

Pricing and costing of warehouse services

By Rick Emerson and Ken Ackerman

Editor's Note: This article was inspired by a logistics service provider who developed a simple and innovative pricing structure. Our guest author, Rick Emerson, has decades of experience with a multi-city warehousing company. This article takes a different approach. KBA

In nearly every situation, there are two commonly identified cost centers, *storage* and *handling*. In addition, there are usually indirect costs for management and clerical salaries that are usually added to these direct cost centers. Finally, a profit margin must be added to arrive at unit selling prices.

Understanding storage costs

The biggest influence on storage costs is the number of SKUs or line items to be placed in storage. If there is just a single item in the inventory, the operator could fill the space with no aisles, maximizing density. But as soon as there is more than one SKU, access must be provided to reach each of the items. When the SKU count runs into the hundreds or thousands, shelving or rack will be needed to allow access to each item. If the items require lot or date control, or serial number tracking, this complexity can expand storage requirements significantly. The cost of providing this storage equipment must be considered, as well as the layout challenge of providing access.

Fire risk is also a factor in storage costs. Certain items with substantial paper or plastic content are considered to be an above average fire hazard, especially if stored on wooden pallets. Where hazardous materials are involved, stacking height will be limited by the requirements of the insurance carrier. In some cases, such as storage of aerosol containers, modifications to the warehouse are required to control the risk of fire loss.

Honeycombing is also a factor in calculating storage cost. Just like combs in a beehive, there will always be spaces which are partially empty but must be retained. A partially filled pallet must be stored until it is completely empty. Space requirements will increase in proportion to the number of SKUs in storage.

When pricing is per unit, a critical factor in calculating storage costs is turnover. The warehouse operator pays the costs of real estate by the month, since leasing and other ownership expenses are usually incurred in monthly intervals. After adding a profit margin, the operator then

measures the unit capacity of the space to arrive at a price per unit. However, the stored product fee will not cover monthly costs whenever the average inventory turns less than one month, or 12 times per year. Turnover is a ratio of throughput to inventory. Therefore, the first step is to calculate throughput. This is the total of receipts plus shipments, divided by two. The average inventory is calculated by adding beginning inventory plus ending inventory and dividing this total by two. For inventory that turns less than 12 times per year, an extra storage fee is justified. When inventories turn faster than 12 times per year, an appropriate discount from the storage fee is sometimes offered.

The cost of material handling

There are always at least two operations involved in handling products at a warehouse. The first is the cost of receiving merchandise and moving it into storage. The second is the cost of shipping, including removal from the storage area. There are many more factors beyond these two. In many warehouses, the cost of picking orders is the largest cost, particularly if the operator is handling individual cases. In fulfillment warehousing, there may be a cost of breaking open cartons to ship individual packages. The cost of dealing with damaged product must also be considered.

Every handling cost calculation starts with these two numbers:

- The fully burdened cost of each labor hour
- The time needed to accomplish receiving and shipping of each item

The first calculation is relatively easy, and the second is more difficult. Until the middle of the 20th century, the warehousing industry seldom employed industrial engineering techniques to measure the time needed to perform tasks. The late Eugene Gagnon was instrumental in demonstrating that engineering standards could be applied. Before that, the process usually involved trial and error.

Additionally, there are costs for operating handling equipment, such as depreciation or monthly lease costs, maintenance and fuel. These costs are often included as part of the fully burdened cost of each labor hour.

Finally, there is an allocation of management and clerical salaries, as well as other overhead items. This is usually allocated across both the storage and handling prices.

In today's environment, software systems costs should also be included.

The relationship between cost and selling price

When you go to the grocery and purchase a can of soup, the store tells you the price, as well as the price of competitive products. Nobody tells you the manufacturer's cost of that product. You buy it because you recognize that pricing is reasonable, or you reject it if the price seems too high. Several decades ago, when transportation in the United States was regulated, freight rates were usually expressed in a price per hundredweight – abbreviated as CWT. Because warehousing was considered to be part of the transport process, the pricing of warehouse services also was in dollars per CWT per month for storage, plus another fee per CWT for in and out handling. The shipper accepted or rejected the price with minimal knowledge of how it was calculated.

We know of a few cases where a manufacturer identified a fair price from a logistics service provider because of detailed knowledge of his/her own warehousing costs. For example, one manufacturer of canned soup operates his own warehouses with a target unit price, based on actual costs. This manufacturer knows that a storage fee per case might be \$.20 per unit, and a price for in and out handling should be \$.80. With this knowledge, the buyer will recognize a price that is too high, but also one that is too low. It is a sad fact that there are a few service providers who deliberately offer low prices in the expectation of making an upward rate adjustment at a later time.

The pricing of warehouse services is usually based on convenience rather than cost. We store and handle units, not hundredweights, so the buyer must convert hundredweights into a rate per unit. The price of a can of soup in the grocery is per can, not per hundredweight. Therefore, the vendor of warehouse services should have a means of converting warehouse charges into a fee per unit.

