



Utilizing "Time" to Drive Meaningful Lean Implementation

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Time is of the essence! Unfortunately this is not well understood in too many Lean implementations and business transformations. This paper will explore how to use time-based performance measures and Lean techniques to drive Lean investment and activities toward improvements that will drop results to the bottom line. Time-based measures and analysis, within the context of Lean strategy, will help the leadership develop direction and allocate scarce improvement resources. At the plant and business unit levels, time-based measures and techniques will help identify specific targets and opportunities for improvement. Finally, at the team level, time-based measures and techniques will be used to execute the plans and strategies laid out at higher levels in the organization. Companies that are serious about Lean transformation across the enterprise must deal with scarce resources, competing objectives, and improvement obstacles (ie, anchor-draggers). Time becomes a common denominator that serves as a common language, a point of reference, and a catalyst for change. This paper fits these various components together to demonstrate how to drive meaningful Lean implementation.

Lean initiatives take many forms. Although Lean has been “bobbing” around American manufacturing industry for the last twenty years, it has developed little to modest traction as a comprehensive way to run the business. Most companies that are “doing” Lean are working with bits and pieces of the Lean body of knowledge. An occasional Kaizen event and a cell or two does not make a Lean plant. 5S is a start, but only paves the way for other Lean techniques that will drop results to the bottom line. A “transformation effort” that fails to get senior management on board in a way that uses Lean as a working strategy to drive the business is not a transformation – it is merely another project. For many American manufacturers, a successful Lean transformation is a requirement to shape up, get competitive, and keep/create good paying jobs!

Why hasn't Lean been taken seriously by American manufacturers? I believe it is due to partial, misleading, and inadequate understanding. Scattered applications, focus that is spread too thin, and short-term orientation all contribute to the confusion. One of the focus areas that provides the most potential to align organizations, create relevant understanding from “top floor to shop floor”, and reinforce a sense of urgency is TIME.

WHY TIME?

Time can serve as a common denominator that should be understood, regardless of one's position in a manufacturing organization. How time is applied as a performance metric may differ in scope and specifics, but the fundamental metric remains. We all have 24 hours in a day. The units of measure (seconds, minutes, hours, etc.) are not in dispute or



confusing. Deadlines are measured in time. Time is objective and measurable. Time is a meaningful driver to all of us.

One of the simplest and most profound observations about the use of time as a driver in a manufacturing enterprise was made by Taiichi Ohno, father of the Toyota Production System. According to his book Toyota Production System – Beyond Large-Scale Production, when asked what Toyota is doing, Mr. Ohno said “All we are doing is looking at the time line from the moment the customer gives us an order to the point when we collect cash. And we are reducing the time line by removing the non-value-added wastes”. Simple – yet compelling!

Time-based performance metrics should be stratified within the business, depending on the scope and function of the person(s) or process. An effective way to look at this stratification that transcends industry boundaries and uniquenesses from one company to another is to start with the context levels in the SME/AME/Shingo Prize Lean Certification. Those context levels are:

- 1.) Tactical – localized area, such as a department or cell, where the focus is on real-time, immediate or hour-to-hour issues. This would usually include front-line employees and supervisors.
- 2.) Integrative – a slice of the business that goes from “got the order” to “fulfill the order”. This is a value stream that could represent a product line, segment of a business, or support operation. The value stream crosses functional boundaries and geographical boundaries. Plant managers, product managers, value stream managers and other support personnel would work within this context.
- 3.) Strategic – the overall business where processes and value streams are linked together to fulfill the purpose for the business to exist. This is the level where strategy is set, priorities are established, and investment decisions are made.

