SCCG
THE SUPPLY CHAIN
CONSULTING GROUP

The Ultimate Guide to **Optimising Warehouse Storage Capacity**

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A Guide by The Supply Chain Consulting Group

This Guide provides readers with a comprehensive understanding of warehouse storage capacity, its importance in the supply chain, and strategies for improving it.

HERE'S WHAT YOU WILL FIND IN THIS GUIDE:

WHAT IS WAREHOUSE STORAGE CAPACITY?

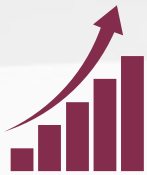
A warehouse's storage capacity is the amount of stock that can be held within the facility. This is typically defined as either the number of pallets or units/value of stock that can be accommodated.

Once a warehouse exceeds its storage capacity, it will be unable to effectively receive additional goods, impacting on its ability to fulfil orders.

WHAT DRIVES STOCKHOLDING?

Stockholding can both grow and shrink in the short term (e.g., due to seasonal fluctuations) and in the long term.

Examples of longer-term inventory changes would include:



Business Growth - As an enterprise grows, stock levels will grow to meet customer demand.

Product ranges – Customers are demanding a greater variety of items along with a faster and better service.

Procurement strategy – Changes to purchasing practice such as placing larger orders to secure lower unit pricing impacts inventory levels. If a business purchases more stock on a longer lead-time, this will raise the level of safety stock required to support the required service level.

Logistics strategy – The number of warehouses and the SKUs held in those warehouses impacts the overall level of stock held, as more safety stock is required when there are multiple storage locations.

HOW CAN YOU ENSURE THAT YOU ARE OPTIMISING YOUR STOCKHOLDING?

Optimising stockholding and warehouse capacity are two separate activities:

OPTIMISING STOCKHOLDING

Stock Optimisation

Stock optimisation is ensuring that there is a correct balance between service levels and the costs of holding stock for each item.

Optimising the level of stock that the business holds is the objective: it ensures that the inventory management and supply chain processes align with business objectives.

Space and Flow Optimisation

Ensuring that the physical warehousing equipment and space are employed optimally for storing goods.

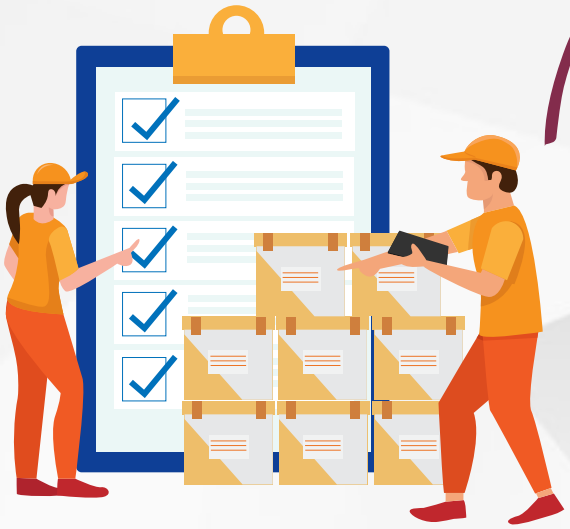
It is a delicate balance, as storage density increases, stock access can be slower (total warehousing capacity involves both stockholding and throughput).

STOCK OPTIMISATION & FORECASTING

While reducing the levels of stock in a business can drive efficiencies and reduce warehouse storage requirements, this can be challenging and is a trade-off: requirements such as minimum order quantities (MOQs), having to order full container quantities and unit cost discounts can reduce the ability of businesses to order 'just in time' while maintaining low-cost.

Running very lean on inventory for many businesses has lost its appeal after the Covid pandemic and associated supply chain issues have shown the dangers. The winners were often the companies that were sitting on stock. While decreasing stock-turn is often a good aim, accurate forecasting is also difficult and long-lead times can necessitate holding additional safety stock.

Rather than minimising stock, stockholding levels should be optimised to balance service levels, resilience and procurement strategy against the cost of holding inventory.



