# IndustryWeek

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FALL 2022: The Leadership Issue



The IndustryWeek BEST Plants

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# Is a Bidenomics Manufacturing Policy in Progress?

Two dramatic weeks in Washington have created huge pools of funds for electric vehicles and microchips, creating a clear policy direction ... but is it the right one?

**By Robert Schoenberger**

As I write this column in August, President Joe Biden has just signed two massive bills—the CHIPS and Science Act of 2022, which creates $52.7 billion in federal incentives to spur semiconductor manufacturing in the United States, and the Inflation Reduction Act, a slimmed-down version of his climate and health proposals. That second piece of legislation offers tax breaks for electric vehicles and supports multiple green-energy initiatives.

The new laws establish an industrial policy for the United States, something that some in the manufacturing community have been urging for decades. Bidenomics imagines America as a leading user of manufacturing technology with dominant positions in the administration's picks for industries of the future—green energy and connected, smart devices.

That direction may seem obvious, and that could eventually become a problem.

Today, as semiconductor supply chain shortages scuttle auto production and every new device boasts connectivity, re-establishing America's might in semiconductors sounds like a safe bet. Similarly, the EV sector has been the one bright spot for automotive growth.

However, as every financial advisor will tell you, past performance is not always an indicator of future growth.

Opponents of selecting economic targets and showering them with public cash often say government shouldn't pick the winners and losers. In our capitalist economy, the market should decide which technologies flourish.

And, historically, governments have been very bad at it. When I lived in Mississippi from 1999 through 2003, the state's bet on advanced polymers seemed like a good idea based on the number of chemical processing plants. That industry never flourished in the state.

More recently, the buzz around autonomous driving has spurred dozens of cities and states (Pennsylvania, Ohio, California, Michigan) to declare themselves the ideal place to develop and test driverless cars. They can't all win.

**The CHIPS and Science Act following President Joe Biden's signing ceremony.**
*Image courtesy of The White House.*

Globally, the same is taking place with Biden's targets. China dominated electric vehicles and materials thanks to massive government support. Taiwan and South Korea heavily subsidize semiconductors and will likely continue to do so. Is the U.S. ready to go toe-to-toe on subsidies for the next 20 years?

And most importantly, a future that seems obvious today may be very different a few years from now.

The semiconductors needed for the future: Will those be cutting-edge processors that Biden envisions Intel making in Ohio or low-priced commodity chips from Malaysia? In August, Micron, Nvidia and Intel warned that the bull run for chips may already be over with orders falling and inventories ticking up again. Are federally subsidized lithium-based car batteries the future, or will new chemistries on the horizon make those obsolete by 2030?

The argument that the U.S. must subsidize these sectors because other countries are doing so is convincing. We need a competitive playing field.

However, it will take years or even decades to know if Biden picked the right horses for his bets. For better or worse, the U.S. now effectively has an industrial policy with set goals. Let's hope they turn out to be the right ones. ◀

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# The Hardest Letter in ESG Is Fast Becoming 'S'

By Stephen Gold

In May, after published reports of a draft U.S. Supreme Court opinion overturning Roe v. Wade, a handful of notable companies such as Starbucks, Tesla, Microsoft and Amazon immediately released statements committing themselves to financially assisting employees seeking medical services unavailable within their state. Then, with the official court decision of June 24, dozens of major companies quickly announced a similar intent.


*Image courtesy © Jon Anders Wiken | Dreamstime.com*

To gauge how manufacturers were handling the news, we informally surveyed 50 CEOs of global manufacturing companies. While 64% were either unlikely or decidedly not going to offer such reimbursements, the other 36% were either exploring the option (18%) or had decided to offer reimbursements (18%). Moreover, while 57% said their employees had not inquired about such a policy, 43% said they had.

If nothing else, these different approaches demonstrate how complicated and complex the world of Environmental, Social, Governance goals—or, more specifically, the "S" of ESG—has become.

Directors, investors and government officials tend to discuss ESG as if it were a monolithic policy goal. Take the U.S. Securities and Exchange Commission's proposed rule for investment funds concerning ESG. The driving factor in this specific regulation revolves around disclosure of greenhouse gas emissions. There's not a word in the announcement that reflects concern about the disclosure of metrics involving social issues. Yet clearly corporations are increasingly feeling pressure in that area.

ESG started in 2005 as a list of recommendations by the financial industry. In that original context, the emphasis on "S" was placed on concerns for worker health and safety, including the potential for human rights abuses on a company or supplier premises. "S" also incorporated investors' attentiveness to community relations.

"S" has evolved. Consumers and employees are increasingly pressuring companies on an expanding social front. Almost 400 companies signed a letter in 2015 urging the Supreme Court to end state bans on gay marriage. When former President Trump prohibited the entry into the U.S. of migrants from Muslim countries in 2017, many companies, like JPMorgan Chase, used the opportunity to reaffirm their corporate values—while others, like Nike and Goldman Sachs, went further, vocalizing specific opposition to the policy. By late 2020, after the death of George Floyd, the top 50 companies in America had pledged $50 billion to support racial justice. And after Russia's invasion of Ukraine, demonstrating their opposition to doing business with oppressive regimes, more than 1,000 companies curtailed or severed dealings with Russia.

The evidence is clear that the pressure on companies related to managing social change is catching up with the pressure accorded environmental sustainability.

The challenge is, while manufacturers understand the key role they play when dealing with the "E" in ESG, corporate responsibilities start to blur with the "S." Ask Bob Chapek, CEO of the Walt Disney Co. He'll tell you that when it comes to social activism, companies are damned whether they do or don't. In March, when Florida's state legislature was debating the Parental Rights in Education Act (aka the "Don't Say Gay" bill), Disney chose not to take a public position. But once the bill passed, backlash from its own workforce led Disney to backtrack and come out against the new law. That led to the Florida governor and legislature revoking the company's special tax status in the state.

