Synchronous Solutions

The continuous pursuit of excellence

Do You Run A Balanced Capacity System? Should You?

Most people do seek a balanced capacity in their operations departments. I used to do that, too. Not anymore.

A balanced system is one that has just the right amount of manufacturing capacity at each process step. In such an idealistic system, there would be no bottlenecks. Orders would flow through the system without accumulating excess inventory at any place. The problem is: That is a practical impossibility. Machines break down, key people are sometimes not present at work due to myriad reasons like vacations, sickness, jury duty, bad weather, etc. And, in a custom product environment, how can you know how much capacity to maintain at each step? Even through careful capacity planning, "Murphy" still exists and can appear at the most inopportune times. "Murphy" is our name for anything that could go wrong (aka: statistical fluctuations and normal variability).

Dr. Frederick Taylor is known as the Father of Scientific Management. His theories in the early 1900's argued that "workers do not naturally enjoy work and they need close supervision and control. Therefore, managers should break down production into a series of small tasks." Moreover, he stated that the capacity of each of these steps should be calculated to just meet the market demand. This is the essence of a balanced capacity system. Essentially, there was no plan to accommodate "Murphy."

The balanced manufacturing System is one in which the capacity for each process step is planned with the necessary equipment and staffing to be about equal to the market demand. While this may seem to be a logical approach for an efficient operation and to make the most money, the reality is that this is simply not true. The fact is that attempting to achieve and maintain a balanced system is not only a practical impossibility, it is a guaranteed failure of management philosophy. Your managers will spend their time trying to regain the balanced status after every visit by Murphy, while they should be managing the flow of materials and information through your plant.

The result will be chaos and unrealized productivity of finished products.

The solution to this dilemma is to maintain a planned level of *Protective Capacity* to absorb the disruptions of downtime, whatever the cause, in order to maintain the desired production levels and to meet the market demand. As we all know, customers really don't care that some of your equipment was down or that some of your people are absent. They just want their orders completed at the promised time.

The unbalanced system is one that maintains a planned level of *Protective Capacity* at each operational step. *Protective Capacity* is defined as the capacity to overcome variability. Typically initiated at about 15%, this additional capacity is intended to absorb the normal variabilities that exist every day. Further, the amount of *Protective Capacity* should be variable across the manufacturing system. More of it should be planned for those operations that experience lots of "Murphy" and less at steps that are more stable.

There are basically three types of capacity that should be considered in your planning:

- **Productive Capacity.** This is the pure capacity it takes to meet the projected market demand. This is the minimum needed to satisfy orders and has no accommodation for Murphy.
- **Protective Capacity.** This the Productive Capacity plus an accommodation for Murphy. The accommodation for that variability is calculable, meaning that where there is little variability there is little need for Protective Capacity. Where there is high variability, there is need for more Protective Capacity. With adequate records on production and variability, this can be planned accurately. Protective Capacity does not mean higher costs. This *cushion* of additional capacity is essential to meeting the market demand given the known levels of variability (aka Murphy). Business is all about creating value (Throughput), not reducing costs.
- **Excess Capacity.** This is the amount of capacity over and above the needed amount to meet the demand including accommodation for Murphy. Excessive capacity means excessive costs. Therefore, when you know it exists, you will

need to plan the utilization of these resources to assure adequate control of this excess cost.

> The opportunity to create value ($T) is infinite. The opportunity to reduce costs is quite finite.

An important principle of Synchronous Manufacturing is that you should not focus on balancing capacities but, instead, focus on synchronizing the flow of both materials and information throughout the overall process. Like water flowing down a mountain river, the orders should move at a consistent rate. The boulders that interrupt that river flow are not unlike the "Murphy" events that interrupt your process flow. The water always finds a way around those boulders. Your managers need to do the same thing to address the "Murphy" events. To do that, they will need a planned level of *Protective Capacity* to absorb that variability.

Without an appropriate amount of *Protective Capacity*, the ability to create value Throughput ($T) will be negatively impacted. As the schedule begins to deteriorate, the inevitable result will be more overtime and growing chaos. The reality is that ultimately, all manufacturing systems are unbalanced. Given that, it is a much better strategy to plan for that reality than to fight it.

We have proof that attempting to maintain a balanced capacity plant where each resource operates at maximum efficiency would create high inventories, long lead times and poor delivery performance, all of which are unacceptable in today's manufacturing world.

The Synchronous Flow approach is that all resources should work like “Roadrunners,” which have two speeds: wide open and stop. That is what your resources (equipment and people) should do. They should work to their maximum high quality speed when there is work to be done to satisfy the schedule. Once the schedule is produced, they should stop and move to some other resource that is still producing to the schedule.

> It is always better to produce what you do need, even at a lower efficiency, rather than to produce at a higher efficiency that which you don’t need.
> This is the essence of *EFFECTIVENESS.*

An unbalanced manufacturing system may seem odd, but the results of this strategy can be outstanding.

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