



The hidden costs of the factory floor

Effective time and cost-reducing tooling solutions you may not have considered

An out-of-control tooling inventory can have a significant impact on a machine shop's productivity and profitability. Faced with the complexity of the problem, shop managers might be tempted to bury their heads in the sand or stick with the old ways of doing things. Fortunately, cost-effective cloud-based software solutions that are easy to use and simple to set-up are now readily available, helping shops to get a handle on their inventories, operate more efficiently and, as a result, make more money.

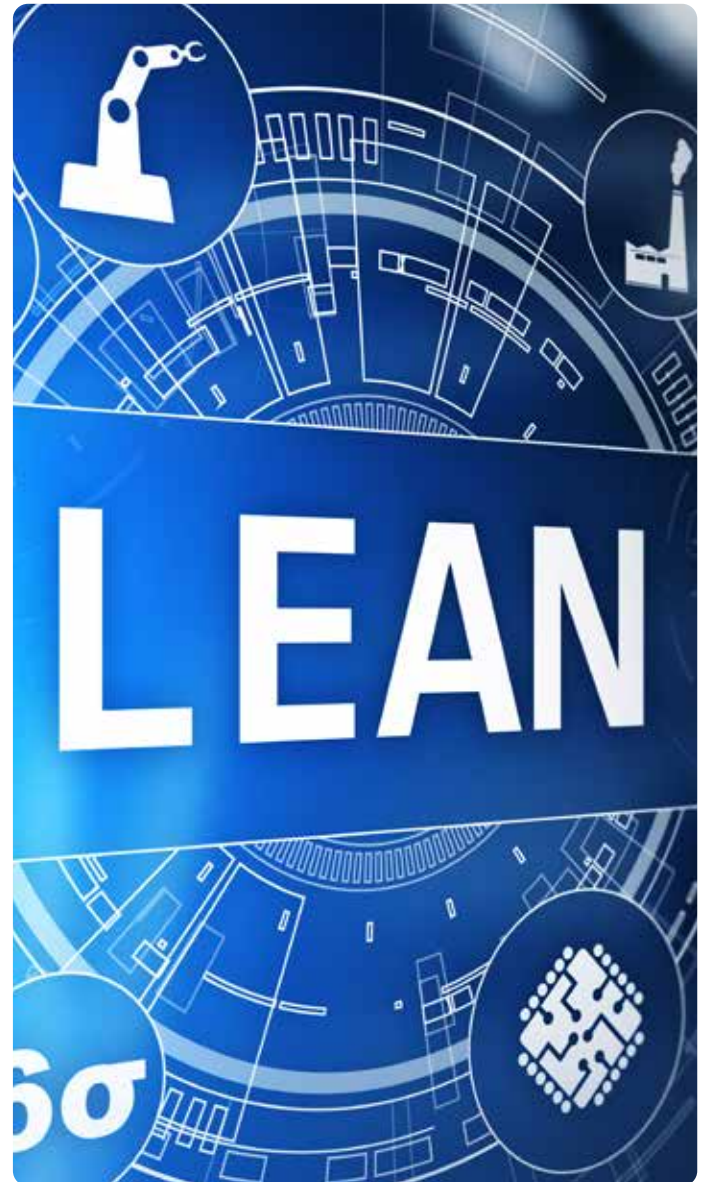
Rapidly emerging technologies such as the industrial internet of things (IIoT), additive manufacturing and collaborative robotics are changing the ways in which parts are made, and unpredictable events such as the covid-19 pandemic can alter radically the business environment in which machine shops must operate.

Despite this turbulence, the age-old concept of lean manufacturing should always remain paramount in the minds of part producers.

Lean machine

The idea of lean manufacturing has been in existence, in one form or another, for over a century, and its principal doctrines will be familiar to many. Lean manufacturing was introduced to the Western world via the 1990 publication of *The Machine That Changed the World*, which was based on a five-year, \$5-million study on the future of the car carried out by the Massachusetts Institute of Technology (MIT). The study outlined Toyota's lean production system, which the carmaker has been steadily refining since the end of the second world war.

