

Metalworking

Four Opportunities for Industrial Metal-Cutting Operations To Reach Peak Performance

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After years of uncertainty, metal-cutting companies and other industrial manufacturers are gaining confidence about future market prospects. In one survey from the National Association of Manufacturers, 93% said they were either somewhat or very positive about their own company's outlook.

Even with this renewed confidence, industry leaders know that continuous improvement activities can't be placed on the backburner. Today's marketplace is just too competitive.

Unfortunately, research shows that metal-cutting organizations and other industrial manufacturers are hesitant to make the necessary changes and investments that could help drive improvement and take their operations to the next level. According to a report from PricewaterhouseCoopers (PwC), "the industrial manufacturing sector remains risk averse, unwilling to spend on new machinery, software, and talent during a period of protracted slow growth and limited proven solutions."

The 2nd Benchmarking Survey of Industrial Metal-cutting Operations, from the LENOX Institute of Technology (LIT), shows a similar trend occurring within the industrial metal-cutting sector. According to the study, only a small percentage of industrial metal-cutting companies are investing the time and resources needed to track the performance of the sawing department and its operators and, as a result, are not achieving optimal results. Specifically, only 33% of the survey respondents said they measure operator performance regularly and provide feedback for improvement, and a mere 20% are regularly tracking Overall Equipment Effectiveness (OEE).

These and other findings from LIT's second benchmark study are significant to industrial metal-cutting companies that want to thrive in today's market. Whether quantifying performance through data or enhancing operator skills through training, the latest benchmark survey results reveal several opportunities for metal-cutting companies to further improve their operations.

Over the last several years, industry leaders have touted continuous improvement and lean manufacturing activities as top priorities; however, benchmarking results show that industrial metal-cutting companies still face a host of operational frustrations on a daily basis. Data also shows that many companies are missing opportunities to attack these frustrations head-on and, in turn, are not seeing improvements in several operational areas.

According to the survey of industrial metal-cutting operations, the top four sources of frustration on the shop floor include:



Each of these challenges affect the bottom line and, more importantly, need to be addressed for a metal-cutting operation to achieve optimal performance. The following is a summary of the

benchmarking study results, as well as recommended strategies for operations that want to advance their continuous improvement activities and see further success in the areas of performance, quality, and cost reduction.

Frustration #1: Operator Error

More than half (53%) of the survey respondents listed operator error as a top frustration. In addition, when there is a defect, 64% of respondents said operator error is “always” or “mostly” the cause.

This is a substantial change from LIT’s 2013 study, in which only 15% of respondents indicated that operator error was a top source of frustration. This increase suggests that operator error is not being addressed and, in fact, is becoming more problematic for many industrial metal-cutting operations. One reason for this may be a lack of formal training. As stated previously, only 33% of respondents said they measure operator performance regularly and provide feedback for improvement. While more than half (62%) said they work with saw operators to maximize their efficiency, there still appears to be a training gap. The majority of respondents (61%) indicated that their approach to improving operator performance is informal and peer-led, and only a little more than half (56%) indicated some formal training processes. In addition, about one-third (32%) of respondents listed recruiting and training qualified operators as a frustration; however, only 25% of respondents take advantage of training from their blade manufacturer to help supplement the formal training they provide. Little to no formal training, as well as minimal external support, may explain why operator error continues to be a challenge for industrial metal-cutting organizations and points to a clear opportunity for companies to use training as a means to improve operator performance, increase quality, and save costs.

Recommended Strategy: Focus On Operator Training as a Formal Process

To reduce operator error, LIT suggests that companies implement formal training processes that demonstrate an operation step-by-step. This may include support from blade manufacturers and other equipment suppliers that offer training as a value-added service. It is also recommended that managers measure operator performance regularly and provide feedback so that errors can be quickly identified and are less likely to be repeated. In addition to reducing errors and improving quality, a strong training program can also help metal-cutting organizations get the highest return on their employee investments. Survey respondents reported that both operator costs (40%) and overall labor costs (45%) are increasing, which means that metal-cutting companies can’t afford to constantly replace operators or retrain existing operators on old skills. Rising costs, coupled with a decreasing talent pool, suggest that it pays for industrial metal-cutting organizations to get the most out of their human capital by equipping them with the skills they need to be successful.

