



Machining

Cycle Time vs. Takt Time: Why the Differences Matter

Kip Hanson | Jan 02, 2019

What is takt time and what is cycle time? Where do they intersect? We dive into the nuance of these two often confusing manufacturing subjects.

Whether it's the length of time needed to bake a cake or the amount of air in your car's tires, history shows that no one can argue the importance of measurement. For example, American engineer and statistician W. Edwards Deming once said, "Without data you're just another person with an opinion." Physicist William Thomson, who was dubbed Lord Kelvin for his work on the transatlantic cable roughly one century earlier, stated much the same thing: "To measure is to know." And management consultant Peter Drucker famously advised, "If you can't measure it, you can't improve it."

Defining Time in Manufacturing: Takt Time and Cycle Time

These statements can be applied to many facets of everyday life but are especially true in manufacturing. In fact, for as long as people have been making things, they've been looking for the best way to gauge their productivity. Which brings us to an important question: How does your shop measure its production? Takt time? Cycle time? Both? Neither?

For a job shop, where high-mix, low-volume production is the rule, the time needed to produce a part—cycle time—is all-important. But what does this term actually mean?

A machine operator might associate cycle time with processing time—or the time needed to go from green light to red light. It's the actual time needed to machine, bend, form, weld or print any given component. To the manufacturing plant supervisor, cycle time more likely means green light to green light, which includes part load and unload time as well as the waste associated with any production process. Most think of this as parts per hour.

To the person quoting the jobs, cycle time is thought of as lead time to the customer. It includes material procurement, setup time, outside processing and, of course, the sum of all the discrete manufacturing operations.



There are real ways to affect cycle time in machining. Read all about it in "How to Slash Cycle Times When Cutting Metal."

The Need for MES

Greg Giles of *RedViking Engineering* spends his days figuring out better ways to measure the manufacturing process, and he says that shops large and small can benefit from some kind of manufacturing execution system, or “MES.”

“Our customers are typically manufacturers that need to know how their capital investment is running,” he says. “They need to know how to improve their processes so they can be competitive in the marketplace and validate that they’re getting the most out of their investment.”

The best way to accomplish this, he says, is by installing MES systems. Unlike the Andon lights perched atop any piece of CNC equipment, an MES offers far more than a red-yellow-green view of production status. It captures information such as: the current job and part number, specific operators logged into a workstation, machine override status, fault data, elapsed cycle time, time remaining, and more. It does this for each piece of equipment on the production floor. The results can then be displayed on what is essentially a big-screen television or sent to a software program for further analysis.

“Technology like this has been used by automakers and other large manufacturers for decades,” he points out. An MES allows shops to see whether there are slowdowns or stoppages anywhere on the factory floor—and help to find out the root cause of those events.

“It gives them actionable information so they can go in and attack the problems that every manufacturer faces, each and every day,” says Giles.

Matching Up Takt Time and Cycle Time

In a perfect world, cycle time will exactly match takt time, regardless of the size of the manufacturer or its production volumes. The problem is that customer demand is rarely consistent. People buy products based on the season, availability, price and a host of other reasons, and this inevitably trickles down to the companies that manufacture those goods.

Coté notes that, where volumes are larger and less sporadic, the volatility of customer demand can be averaged somewhat, providing a relatively stable takt time against which cycle times can be measured. And even in those cases where takt time becomes ambiguous—with smaller machine shops and custom manufacturers, for instance—it’s still important that companies gain a firm grip on order history, demand on the facility, people requirements, and how many components have to be machined or pieces of equipment designed and built each year.

Whatever the method of calculating takt time, cycle times are equally relevant, and often more so. “In order for you to understand and then improve upon the end-to-end process, you need to know your production capabilities, whether you’re using manual labor or automated machinery,” he says. “Without this, you won’t know how to determine costs, what resources and equipment are needed, or how long it will take to deliver products. These are all key elements, and cycle time plays an extremely important role in all of them, particularly when the cycle time in one area is causing the rest of the system to bog down, or move

Being Proactive in Manufacturing Processes

"It's critical now more than ever to understand what's going on in your processes, so you can proactively address problems and minimize production delays, rather than reacting to them after the fact," says Greg Giles, a director at manufacturing solution provider RedViking Engineering.

Here again, the two methods of measuring throughput and their relative importance to one another depends largely on the type of manufacturer, as well as who is doing the measuring.

"I consider takt time as the mean time between jobs as needed to meet customer demand," Giles explains. "I typically look at cycle time as the elapsed time from the moment that a job is available to be worked on until that job is clear of a given station or machine tool, including the time needed for load and unload."

The definitions are going to change somewhat based on whether it's an assembly line, an automaker or a discrete manufacturer—and how the customer measures it internally.

"Whatever the case, though, your cycle time will hopefully be slightly less than your takt time—if not, you're going to fall behind schedule," explains Giles.



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