Case Study

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Process & Material Handling Transformation

"Changing a Tire on a Moving Car"

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Oxford University Press (OUP), the world's largest university press, publishes and sells books, journals, Bibles, sheet music, online subscription-based reference and other products throughout the world. When the project began, their current processes, equipment and systems couldn't support substantial five-year growth projections in both units shipped and the SKUs offered. The initial analysis showed that the operational changes needed to meet these demands were considerable. One project requirement for any proposed improvement was that the operation could not be interrupted. Implementing these types of fixes in an ongoing environment could be compared to changing a tire on a moving car. This car was not going to stop.

The first step toward meeting the demands was planning the path to be taken. Exceed Consulting was hired to analyze viable alternatives and solutions to address the projected growth. The OUP team and Exceed collaborated to examine how the growth would affect the operations in four main areas. Loose piece picking, returns, storage and the shipping dock operations were considered the areas where the largest benefits could be reaped. Many alternatives were considered and a final design ultimately was selected which incorporated major design changes in all four areas.

Although the changes touched all four areas, the modifications in the picking and shipping area proved to be the most critical. The changes impacted the existing WMS system, material handling equipment and operational processes. Special designs and implementation plans were developed with a core team consisting of the operations management, project staff and hourly employees. The goal of this group was to implement these changes with no operational downtime.

Loose Piece Picking

OUP had a large proportion of shelving locations attributed to a deep sku list and many slow moving titles. These locations were divided into separate areas. All shelving locations were batch picked using RF. The product was picked from the shelves, placed into totes and routed via conveyor to all the appropriate loose pick areas for that "carton". At the end of the process the tote was routed to a pack area where the product was packed into a shipping carton.

The redesign accommodated the growth and reduced travel distance of the more than 10,000 new shelving and the 500 reconfigured carton flow rack locations. The design also accomplished increasing efficiencies by modifying the conveyor layout and processes to pack the loose product as it was picked. The conveyor modifications needed in the picking and packing area to accomplish this were one of the major challenges the project faced.

Shipping Dock

Previously, cartons were sorted at the shipping dock manually. When a carton was diverted to a conveyor line at the dock, the dock workers would sort based on an order number. They would manually match cartons based on an order number noted on the shipping label.

Two major changes were made to gain efficiencies on the dock. First, the MARC WMS system was reconfigured to analyze an order at allocation time and pre-assign the cartons in that order to a specific pallet on the dock. A new shipping label was added which displays the predetermined dock spot, helping the operator place the carton on the correct dock spot pallet.

Along with the system changes, modifications were made to the conveyor. The entire dock area was reconfigured to provide more needed space for the growing number of cartons and orders being waved and shipped at one time. The conveyor also was utilized to confirm the carton to the appropriate dock spot at the time it diverts.

Again, these two changes were critical to the design but also to the existing operation. The construction and system changes were made in parallel to the existing operation to reduce downtime.

Other Design Modifications

Other operational and system designs were also achieved to gain productivity which weren't as difficult to implement on the "moving car". They included:

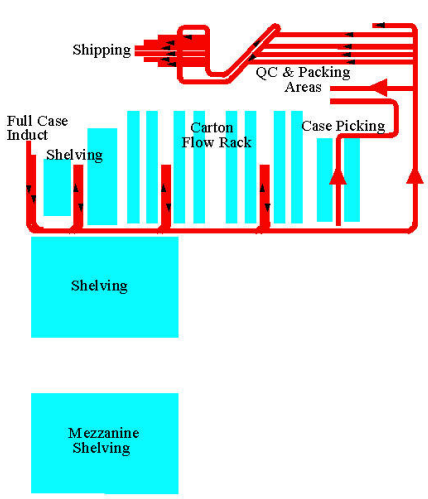
Product slotting – the slotting upgrade was achieved through the implementation of a timely slotting report comparing the current picking class vs. the optimal picking class.

Returns consolidation –the returns process was changed to prioritize the items being returned. The items are now consolidated in the returns area prior to being putaway. The system was also reconfigured to consolidate the returns into the rack area after a loose threshold quantity was met in the loose pick area.

