

Forklift Truck Developments for Increased Warehouse Efficiency



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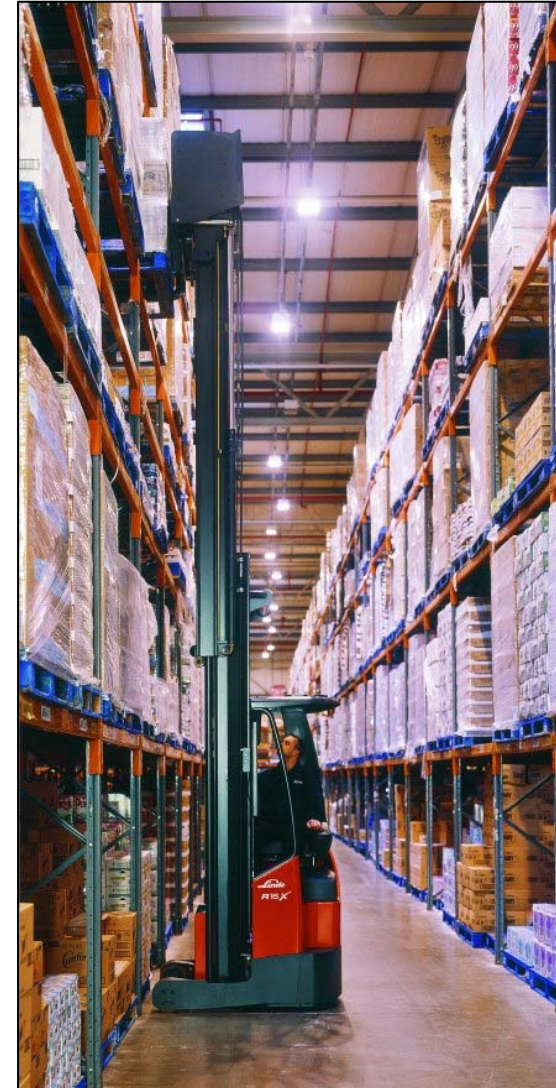
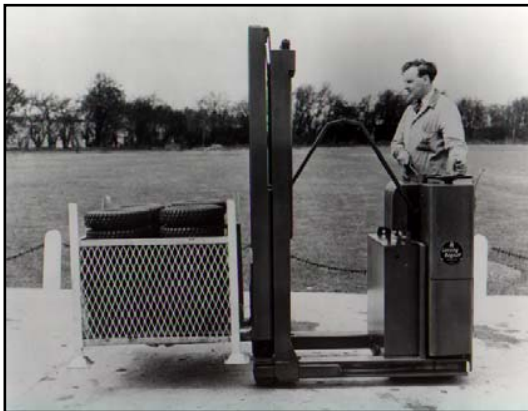
Forklift Truck Developments for Increased Warehouse Efficiencies

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Two strands in the title :

- Forklift Truck Developments
- Increased Warehouse Efficiencies



Forklift Truck Developments

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What prompts development?

- Legislation
- Cost reduction
- Technical advances
- Customer requirements
- Competitive pressure
- Desire to innovate



- First major directive EC 86/663 came into effect in January 1989
 - Overhead guards mandatory
 - Overhead guards must be tested
 - Minimum space in operator's compartment
 - Safety interlocks mandatory eg anti-crush button on pedestrian trucks
 - Maximum speed of 6 km/h for pedestrian trucks
- Then in January 1996, EC 89/392 came into effect
 - Electromagnetic compatibility
 - EURO 2 engines for counterbalance trucks
 - CE plate
- PUWER and LOLER
(Provision and Use of Work Equipment Regulations and Lifting Operations and Lifting Equipment Regulations both in 1998)
 - Operator restraint system (seat belt) for counterbalance trucks
 - MOT type test for forklift trucks