The basic premise of lean manufacturing is to establish processes that eliminate waste, such as overproduction to meet perceived or forecasted demands, defects or bottlenecks in production processes, redundant inspections or requirements, excess transportation, idle time, the unnecessary motion or handling of products, and the overall "culture" of a given operation.





Staying relevant

Some manufacturers see lean manufacturing as an unnecessarily complicated and old-fashioned set of standards that are too costly or time-consuming to implement. Further, the Toyota production system on which lean manufacturing is based was designed for plants assembling similar vehicles by the thousands. A typical machine shop, by contrast, might produce a wide variety of parts in comparably low volumes, making many of the tenets of lean manufacturing largely irrelevant. A machine shop, therefore, cannot expect to realise the same lean benefits with the same lean tools.

There are certain lean manufacturing concepts, however, that – when implemented correctly – can pay huge dividends for machinists in the long run. Ranking high amongst these is that of inventory control. An out-of-control inventory can make the business of producing parts significantly more complicated than it needs to be and can have serious impacts on profitability.

The good news is that, when it comes to tooling inventory management, there are cloud-based software solutions that are cost-effective and easy to implement for even the smallest and most specialised of shops. Such software can answer those key questions about tooling. When was a tool ordered, and how long has it been here? When will a tool be back in stock, and will it be in time to carry-out that critical job? Why are so many of these tools being carried when sales of the parts they are used to produce have been dropping?

By answering these questions, and more, teams can work together to identify where inventory is needed and where it is not. The results are a leaner operation and more money with which to pursue new opportunities for growth.

Counting the cost

To understand the benefits of this lean approach, the costs associated with an out-of-control tooling inventory must first be quantified.

First, there are opportunity costs. Space used for storage is space that cannot be used for other purposes, such as a new product line, new machinery, office space and more, which may cause a company to expand or relocate its facility prematurely. Further, money tied up in unnecessary assets is money that could be spent elsewhere on profitable endeavours.

Second, huge amounts of time can be spent maintaining and managing tooling inventory, including ordering tools, putting them away, and picking, counting and relocating them. The larger the inventory, the greater the number of transactions and the greater the number of people involved. Time is also eaten-up by the administrative tasks associated with tooling inventory management. If the tooling is obsolete, as – according to a survey undertaken by Sandvik Coromant – 60% of it will be, this time is wasted.



Third, equipment is required to load and unload inventory, as well as transport tools to their points of use. Typically, fork-lift trucks, pallet trucks, tow motors and ladders are used for this purpose. In addition, racks and shelves will be needed for storage and possibly even pallets and skids for larger tools. All of this equipment must be maintained, and employees must be given extensive and expensive training in order to use it safely. Although obsolete inventory might not be moved very often, it is not uncommon to periodically relocate slow moving items.

Fourth, insurance premiums escalate in proportion to the size of the inventory being held. This means that obsolete inventory can lead to a higher insurance premium.

Fifth, a disorganised tooling inventory can lead to disorganised working practices. The Sandvik Coromant survey found that 30–60% of tool stock is uncontrolled and is simply stacked by machines, getting in the way of work, forcing operatives to make detours and sometimes even posing safety risks. A large tooling inventory makes it harder to find what is needed—20% of an operator's time is spent looking for tools. This is a waste of time and effort, and can cause delayed orders, unnecessary re-orders of tools and costly mistakes. Indeed, 15% of jobs can be stopped or delayed due to a lack of the correct tools. Most strikingly, the survey found that 80% of work is performed with only 20% of the tools in an inventory.

Finally, inventory can be used as a cure-all with which to solve problems, but ultimately, all it does is mask them. A large inventory may ease worries regarding long vendor delivery times, critical machine breakdowns, long equipment set-up times, production schedules not being met and even absenteeism. If, however, inventory has to be reduced because the high costs associated with it cannot be absorbed for extended periods of time, these problems must be dealt with. It is better to do this from a position of relative comfort, rather than out of pressing necessity.