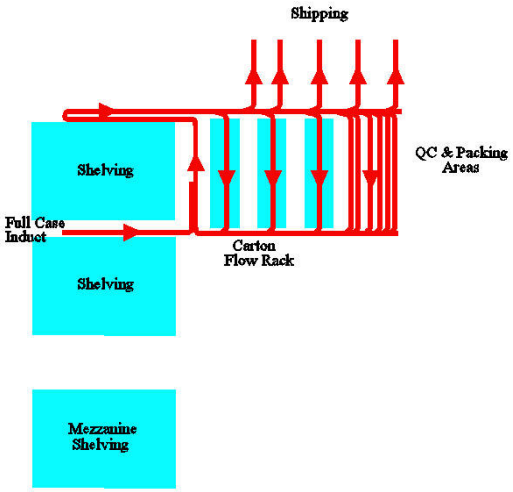
Addition of small locations in bulk storage - pallet sized locations were converted into widespan type locations in the bulk storage area to meet the smaller receipt/ buying patterns and new returns needs. Widespan locations are small storage locations in the bulk area with wire decking to allow for the dense storage of cases rather than pallets.

Implementation

The before and after layout changes for the pick area as noted below illustrate the magnitude of the changes that had to be made as order fulfillment continued.



Before



After

A request for proposal was distributed to several material handling vendors. Automotion was selected as the material handling integrator. One of the key advantages to the Automotion solution was an innovative design and implementation strategy. The cornerstone of their design was the use of a bi-directional sorter to support both picking and shipping. A carton was started in one of the pick areas and an operator would place a carton on the conveyor system. The carton's shipping label would be used by the conveyor to direct the carton to its next destination. If the next destination was another pick area, the new elevated sorter directed that carton into the appropriate pick area. If that pick area was unavailable, the carton was directed to the next pick area available for that carton or re-circulated until the desired pick area became available.

Once the carton was finished picking it was directed to the new carton sealing area. After the carton was sealed, it continued on the conveyor and back onto the sorter to be directed to the appropriate shipping lane. The position of the new sorter in the layout allowed it to be erected early in the installation schedule while the existing operation continued to function.

The other physical changes were implemented in a series of phases. Each of these steps freed up floor space for the next phase while progressing toward implementing the final desired design. The final phase was completed over a four-day weekend. During that weekend, the sorter that had supported the existing pick operations was removed. The new preassembled pick sorter was slid into place replacing that sorter and the new shipping diverts were completed.

Having used the MARC WMS for many years, OUP kept the changes on the system side to a minimum. The main changes were around the predetermination of the dock spot and the returns process changes. These changes were made and tested in parallel with the material handling installation.

Success

The key to the successful installation process was the kickoff presentation to the entire staff. The complete analysis phase was described. In addition, the changes in each area and project time line were described in detail. Each area was defined in terms of the current process and layout. The new processes and corresponding layout changes were also clearly presented. This included actual photos of what the end layout, equipment, process and label changes would look like. The pictures and videos were from similar implementations of the specific changes. This helped the staff take AutoCad layouts and descriptions and visualize the benefits that the end result would mean to respective employees specifically. These pictures were worth a thousand words.

The overall installation schedule was presented as well. Each phase showed the exact days the installation was taking place and highlighted the area being changed. It also described the changes and objectives for that portion of the project. A full size AutoCad plot of each phase and objectives was displayed in the cafeteria so that staff knew exactly what was happening each week. The staff was also encouraged to offer recommendations to their supervisor to minimize the risk during each phase. These recommendations greatly aided in improving the riskiest part of the implementation, which was the tremendous amount of product relocation during the installation.

The detailed schedule and objectives allowed the staff to prepare for the changes prior to when the specific phase affected their area. The objectives allowed them to ascertain where they were from a completion standpoint during each phase.

The entire conversion took approximately three months. It was completed on schedule and budget. The project has realized its projected payback of slightly less than two years.

While the changes were ambitious, a detailed plan understood and bought into by all involved allowed OUP to change the tires on this moving car without a crash.

"The project Exceed did for us was very successful.

They were successful in meeting dates, working with vendors and working through implementation, and the project came in within budget."

Senior Vice President, Distribution
Oxford University Press