Oracle WMS – A Scary Success

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Introduction

Headquartered in Oklahoma City, Oklahoma, M-D Building Products, Inc. is a manufacturer and distributor of home improvement products. Currently we manufacture and purchase for resale approximately 2,500 products. Our manufacturing processes include aluminum and vinyl extrusions, powder coating, and anodizing.

Our distribution center serves over 10,000 customers. These customers range from "big box" retailers such as Wal-Mart, The Home Depot and Lowe's to your corner family-owned hardware store. The methods of distribution to these customers include direct-to-store shipments as well as to major distribution centers. Order sizes vary from a single carton to orders that are more than a trailer load. Product sizes also vary widely ranging from a box of foam tape measuring less than a cubic foot and weighing less than one pound to a 12 foot tube of carpet metal which weighs close to one hundred pounds.

In the summer of 2006 we replaced our home grown systems with Oracle Order Management, Shipping and WMS.

While the end result was a highly successful operation, the path to success was full of missteps, mistakes and many lessons learned the hard way. From hardware problems to inventory issues to late orders and unhappy customers, we learned, adapted, and became a better company because of it.

Pre-Implementation

M-D has utilized Oracle Financials since 1991. Oracle Manufacturing and related modules have been utilized since 1996. In 2005 we migrated from a 10.7 character based environment to 11.5.9. We also moved to a hosted model using Oracle On Demand services when we implemented the 11i applications.

Prior to July 2006, M-D used a custom legacy system for Order Administration and Warehouse/Distribution activities. This combination required multiple interfaces be maintained to transfer data between the Order Administration system and the Inventory system.

Order picking was performed from hand held scanners. These scanners utilized custom developed Java code to direct the picking activities. The picking process was initiated by scanning a bar code from a picking document. The process then directed the picker to a bin location where a scan of a bin bar code was performed to verify the picker was in the correct location. The next step was to scan the product in the bin. This process extracted a five-digit product number from an I2of5 bar code. The picker was then given the quantity of product to pick. Once the quantity picked was confirmed, the picker was directed to the next bin location.

This process provided accuracy and consistency in the picking process. It also made training new and temporary employees quite easy. While much better than previous processes that were all paper based, there were still a number of short-comings.

The picking system assumed inventory was available. It would direct a picker to a bin location that might not have enough product to pick the quantity the customer ordered. There was no process to release orders systematically for picking. To determine what orders were to be picked distribution supervisors sorted through paper picking lists and handed them out to pickers. No inventory reservation was involved.

A major challenge faced by M-D is that while inventory is produced and kept in inventory in packages containing multiple retail units, virtually all of our customers order by the retail unit or each. Customers use the each SKU number as this is the unit of measure they stock in their stores and sell through the check-out register. This has always presented challenges to M-D.

Another challenge is the variety of order sizes and configurations. A single order can have small boxes and twelve foot tubes; an order can be one box or multiple pallets. Designing a single system to address this variety has always been another challenge.

Like many businesses our customers expect superior service. Most orders must ship 100% complete within 3-4 days of receipt.

Implementation Planning and Testing

Several factors were involved in the decision to implement Oracle Order Administration and WMS applications.

In addition to the issues previously detailed, there were the ongoing costs of supporting a custom legacy system. The legacy system was running on outdated hardware and software. Replacement was unavoidable.

Another goal was to improve efficiencies and productivity in distribution and capitalize on better interaction between Order Administration and Inventory. Real-time inventory was not available in the legacy system. Our legacy system also required all data required for financial reporting and planning processes to be fed via interfaces or entered manually.

As a long time Oracle customer, the choice to implement additional Oracle modules was an easy one. Our implementation team was made up of M-D employees from several functional areas. Finance, Customer Service, A/R, Distribution and IT were included. The people on the project team were assigned full-time from the planning process through the weeks following the go-live. Independent consultants were used to provide knowledge of the applications and assist as needed.

The project team had complete support from senior management to implement the Oracle systems with as few customizations as possible. In many cases this required business processes to be modified to fit the software rather than modifying the software to fit the processes. This support from management was crucial to the ultimate success of the project.

The initial discussions regarding the WMS implementation centered on the different issues related to the variety of customer orders we process. It is almost impossible to pick all of our orders efficiently from a single warehouse layout. The decision was made to create multiple sub-inventories that each matched the need of groups of customers with similar needs. This was facilitated by the physical layout of the warehouse which was divided into two areas by a wall, as well as a separate building used to stock 12 foot tubes of metal.

The first sub-inventory known as FGLARGE is used for picking orders destined to customers who use distribution centers to feed their stores or members. This sub-inventory is set up for high volume and larger pick quantities. It has wide aisles to accommodate forklifts and pallet jacks. This sub-inventory has 17 aisles with four level racks. Only the bottom two levels are used for picking with the top two used as overflow. The total space is approximately 75,000 square feet.

