machinemetrics

SYNERGY
DRIVING INDUSTRY FORWARD

SHOP FLOOR COMMUNICATION, REDEFINED.

One manufacturer's continuous improvement journey

CLIENT

AccuRounds
Accuracy on the cutting edge.

TYPE OF COMPANY

Advanced manufacturer providing custom precision machine components

PRIMARY INDUSTRIES SERVED

Medical, aerospace, semiconductor, oil and gas, robotics, emerging technologies

PRIMARY EQUIPMENT

- CNC Swiss Lathes
- CNC Mills
- CNC Slant Bed Lathes
- CNC Grinders

PRODUCTION FACILITY SIZE

45,000 square feet

INTERVIEWEES

Michael Tamasi, *President and CEO*
Jon Colozzo, Director of Operations
Sonia Dumoulin, Production Coordinator
Jim Fruzzetti, Manufacturing Engineer
Paul Cabral, Process Engineer
Jacob Perry, Process Engineer
Machinists[1]

1 Machinists were interviewed as part of a larger research project and were promised anonymity, and they are not named in this case study.

Contents

The Company

ABOUT ACCUROUNDS

AccuRounds is a second-generation, family-owned, advanced manufacturer based in Avon, Massachusetts. Established in 1976, they provide custom, precision-machined components to industries including medical, aerospace, and emerging technologies.

THE EVOLUTION

In 2006, AccuRounds became the first contract metalworking company in North America to win The Northeast Shingo Prize Silver Medallion. Mike Tamasi, AccuRounds' President and CEO, credits his people with this success and has developed an organizational alignment strategy, "The Path to Perfection", to continue to drive clarity and improvement. Under the company values of GET IT (gratitude, excellence, team first, initiative, and trust), Mike has transformed the culture in his organization.

In 2017, AccuRounds began talks with MachineMetrics and installed their machine monitoring system on ten CNC machines in January 2018. Within a year, they had connected twenty-three machines and were driving process improvements and greater collaboration between engineers and machinists. Because of AccuRounds' history of building a strong culture from the front office to the shop floor, the team worked to deliberately manage the tensions that came to the surface during their first few months after installation.

The Groundwork

How would you describe how AccuRounds' culture is supported and enacted on a daily basis?

Mike: My door is open 95% of the time. I walk the floor multiple times a day, interacting with team members. Machinists have the opportunity to address me. Now, I know that could be intimidating for some people, but I try to make sure that I'm approachable, and I think that's important for our entire executive team to understand—that they need to be approachable. We have idea boards, we have scheduled meetings, we have daily huddles—all to drive engagement and collaboration. We try to maintain an environment that focuses on clarity and alignment, which is very difficult to do in our organization where our customers' priorities are constantly changing. Only when you have clarity and alignment can you hold people accountable. Hopefully our team sees that and understands it. If people can trust other people, then they're not intimidated to ask questions or make suggestions or address concerns.

What goals were you hoping to achieve by implementing a machine monitoring system?

Jim: Measuring the efficiency of the process on the machines, that was the end goal. At one point we were doing that by hand, on paper, hourly, and my feet live to tell about it. It was not the most efficient, but it was still eye-opening, because you realize how inefficient you really are. When I know the problem, I can put the right person with the machinist. They'll get training, they'll get experience, they'll solve the problem, the company will make money, and you won't lose these big chunks of time.

Paul: Everything was done by paper and pen. We would record how much they were hitting as far as rates and parts an hour. Their information was getting lost in time. You would go out on the floor, and they would say, "Things are running well." You would take their word for it. Come to find out things are not running well. The biggest thing was, if a job was scheduled to run for three days, we just expected on that third day for it to be done. If it wasn't, then maybe that's when we would interact with that operator. We were beginning to realize how important it was to track that.

The Solution

Why did you choose MachineMetrics over the competition?

Mike: We looked at a couple of companies. The look and feel of MachineMetrics felt right to us—the dashboard, the app, the ease of use, the drill-down abilities. It just felt like something that we were able to adopt quicker than some of the other opportunities out there. I think the fact that it's a Massachusetts-based company was kind of cool, and the open architecture piece. If we come up with an idea and MachineMetrics implements it, then everybody wins. Likewise, if there's another customer that comes up with something, MachineMetrics just opens it up to everyone so we get to take advantage of that. That's not a philosophy of, "We're going to keep things secret." It's a sharing environment. It's for the benefit of the industry, and it's going to make us better. If it makes our competitors better, so be it, let's raise the standard of our industry. We open our doors to competitors—come on in, this is what we do. Maybe you can learn something and then you can help us out as well.