Weighted Average Cost of Capital (WACC)
Typically 10-12%

Warehouse Space Lease Costs

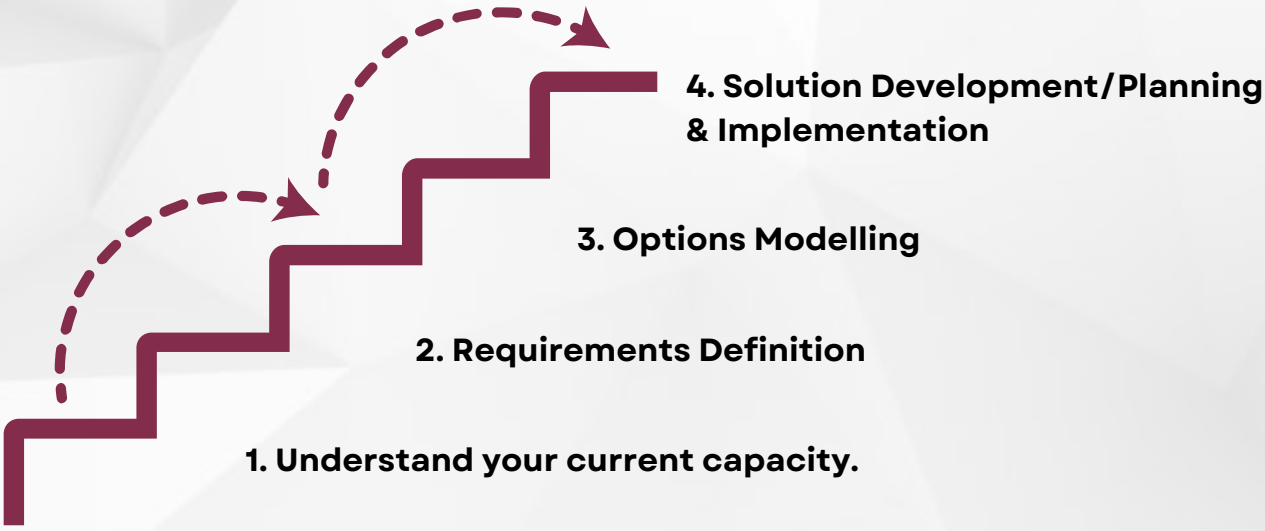
Pilferage, Scrap, Damage and Obsolescence
(Typically 3-5%per year)

Stock Routines, Labour, Insurance, Accounting and other overheads (2% per year)

The estimated cost of holding inventory is 18% - 22% p.a.

OPTIMISING STORAGE METHODS

Optimising storage has 4 key phases



UNDERSTANDING YOUR CURRENT CAPACITY AND UTILISATION

The first step in any warehouse capacity optimisation project is to ensure you understand the capacity of your existing storage media and have drawings of the existing warehouse layout, this is so that the space can be analysed.

Capacity is analysed according to the products being stored, but a typical measurement would be the percentage of locations that are occupied with stock (occupied locations/total locations).

As well as the number of occupied locations, **capacity within the locations** should be understood. If location heights are incorrect within the racking, or if multi-depth storage is employed, but is not a good match for the batch sizes to be stored, then utilisation will be poor. This is the case even if the number of occupied locations is high.

Even if the **warehouse appears to be full of storage equipment**, it may be that real capacity can be increased by employing equipment that is better suited to the profile of goods to be stored.

UNDERSTANDING YOUR CURRENT CAPACITY AND UTILISATION

Thoroughly **understanding the flow and utilisation of the current layout**, including rack configuration and the slotting/pick philosophy may also mean that immediate improvements are possible.

Operating at, or near 100% storage capacity is not always an effective option – as storage nears capacity this can lead to increased inefficiencies in processes later down the chain.

For example, **stock may not be able to be located** near to its picking location during put away, which can impact replenishment speeds.

REQUIREMENTS DEFINITION

After existing storage media is understood, the next step is to understand the **storage requirement** both now and into the future. This involves building a future 'material flow' for your operation. This includes projecting growth to ascertain the planning base and including seasonal peak trends, as well as a thorough volume analysis of inbound and outbound product flow.

The material flow and storage calculations must be built for each individual storage capacity/media. For example, if the business stores a combination of barrels, long lengths and pallets, these would need to be forecast separately to ensure the correct mix of storage media into the future.

As well as the material flow – other **stock requirements need to be considered**, such as if there are specific segregation rules that inventory must follow, e.g., in chemical/food stores it is good practice not to store liquids above powders – this may impact your layout design.

OPTIONS MODELLING

Develop a range of options based on space utilisation, physical constraints, and financial resources. Include both available capital and operating expenditure (CAPEX and OPEX). Investigate alternative storage media and automated picking solutions within your budget.

The basic considerations for determining the most appropriate storage and handling system are likely to include:

Effective use of space

Building height, building footprint and pallet location utilisation factors.

