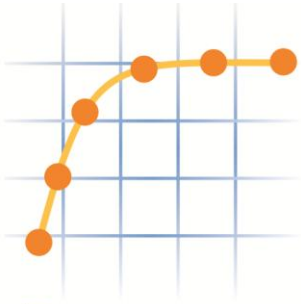


abco automation llc.

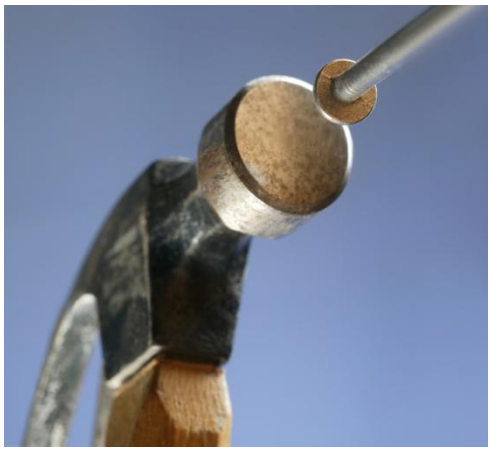
The Pareto Curve and How it Affects Distribution Center Design

An e-book from abco automation

The Pareto Curve in Distribution

If all you have is a hammer everything looks like a nail

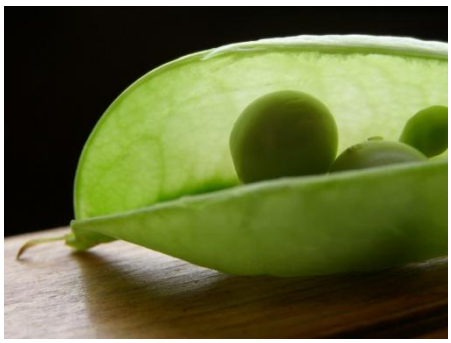
Do you have a single-technology distribution center? Do you pick all your SKUs using the same method? If you do have a single technology distribution center you may be missing some huge opportunities for efficiency. Let's explore why that is; and that means going to Italy.



The Pareto Curve

The Italian economist Vilfredo Pareto first observed that 80% of the land in Italy was owned by 20% of the population. He also was able to apply it to the income in his country. Most of the money was controlled by a relatively small percent of the population.

Years later, business-management thinker, Joseph M. Juran, developed the 80/20 principle and named it after Pareto.

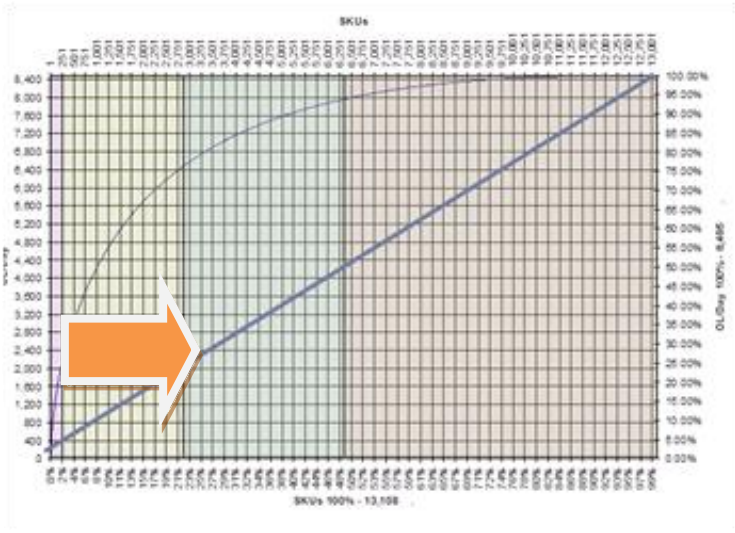


And this holds true across a great swath of our world: 20% of your customers account for 80% of your sales, 80% of your HR problems come from 20% of your workforce, etc. This also hold true in our world of distribution. In fact, there is a great deal of similarity between peas and your distribution center.

