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DO YOU REALLY HAVE CONTINUOUS FLOW IN ASSEMBLY?

By Mike Rother

A fake painting looks genuine to the untrained eye, but it is usually worth very little. It is exactly the same with fake flow in your assembly processes.

The concept of rearranging equipment in the order of processing steps and introducing a continuous flow of material is widely accepted. However, it is surprising to see how little true continuous material flow actually exists in practice. A frequent sight is processing steps that have been grouped into U-shaped product-family cells -- they look like cells to the untrained eye -- but yet there is still only intermittent and erratic flow through the cell. The cell's output gyrates from hour to hour and small piles of inventory accumulate between the processing steps. One operator is standing at every workstation, waiting while the assembly machine cycles.

True Cellular Manufacturing Is Still Rare
When we see this pattern, we know that the benefits of cellular manufacturing are not being achieved. Almost any grouping of machines that performs processing steps in a sequence is labeled a cell. But in most cells we see no continuous flow, which is really what makes a cell a cell.

What we usually find is just a *module*, not a cell at all. This is, of course, better than an old-fashioned layout with equipment grouped by type of machine. But the individual assembly stations are still functioning as isolated islands. The machines might as well be much further apart; it doesn't make much difference. We are talking about a "fake flow."

In contrast to an assembly module with fake flow, true continuous flow through proper cell design and operation typically doubles assembly labor productivity, halves again the needed space, reduces assembly lead time by a further 90 percent, dramatically improves quality, and permits better response to changing customer demand.

And perhaps even more importantly, achieving and maintaining a true continuous flow in assembly processes allows them to function more effectively as the pacemaker, or heartbeat, of the value stream. How well you can serve the customer and how lean your value stream can be depends to no small degree on the amount of variation you maintain at your pacemaker processes.

For example, if the production volume in assembly fluctuates significantly -- unfortunately not an unusual situation -- then the upstream processes have to be ready to accomodate the spikes. When you assemble large batches of one product type, then your customers for the other types have to wait, and your upstream fabrication processes have to handle demand surges for one component type. And due to the well-known "bullwhip effect," fluctuations at assembly get amplified the further up the value stream you go.

Many plants are now trying to establish supermarket pull systems between the processes in their value streams. Connecting the chain of processes in this way is a good thing. However, if you run significant volume fluctuations and/or large batches of one product type in assembly, then the inventory levels in the supermarkets between the processes will be much too high. With or without pull systems, the lead time through the value stream will still be too long.

Caution! Cell Design Pitfalls
When engineers design an assembly cell they often make some critical mistakes:

• We rely too much on standard times instead of going to the shop floor with a stopwatch and working to analyse and understand the work elements there.

• We tend to place a person at each assembly station. Yet if the work content at each station doesn't match the customer takt time, then we have permanently baked waste into the process.

• We tend to improperly design and utilize automation, with the result that the operators become tied to the machines.

These problems can be fixed. It starts with management giving more attention to assembly and sharpening its eyes for flow and eyes for waste. Managers and engineers need to focus in on the details within each cell to root out the poor flow and excess number of operators, who can be redeployed. Today, we look at our assembly cells and lines, see each operator working at their machine, and think everything is OK. But as we develop our eyes for flow, we realize that what we thought was a masterpiece is really a fake, returning little of continuous flow's potential benefits to the company.

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