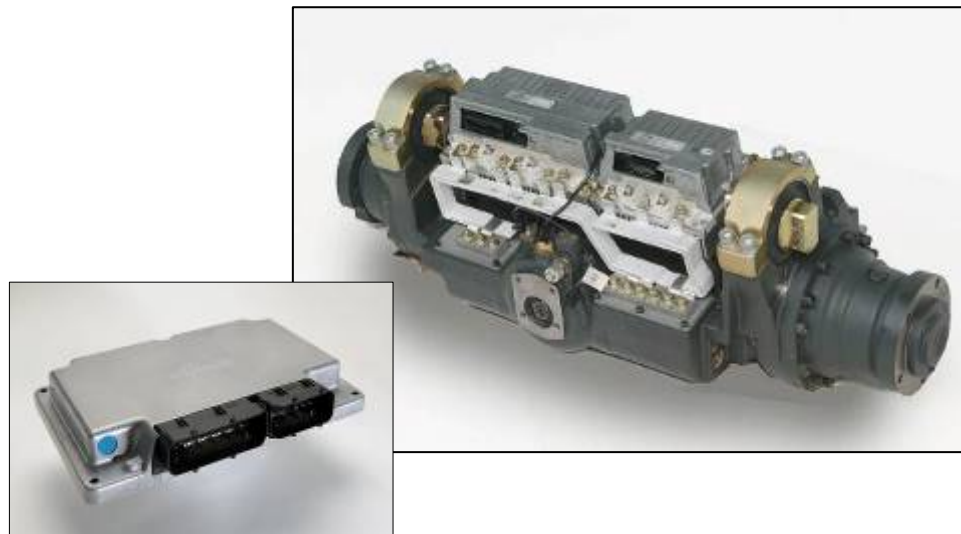
Cost reduction

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- Mainly associated with the 'reduce cost' approach to manufacturing of the 1970s and 80s
- Does not fit well with the UK market's preference for contract hire
- However as cost structures change due to new techniques used by suppliers, more things become possible at the same cost eg plastic mouldings, functionality of electronic controllers

- As new technology is developed, so new functionality can be introduced into forklift trucks
- For example, digital electronic control systems now used by all major manufacturers
 - Highly reliable
 - Full of features eg on-board diagnostics, programmable performance parameters



Customer requirements

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- Customers' desires to achieve specific objectives can drive development
 - High lift masts on reach trucks
 - Small, low cost pedestrian pallet trucks for r



Competitive pressure

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- Introduction of a new idea by one major competitor can lead to a general development across equipment of the same type
 - AC motors on warehouse trucks



Desire to innovate

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- The strongest motivator is the desire to innovate
 - Get or stay ahead of the competition
 - Provide genuine differentiation between products
 - Provide more effective and efficient products for customers



What is 'efficiency' in warehousing?



What is 'efficiency' in a warehouse?

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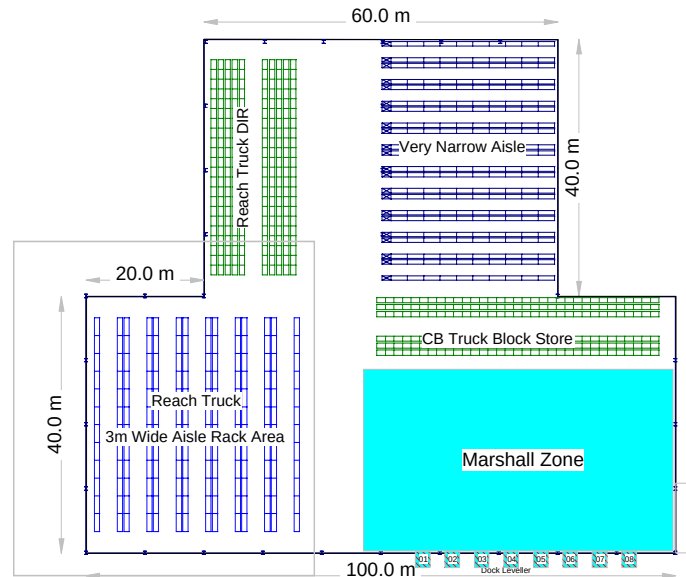
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- Better use of cube
- Reduced acquisition cost
- Reduced operating costs
- Higher throughput



Better use of cube

- Narrower operating aisles
 - Consider a different type of truck
 - Prove a new layout using the STRATOS Warehouse Planning software



