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Managing the transformation from Job shop to production flow.

As jobbing shops grow in latitude from producing small discreet quantities to many of a similar kind the arrangement of machines, jigs and facilities also needs to adapt and the management of labor needs a new think. For those versed in the automotive and appliance industries, the transformation is imaginable but for others from traditional, engineering based companies, this is easier said than done. Making the change from process driven to product driven production requires a big shift in thinking. On the one hand, process type layouts offer flexibility, allowing vastly different items to be made at any one time. Work life goes on happily until customers ask for more and more of the same thing. Suddenly, flexibility in layout design is no longer the important factor. Instead, we want products to move along at a faster rate and in exchange for flexibility; flow and rate of throughput become increasingly more important issues. This is why for larger volumes of a similar product; layouts designed around product needs offer greater efficiency but loose the flexibility. It's a trade off!

My interest lies in how to manage the transformation from jobbing to larger production volumes.

The more we get to know the process the better and I have found in most companies, there are few people who know the entire process well enough to claim expert status. This is discovered with the aid of pencil, paper and a good pair of shoes! The process is mapped out by walking about, following the fork truck, identifying the delays, looking for dust covered stashes of WIP and asking the factory workers what actually happens on the floor. No short cuts, no speculating what happens whilst sat behind the desk. Record every thing you see happening on the map and display the map with all its delays, inspections, reworks, wastes and operations on a big wall where everyone has access. Having a large roll of brown paper to do this helps.

Fill in the process time for each sequential operation so that it is now possible to know which operation has the greatest duration in the process. This is the constraint. If the capacity of the constraint is less than the customer demand rate, then the constraint must be managed to produce equal to or slightly greater than the customers needs. This is fun!

The map is a tool, a good one but that's all it is, just a tool. What's important is the ability to conceptualize how work can be re-arranged and to visualize improvements in the process. Imagination is more important than knowledge as Einstein once said.

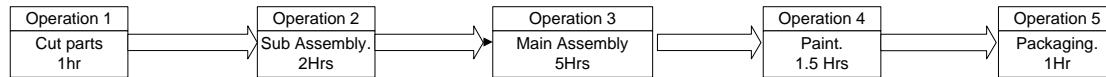
In the automotive industry, this exercise is called 'Man Assignments' but equally, it can be used to determine equipment needs too.

A process is a sequence of linear activities where each is dependant on the previous. This rule is generally rigid so managing the constraint is vital to the entire process capacity.

Example.

Five sequential operations each have a time in which the job can be completed.

Process Map



Which operation is the constraint and what is the line capable of producing in an 8hr shift?

Operation 3 is the constraint and the line capacity is 1.6 units for the shift. All other operations simply add waiting time to the process. It is futile attempting to improve operations 1,2,4 and 5. And yet, this is what happens regularly.

Now, supposing the customer wants 2 units each shift and the line capacity is 1.6 units. What would you do? Many factories accept the constraint and work overtime to make up for the deficit. However, to find an additional 25% output is not beyond the average supervisor, manager or Industrial Engineer, especially if they put their heads together and mind storm a method solution. That's huge fun and very profitable!

Now, how to make sure you get the desired output over set time periods? In an industry with short cycle times such that an operation takes less than 60 minutes to complete, short interval controls are recommended. These are hourly counts of quantity produced, which must not be less than the customer call off rate.

When the cycle time is greater than 60 minutes, use the drum beat method as advocated by Elly Goldratt in his book "The Race". The drum beat signals a time for all assemblies in the process to move forward to the next operation and a finished product reaches the end of the line. Whether it's a drum beat, light indicator, siren or supervisors voice, doesn't make much difference, the objective is to get line operations working together in harmony.

It's all about positive discipline really.

Good luck.