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MICHAEL TAMASI
President and CEO, AccuRounds

The Challenges

How did you prepare for and roll out your MachineMetrics installation?

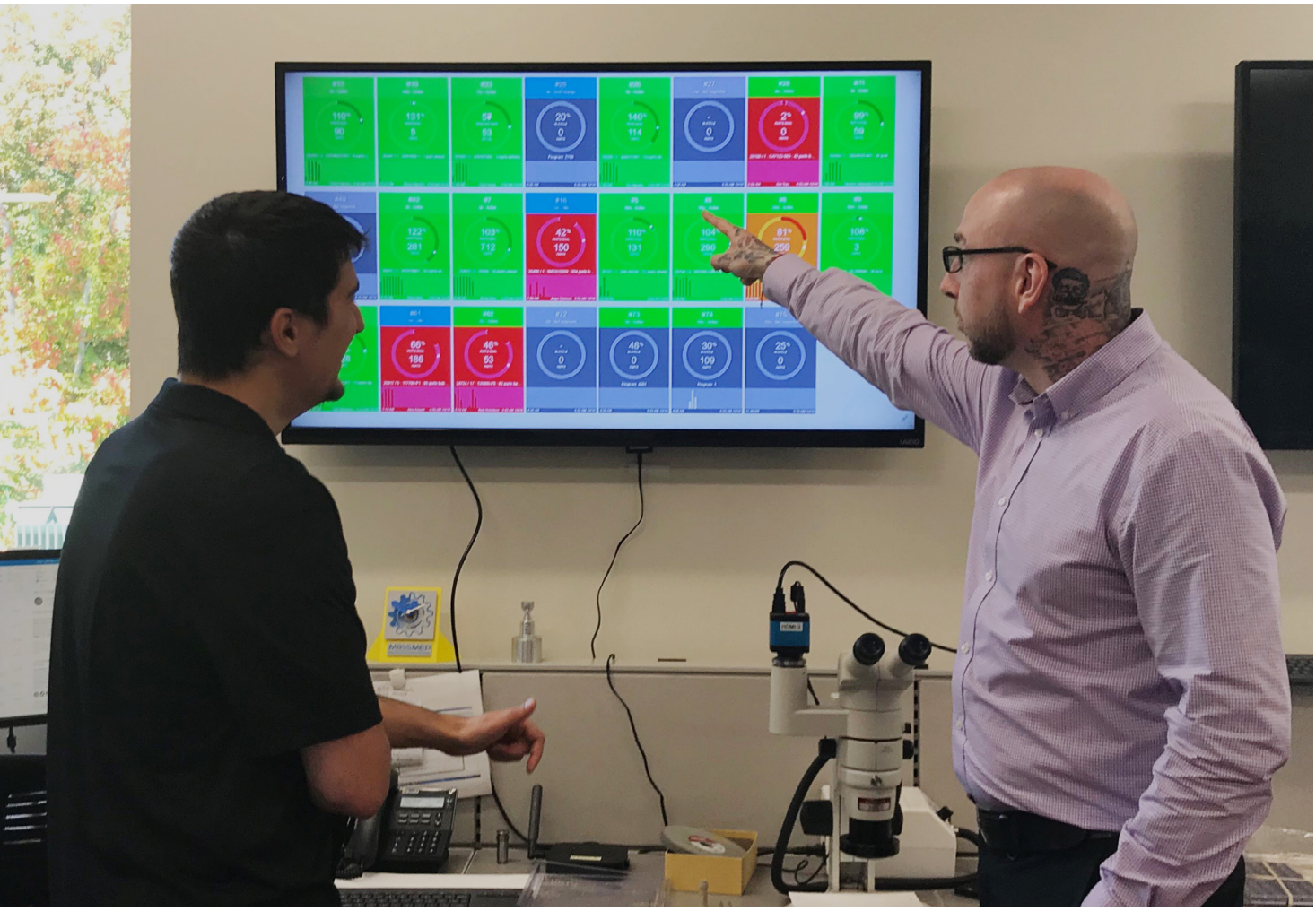
Mike: We talked it up a little bit beforehand. I don't think people really grasped what this was going to be until they said, "Oh, there's a tablet in front of me. Wow, look at the color, and what does that all mean?" We only started with the ten machines that we thought were the better performers, that would be easier to get the implementation up and would yield less resistance. We were targeting our more progressive individuals that we felt would grasp and welcome this technology versus people that just would have a difficult time understanding it. You want to go for the easy ones first.

