Reducing Warehouse Picking Labor Costs with STA and Slotting Optimization in a Medical Device Distribution Center

1 Introduction

A global medical device manufacturer operating a high-volume distribution environment supports critical healthcare supply needs through efficient, accurate order fulfillment. With a complex SKU profile that includes both batch-controlled and serial-controlled inventory, the company's warehouse execution requires strict discipline in slotting, pick path logic, and replenishment strategy. As growth accelerated, leadership recognized the need to improve storage utilization and reduce picking labor while maintaining compliance with batch and serial handling requirements. The organization engaged Alpine Supply Chain Solutions to perform a Storage Type Analysis (STA) and develop an optimized slotting strategy to improve efficiency and support scalable growth.

2 Challenge

The client faced location utilization challenges within its racking configuration, limiting its ability to efficiently scale storage and fulfillment operations. Batch-controlled SKUs could be stored in multiple locations throughout the warehouse, which caused inefficiencies when pickers were required to travel long distances depending on which batch needed to be picked first. In addition, some batched SKUs had dedicated forward pick locations, while many others did not, which created inconsistent replenishment effort and uneven labor requirements across the operation. Serial-controlled SKUs required all quantities to be slotted in pick locations, further increasing the complexity of the slotting model. With increasing growth and order volume, the company needed a structured slotting approach that would reduce travel time, improve pick productivity, and balance replenishment workload more effectively.

3 Solutions

Alpine began the engagement by performing a Storage Type Analysis to evaluate SKU characteristics and recommend the ideal rack mix needed to improve utilization and support future operational demand. From there, Alpine partnered with the client to define a slotting strategy aligned to batch and serial restrictions while improving overall pick efficiency. Key slotting rules were established, including limiting each pick location to a single batch and allowing up to ten serial items of the same SKU to be stored within a single location. Alpine also recommended implementing two dedicated forward pick locations for all batch-controlled SKUs, enabling pickers to clear one location completely before the WMS directs them to the next while replenishment refills the empty slot. All serial-controlled SKUs and quantities were assigned to forward pick locations to ensure compliance and reduce execution complexity. Alpine evaluated six different slotting scenarios and developed a full cost-benefit analysis for each, ultimately aligning with the client on a final approach that slotted inventory based on heavy-to-light sequencing, branch plant grouping, and fastest-to-slowest movers, while maintaining constraints such as long-item zoning and prioritizing the bottom five rack levels before using upper VNA levels.

4 Implementation

Using Alpine's STA recommendations, the client adjusted rack elevations across ten aisles to increase utilization and improve storage density. The warehouse team executed the physical slotting moves during third-shift operations to minimize disruption to daily fulfillment activity. The implementation followed a structured aisle-by-aisle process: first removing existing SKUs and labels and temporarily relocating inventory to open space in other aisles. Next, locations were re-labeled based on Alpine's slotting output, using the provided location file to generate accurate new labels.

SKUs were then moved into their newly assigned dedicated pick locations in alignment with the finalized slotting plan. In parallel, the client implemented required system updates, including changes to location numbering, location dimensions, pick path sequencing, slotted SKU-to-location mapping, and min/max replenishment quantities—ensuring the WMS execution logic fully matched the new warehouse layout.

5 Results

As a result of the optimized slotting strategy, the client is projected to save between $300,000 and $600,000 annually through improved picking efficiency and reduced travel time, with the exact value dependent on future picker productivity rates. While replenishment activity is expected to increase due to expanded forward pick coverage, the estimated additional replenishment labor cost is approximately $150,000 per year. Even after accounting for replenishment increases, the overall net savings are projected to be between $150,000 and $450,000 annually. Beyond cost reduction, the slotting redesign provides a more scalable fulfillment structure by improving pick path consistency, strengthening batch and serial compliance, and enabling better utilization of racking capacity as volume continues to grow. The combined STA and slotting effort established a clear operational foundation that supports long-term efficiency improvements without requiring major facility expansion.