The second sub-inventory, FGSMALL, is used to pick smaller orders for customers who ship direct to a store or other retail location. This sub-inventory is set up for hand-picking using push carts. The aisles are narrower to accommodate foot traffic. The sizes of bins are typically smaller and hold less inventory. This sub-inventory has five aisles with three level racks. The total floor space is approximately 17,500 square feet. Products in this area are arranged by product family to reduce travel time.

The third major sub-inventory, FLOORCOV, is housed in a separate building. This sub-inventory contains exclusively tubes of 12-foot carpet metal that are sold to carpet and flooring distributors. The orders shipped from here are bulky and thus require additional handling. These customers often have custom labeling requirements. A single level of stand-up racking is used in this 20,000 square foot building.

The challenge was to convert the existing warehouse space to the new layout while still shipping orders. M-D previously used automated carousels in the space allocated to FGSMALL. These were removed, and the newly unoccupied space was set up with racks. This change created better utilization of the cube space available in the warehouse.

Bin labels were designed to support the picking of packs when a customer had ordered in eaches. A customization was made to the order entry process to verify that customers order in correct multiples. This was based on multiple units of measure conversions being set up on individual items to reflect the proper multiple for that SKU. Items are assigned to specific bin locations with a unit of measure. The bin label includes the unit of measure and when scanned converts the each quantity and unit of measure to the pack quantity before the picker pulls inventory from the locator. The picker is then given the number of packs to pick – not the number of eaches.

Once the plan was developed, set-ups and testing were performed. The picking, confirmation and replenishment activities were tested by IT and Distribution personnel. The picking process seemed to work well in our tests and in the pilot.

The shipping confirmation process presented several challenges as it was quite different than the processes as they occurred in our legacy system. Eventually these issues were resolved and the new processes were tested.

To facilitate the training of distribution personnel in warehouse operations, custom training manuals were developed. These manuals used screen shots and photographs to demonstrate the required tasks rather than paragraphs of narrative. This was important since M-D's warehouse personnel are from a variety of cultural backgrounds. All personnel were trained in small groups using the test system and then had trainers available to assist after the go-live. They were also given copies of the manual to use.

Two major issues with our testing would later lead to problems after the go-live. The first was inventory availability. When testing the picking process, we avoided shortages by making sure there was always enough inventory to pick whatever orders were to be processed without taking into account the actual amount of inventory the bin would hold. The second problem was created by using auto-pick to create test data for ship confirmation and auto-invoicing. Using auto-pick reduced the amount of testing of the pick processes.

Migration

The go-live occurred over the July 4th weekend. After periods were closed for June, the WMS enabled flag was turned on which also enabled the cost group functionality.

The migration plan went nearly flawlessly. Customer set-up was completed and open orders were transferred from the legacy system into Oracle with only a few minor issues. Once everything was verified we prepared for the first shipments which would occur on July 5, 2006.

Go Live

At first the go-live went amazingly well. There were issues with people remembering their training as there are when any system goes live. These were quickly resolved. As we began picking a few orders at a time most everything was going according to plan.

During the first few days we had considerable problems with the radio frequency network. We discovered some dead areas where connectivity would be lost or intermittent. These issues were identified and resolved by working with the IT staff and our vendors. In the end we had to add access points to resolve these problems.

The confirmation process also presented some challenges. In particular, printing shipping labels and bills of lading was very slow. This caused a bottle neck in the consolidation areas where we prepare picked orders for shipment. Initially these problems were overcome by adding additional personnel and work stations to share the unplanned work load.

The other major problem we encountered was the under-sizing of pick bins. When testing we could overload a bin to make sure there was sufficient inventory to pick an order. In real life this was not possible. We ship approximately 100 orders to one of our largest customers daily. This customer required 100% fill rates and does not accept back orders. In order to meet their requirements we set them up for ship sets. This presented a challenge as the pick release process only reports the first item on an order that prevents the entire order from being released. Once that item is resolved, the second item is identified and so on; by the time all items were identified the first item could again be short. Again, we addressed this issue by adding additional personnel to the release process as a stop-gap measure.

Chaos!

While we definitely were not shipping orders at the rate we needed, steady progress was being made during the first few days. Additional work-arounds and personnel were utilized as we worked on solutions to the problems we were having.

Then it happened.

One morning someone performed a pick release of all of the orders in the system. Until this time we had kept this tightly controlled by releasing only a few dozen orders any given time. When the mass release was performed it processed almost 2,000 orders. Chaos ensued!

Inventory shortages both due to lack of inventory and under-sized pick bins caused partial orders to be released for picking. This required us to stage partially picked orders until the rest of the order was picked. Our limited space to stage orders made it extremely difficult to marry these order picks together prior to shipment. As a result many orders were shipped inaccurately and late.

The performance problems at the consolidation work stations were exacerbated by the number of incomplete orders that were coming to them for shipment.

