

TACKLING THE TOP 5 OPERATING CHALLENGES IN INDUSTRIAL METAL CUTTING

The following paper identifies the top five operational challenges managers face in a metal-cutting environment, the impact they can have on the bottom line, and best-practice approaches for achieving operational excellence.

CHALLENGE #1: PROCESS AND WORKFLOW BOTTLENECKS

In a high-production operation, there is no time for bottlenecks. From creating a paper trail to instilling a proactive maintenance program, this section arms managers with hands-on solutions that reduce downtime and, in turn, increase productivity.

CHALLENGE #2: RESOURCE ALLOCATION AND EFFICIENCY

Proper allocation of resources is critical in today's unpredictable marketplace. This section discusses ways to identify areas that need improvement, as well as some high-tech solutions that offer a high return on investment.

CHALLENGE #3: TRAINING AND MAINTAINING TALENT

A company is only as good as its employees. This section talks about the growing need for today's managers to invest in their workforce, especially as the industry faces a shortage in skilled production workers.

CHALLENGE #4: CUSTOMER SERVICE AND DELIVERY

Customer service is about more than delivering orders on time. This section talks about the challenge of balancing quality and speed and best-in-class methods for achieving both.

CHALLENGE #5: MANAGING COST

Today's competitive market requires managers to approach cost strategically. This section highlights the importance of making cost decisions that provide long-term benefits.

After a rough few years, most experts agree that the U.S. metals industry is on the rebound and, more importantly, part of an overall rise in North American manufacturing. Some industry segments have been reporting year over year sales increases[1], and many metal executives expect their key markets to either grow or remain flat this year.[2]

However, even with signs of a market recovery, some uncertainty still exists within the industry. Demand is estimated to be about 15% lower than it was six to seven years ago, and there has been enough volatility in the global market to make executives cautiously optimistic about the near future.[3] Uncertainty about external factors such as economic activity and commodities pricing has pushed metal-cutting companies to focus on improving the aspects of their business they can control—internal operations.[4] In a recent survey by PricewaterhouseCoopers, 56 percent of metals CEOs listed improving operational effectiveness as one of their key investment priorities.[5] Specifically, the report says that “cost-cutting and operational efficiency are high on the agenda.”

While many of today's metal-cutting companies exist because of their ability to survive even the toughest market conditions, best-in-class executives know they cannot afford to rest on their laurels. Today's industry leaders are taking a proactive approach to optimizing their metal-cutting operations so that they are in the best position possible when the market fully rebounds.[4] This includes addressing traditional pain points like efficiency and

cost, while also tackling new challenges in areas such as workforce and customer requirements.

This paper will discuss the top five challenges facing today's metal-cutting executives, the impact these challenges can have on operations, and strategies focused on helping companies flourish in today's growing, but often unpredictable, marketplace.

CHALLENGE #1: PROCESS AND WORKFLOW BOTTLENECKS

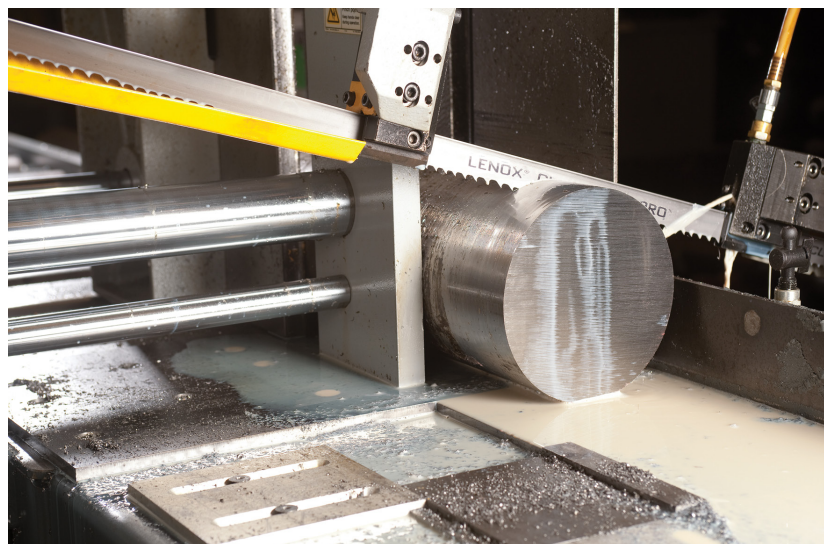
As with any manufacturing operation, process and workflow bottlenecks are a common challenge metal-cutting operations face. The fast pace of the shop floor can tempt operators and managers to focus on speed before quality, which often leads to failures in equipment and blades, costly mistakes, and a decrease in overall productivity.

