


Ken Koenemann, Managing Director, Lean Value Chain Practice, TBM Consulting Group, Inc..



When the trailer pulls away from the dock doors, it's over. You've done all that you can do to ship your customers the right product in the right quantity and have it delivered on time. It's also your final opportunity to get it wrong, which is why manufacturing executives need to pay as much attention to creating a lean material flow in their picking, packing, and shipping areas as they do in the factory.

A lean distribution operation is an integral part of a pull-based value chain that begins with the customer order. Such operations apply lean tools and techniques to simplify packaging, streamline material flow, reduce errors, eliminate extra handling, reduce floor-space requirements, and improve inventory management. In the ideal state—admittedly a far-off vision for many companies—warehouse workers do not have to rush through a large batch of shipments at the end of the month or quarter.

Ripe for the Picking

Getting to that point and setting up a lean distribution operation does not start with equipment. It's not about having new conveyors or the latest material-handling automation to eliminate labor hours. New equipment and technology may be part of the final solution, but lean distribution starts by thinking about how to apply the lean principles of eliminating waste, creating flow, and implementing pull-based processes to create a value chain driven by customer demand. The goal on the floor is to create a linear material flow, based on takt time (the total net daily operating time divided by the total daily customer demand), where

product comes from manufacturing and goes directly to the shipping dock with no double handling. Current equipment may or may not support that objective.

For example, picking orders from flow racks with products slotted based on sales velocity and ergonomic factors (with fast movers located between the thighs and shoulders) will be far more efficient than picking orders from pallet racks. Flow racks allow incoming product to be loaded on one side and then slide forward to the pick face as it is consumed, supporting first-in, first-out inventory management.

In one of our client's facilities, the travel time for order pickers in the existing pallet rack shrank from upwards of two minutes per item to 40 seconds or less with flow racks. New labels with specific colors for each part family further reduced opportunities for error during put away and order picking. Other efficiency improvements and reductions in travel time not directly related to new equipment came from zone picking waves of orders rather than have each order picker work on a single order at a time. This tactic allows order pickers to simultaneously fill lines on multiple orders, which are later consolidated by order.



Standard Packing Cells Lean Pick, Pack, and Ship	Before	Results
Volume (lines per day)	900	1,100
Productivity (average lines per hour per person)	5.5	7.5
Defects per million opportunities	1,392	200

Another common warehouse practice that can contribute to errors and extra handling is releasing orders to be picked in the order that they happen to come in or by some other random method that's not linked to the shipping schedule. What's picked in the morning should go out in the late morning or early afternoon, not that evening or the following day. Otherwise boxes and pallets just sit around, taking up space on the shipping dock.

Packing to Perfection

Packing is another area where there's a lot of opportunity for a lean approach to make dramatic improvements. Packing departments in many companies are haphazard, chaotic areas with randomly placed tables and equipment—scales, taping equipment, label printers and shrink-wrapping machines—surrounded by shelves of corrugated material and shipment staging areas.

In contrast, a lean packing operation features ergonomically designed work cells, each outfitted with the same equipment, which support standardized work and make it easy for employees to rotate from one workstation to the next. Each work cell utilizes standard-sized boxes and has the necessary dunnage within easy reach. A

dedicated material support person (a “waterspider” in lean parlance) helps replenish packaging supplies for all of the cells and loads the sealed boxes onto pallets. This allows order packers to stay focused on their work. To further save handling and travel time, a return conveyor automatically transports totes from the packing area back to order picking. A lean setup like this can have a dramatic impact on throughput and the amount of work-in-process inventory in the packing and shipping area.

Of course the packing operation goes smoother, with less variation in the workload, when supply-chain managers have worked with customers to optimize pack sizes based on actual demand. On another recent project our client had been specifying a minimum order quantity of 65 units for a particular product. Their customers were large retailers. Each store sold 10.6 units of this particular product per week on average, which meant that the minimum order quantity represented a full month and a half of inventory. By reducing the unit pack quantity to 13, much closer to the weekly sales average, they saved storage and shelf space for the customer and dramatically smoothed out the replenishment process.

Fast Cash

Today's global financial turmoil and the tightened credit markets require an urgent focus to redirect your lean focus to find opportunities to convert balance sheet items like inventory and receivables to cash.