OTHER TRAINING STRATEGIES TO CONSIDER:

- Provide ongoing training beyond new-hire training
- Conduct regular safety training
- Train operators how to measure blade performance (number of cuts, square inches removed, etc.)
- Teach operators how to break in blades to extend blade life
- Measure the percentage of defective parts per operator
- Cross-train operators to challenge them and keep them engaged

Frustration #2: Premature Blade Failure

About 46% of survey respondents listed premature blade failure as a top challenge on the shop floor. This is an increase from LIT’s 2013 study, in which only 27% of respondents listed blade failure as a top frustration. Data from the most recent study points to two main reasons for this growing frustration:

- Only 54% of respondents said they are using the right metal-cutting blade for the application more than 75% of the time.
- Only 57% of respondents said they teach their operators to break in blades, a proven process that significantly extends blade life by honing the teeth of the blade.

The most common reason for premature blade failure is operators failing to run equipment properly—another reason why operator training is critical. Proper use starts with working closely with your blade supplier to choose the right blade for the material and application. However, blade life also relies on a variety of other variables, including cutting speeds, feed rates, blade tension, lubrication, and break-in procedures. When any of these variables is out of sync, blade life is diminished, resulting in bottom-line consequences such as increased tooling costs, downtime, rework, and scrap.

Recommended Strategy: Train Operators to Break in New Blades

One of the first and most important steps in metal-cutting occurs before production even begins. Breaking in new blades is critical to achieving longer blade life and high-quality cuts. In order to withstand the cutting pressure used in band sawing, tooth tips need to be honed to form a micro-fine radius. Failure to perform this honing will cause heavy uneven wear on the tooth tips, as well as chipped or broken teeth. This, in turn, reduces blade life and could impact surface finish and cut tolerances.

Unfortunately, research shows that fewer metal-cutting companies are taking this critical production step. While 28% of respondents in LIT's 2013 benchmark study said they "always" break in saw blades to ensure optimum performance, only 21% said the same in 2017. Meanwhile, 9% of 2013 survey respondents said they can "always" predict blade failure, whereas only 6% said the same in 2017— a meaningful correlation and a strong argument for the benefit of breaking in blades.

In fact, of the 31% of 2017 respondents who said they can predict blade failure, 95% said they "always" or "mostly" break in blades, and 91% said they perform scheduled and preventative maintenance activities. These findings suggest that companies that proactively care for blades and equipment can achieve better productivity by turning disruptive or unplanned downtime into anticipated and scheduled downtime.

LIT recommends that metal-cutting companies train operators in how to properly break in new blades to avoid premature blade failure and improve overall efficiency. By following proper break-in procedures, metal-cutting organizations can prolong blade life and reduce production bottlenecks caused by frequent blade changes, both of which have cost-saving implications.

Frustration #3: Measuring Performance

Another top frustration among survey respondents is the ability to measure performance effectively. More specifically, 37% of companies surveyed said they are frustrated with either measuring the performance of their overall operation, measuring blade performance—or both. This frustration is evident in the lack of measurement occurring within industrial metal-cutting operations. For example, only 20% of respondents are tracking Overall Equipment Effectiveness (OEE)—a metric commonly used by manufacturers to measure availability, performance, and quality. A mere 3% said they "always" track OEE, and 46% said they "never" track it at all.

Additional survey results show that far less than half of metal-cutting companies are conducting other types of measurement that would help them manage performance:

32%

of survey respondents
measure the number or
percentage of defective
parts per operator

33%

measure operator
performance regularly
and provide feedback
for improvement

35%

teach operators how
to measure blade
performance (number of
cuts, square inches, etc.)

Results did show that most industrial metal-cutting companies are tracking costs. Exactly 75% of survey respondents said they are measuring material costs, 71% are measuring labor costs, and at least half are measuring machine costs, utilities, and operator costs. However, fewer companies are measuring costs associated with packaging (33%), training (18%), and regulation (10%). About 13% of respondents are tracking no costs at all.

Recommended Strategy: Utilize Metrics to Quantify and Improve Performance

As the old adage goes, you can't improve what you can't measure. In other words, quantifying the performance of an operation is the only way to set goals and identify areas that need improvement. To drive continuous improvement in performance, quality, and cost reduction, LIT recommends that today's industrial metal-cutting operations focus on increasing their proficiency and sophistication in measurement and optimization.