What were the challenges you anticipated?

Mike: I think one of the challenges through implementation was getting past the whole human element of, "Why are you watching what I'm doing?" There was a lot of coaching that took place to get past that. We have some individuals that run two machines, and it might be tough to keep two machines green, so they were upset that one was red. They knew they couldn't get into green, and they thought they were going to get penalized for it, when the reality is no, you're producing something at 50% versus zero. So you're getting 150% production versus nothing on that second machine. And that's okay.

Jake: I would say that there is also an age gap, a generation gap, and a language gap. When you get the younger generation that's tablet-driven, and app-driven, and data-driven, they're more apt to think of it as a tool, versus an older generation, the only person they ever answered to was one supervisor. Now they have a tablet watching what they do at every machine. You're trying to explain to him, "No, we're not watching what you're doing to get you. We're watching the process and watching the job."

Mike: And are we responding to what the tablet is telling our team? Are we providing them the resources that would make the improvements needed to get something from red or orange to green? So, if we're not reacting, if we're not communicating with them, and they're not seeing the benefit, and I'm not talking about it at meetings on what it's done for us, then it could become a turnoff for all involved, and they're not paying as much attention to it as we'd like them to.



Paul and Jake, two of our Process Engineers, reviewing MachineMetric's real-time dashboards.

So, I think the entire support network around MachineMetrics needs to be there. We have not taken any type of disciplinary action on an individual's part. It's really a question of "All right, where's the process breaking down?" We don't want to set our team up to fail, but that could happen. A person could be on a machine that he or she shouldn't be on, and it's red because they just don't have the proper training. So that's on us, that's on the company to get that individual the proper training. The more those instances came about, the more they were addressed the right way, the more comfortable our team became utilizing MachineMetrics.

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What about from the operator perspective?

Machinist 1: The more information they have, the better they can make decisions. There's never too much information in a place like this. Like Mike says, the biggest thing is having spindles running. Even if we notice a small thing, it might be an ongoing issue we have.

Machinist 2: It's pretty cool. We had it at my old company, but only the supervisors could see it, so they would know when the machine is off. It's cool that we can see it too, so we know if we're behind.

Machinist 3: If I'm doing the right thing, I don't care how they measure it. I will put what information I have to. It's not measuring me, it's measuring the process. If it's red, there's less chance for a bonus, but I don't panic. Sometimes it's a mismatch, the wrong expected time, or a tool that takes longer. It may depend on if they're experimenting with tooling… We're always trying to improve the process.

Machinist 4: It's great. You can see the effects of the change in the process, and it's more information for me. But if I'm running two machines... I don't have time. I try to give them all the information because it's important, but it gets to the point where you have too many things to do and you can't.

Machinist 5: I usually don't like to look at the screen, because then you can micromanage yourself. If you're constantly looking, you feel like you're under the magnifying glass, and it kind of puts pressure on you. But, you can see things like this tool change was 3 minutes, and the last one was 4 minutes, so you're getting better. Like when I came over to this cell, my tool change was 9 minutes, and I got it down to 7 minutes 30 seconds. I developed a habit of whenever I would change the tool, I would time myself. But the first thing I say when training new guys is, "Don't look at the screen. I'll stop you for a half an hour to show you something sometimes." They might want to make the rate, but then half of their parts are bad. A month in, you should be orange all the time.

Machinist 6: This sends them correct information, rather than waiting until the end of the day and seeing that you were supposed to make 500 but only made 400. Some guys let it affect them, like, "Oh they're watching me," but I figure if they're watching you, they're watching you. I do check to make sure it's working accurately. If the cycle time says 50 but I'm only making 45, they need to know it. For me, it's kind of like paperwork, just another thing. But one positive thing is the hour-by-hour information on cycle time. It's direct information there right where you need it.

