

Trends in Warehousing and Distribution

Competition, customer demands and sophisticated tools like RFID are bringing new efficiencies to distribution operations that will benefit manufacturers at all levels.

By Tom Singer, Contributor

In the past decade, warehousing and distribution operations have had to cope with a variety of emerging business trends and forces. The days of straight fulfillment operations have given way to a more complex world. Competitive forces have worked their way onto the warehouse floor with a vengeance. Buying habits have dramatically changed for manufacturers, wholesalers, retailers and consumers alike. Service levels have become increasingly more demanding. Mergers and acquisitions have caused distribution networks to be revamped at a rapid rate. Globalization has crept into every nook and cranny of the supply chain.

These forces manifest themselves in numerous ways. Distribution operations have been obliged to manage leaner inventory levels, smaller order sizes, larger SKU catalogs, quicker order turnaround, and increased customer packaging and value-added service requirements. While adjacent links in the supply chain were once primarily local, today they can span the globe. Companies that used to have a straightforward, brick-and-mortar distribution network are now dealing with multiple distribution channels.

Distribution operations have responded to these challenges in various ways. Some have redesigned processes and facilities to meet emerging requirements. Others turned to software solutions like warehouse management systems (WMS) and transportation management systems (TMS) to reduce costs and improve service levels. Some have sought to meet these challenges through automation. Many have elected to use all three responses.

And the impact of these challenges goes beyond distribution. They can affect every aspect of the enterprise from purchasing to customer service. Plant engineering and maintenance management are hardly immune. They are or will be pressed to support much leaner, quicker distribution networks. In this new world, their performance and effectiveness will become increasingly more important to the success of distribution operations.

The forces shaping supply chains will continue to promote changes in warehousing and distribution. Competition will continue to press operations to be more efficient while catering to more demanding customers. Traditional brick and mortar retailers will continue to branch out into other channels. Manufacturers will be pressured by retailers to ship directly to stores or tender shipments that can be quickly cross-docked at flow-through distribution centers. Manufacturers will increase demands on suppliers to support even leaner and more responsive supply chains. Customer demands will force all links within the supply chain to provide new value-added services that might not fit their current operating mode. Failure to meet these

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Published on Industrial Maintenance & Plant Operation (<http://www.impomag.com>)

demands and challenges can spell doom for the enterprise. While many distribution operations still function much the same way they did a decade ago, the forces of change are bound to impact the way they do business regardless of size and industry type.

Some have already opted to outsource their warehouse and distribution functions through third-party logistics providers (3PL). A 3PL provides the ability to leverage an external entity's distribution infrastructure and experience instead of internally developing and supporting logistics resources.



Many logistics operations are also becoming increasingly aware that their transportation dollars are not well spent. They are restructuring their distribution networks to reduce inbound and outbound freight charges. They are reevaluating their transportation procurement, carrier management, and freight auditing and claims management processes. They are also turning to freight pooling and zone skipping, and backhauling in order to reduce costs. They are supporting these and other initiatives through transportation software, redesigning processes and improving management practices. There are also more sophisticated trends that are beginning to play an important role in warehousing and distribution. These are not necessarily new, but they are starting to appear more often. Most of them will have some impact on just about all warehousing and distribution operations in the coming years.

Focus on profitability, accountability and metrics

Distribution has typically been a service operation. Its primary function has been order fulfillment. With the exception of need dates, all orders are generally treated equally. Little attention has been given to the profitability of the individual order both from an execution and reporting perspective. Distribution operating costs are typically spread proportionally across all orders.

Today, more organizations are looking to capture true per-order distribution costs. They are charging inventory storage and handling costs back to appropriate cost centers. Activity-based costing is not a new concept, but has primarily been limited to third-party logistics providers who use it to support their client billing processes. However, many enterprises are beginning to realize that it can be a key tool in managing the effectiveness of their internal distribution operations. Furthermore, some operations are beginning to factor the customer-order profitability into their order-scheduling and inventory-allocation routines.

