white paper

Top 10 Trends Driving Order Fulfillment

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Creating Logistics Results

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Introduction

What is driving the design of order fulfillment systems today?

What is driving the design of order fulfillment systems today? While an analysis of the activity profile (orders per day, daily unit volume, lines per order, etc.) points to the appropriate order fulfillment system design, there are other issues that will also have an influence on the process and system design. Here is an overview of the issues and trends impacting the order fulfillment process in the warehouse and distribution center today:

1. The Impact of Labor

Labor force issues include: employee turnover, injuries, absenteeism, safety, ergonomic conditions, productivity and the increasing influence of government regulation. The sum of these issues is causing distribution operations to rethink the order fulfillment process and incorporate new methods and designs.

To improve worker productivity and ergonomics while improving the worker experience, more distribution operations are implementing real time paperless picking systems. For example, some distribution operations blend voice and light directed technology to maximize the efficiency and accuracy of their workers. With this design, a team of order selectors use a voice directed system to pre-pick SKU's required for customer orders. Once picked, a conveyor network delivers the SKU's to a "Put-to-order" module. Once the SKU's arrive at the module, a light directed system indicates which SKUs are to be "put" to each order container.

Order fulfillment system designs that incorporate the "goods to the person" principle, allow improved ergonomics since the items to be picked comes to the worker (worker stays in one place) while presenting each SKU to be picked at an ergonomic height with less lifting and bending. Also, the "goods to the person" configuration, which typically utilizes high density storage technology like AS/RS, reduces the cube space required for storing product while increasing inventory accuracy. When the "goods to the person" configuration is utilized for freezer/cooler applications, the workers are kept out of the harsh environment thus improving the worker experience, reducing turnover, and increasing productivity.

2. Inventory

The top inventory issues affecting order fulfillment design include: SKU proliferation and slow moving inventory. Slow moving items take up more and more space in the distribution center; most operations dedicate a pick face for each slow moving SKU.

One solution for accommodating more SKUs and slow moving inventory is the dynamic pick module. In a typical application, thousands of SKUs are contained in a single aisle miniload ASRS (approx. 20 levels high). Dynamic pick faces on the outside of the rack structure on the first level are used by order pickers to build orders. This design reduces the distance walked between picks, reduces order fulfillment time, and increases worker productivity; only the SKU's required for order fulfillment are placed in the 1st level by the miniload device. A dedicated pick face is eliminated; any SKU in the ASRS can be presented to the worker.

3. Customer Order Profile

The average customer order size continues to decline, while customer orders need to be processed with more frequency. This creates the need to ship less than pallet quantities.

To accommodate this trend, fulfillment operations can use techniques such as negative picking and layer picking. A negative pick occurs when cases are removed from a pallet in order to create a pallet load containing the appropriate number of cases required. Layer picking is a method of building a mixed pallet load with a different SKU in each layer.

Another method used to accommodate the growth in smaller order sizes, is batch pick carts. Batch pick carts (accommodating multiple order containers) and voice directed technology combine to efficiently batch pick discrete orders while improving order processing speed and order accuracy.

4. Customer Friendly Order Building

The need to reduce the time and increase the efficiency of the unload process at the load destination is affecting the way orders are processed. For example, some retailers have implemented order fulfillment systems that build pallet loads by combining SKUs into family groups. Other retailers build pallet loads that reflect the retail store planogram for easy shelf restocking. Sequence appropriate pick paths combined with strategic slotting and voice directed picking instructions allows the build up of customer friendly mixed pallets. Mixed SKU pallet building can also be achieved by case picking (in a strategic sequence) to a conveying and sorting system, followed by manual palletizing at the end of each sort lane. If more automation is appropriate, robotic mixed pallet building can be utilized.

5. Energy Management

Operators of distribution centers, warehouses, and production operations are learning that "green" initiatives are not only good for the environment, but "being green" can also mean saving money. Adding more pressure to this scenario is the prediction that energy costs will continue to rise in the future.

