



Lean Manufacturing

Get Lean: Choose Better Tools, Compress Time, Deliver On Time

Don Sears | Apr 10, 2018

What You Need to Know

Is a delivery "on time" if it's not in the hands of customers? Likely not, so experts advise investing in learning about delivery in the dimension that matters most to customers.

Work can be compressed and on-time delivery can be improved by performing efforts in parallel, eliminating time-consuming handoffs and removing certain process steps altogether.

If you could save cycle time in a machine, theoretically, the math could work in the favor of more production output in less time.

When seeking to reduce or eliminate steps, look for technology that has time-compression functionality as part of its design.

The obstacles to on-time delivery are real and embedded in the fabric of manufacturing production. The main concern for your customers is having your product when they expect it. Here's how you and your team can help.

Given today's highly distributed supply chains, shortened lead times really matter. Customers want products when they need them—and expect more guarantees than ever before. Manufacturers that do not deliver goods based on their customers' timing often struggle and may find their customers turn to rivals to fulfill their needs.

"While on-time delivery is desirable as an *outcome*, the emphasis on it as a performance measure can border on the dysfunctional," writes Kent Vincent, a managing principal and consultant for Industrial Systems & Re-engineering Services, in an M-Wave International *blog post*. "Instead of helping to reduce the end-to-end timespan through the entire process chain, internal departments and external suppliers both tend to pad their planned or promised lead times so that on-time-delivery performance looks good."

When addressing the true value of on-time delivery, it is necessary to define "delivery to where?" says MRO expert and author George Krauter. "Traditionally, on-time delivery is measured by comparing the promised delivery time to the actual time the shipment arrived onto the plant's receiving dock." But if the product isn't in your customers' actual hands, is it really on time? In the eyes of the customer, the

answer is likely “No.” In that case, maybe the focus should be on customer satisfaction and your company goals together, suggests a 2017 study on delivery performance metrics focused on customers.

Use Data, but Put It in a Shop Floor Context for Better Accuracy

Information is regularly being captured and reported. From machine-level data that feeds *overall equipment effectiveness* metrics to better forecasting numbers that are closely aligned with production, the factory is data driven. But in a world of continuous manufacturing improvement, data alone is likely not enough. Accuracy of information matters.

“No manufacturing operation has a chance of delivering outstanding service to customers if there isn’t accurate data available, by product groupings (with common product and process parameters, i.e., value streams), for use in a formal sales and operations planning process,” *writes* Larry Fast, founder and president of Pathways to Manufacturing Excellence, in the *Industry Week* article “Why a Robust S&OP Process is Critical to Delivery Performance – and Key Factory Metrics.”

Data in context is key—so that improvements can be worked into a process to support objective improvement. In lean manufacturing, the data needs to be reliable and actionable. What happens when the context is messy and not reflective of actual work or work constraints? A certain amount of chaos.

Better information is needed that may mean communicating with a wider set of tactical players—including those on the shop floor, suggests Fast. For example, if you don’t know that a cell of machines is having unusual downtime because part quality is poor—and that machinists are burning through tools and hours trying to get things right—the production schedule is likely to be way off. Fast describes observing way too many instances of schedules that were not executable from Day 1, but the shop floor was blamed despite known constraints and obstacles. Fast recounts:

“This is a mindless circle that I see repeated week after week in lots of factories. The plan must be in sync with the constraints or it simply cannot be executed. Capacity is not infinite. It is finite to the demonstrated capacity until actions are taken to expand it.”

Looking for help with selecting the right tool that ultimately benefits on-time delivery? Contact 800-645-7270 to have your questions answered by an MSC representative.

“Given the resource constraints many firms face today, they have to make *focused efforts* to improve the delivery performance dimensions that contribute most to future customer purchase volume or price,” *finds joint research* from the University of Houston and Oregon State University.

Ultimately, the important part is to know what customers prioritize and value—and how that relates to business behavior and investment choices, the study suggests: “Attempts to improve delivery

performance with unfocused investments likely will have smaller-than-expected effects on customer purchase behavior because the improved dimension may not be what customers value most."

So the question becomes: Where do you *actually* focus? Lean manufacturing experts **advise** using a business improvement methodology, much of which has come from the Japanese business practice of "**kaizen**," or continuous improvement—and in just-in-time manufacturing principles that focus on cutting waste. A JIT manufacturing approach seeks to limit overproduction, cut waste from employee effort, eliminate unnecessary or excess physical motion on the plant floor, and reduce or eliminate unnecessary inventory and product defect waste.

How to Improve Lead Time: Compress Work and Use Technology

How can you work with the capacity you have and ship products faster? It is not by simply working faster, finds lean manufacturing expert Jamie Flinchbaugh, because working faster often leads to errors. Work can be compressed and on-time delivery can be improved by performing efforts in parallel, eliminating time-consuming handoffs and removing certain process steps altogether.

"Technology is often a solution here, whether it is buying faster equipment in manufacturing or developing software tools for the office," **writes** Flinchbaugh in the *Industry Week* article "Lessons from the Road: Reducing Lead Time Changes Everything." **Technology** abounds in today's supply chain and manufacturing—and continues to evolve across sensors giving machine data, programming, simulation and reporting software, machine tool technology—and the machining process itself with **3D additive** and **high-performance machining**.

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Jamie Flinchbaugh

Lean Manufacturing Adviser, Speaker and Author of "The Hitchhiker's Guide to Lean"

When the goal is a complete customer delivery, every efficiency counts. For example, if you could compress work by using more effective cutting tool technology that could save cycle time in the machine, theoretically, the math could work in the favor of more production in less time. Mike Lynch, president of **CNC Concepts**, which trains organizations on improving machine cycle and setup times, has an illustrative example: The value of saving one second of cycle time.

Here's an example: Assume modest machining hours of 5,000 per year, then imagine shaving off one second of cycle time—from 31 seconds to 30 seconds. If you knew the machine's burden rate was \$100 an hour, some simple calculations would show that reducing one second of cycle time equates to about **167 more machining hours** and a \$16,700 savings over a year, Lynch explains.

Don't Forget: Setup Time, Tool Changeover and Knowing What Your Machines Can Handle

Some machine tools today are designed to compress setup time—which would fall into Flinchbaugh's category of reducing or eliminating steps. Some tools have "quick-change adapters" that function to ease setup time from many minutes to very few minutes. It's not hard to begin seeing the impact on production output—and on the potential to cut lead times and reach on-time delivery to customers.

Looking for the right questions to ask when it comes to tooling? Read "Ask an Expert: How Do You Measure the Value of Tooling?"

The potential for parallel work is strong in a multiple machining center setup. Let's remember, the

enemy of complete delivery is machine downtime. But there's known downtime when tools need to be changed out or for maintenance. In larger production runs, tools will wear out, and timing new tool changeover is expected—so parallel work becomes essential to stay on track toward complete delivery.

"Most efforts of setup reduction are solved in this [parallel] way: taking steps done in a series after the machine stops and moving them to being done in parallel to the machine running," notes Flinchbaugh.

Beyond lean parallel processes and tooling technology, do you know what your machines can handle? Cycle time rates are often determined by profitability metrics. A manager might know what it takes to make a job profitable at, say, 20 seconds, for example, but that number could end up having an unintended consequence: The machine is never run beyond it. At some point, unintentionally, "that morphs into how fast the machinists *should* run the part," says Adam Moran, vice president at Vorne Industries, in the article "***How to Slash Cycle Times When Cutting Metal.***" "But when we actually go and look at how fast the part can run, we might find that we can do it in 12 seconds relatively easily."

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