Another shift is occurring in metrics, which has always played an important role in warehousing and distribution. Walk into any DC and you are likely to see daily cartons shipped, order fill rate, or some other statistic prominently displayed on a whiteboard for the whole world to see. But a new generation of supply-chain

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decision-support software allows operations to move beyond this whiteboard mentality in their reporting and use of operating metrics. These tools can display a wide-range of information tailored to the needs of the individual user in a format suitable for rapid decision-making.

This has led to the loss of anonymity in distribution. Activity reporting and performance monitoring is being extended to all levels, and accountability has become a watchword.

Extending supply-chain software

In the past decade, distribution operations large and small have turned to WMS and TMS packages to improve efficiency. The WMS and TMS software industry has grown from a handful of custom developers to a highly competitive and segmented packaged-solution marketplace. These packages have steadily gained in functionality and now, some vendors spend more time looking to replace older solutions than first-time installations. Many have expanded their offerings by adding various packages or modules, including:

- * Labor management systems (LMS) that measure and track employee activity. LMS packages provide the ability to define elemental work tasks and their associated completion time. They track employee performance against either engineered standards or historical benchmarks. LMS solutions are used to help control labor costs and support incentive-based pay.
- * Supply-chain visibility solutions that allow a distribution operation to coordinate activities with suppliers and customers. They are typically web-based applications that allow distribution operations to share information such as order status and stock level with their trading partners. They help reduce processing and customer service costs by automating the flow of information in the supply chain.
- * Transportation procurement solutions that allow distribution operations to better manage their carrier contracting process from bid solicitation through contract award.
- * Decision-support tools that provide the ability to generate key performance indicators (KPI) that can be tailored to specific job functions and operating goals. These packages are typically Web-based and deliver their customized metrics to users through graphical dashboards.
- * Reverse logistics packages that help organizations increase the efficiency of their returns operations from initial customer interaction through final product disposition.
- * Slotting packages that allow operations to optimize product location with their warehouses for increased picking efficiency.
- * Distributed order management solutions that allow a distribution network to dynamically route orders to its various nodes-based inventory availability, customer service requirements and transportation costs.
- * Yard management systems (YMS) that provide the ability to manage and track trailer movement within a distribution center's yard.

Maturing of automation and control systems

During the 1990s, much of the focus for automated material handling systems was

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on large-scale, lights-out installations. These high-priced implementations typically featured miles of conveyor. The primary drivers in their acquisition were productivity and reduced labor costs. While fully automated facilities captured the attention of trade journals, conveyor and control-system vendors made a lot of money installing shipping sorters.



The dot-com bust and the last recession made a considerable dent into earnings of material handling automation vendors. But this hasn't meant the industry has stagnated. Productivity coupled with the need to increase order accuracy and customer service levels still makes automation attractive to many distribution operations. Furthermore, automated material handling solutions have grown in flexibility, reliability and number. The variety of solutions allows vendors to support an increasingly wider range of operations and product types. Sorting applications can choose from a broad assortment of technologies including shoe, tilt-tray, cross-belt, narrow-belt, Bombay and garment sorters. Numerous vendors provide automated carton sealers, price-stickering machines, palletizers, dunnage stations, and print-and-apply labelers. Variable frequency drives and motorized drive rollers make conveyor systems more flexible and easier to maintain.

Of course, the automation is of little value without control systems to make it work. Earlier generations of warehouse control systems (WCS) were custom affairs that offered little flexibility and limited functionality. But WCS solutions have grown considerably in capability, reliability and ease-of-use. Leading systems provide graphical user interfaces that mirror the various equipment systems and modules they support. They allow users to reconfigure processing flow and sort rules through a few mouse clicks. They can also provide a myriad of alerts and reports on operating conditions and equipment problems.

The combination of more functionality in both material handling equipment and control systems is allowing organizations to be more flexible in their application of automation. Much can be gained in efficiency and throughput by implementing multiple-use solutions. While material flow from/to receiving and shipping docks is still a primary focus, more attention is being paid to other processes like storage, replenishment and returns processing.