The 80/20 rule states that 20% of your SKU-base does 80% of your volume. That's right: 80% of your volume is done by 20% of your SKUs. And conversely 80% of your SKUs do only 20% of your volume.

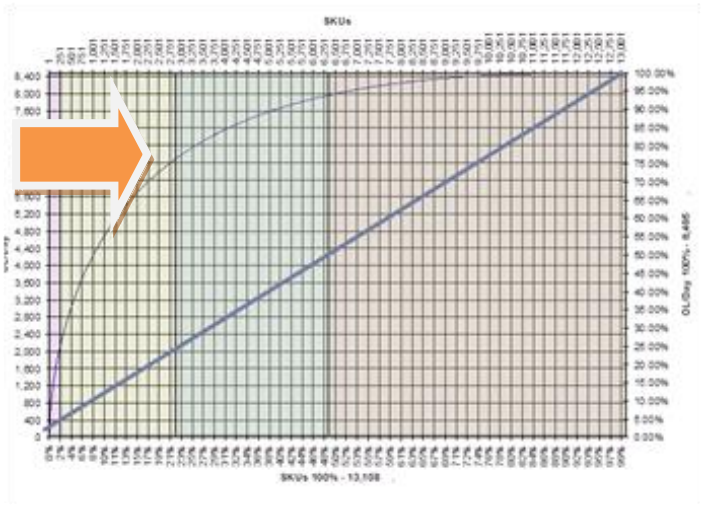
Only 20% of your SKUs make up 80% of your volume!

Ok great, so what does that have to do with your distribution center design? Well if you're picking all of your SKUs the same way, then you are missing out on huge opportunities.



If you have a single-technology picking system you are **assuming** that every SKU that you add moves at the same rate as the last one you added. So you have a linear function on this curve, as demonstrated by the arrow to the right.

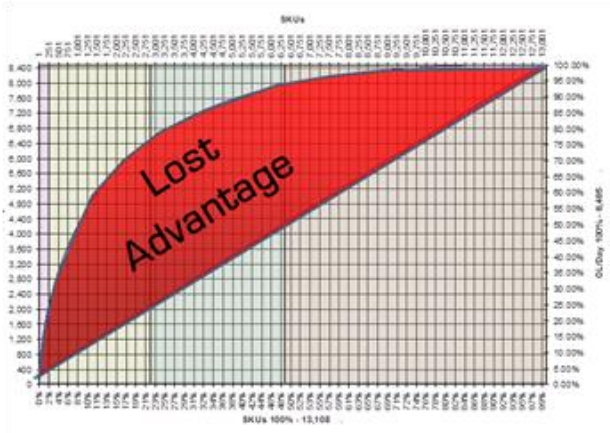
So proceeding with that thought as you add from 25% to 50% of your SKU base, you add from 25 to 50% more business volume.



You are assuming in your one-technology system that everything moves through the distribution center as the same rate.

But Pareto says 20% of my SKU base does 80% of my business volume. And it doesn't really matter whether I measure my business volume in lines or pieces, however you want to metric your business volume, it really doesn't matter.

And you will probably agree with him because you know that that this season's most fashionable black dress is not moving out of the distribution center at the same rate as the remnants of last year's ill-fated electric-purple shoe line.



So your distribution center SKU movement really looks like this curved line to the right.

There is a big difference between the 2 lines and that is a lost advantage that you can't realize if you are picking SKUs in your distribution center the same way. And that's because you can really leverage the difference

between this linear relationship in this Pareto curve with the smart application of some design and technology.

Why is there Single Technology?

So why do you have a single technology distribution center. And you want to know why?

"Doesn't everybody know in the industry that sells material handling systems know the Pareto Curve? And if they do know it why would they sell me only one piece of the puzzle?"

Unfortunately, the fact is that a lot of people don't know about the Pareto Curve and how it affects your distribution center.

Secondly if they do know it, it may not be in their best interest to design your distribution center to it. Let's look a bit at their motivation.

If a company only has one product, they only want to sell that product. If you sell apples you don't want your customer to buy oranges. Heck no, you don't need oranges! Its apples for you!