TIME AT THE TACTICAL LEVEL

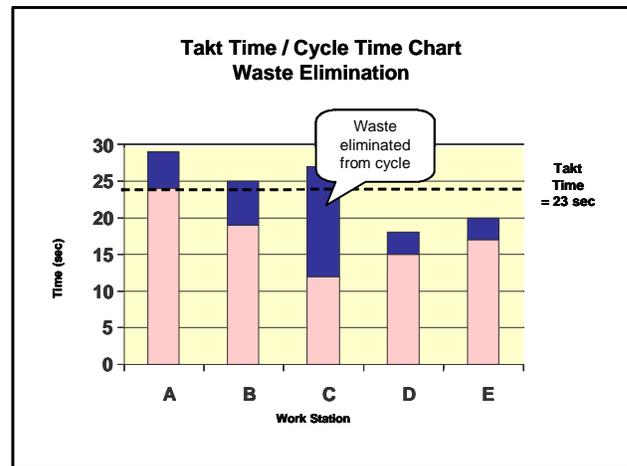
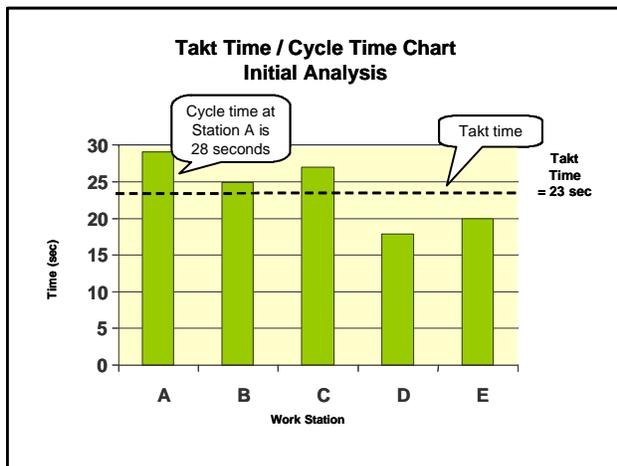
Success in driving Lean implementation at the tactical level is a function of how receptive the front-line personnel are to adopting new methods. Included in this group (at a minimum) are the people with tools in their hands, people who design the processes, people who get material to the point-of-use, and people who supervise the former. Would all of them eagerly embrace the change associated with effective Lean implementation and transformation? Some will, some won't, and some will not care. Typical obstacles or defenses you would hear from naysayers at the tactical level include:

- That's not my job.
- I'm already working hard – you want more?
- If only those direct labor people would do what I told them.
- I've done it this way for 10 years.
- I wish that engineer would come out here and see how this really works.



How can time-based performance measures help in this situation? Time is the common denominator that can be objective and factual. It is the language that will cross the perceptive divides among people working at the tactical level. Elements of time-based measures that illustrate this include:

- 1.) Takt Time – the pace of customer demand. The elements of takt time are available time (the numerator) and units of demand (the denominator). Both of these should be factual and objective, but usually are emotional and debatable. The determination of available time forces people to answer questions such as: a.) do we run one shift or two?; b.) do we really have 24,600 seconds per shift, or are we losing time at shift start-up, returning from lunch/breaks, and shift clean-up?; and c.) are we losing more time to downtime, minor stops and set-ups than we expect? For available time to be factual and objective, these and other questions must be answered. The analysis will highlight perceptive differences. The determination of units of demand should be straight-forward, but ... There is variation in demand for both good and weak reasons. However, it is imperative that sales, planning, and production people come to terms on demand information so that people working at the tactical level have the information necessary to run their part of the business effectively. Notice how takt time begins to force issues that otherwise might not be effectively addressed. Time flushes out these issues in a non-confrontational way.

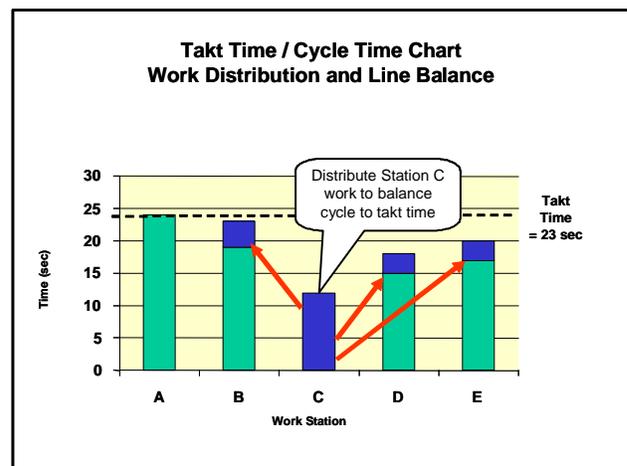
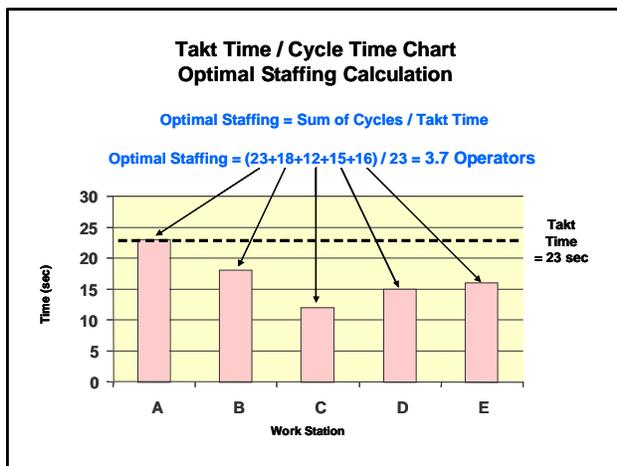


- 2.) Cycle Time – the time it takes the person doing the work to do the work. Lean practitioners must go to gemba (Japanese for “on the floor, where value-add occurs”) to determine and really understand cycle time. Industrial engineering standards or rate books won’t do the job because they do not usually account for waste in the process. Cycle time should account for all the time it takes for a job to get done. If the person doing the work is familiarized with the seven wastes, then the Lean practitioner, the person designing the work, and the person doing the work can have constructive and objective discussions about how to reduce



cycle time. Again, time leads to a fact-based and objective analysis of “why are you doing the work that way”.

