacity

Four wheel trucks: why comparisons with cars are irrelevant

Front wheel drive cars are often cited in support of the front wheel drive principle. "Why do so many manufacturers design front wheel drive cars, if rear wheel drive is better?" This however, is missing the point: *the greatest traction is achieved when the driven wheels carry the most load*. This is why, for example, a Mini, with front wheel drive and with the engine (the heaviest component) at the front, has excellent traction and is therefore easy to drive in snow. In the case of a high performance or racing car, the rear wheel drive / front engine layout can have high speed handling advantages, but always at the expense of traction. In a fork truck, traction and stability are the key issues, therefore driving the wheels carrying the significant part of the load, is crucial.



Three wheel articulated trucks – big benefits on a smaller budget

Three wheel articulated trucks bring Bendi benefits to a wider audience with a simpler drivetrain – whilst maintaining excellent stability in excess of counterbalance trucks.

To understand the reason why three wheel trucks are so stable in operation, consider the triangle of stability. With a four wheel truck, the front axle not only steers but articulates to give suspension. This results in a triangle of stability with points at each of the rear wheels and in the centre of the front axle. With three wheel trucks, the triangle of stability is exactly the same, as there is no requirement for front suspension to compensate for uneven flooring.

The significant difference between three and four wheel trucks lies in the way that traction is obtained. The single front wheel carries double the load that would be carried if the truck had four wheels. Therefore, front wheel drive becomes a viable and cost effective means of delivering effective traction.

Comparing a three wheel articulated truck with a three wheel car?

The joke's on you!

Car analogies are often misguidedly used to justify one truck configuration or another. Three wheelers are a case in point. With forward biased weight distribution, the old Reliant Robin three wheelers were prone to tipping over when braking into corners. With a three wheel articulated truck, the weight distribution is rear biased, giving the opposite effect in terms of stability.



Four wheel articulated truck



On a four wheel articulated truck, the rear biased weight distribution makes rear wheel drive the most suitable option

Three wheel articulated truck



On a three wheel articulated truck, the triangle of stability is the same as its four wheel cousin. However, greater traction is gained with front biased weight distribution and front wheel drive.

Warehouse considerations

Storage density, flooring and more...

More storage capacity in less space

Rising property values as well as heating, lighting and maintenance all play their part in the increasing costs of operating a warehouse. Over the years various advances in technology have allowed higher storage densities to be achieved, whilst allowing fast, efficient order picking.

The articulated truck represents the latest and most significant advance in this respect, allowing much higher storage densities than even highly specialised and costly wire- or rail-guided VNA trucks.

As a rule, warehouses designed for counterbalance trucks in conjunction with A.P.R. (adjustable pallet racking) are the least space efficient, with aisle widths of 3m to 4m in common use. However, the aisle width is only part of the equation – turning and loading/unloading space at the ends of the aisles also accounts for 'lost' space. This also applies in warehouses where other types of trucks are operated, although the lost space is much less when using articulated trucks.

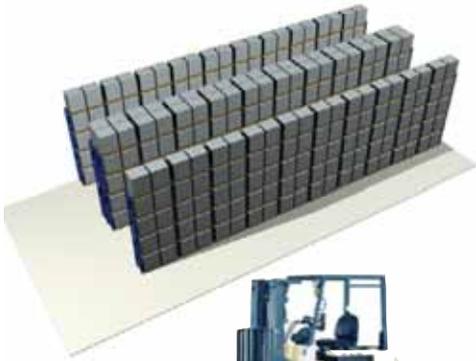
A more versatile vehicle means a less compromised warehouse

'Lost' storage space at the end of aisles can be greatly reduced when operating articulated trucks. This is not only because the trucks are more manoeuvrable, but also because there's no requirement for other types of vehicle within the warehouse, to load and unload the warehouse trucks. Bendi articulated trucks can stack and de-stack pallets and load or unload them to or from lorries in your yard, saving space, time and further investment in other vehicle types.

Aisle widths for articulated trucks – the facts

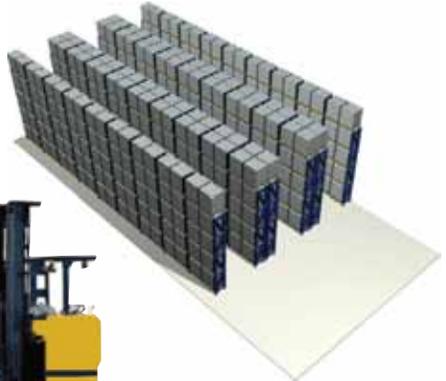
Much has been said and written about safe working aisle widths for articulated

Relative storage densities in the same warehouse space



USING 4 WHEEL COUNTERBALANCE TRUCKS
One double; two singles.