Sample Stratos layout

Linde K
Range
Combi Truck



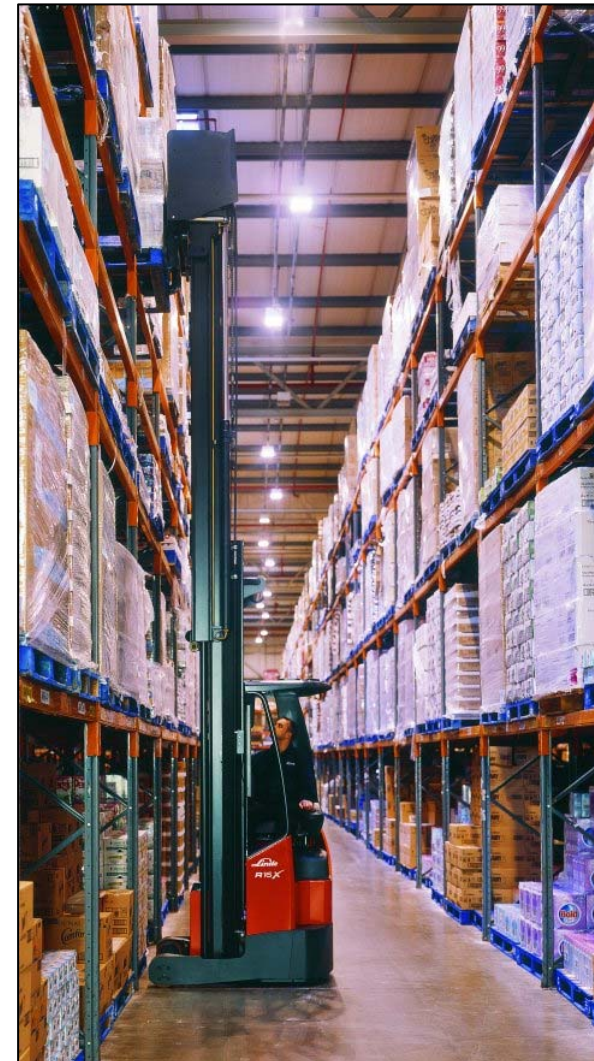
Better use of cube

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- Higher lift heights
 - Or higher capacity at height
eg Linde R17X HD offers 1250kg at 11.5m

Linde X Range
Reach Truck

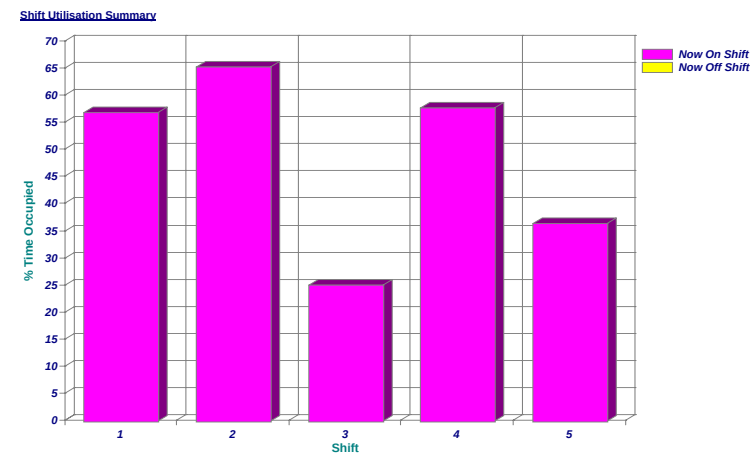
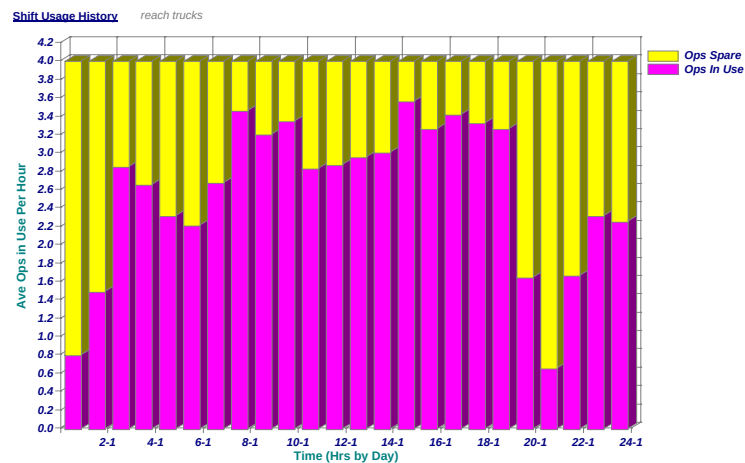


