

## PROCESS REFLECTIONS

### Telling Time

Time is an essential ingredient in life – but it can be quite confusing. Just ask Alice:

“Alice sighed wearily. ‘I think you might do something better with the time,’ she said, ‘than waste it in asking riddles that have no answers.’

‘If you knew Time as well as I do,’ said the Hatter, ‘you wouldn’t talk about wasting it. It’s him.’

‘I don’t know what you mean,’ said Alice.

‘Of course you don’t!’ the Hatter said, tossing his head contemptuously. ‘I dare say you never even spoke to Time!’

‘Perhaps not,’ Alice cautiously replied: ‘but I know I have to beat time when I learn music.’

‘Ah! that accounts for it,’ said the Hatter. ‘He won’t stand beating. Now, if you only kept on good terms with him, he’d do almost anything you liked with the clock. For instance, suppose it were nine o’clock in the morning, just time to begin lessons: you’d only have to whisper a hint to Time, and round goes the clock in a twinkling! Half-past one, time for dinner!’”

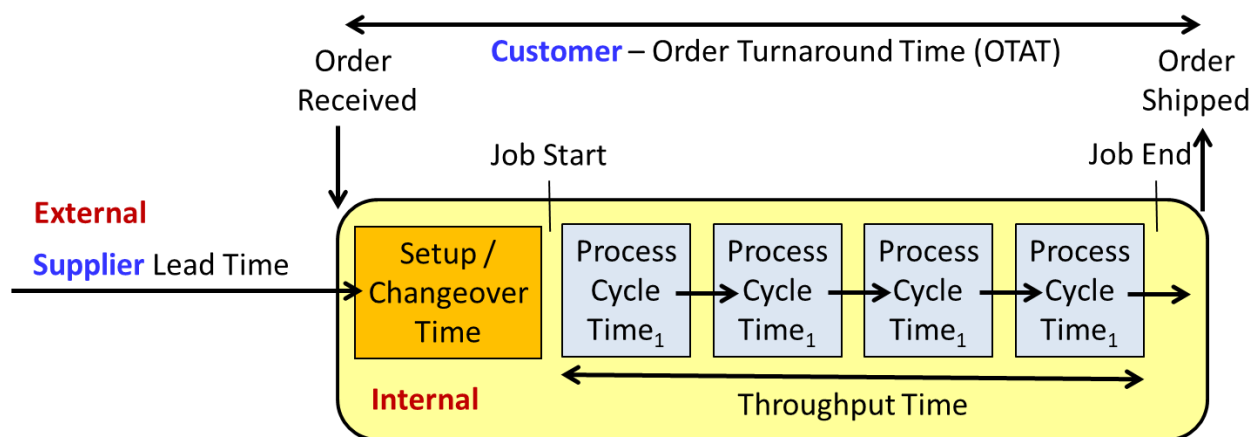
— Lewis Carroll, *Alice in Wonderland*

The word “lead” typically implies the starting of something. Except when one is discussing the idea of “Lead Time” in the production system context. The problem with “lead time” is similar to the one Alice had with the Hatter in the confusion over “beat time” – there are differences in the way it is commonly interpreted depending on your perspective. The phrase “lead time” is generally defined as the period of latency between an initiating event and a concluding event. A production process, however, has a sequence of milestones that can be represented as chain of interlocked events. But there are two major components – an order chain delivering commands and a material chain that delivers components and the two merge to form the production chain which produces, tests, and delivers fulfillment of the order. Thus, an independent Supply Lead Time (SLT) needs to be coordinated with the Order Lead Time (OLT) and connectivity between these two is a rational decision process based on performance probabilities relative to planned capabilities.

So, depending on how the timeline is divided one part’s lead time may only be an element in the cycle time of another. One breakdown of production events by time identifies five distinct “lead” times: order lead time (OLT), order handling lead time, manufacturing lead time, production lead time, and delivery lead time. However, order lead time is considered the latency between input of a customer order and delivery or fulfillment of the order. This is also called the “order turnaround time” (OTAT). However, there is even more confusion when one takes consideration of the reference points for start and stop times for determining the latency

period. Consider these differences relative to OLT: actual OLT (the time between the placement of a physical order and the physical delivery of the goods; requested OLT (the time between the entry of an order and the requested delivery date); quoted OLT (an agreed upon period from the date of order entry to the delivery date stipulated in a contract); and or acknowledged or confirmed OLT (the date between the order entry date and the confirmed delivery date). There is so much confusion because these events are not clearly demarked with terms that uniquely identify the time intervals.

Decomposing the work activities into a sequential structure that tracks the temporal pathways which connect all of the events using terms that are logically distinct helps to clarify this picture and develops a stronger sense of accountability for performance in each of the intervals. One way to illustrate this is shown below:



It is essential to obtain clarity from a production perspective by identifying each individual time component in the end-to-end flows. The graphic shows the external flows of Supplier Lead Time and Order Lead Time; however when the two merge into the production process then there are internal components of the process setup/changeover time, movement times, waiting times, as well as various cycle times for process steps (whether value-adding, non-value-adding or work that is required without adding any value). Keeping track of time and movement are two critical aspects of gaining control over a daily management system. Assigning cost to time, movement, and productive activities allows comparing operational performance to financial performance and consolidation of both reporting systems.

Thus, rather than speaking in general terms it is best to decompose all time series activities into clearly described elements that have clear operational boundaries and ensure that movement of products through these points are captured as data in the management system to allow their analysis for accountability from both operational and financial perspectives.

### **Reflective Questions:**

1. Time is the essential measure of production process performance. Quality issues, safety issues, and motivational issues all result in longer than desired production time.

Understanding of the financial structure of a business means that time can be factored to discover cost. Should time be the constant performance indicator applied to track the end-to-end flow of operations? If this is done, then how does it relate to quality, productivity, and cost? Can you connect the equations?

2. "There is timing in everything" is an observation of Taiichi Ohno, curator of the original Toyota Production System. How should you start to manage time? What should be the steps that will allow you to get your timing under control?

**Lesson to be Learned:**

Understanding production requires learning both about the time required for movement and also the timing that is required for delivery. Both dimensions of time are important – one has priority in internal applications while the other has priority in external operations. Successful businesses must learn how to align these "clocks" and how to manage them concurrently with efficiency.

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