The Results

What have been the benefits of MachineMetrics for engineers and managers?

Jon: I can see how the job ran hour-to-hour. The whole shop used to do a paper system, but with that, you're not evaluating the process at all, and you're adding administrative work that no one does anything with. MachineMetrics eliminates all that. It shows if a machine is running and what's going on. We build confidence in our processes when I see consistent data.

Sonia: What has helped a lot is rates and seeing that real-time rather than when the job ends. It has also helped, as far as looking at the history. Okay, we ran this job so many times and there continues to be issues. What's going on?

Paul: For us, it's a pareto chart to see where training needs to be focused. If downtime is because they're doing a tool change and I'm noticing it's taking them 30 minutes to change a tool, maybe you can retrain that operator to have it become a five-minute change. They're probably not comfortable or not confident enough to change the tool really quick. I've seen a few of those.

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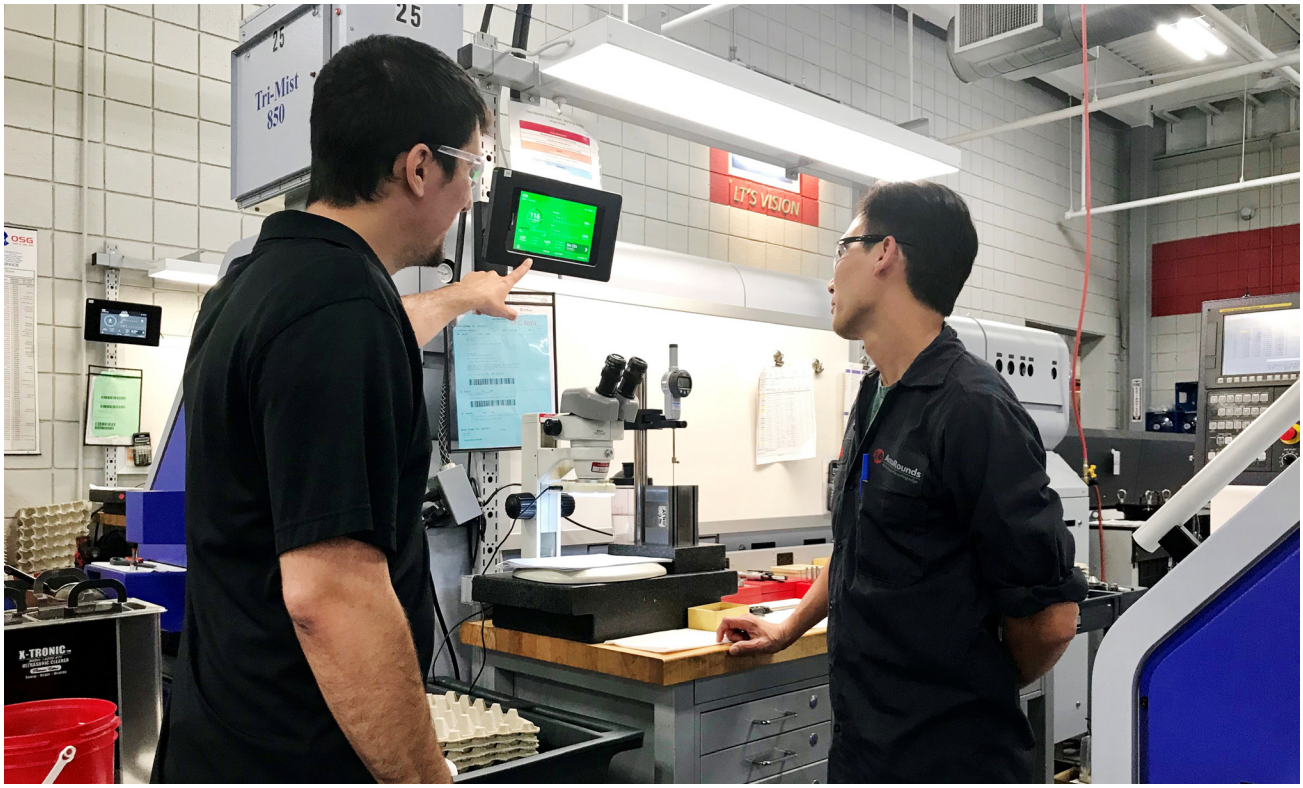


Paul discussing run rates offered in MachineMetric's Operator View with Thu, a machine operator.