Ultimately, some market analysts say it's better to worry about being on "the right side of history" than worry about alienating some consumers or employees. Many manufacturing CEOs, who may agree but whose jobs depend on corporate growth and positive balance sheets rather than history's judgment, are finding the balancing act challenging. ◀

**Stephen Gold** is president and CEO, Manufacturers Alliance.


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# As the Planet Heats Up, It's Now or Never for Manufacturers to Act

'It's a pivotal moment.'

**By Diane Kappas**

One of my favorite Chinese proverbs states, "The best time to plant a tree was 20 years ago. The second-best time is now."

This statement could not be more fitting as organizations continue to place emphasis on understanding their customers' sustainability needs, evaluating their core emissions sources, prioritizing positive impacts in their communities and further refining overall governance for the company. Many organizations have historically invested in strategies to address these issues, but an increasing number of companies recognize the pivotal moment we now face in order to reverse the detrimental effects of climate change and how strong environmental, social and governance (ESG) practices can further this journey. The time to act is now.

*Image courtesy of PPG*

As we collectively work toward a low-carbon economy—which is at once an enormous challenge and opportunity—an increasing number of companies have a keen eye to furthering their sustainability efforts and reducing their greenhouse gas emissions and associated carbon footprint. A key part of that includes reducing energy use and exploring options for renewable energy sources across manufacturing sites.

We recently announced the startup of a high-efficiency power-generation facility at PPG's Quattordio, Italy, automotive coatings manufacturing site. Through an agreement with a third-party developer of high-efficiency energy-generation solutions, the facility is expected to reduce energy costs by 13% and carbon dioxide emissions by 10% annually. This is just one example of actions manufacturers can make to further their energy efficiency and greenhouse-gas emission reduction strategies and ultimately reduce their carbon footprint.

In addition, organizations should also consider committing to collaborating with various stakeholders across their respective value chains to reduce greenhouse gas emissions and consider setting science-based targets (SBTs) for reducing greenhouse gas emissions. PPG recently made a commitment to the Science Based Target Initiative (SBTi) to define new Scope 1, 2 and 3 greenhouse-gas emission-reduction targets that define a pathway to reduce the impacts of climate change. We are proud to have joined the more than 3,000 companies that have committed to SBTi and will use this commitment as a basis for our sustainability goals moving forward. I encourage manufacturers to consider taking decarbonization actions now to continue our responsibility as corporate stewards of the environment in which we live and work.

As we move toward a low-carbon economy and identify new ways to lessen the impact of companies' upstream and downstream emissions sources, organizations must measure the positive impact and steps taken to improve waste, water and energy use. We must also focus on the human aspect of ESG. I encourage companies to develop and act upon sound diversity, equity and inclusion goals as a business imperative, as well as focus on corporate social responsibility actions.

If your organization is committed to leading the charge to protect and preserve the planet for future generations, create more inclusive communities and make a positive impact within the places in which you live and work, the time for bold action was 20 years ago, but the second-best time is arguably right now. ◀

**Diane Kappas** is vice president, Global Sustainability for PPG. She also represents PPG in the "Sustainability 50" organization, a private community for sustainability leaders from globally respected organizations to share ideas, solutions and collaborate on climate change issues. PPG's 2021 ESG Report is available at ***www.sustainability.ppg.com***.

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# GET YOUR COMPANY'S CULTURE RIGHT: *Eliminate the ABCs*

By Randy Breaux, President, *Motion*

During my 40+ years in the industrial manufacturing and distribution business, I've been fortunate to have several great mentors. They taught me lessons about business and life, some of which I still incorporate daily at Motion. One of my first industry mentors was the chairman and CEO of the then Baldor Electric Company: Roland S. Boreham, Jr.

"Rollie" (as he was called by most) hired me in 1989, taking me under his wing, and sharing how to create a successful culture and run a great business. One of his first lessons was that a great company culture comes from working hard and purposefully eliminating the ABCs:

### A = Arrogance

You cannot have a great company culture if you allow arrogance—which we all know is easy to spot. If the company's executive ranks are arrogant, you are in big trouble! It may require bold steps to eliminate arrogance in upper management, but if you do, your people will respect it and be more inclined to follow those without this bad characteristic. There is a fine line between arrogance and confidence—make sure your people know the difference!

### B = Bureaucracy

Too often, businesses get caught up in so much bureaucracy that they can't get out of their own way. Time and again, work is created with zero value to anyone inside or outside the organization. For example, how often do you produce the same report month after month, only to learn that it hasn't been used in years? But "we've always done it this way" and always will until someone says to stop. And then there's the "sign-off" routine to get something processed when the only one who really needs to approve it is the person responsible for putting it together! Eliminate bureaucracy before its overgrowth consumes your organization.

### C = Complacency

While that may seem easy, many times it isn't, because complacency tends to show up in management and tenured employees. In reality, they set the "acceptable" behavior for all others. If you allow management to become complacent, don't expect their team members to be much different.

So, how do you deal with the ABCs in your organization? First, take a look at yourself. If you practice any of the ABCs, why would you expect differently from anyone else? Change may start with you! Make it clear to all that the ABCs cannot be tolerated and will be dealt with. Then do it!