Another problem was that the radio frequency equipment was continuing to be a problem. Despite our best efforts we were still having connectivity issues. Pickers would lose their connection, and the guns would have to be rebooted several times a shift.

LPNs also presented some problems. A parent/child relationship is created when the LPN field is entered on the Pick Drop screen -- an issue not identified in testing. This prevented unassigning and assigning of delivery functions from working properly. This problem could only be identified from a LPN scan on a gun.

There were also numerous patches that had to be applied for LPNs to work properly. None of these were identified in testing or pilots, nor were they identified by any Oracle documentation as necessary.

All distribution personnel were working 7 days a week, a minimum of 12 hours a day to help work through this period. Additionally office personnel were working in distribution to help get orders out the door. Spouses and teen-age children of many employees assisted in getting caught up. Despite the problems we were having, we found that it was very easy to train new personnel even if they had no previous warehouse experience.

Adding to the stress of the problems the system was experiencing was the weather. July of 2006 was the 8th hottest July on record in Oklahoma City. The average daily temperature was 86.3° F with 15 consecutive days in late July, early August over 100° F. There is no air-conditioning in our warehouses or manufacturing facility.

Customers suffered. During July M-D shipped approximately 50% of our planned shipments for the month. Orders were late and too often incomplete. Daily meetings were held to prioritize shipments to ensure customer complaints were addressed

Resolutions

Once again the backing from M-D's executive management was critical. At no time was there any serious consideration to "backing off" and retreating to the legacy system. Eventually the problems were resolved.

The mass release was eventually worked through. In hind-sight this could have been dealt with differently by backordering all of the unwanted picks (a tactic we have used in a similar circumstance since then), but our initial lack of experience with the system limited our choices.

We have since put in personalization controls in the release screen that prohibit some one from accidentally releasing too many orders at one time. We have also worked to refine the pick release process and have expanded our use of ship sets to all customers picking from the FGSMALL sub-inventory to limit partially picked orders.

The shortcomings encountered in the pick release process with ship sets where only the first item prohibiting the entire ship set from releasing is identified have been addressed. IT developed a spread sheet that identified all shortages for a customer order regardless of whether or not ship sets are involved. This spreadsheet is still used today to support the pick release process.

Several patches were identified and applied to address problems

The radio-frequency issues were resolved with the help of our vendor. Additional access points and antennas were installed and others moved to ensure we have wall-to-wall coverage in our facilities. We also discovered some of the issues we thought were hardware related were actually due to problems with the MSCA programs. These programs are now restarted daily, alleviating most of the problems we were experiencing.

The performance problems we had in the consolidation areas were resolved with the help of Oracle support. Purges are now utilized to reduce the data in the tables. We have also reworked the label printing processes to improve the speed.

Distribution has also made changes to their staffing in the pick release and consolidation areas. A dedicated team is now responsible for pick release, and we have increased the number of consolidation workers and stations to accommodate our needs. While we have added personnel in these areas, increased picking efficiencies have allowed us to off-set these increases.

Distribution has also resized many of the bins used for picking. The increased size for specific items allow for better flow of orders through the warehouse. This reevaluation is an ongoing process for us as we address changes in customer ordering patterns.

During August, 2006, the second month using the WMS system, M-D shipped approximately twice the orders that had been planned for that month. This virtually eliminated the backlog that had built during July. August 2006 was and still is a record shipping month for M-D. By September, our customers felt very little effect from the change although costs were still higher to support additional personnel.

Conclusion

Eighteen months after our implementation the WMS systems and processes work extremely well. 2007 was M-D's most successful shipping year in our history.

Our understanding of Oracle WMS and our business has grown exponentially. We now realize that our distribution operation is a fast, narrow pipeline. We have learned how to control it and to not choke it.

Distribution labor costs per sales dollar have decreased by more than 30% since the WMS implementation. The labor cost per order has decreased by 35%.

The new system has also given us the ability to measure efficiencies in the picking process. This data is provided by shift and employee to distribution management and is used in evaluating employees and identifying areas for improvement.

Inventory accuracy has improved dramatically. This supports better decision making in distribution, planning, manufacturing and purchasing. Today we ship more orders, on time, and with fewer shortages despite having reduced our finished good inventory by approximately 25%.

M-D's distribution performs and reacts to changing customer demands better than at anytime in its history.

In the near future M-D will begin using WMS to ship from satellite warehouses in Gainesville, Georgia and Mexico. These facilities will ship based on the model developed and implemented in Oklahoma City.

We also see opportunities to use replenishment and directed put-aways to better support distribution activities. We also are beginning to look for ways to plan distribution resources and activities further into the future.

IT and Distribution management continue to work to improve our processes. Our focus is on increased productivity and efficiency, reduced shipping errors, increasing inventory accuracy, and complete customer satisfaction.