Cost plus pricing of warehouse services

There are situations where a cost per unit is difficult or impossible to calculate. A manufacturer of office copiers was shopping for a logistic service provider to handle the distribution of replacement parts. This was a new operation, and there were no statistics to support turnover calculations or handling costs, nor were there any weights and dimensions of the units to be stored. Lacking any data, they agreed to a price based on square feet of space, plus hourly costs for warehouse labor and lift trucks, and a profit margin.

The issue with cost plus pricing is that it cannot be readily audited; It is not practical for the buyer to constantly inspect to be sure that the vendor is not cheating in creating the billing numbers. Sadly, we have seen cases where a dishonest warehouse manager abused the process and was caught charging for space that was never occupied, or for labor that was not expended. In the best of these situations, the buyer engaged a consultant to help both parties arrive at a pricing system that could be audited. The risk of cost plus pricing for handling can be mitigated by comparing productivity to specified KPIs

(key performance indicators) that are part of the contract.

Usually, it is advisable to convert cost plus pricing to unit costs just as soon as enough information is available to accomplish this.

Other Pricing Methodologies

Some pricing agreements are set up on a fixed and variable pricing tied to KPIs. Costs that are fixed, mostly storage but also some handling equipment leases are billed as a negotiated monthly fee, based upon an agreed upon activity level. They will be adjusted only when there is a significant change of volume. Variable costs are usually tied to the direct labor hours expended, but they may be compared to specified productivity KPIs.

Some pricing agreements may include gain sharing incentives that create a motivation for improvement. Gain sharing provides an incentive for the service provider to identify cost saving ideas with a promise of a sharing in the savings.

A model unit pricing system

One logistics service provider is a specialist in household products. His clients have hundreds of SKUs in a variety of sizes. The dimensions of each SKU are readily available. The vendor has developed a cubic foot rate (perhaps 18 cents) as the common denominator to create pricing for each SKU, even with substantial variation in sizes. The same cubic foot price is also applied for receiving, shipping and storage. There is also a turn calculation similar to the one described earlier to compensate the provider if inventory turnover does not reach the agreed velocity. The pricing system is auditable, since all parties can determine the number of cubic feet in each SKU.

An industry obsessed with prices

If you examine the website home pages of logistics service providers, a great many of them have a tab labeled "request a quote" on the homepage. Your local grocery store does not suggest that you request a quote before shopping. Most surveys of warehouse buyers reveal that pricing is not the first criterion for purchase. The sensible buyer knows that a price that is below normal cost is a sign of trouble. There are no trade secrets in the business of warehousing, so it is unlikely that any vendor who is pricing below normal cost will hold that price for long. The intelligent buyer is one who understands warehouse costs and seeks a vendor who will operate at a profit and earn enough revenue to provide dependable service.



After a multi-decade career with Illinois-based DSC Logistics (now CJ Logistics), Rick Emerson is currently handling consulting engagements all over the US. Rick established and grew DSC's finance department, building ABC cost base pricing and customer profitability reporting systems before being promoted into operations leadership. He is a long-time board member for the Columbus Roundtable of CSCMP and can be contacted at: rick@emersonsupplychainconsulting.com.

KEN'S COMMENTS

Will supply chain disruption destroy JIT?



A major advancement in the last decades of the 20th century was the auto industry's adoption of "just-in-time" or JIT. Inventories of supplies were cut, and vendors were required to deliver on precise timetables to ensure that components were available at exactly the time when they were needed. In Japan, the secret to success was to position suppliers within a few miles of the assembly plant. In America, where the tent pegs are further apart, JIT is more difficult. Today we see a situation where the supply-chain seems broken, and the cost of money is at record lows. A natural reaction to this condition is to replace JIT with "just in case." Stockpiling massive inventories seems to be a reasonable way to avoid a shutdown of the assembly line. Is this one reason why the demand for warehouse space so greatly exceeds the supply?



Why micromanagement is a habit that is tough to break

We have all experienced micromanagement, first when it is done to us by a boss and later when we do it ourselves. Even when we know it isn't effective and we don't like it

done to us, why does the habit persist? Here are a few reasons:

- We are only eager to help. One way to pitch in is to start doing the job yourself. When your team is overloaded, this kind of micromanagement might be welcome because it helps get the job done. But when there is no overload, doing it yourself is unwelcome and not helpful.
- We confuse the processes of showing and coaching. Coaching is an important element of leadership, but it is far more than mere demonstration. People learn by doing, not just by watching. If watching is not accompanied by learning, the person may feel micromanaged.
- We are most likely to micromanage those things that we know well and are good at. Because of our competence and confidence, it is painful to watch somebody do the job in a different way than the one that we are used to. Therefore, we can't resist the temptation to jump in and get it done with our favorite method.
- We emphasize short-term results. When speed seems more important than enabling others to learn and grow, there is an irresistible temptation to do it yourself.
- When the cost and risk of doing it wrong is very high, it is safer to do it yourself. Making mistakes is part of the learning process, and there are cases where errors seem intolerable.

None of these examples are bad things. Doing them occasionally does not make you a bad leader. They are problems when they become the way we always work.