You'll be surprised how supportive most of your people will be when you first tackle arrogance, bureaucracy, or complacency in your organization. Rollie taught me the value of dealing with them long ago, and I still focus on eliminating the ABCs every day. •

**Randy Breaux** is President of Motion. His career as a strategic leader in industrial manufacturing and distribution spans over 30 years, including 20+ years at ABB/Baldor Electric Company and the last 11 with Motion. Visit *Motion.com/industryweek* or discover *ai.motion.com.*

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# DRUMROLL, PLEASE:

## *Meet the 2022 IW Best Plants Award Winners*

### *IndustryWeek* applauds the 32nd class of honorees, showcases of manufacturing excellence.

**By Jill Jusko**

*IndustryWeek* never tires of celebrating manufacturing excellence and applauding the people, places and processes that make it happen. This year proves no exception as we reveal our four IW Best Plants Award winners for 2022.

In a manufacturing landscape still not quite back to normal, this quartet of fantastic factories demonstrates that excellence on the plant floor is achievable in less-than-perfect operating conditions and without clear visibility ahead.

These four facilities performed, nevertheless, and brilliantly.

The 2022 IW Best Plants Award winners comprise the 32nd class of honorees. They join an IW Best Plants community that dates to 1990 (the first year of the annual competition) and share many traits: strong, participative leadership; smart, team-oriented workforces; keen understanding of plant-floor and supply chain operations; and unswerving desire to always do better. Moreover, members of this IW Best Plants community never forget they *can* do better, that excellence today does not guarantee excellence tomorrow.

It is our pleasure to introduce the 2022 winners, in alphabetical order:

**NOV Texas Oil Tools**
*Conroe, Texas*

**Protolabs Injection Molding Facility**
*Plymouth, Minnesota*

**The Raymond Corp.**
*Greene, New York*

**Sandvik Coromant PU Westminster**
*Westminster, South Carolina*

"Things were supposed to be better in 2021. We went into the year thinking that supply chains would normalize, and we could all get back to business as usual. Instead, it's still incredibly difficult to get materials into plants and finished goods out. The IW Best Plants class of 2022 suffered along with their peers, but they also rededicated themselves to manufacturing excellence," says Robert Schoenberger, *IndustryWeek* editor-in-chief.

"I'm also excited by how diverse this group is—a great assortment of large and small with a blend of low-mix and high-mix production. This year's winners show that being the best isn't about size, it's about a pursuit of excellence."

*IndustryWeek* is excited to share the stories of the 2022 IW Best Plants winners, and we hope that you enjoy them. Even more, however, we urge you to learn from their efforts. Borrow ideas that make sense for your manufacturing operation. Gain insights from their mistakes. Let their pursuit of excellence spur your own.

*IndustryWeek* also will celebrate the 2022 IW Best Plants Award winners during an awards ceremony at the 2022 Manufacturing & Technology Show, an *IndustryWeek* leadership event, ***www.mfgtechshow.com***, which will be held October 18-20 in Cleveland.

### About the IW Best Plants Awards

The *IndustryWeek* Best Plants Awards program annually recognizes North American manufacturing plants that are on the leading edge of efforts to increase competitiveness, enhance customer satisfaction, and create stimulating and rewarding work environments. Winners are selected following a rigorous review of applications by a panel of *Industry Week* editors, aided by independent evaluations from manufacturing experts. Selections are not finalized until site visits. A more complete explanation is available online at ***www.industryweek.com/22012282***. The 2023 IW Best Plants Awards competition will be underway soon. ◀

**Executive Editor Jill Jusko** can be reached at ***jjusko@endeavorb2b.com.***

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# Pushing the Limits of Prototyping Speed at Protolabs Injection Molding Facility

**One of *IndustryWeek*'s four Best Plants 2022 winners, Protolabs Injection Molding Facility in Plymouth, Minnesota, boasts an end-to-end digital chain and rapid product turnaround.**

**By Ryan Secard**

Briana Miranda operates an injection molding machine on the factory floor.

There's no getting around it: Protolabs' Injection Molding Facility in Plymouth, Minnesota, stands out as an unusual IW Best Plants winner. Most winners make one product or a small handful of products, and they aim to maximize the amount of time their machines are running.

Unlike most winners and most factories, though, Protolabs produces unique custom products, quickly and on demand. The Plymouth plant makes (appropriately for the name) prototypes. The products that make up its high-mix, low-volume output are modeled by a computer and made into injection-molded plastic pieces within a timespan of mere days or hours. Protolabs Plymouth's remarkable achievements in perfecting its model of manufacturing—and working to advance beyond it—are what make it a worthy 2022 *IndustryWeek* Best Plants Winner.

Gurvinder Singh, global product director of Protolabs' injection molding operations, says the reason Protolabs exists comes down to one word—speed. This single-factor focus is one reason for the company's unorthodox approach to machine availability: Part of Protolabs' appeal for clients, according to Plymouth plant leadership, is what the company calls its "infinite capacity" model, in which machine uptime is treated as a capacity performance indicator instead of a performance capacity indicator.

In short, since the company has so much capacity, its clients never have to reserve production time. Plymouth's quick turnaround also explains why the company holds relatively little inventory.

Plymouth's devotion to speed and ease of client access has led to remarkable agility for its operation. According to Greg Wesling, director of manufacturing operations, the turnaround on some projects from 3D-modeled plan to mold to a prototype in the client's hand can be as little as 24 hours—though the standard is more often closer to 10 days.

The speed and simplicity of the process is reminiscent of "gig" apps like Lyft or Uber Eats in terms of

*All photos courtesy of Protolabs.*

its convenience and ease of use. First, a prospective client visits Protolabs' website. They upload a 3D model of the part they want to create. Protolabs then uses software to analyze the model and evaluate how well it can be made using injection molding, making recommendations along the way. This design-for-manufacturing analysis, or DFM, plan is then usually checked over by one of the company engineers, many of whom now work remotely.

