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Wednesday's Words of Quality

Maintenance Kaizen to Sustain the Gains of Improvement

This week I share the words of Lean guru, Dr. Jeffrey Liker, author of The Toyota Way and co-author of The Toyota Way to Continuous Improvement, on sustaining the gains of improvement in a Lean culture.

These reflections by Dr. Liker are quite pertinent to our current initiative to pilot a Deviation Management Reporting and Resolution System throughout the laboratories of HFHS.

Resist your machine thinking!

By Jeff Liker

from The Lean Edge, Saturday, April 2, 2011 at <http://theleanedge.org>

"One of the most common questions we are asked is how to sustain the gains once we have improved the process. A lot of work went into getting the process right in that carefully planned kaizen workshop, and it is certainly wasteful to see it slip back to where it was before the change.

Unfortunately, the most common outcome of process improvements is slipping backward. Why does this occur?

The problem is actually a fundamental misunderstanding of what it means to sustain the gains. It goes back to our old friend machine thinking. When you make an improvement to a machine, you expect it to operate in the new improved state for some time, as long as some basic maintenance is done. For example, you do not expect to make a change that improves an engine's output and then have it creep back to the lower level of output within weeks, though even a technical change like this does not last forever. On the other hand, when you improve a socio-technical system, it is not just a physical thing that you are changing. Let's consider three examples of lean improvements that are often made by staff experts:

1. Line rebalance. Rebalance the work on the line to a given takt in order to increase productivity.
2. Standardized work. Develop new standardized work, emphasizing quality key points, to reduce variability in order to improve quality.
3. Pull system. Organize a supermarket area with defined minimum and maximum inventory levels and a kanban system in order to reduce inventory.

In each case, the improvement project may be great technically, with superior visuals and precisely calculated quantities, yet still fail in the long run. There are two problems. First, each of these projects is based on the set of conditions at the time of the project, which in reality will change over time. Second, each of these projects assumes a set of behaviors by the people working in the area, which may in fact not occur.

One assumption of each of these lean projects is a certain rate of customer demand—the *takt*. What if the customer demand changes?

Then you need to rebalance the work to a new *takt*, you need to revise the standardized work based on a new *takt*, and you need to identify the quantities in the supermarket based on the new *takt*.

Many other things can also change—the mix of products may vary, there may be engineering changes to the product, parts may come and go, customers may use different containers, and so on. Each of these changes requires some adjustments. Unless the expert who set up the system stays around indefinitely to make these adjustments, the system will degrade. And unless the expert stays around to continually retrain the workers and to monitor their behavior and provide feedback when they stray from the standards, the system will degrade.

If we shift from machine thinking to systems thinking, we get a very different perspective. It is well known in systems thinking that systems are always changing, even when it appears that they are staying the same. To maintain consistent output, one must continually adjust the system to changing environmental conditions. **This is called *dynamic homeostasis in systems thinking, or running to stay in place*.** Think of the hamster madly running on a wheel and simply staying in one place. If the hamster stops running, it will be carried backward by the momentum of the wheel.

So asking how to sustain the gains is equivalent to asking what the dynamics are that will keep the system in homeostasis. There are two parts to the answer: (1) dynamic adjustment to changing conditions, and (2) people being checked and coached on how well they follow the standard process.

The dynamic adjustment needed to keep the system stable is what Toyota calls **'maintenance kaizen.'** It is well recognized at Toyota that it takes a lot of work to maintain a system.

And the dirty little secret is that the more waste you take out of a system, the more work it takes to maintain the system at that high level of performance.

Maintenance comes from having clearly defined standards, observing carefully for deviations from those standards, and then developing and implementing countermeasures to eliminate the deviations.

Sometimes a new standard is needed simply to maintain the quality or safety or productivity because conditions have changed. It is really hard work, and it can be done only on a continuous basis by someone who is continually in the process so that he can closely monitor it, which in most cases means the team members, team leaders, or group leaders. This of course assumes you have a sufficient number of well trained team leaders and group leaders, trained in kaizen, who are at the gemba observing, leading the people to follow the current standards and call for help when there is a deviation, and adjusting the system."