Jake: It helped us to identify problem jobs and problem processes in a much more organized fashion. Before, I don't really think we were capturing the information. It was more of, "Why didn't this run right?" And then we'd go back to the machinist after he was two or three jobs past that and say, "What was the issue with this?" And they'd say, "I don't remember, I mean I already set up three jobs between then and now." With MachineMetrics, they can put notes within the downtime categories and say, "This is what happened. This is the issue I'm having." I can also look back and see, maybe they're burning up tools because you'll see: tool change, tool change, tool change. Why does it happen so often? So, it really fine-tunes a job, from set-up to finish, depending on what data you want to pull and how you want to use it. It's also going to throw the red flag, saying that something's off. Then you have to go out and follow up with direct raw information from the operators: "Hey, we saw this happened. Is there a reason, or you know, were you just sick that day?" That can happen too. Like, "I wasn't feeling good, I just couldn't keep up with it." Understandable. Or is it, "We can't keep up with it because it's too fast", or "You have to get somebody else over there to help," or "The tool's breaking so many times I just shut it down." Like I said, it'll just prompt a red flag to get the raw information from them. And it's given big insight to problem jobs and jobs that are fast runners. Scheduling is the lifeblood. You have to make time for your spindles.

Mike: MachineMetrics is another vehicle to have a discussion, a dialogue. It's a tool to help keep spindles running, and that's what we're paid to do. It's enhanced the culture for sure. We've seen it. It's allowed us to identify issues quicker and get them resolved quicker.

Why else is it important to have a dialogue with operators?

Jon: In MachineMetrics, we measure off a 24-hour shift because we have a swing shift. Some work until 4:30pm, some leave at 3pm. And we don't gain anything from seeing the spread of data across different shifts. All we care about is machine uptime.

Paul: Back when we had first shift until 3:30, some of those second shift guys don't come in until 4pm. But if they are coming in later, they're coming in at a red screen [because the rate was measured off a 3:30 start time]. It eventually turned into orange and maybe at the end of their shift, green. They were trying to catch up the whole time. [First shift operator] would always complain that MachineMetrics would kick him out, because he is one of the guys that could stay until 4pm. So it kicked him out of that 3:30 shift, and he had to go back and clock in again for that last half hour. Then there's a few guys that are here at 5:30 or 5am, and if they try to log in, it logs in as unavailable or like a ghost operator. They couldn't actually clock in until first shift would start at 7am. So there was a lot of complaints.

Jon: The amount of parts they should be producing over the course of the day looks different now on the tablet. I didn't even think of it when we made the change. But it shows they're paying attention, since some of them brought it up.

Sonia: And I think moving away from first and second shift and going to one 24-hour shift has helped a lot as far as operators accurately clocking in and out.

What else have you done to leverage MachineMetrics to support and transform the culture at AccuRounds?

Sonia: I like to always look at the data before I actually go out on the floor, so I know what I'm talking about and it's not like a surprise to me. I don't like going out there without having some information, some insight of what's going on. The guys on the floor, they don't remember every single work order. They run so many orders, so I've got to show them the data. Four work orders ago, this is how it ran, this is who set it up. And then it comes back to them. They figure out, okay, this is what happened.

Mike: I've coached people up on what certain percentages mean and how they're calculated and then ultimately talked about the result of what green means across the board for the entire company —ultimately better performance, satisfying the customer, more money in your pocket through a bonus check. When something's orange or red, I'll try to just ask questions to see what they may know and understand, versus what they don't know, what it's telling them. See if anybody's been over to help. Part of the coaching is, maybe if we have another individual that has some time that could contribute, maybe you can get that red or orange to green. There are other people that will call me over and say, 'Hey, why does it say this, or why does it say that? That's not right.' And sometimes it could be an issue with the data or the tablet, or it just could be that they don't have a clear understanding of what's being reported. So that's good, when you get an individual coming to you on that. That's what we want. We want them to engage in asking questions. I'm convinced that just having the screens out there and human nature asking you "What do I need to do to get this green, if it's not green?" is huge. That mentality has driven improved performance.