- 3.) Optimal Staffing– this is a calculated method to determine how many people “should” be in a process. The sum of the cycle times is divided by the takt time. The result provides a targeted number of workers for the process. The optimal staffing provides a fact-based and objective target. It may induce stress because it may look impossible to achieve, but it should reduce emotion because the analysis is data-focused. Note again how time is used to drive the tactical level Lean improvement.
- 4.) Line Balancing – the next logical extension of this tactical level Lean is to design the work so that the cycle times reach approximately 90-95% of the takt time. Use this ideal state to drive creative thinking and problem-solving.



This tactical level discussion can be pulled together in a takt time / cycle time chart as seen above. This is one of the most powerful tools available to tactical level Lean practitioners. It illustrates how time can be used to drive meaningful Lean improvements. For this analysis to be most effective, the knowledge and application skills must be shared and developed deep into the organization. This is a basic tool that is widely misunderstood and underutilized in American manufacturing organizations.

TIME AT THE INTEGRATIVE LEVEL

At the integrative level, the Lean transformation is driven by measures that tie subprocesses together along one or a series of value streams. Time begins to drive a segment of the business. Where tactical time-based measures tend to be localized and vertical, the integrative time-based measures begin to be wide-spread and horizontal. At this level, the Lean practitioners, leaders, and people associated with the transformation



must think about a broader segment of the business. Typical obstacles or defenses you would hear from naysayers at the integrative level include:

- I am accountable and rewarded for performance in this subprocess – not what happens before or after my area.
- I don't see how I affect that performance measure.
- Other people affect my outcome and results – how can you isolate my performance?
- The horizontal part of this process matrix makes accountability really fuzzy.
- Transforming those other guys is fine, but my area is running OK.

How can time-based performance measures help in this situation? Again, time is the common denominator that can be objective and factual. It is the language that will cross functional boundaries and organization charts. Elements of time-based measures that illustrate this include:

1. **Dock-to-Dock Time** – this time-based measure focuses on velocity of material. Usually this is expressed as the elapsed time from when a unit of inventory is received to the time it is shipped as finished product. The greater the velocity, the more positive the impact on financial performance. If a plant can consistently get dock-to-dock performance to three days or less and negotiate aggressive terms with customers based on consistent performance, then the plant might create a situation where the customer pays for end product before the plant pays for incoming material. One major tier one auto supplier financed the building of their multi-billion \$ company in this fashion! Notice how time drives plant behavior (buyers/planners, production personnel, A/P and A/R personnel, and customer service) in such a way that financial performance and shareholder benefit is achieved.
2. **Value-Add versus Non-Value-Add** – what the customer really wants to pay for. At the integrative level, the value stream map is one tool that pulls people together to see an objective and fact-based representation of a part of their business. The value-add versus non-value-add time measure is an integral part of the value stream map. Why? Because it will show the ratio of time a plant is adding value. If applied from a Lean “purist’s” perspective the ratio will be shockingly low. However, it will scream opportunity! The large chunks of non-value-added time represent targets to accelerate the Lean transformation.
3. **On-Time Fulfillment Performance** – a plant that uses Lean tools to execute a Lean strategy will have a positive affect on order fulfillment performance. At the integrative level, the leadership and the Lean practitioner must consider overall performance as well as localized performance. On-time fulfillment measures the performance from the perspective of the customer expectation date. This is a balancing measure to the dock-to-dock (velocity) measure described above. The two measures taken together tell how well the plant is applying speed and hitting the target. Measuring the deviation from the target date (and specific time of day)



provides evidence of how well the plant aligned and utilized its resources for this customer order. Again, this time-based performance measure will drive behavior.

The Lean transformation at the integrative level is conducted horizontally, weaves projects together to have significant impact, and accelerates the results at a business unit level. The time-based measures described above help the leadership create focus, identify priorities, and hold people accountable for significantly changing the way that portion of the company conducts business. The Lean practitioner driving change at the integrative level takes a broader view of the business.

TIME AT THE STRATEGIC LEVEL

At the strategic level, the focus is on entire business transformations. A transformed business/company/plant uses Lean tools to execute improvement and Lean philosophy to guide its business processes. Lean is not an afterthought – it is the way to conduct business! Time plays a critical role at this level of Lean change. The Lean practitioner and business leader looks for results that affect shareholders, customers, and their employees. The business strategy is influenced by the Lean transformed operations. Market opportunities begin to emerge based on new capabilities, “cranked up” levels of performance, and confidence that engineering and manufacturing can deliver.