For these reasons, process control is critical. When production requirements increase, it is imperative that systems are in place to keep quality consistent and, even more so, make it easy to identify and correct any mistakes or maintenance issues that create bottlenecks. Daily checklists, maintenance reports, defect reports, and operator sign-off procedures are just some strategies industry leaders are using to reduce bottlenecks and ensure that equipment is running optimally and continuously.

One leading metal-cutting company has instituted a "one-over-one" signature process that requires an operator to provide his or her signature once equipment has been set and the first few cuts have been made. Another operator or supervisor is then also required to provide a signature to confirm that the

proper procedures were followed. This process is repeated once the cutting job is complete to ensure quality, and it is used again in the shipping department to ensure order accuracy. This not only helps reduce the occurrence of bottlenecks, it also provides a means of traceability and accountability when bottlenecks and errors occur. With a signed paper trail, managers can quickly identify the source of the issue and institute corrective action so that the operator does not repeat the mistake. This accountability also encourages the operator to follow procedures correctly the first time.

One strategy for reducing maintenance bottlenecks is to implement a preventative maintenance (PM) program. By following a short list of maintenance checkpoints before cutting, operators can ensure that machines are running at optimal levels and proactively identify mechanical issues that could affect quality. This also helps operators get familiar with the equipment and increases their cutting expertise. While this may require more set-up time on the front end of the production process, the end result is a reduction in overall maintenance issues, which can improve long-term productivity.



Perhaps the greatest source of bottlenecks in a metal-cutting environment is equipment downtime. When a piece of equipment is malfunctioning or a blade needs to be replaced, productivity is immediately affected. While managers may be tempted to blame equipment and blades for continued maintenance issues, a detailed review of maintenance reports can often reveal root-cause operator issues. In many cases, high maintenance costs are a symptom of larger problems on the shop floor, such as lack of operator knowledge and training, as well as incorrect cutting parameters or improper blade or tool usage.

Finally, managers should be aware that some bottlenecks aren't immediately obvious and can be hidden in issues such as a poor workflow on the shop floor. Strategic equipment placement and improved ergonomics are key aspects of high productivity and optimized workflow. The fewer times an operator touches a material, the fewer chances there are for injury and human error, both of which contribute to productivity.

To address this issue, one leading metal-cutting company decided to bring in an ergonomics consultant to make a number of workflow adjustments at its facility. Improvements ranged from relocating band saws to purchasing height-adjustable tables and lightweight control boxes for their cranes. According to the company's operations manager, the initial motivation for improving ergonomics was to keep operators safe. However, by increasing safety, the facility also saw a reduction in operator downtime, which helped improve productivity.

CHALLENGE #2: RESOURCE ALLOCATION AND EFFICIENCY

While reducing process and workflow bottlenecks is one way to make an operation more efficient, managers are still faced with the challenge of strategically allocating their resources in the most economical and efficient way. In some cases, this

may require investments in technology, while in other instances, it may require investments in the workforce.

To properly allocate resources, managers need to identify the aspects of their operations that need the most improvement. This requires measurement. A good starting point is for managers to conduct a time analysis of their operations. This should include more than just a study of labor functions. When done correctly, time analysis should include the total picture of an operation, including plant layout, material flow, management practices, shop functions, and purchasing activities.[6] Using consistent recording methods, data is collected over several days and is then added together to get an average of the time spent on each function. Managers should then compare their findings to what research says is an ideal time for completing certain tasks (i.e., welding). In other words, if it takes an operator 9 minutes to complete a task that should take 5 minutes, it should be marked as an area for improvement and addressed accordingly.

In some cases, automation and technology investments may be part of the solution. However, the challenge is determining whether or not allocating resources to automation and technology will offer a true return on investment. One rule of thumb is to consider whether or not the improvement will enhance customer service. If the customer will receive a significant benefit either in terms of improved quality or faster delivery, it is typically an investment worth researching.