Thirdly a lot of manufacturers don't have the versatility of a system integrator. They can't (or won't) source another product or solution that might be better for their customers because they have to keep the factory pumping out their solutions.

Lastly, your distribution center may just be outdated. A lot of manual solutions are single-technology systems. And that technology is people. An army of people marching through the distribution center, maybe with forklifts or cart, but basically armed with only with one technology.

The advent of computers in the DC is still pretty new. Originally inventory was managed with ledgers and shelves. Then when the first time that computers came into the DC they were based on that same format of ledgers. That's the genesis of "wave" or "batch" picking processes.

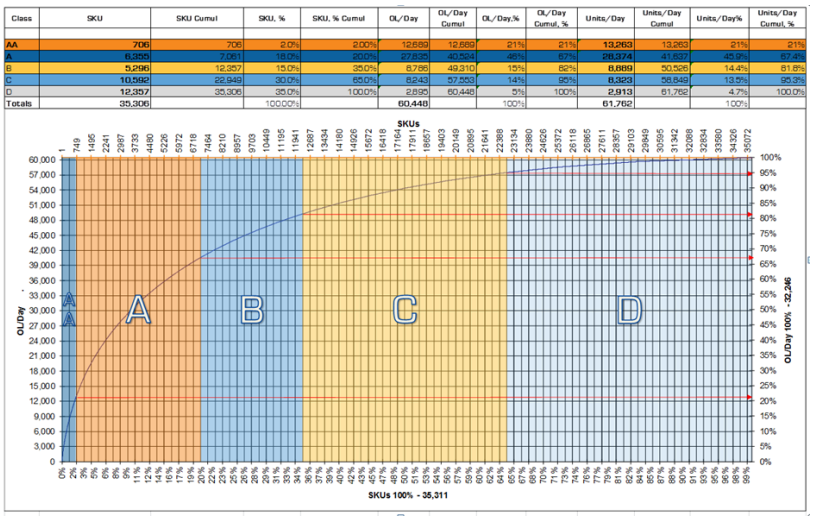
However today in the second decade of the 21st century, we have a vast assortment of storage and picking technologies that can do amazing things with no tie whatsoever to old-style wave and batch processing.

So for those reasons, and maybe a couple others, many distribution centers are still single technology systems.

Leveraging the Curve

So how can you leverage the curve to get to those efficiencies we addressed above? Let's look at the SKUs in your distribution center. If you divide all of the different SKUs in your DC you have your "A's", your "B's", your "C's" and then your "D's". These SKUs are all categorized based on the way that they move through the system.

So we have our SKUs down near the end which are my "D" SKUs, or my "dog" SKUs – the museum pieces. All of these SKUs down at the end might only generate 4% of your business volume. If you combine them with the "C's" together maybe they do somewhere between 10 to 15% of your whole business volume. Yet they are going to represent 40-50% or more of your SKU base.



Class	SKU	SKU Cumul	SKU, %	SKU, % Cumul	OL/Day	OL/Day Cumul	OL/Day,%	OL/Day Cumul, %	Units/Day	Units/Day Cumul	Units/Day%	Units/Day Cumul, %
AA	706	706	2.0%	2.00%	12,669	12,669	21%	21%	13,253	13,253	21%	21%
A	6,295	7,001	18.0%	20.0%	27,825	40,504	46%	67%	28,274	41,527	45.9%	67.4%
B	5,296	12,357	15.0%	35.0%	8,786	49,310	15%	82%	8,889	50,526	14.4%	81.8%
C	10,592	22,949	30.0%	65.0%	8,243	57,553	14%	95%	8,323	58,849	13.5%	95.3%
D	12,357	35,306	35.0%	100.0%	2,895	60,448	5%	100%	2,913	61,762	4.7%	100.0%
Totals	35,306		100.00%		60,448		100%		61,762		100%	

And if you are a distribution center operations person you're slapping your forehead saying "Why do we even bother carrying these things?!" Well the simple truth it doesn't matter what products you carry, you will always have this Pareto effect.