Reduced acquisition cost

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- Fewer trucks
 - Higher performance trucks
 - STRATOS Warehouse Planning and Simulation software

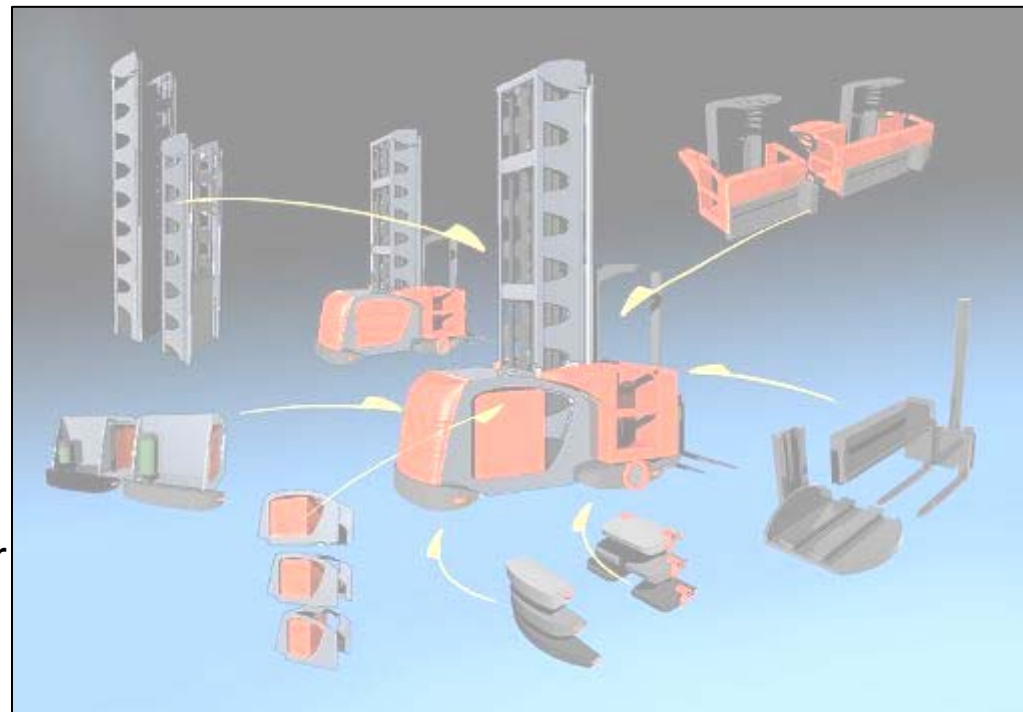


Higher throughput

- Cheaper trucks
 - Larger battery sizes can allow multiple shifts without battery changing
 - Modular construction of Linde K Range Combi Truck allows major truck components to be tailored to the application



Linde N20/N24 Low Level Order Picker
– up to 630Ah battery



Reduced operating costs

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- Less damage
 - Better design concept
 - Better visibility
 - Improved ergonomics and comfort