Once the design is finalized, the front end can send the plans directly to the milling machines, which machine aluminum blocks into custom molds. At the same time, it can also send those parts to Plymouth's quality control area, where automated 3D printers produce fittings to hold the finished, molded part in place for quality checking by a computerized coordinate-measuring machine, letting the company run inspections on the parts made without adding lead time.

**A production worker prepares an aluminum mold before it's used to produce an initial run of parts for customer verification.**

The end-to-end digital chain of Protolabs Plymouth's process, Singh says, is one of the company's competitive advantages over operations that prioritize front-end tech. Each part can be digitally tracked through the process of the plant by the client that ordered it.

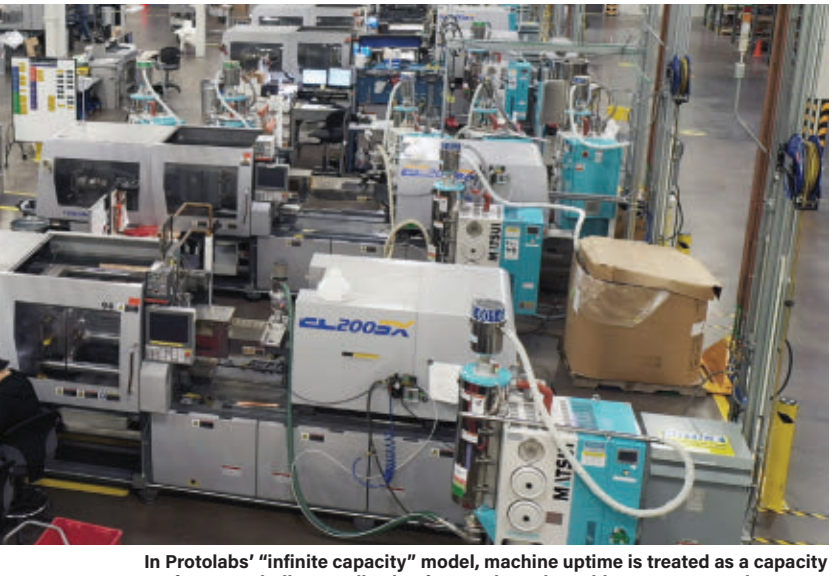
"Websites are common now, right?" Singh points out. "Our level of automation is high on the front end, but I think on the front end, everybody's figuring out how to do it. I think we still are significantly different from any other competitor on the back end."

## PROTOLABS INJECTION MOLDING FACILITY

*Plymouth, Minnesota*

**Employees:** 450
**Square Footage, Manufacturing:** 140,000
**Primary Products:** Injection molding
**Startup Date:** 2014
**Achievements:** Automated digital twin, Recognition as a WEF Global Lighthouse Network plant, 16.4% reduction in scrap and rework costs within past 3 years, digital process control reduced parts non-conformance by 45% and increased large injection molding capacity by more than 50% in the past 3 years.

Protolabs' other advantage over its competitors, Singh says, is its manufacturing expertise. While some prototyping companies are essentially intermediaries that connect clients to other contract manufacturers, Protolabs Plymouth has the know-how to do its own stunts. At the same time, though, the company is planning to expand its footprint on what it can provide for customers beyond its own house-made prototypes: Protolabs' acquisition of 3D Hubs last year, Singh says, will cover even more ground by enabling Protolabs to connect clients to other manufacturers for high-scale orders.



**In Protolabs' "infinite capacity" model, machine uptime is treated as a capacity performance indicator, allowing for consistently rapid part turnarounds.**

"[The Hubs acquisition] basically allows us to be the one-stop shop. You want early prototyping and you want fast, we're here for you. Hey, if you want longer lead times, we're here for you," Singh said. "You want millions of parts, which we're not great for? We will help you fulfill it from a plant."

Like other IW Best Plants winners this year and in the past, Protolabs credits its employees' freedom to make decisions for part of its success through kaizen projects and getting floor employees invested.

"We are extremely fortunate. We have got a very committed and very engaged workforce," Wesling says. Plymouth employees feel connected to the success of the plant, he says, thanks in part to clearly indicated plant KPIs displayed on whiteboards, as well as individual goals and annual merit pay increases.

As for attracting newer workers, Plymouth appeals in large part because of its impressive investments in technology and the digital chain. "If you look at Protolabs and what it does, it's a technology company, right?" says Singh. "We're all powered by technology; we talk in technology."

Vigorous devotion to speed and quality, a strong focus on customer satisfaction tied with a culture that encourages employees to experiment, and innovative technology: These are the features that qualify Protolabs Plymouth as an IW Best Plant. ◀

**News Editor Ryan Secard** can be reached at *rsecard@endeavorb2b.com.*

# Problem-solving Culture Propels The Raymond Corp.

## Daily drumbeat of continuous improvement delivers sustained gains.

**By Jill Jusko**

It's a sunny July morning, and this *IndustryWeek* editor is at The Raymond Corp. in Greene, New York, home to both the company's headquarters and large manufacturing site. The maker of forklift trucks is celebrating its 100th anniversary in 2022, and on this day the large, airy building lobby is dominated by multiple, impressive interactive exhibits showcasing many of the historical milestones, people and innovations that have contributed to the company's century-long run. Clearly, The Raymond Corp. knows something about longevity.

The goal of my visit is straightforward: Observe up close and personal the secrets to Raymond's stellar performance on the factory floor in Greene. Because perform is what it does, across a host of metrics. The Greene site delivers enviable first-pass quality yields, shows strong evidence of continuous improvement (double-digit reductions in OSHA recordable incidence rates, for example), enjoys low employee turnover and has solid workforce engagement.

