



## Efficient planning and reliable operation

### Introduction

Cold stores are amongst the most demanding of material handling applications. All of the normal efficiency factors apply, with the need to move and store goods accurately and safely, as well as the need to order pick in some applications, but there are important additional issues to deal with.

Firstly, the cost of maintaining the low temperature environment. In the same way it costs electricity to keep your domestic refrigerator or freezer, cold stores consume energy to maintain temperatures that can be as low as  $-35^{\circ}\text{C}$ . One of the most important considerations here is density of storage. An empty cold store is much more expensive to run than one that is full of stock. TMHE offers a range of solutions that can maximise density of storage in order to reduce cost.

Secondly the way that trucks have to be adapted for cold store use. All TMHE trucks can operate in chilled environments down to  $-10^{\circ}\text{C}$  without technical modification. But for lower temperature cold stores most trucks need technical changes to be made. The Toyota and BT ranges offer a complete choice of models that are suitable.

### Efficient planning

The sheer cost of creating pallet positions – due to the additional cost of refrigeration over and above the

building and racking costs – typically multiplies space cost by **2.5 times**.

And because filling space in the most intensive way actually reduces refrigeration cost, there is a further incentive to reduce the wasting of energy caused by refrigerating empty space. The consideration of environmental issues is an added factor.

Achieving maximum density of storage is key to cost-efficient operation, and density of storage will be determined by the type of storage system. However this has to be balanced by the type of goods stored, number of product lines and frequency of transits.



The simplest and best example is block-stacking which provides maximum density of storage. However the ability to block stack depends on a number of factors including weight, shape and strength of the loads being stored and most importantly the number of different stock lines, as accessibility is significantly restricted.

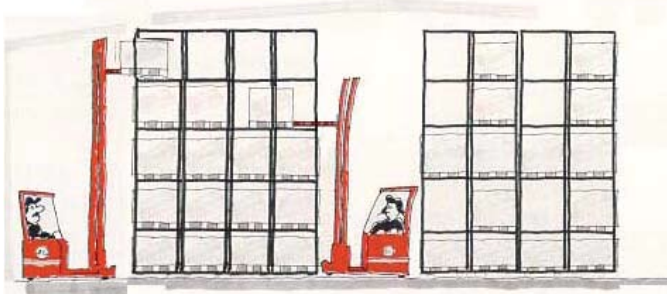
**TOYOTA**

MATERIAL HANDLING

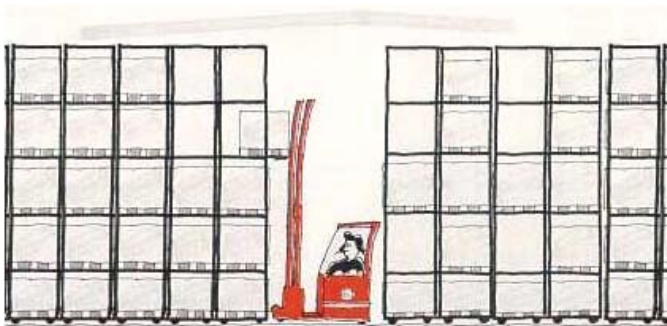
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# Facts about

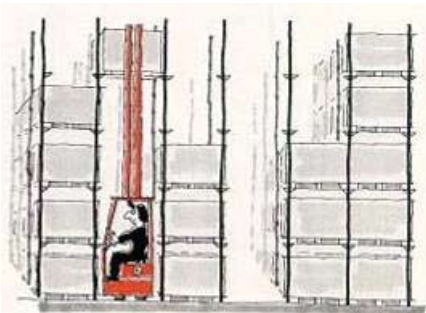
There are several types of racking system designed to provide high-density storage, all of which can improve cost efficiencies in cold stores. Here are some examples:



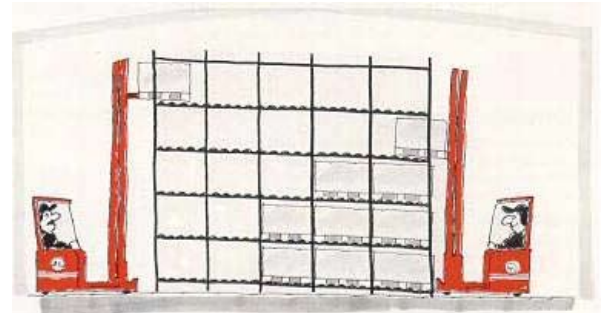
**Double-deep racking** systems allow for high-density storage, with the deeper pallet positions being reached with telescopic forks units, usually attached to a reach truck. BT offers this type of solution. Double deep racking allows relatively flexible storage for many different stock lines, but with up to 50% of loads not instantly accessible at any time.



