Lean Manufacturing

Stop Looking for That 10-Cent Part: Calculate Your True Shop Rate

Don Sears | Jun 11, 2018

Follow the journey of a machinist who cannot find tiny, inexpensive parts to keep his CNC machine producing customer orders. See what it costs to have core people away from their main job role.

Imagine this: You need a bag of specific-sized nuts, bolts and fasteners to fix a broken door of the ***CNC machine*** you work on regularly. You planned for this maintenance downtime, but the window was meant to happen on one of your breaks so you could get it back up and running quickly. Luckily, the other programmable CNC is fine and humming along.

Some larger companies might have maintenance teams take care of this kind of issue or have apprentices kit all the necessary parts for setup and maintenance jobs offline, but your company doesn't have a dedicated maintenance team, and frankly, this repair seems simple enough.

"When I go into a manufacturer, I will often ask, 'How long does it take to make a setup?' and managers will answer with, '20 minutes,'" says Mike Lynch, president of ***CNC Concepts Inc.***, an expert consultant who trains manufacturers on everything CNC. "But that was when the machinist had everything they needed right there in front of them. The manager has not factored in the time wasted in day-to-practice—there is a lot of underestimated downtime in a shop that management doesn't realize in their calculations."

The inventory system says these parts are in a bin in the storeroom, but they're not in the usual spot. The purchasing department says a replacement order came in a week ago and should be in the storeroom, but you cannot find the parts anywhere.

Did these fasteners and bolts actually come in? Did someone else grab the parts when the order arrived to keep them handy for themselves? Are they in a different bin location than normal? After an hour of trying to locate these parts by rummaging through bins and asking around the shop, you give up. You get in the car with a little bit of petty cash and drive to the local big-box hardware store.

With parts now in hand, you look at the clock on the car and it's now two and half hours since the door repair attempt began—and over two hours since that machine was officially taken out of service. Sure, you had another production run in that time on the other machine, but when you get back, you find something happened and that other machine did not produce the parts as accurately as needed—and so they are defective and cannot be used. You thought the other machinist you asked to keep an eye on

that machine would catch any issues—but he missed it. And the shop supervisor was fixing a different issue on the other side of the floor. If you'd been there, it's likely you would have seen the chip runout looking strange and could have adjusted it right then and there.

So now, production on your two CNCs has completely stopped. Ouch. What was scheduled and planned has now turned into two corrective maintenance situations and a customer-parts deadline looming. Downtime is now really starting to cost the company money.

Need help managing your downtime and the metrics associated with your machining output? Read "Lean Manufacturing: Improving TPM with OEE Calculations and Methods."

MRO Supplier Sprawl

It's not a surprise in some ways. It could be too many suppliers to manage. A ***study*** by Synovos found that more than 55 percent of manufacturers are doing business with more than 50 MRO and indirect suppliers, and nearly 32 percent are doing business with more than 100 suppliers. Maybe some of them are not as good about shipping or inventory on their end as they need to be. Or it could be that you need help managing it all.

More than half of the individuals surveyed said purchasing and maintenance do not work together to identify opportunities to substitute or reverse engineer spares and components.

More than 56 percent do not consistently have supplies and parts kitted and delivered prior to the technician's arrival for scheduled maintenance events, with nearly 15 percent responding they almost never do.

Ok, so for you, it might be too much to think that you could have things kitted at your company—or that you had any time to work on crafting up substitute parts and components. But having parts when you need them on-site in the right place? A little organization and timeliness can save a whole lot of effort and energy—and keep machinists doing their main job—while keeping those machines spinning and producing parts for customers.

Looking for help with your parts inventory management? Learn how MSC can help reduce your costs and manage your parts with a ControlPoint Vendor Managed Inventory (VMI) specialist.

Calculating Shop Rate: Include the 'People' or Employee Productivity Part

The moral of the story: The work loss can quickly add up to thousands of dollars in machine downtime and lost production time for a few parts that cost next to nothing. If 10-cent parts had been in the bin where they were supposed to be when they needed to be, the door could have been repaired, the chip runout could have been monitored—and all would have been avoided.

"Typically, most manufacturers and job shops with CNC machines use a shop rate for their machines—so they can understand the cost of making parts and using the machine," says Lynch. The range depends on what they are making and what they quote each part—and can factor profit, a

machinist's hourly rate, the cost of the outstanding loan on the machine, the cost to replace the machine, and much more. But sometimes not every company calculates the full cost of running the machine and the labor, Lynch explains.

"A typical shop rate range is about $150 an hour for a machine that costs $100,000," says Lynch. "In terms of downtime, a good rule of thumb is to do some simple calculations: Say your shop rate is about $120 an hour, so every minute your machine is not running costs about $2 per minute."

And don't forget, your machinist who has been away from his core role and is chasing parts is part of the shop rate equation. If your rate is closer to $150 an hour, the cost would be $2.50 a minute. It starts to add up.

Some job shops might only be assigning a $30 or $35 per hour shop rate and are not factoring in the cost of the longevity of the machine, Lynch explains. If that machine reaches its end of life and you have not been factoring in the funding for a new machine in your shop rate, well, you may not have the finances to pay for the down payment of a new one.

Factor the Downtime in Your Shop Rate When Calculating Manufacturing Shop Rate

So, back to our machine scenario dilemma: The shop supervisor is not happy—and you've lost at least a third of the day—if not more in production. All that time wasted and you still need to fix the door—and get the programmable machine back up and making new parts—which requires a watchful eye to keep the quality there.

"It is very common in my experience to see that the calculations used to determine what time goes into the maintenance or setup of a machine are off by a factor of three to five times," says Lynch. "Companies are often deceiving themselves here … When they walk the shop floor, they are not looking enough at all the spindles not running or machinists in the storeroom away from their core jobs trying to find parts. The costs add up."

There was the time looking for parts in the storeroom. There was time asking about the parts order and its location with purchasing. Then, there was the time looking for it again, asking around the floor—and the time to get approval for the petty cash and approval to head to the hardware store. Not to mention, there was time in the hardware store and the driving. And do not forget about the time lost in the machine that was running and making defective parts.

"[T]here is the issue of diverting highly paid maintenance personnel from repairs and planned maintenance activities," notes ***Supply Chain Management Review*** in its article "The Case for Managing MRO Inventory." "Having them carry out materials management work is not the best use of their skills and time. I've heard more than one plant manager complaining about maintenance staff sitting in an office talking to vendors, and in the same breath, groaning about equipment downtime."

Remember, people downtime could very well mean machine downtime. They often go hand in hand.

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Options for Keeping Machinists and Operators Productive

Whether by organized storeroom solutions such as vending systems or by the complete outsourcing of inventory management to someone whose sole job is to manage your MRO and low-cost parts' needs, there are real options for ensuring machinists and production employees stay true to their core role. Ultimately, your manufacturing operation will be measured on its ability to hit its delivery targets to paying customers.

"The solution to real on-time delivery rests with an agreement to have the supplier inventory on-site to control designated SKUs in the quantity required to eliminate downtime and idle workers," writes George Krauter, MRO expert and founder and former president of Industrial Systems Associates, in the article "***From Supplier to Tool Crib: Mastering On-Time Delivery of MRO***."

While some downtime for routine maintenance is expected, plant management will be focused on keeping lead time and delivery dates intact—which requires MRO parts be managed more intently than they might be otherwise. As Krauter goes on to note in the same article: "The optimum MRO supply situation is to have a mutually profitable agreement with all plant disciplines and with all members of the supply chain to provide needed parts in the location where they are consumed."