How a Biotech Leader Expanded Capacity and Improved Warehouse Efficiency with Alpine Supply Chain Solutions

1 Introduction

A biotechnology and medical device producer committed to advancing global health manufactures high-quality products for medical, scientific, and research applications. As demand for its life-changing technologies continued to rise, the organization faced mounting operational challenges in its warehouse related to limited space, inefficient material flow, and labor-intensive processes. To improve storage capacity, streamline workflows, and prepare for future automation, the company partnered with Alpine Supply Chain Solutions to redesign its warehouse for higher performance and long-term scalability.

2 Challenge

Prior to engaging Alpine, the company struggled with several critical limitations that hindered operational efficiency. Severe space constraints restricted the ability to scale production and store growing volumes of raw materials and finished goods. Material handling inefficiencies—including excessive manual touches and long travel paths—slowed operations and increased labor costs. The existing warehouse layout made it difficult to maintain FIFO (First-In, First-Out) rotation, creating risks for product quality and expiration control. With demand accelerating, the organization needed an optimized layout that could support growth, improve throughput, and serve as the foundation for future automation investments.

3 Solutions

Alpine Supply Chain Solutions conducted a 6–8 week engineering and design engagement to develop multiple warehouse layout alternatives aligned with future production forecasts. The goal was to create a best-fit solution that maximized both storage capacity and operational efficiency. Alpine delivered a comprehensive redesign supporting 2,231 pallets and 4,462 bins, incorporating future automation capabilities such as pallet shuttles, automated pallet wrappers, pallet changers, and AGV-friendly travel paths.

Alpine's solution introduced strategic slotting principles that optimized ergonomics, reduced unnecessary motion, and grouped product families to support efficient picking and replenishment. A streamlined one-way assembly travel path improved flow and reduced congestion. The integration of pallet shuttle technology enabled more effective FIFO management and reduced manual handling, particularly in high-density storage environments.

4 Implementation

Alpine developed seven alternative layouts, analyzing trade-offs between efficiency, capacity, and automation readiness. The final layout was selected for its strong balance of expanded storage, operational productivity, and long-term scalability. The implementation plan, estimated at 6–12 months, called for phased integration of new storage systems, racking, material flow changes, and assembly-area adjustments.

In Room N12, Alpine implemented pallet shuttle racking, removed restrictive walls to improve flow, and increased storage capacity by 37% while establishing a straight-line AGV-ready path. In Room N10, new shuttle and drive-in racking improved FIFO control and boosted capacity by 24%, supported by automated pallet wrapping and pallet changing to reduce manual labor. The assembly area was reconfigured with a main aisle travel path and standardized pick-up/drop-off points to enable smooth AGV adoption in future phases

5 Results

The redesigned warehouse significantly enhanced the organization's operational effectiveness. Storage density increased by 29% across key sanitation rooms, with targeted areas seeing up to 37% more capacity. Material flow improved through clearly defined one-way travel paths, reduced handling, and optimized layout logic. The introduction of pallet shuttle systems strengthened FIFO compliance and reduced the labor burden in high-volume rooms like N12. While full quantitative benefits will be measured as implementation progresses, the company is already positioned to achieve higher operational efficiency, reduced labor costs, smoother inventory rotation, and improved scalability. Most importantly, the new warehouse design is automation-ready, giving the company the infrastructure needed to integrate AGVs and other advanced technologies as demand grows.

6 Conclusion

Through its collaboration with Alpine Supply Chain Solutions, the biotechnology and medical device producer transformed its warehouse into a more efficient, scalable, and automation-ready operation. By addressing space constraints, enhancing FIFO management, and improving material flow, the company is now better equipped to support rising production demands and maintain its commitment to delivering high-quality products for the medical and research communities. This success story demonstrates the power of strategic warehouse redesign in driving measurable operational improvements and preparing organizations for future technological advancements in supply chain automation.