Total 400 pallet locations.



USING REACH TRUCKS
Two doubles; two singles.

Total 540 pallet locations.



USING VNA TRUCKS
Three doubles; two singles.

Total 720 pallet locations.



USING BENDI ARTICULATED TRUCKS
Three doubles; two singles.

Total 880 pallet locations.

trucks. The fact is that different truck designs require different aisle width calculations. Despite some manufacturers' claims, it is naive to assume that the formula can be based purely on the diagonal dimension of the pallet. Many aspects of truck design have a bearing on minimum aisle width. Current Translift Bendi articulated Trucks represent the most efficient design in this respect, with a minimum recommended aisle width of 1600mm. This is achieved through careful application of the principles outlined earlier in this chapter.

Understanding the product and industry Guidance Notes brings important benefits to operators and results in efficient, cost effective and safe storage solutions. BITA puts the interests of industrial truck users and their safety first and foremost and their guidelines should always be observed for safe working practice.

GN9 and Industry Standards can be obtained from BITA, go to www.bita.org.uk For additional guidance regarding warehouse layout and aisle widths, consult the truck manufacturer.

No specialist floor requirements

The outstanding stability of Bendi articulated trucks allows their use in warehouses with standard floor finishes and flatness required for use with counterbalance trucks – even where racking up to 12m plus is used. This eliminates the requirement for costly specialist flooring or grinding of existing floors. There is also no requirement for guidance rails or wires as is usually the case with other space saving systems.

Additionally, Bendi articulated trucks are able to operate in external yards – even where the ground is uneven.





Bendi articulated trucks are equally at home working in narrow aisles in the warehouse, or outside in rough surfaced yards



Driving & driver training

Safe, easy, productive

The way that Bendi articulated trucks work often seems a bit of a mystery to those that are new to the concept. However, often despite initial apprehension, operators driving articulated trucks for the first time remark that they are markedly easier to drive than conventional trucks. The success of the Bendi is in part due to the continued, enthusiastic support of drivers.

Once the principles of driving are understood and a little practice undertaken, driving an articulated truck is like riding a bicycle. Steering input, control of lifting and power application all become automatic or intuitive, allowing the operator to concentrate, to carry out tasks quickly and safely.

Most of the basic driving rules and guidance that apply to counterbalance trucks, can also be applied to articulated trucks. However, articulated trucks hold a number of key advantages best explained by a qualified driver training instructor.

Standard operating safety routines and regulations should always be observed and trucks should never be operated without authorisation and proper training.

The following excerpts from the Bendi Driver Training Manual are intended as a guide only and should not be considered comprehensive.

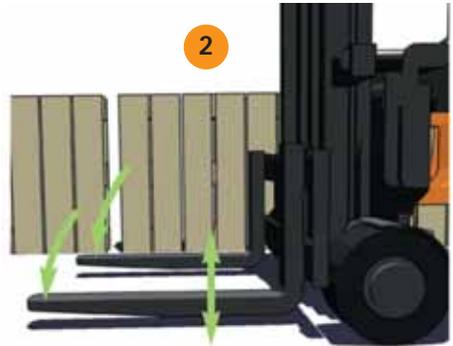
Working in narrow aisles

Bendi articulated trucks excel at handling pallets within the confines of very narrow aisles down to 1.6m. The unique design of the truck allows real flexibility of operation and gives the operator many choices when driving.



1. As you approach the pallet you want to retrieve, you should manoeuvre the machine over the opposite side of the aisle, leaving about six to eight inches between the chassis and edge of the aisle. Once the centre of the front wheels and the centre-block of the pallet to be retrieved are aligned, the operator must stop the machine.

2. With the parking brake applied, set the correct fork height and tilt. The tips of the forks should be within the height of the pallet and the fork blades should be level. Doing this will reduce the risk of catching the pallet when entering.



3. With all brakes released, turn the forks smoothly towards the pallet to be retrieved. If the pallet is above ground level, the forks can also be raised to the correct height during this step, provided no obstructions are present.