So why'd you pick them all the same way?

Picking Strategies from the Pareto Curve

These products that are down here at the slow end can have some technology applied to them from solutions that I call products-to-person technologies (P2PSM). You might also know them as goods-to-person, or goods-to-man.

Now these technologies can differ depending on your products, their size and exactly how you need them to move through your distribution center. The technology might be carousel

systems or shuttles or AGV's but they are technologies or vehicles that bring products to the picker.

Instead of the picker going out and passing 80% of the SKUs in the warehouse to find the ones that they need, these products or technologies bring them to the selector instead. The selector or picker just stays in one area and they are present to the picker in totes and the WCS tells the picker what SKU and in what amount to pick. This is an area that a smart distribution center design can give you a huge benefit in picking efficiency.

In picking, it's all about minimizing the amount of wasted time between picks. It's not unusual for a picker to spend 70% of the time walking and 30% of the time picking. That means during an 8-hour shift, your picker spends 5 hours and 36 minutes just walking around! You pay for 8 hours of picking, but only get 2 hours and 24 minutes of actual picking work!

So the goal is to clean out all of the extraneous "stuff" that the picker does that takes them away from their main job. The focus should always be on picking. After all, that is what pickers (or selectors) get paid to do.

For picking processes, automated systems either automatically pick the order, or use automation to bring the products to be picked to the associate, thus eliminating travel time, peaking efficient performance (ca. 650 OL/hr) and reducing the number of people required to perform these functions.

This is how a product-to-person material-handling system functions as an investment. By reducing the number of people, you lower all the inherent cost with having an army of people on forklifts running through your warehouse.

Over on the other end of your SKU base, at your "A's," you have the 20% of your products that are doing 80% of your volume. Why would you move these products around? These products need to be stationary so they can be picked.

The principle of efficiency is concentrating the fast-moving, frequently-touched SKUs in a single area. The idea is to "pull the weeds" – eliminate all slower–moving SKUs, so you can

efficiently service the 20% of your product base that generates 80% of your volume.

One of the consequences you will have in concentrating these SKUs is how to replenish them fast enough, so make sure you think about that in your design.

So do you have a single technology warehouse? Well then you can see now there are some huge differences in efficiency that we can apply to help make your distribution center design more efficient.

Conclusion

As we can see in the distribution center balance is not always good. Instead, leveraging the natural imbalance of the Pareto principle is an opportunity to drive tremendous benefits for your company.

Single-technology distribution systems assume that all products should be handled the same way. Mr. Pareto would disagree. His principle suggests that we need to apply multiple technologies to optimize the efficiency of different "bandwidths" along the Pareto Curve.

So if you have a new material handling system or distribution center what do you need to do in order to ensure that you have the best system for your needs?

1) Don't go with a company that only has one solution (See the entire e-book above)
2) Find a partner that is willing to "Do the Math". Analysis of your distribution center and of all its products, the throughput that you need, your goals, etc. takes time, but pays off in the end. Take the time to make sure that the integrator that you pick can demonstrate that they take the time to figure out the best solution for you.
3) Give them all the information that you can. A good integrator will know exactly what you need so they can do the analytics your multi-technology solution will need.

abco automation and the Pareto Curve

If your company is thinking about building a new distribution center, we would encourage you to contact us to consider the benefits your company might gain through automation and our commitment to "Do the Math".

abco automation is an American engineering company that designs and implements turn-key, integrated-technology distribution systems. We focus on accurately generating more throughput in less space with fewer people generating "hyper productive" systems which offer a very attractive return on investment.

abco automation can develop distribution concepts for you that are more financially efficient (the combination of capital cost, space and FTEs) than most American integrators. We possess 39 years of collective automation know-how and excel by virtue of having exposure to European distribution processes and technologies – concepts that most American integrators and operations professionals have never seen. In a competitive scenario, we clearly outdistance our counterparts in the ideas we bring to the table. At the same time, we are not a manufacturer beholden to sell a particular brand AND have the ability to shop available suppliers for the lowest cost.

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