Month to month, it's tough to really see that, but you can see it day to day. So it just opens up the opportunity for more dialogue, more awareness, more communication to process improve. And that's really all we want. We want more engagement, we want a higher level of engagement. And this tool gives us the opportunity to do that.

Jim: Based on the process and how it should be running, you should be running 85 to 90% or better, which puts it in the green, which keeps everybody happy. If it's not running there, are you having a problem with the machine? Is it the process that broke down? Did we do something that caused a failure and didn't set you up to succeed? Because we've had that happen too, where it's not the fault of the operator that we didn't have a tool in stock or it wasn't where it should've been.

Jake: Being a machinist myself for over a decade and then coming into engineering, I can tell you, you take pride in what you do. You take faith that you're hired to be trusted in what you do. So when someone's coming and going, "Hey, I noticed you're red...," Immediately you just go on the defense. If they're running at 60% and it's in the red, it usually prompts me to go out and talk with the operator to say, "You having an issue?" But if you just say, "Hey, why is it in the red? Why?" Immediately they're going to be like, "Why do you care?" Or, "I don't answer to you," But if I go out to them and say, "If you're having issues, we'll get you more resources," or something like that, then they're more apt to go, "All right." And it's not just a red flag. When they're running in the green, you want to go out there and say, "Hey, you made a better process. We just want to capture that time in the process." Because if we don't get the real-time data for scheduling, and they're running at 150% efficiency, that job will finish up maybe eight hours ahead of time. And if we have a job that we can sneak in to those eight hours, that's almost free money.

Paul: It's actually more insight without having to look over an operator's shoulder. You don't want to just feel like you're looking over everyone's shoulder. You want to give them the freedom to run the parts. They know the job, they're doing the job well.

The Future

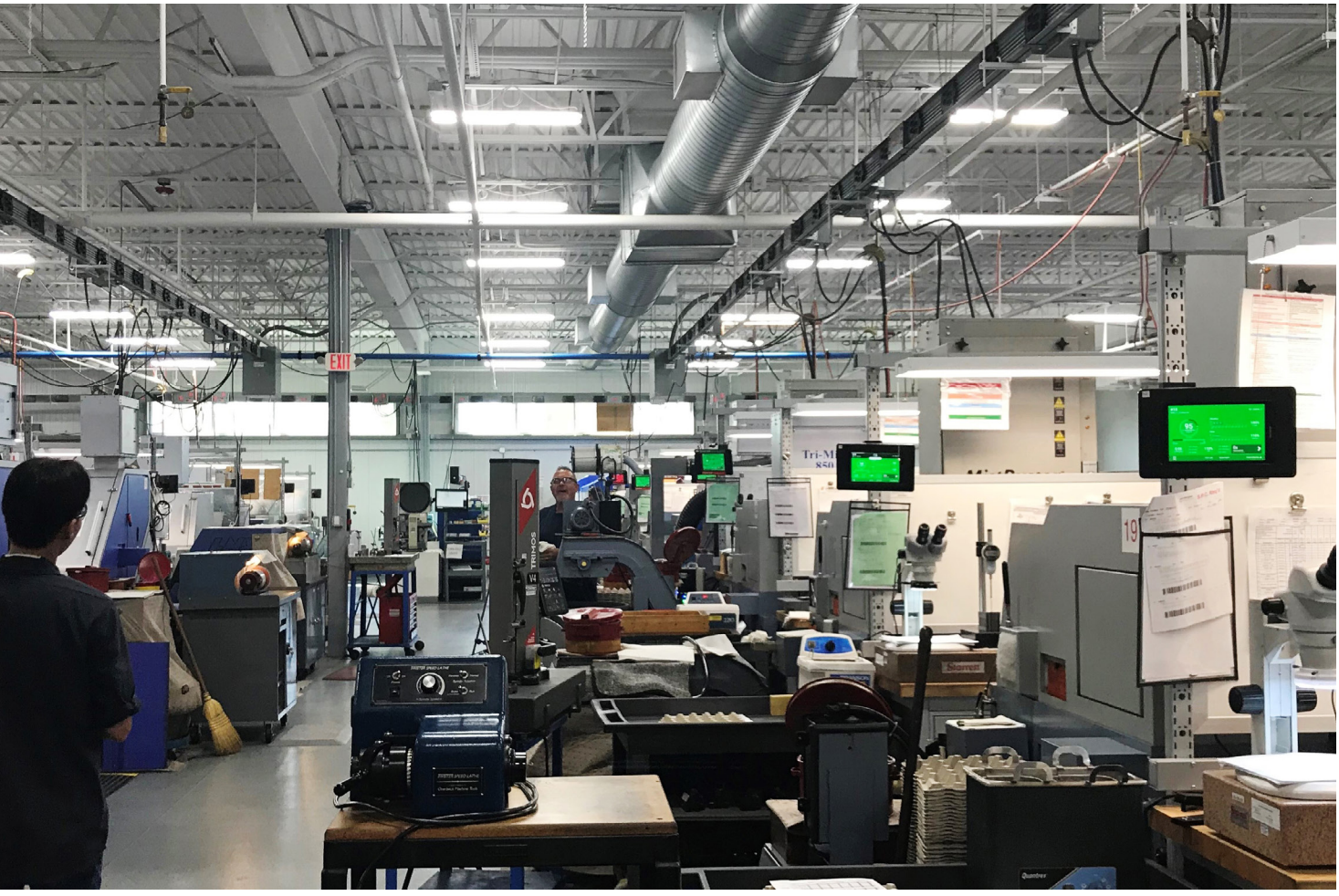
What advice would you give to other companies on how to successfully support an implementation?