4. When at the correct level, drive the forks into the pallet. Start by driving forwards and once the forks are pointing straight into the pallet, start removing steering lock, to keep the forks straight. Unlike other forklifts, you can use the sideshift here, if fitted to adjust fork positioning.



5. Once inserted up to the heels, apply the parking brake, lift the pallet and cradle the load with a small amount of back tilt.



6. Put the truck into reverse and drive backwards to withdraw the pallet from the location. Use the steering (apply more lock) to keep the pallet straight.



7. Once full lock has been achieved, keep driving the truck back. When roughly in the position shown, stop. Then without driving, straighten the steering so the forks are pointing straight ahead.



Finally, apply the parking brake and set the load to a suitable travelling position. Move away as soon as you are ready/able to.

Working in the yard – loading and unloading

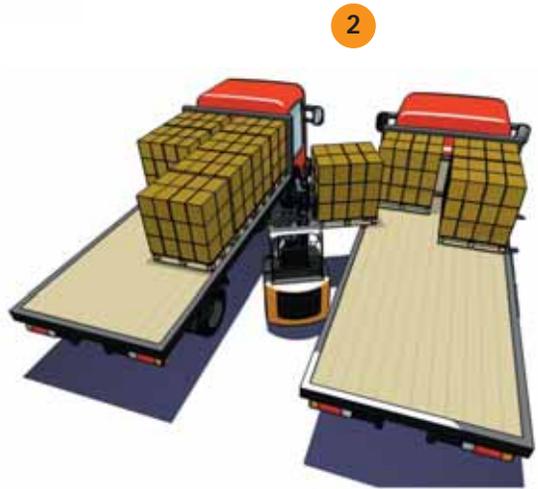
Versatile Bendi articulated trucks are as efficient at loading and unloading trucks in the yard, as they are working in narrow aisles in the warehouse. As with the previous section covering narrow aisle operation, the following excerpts from the Bendi Driver Training Manual are intended as a guide only and should not be considered comprehensive.

A Bendi can be used one of two ways when loading and unloading road vehicles such as flat beds and articulated trailers. This first way will be more familiar to seasoned counterbalance drivers. The operation should be started from the front or the headboard of the vehicle and then working back on alternate sides. Drive the Bendi any way you like, in the confines of the space available and within the guidelines given during training:



1. Try not to stack the pallet with the forks facing directly forwards. Instead, angle the truck as shown above and you'll have great visibility. When it comes to unloading, again work from the rear forward, if possible.

When space is at a premium within the yard or loading area, it makes sense to use the Bendi's capabilities to your advantage. If two lorries are parked no closer than about 2 metres apart, you can load and unload pallets from them as you would within the aisle. This saves time over shunting trailers and lorries around.



Driver training: the key to maximising productivity

Getting the most out of any fork truck comes down to one important factor: driver skill. Articulated trucks are easy to master when the correct disciplines are learned from the outset. As with learning any task, it's more difficult to 'un-learn' bad habits than to learn it 'right from the start'.

For this reason it's advisable to always carry out driver training with an organisation that's approved by the truck manufacturer.



Health & Safety

An overview for articulated truck operators

Whilst the principles of operation and driving techniques may vary, most of the same basic Health & Safety rules apply to articulated trucks as to conventional forklifts. However there are some significant variations:

GN9 – and why it doesn't apply to articulated trucks

In 1999 British Industrial Truck Association (BITA) introduced Guidance Note 9 (GN9) to increase safety for trucks which have the traditional triangle of stability. These machines needed some operational rules applied to prevent them from becoming dynamically unstable when stacking. In brief, these rules legislate for the fact that turning at height will have a much greater impact on the dynamic stability of the truck and will affect the balance of the machine.

The advice given in GN9 dictates that the truck must be able to rotate through 90 degrees within the aisle with 200mm clearance (100mm either side) and that the machine must remain stationary with the handbrake applied whilst stacking so that the stability of the truck was not affected by an additional dynamic force.

A.I.T.T. (Association of Industrial Truck Trainers) Council and Standards Committee representative and Director of BDT Jonathan Handley comments "Of course the primary aims of GN9 do not apply to articulated trucks: The triangle of stability is reversed and the trucks were designed and tested to stack whilst pivoting. To this end BITA's GN9 has a foot note on page 2 that reads "trucks steered by an articulated chassis are not included in this Guidance Note".