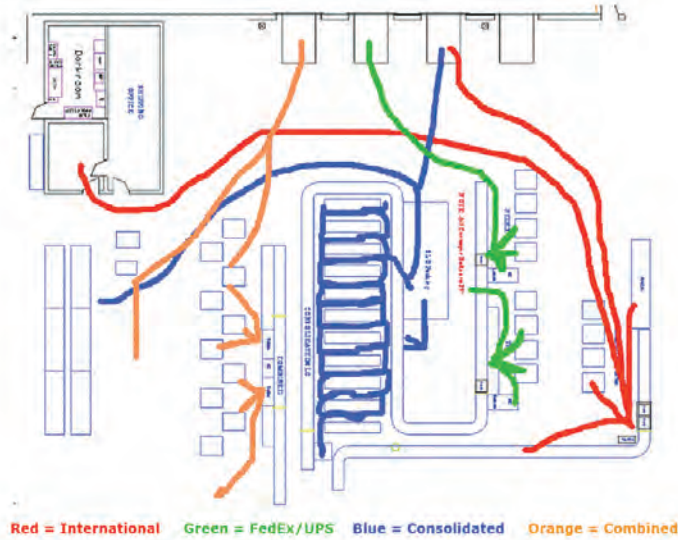
Many of our clients are seeking to rapidly improve cash position by conducting a series of lean projects focused to reduce the working capital in the value chain. We start by understanding your demand segments and by conducting a product portfolio review. We can quickly identify and start implementation of product-line rationalization and pull-replenishment activities that reduce inventory and increase gross margins.

Measurable results can be obtained within 8–10 weeks for both discrete and continuous process manufacturing companies:

- 10% ~ 45% reduction in finished goods inventory
- 15% ~ 50% reduction in raw material inventory
- 20% ~ 30% reduction in Days Sales Outstanding

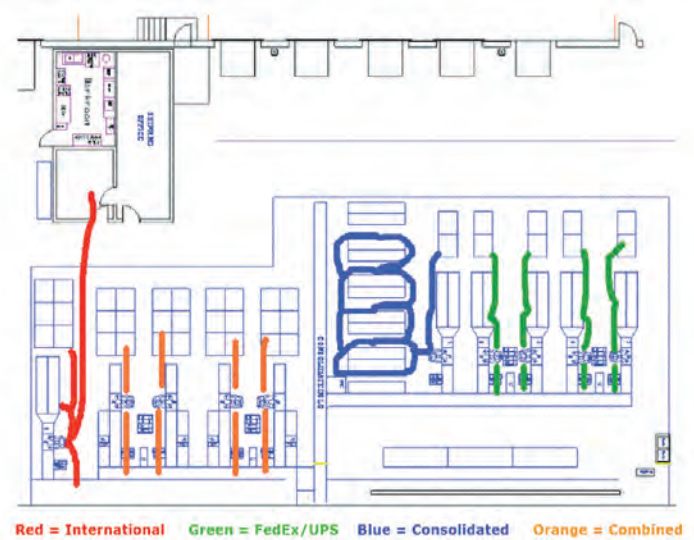
We can provide you with critical training or consulting to help make immediate, meaningful improvement in your working capital position. Contact Kathy Million at kmillion@tbmcm.com to speak with a member of the TBM Lean Value Chain practice if you'd like to learn more.

Shipping Department before Kaizen



This diagram shows the shipping department with inefficient flow prior to kaizen activity. Waste included excess handling of totes and pallets, no standardization of packing areas, and product stored in a non-friendly, poor-ergonomic fashion. Pallets of product scheduled to ship were moved from packing stations and staged by dock doors.

Lean Shipping Department



This diagram shows the redesigned material flow through the shipping department. From manufacturing and inventory storage areas, FedEx/UPS shipments (green), consolidated orders (blue), combined shipments (orange), and international shipments (red), flow directly to packaging stations and out the dock doors (top).

Ship Shape

When it comes to shipping, standard pack sizes and carton configurations have some other benefits. It's much easier to "cube out" a trailer—fill all of the space available and thereby minimize transportation costs—if you have three standard box sizes compared to 20, for example. With standard packaging, managers can figure out how to load the trailer for maximum efficiency before orders have been picked, and even release orders so that shipping personnel can build optimum loads.

In many distribution operations today success is defined by the "perfect order." This is not a theoretical ideal, but a higher level metric that combines the error-free performance at each stage of an order. Factors include order entry accuracy, warehouse pick accuracy, on-time delivery rate, damage-free shipment rate, and invoice accuracy. Lean supports the quest for the

perfect order by improving accuracy and throughput while simultaneously reducing operating costs because there are fewer errors being made and inventory requirements are lowered.

A lean distribution operation is an integral part of a lean value chain. Concepts such as working to takt time are just as applicable in the warehouse as they are on the shop floor because they align operations with demand to give customers what they want, when and where they want it, and in the right condition. Getting there doesn't require tons of new technology and automation. It requires a change in mindset and an organization-wide commitment to making material flow. ■