



Lean Manufacturing

This time we'll look at implementing a Lean factory layout.

Can we use can analogy to assist with the picture? You're at a set of traffic lights. The lights turn green and the front vehicle moves forward, then the next. You notice a short delay between each vehicle until it's your turn. That brief delay between vehicles is a critical factor in process management and because it happens with such great frequency during the day, these small amounts of time accumulate to substantial delays. Now imagine a locomotive with a number of coaches, each coach linked to the next. Unlike the traffic light model, when the locomotive moves forward, so do the coaches, except without delay. The linking of activities in any process is a key factor in Lean Thinking. Why, because it minimizes the span of time(money) between your supplier, you and your customer. Calling Lean 'Linked Production' is an accurate definition.

When considering layout planning, linking operations together provides us with so much more value, so let's look at this in more detail.

Gathering data.

Working with facts will produce a more accurate end result and whilst most factories will have a good idea of actual data, getting down to realities can be a challenge for some to accept. So this is the starting point, know what you are dealing with.

When faced with the task of layout planning most will go straight to the drawing board or the CAD program to rearrange machine positions. In fact, this part is way down the list. So its fact gathering first. What are we looking for and why? Using layout planning as a problem solving tool we'll need to have a good idea of what our present problems are, so backing these up with facts will go a long way to solving them. Publish these as a benchmark of the present position because later on, this info will be a reference as a 'before picture' for comparative purposes.

Typically, the range will include:-

- Overtime(Essential and non-essential)
- Through -put time. Raws to dispatch.
- Cycle time for each operation.
- Labour count and staffing strengths.
- Rework levels. (Any work requiring adjustment)
- Waste.
- Customer demand rate and TAKT time.(TAKT time is the monthly or weekly customer demand rate divided by the number of hours in the period)
- Production downtime.
- Raw material lead times
- Product mix and volumes.

Record the actual present Process

There are many recording tools, most use symbolic shapes to distinguish between operations where value is being added and other activities attracting cost like transports, storages, delays and inspections. There is soft ware available like Microsoft Visio to chart the events through the process but the starting point in mapping is on with pencil and paper on the floor. Record what you see, not what you think is happening. Common activities are double handling, intermediate storage, work piled up on floor between operations, work side lined for quality reasons and most common of all, work piled up around a work place so that it hides the operator! This all looks impressive and makes it appear busy but it is all a façade.

Analyse the chart.

Use simple measures like distance traveled, space consumed and time taken for process. Once every thing is down on paper, use critical questioning to ask 'why'. Why are we doing it this way? Why in that sequence? Why can't we eliminate this activity or combine it with another? Challenge every thing you do! This will help develop a new method of working. Critical Examination is an extremely probing tool and was used successfully as a problem solving tool during the space race to recover one of the manned capsules.

Develop a new method.

This is creative work and a challenge for those involved. Be imaginative, especially with methods needing low cost technology. Too often we look towards high tech to solve problems instead of being inventive. Applying our minds to problems such as this produces amazing solutions.

Record the new method and make comparisons with the present. There ought to be radical differences between the two! Expect big results!

Simulate the proposed way of working either by using software or simple spread sheets. These will confirm whether the proposals are workable or not. Spending time here even erring in the planning stage is better than implementing a method and later discovering something has been left out. Talk to end users if the changes impact on them in any way. Draw layouts showing material flow. Machine positions, pallet locations, walk ways and storage space.

Don't use up space simply because its there. In the earlier part when we were looking at customer demand we would have established a balanced machine concept having calculated the number of machines required using machine cycle time multiplied by the call-off rate. Look for opportunities to dedicate machines to specific product families. Machines can be laid out to have them feed hand to mouth, i.e. no work in progress. Balancing production lines this way is very effective, saves space and increases actual through-put volumes. Remember the traffic light and locomotive analogy? Link as many operations together as possible.

Use two dimensional layouts with templates and move them about on a scaled drawing. In the end you are probably going to compromise between a safe layout, one that allows more latitude for production and an adventuresome one where tighter control is offered. There is never a perfect layout, always there is a better method and layouts should be revisited annually depending on the product mix, customer demand.

Conclusion

Those of us who have done many layouts will know the law of three applies. Firstly, the layouts you design, then the one you implement and thirdly, given the benefit of hindsight,

the layout you wished you'd implemented. There will always be a better method. Good luck

Next time we'll look at how best to control production in a lean environment.

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