Moving beyond the hype: RFID

Wal-Mart and other large retailers have set the stage for Radio Frequency Identification (RFID) to be one of the most dominating technologies in distribution in the coming years. Along with the Department of Defense (DoD), these RFID-compliance mandates have fueled considerable activity and interest in the supply

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chain world. This interest has generated considerable hype about the technology's benefits, costs, and capabilities. Much was made about RFID's potential to help supply chains lower operating costs, improve inventory accuracy, increase throughput, enhance product authentication, reduce inventory levels, and increase visibility. Cost and performance issues were downplayed as sidebar factors that would be quickly conquered.

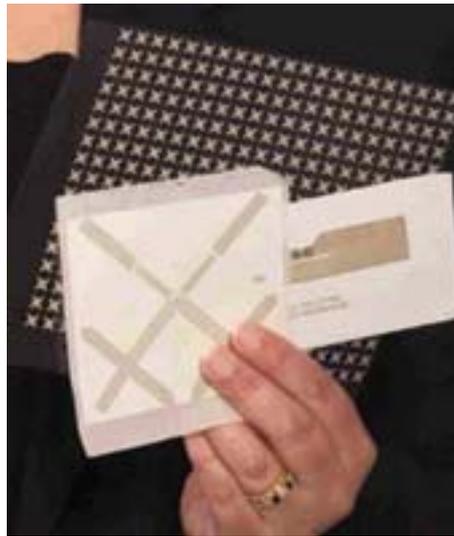
But the blush of these initial promises has worn off a bit. RFID tag and equipment costs are still prohibitively high for many operations. Performance issues dog many prospective applications. Integration challenges can make it a resource-intensive proposition. Furthermore, many existing warehousing operations and systems aren't designed to take advantage of RFID's full benefits. Even the compliance drivers are challenged and have adjusted their rollout plans accordingly.

All of these issues have generated some skepticism about RFID's potential impact on the supply chain. But the current problems and challenges have not discouraged major retailers from their long-range compliance plans. Wal-Mart and others believe that the technology will eventually play a major role in the way their stores and distribution centers operate.

There are similarities between the introduction of RFID into the supply chain and the advent of bar-coding technology. For example, standards have been in flux with competing vendors offering non-compatible solutions. However, this is rapidly changing. The Electronic Product Code (EPC) has become the prevailing RFID tag standard for supply-chain applications. Wal-Mart, DoD, and other compliance drivers have embraced the Class 1, Generation 2 tag for pallet and case identification as developed by EPCglobal, an international standards organization.

Generation 2 tags offer performance advantages over earlier EPC versions. More importantly, they provide a firm standard that will entice more vendors to offer more RFID solutions. This will, in turn, reduce the costs and increase the performance of available solutions. All this will not happen overnight, but limited pilot tests will eventually evolve into a full compliance mode. More and more retailers will jump onto the RFID bandwagon by initiating their own compliance program. The technology will continue to evolve in ways that may not be anticipated, but RFID will certainly make its mark in the coming years.

Given tag costs, suppliers will have to become increasingly more intelligent on how they meet compliance directives. Many will look to redesign processes and modify systems so that cartons destined for compliance can be more efficiently tagged. Others will turn to automation and install selective label application systems that can identify which cartons require tagging. But the ultimate high ground for suppliers will be to dilute compliance costs by figuring out how to use RFID to improve their own internal operations.



Alternative picking methods

The evolution of WMS functionality over the past decade has been coupled with the spread of Radio Frequency (RF) technology in warehousing operations. Most WMS packages provide RF programs to support floor and dock operations. While many operations still pick by paper lists or labels, RF picking has become increasingly popular. Many WMS packages offer a variety of RF-picking methods including discrete, zone and batch. They can support RF picking by label or cart. They verify picks through location and SKU barcode scans.

RF picking offers the advantages of increased accuracy, and near-real-time inventory and order updates. It can support a wide variety of product and order types. But it does have disadvantages. For example, scanning bar codes and keying quantities takes time. Mobile RF terminals can also be cumbersome to use, especially in piece-pick operations or refrigerated environments. Wearable units with ring-activated scanners address some of RF's unwieldiness for piece picking, but RF is not always the best solution for some picking operations.