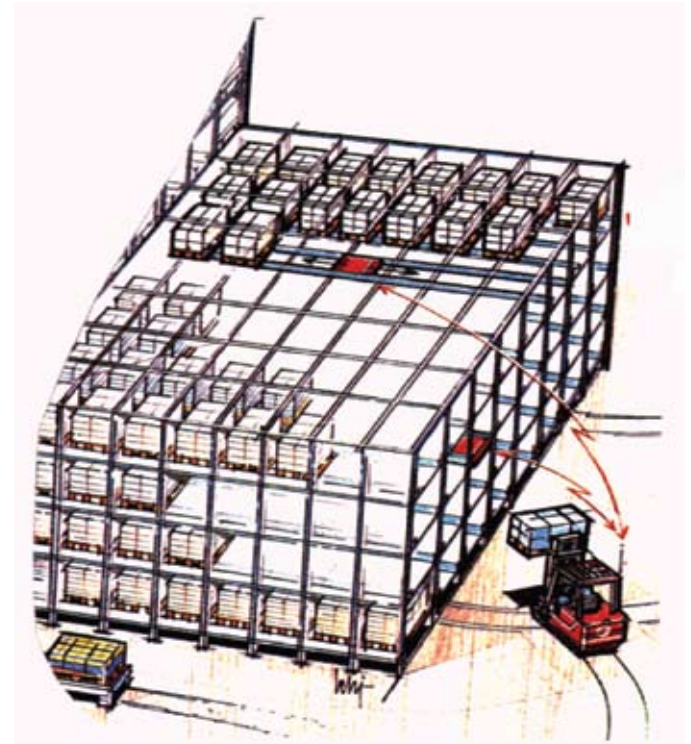
**Mobile racking** systems also provide for very high-density storage, and have the benefit of working with standard trucks, and the ability to access all pallet positions. However throughput rates are slower and cost and complexity of installation has to be taken into account.



**Drive-in racking** is another way to achieve high-density storage with a limited number of product lines. This type of system requires adapted trucks – available from Toyota and BT – but also reduces flexibility due to slower speed of operation and reduced accessibility to pallet positions.



**Flow-through racking** (often referred to as gravity flow racking) provides very high-density storage and can be accessed by standard trucks. Pallets are deposited at one face and then gravity-fed on rollers, built into the racking, through to the opposite face. However here are limitations in terms of the number of different stock lines that can be accommodated, and investment/maintenance costs are high.

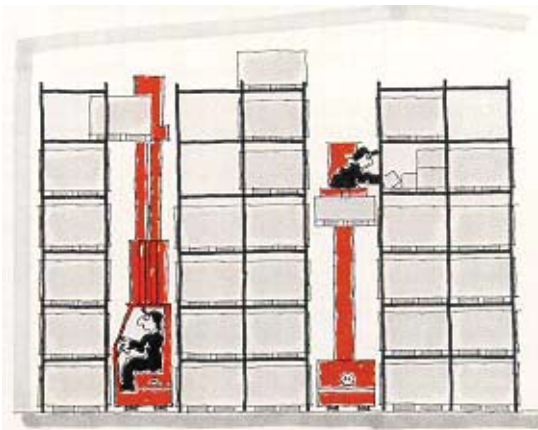


**BT Radioshuttle** is particularly suited to cold stores. It gives very high-density storage without compromising throughput. Even allowing for installation costs the end result is a low cost-per-pallet-moved thanks to its semi-automatic operation. Loads are carried inside the racking on radio-controlled shuttles that are moved between slots with conventional trucks. Several shuttles can be operated by **one driver and truck** at any time. Racking can be configured for both FiFo and FiLo. The goods are well protected and the racking can be located in conventionally 'wasted' space such as above loading bays or on mezzanines.

## Flexibility vs space efficiency

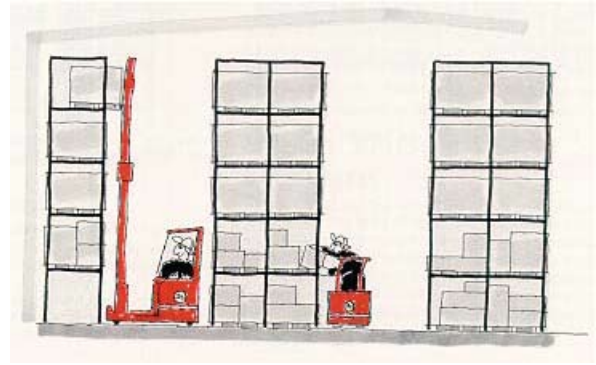
Whilst all of the specialist high-density storage systems described give clear benefits in terms of efficiency in refrigeration costs, this has to be balanced with flexibility. The very nature of cold storage is all about increasing the storage life of produce – which allows some flexibility when it comes to storage methods and demands for stock rotation. Nevertheless stock will invariably be managed broadly on FIFO (first in, first out) principles, which most high-density storage systems can constrain. Likewise if many different stock lines are to be stored, high-density systems can create operational problems.