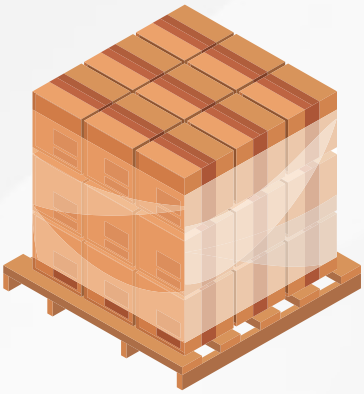
For example: for tall buildings, a height of 14 metres plus or very narrow aisle pallet racking (VNA) and/or automated crane systems may provide similar density to drive-in racking once the utilisation factor is considered.

These solutions may provide more flexibility and better productivity.

Appropriate access to pallets/stock

In some cases it will be necessary to have **access to every individual pallet, necessitating single deep storage**.

In the case of non-perishable FMCG products received in large batches, one pallet is much the same as another.



Analysis of stock depth by SKU / batch / best before or expiry (BBE) date can be undertaken to determine the opportunity for multi-depth storage. Inappropriate use of multi-depth storage leads to poor utilisation and low productivity, negating the density benefits.

Multi-depth storage also varies in the extent to which First-in-First-out (FIFO) stock rotation is available. For example, the pallet live system, while not allowing access to individual pallets, does allow FIFO as pallets are stowed on one side and retrieved from the other. This is not true of pushback or drive-in racking.

With **drive-in racking the entire bay** at all levels must usually be dedicated to the same SKU / batch, whereas the use of semi-automated shuttles to stow and retrieve pallets allows for a different SKU/batch per level.

OPTIONS MODELLING

Appropriate speed of throughput

Storage media can impact the overall throughput capacity (i.e., the number of pallet retrievals per hour in an aisle). In the case of VNA for instance, it is normally only possible to use a maximum of one truck per aisle.

If the peak required throughput is greater than can be achieved with that one truck, then VNA will not be an appropriate choice.

Broader Warehouse Space Requirements

In addition to operations within storage areas, it is important to allow sufficient space for staging of inbound and outbound, and for circulation of personnel and mobile equipment.

These spaces can often become an operational bottleneck if not carefully considered.

Offsite Storage Opportunities

When space is under pressure, sourcing additional warehouse space can be an effective solution, particularly to satisfy peaks, however, it can be expensive in the long term and, introduce transportation costs.

Overall cost

The overall cost should consider the cost of space, equipment cost/depreciation, and any impacts on operating costs of varying productivity.

There are many options for storage media dependent on the type of stock to be handled and the required throughput/access.

OPTIONS MODELLING

For palletised storage, the tables below show the relative **storage density** and **location utilisation factors** for some of the most common storage media types.

They will vary according to your specific circumstances.

Space Utilisation examples

Storage Type	Assumed Height	Floor Utilisation	Pallet Spaces per m²
Block Stack (four deep)	3 pallets	62%	1.5
APR (reach truck)	5 pallets	36%	1.5
Double Deep	5 pallets	47%	2.0
Narrow – Aisle	7 pallets	44%	2.6
AS/RS – Single Deep	10 pallets	48%	4

Space Utilisation examples (including location utilisation)

Storage Type	Pallet Spaces per m²	Location Utilisation Factor	Pallets per m²
Block Stack (four deep)	1.5	70%	1.1
APR (reach truck)	1.5	95%	1.4
Double Deep	2.0	85%	1.7
Narrow – Aisle	2.6	95%	2.5
AS/RS – Single Deep	4.0	95%	3.8

Source: The Handbook of Logistics and Distribution Management, Rushton et al. (CILT, 2022).

OPTIONS MODELLING

There are compromises to be made between **storage density and throughput.** For example, rack types such as drive-in racking that offer dense storage do not give good access to pallets. Other types such as **single-deep adjustable pallet racking (APR)** that offers individual access to pallets often provide poor space utilisation.

However, where a system offers both **excellent space utilisation and individual access**, as with powered mobile racking, then the speed of throughput is compromised. A trade-off often must be made between these factors when deciding on the use of any storage and handling system.

Similar trade-offs are also seen within non-palletised storage. For example, carton or unit storage. A vertical carousel or lift can often increase storage density for small parts.

It can also be an expensive form of storage and the throughput/tray retrieval speeds need to be carefully considered to ensure they do not limit total warehouse throughput. They are unlikely to be suitable for all SKUs. Each storage media would then be compared against the material flow and requirements that were found in the requirements definition phase.

