

Building for Success:

Construction Tools Manufacturer
Overhauls Warehouse Layout to
Overcome Space Constraints

1 Introduction

A renowned manufacturer of top-tier construction tools and equipment recently acquired a new warehouse facility with the intent of expanding their manufacturing capacity. This strategic move provided the manufacturer with an unprecedented opportunity to overhaul its warehousing operations to accommodate growing inventory and free up valuable manufacturing space. To fulfill this vision, the manufacturer embarked on a Storage Type Analysis (STA) and Layout project, dedicated to optimizing their warehouse facility for augmented efficiency and productivity.

2 Key Challenge

After acquiring a new warehouse to expand manufacturing capacity, the company needed to optimize storage and layout to manage growing inventory and free up production space—all while maintaining efficiency and productivity.

3 Objectives

To address this challenge, Alpine, a trusted partner, initiated a thorough analysis of outbound shipment records, item master data, and inventory snapshots. A comprehensive STA was conducted to pinpoint the most efficient storage types for both Pick and Reserve Locations, paving the way for enhanced storage optimization and addressing the space constraint effectively.

The core objectives of both the STA and Layout project were as follows:

- Optimize the storage capacity of the new warehouse facility to accommodate the diversity of odd-sized, lengthy, and compact items.
- Enhance the overall warehouse layout and organization to optimize inventory management and expedite order fulfillment processes.
- Free up space in the existing manufacturing facility to boost production capacity, enabling the adoption of new manufacturing technologies.

4 Methodology

The manufacturer assembled a team of seasoned industrial engineers and warehouse design specialists to execute the STA and Layout project. The project followed a structured methodology:

- **Storage Type Analysis (STA):** The project started with an exhaustive inventory assessment, with particular emphasis on lengthy items. This involved capturing item dimensions and categorizing items based on size, weight, and demand patterns. Special attention was devoted to the lengthy items, which presented the most significant storage challenge.
- **Warehouse Layout Design:** Leveraging insights from the STA, the team proceeded to craft an optimized warehouse layout, encompassing:
 1. **Racking Systems:** Meticulous selection and configuration of racking systems, including cantilever racks and pallet racks, to maximize storage space for lengthy items while ensuring easy access and retrieval.
 2. **Aisle Design:** Determination of the ideal aisle width and arrangement to facilitate the movement of goods, incorporating the use of narrow aisles for high-density storage.
 3. **Zone Allocation:** Division of the warehouse into zones based on cubic volume movement, order processing areas, and loading/unloading zones, facilitating efficient material flow.
 4. **Staging Capacity:** Creation of ample staging capacity to enhance cross-docking efficiency, aligning seamlessly with the flow of goods entering and exiting the facility.

5 Results

The STA and Layout project delivered remarkable improvements for the manufacturer:

- **Optimized Storage Capacity:** Through the strategic selection of dense and selective racking systems and layout reconfiguration, the warehouse now adeptly accommodates a wide range of SKU sizes, freeing up valuable floor space for other inventory and operational activities.
- **Enhanced Efficiency:** The revamped layout was designed to minimize travel times for order pickers, resulting in expedited order fulfillment and an enhanced customer service experience.
- **Increased Manufacturing Space:** By relocating lengthy items to the new warehouse, the manufacturer reclaimed space in their existing manufacturing facility, paving the way for the expansion of production lines and increased output.

The tables below illustrate how the designed layout exceeded the STA requirements for the operation's business profile and 5-year growth projections.

Forward Pick	STA	Proposed
Closed Bin Shelving	149	196
Case Flow	12	13
VNA	25	26
Single Select	399	400
2 Deep Pushbacks	25	26
Stack Rack	10	23
Oversized Upright Locations	96	96
Cantilever	95	95
Overall	STA	Proposed
Full Pallet Equivalent	6,206	7,517
Staging Lanes	25	180



6 Conclusion

The STA and Layout project has successfully transformed the manufacturer's newly acquired warehouse facility into an efficient, well-organized space that caters to their storage needs for lengthy and uniquely sized items. This accomplishment has streamlined operations and opened doors for the expansion of their manufacturing capacity. This project stands as an exemplary testament to the power of strategic warehouse planning and design, driving operational excellence and supporting business growth in the manufacturing industry.