Moreover, it has demonstrated an ability to accomplish arguably an even tougher task—*sustaining* its performance gains over time. Indeed, *IndustryWeek* has presented The Raymond Corp.'s Greene site with IW Best Plants Awards twice previously, in 2018 and 2014.

What I learned during my visit is that the secret is not a newfangled piece of technology—although new technology certainly is being implemented on the factory floor. An automated andon system that has been put into action since IW's last visit is but one example. Replacing what had been a manual process, the new system allows for better data collection on which to act.

Nor is the secret a continuous improvement guru who singlehandedly races around performing acts of operational excellence.

Instead, the secret, it turns out, is no secret at all. Michael Field, Raymond Corp. CEO, describes it simply: reinforcing the fundamentals. "You have to keep repairing it, just like a bridge," he explains. It's making that happen over and over again that presents the challenge.

### A Learning Organization

Fundamentally speaking, the Toyota Production System underpins operations at Raymond's vertically integrated Greene manufacturing site—not surprising, given that Raymond is a Toyota Industries company.

At the Greene site, reinforcing the fundamentals could be described as "always be learning," supported by a structured approach to continuous improvement. Moreover, Raymond works diligently to engage all employees in these efforts, and the impact is clearly evident on the plant floor. For example:

The Greene manufacturing site has a robust kaizen program, with more than 6,100 kaizen suggestions recorded in 2021, 94.5% of which were implemented.


**Elizabeth Mirabito is a two-year veteran of The Raymond Corp., where she works in assembly and has learned the skills needed to work at multiple stations in her department.** *All photos courtesy of The Raymond Corp.*

Kaizens typically are individual efforts by employees to improve their own processes, and with participation comes opportunity for monetary rewards and enhanced individual performance ratings. During my visit, the plant presented the Kaizen Award Winner of the Month. The CEO was among the leaders in attendance in the welding department where the award was presented.

**THE RAYMOND CORP.**
*Greene, New York*

**Employees:** 1,733
**Total Square Footage:** 667,206
**Primary Product:** Forklift trucks
**Start-up Date:** 1922
**Achievements:** 94.5% of improvement suggestions from employees were implemented in 2021; 41% reduction in OSHA recordable injury and illness incidence rate in past 3 years; ISO 14001 certified; overall quality yield has improved by 35% in the past 3 years.

"We are challenged out of the gate to embrace continuous improvement, to not be timid about saying, 'I have an idea,'" says Brandon Van Hoesen, a QCC (quality control circle) specialist.

Examples of implemented kaizen suggestions at the Greene factory include relocating a tool board for more direct and convenient access by the operator, restructuring an assembly process to improve ergonomics and working with a supplier on a paint process that led to reduced emissions.

Kaizens are a structured process, and so too are quality control circles. Unlike kaizens, QCCs are team-based, small groups of hourly associates who work together to solve an issue in their work area. While there is a facilitator, the group is self-guided and learns problem-solving tools with which to address the issue. They meet for 30 minutes a week over a set period of time and follow an eight-step QCC process.

Interestingly, the primary focus of the QCC is "human resource development," in the words of The Raymond Corp. In other words, the manufacturer's goal is to develop a team of problem-solvers.

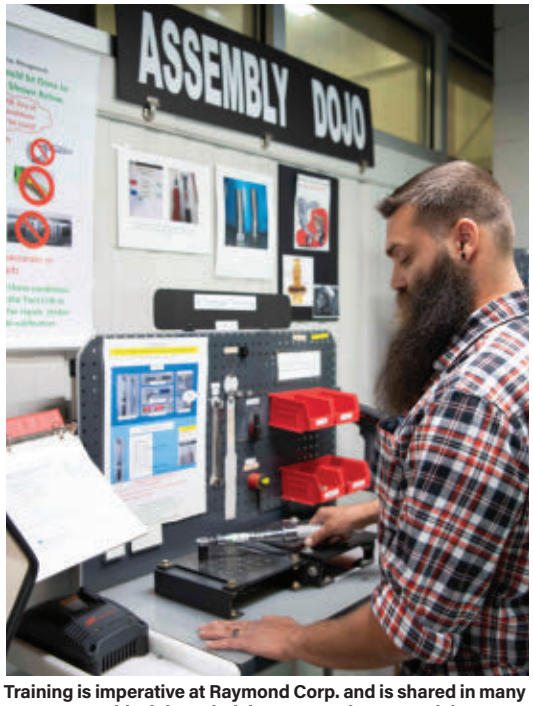
"Raising the knowledge of the workforce," is a win both for the individual and the company, says Field.

Raymond had 44 active quality control circles in 2021.

## Wait, There's More

My visit both started and ended with ever more examples of a learning organization. In the morning I visited the safety dojo, a small, glass-walled room prominently located at the entrance to the factory where new employee training and employee retraining occur. Similarly, the plant has an assembly dojo, and in the welding dojo, I met Dave Micha who recently won gold in the international Toyota Material Handling Group skills competition for his welding prowess. He was transitioning from working as a welder on the line to becoming a trainer in the welding dojo.


**Raymond Corp. Director of Operations Michael Kretzmer keeps problem-solving reminders close at hand, on a lanyard around his neck.**




**Training is imperative at Raymond Corp. and is shared in many ways. Assembly dojo technician James Hinman explains some of the training tools and methods used in Greene, New York.**

Suddenly it's 2:30 p.m. in Greene, and at The Raymond Corp. the daily 15-minute "Yuichi" or afternoon meeting gets underway in the Asaichi room. In rapid-fire fashion, line managers and the director of operations take turns sharing updates on production results, discussing downtime issues and adjusting build schedules as needed. They speak in what sounds to this outsider like some strange language known only to them. A similar 15-minute meeting occurs every morning. The focus of the morning, or Asaichi, meeting, however, is reviewing defects and disruptions, as well as root causes and countermeasures.