One metal service center developed an internal software system to automatically track the number of square inches processed by each saw and each blade. At any point, the manager can go to a computer screen, click on a saw, and see how many square inches that saw is currently processing and has processed in the past. This has allowed the service center to easily track trends and quickly

detect problem areas. For instance, if a saw's square inch life has deteriorated, a supervisor or manager can look into the issue, determine whether or not the cause is maintenance or operator related, and address the issue accordingly. In this case, the company says the technology upgrade helps keep equipment running non-stop, which has made it a worthwhile investment.

Another metal-cutting company is developing a software system that connects the sawing equipment to the company's order-tracking system. Historically, employees would input order information into the company's system, print out a report, and deliver it to the operator. The operator would then have to reenter the data into the sawing equipment. By developing a communication bridge between the saw and the computer system, the company no longer needs to enter the same data twice. The goal is to reduce the chance of human error as well as eliminate an unnecessary production step.

Managers may also find it beneficial to invest in new tooling advancements. One machine shop recently found that upgrading to a carbide-tipped band saw blade provided a substantial improvement in efficiency. Previously, the shop was using bi-metal band saw blades to cut stainless steel, which could take up to two hours. Now,

with the carbide-tipped blade, cuts are performed in minutes, which has provided huge time savings and has freed up the sawing equipment to do more cutting. While the short-term cost of the newer blades was higher, this machine shop found that the long-term productivity benefits were well worth the investment.

CHALLENGE #3: TRAINING AND MAINTAINING TALENT

Today's metal-cutting companies are also realizing the growing importance of allocating resources to the workforce. While the trend has been for metals companies to invest in technology over people[7], a shortage in skilled production workers is forcing managers to invest in training and maintaining talent. According to a survey from Deloitte Consulting and The Manufacturing Institute, 74 percent of manufacturing executives surveyed admitted that shortages in skilled production jobs such as machinists, operators, and technicians are taking a toll on their ability to expand operations, drive innovation, and improve productivity.[8]

The workforce challenge for today's metal-cutting executives is two-fold. First, a large number of workers are facing retirement in the coming years[8], which will have a significant impact on shop floor experience. In addition, a recent report from trade publication Modern Metals states that by 2020, companies will have up to five generations in the workforce at once. [3] This unbalanced level of skill and experience in a metal-cutting operation can have a significant impact on both quality and productivity.

Meanwhile, the industry's recent investments in technology and lean techniques have changed the nature of metal-cutting. This means the need for highly skilled operators is higher than ever, both in new employees with



little experience and in seasoned employees that might be resistant to change. As a result, managers need to work closely with machine operators to ensure that their knowledge and skill sets line up with the company's technological assets and, more importantly, their productivity goals.

One way to address these challenges is to establish ongoing operator training, either internally or with the help of a supply chain partner. By requiring training, managers can balance the level of skill on the shop floor and across different shifts. For example, one metal service center recently developed and instituted a new band saw training program as part of its quality system. While the service center has always offered some form of training, it wasn't effective until the program was considered a formal procedure and audited accordingly. This training strategy has provided consistency and accountability within the service center's workforce and has helped balance the level of talent shop-wide.

Managers can also use the different strengths found within a multigenerational workforce as an asset. While younger, less experienced workers may lack industry knowledge, they are typically more technology savvy and more willing to embrace new techniques. Seasoned workers, on the other hand, may be resistant to both change and technological improvements; however, they typically have a vast amount of experience and loyalty, and may be able to mentor new employees. When leveraged appropriately, many companies are finding they can use this diversity as an opportunity to improve operations and create new and innovative solutions to traditional problems.[3]

CHALLENGE #4: CUSTOMER SERVICE AND DELIVERY

Another more recent industry development has been customer requests for higher quality. Balancing speed with quality has always been a pain

point for metal-cutting companies, but many metals customers are now also asking for tighter tolerances and expecting zero errors. In other words, they expect both speed and quality. Growing demand has made this an even greater challenge for today's operations managers.

While speed and agility are certainly key attributes of any leading metal-cutting operation, best-in-class companies have found that they cannot come at the expense of accuracy. In a band-saw cutting environment, for example, if an operator increases the speed of the saw to get more cuts per minute without considering the feed setting or the material, the end result will be decreased blade life, possible maintenance issues, and lower quality cuts. In the same way, companies focused solely on speed and delivery without considering the quality aspect of customer service will likely see other areas of their business suffer, including customer retention and costs.

