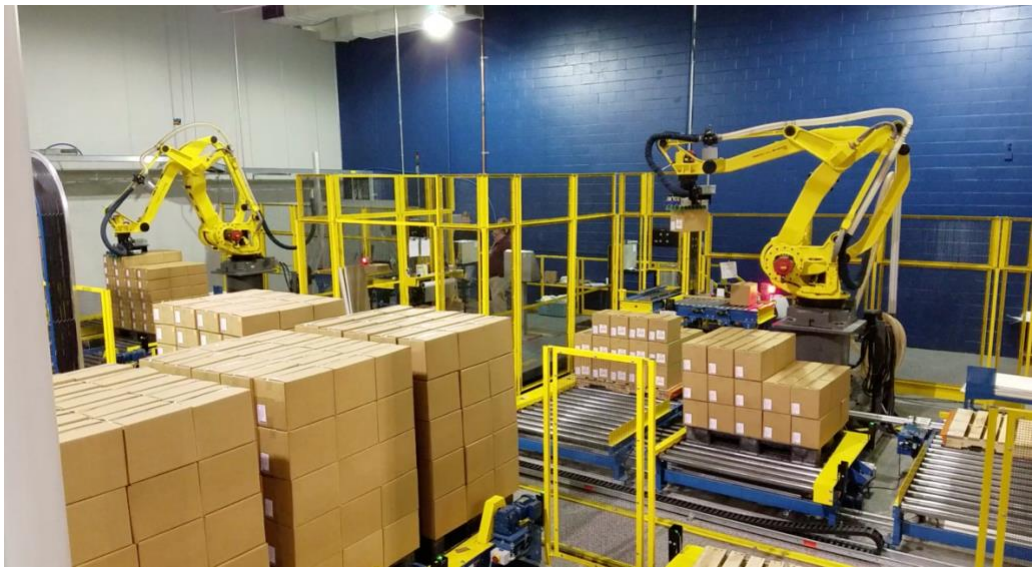
AUTOMATED ROBOTIC PALLETIZING SYSTEM



SilMan Industries provided an automated robotic palletizing system in a fulfillment center for a global leader in the entertainment and amusement industries.

(Click here to view a video for this project)

Project Scope

The SilMan team managed all aspects of the project, including engineering, procurement, robot and controls programming, electrical, mechanical, safety, and scheduling. SilMan engineers also provided design and drawings for improvements to the facility to accept the new system.

The operation transfers packages on pallets from the production floor to robotic cells, which pick and place, repalletizing cartons to shipping pallets.

Implementation and installation of the project included procurement of material and equipment to develop all hardware designs, PLC and HMI program development, Panel Fabrication, and installation.

The Operation

The process is initiated with the delivery of outgoing stock to an induction station by a forklift operator.

The system includes two conveyance routes:

- Production pallets to robot cells
- Outbound to shipping, including shrink wrap of pallet loads

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An automated stacking and de-stacking solution for work-in-process (WIP) pallets is provided, along with return routing for empty pallets back to the production floor from the robotic cells.

The centerpiece of the solution is the two robotic cells. Robot performance includes vision, pallet de-stack, pallet shuttle transport cart, WIP functions, auto-labeling, and multiple configurations of product orientation on pallets. Once palletized, the re-palletized product is forwarded to shipping.

Movement of pallets is automated: completed pallets are removed from the robot cell area, labeled, wrapped, and delivered for shipping via conveyor. Empty pallets are returned to the warehouse, also via pallet conveyors.

Engineering

Our Tupelo-based engineering team, led by Keith Hiyama, provided all systems design (mechanical, electrical) and required building modifications to accommodate the new system.

- Conceptual drawings
- Final engineering of Robotic Cells, Conveyance, and Controls
- Electrical engineering for panels and field devices
- Controls engineering for HMI interface
- Electrical engineering of machine handshakes
- Mechanical and Electrical Installation drawings
- Facility improvements

Robotics: Equipment and Programming

The Fanuc M-410+B series were selected for this implementation. This model was the ideal choice because of its high degree of variability, offering the ability to manage changing payloads and weights at high-speeds.

The M-410+B robot series is + R Vision ready and was programmed for the following actions:

- Detection of height of workpieces
- Discrimination of part-size or type
- Visual inspection
- Sorting of workpieces
- Depalletizing the load on a received pallet
- Motion optimization

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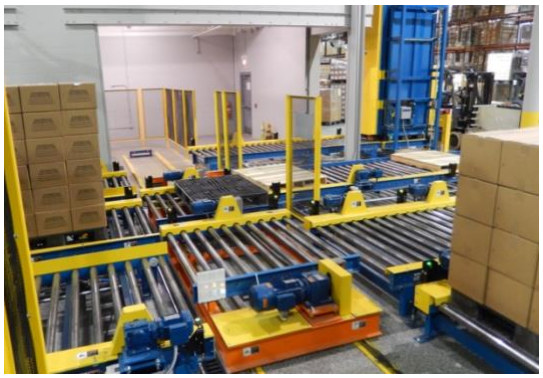
Challenges



The initial challenge was the internal logistics/floor plan of the new operation. That is, reimagining the existing space as a new high-tech fulfillment operation.

However, it was the highly customized delivery specifications of the company's client base that demanded the most imagination and brainpower from our engineering team.

A variety of pallet sizes and configuration patterns based on product identifiers are required by each destination state and distribution location type.

These variations at the point of delivery require thousands of iterations of product placement patterns on shipping pallets. All which needed to be performed by the robots in real-time as products are scanned and picked.

ROI on Automation

The solution described above provides a classic example of the ROI of automation.

The previous operation required five employees for each shift, three shifts a day, seven days a week. In the recent environment wave of labor shortages, this placed tremendous pressure on recruitment efforts. Not to mention the constantly rising costs of labor, payroll taxes, and insurance.

With the new system, only one team member, a fork operator, is needed for each shift - a savings of 12 employees.

This solution creates opportunities to reassign team members to safer, less repetitive work, and is a win for all parties:

- Reduced time and effort for recruitment
- Improved working conditions and opportunity for employees
- Lower daily operating costs
- High-speed, consistent performance
- Reduced errors in final shipping

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The SilMan Engineering provided end-to-end support for this project:

- Electrical and Mechanical Engineering
- Controls and Robotic Programming
- Inter-Logistics Planning and Facility Design
- Project Management

Results

SilMan's engineered solutions provide unique contributions to the successful outcome of this project.

Improved Performance, Reduced Costs

Key team members in achieving these results are:

- Mike Proctor: Electrical Engineering
- Ray Hawkins: Robotic Tool Design, Programming, And Installation
- Harrison Rupp: Project Management
- Tommy Ethridge: Account Management

And lastly, the only true measure of success: the customer.

Our client is pleased with the speed, efficiency, and cost-improvements in their new system.

We also enjoyed a close, collaborative relationship with the client's project leadership, particularly in light of the top-to-bottom updates of facility, equipment, and technology that was proposed and executed.

About SilMan

SilMan Industries (previously SilMan Construction) is based in San Leandro, Calif. Founded in 2008, the firm operates nationwide in three divisions – Construction, Material Handling and Site Services - and partners with "best in class" companies nationwide providing integrated solutions in the Industrial, Manufacturing, Distribution, and Public Works sectors. For more information, please visit www.silmanindustries.com/about.