Designers from leading manufacturers Translift Bendi and Narrow Aisle, as well as Jonathan Handley from BDT, worked with BITA to produce common training and operation standards for articulating trucks. It is again evident when following these approved standards that GN9 simply does not apply.

Articulated trucks in action

Case studies

Alpha Colour Printers

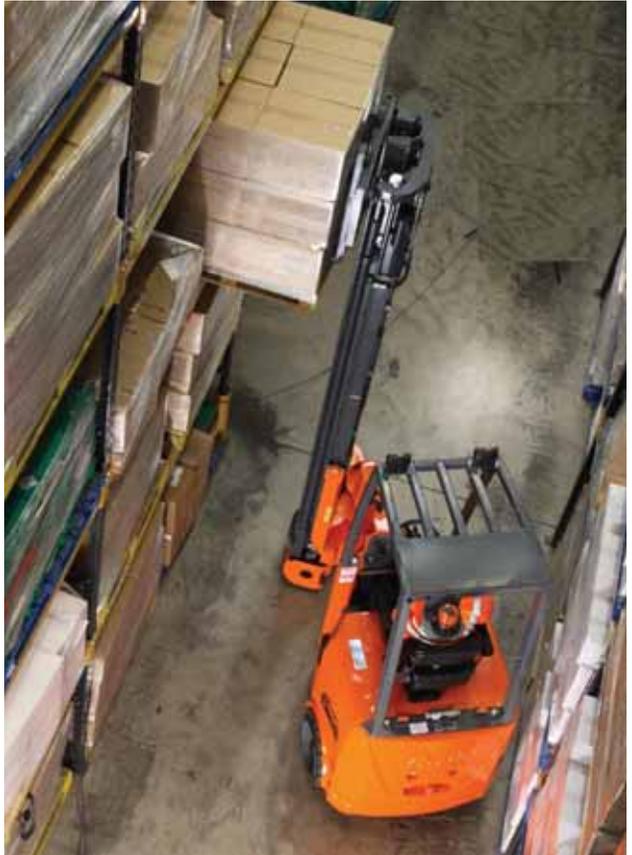
A warehouse designed around Bendi trucks

To gain best use of valuable space, Alpha Colour Printers of Gloucester built a new warehouse designed specifically around the Bendi articulated forklift.

A growing family-run business established nearly thirty years ago, much of Alpha's business today is for greeting cards and financial annual reports as well as other printed items.

Alpha was among the first buyers of the B313 Bendi, a three-wheeler, electric forklift which reverses the conventional design by placing the single steer wheel at the front to give better manoeuvrability and space saving. Alpha needed to lift 800kg loads to 7.2m in 1.9m wide aisles, although the Bendi is capable of working in 1.6m aisles.

Joint managing director, Jeff Williams, explained that



Three wheel Bendi articulated truck as used by Alpha Colour Printers

before making the Bendi investment Alpha considered all the alternatives. This included a wire-guided VNA truck, but was thought wasteful as its low usage rate would not warrant such an expensive option. It is also totally unsuited for outdoor work and so would have required a second truck, namely a counterbalance machine for yard work. A Reach truck solution would also have needed a second forklift for lorry loading in the yard. The only sensible choice was to choose a truck based on the articulated principle but then came the decision: which articulated truck? "I thought the 3-wheel Bendi was the most manoeuvrable" explained Mr Williams, "and I also liked the idea of the weight being on the front wheel."

Compared with a counterbalance forklift which Alpha had been using in 4m wide aisles, all Bendi models can expect to provide users with up to 50% more pallet positions without increasing the storage cube. The comparison with reach trucks is for a 33% gain. There can also be considerable savings from less damage "what I particularly like is that when you are putting pallets away at right angles you can see the loads better" said Mr Williams. Unlike reach trucks and counterbalance machines, the Bendi also lacks rear end swing, a cause of much rack, truck and load damage.

ERA Products

Articulated truck rental deal saves ERA Products over £20,000

By switching from two articulated and one counterbalanced forklifts to three electric Bendi forklifts, locks maker, ERA Products, expects to save at least £20,000 over the five-year contract rental period.

As Britain's number two locks supplier, ERA has been producing security products at Willenhall for over 160 years. When in 1999, it outgrew its warehouse, the company acquired additional premises two miles away at Walsall but this was not as large as the company's distribution and inventory manager, Stephen Madden, wanted. The solution, therefore, was to make best use of storage space by designing the racking around articulating forklifts.

