White Paper

Engineering Solutions for Manufacturing Problems

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Engineering Solutions for Manufacturing Improvement

Engineers must have a thorough understanding of the manufacturing process as well as the design process. The gains that are achievable by paying close attention to the processes are surprising. Indeed, while it's true that the emphasis on manufacturing improvements and on deploying lean thinking in our workplaces has had a dramatic effect on the productivity of manufacturing processes, these gains are only a primer for what can happen when design solutions are successfully integrated with the manufacturing processes. The interface between product development and manufacturing operations offer one of the biggest opportunities for improvement in our facilities. Just as 5S serves as an introduction to a full-fledged lean deployment, design and process integration serve as an introduction to facility wide lean transformation.

The Good Engineers…

With access to powerful CAD systems, it is easy for engineers and designers to stay at their computers, theorizing about the best way to make the parts and assemblies. But here's the catch; design which doesn't comprehend the details of the manufacturing process is not engineering; it is merely creative drawing. Likewise, when designing products "on the floor", obsolete and outdated process assumptions cannot be challenged. It becomes difficult to develop a good understanding of the effects and causes of variation. Without detailed design work, little improvement is made; parts won't fit together, and real improvement from previous projects cannot be made.

So what are we to do? The only answer is to immediately start forcing the issue by bringing the design elements into compatibility with the manufacturing processes. Designs must be completed with the manufacturing processes in mind.

When working with a specialty vehicle manufacturer, it was discovered that the production associate spent nearly 45 minutes trimming seat brackets to improve the appearance. Everyone agreed that this was too long and an extended discussion ensued which focused on removing much of the time from this operation. But it was the wrong discussion. The mounting brackets were impossible to see once installed in the vehicle, so there was no reason to trim them. In the lean vernacular, the entire operation was non-value added.

This happened because engineers didn't understand either the process or the requirements of the system. The finished assembly requirements were never checked. No one bothered to watch the production process, to understand the quality requirements, or to validate the logic.

Unfortunately, situations like this are not isolated or even rare. In every plant, in every operation similar findings are waiting to be discovered. But shortcuts are taken, CNC programs aren't optimized, manufacturing plans and design plans aren't integrated – and the profits suffer.