According to research conducted by LNS Research and MESA International, the following four operational measurement categories have the biggest impact on average annual improvements in financial/business performance:

- 1. Inventory.** One inventory metric to consider is WIP (Work in Process) inventory/turns. This commonly used ratio calculation measures the efficient use of inventory materials. It is calculated by dividing the cost of goods sold by the average inventory used to produce those goods.
- 2. Efficiency.** Metrics in this category include throughput, capacity utilization, Overall Equipment Effectiveness (OEE), and schedule/production attainment.
- 3. Quality.** One quality metric worth tracking is yield—the percentage of products that are manufactured correctly and to specifications the first time through the manufacturing process without scrap or rework. Other quality metrics include customer rejects/return material authorizations/returns and incoming quality (from vendors).
- 4. Responsiveness.** Common metrics in this category include on-time delivery to commit, manufacturing cycle time, and time to make changeovers.

Frustration #4: The Ability to Optimize Jobs to Meet Production Goals

Survey results revealed that optimization is also a main source of frustration for industrial metal-cutting companies. A little more than 60% of survey respondents listed one or more of the following as challenges:

- Job optimization (i.e., right material, right saw, correct parameters)

- **Forecasting and production scheduling**
- **Time to job completion**
- **Meeting productivity targets**
- **Meeting production targets**

Data suggest that these frustrations are impacting performance. As previously stated, only 37% of survey respondents are running at optimal performance more than 75% of the time. Additional findings point to other areas of inefficiency. For example, only 33% of respondents have uptime over 75%, which indicates that metal-cutting companies are not as efficient as they could be with their equipment. In addition, only 33% of respondents said they get the cut quality they desire more than 50% of the time.

Research findings also revealed that respondents are seeing little improvement in performance.

While survey results show that most respondents aren't seeing decreased performance year over year, the majority seem to be achieving the same results year after year. According to the survey, 60% of respondents indicated they are seeing no change in their metal-cutting machine's cutting time year over year; 58% are seeing no change in machine set-up time; and 45% are seeing no change in on-time job completion.

Performance also appears to be flat when comparing current benchmark data to the 2013 benchmark study. For example, 44% of 2013 respondents said on-time job completion was increasing year over year, and 42% said the same in 2017. In addition, 26% of 2013 respondents reported that metal-cutting machine set-up time was decreasing year over year, whereas approximately 25% said the same in 2017.

This static performance indicates that industrial metal-cutting companies are not continuously improving, nor are they reaching their full potential.

Recommended Strategy: Work Closely With Your Blade Supplier to Achieve Optimal Results

One common reason many industrial metal-cutting companies are unable to optimize is a lack of resources. This is especially true for smaller operations. Finding the time, money, and manpower to train operators, correct mistakes, and measure performance makes it difficult for companies to achieve optimal results.

To correct this issue, LIT suggests that metal-cutting organizations work closely with trusted suppliers that can provide value-added resources that can lead to optimal performance.

Below are some possible areas where suppliers can help:

- **Training and Performance Improvement.** If your goal is to increase productivity, many suppliers offer troubleshooting expertise and training resources. You may even ask suppliers to include training as part of your original purchase agreement. Some suppliers can also provide useful, practical tools like free software to help your operators work smarter.
- **Measurement.** Most industrial metal-cutting companies don't possess all of the knowledge, resources, or infrastructure necessary to collect efficiency data, let alone analyze it. This is where a supply partner can help you gather some quantifiable, useable data.
- **De-costing.** If you are looking to save costs, one of your best resources is your supply chain. Factories with a strong record in de-costing often create local customer teams made up of top suppliers. This could include original equipment manufacturers, parts suppliers, distributors, etc. In an increasingly global market, it is also important to seek expertise from suppliers that can provide a global perspective and international best practices.

Conclusion

Regardless of market conditions, thriving in today's competitive market requires companies to embrace change and focus on continuous improvement in all areas of their business. Lenox Institute of Technology's benchmarking study reveals four key sources of frustration for today's industrial metal-cutting organizations and recommended strategies for attacking each challenge. Industry leaders know that real change requires action. Without it, performance remains stagnant. Formal training processes, proactive care of equipment, measurement, and close supplier partnerships are just a few of the strategies metal-cutting operations can implement now to start seeing better results on the shop floor and on the bottom line.

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