ERA chose two B313 and one refurbished B20 Bendi. This made better sense than the previous operation which relied on two articulated trucks and one

counterbalance machine because the three Bendis are all yard compatible trucks. At very busy times, having a third pivot-steer truck working in the aisles meant taking the pressure off the remaining two, something a counterbalance truck could not do. The Bendis also allow more working space within the aisles compared with the old, replaced machines.

Era's warehouse aisle widths are 2.1 m, which leaves plenty of room for the B313s, as they can work safely in just 1.6 m, matching any dedicated VNA truck. They lift both standard and double standard pallets (2,400 x 1,000mm) up to 5 m, working a 24-hour day, five days a week. Truck reliability, therefore is crucial, so Era has a full maintenance contract, with emergency call outs usually accomplished on the same day. The Bendi's over engineered nature is also a comfort in such working environments. Era's delivery service commitments are strenuous, with loads delivered anywhere in the UK by the day after order receipt.

The combined effects of a competitive five year rental contract, with improved space utilisation, higher productivity and lower downtime are estimated to achieve a saving in excess of £20,000 over the five year rental period.

Thames News Service

Bendi forklifts solve growth problems

Three articulating Bendi forklifts from Translift Bendi were the only solution to Thames News Service's rapid growth problems, said its operations' manager, Robbie Oliver. Previously, Thames had been using a man-up, dedicated, VNA (very narrow aisle) truck but its handling speed was too slow to cope with the huge increase in business and the pending changes in warehouse control.

When coping with the problems of expansion, warehouse operators can easily pay dearly for choosing less than optimum trucks for the job. By choosing the Bendis, Thames avoided all the costs of racking adjustments and business disruption. The racking for the 20,000 sq ft Basildon site was designed specifically around the Bendi. At this and the company's other main site in Crayford, operations are changing over to paperless stock control, with the forklift drivers equipped with

handheld RDTs. This is another reason why a much faster forklift operation was needed.

Apart from delivering major benefits of maximised storage capacity and zero disruption costs, the Bendi trucks crucially allow faster handling. At first, Robbie Oliver was very sceptical of the Bendi "but I was overwhelmed by them, especially by the speed of operation," he says. "It really opened my eyes, and once the drivers got the hang of them they preferred driving them to the counterbalanced trucks."

Versatility is a key advantage of articulated trucks, with many businesses benefiting from the ability to use one truck from warehouse aisles to truck loading bays.



Lindab*A harder working solution for a distribution hub*

Lindab's national distribution operation ventilation equipment has been transformed by two Bendi articulated trucks.

Based in Northampton, Lindab's national distribution hub was purpose built for the Bendis to supply eleven branches and end users of the company's products. The facility replaced two smaller warehouses in Northampton and one in Birmingham based on wide-aisle operations using a mix of counterbalance and reach trucks.



Lindab had considered dedicated very narrow aisle (VNA) trucks before choosing Bendis, but dismissed them for their inflexibility. "We wanted to reduce the number of trucks we were operating, so the ability to multi-task was crucial. The Bendis have allowed us to achieve this by operating both inside the warehouse and out in the yard."

The two Bendis work an intensive ten hour shift, lifting loads to 8m with special masts and extra long forks. Laser height selectors improve safety and are less damage prone than cameras and TV monitors. The capital outlay required was also significantly less than the camera option.

Rated to lift 1,050kg to 8m, the trucks work in 2.1m aisles, compared to the 3m aisles previously used. This means that Lindab has achieved maximum storage density and flexibility in its 30,000 sq ft warehouse that would have been impossible with any other type of forklift. The Bendis also offer excellent manoeuvrability when handling 5m long loads through a 3m wide door.



For further information about articulated forklift trucks, please contact:

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Bendi

Anything else is a waste of space.



Simon Brown

is Managing Director of Translift Bendi, the world's leading manufacturer of articulated trucks. He has been closely involved with the development and application of articulated trucks for more than fifteen years.

The Warehouse Revolution clearly explains the principles and benefits of operating articulated trucks in the warehouse. It's been written to provide owners, operators and drivers with the information they need to make more considered decisions with regard to forklift trucks and space utilisation within the warehouse.

"Read this before you buy your next truck"

"A complex subject made simple to understand"

"The case for articulated trucks is compelling"

"A useful introduction"

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