Alternatives to paper and RF-picking include voice-picking and pick-to-light technologies, which have been available for many years. Voice-directed warehouse solutions support order picking through speech-recognition and synthesis. They employ a wearable, wireless PC that communicates with a server, which in turn is interfaced to a WMS or ERP package. Users communicate with the voice application through a headset and microphone. Applications are programmed to recognize the voice of each specific user.

Given its hands-free mode of operation, voice technology has made inroads in the grocery industry for picking in refrigerated areas. But cost and integration issues have limited its use. However, prices for voice terminals have dropped to the point where they cost about the same as vehicle-mounted units. Also, top-tier WMS vendors are starting to support standard interfaces to some voice solutions reducing the cost and effort required to interface the two systems.

Pick-to-light solutions guide order pickers through display lights, LCD panels and entry keys mounted over pick faces. Specialized software controls the flow of information to and from pickers. Pick-to-light software is usually interfaced to a WMS or ERP in a near-real-time or batch mode. Pick-to-light solutions are typically

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employed to support zone pick. Generally, each user starts the process within his/her zone by scanning a bar-coded order or carton number. The software then activates the display lights above each location that has a pick and displays the pick quantity on the associated LCD panel. Each pick is acknowledged or adjusted through the location's entry key.

Pick-to-light solutions can be found in a wide variety of operations. But their popularity has been limited by cost, integration, and functionality issues. Like voice-picking, price points for pick-to-light solutions have become more favorable over the past few years, and the systems have become easier to install and maintain. Top-tier WMS vendors are beginning to offer standard interfaces to popular pick-to-light packages. Furthermore, pick-to-light software has become more sophisticated in functionality and easier to use and configure.

Some operations rely on automation to support their picking requirements. The equipment, software and processes employed to support automated picking vary by product type, volumes and customer requirements. Full-case operations might employ a pick-to-belt operation where the outbound carton is systematically packed as it travels through a conveyor scanner array. Automated piece picking and packing can be supported by everything from A-frame dispensers to tilt-tray sorters. Advances in equipment technology and control systems are increasing the attractiveness of this type of automation.

Struggling to retain and grow employees

Controlling labor costs remains a primary focus in distribution and warehousing. Many operations view labor strictly in terms of seeking opportunities to reduce head count. But this philosophy is hardly a prudent course given the changing face of distribution. Driven by customer requirements and competition, distribution operations are becoming increasingly complex. They must be more responsive and flexible while striving to be more efficient. This means that warehouse personnel must contend with more complex processes, systems and machinery.

The days where meeting service commitments meant throwing enough unskilled or semi-skilled labor at the job are over for most operations. Many warehousing positions are requiring increasingly higher skill levels. Key personnel are also being expected to perform more roles. Software, analytical, and engineering skills play a critical role in keeping many operations functioning at their required service levels. Expectations have not only increased for management and key support personnel, but hourly workers now need to have skill sets that weren't previously required. Being able to navigate through WMS functionality can be just as important as forklift skills in performing many warehousing operations.

A more complex distribution environment means that many operations will have to rethink their approach to employee development and retention. Training will become increasingly important. Operations will also have to expend money and energy in retaining key employees. This will be difficult for many who are used to viewing labor as a commodity. But the price of ignoring employee retention and development may be too great for many organizations to bear.

Despite the challenges and trends identified above, warehousing still revolves around the same core activities: receive, pick, pack and ship. But there are many agents of change working to shape the way supply chains do business. Though the ways in which enterprises adapt to these changes will vary, inertia will not be a

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viable response. The real challenge facing logistics operations will be to break out of old habits and thought processes.

Warehousing and Distribution Trends IMPO November 2004

Source URL (retrieved on 08/29/2014 - 1:24am):

<http://www.impomag.com/articles/2004/11/trends-warehousing-and-distribution>