For these reasons many users still require the flexibility of selective racking systems with all pallet positions fully accessible at all times. This leads to two further options:



## Very Narrow Aisle

storage increases use of space by around 30% compared to traditional racking, which makes it a good option for cold stores. VNA systems can provide effective full pallet cold storage and also order assembly, picking from all levels. TMHE offers a range of equipment suited to VNA pallet storage and low and high level order picking, including the advanced Vector man-up machine, which can be equipped with a heated cab.



**Conventional pallet storage** is often the preferred solution as it provides complete flexibility using conventional equipment such as reach trucks, often combined with order picking at lower levels. It does not provide the most efficient solution in terms of use of refrigerated space and associated running costs, but it allows for conventional, straightforward handling methods to be employed.

## Reliable Operation in Chilled Stores

The temperatures in chilled and cold stores demand equipment that is engineered for the job. All TMHE trucks are able to be used in chilled environments down to  $-10^{\circ}\text{C}$ , without modification.

## Reliable Operation to $-35^{\circ}\text{C}$

For frozen environments, with temperatures down to  $-35^{\circ}\text{C}$  most equipment needs to be adapted. TMHE offers a complete range of BT warehouse trucks including hand pallet trucks, support arm stackers, order picking trucks, reach and VNA trucks, as well as Toyota counterbalanced trucks, all fully engineered for cold store use.

Some trucks in the range require little modification. For example BT Levio and BT Staxio pallet trucks and stackers simply require low temperature hydraulic oil – in all other respects they are pre-engineered for cold stores with fully sealed components.

Condensation is the biggest challenge in most cold store facilities, forming on equipment when transiting between cold and ambient areas. This requires trucks to be adapted to prevent corrosion and ingress of moisture. Servicing requirements may also need to be increased to ensure reliable operation.

All cold store machines are clearly identified by the snowflake symbol. This helps drive down costs by reducing the risk of trucks being incorrectly used.

## Zone control to reduce service costs

TMHE's clear snowflake identification of cold store machines helps companies to carefully control the zones in which different trucks are used. Trucks dedicated to work only within the cold zone are not exposed to the impact of temperature change and are, therefore, less likely to require additional servicing.

If the number and type of trucks used to transit between ambient and cold areas is kept to an identified minimum this can significantly contribute to driving down service costs.

## The financial benefits of heated cabs

TMHE offers a full range of trucks with heated cabs, carefully designed to provide an effective working environment fully insulated from the cold conditions. The use of heated cabs can have a substantial effect on costs. Extra work breaks are common practice for people working in cold store environments. Typically these can represent a 10%–15% loss in productivity, the cost of which can be easily calculated. Compare this to the marginal cost of a heated cab – which over the life of a truck is likely to amount to less than 5% of the cost of a driver, and the cost reductions are clear.

## The TMHE range available for cold stores to –35°C

*Warehouse trucks:*

### hand pallet truck

- BT Stainless Lifter LHM200ST

### low-lifters

- BT Levio LWE140-250
- BT Orion LPE200, 240

### stackers

- BT Staxio SWE080L, 100-140, 200D
- BT Ixion SPE125-200

### reach trucks

- BT Reflex M RRE120M-160M
- BT Reflex RRE140-250

### order pickers

- BT Opus OSE100/W, 120/P, 120CB, 180X/XP, 250/P, OME100N/NW
- BT Opal OME100/W/M/MW
- BT OP-series OP1000SE/HSE, OPW1200SE/HSE

### VNA

- BT Veflex VRE125, VRE150, VRE125SF
- BT Vector VCE150A, VCE125ASF

### aisle-free storage

- BT Radioshuttle

*Electric counterbalanced trucks:*

- Toyota Traigo 24\*
- Toyota Traigo 48\*
- Toyota 7FBMF\*

\* –30°C minimum temperature and maximum exposure of 30 minutes, with 30 minutes at ambient temperature before returning to cold store.

*Consult your local TMHE representative for further information.*

