



Mobile racking helps increase capacity by 30% for Oxford Cold Storage

Oxford Cold Storage, Australia's largest privately owned, temperature-controlled storage specialist, has recently added a new state-of-the-art freezer housing more than 23,000 pallets at its 60 acre Laverton North complex in Melbourne.

While the majority of the pallets in the 11,000 m² freezer are stored in double-deep ColbyRACK pallet racking, a key feature is Oxford's first application of mobile pallet racking, which raised storage capacity within a section of the new warehouse from 5,748 pallets with double-deep racking to 7,672 – an increase of 30%.

A multi-national team comprising Oxford's long-term logistics partner Dematic, mobile racking equipment supplier Storax from the UK and South Africa's leading mobile racking installer Barpro, worked in conjunction with building contractor Vaughan Constructions to deliver the technically-demanding project in seven months.

Mobile pallet racking system

The mobile pallet racking system comprises 25 double rows of selective ColbyRACK, split across three zones. This configuration allows up to three aisles to be open simultaneously, enabling multiple RF-directed forklifts to put-away and retrieve stock concurrently, ensuring high productivity levels.

The system is 20 pallets wide, seven pallets high and features a combination of two and three pallet-wide bays, with a specially developed single pallet-wide cantilever bay at the end of each row making efficient use of the headroom above a pedestrian walkway running through the rear of the storage system.

Mobile pallet racking design features

The design practice used for mobile racking superstructures differs from conventional static pallet racking, with some commonality to that used by Dematic when designing for light seismic conditions.

The upgraded pallet racking superstructure includes:

- Stronger ColbyRACK beams and uprights
- A special end frame to support the cantilevered bays
- Heavy-duty baseplates
- Flexible back ties, allowing the racking to sway slightly when moving.

Mobile racking system operation

An interface to Oxford's warehouse management system (WMS) automatically opens the required aisle as forklift drivers approach the system, while control panels mounted to the front of the racks can also be used to manually operate the racks.

Instead of being secured to the warehouse floor, the racks are mounted to electrically-powered mobile bases – bogies – which run on special hot-rolled cast steel rails, the sides of which are tapered to lock into the high-strength, post-tensioned superflat concrete slab.



The steel rail ends are scarf-cut at a 60 degree angle, for smooth transfer of wheel pressure and to limit impact shocks to the mobile base as it traverses the joints between rails. Each bogie contains four direct-drive low torque, high inertia motors to provide even and uniform drive.

All bogies feature structural protection devices to absorb any accidental impacts from forklifts. In addition, structural side members protect the base and power cables, and help keep the wheel units aligned correctly and moving in the same direction.

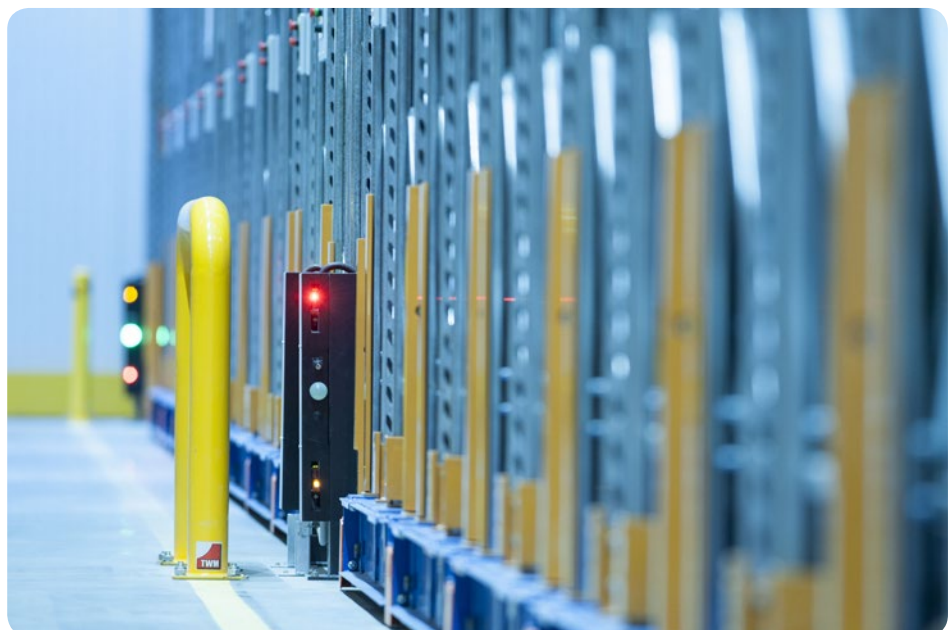
A total of eight bogies are used per zone of racking, with the weight of each when fully loaded with pallets adding up to around 276 tonnes.

The mobile racking system incorporates a night-park feature, which automatically opens up all the rows of racking to allow improved circulation of chilled air between the racks.