Who might the naysayers be at the strategic level of Lean transformation? Some examples might include:

- President – When we get Lean working in the shop, we’ll be set. We don’t need to apply these tools to our professional people.
- General Manager of a Business Unit – If I had responsibility for the designers and marketers, I could really make this unit hum. As it is, they just don’t listen to me.
- CFO – Those people in operations need to focus more on getting product out the door and less on rearranging the machines.
- Sales and Marketing Executive – Here’s what we’ve sold, you figure out how to make it. Just don’t screw up my customer relationship.
- CEO – What does Lean have to do with our business strategy? I am dealing with more important issues.

Just as Lean practitioners progressively develop their skills and portfolios, companies must also progress in a methodical fashion. In the beginning, activities are tactical. A project here, a project there. Maybe a plant really gets it and begins to pull the pieces together. Somewhere along the progression line, a plant or business unit looks at itself horizontally. Cross-functional teams and projects are conducted. Broader time-based measures begin to drive behavior. The end customer comes into focus. This is Lean at the integrative level.

The next level of progression is when Lean is “the way” we do business. The link between business/market strategy and Lean strategy becomes a two-way street with ideas,



opportunities, and decision criteria bouncing back and forth. This is in contrast to a one-way line of direction where the business strategy dictates to the operations strategy. This begins to describe Lean at the strategic level.

Examples of time-based measures that will help foster this kind of sharing, “we’re all in this together”, “nobody (i.e., vertical slice of the organization chart) has all the answers environment” include:

1. Time-to-Market – this is a time-based measure that crosses functional boundaries and organizational turf. Lean methods and tools applied to customer needs assessments, concept development, prototype development, production design and production ramp-up will reduce time-to-market. Value stream analysis will identify the critical path. This will help avoid isolated pockets of improvement that don’t contribute to squeezing the targeted performance measure – time-to-market. Notice how this performance measure can be a catalyst to drive business strategy. Time is that objective measure that allows leaders to work toward the good of the whole and not get wrapped up in suboptimized, parochial activities.
2. Performance to Customer Expectations – at the strategic level, leaders, managers, and Lean practitioners must think about customer relationships and how we, as a supplier to that customer, can make our company indispensable. Although cost is a key metric for most customers, many of our cost drivers are a function of time. Examples that result in costs for our customers but are caused by our actions include: the time it takes to get and enter an order; the time to make a decision about personnel; turn-around time for a piece of capital equipment; time to receive material in a condition ready to use at the place where it is to be used; and the time it takes for all our administrative and support processes to do their work so the shop can operate effectively. All these tactical components of work can be rolled up to a strategic level performance measure – i.e., how does this customer view us relative to time?
3. Cash-to-Cash – using time to measure the cycle from cash-to-cash is an effective way to put a very important financial element of manufacturing organizations (how we manage our cash) into operational terms that creates cause and effect. The desired effect is a short cycle between when cash is invested or expended and when cash is returned. The application of Lean methods and tools will drive down the time for the cash-to-cash cycle. For example, plants that use flow, quick changeovers, and supplier kanban effectively might be able to collect cash from the customer before paying the supplier – resulting in negative cash-to-cash cycle time. In another example, a plant that is going to invest in a new major piece of equipment will expect the design and installation to coincide with the customers’ ramp-up dates. Both of these examples apply time to the function of cash. At the strategic level, the CFO and Lean practitioner have a common language that drives behavior for the benefit of the whole.



SUMMARY

Lean implementations and transformations are too important to the future of American manufacturing to leave any room for error. Time-based measures are objective and clearly measurable. When these measures are applied to the tactical, integrative and strategic levels as defined by the SME/AME/Shingo Prize Lean Certification process, they can be a catalyst for disrupting the status quo, reorienting our thinking about how to manage change, and driving new behaviors throughout the organization. In short, time is of the essence!

Bio:

Jeff Sipes is Principal with Back2Basics, LLC, a consulting company focused on assisting manufacturing companies to design and implement Lean strategies and plant transformations. Prior to forming Back2Basics, LLC, Jeff's experience included serving in leadership roles in a Big 4 consulting organization, a lawn equipment manufacturer as Vice President Operations and Caterpillar as a machinist apprentice and production supervisor. His professional passion is helping manufacturing companies to transform to high performing organizations through streamlining processes, aligning management and workforce focus, and dropping results to the bottom line. He earned his Master of Science in Industrial Administration from Purdue University. Jeff is a charter member of the committee that developed the SME/AME/Shingo Prize Lean Certification process and is recognized as Lean Bronze Certified (LBC) by SME.

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