Mike: The first piece of advice is, make sure it's right for you. Make sure you have the culture that's going to embrace it ultimately. And start small. Don't try to do the whole shop. Then celebrate the wins. Celebrate the opportunities for improvement. Communicate, communicate, communicate. Let the team know what the potential is, and just continue to keep that in front of your entire team because you can't just make the splash and walk away. You've got to constantly talk about what that tool is doing for you and the opportunities that are opening up to present themselves that make the company better. Because that's ultimately what we're after. Everybody wants the same thing. We want to be successful and we want to make sure that our jobs are going to be there in the future.

What does the future hold for MachineMetrics at AccuRounds?

Mike: I always count the number of gray tiles on the dashboard, because to me, just that little metric alone tells me not that we don't have work, but we don't have enough people to run the machines or we don't have processes to leverage our labor. So, as we continue to drive down the number of gray tiles, we're going to see our costs improve. We've had some pretty good months where we can point to the fact that our utilization was up and that's driving our costs down, which again plays into the opportunity for everyone to get a better bonus at the end of the year. We want to grow; we want controlled growth every year. Part of that growth will be the need for some type of data analytics activity to take place in our organization. And maybe ultimately we can get to the point where we're providing machinists with some reports and information that are going to help them understand the data better, which would facilitate more ideas and improvement.

My number one job is to make sure people understand what behaviors are expected at AccuRounds. How can I help coach them to be a better team player, and what can we do to help them be a better team player? Understanding and implementing tools like MachineMetrics is going to help us get there: integrating automation, robotics, 3D printing, big data—with MachineMetrics and other tools. Those are the types of things that are going to facilitate machinists' workday and make them work smarter, not harder. Whatever labor we can take out of the process allows us to expend that labor on something that's going to create more value for the organization. The key is leveraging labor. We're a high cost-country, high-cost state. We're paying top wages, so we got to make sure we're getting the return on that and leveraging it to the best extent to make AccuRounds successful.



MachineMetric's Operator View in action, throughout AccuRound's shop floor.

THE METRICS

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—**MICHAEL TAMASI**, President and CEO, AccuRounds

20%
INCREASE IN OEE

6%
INCREASE IN OTD

15%
REDUCTION IN TOOLING SPEND

52%
REDUCTION IN TURNOVER RATE

90%
REDUCTION IN PAST DUES

60
DAYS TO ROI

ABOUT MACHINEMETRICS

MachineMetrics is the machine data component of the Digital Factory; manufacturing's first Industrial IoT platform designed for discrete manufacturing. Right now, hundreds of manufacturers are using the MachineMetrics platform to measure and analyze the performance of thousands of machines across their global factories. Their solutions are providing these companies the necessary real-time data they need to optimize machine performance and productivity, increase capacity utilization and ultimately win more business to remain globally competitive.

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