In most cases, planning is the key to balancing speed with quality. One metal service center, for example, has seen tremendous operational improvements as a result of forecasting. For many years, the company's metal-cutting operations were rushed and frenzied, and, as a result, it was barely making customer orders on time. The service center also had no time for quality checks, which means they were often sending out low-quality orders just to meet deadlines.

However, about five years ago, the company brought in a new manager who worked with the staff to plan out orders 6 to 8 weeks in advance—a schedule the company maintains today. By planning ahead, operators are given the time and flexibility they need to not only get the job done on time, but to do the job right. This approach has provided the service center with a wealth of benefits, from faster customer delivery and higher efficiency to improved employee morale and higher sales. Specifically, the

company reduced its scrap rate from 5 percent to less than 1.5 percent, and sales have increased 15 to 20 percent per year for the last five years.

CHALLENGE #5: MANAGING COST

Ideally, an efficient metal-cutting operation shouldn't list cost as a challenge. If production is running smoothly, maintenance is under control, operators are trained, and customers are satisfied, then costs should be relatively stable. However, at a time when the industry is coming off a recession and uncertainty about market conditions remain, cost is a major concern for even the most efficient metal-cutting operations.

One challenge for today's operations managers is balancing short-term costs with long-term benefits. For instance, some metal-cutting operations are using the "pick for speed" method to meet growing demand and improve short-term productivity. This means operators are grabbing fresh material every time and ignoring scrap. However, many industry leaders are finding that "pick for clean" is a better long-term solution. In most cases, using remnants first and striving to keep inventory low leads to increases in productivity and quality in the longer term because operators take the time to perform cuts right the first time. This also keeps material costs low, which affects the bottom line. Many times, high inventory levels and costs can be a sign of "hidden" operator quality issues and inefficiencies that could be avoided with proper training and management.

Another way to keep costs under control is to make sure metal-cutting equipment is operating as optimally as possible. This includes ensuring that equipment is running at the proper settings and that saws are using the proper blades. Closely monitoring blade life and maintenance reports are a critical aspect of managing equipment costs. If operators are taking too long to cut a specific material or blade costs are up, managers should review

equipment settings and monitor the operator in action. If the problem persists, supply chain partners may be able to suggest solutions or identify the source of the issue.

Consistent general and preventative maintenance (PM) programs can also help metals executives better manage costs. On a band saw, for example, low coolant levels can lead to premature and uneven wear of band wheels, which typically cost about \$1,000 each. By instituting regular coolant checks as part of a PM program or daily operator checks, managers can eliminate this unnecessary maintenance cost, as well as the time needed to replace the band wheel.

On a higher level, managers also need to be sure to monitor total cost. According to lean manufacturing consultant Bill Waddell, metrics such as labor efficiency and machine utilization should only be data points that shop floor managers choose to use or not use to help them attain the lowest total cost.[9] In his paper, *Manufacturing's Five Golden Metrics*, Waddell says that the only meaningful measurement of total cost is on a cash basis. All money spent on manufacturing must be totaled and compared to the previous period to get an accurate picture of whether costs are up or down. Waddell also says that it is important that the total cost figure includes all allocations and "does not exclude sales, general, and administrative costs." By monitoring the bigger cost picture, managers can gauge whether or not their operation is thriving.

CONCLUSION

There is no question that a tough economy has changed the metals environment, and today's metal-cutting executives have found that adapting to change is not only strategic, but necessary for survival. Most metal-cutting companies are now approaching the market with a cautious optimism, and as a result, industry leaders are taking a look inside their own doors and making opera-

tional improvements wherever possible. This has required managers to address newer industry developments such as shifts in the workforce and new customer requirements, while continuing to find new approaches to age-old issues like efficiency and cost.

With an uncertain economy, metal-cutting executives can no longer afford to ignore their operational pain points. From workflow and resource allocation to managing talent, customer service, and costs, a successful metal-cutting operation seeks continuous improvement in all aspects of its business. By both identifying and addressing their top operating challenges, managers can ensure that their operations will not only survive but, more importantly, flourish as the market continues to recover.

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