These get-togethers are routine, matter of fact. And boom, just like that they are done, and everyone moves on to whatever step is next in their daily cadence of keeping product shipping out of the Greene site.

## What's Next?

Innovations in the material handling industry have delivered a century of growth at The Raymond Corp., and CEO Field is very clear that innovation is its future as well. The Greene team is betting on a workforce of problem-solvers to sustain that vision. ◀

**Executive Editor Jill Jusko** be reached at *jjusko@industryweek.com@endeavorb2b.com.*

Shannon Lindsey (left) and production leader Anthony Reno talk about the company's precision inserts.

*All photos by Laura Putre*

# Sandvik Coromant Westminster Leads with Can-Do Spirit, Smart Strategy

**By Laura Putre**

In a particularly green, winding section of South Carolina sits a city called Westminster that is also a particularly thriving manufacturing center. Boeing, BMW, Caterpillar and BorgWarner have plants in the vicinity, and the competition for workers is fierce. Global metal-cutting tooling manufacturer Sandvik Coromant has a plant here, too, a 328,000-square-foot facility that over the past decade has steadily established itself as a real workhorse. The plant's performance, and the people who drive it, distinguish Sandvik Westminster as a 2022 *IndustryWeek* Best Plants Winner.

Sandvik Coromant's Westminster plant, which came to the company during its acquisition of cutting-tools maker Valenite in 2002, primarily manufactures cemented carbide inserts—over 2,300 types—for aerospace, automotive and oil and gas tooling. In addition, Westminster produces over 50 different grades of ready-to-press (RTP) powder and customized round tools for industry and refurbishes those round tools for its customers, many of them big names in industry. It has a competitive advantage by being the only plant in the Sandvik Coromant family that produces inserts, round tools and the materials used to manufacture them.

While corporate in Sweden provides a framework and resources, the people on the ground in Westminster direct the plant's progress. Local leadership, including Production Unit Director Arun Pattanaik and Project Coordinator Shannon Lindsey, bring the ideas and act on them. This is the first Sandvik plant outside of Europe, for instance, to do in-house product development.

A years-long push to refine processes, strategically invest in automation, develop new business and upskill workers has paid off in increased productivity and profitability, a stellar safety record and outstanding quality metrics. Total manufacturing time (number of days from the start of an order until it is shipped from the plant) is down 19% in the past five years. Productivity as a percentage of sales is up 23% in the past three. Customer complaints are at 1.2 per 1 million inserts. Average machine availability rate was 97.26% in 2021. And the manufacturing rejection rate in the powder and blanks department has decreased by 46% since 2010, resulting in significant cost savings and setting the benchmark in the Sandvik Coromant group.

## SANDVIK COROMANT
*Westminster, South Carolina*

**Employees:** 275
**Square Footage, Manufacturing:** 233,000
**Primary Products:** Cement carbide inserts, ready-to-press powder and customized round tooling
**Start-up Date:** 2002
**Achievements:** 425.9% growth in profitability over three years in powder, 48.1% in inserts.

Empowerment at every level of the organization is evident in Westminster's robust safety culture, with team members self-reporting hazards (and, when appropriate, immediately fixing them) and over the past five years making substantial progress in reducing safety incidents. A year ago, the plant celebrated 1,000 days of zero lost-time safety incidents. While that streak was recently broken with a slip on a mat, the plant continues to have a respectable OSHA incident rate of 1.23 for 2021. Employees reported 396 hazards last year, 90% of them resolved within 90 days.

The can-do spirit is also on display in the blanks department, where that team recently took the initiative to build a vertical wall storage area for a continuous improvement project. It saves precious floor space, prevents operator mistakes by making labels more visible and substantially reduced inventory-on-hand by limiting storage capacity to what can go on the wall.

Westminster's lean journey began in 2012. The plant is currently focusing on signage and flow throughout the shop, with supervisors and production workers taking charge of the labeling and organizing for their own departments.

Visit the round tools shop, a growth area for Westminster, and you'll see teamwork and flexibility, as seasoned machinists with a cross-section of expertise work smoothly together and share know-how. Sandvik Coromant recently acquired tooling company Precorp about an hour away in Greer, South Carolina. Westminster leadership saw huge value in the Precorp workers' tooling knowledge and offered all 40 of them relocation to the Westminster plant. Seventeen took the deal, pulling up stakes and moving their families, and now work as a team with the machine operators in the round tooling shop.

New automation at the plant strategically focuses on freeing up workers from the most repetitive tasks and moving the line along faster. The biggest recent investment is a Sandvik Coromant-built wet blasting machine, called the BoxER, which is replacing three "end of life" machines and has more production and R&D capabilities and better results. Other investments—including an ethanol recycler—both generate substantial cost savings and help meet sustainability goals that are planned out through 2030. A new water-based coolant system saves $75,000 per year annually. Scrap recycling yielded 219 tons in 2020.

Lindsey, who has been at the plant for 29 years, starting as a grinder, has transformed into a self-made data analytics expert (partly through a slew of YouTube videos) and built a system of automated daily push reports that go to supervisors, managers and upper management every morning. He has also built individual departmental reports and created an app to easily share data on the shop floor via phones and tablets.

Tony Munger, supervisor in the blanks department, explains the wall storage handiwork that his team built.


Carbide Grind Specialist Jerry Link, who hails from Michigan and spent his early career in automotive, is the "Swiss Army knife" of the round tooling shop.