The "green" money is created primarily in two areas: energy management and rebates. By reducing the energy required to run your facility, your operational costs go down; add to that an annual rebate check from the local power company and you've got real money. For example, one distribution center that upgraded their conveyor system controls and added a new energy saving conveyor system, received a rebate for $40,000 from their electric power provider.

In operations that utilize mechanized technology such as conveying and sorting systems, there are opportunities to reduce the amount energy required. Conveying and sorting systems are typically turned on at the beginning of the day and run full speed all day until turned off at the end of the day. However, many operations do not have high rate material flow throughout the shift. So why not design the control system to match energy usage with the spikes in throughput? With "run on demand" energy management you can.

Package conveying and sorting technology can be designed to automatically slow down and operate in slow speed during periods of low carton flow activity. Control systems monitor activity on the system and slow down or speed up to meet throughput demands and therefore only use enough power to do the job required. Operating at slower speeds means reduced energy consumption as well as reduced wear and tear on equipment, and therefore increasing the life of the system while reducing maintenance costs. Furthermore, when there is no carton flow for a pre-set period of time, control systems detect the lack of activity and can turn off sections of conveyor where there is no carton flow.

6. Value Added Services

We often think of the warehouse and distribution center as an order fulfillment machine, but increasingly it is becoming a light assembly operation. More value added services are required just before items ship. Supply chain strategies such as postponement are driving this trend. By performing a final assembly operation in the warehouse, a computer printer manufacturer reduced inventory levels and the total number of stock keeping units. A supplier of logo merchandise applies the required logo at the time of order fulfillment to reduce inventory and number of SKUs in the warehouse.

Configuring the product for the customer at the last moment before shipment impacts the order fulfillment system design. Parts may be kitted and assembled into the final product as part of the order fulfillment process. These means assembly cells and work stations need to be blended into the flow paths. Considerations for increased transactions, and specialized labor need to be built into the process. Sequencing and buffering sub systems connected by smart and modular conveyor networks will make up the system solution.

7. DC Optimization

Too many “touches” to the product as it passes through the warehouse kills productivity. The best material handling system requires less movement and minimal product “touches”. Complex flow paths, extra moves, and inefficient activities are adding costs, time, and product damage to the process.

An analysis of process flow should reveal opportunities for improvement. Activity profiling will determine the appropriate configuration for optimized performance. For example, incorporating conveying and sorting technology that integrates ergonomic de-palletizer stations, automatic carton erectors, automatic print and apply labelers, in-line weigh scales, and case sealers will speed the flow, improve accuracy, and reduce the number of product touches.

To increase labor efficiency, many operations have moved from paper based picking to paperless picking. The metrics tell the story; one retailer went from paper based picking rates of 125-150 lines per picker per hour to light directed picking, with rates of 300-500 lines per picker per hour.

Another method of achieving more DC optimization includes the use of crossdocking. Crossdocking decreases the number of product moves since putaway/storage, replenishment, and order selection steps are removed from the process. Although it varies widely depending on the business, a typical operation can crossdock in the range of about 20% of the merchandise.

8. Uneven Order Volume

Today’s distribution operations are more often faced with wider ranges in capacity requirements. The lows are lower and the highs are higher. Many operations do not have the luxury of accommodating a consistent level of order volume and thus material flow volume. What is driving this? Stronger seasonal fluctuations, more promotional activity, and sudden unpredicted changes in demand have a direct impact on the order fulfillment system. Therefore, order fulfillment systems need to be designed with the capability to “flex”.

When demand for order processing is reduced, operations need to dial down capacity and then be ready to quickly dial up the capacity. This may even happen during a shift of operation. To accommodate staffing, order fulfillment systems can be designed such that pick modules and picking zones can be staffed with one or multiple operators. Also pick zone boundaries can expand or contract to optimize picking efficiency. Real time picking systems that utilize RF devices, or light and voice directed technology are designed to accommodate flexible zone boundaries and the ability to add or reduce the number of operators in a zone. Furthermore, these paperless pick systems are fast for temporary workers to learn, especially voice and light directed technology.

