Improving Warehouse Product Flow

When thinking about Improving Product Flow, our mind immediately breaks the matter into three parts (acquisition, storage and handling, and disposition), the first and third of which seem fairly irrelevant at first blush. Our second thought is “‘Improving’ for whom?” And immediately on the heels of that one comes another – “As expressed in what terms – dollars? Productivity? Service?”.

The answers to that “How…” question alone drive one into every aspect of the overall process: purchasing, manufacturing and vendors, warehousing and distribution, transportation, information systems, stores and customers, marketing, sales and finance.

Three broadly stated answers together touch on the interests of all parties identified above:

- Buy right; own product for as short a time as possible; sell it before you have to pay for it.
- Minimize product handling.
- Maximize the utilization of all resources associated with your process – space, labor, equipment, cash and time.

If you think for a minute about any one of these, it soon becomes obvious that they are highly interrelated, and all of them bear squarely on operations within the four walls of the distribution facility.

Delivering on each of these goals can be fairly complex but can also be very powerful. Let’s see how these concepts might leverage product flow to the benefit of those who manage them well.

Buy Right

Initially “buying right” might not seem to relate directly to the topic at hand. However, product flow must be a major consideration of those who determine inventory ownership and vendor requirements if the organization is to have any chance of meeting such a goal.

Only under the right circumstances can product be acquired in such a way that it flows rather than being stored. That means it arrives at its distribution point shortly before the time for its use (shipment or consumption). This practice facilitates cross-docking, minimizes holding capacity requirements and increases inventory turns which usually improves cash flow in the operation. There are many more implications for handling which are addressed below.

Finally, the product should be acquired under terms that enable the completion of the sales and payment for the product’s consumption prior to paying the vendor for the product whenever possible. This is a major contribution which “good” product flow (i.e. well-planned, consistent, reliable and efficient) makes to the organization as a whole. It amounts to having your inventory funded by your vendors and your customers.

This is accomplished by negotiating vendor payment terms that exceed those of your customer, by turning the inventory quickly, by eliminating all errors (they will only extend the cash-to-cash cycle and increase costs and otherwise interrupt the planning for and flow of inventory and increase returns), and by shipping on time.

Minimize Product Handling

In broad strokes, a major contributor to minimizing product handling is to assure that the right quantity is deployed where and when it is needed. However, this is more a strategic than tactical issue and the subject of another longer treatment than can be made here.

Minimizing handling also means that inbound product arrives in a form best suited to handling at the destination (properly and easily identified, and unitized based on what is to be done with it). If the product is to be cross-docked, it will be packaged and marked for a cross-dock destination – usually with bar code labeling. Cross-docked product generally leaves the facility within hours of its arrival.
It may go directly from an in-bound dock into an out-bound trailer, which will be dispatched as soon as it is full. Or it may be temporarily stored in random pallet storage or a staging area near the outbound dock until its trailer is brought to the dock for loading.

In the case of highly automated facilities operated by large volume retailers or small package handlers, product may be in the facility for only 7 or 8 minutes and is untouched by human hands at any point. Talk about minimizing handling!

Product that needs to be ticketed and assorted for repack with other products being shipped to the same destination may be best moved in bulk. This makes it easiest to rework before shipping it on.

Quantity is not to be overlooked in this examination either. The “it” that arrives at the inbound dock should usually be a quantity suited to immediate or short-term demand, not a “just-in-case” supply to be held. Some products can be purchased in quantities that match the capacity of its dedicated pick location, in which case it is moved once from the dock to the pick point. The only other handling is to pick and ship it, rather than moving it from the dock to rework, to reserve, to a pick location and then picking and shipping it.

Where the product is destined for short-term storage it should be palletized with the right height and width for its short-term storage location. This maximizes space utilization by filling the whole slot with the right size pallet. It also saves the labor and handling involved in restacking product when pallets are too large for the location designated for their storage.

The consequences of this approach to product handling are several. Minimizing handling reduces labor cost and reduces product loss due to damage and loss (lost or damaged product obviously does not flow). Minimizing handling also eliminates delays and otherwise reduces the time required to complete work pointed at servicing the customer. And reducing product handling improves quality because it reduces the number of opportunities to make a mistake in quantity, location or information. In combination, they can make it easier to consistently put away all products received within 12 to 24 hours of its arrival, making available to ship immediately – a goal most warehouse operations should be able to attain.

**Product Slotting**

Once the decision has been made to store the product, a plan must be devised to answer the “Where?” question. This is the point at which in- and out-bound product flow meet and is also a subject suitable for a much longer discussion.

