

Smaller Batches Make More Money

Don Guild, Synchronous Management



Any discussion of changes in manufacturing strategy must be preceded by a discussion of the goal of the business. The following remarks are based on the assumptions that the goal of the manufacturing business is to make money, and that a company makes more money by accelerating material flow - specifically by increasing the rate of sales, reducing investment in plant and inventory, and reducing total spending (simultaneously, if possible). If you are not in business to make money, and if you do not believe that increasing sales, reducing investment and reducing total spending will provide that result, then you can stop here.

Note that in defining the goal I have said "reducing total spending", not "reducing cost". This is because traditional cost-based manufacturing metrics are based on two faulty assumptions. The first is that amortizing setup costs over larger batches somehow reduces "costs" and allows you to make more money (high efficiency). The second is that maximizing the activation of your resources - people and machines - maximizes either the return on investment or cost of those resources, again allowing you to make more money (high utilization).

The key to understanding the fallacies of these measures is understanding the nature of resource capacity. Every resource in your plant, people or machines, is either a bottleneck or a non-bottleneck. A bottleneck is a resource (or combination of resources) whose capacity is less than the market demand put on it and less than the capacities of all other resources for same product. Thus, if capacity is lost at this resource, sales dollars will be lost; by definition, the resource does not have enough capacity to keep up, let alone catch up. Our experience in most plants is that the number of pure bottleneck resources is generally limited to no more than 5-10% of all resources.

All other resources are non-bottlenecks. That is, their capacities exceed the demands put on them. Thus, if a resource is a non-bottleneck, and has excess capacity, total spending does not rise if the excess capacity is utilized to do more changeovers, which would permit running smaller batches. This would be the case even without reducing the duration of individual changeovers. In fact, since smaller batches reduce inventory, improve quality, shorten lead times, improve flexibility and customer service, and reduce extraordinary costs such as premium freight and overtime, the results of these "inefficient" smaller batches could be increased sales, reduced investment, and reduced spending owing to the inventory reduction and smoother flow. Thus, the company makes more money.

Which resources are bottlenecks or non-bottlenecks may change over time because of customer mix changes, process changes, or seasonality. However, this merely changes the capacity of a resource relative to demand; it does not change the differences in the nature of a constrained vs. non-constrained resource.

On the other hand, a non-bottleneck can be made to look like a bottleneck in any of several ways. One way would be to run batches that are too small; this would consume more than the excess capacity in additional changeovers, leaving insufficient capacity to meet market demand. Fortunately, the application of Capacity-Based Lot Sizing will prevent this from happening.

A second way a non-bottleneck resource can be made to look like a bottleneck is by running batches that are too large. But, since a large batch includes product without immediate requirements, the "load" on the perceived bottleneck does not reflect actual demand. Therefore, the resource need not be a true bottleneck to look like one.

Another way to turn a non-bottleneck into a bottleneck is to trim the capacity of the resource to match exactly the demand of the market place (high utilization). This policy is often adopted based on the faulty assumption that high resource utilization maximizes the output per unit of cost of those resources. The problem, of course, is that this approach turns all resources into bottlenecks. Thus, when any disruption occurs in the flow of material,

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capacity is unavailable to compensate, shipments are missed, inventory grows, and overtime or expensive subcontracting is required to get back on track. Again, you move away from the goal of making more money.

Our experience is that companies who move away from a cost-reduction strategy to a throughput-driven, flow oriented strategy simply make more money. We have seen company after company double or triple in size in just a few years, while offering their customers price reductions for taking smaller batches! The true paradigm shift is that, once you realize that smaller batches make you more money by increasing sales, reducing investment and reducing total spending, you might conclude that sharing those savings with your customers will provide you with a strategic advantage over your tradition-bound competitors.