Despite the competition for manufacturing workers, Westminster's human resources department has had decent success recruiting for the shop floor and even engineering with periodical weekend job fairs they've hosted for the past three years. But partnerships with local technical colleges and the public schools are especially important for talent development. Sandvik Coromant Westminster funds college scholarships and has an internship program; its team members are guest presenters in STEM classes and are working with a local elementary school on building a greenhouse. The Westminster team also donates meeting space in its facility for community groups like Girls in Engineering and Manufacturing (GEM) and a STEM summer camp.

Westminster is in the process of re-evaluating its benefits to see where they can improve; an on-site gym and a part-time on-site nurse practitioner are strengthening wellness initiatives. Management is also tapping into the knowledge of older workers by bringing back retirees to work part-time to train new recruits on machines and processes.

Key to the increase in productivity is cross-training workers on new jobs and new machines to alleviate bottlenecks. Worker flexibility has not only increased engagement but helped keep production on track during COVID labor shortages. Workers, many with long tenure at the plant, talk about being part of a family and like that they are challenged and respected by their bosses.

Boatloads of initiative and a well-thought-out and executed vision have brought rewards—and profits—for this hardworking team in Westminster. ◀

**Senior Editor Laura Putre** can be reached at *lputre@endeavorb2b.com.*

# Texas Oil Tools: Manufacturing Excellence on a Budget

**Pandemic-spurred slowdowns in oil and gas production gave the plant the opportunity to embrace cellular manufacturing layouts, dramatically improving efficiency.**

**By Robert Schoenberger**


**CNC machinist "Super" Mario Perla runs a three-machine cell that produces caps and bonnets used in oil drilling safety equipment. The cell arrangement eliminated excess work in progress.** *All photos by Robert Schoenberger.*

With plenty of money and consultants analyzing every operation, boosting factory efficiency sounds easy. But, that kind of spending isn't always an option, especially for small- and medium-sized manufacturers. So, what can you get for a few thousand dollars and a workforce committed to continuous improvement?

How about these three-year results:

- Workplace injuries eliminated
- Double-digit improvements in on-time delivery
- Halving already low scrap rates
- Reducing inventory levels by $17.5 million

The spend for NOV Texas Oil Tools, a 130-person machine shop, to achieve those gains? A few equipment upgrades, about $5,000 for TV screens to share production data throughout the plant a workforce committed to continuous improvement.

"We empower a lot of people around here to get things done," says plant manager Brandon Davis in Conroe, Texas, about an hour north of Houston. Listening and collaborating, not new equipment or outside experts, were key to decimating waste and inefficiency.

Without a massive budget at its disposal, Texas Oil Tools made the grade holistically—rededicating itself to safety, cost reductions, quality improvements and operational efficiency in virtually every department.

The big thing that had been standing in the way of improvements was time. Rearranging a machine shop to improve workflows is nearly impossible when orders are flowing. Oil prices plummeted at the onset of the COVID-19 pandemic, and Texas Oil Tools' orders disappeared. Painfully deep layoffs followed, but the crisis provided the opportunity to reconfigure the shop floor for increased productivity, improve warehousing operations to lower inventory costs and engage employees to improve safety.

## Embracing Cells

In 2020, Texas Oil Tools used a traditional machine shop layout—lathes next to lathes, mills next to mills, one operator per machine. CNC machinist "Super" Mario Perla says the process inflated work in progress.

"You'd have parts that needing milling and lathe work," Perla says. Lathe operators would batch dozens of parts together, then they would often sit for days until mill operators were ready for them.

Grouping equipment by product instead of process eliminated that problem. Multi-machine cells, typically two mills and one lathe, are arranged in a horseshoe pattern around one person who can operate all three. Rather than turning 50 pieces on a lathe, letting them

### BLOWOUT PREVENTERS

**TEXAS OIL TOOLS** makes wellhead pressure control equipment with the primary product being blowout preventers (BOPs), devices that save lives and prevent environmental disasters. In oil and gas drilling, coiled steel tube feeds into the wellbore to eventually carry hydrocarbons to the surface. If drill bores hit pockets of pressurized gas or liquid, those can travel up the pipe to the drilling rig, putting people and the environment at risk.

A series of hydraulic rams (typically four) on the BOPs stop the coiled tube from moving into the well, trap the pressure underground, shear the pipe and seal the system. Blowouts are rare, so the plant's products almost never get used. However, when needed, they must be absolutely reliable. So, the American Petroleum Institute mandates 100% testing for incoming materials and 100% inspection for many machined components on BOPs.

**Wilfredo Magbag catalogs ram guides produced in a two-machine cell. Texas Oil Tools uses many forms of color coding—the green vest marks Magbag as a new employee. Orange spray paint on the steel billet notes that it cleared rigorous materials testing.**

sit for a week, then milling features, one machinist turns the initial piece on the lathe, moves the semi-finished part to the first mill for one set of operations, then moves it to the second mill for more metal cutting.

The continuous flow allows one machinist to finish components without waiting for parts from another line. Eliminating waiting times boosted on-time delivery by 20 percentage points throughout three years.

Texas Oil Tools had experimented with cells pre-pandemic with one three-machine operation. With the floor mostly idle in 2020, crews rearranged equipment to create 11 more cells. No investments in automation, no expensive new equipment, no complex pallet systems. Just forklifts to move decades-old CNC machines and teamwork to optimize layouts.

## People Drive Success

While the lack of work resulting from plunging oil prices allowed process improvements, the sting of layoffs forced remaining employees to question the future. Davis says workers needed some wins to boost morale.