Linde N20/N24 Low
Level Order Picker



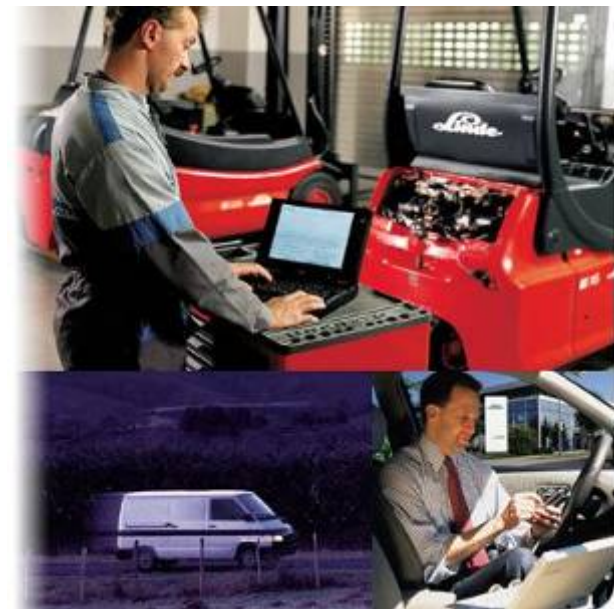
Linde X Range
Reach Truck

Reduced operating costs

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- Less downtime
 - Extended service intervals – up to 1000 operating hours
 - ‘Out of hours’ servicing
 - CAN bus architecture reduces wiring and connections
 - Improved hydraulic oil filtration
 - Sealed traction and lift motors
 - On-board diagnostic history and laptop fault finding



Reduced operating costs

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- Greater flexibility
 - Contract management and flexible finance



Higher throughput

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- More pallet moves per hour
 - Higher traction speed – 14 km/h
 - Higher lift/lower speed – 0.7/0.4 m/s
 - Only 170mm of reach movement
 - 15% increase in pallet moves



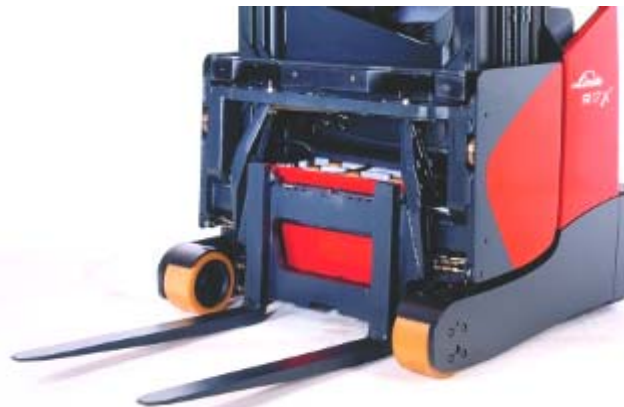
Linde X Range
Reach Truck

Higher throughput

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- More pallet moves per hour – but not only because of higher performance
 - Improved ergonomics
 - Greater comfort leading to less fatigue
 - Exceptional visibility
 - Greater stability due to low slung battery and revolutionary new mast design