Another feature of flexible systems includes the ability to slow down and speed up conveyors and sorters. During hours of slow to moderate order processing requirements, the conveyor speeds can slow down, thus reducing equipment wear, noise and energy. If throughput rates stop for a period of time, theses systems can automatically shut off, section by section, until product flow starts again. During peak periods, the system speeds can increase thereby supporting the high throughput requirements.

9. Perfect Order Performance

Another trend impacting order fulfillment design is the increased awareness and expectations regarding a metric for measuring order fulfillment quality, “perfect order” performance. Customers increasingly expect higher levels of accuracy and some are measuring multiple attributes of the order (correct items and quantity, damage free, correct paperwork, on-time, correct invoice). Other issues relative to order accuracy include the actual cost to fix an incorrect order, not to mention customer satisfaction. In addition to all of this, some companies are implementing “charge backs” for orders received with quantity errors, missing items, or orders that are received late (or too early).

Order fulfillment system designs accommodate the accuracy requirement by eliminating or at least minimizing the possibility of errors in the process. For a wholesale distributor, accuracy was increased so much when voice directed picking replaced paper picking, that the quality check step was eliminated. Meanwhile, an internet retailer of computer supplies scans every item for every order at the pack stations prior to shipment to insure order accuracy. For another wholesale distributor, order accuracy improved to high levels when inventory was placed in an automatic storage and retrieval system (ASRS). Under computer control, inventory and SKU location accuracy dramatically improved over the previous method of using manually operated fork trucks and pallet rack. Before implementation of the ASRS, some inventory was temporarily lost in the warehouse and incorrect items got picked because the wrong SKU was in the pick location.

10. New Methods

The last trend, discussed here, impacting order fulfillment operations is the use of new methods and technologies that increase system effectiveness. New methods and new controls are making existing distribution center technologies operate more efficiently.

The first example is the trend for retailers and wholesalers to use the “put to store” method for building orders. Distribution operations that are required to ship product to the same location on a recurring basis can increase productivity with an order fulfillment strategy referred to as “Put”. Put systems offer a greater range of process control, increased order fulfillment efficiency and improved access to operator metrics. For example, one retailer migrated from active pick locations to the “put” method and obtained excellent results:

Active pick locations, RF:	100 reaches per hour
Put to Store, RF:	385 reaches per hour
Put to Store, light directed:	530 reaches per hour

Retailers and wholesalers are a prime candidate for utilization of a put system in their distribution operations since order fulfillment is performed on a regular schedule with many of the same items being sent to all or a majority of the stores. Typical delivery schedules may range from daily, every other day, three times a week or perhaps once a week.

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New Methods (cont.)

A new control method that is now creating logistics results for mechanized conveying and sorting systems is dynamic optimization software. Dynamic optimization software provides increased throughput with more strategic use of traditional conveying and sorting technology. For example, operations that use wave based picking and sorting can now shift to "wave-less" processing. Wave-less processing omits the inefficient end of wave product flow trickle thereby increasing the system throughput.

Dynamic optimization software can also be used for dynamic balancing of resources such as labor, pick faces, and packing chutes/stations. Finally, dynamic optimization software can replace fixed schedules in place of real time scheduling to allow increased distribution center efficiencies.

About Dematic

Dematic Corp is the world's leading supplier of logistics automation solutions, systems and service. Dematic's integrated material handling solutions incorporate process improvements, material flow technologies, controls, and software to reduce operational costs, maximize productivity, and optimize supply chain performance.

Since 1939, Dematic's focus has been to design, build, install and support the core material handling technologies required to operate effective logistics solutions for multiple industries, including hard goods production and assembly, food/beverage; and wholesale/retail distribution of grocery, hardware, apparel, retail drug, office supplies, and general merchandise.

As a partner in each customer's success, we deploy innovative system solutions based on global "best practice" experience, with innovative products that are designed, tested, and manufactured in a controlled quality environment, and supported by the most responsible and responsive customer service group in the industry.

A global company with operations in 22 countries. Dematic's North American presence includes an engineering/manufacturing headquarters in Grand Rapids, Michigan, and 18 sales/engineering/service offices.

If you are interested in learning more about this topic and how we can help automate your distribution center, please contact Dematic at (877) 725-7500.