Accepted metrics of tool management systems

Of course, all of these costs can be difficult – or maybe even impossible – to quantify accurately, but in order to get serious about tooling inventory management, that big picture is needed. This can be achieved using two widely accepted metrics.

The first is inventory turnover (also known as Stockturn), which is calculated using the following formula:

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{average cost of inventory}}$$

To illustrate, Company X sold £4 million worth of goods in 2019, and the average value of their inventory was £1 million. The ratio reveals that the inventory turned over the equivalent of four times during the year. Cutting the value of that inventory in half through an inventory-reduction programme would increase the inventory turnover ratio from 4 to 8, meaning higher sales in relation to the inventory investment, and higher profits.

Another widely used ratio, called inventory holding period, uses similar data to show how many days, on average, inventory is held. The formula is:

$$\text{Inventory holding period} = \left(\frac{\text{cost of inventory}}{\text{cost of goods sold}} \right) \times 365$$

Cutting inventory costs in half, as in the Company X example, would decrease the holding period from 91 to 46 days, reflecting less money spent on maintaining inventory, and more left over as profit.



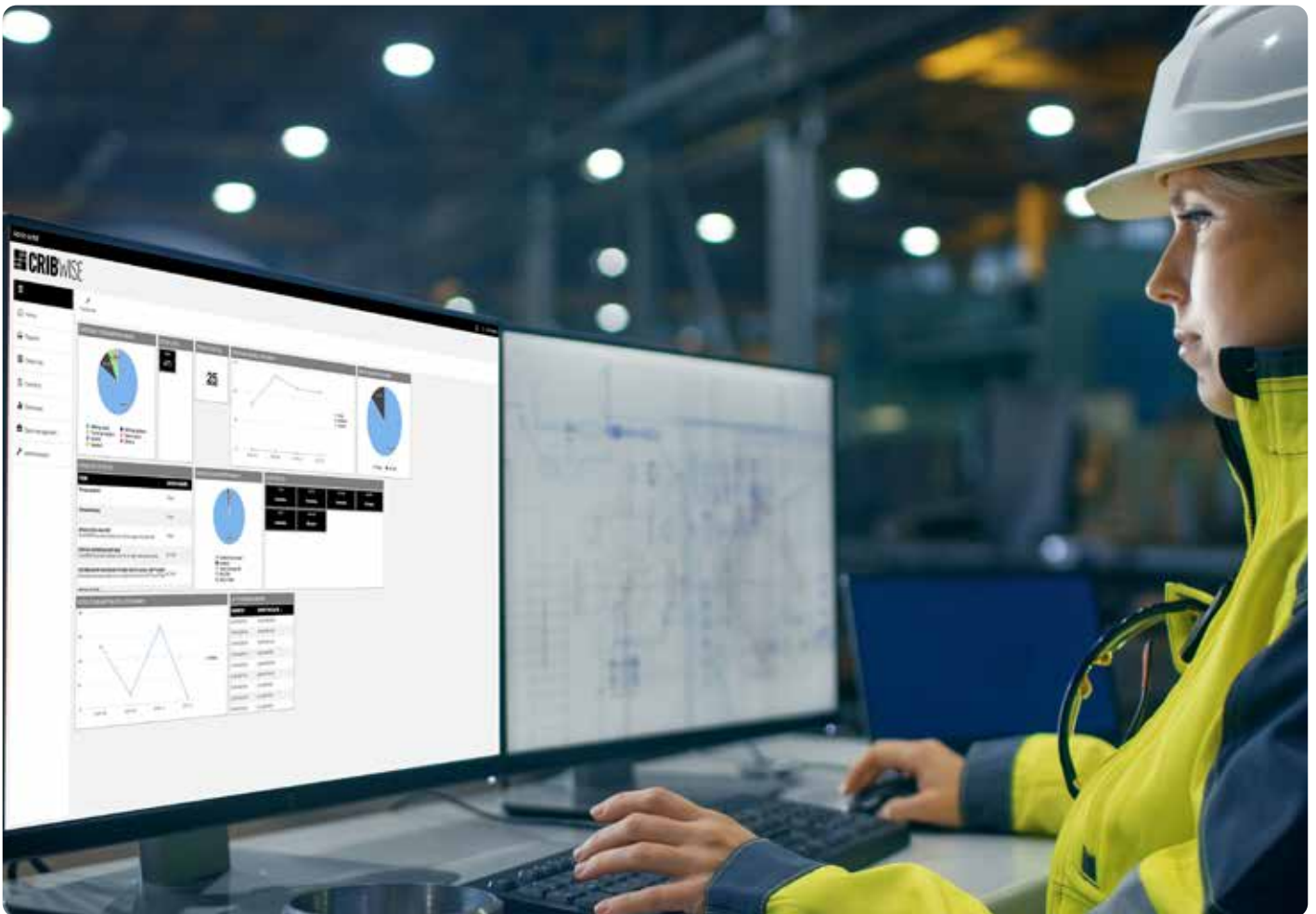
Simple tooling inventory solutions

Traditionally, an out-of-control inventory could be a lengthy and complex problem to solve. Fortunately, simple and cost-effective solutions are now available. Machinists are increasingly turning to inventory management software for their tools, equipment, assets and personal protective equipment. The benefits of the best inventory management software are numerous.

They reduce administrative headaches. Using intelligent rule-based systems, the ordering process can be automated. The ways in which tools move through an organisation and around the shopfloor can be streamlined and controlled precisely. Tool inventory management software can also be integrated into existing enterprise resource planning (ERP) systems to simplify the management of orders, the goods-received process and invoicing.

Using inventory management software for tools, costs can be controlled. Inventory can be made more visible; tooling can be marked as “in use” rather than “out of stock”, for instance—eliminating over ordering. Rules can be set that ensure that operators choose used and refurbished tooling before new. Tooling consumption patterns and spending over time can be tracked to identify areas of improvement.