At this point, you may need to engage with specialists who are experts in warehouse design and layout to help evaluate the possible alternative solutions and select the preferred option.

FULLY DEVELOP THE SOLUTION FOR THE PREFERRED OPTION

- **Establish** a realistic timeline and identify the dependencies.
- **Consider** the procurement of equipment, final design refinements based on the specifics of equipment from the chosen vendor(s), and installation timelines.
- If this change is to happen in an active operating environment, **identify** the actions needed to continue business as usual: rack labelling, system configuration, MHE training, etc.
- It may not be possible to pull down all the racking at once while operating, so practical concerns around migration need to be considered.

HOW THE SUPPLY CHAIN CONSULTING GROUP CAN HELP

When it comes to optimising storage capacity and achieving the right solutions for your storage needs, our company is here to help.

At **The Supply Chain Consulting Group**, we specialise in providing comprehensive logistics consultancy services tailored to our client's unique requirements. With years of industry expertise, we understand the critical importance of optimising storage space for enhancing supply chain performance.

Our team of **professional consultants** can guide you through the process, offering expert insights and practical solutions to **maximise your warehouse's storage capacity and operational efficiency**. Whether you need assistance with warehouse layout and design, or optimising your storage space, we have the knowledge and experience to help.

Discover **three short case studies** where SCCG helped towards improving the storage capacity by implementing new technology systems, layout or design, AI or automated machines, and sustainable solutions.

- **What was the problem faced by the client?**
- **How did we solve it?**
- **The benefits of using our approach.**

WHERE HAVE WE BEEN SUCCESSFUL

BEYOND THE BEAN, A COFFEE DISTRIBUTOR

Beyond the Bean (BtB) engaged SCCG to review its warehouse operations, with a particular focus on gaining greater **storage capacity** to accommodate its growth. SCCG analysed information from BtB and undertook an on-site operational review.

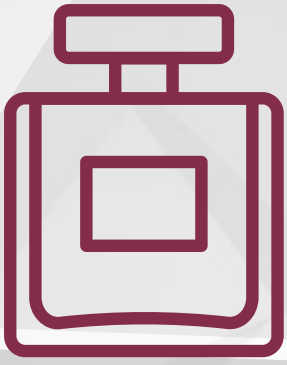
SCCG provided layout drawings showing increased storage density with a capital equipment schedule alongside other recommendations such as the use of a temporary building for overflow storage. The changes were successfully implemented with continuing project support from SCCG.

A RETAIL TECHNOLOGY COMPANY

SCCG was engaged by a retail technology company initially in 2019 to **review the layout and processes** at its site in South Yorkshire, with a view to **increasing capacity**.

The proposed layout changes, provided a 20% increase in storage capacity alongside a 60% increase in working areas, facilitating greater throughput. The client further engaged SCCG in 2022 to advise on its ongoing warehousing strategy.

DISTRIBUTOR OF NICHE PERFUMES



SCCG was initially engaged by an exclusive UK distributor **of high-end niche perfume brands** to retailers to provide a warehouse review to look at operational improvement alongside **a capacity assessment** against the company's business plan.

The client was considering moving to a larger warehouse to accommodate growth. By redesigning the layout, using dense storage technology, capacity within the existing building was improved, extending facility life to accommodate a further doubling of turnover.

SCCG provided interim management support to implement the changes, including process improvements to improve productivity and the adoption of a new warehouse management system.

ABOUT SCCG

Providing Logistics Solutions to Help Your Business Grow

WHO WE ARE

The Supply Chain Consulting Group (SCCG) is a well-established logistics consulting firm with a great reputation for helping companies to meet their business goals through effective logistics strategy and design.

Based in the UK, the company has completed over **500+ projects** across **30+ countries.**

Owned by its **Directors**, who are actively involved in projects, SCCG works with clients from major corporates to **fast-growing entrepreneurial businesses** across all sectors to improve customer service and reduce cost-to-serve.

WHY CHOOSE US?

- **Deep Industry Experience**
- **Operational and Analytical Expertise**
- **Client-centric Approach**
- **Implementation Support and Project Management**
- **Long-term relationships**

Supply Chain Consulting

- Cost to Serve Modelling
- International Trade Advisory
- Inventory Management
- Planning and Project Management

Logistics Consulting

- Logistics Network Strategy
- 3PL Outsourcing and Tender Management
- Transport Modelling and Route to Market Strategy

Warehouse Consulting

- Warehouse Operational Design and Improvement
- Warehouse Automation Design and Procurement
- WMS Strategy and Implementation

CONTACT US

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