Mobile racking safety features

The mobile racking system is equipped with numerous light sensors, which ensure the racks can only be operated when aisles are completely clear of materials handling equipment, people and stock.

Integral safety features include trip bars which, when activated, cut the power to the motors and bring the mobile rack to a controlled halt in a short distance. Emergency stop buttons are also fitted to the front of the mobile racks, and electrical circuits are protected with circuit breakers.



Australia's largest cold storage facility

Commenting on the project, Oxford Cold Storage Director, Paul Fleiszig, said: "While we operate the largest single cold storage site in Australia, that doesn't mean we can afford to waste space. That is why we reevaluated the viability of mobile racking for the recent extension."

"In addition, when Dematic analysed the footprint for the mobile racking system, their engineers determined that moving to three pallet-wide bays would enable us to fit an extra row of pallets within the warehouse."

To accommodate the three-pallet wide bays, extra heavy-duty rack components including 150 mm deep ColbyRACK UU-beams and stronger safety clips were specified. The heavy-duty ColbyRACK UU-Beam provides increased load carrying capacity and improves frontal impact resistance by over 200%, virtually eliminating damage, improving OH&S and reducing rack maintenance costs. Operational safety is further improved with the use of Colby Protect-a-RACK components, including front and rear rack upright protection, and end-of-bay guards.



An 18 m wide refrigerated loading dock runs along the full length of the new warehouse. Vehicle unloading is through 10 fully-enclosed hydraulic dock levellers fitted with inflatable airbags. Access to the loading dock is through airlocks with self-closing outside and inside doors.

Pedestrian safety is enhanced by pedestrian walkways along all walls, and flashing warning lights on all freezer and dock doors.

Energy efficient design features

The warehouse is designed to be energy efficient, with key features including:

- The use of PIR (polyisocyanurate) sandwich panels and assisted attic ventilation
- Solid-state LED fixtures for all internal and external lighting
- Variable frequency drives on all evaporator and condenser fans and screw compressors in the freezer.



Oxford Cold Storage

Across its 60 acre site at Laverton North – the largest dedicated temperature-controlled site in Australia – Oxford Cold Storage provides racked storage for more than 165,000 pallets and bulk storage for an additional 20,000 pallets.

A key enabler in Oxford's world-class operations is its customised wireless WMS, which has been developed in-house over many years. The WMS is extremely flexible and capable of managing the most stringent cold chain requirements.

“While the mobile racking system is more expensive than static pallet racking, the additional storage capacity the system provides will enable an acceptable ROI,” explained Mr Fleiszig.

Construction of the superflat floor slab and installation of the guide rails for the mobile racking system was supervised by staff from Barpro, which has extensive experience in implementing Storax mobile racking systems in South Africa, with Dematic responsible for the system design and installation of the ColbyRACK pallet racking.

“We are very happy with the high level of co-operation between the various members of the international team responsible for implementing the system, and their ability to meet our tight construction schedule,” added Mr Fleiszig.

Mobile Racking Benefits

Aisles are a necessary evil in warehouses. They enable ready access to stock for man and machines between rows of pallet racking and other types of shelving systems. However, the problem is that many aisles lie empty most of the time. When you consider that aisles can account for a large percentage of the available floorspace in a typical DC, warehouse operators pay a very high price for space they rarely use.

Higher density storage solutions like double-deep and high-rise narrow-aisle racks can help improve floorspace utilisation and overall storage capacity by up to 70% compared to selective pallet racking, but they also require the use of more expensive materials handling equipment, such as specialised reach and turret trucks, or automated crane systems.

Mobile racking systems, however, eliminate the need for aisles between every row, with just the one aisle effectively servicing as many as 10-20 rows of racking.

When a forklift operator needs to access stock stored within a mobile racking system, they simply access the control panel at the end of the relevant row, and the mobile racks open in under 60 seconds, creating the required aisle for the forklift operator to retrieve the stock.

When the operator has completed picking within the aisle and needs to access stock located in another row, they simply travel to the end of the relevant row, press a button to open up the aisle, and the mobile racking system automatically repositions the rows of racking to create the new aisle where required. The process of opening aisles can also be automated through the user's WMS, saving further operator time, with the aisle already opening by the time the forklift driver arrives at the location.

In the majority of applications, mobile racking systems will provide around 30-50% greater storage capacity than selective and double-deep racking. Because mobile racking systems utilise the storage cube more effectively, they are particularly suited to chiller and freezer applications.

While it wouldn't make sense to place very fast-moving stock in mobile racks, for products which are accessed less frequently, users of mobile racking systems can realise significant floorspace savings, increasing their overall storage capacity within a given area, or reduce associated leasing/construction and on-going operational costs.

In addition to storing palletised unit loads such as cartons, drums and sacks, mobile racking systems can also be fitted with various types of decking to suit applications such as archive storage.



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