WAREHOUSING TIPS

Bringing them back to the workplace

Most of the workers in the warehouse are handling freight, and there has never been a way to do this by working from home. But the knowledge workers can work from home or use a hybrid schedule where they need not be at the office every day. Most employers are trying to minimize the number of people who work from home, and there are several ways to do this.

One approach is to provide your people new or better on-site perks. If there is a cafeteria or a food truck to provide lunch or snacks for your workers, what could you do to make that food service more attractive? Could you find a vendor who could take care of employees laundry and dry cleaning with pickup and delivery on site? Could you arrange for your employees to have e-commerce packages delivered to your workplace rather than to their home, thus avoiding the risk of porch pirates?

Another attraction is flexible schedules. Does every knowledge worker need to be on-site at 8 AM? Could

some arrive earlier, or later? Ask your people what they want. What changes might make your company the most attractive workplace in your community?



How old is too old?

We were surprised by an article titled "US supply of logistics warehouses is getting too old." Unlike clothing fashions, storage buildings have no style obsolescence. Even those built before the development of forklifts can be made useful for fulfillment.

Those designed for trailer drop and hook may not have sufficient land to park vehicles, but this can be corrected by acquiring nearby land. In this time of unprecedented shortage of storage space, the most creative developers will find ways to make obsolescent buildings usable.

The author tries to prove his point by observing that average age of industrial real estate in established commerce centers is about 50 years.

One of our oldest universities has an administration building that bears the scars of a battle during the American Revolution. Some might say the 18th century building is too old, but it remains in active use today.

As 3PLs emerge from two years of turmoil, how will providers adapt?

By G. Franz, *DC Velocity*, April 2022, pg. 28.

Based on interviews with operators, market analysts and private equity firms, this article identifies five major trends.

- Users of logistics services have migrated from minimal inventory and JIT to robust inventories.
- You can no longer wrestle with service providers to get low rates. Rather you should ask the provider to identify practices that add cost, then work to eliminate those.
- How quickly can the provider, or the client, adapt to change?
- The level of venture capital and private equity money flowing into 3PLs has been stunning. "They are destroying the market, throwing money at anything that moves."
- The best 3PLs combine a consultative approach with accurate data and intelligence to help shippers make the best decisions.



Storage rack fundamentals

By V. Kickham, *DC Velocity*, April 2022, pg. 38.

Six types of rack are identified and described in this primer on storage equipment. These are selective racking, carton flow rack, pallet flow rack, drive in racks, push-back rack and cantilever rack.

The user starts by determining needs, both immediate and long term. Maximizing storage capacity is a priority today when space is tighter and more costly than ever before. Seismic considerations are critical in areas where earthquake is a risk. Safety takes a greater role in rack design today.



Optimizing the reverse logistics process using analytics

By M. Foy, *PARCEL*, April 2022, pg. 22.

Analytics are used to control the cost of handling returns. These data elements are considered:

- Distance from customer to returns warehouse
- Physical handling cost in the returns warehouse
- Customer history of returning, and percentage of returns that are re-sellable
- Condition history for that item
- Current demand for that item
- Current price for the item versus historical prices

Merchants are now seeking to optimize returns to yield the most margin.

Piece picking robots make their mark

By G. Forger, *Modern Materials Handling*, April 2022, pg. 36.

Until recently, nearly all robot applications in warehousing were designed to cut travel time. They are used to reduce the amount of walking or driving between the place where the product is stored and the receiving or loading dock. The picking of individual pieces has been considered to be too complicated for most robotic applications.

This article describes how the landscape is changing. Six different variations in picking must be considered: manual, automated, batch, wave, goods-to-person, and person-to-goods. A first step is to establish a desired key performance indicator (KPI). FedEx has done this, and they say that each robotic system should sort 1000 to 1100 packages per hour. Another variable is those devices that grab individual pieces. The two most common options are a suction cup or a gripper.

The author admits that piece picking robots are not entirely autonomous. Most require people to intervene at some point.



Digital decongestants

The Economist, May 7, pg. 58.

This article is about freight forwarding and freight brokerage, and about new software to control both processes. The two biggest freight brokers are DHL and Kuehne + Nagel, but these two have a combined global market penetration of only 6%. A table identifies seven digital freight forwarders, arrayed by size of venture capital (VC) investment. The largest one, Flexport, automates processes such as getting quotes, filling out documents, and coordinating with shippers and carriers.

A common feature of such platforms is the ability to glean insights from data. Though the freight forwarding industry is described as "archaic," it has tripled its business volume in each of the past four years. Because of the highly fragmented nature of this business, an upstart broker with better technology has the ability to change the game.



Lean isn't mean and agile isn't cheap

By P. Myerson, *Inbound Logistics*, April 2022, pg. 34.

Since 2010, there has been a shift in thinking from an emphasis on efficiency to a more responsible one that requires flexibility. Lean philosophy is all about cutting costs. Agility is about customer responsiveness, flexibility, and collaboration. The best logistics service providers have a combination of both.