Further, the use of tooling inventory management software can increase productivity and the amount of time machines can be run. The tools available, where they are on the shopfloor and even the operative that selected them can all be tracked – eliminating time wasted searching for them. Incoming orders and deliveries can also be tracked, and low-inventory alerts and automatic ordering rules can be established so production delays become a thing of the past.



Tool Inventory Management: Key features

What features should shop managers look for to determine the best inventory management software for them? It should be easy for them to use and to customise to their needs. It should be vendor-agnostic. It should be capable of hardware-software integrations that encompass all of their inventory, regardless of brand. It should also be able to function as a stand-alone system, or with various optional vending machines.

CribWise

Modular, customisable and easy to integrate, CribWise grants machine shops complete control over their tooling inventory with minimal effort and expense as well as providing sustainability benefits by the nature of reducing resources. It eliminates administrative hassles, eradicates production delays and cuts excessive (often hidden) expenditure.

CribWise customers have reduced their inventory costs by as much as 20% and have cut their tool usage costs by up to 10%. On-hand inventory levels can be reduced by around 30%. When used to manage inventories of personal

protective equipment (PPE), consumption of these items can be slashed by almost 40%. Fårbo Mekaniska, for instance, had a tooling inventory of \$700,000, about 10% of its annual turnover, and spent over 2,000 hours a year looking for tools. With CribWise, it reduced its stock levels, cut downtime and automated its orders – enabling its management team to concentrate on the needs of its customers and the development of strategies to take the company forward.

Gaining control of your tool inventory

Out-of-control tool inventory is a more common and costly problem than many shops realise, and many struggle to answer even basic questions, such as: are the items critical to production always in stock? Are their purchase orders generated automatically? Can inventory data be accessed quickly? The use of inventory management software enables machine shops to get control over their tooling related inventory and adjacent purchasing processes to maximise production efficiency and growth, to automate tool procurement, streamline the use of consumable and durable goods, reduce working capital and, ultimately, improve productivity and profits.





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