Among the many considerations that can be taken into account are the physical characteristics of the product (fragility, weight, cube, temperature sensitivity), its value (dollars or scarcity), its velocity (volume shipped per period) and its relationship to other products (men who order shirts in one color usually order the same shirt in one or two other colors at the same time; women often order a blouse and skirt together; wheel barrows come in parts – when a pan is ordered, its usually accompanied by handles and a wheel; when someone asks for literature about a particular investment, they are often interested in others that are related or similar in holdings, earnings, or some other common denominator feature).

**Warehouse Travel Optimization**

From the perspective of “flow”, it is also appropriate to consider factors that minimize travel and labor usage. One approach is to always attempt to fill the dedicated pick location with newly arrived inbound product to minimize movement to and from reserve storage. More sophisticated receiving or inventory management software applications will do this analysis and inform the associate when this opportunity is available. This reduces both travel and handling.

Another factor is to multi-task where possible. For instance, when products are ordered in small quantities, they are generally put away in mixed pallet loads. By evaluating the optimal travel path to complete a mixed-pallet put-away, a robust WMS application can significantly reduce the travel element in that work.

Similarly, replenishment of product from reserve to dedicated pick locations involves travel to “pick” product from reserve and to “put” product into forward pick locations. This affords two different opportunities to optimize travel paths.
A fourth is to do task interleaving. Where put-away tasks and replenishment tasks require the same kind of equipment and take place in the same geography, a shared task pool can be established. When the operator completes a task, the software then takes into account where that task ends before assigning the next task, in order to minimize travel for the operator. This also has the potential to increase the productive utilization of the equipment and the operator’s time.

Taken together, these four tactics will significantly enhance the flow of product through the facility by helping assure that planned execution of all the tasks that make up the distribution process can be accomplished consistently and as scheduled.

Disposition - Transportation and Product Flow

As was the case with product acquisition, at first glance transportation may seem irrelevant or ancillary, but it is not. Ongoing pressures on the supply chain further diminish the margin for error and continue to try to wring out costs. In an effort to gain more control and limit the consequences of errors and delays, both of which seriously impact product flow, operators look to transportation for help.

Productive use of equipment is one way in which transportation impacts product flow. Like the old joke about the half glass of water, whether a trailer is half empty or half full depends on whom you ask. The third answer, of course, is that there may be too much trailer. No matter what your perspective, improving utilization can improve product flow.

In the same way that it is less productive for a forklift operator to travel through the warehouse without a load, it is unproductive to have unused or partially used equipment sitting around. One can attack this problem from several directions. First, assess what equipment is idle and when. Conduct a simple tally of equipment in use by hour of the day. Another simple way to evaluate this situation is to simply walk out into the yard and count idle equipment every hour. It is also informative to look at every departing trailer and rank its fullness for a week or so (one quarter, one third, one half full, etc.).

If the results warrant it, test ways to change the equation. Can improved routing for outbound delivery reduce the equipment requirement without increasing costs or degrading delivery service? Can deliveries be made at other times of the day or night that reduce the amount of equipment required over 24 hours? Can I entice customers to take larger quantities and fill the trailers when shipments are made? In combination, these may add surprising benefits.

Another concept along these lines is to pick up inbound product using outbound equipment that is ready to return. Every bit of the product which is shipped out is shipped in as well. Picking up inbound shipments with equipment under your control (your fleet or your contract carriers) improves control of product flow, has the potential to reduce inbound delays, eliminates “dead head” travel and improves equipment utilization.

Well, that’s done, or is it?

Now that the problem of product flow has been addressed and numerous solutions proposed, it is only fair to close with a warning. While the strategies and solutions offered above are valid and proven, they are not permanent fixes. Markets, vendors, products and, especially, customers change constantly. A brief review of the factors we highlighted above will make it clear that each of these elements will also change the fit between new demand and current product flow. It needs to be part of the world of continuous improvement, not the world of the fixed solution.

May good flow (analysis) be with you always.

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Tom Zosel Associates (TZA) is the world leader in optimizing logistics performance. Consistently delivering results for numerous logistics leaders, TZA helps clients reduce operating costs, substantially improve logistics processes, eliminate bottlenecks, increase throughput and capacity, achieve material handling automation goals, and optimize total logistics network performance.

These results are achieved through a focused portfolio of consulting services and technology tools. TZA’s unique methodology, which helps companies improve strategic decisions through an unbiased, comprehensive evaluation of appropriate alternatives, enables companies to achieve their logistics goals at the minimum level of required investment.

TZA’s core competencies include Strategic Network Design, Facility Design and Material Handling Engineering, Transportation System Design, Logistics Software Solutions and Productivity Improvement Programs. TZA’s ProTrack software offers the industry’s most powerful labor planning and reporting software solution.

TZA is passionate about helping its clients succeed with a laser-focused methodology built on value realization.