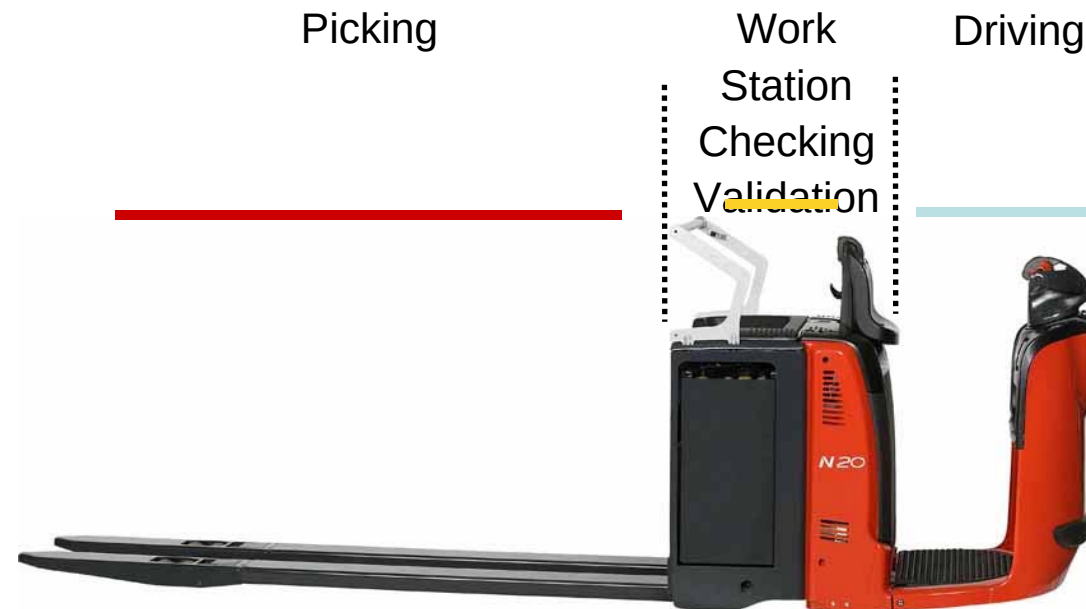


Higher throughput

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- More cases picked per man per day/shift
 - Different layout from conventional order picker



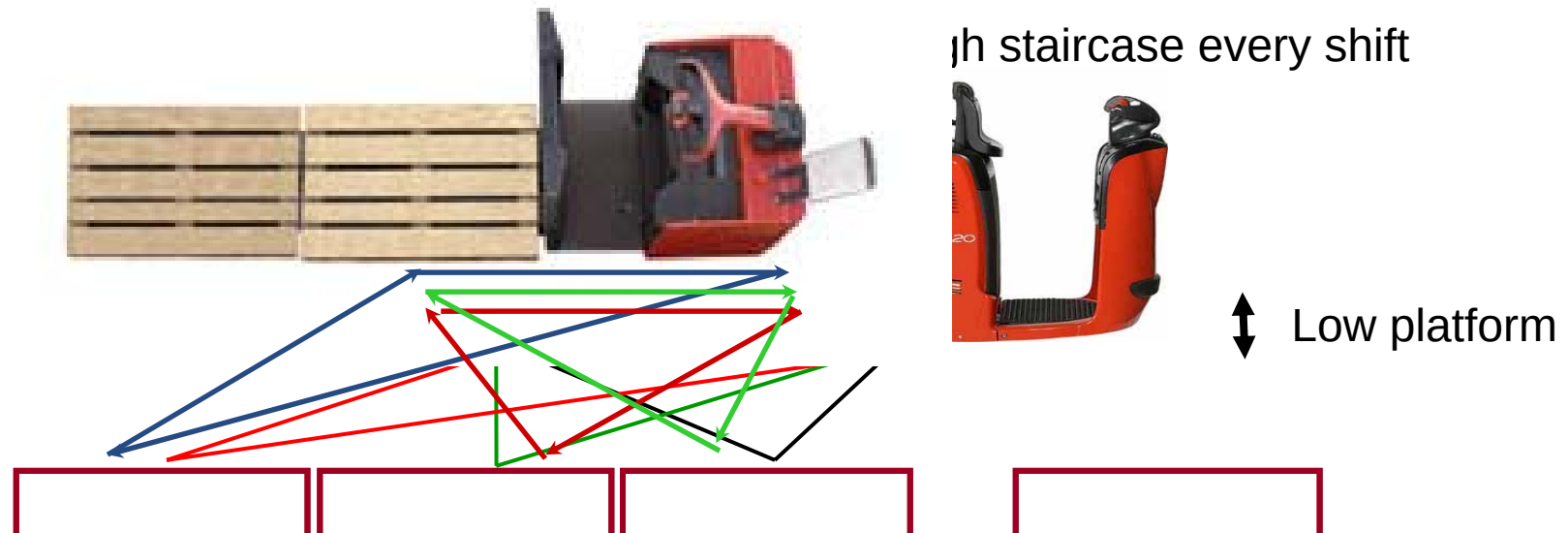
Linde N20/N24
Low Level Order Picker

Higher throughput

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- More cases picked per man per day/shift –through rethinking the problem



Conventional concept: 14 m

Linde concept: 11 m

Saving = 1 m/pick x 1500 picks/day = 1.5 km saved per day

- Increases in the efficiency of forklift trucks in warehouse applications can often be achieved
- Developments that bring the largest increases come from new concepts
- Choose a manufacturer who shows a consistent desire to innovate so that you benefit from those new ideas
- Take advantage of any tools that will analyse your existing operation
- Changes in warehouse layout and operation should not be ignored
- Look for flexibility in approach on a commercial basis – it is available

Thank you for your attention