

BENCHMARK BRIEFINGS

kardexremstar

SITE

Rockwell Automation
Dublin, GA

APPLICATION

Storage and retrieval of reels used in SMT manufacturing operations

EQUIPMENT

Two Kardex Remstar vertical carousels with Rockwell MicroLogix 1500 controllers

SUMMARY

Centralized storage in vertical carousels, combined with kitting operations, recovered 73% of floor space while helping increase SMT equipment productivity by 50%



SMT manufacturing increases space and productivity efficiencies by integrating two vertical carousels and MicroLogix 1500 controller.

Centralized storage of SMT reels yield 73% space savings and 50% increased equipment productivity.

When the Rockwell Automation's manufacturing facility in Dublin, Georgia wanted to improve the availability of Surface Mount Technology (SMT) production equipment, manufacturing engineers looked at a number of improvements, including revamping the reel storage and retrieval operations.

The Dublin facility manufactures printed circuit board assemblies for Rockwell Automation's industrial control systems, including the Flex I/O flexible, modular I/O system for distributed applications, the Small Logic Controller (SLC) small logic controller and others. The facility manufactures approximately 500-600 printed circuit board assembly numbers for Rockwell Automation systems.

The 25-year-old Dublin facility occupies about 186,000 sq. ft. and employs some 350 people. In the past, the company used a combination of three-tiered drawer cabinets and metal rack spread throughout the shop area to store reels of SMT components used in circuit board manufacture. The cabinets and shelving occupied about 930 square feet of manufacturing floor space.

The reels, some of which hold more than 10,000 individual circuit board components, are positioned on high-speed

placement machines used in production operations. "When a reel had to be replaced on a machine, the operator had to walk to a storage shelf or cabinet, find the correct storage location, bend, stretch and retrieve the part, go back to the machine and load it. It was terribly inefficient," said Steve Poulter, Manufacturing Engineering Supervisor at the facility. "Each SKU had to have a fixed storage location in the system whether we had it in stock or not which dramatically added to the required floor space and wasted time," continued Poulter.

Recovering Valuable Floor Space

The company replaced the cabinets and rack with two Kardex Remstar vertical carousels installed side-by-side on the shop floor. Vertical carousels provide high-density storage with quick access to items via a system of vertically arranged rotating carrier shelves that bring the exact storage position to the operator.

With the installation of the vertical carousels, the Dublin facility reduced storage floor space by 73%, down to about 260 square feet. "Actually, the recovered area was greater than that," Poulter said, "since the cabinets and racks weren't grouped and required some surrounding open work



MicroLogix 1500 controllers including a Panel View operator interface allow the vertical carousel to present the correct reel with a push of a button.

the reel and check against the pick list. The selected reels are placed in a pick up area where the machine operators retrieve them, load their machines and begin production.

“The pick lists represent real time material availability,” Poulter said. “Our materials management software also allows us to use First In First Out (FIFO) inventory control which was not the case in the past.”

To determine production efficiency, the Dublin facility measures the utilization rate of each high-speed placement machine in the surface mount lines. Because of the time necessary to retrieve components using the cabinet and rack system, machine utilization ran about 40%. With the installation of the vertical carousels and implementation of the kitting operation, machine utilization increased right away.

“The vertical carousels, in conjunction with other improvements, have enabled us to further increase machine utilization to 60%,” Poulter said. The Kardex Remstar vertical carousels are fitted with Rockwell Automation MicroLogix 1500 controllers including a Panel View operator interface.

“To meet our current and future business needs, it was determined that Rockwell’s controls would allow us greater flexibility. We saw this as an opportunity to develop a control package for vertical carousels, partnering with Kardex Remstar,” Poulter said. “The resulting combination has worked well. The vertical carousels have been in operation here for nearly three years with no problems.”

space to be used. The vertical carousels eliminated the need for most of that space as well.”

Working with Kardex Remstar engineers, the company designed custom, ESD-safe bins. The bins are fitted with slots sized to hold specific size component reels used in the manufacturing operation. Each reel has a bar code for identification. The bar code is scanned into the system software that creates a random storage profile to optimize use of storage space in the vertical carousels. Two vertical carousels installed at the Dublin facility have 22 carriers or shelf levels and are 192” tall, 142” wide and 69” deep.

“An important consideration in replacing the cabinets and racks was that the vertical carousels allowed us to centralize all of our components and initiate a kitting operation,” Poulter said. “This has helped us significantly streamline our materials retrieval operation, and, consequently, improve the availability of our production machines.”

The key to production efficiency at the Dublin facility is to load each high-speed SMT placement machine with as much work as possible. In the manufacturing operation, blocks of orders are scheduled in a machine set up format. The materials management Manufacturing Execution System (MES) portion of their software creates a pick list for the required reels, and sorts the pick list by the location of the components in the vertical carousels. Operators take the list to the appropriate vertical carousel and enter a carrier number. The correct carrier is automatically delivered to the operator at an ergonomically positioned shelf. Operators locate the correct storage bin and slot, pull



Walking, bending and searching for reels have been eliminated with waist height push of a button delivery.