The facility's pre-pandemic safety record of roughly one accident per year already was better than industry average, but that number can always improve. So, Texas Oil Tools created an employee committee that collects suggestions and concerns from co-workers and studies ways to address those.

Gurmeet Setia, a CNC machinist and founding member of the safety committee, says machinists, warehouse workers and quality testers offered more than 80 ideas for improvements—some as simple as painting stripes around high-traffic areas, others that required upgrading components on machines to improve guarding.

**Jose Pesina runs a 5-axis Mori Seiki lathe with machining capabilities. The two-machine cell lowered waste and work-in-process at the plant.**

### NOV TEXAS OIL TOOLS

*Conroe, Texas*

**Employees:** 136
**Primary Product:** Oilfield safety equipment
**Startup Date:** 2012
**Achievements:** Zero accidents in nearly three years; more than 50% reduction in inventories in the past three years; 50% reduction in scrap in the past three years; 14-week turnaround time on service jobs, down from 28 weeks; reshaped the factory floor, launching 12 manufacturing cells in three years.

"We just listened to everyone's ideas and picked the projects that sounded like they had the most potential," Setia says.

In August 2022, the plant was 1,059 days accident free.

Davis says putting employees in charge of the safety committee encouraged people in harm's way to find better ways of doing everything.

"Excellence in safety has other benefits. The attention to detail that you need to get to zero accidents leads to lower scrap and lower waste overall," Davis says.

## Focus on Results

That comment sums up Davis' mixed approach of empowering people and tracking classic continuous improvement metrics. He can point to individual employee contributions to statistical improvements and evaluation metrics that changed workers' attitudes.

Some gains were top-down from management. Texas Oil Tools developed better statistical tools to improve demand planning, allowing that $17.5 million inventory reduction. Warehouse changes placed stringent targets for positional accuracy of every tool, workpiece and block of material.

Others gains involved trusting people and getting out of their way. Management removed time limits on setting up certain machining operations, trusting employees to do the job right and not waste company time. Scrap and rework costs fell 52% from already low levels, and setup times didn't change significantly.

You can see buy-in for those changes from the plant's workforce in its 2% annual turnover rate.

That constant embrace of people, teamwork and culture—well, this is Texas, so it all comes down to barbecue eventually. Several times throughout the year, teams compete against each other for the best smoked brisket and beef ribs, friendly contests that lead to everyone getting fed. It might sound a little corny, but Davis calls sharing meals a Texas Oil Tools best practice.

"You'll have engineers and salespeople sitting down with machinists and testing people," Davis says. "When people talk to each other across department lines like that, that's when you get the best ideas." ◀

**Editor-in-Chief Robert Schoenberger** can be reached at ***rschoenberger@endeavorb2b.com***.

# THE MANUFACTURING & TECHNOLOGY SHOW

An IndustryWeek Leadership Event

OCTOBER 18-20, 2022

THE HUNTINGTON CONVENTION CENTER OF CLEVELAND

*IndustryWeek* presents presents The Manufacturing & Technology Show, which prepares and connects manufacturing leaders for what's next, and showcases excellence in action on an exciting trade show floor. Developed around the industry expertise of conference speakers, this event has grown to be the premier event for leaders in manufacturing to network and learn about the latest trends and technologies.

## KEYNOTE SESSIONS

### Charging into the Future: Electric Vehicle Panel Discussion

With environmentally-friendly electric vehicle (EV) manufacturing surging in Ohio and surrounding areas, take this opportunity to learn manufacturing and EHS best practices from battery maker Ultium Cells (a GM/LG Electronics joint venture), Eaton eMobility and other automotive OEMs and Tier-1s.

*Speaker: Scott Adams, President, eMobility, Eaton | More panelists to be announced.*

### Leadership through the Lens of the Last 2 Years

Ron Wilson will detail how Moen and Fortune Brands Water Innovations survived and thrived during the pandemic and its fallout. In addition to adapting to people working from home and determining when it was safe to return to the office, executives had to deal with supply chain shortages, plant expansions and facility modifications to keep COVID-19 at bay… all while demand for home improvement and remodeling products were at record highs.

*Speaker: Ron Wilson, Senior VP, Water Innovations, Fortune Brands Global Plumbing Group*

### Making a Benchmark Manufacturing Facility a Reality

Navistar's San Antonio plant is the operational backbone launch facility for Industry 4.0 concepts and lean manufacturing processes that will be deployed to Navistar's existing manufacturing network of plants, so it will lead Navistar's manufacturing in process optimization, real-time production management and sustainable operation techniques. Hernandez will share what it takes to build a modern-day truck manufacturing facility.

*Speaker: Mark Hernandez, EVP, Global Manufacturing & Logistics, Navistar*

# 2022 SHOW PREVIEW

## CONFERENCE SESSIONS

Session details are subject to change. Updates can be found at **mfgtechshow.com**.

### TUESDAY OCTOBER 18, 2022

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**Advanced Workshop Presented by ServiceNow**
1:00 PM - 2:00 PM

### WEDNESDAY OCTOBER 19, 2022

8:15 AM - 9:45 AM

**Presentation of the**
**2022 *IndustryWeek* Best Plants Awards**
*Each year, IndustryWeek celebrates exceptional manufacturing performers and performances*

Advanced Manufacturing | Continuous Improvement | Leadership & Workforce

10:00 AM - 11:00 AM

**Robots, Cobots and Humans: Better Together**
*Jonathan Crespo, Flex Ltd.*

**Building a Culture of Continuous Improvement with Quick and Easy Kaizen Cards**
*Tim Stasko, Vitamix*

**The Power of Purpose—How Manufacturing Organizations that Lead with Purpose Will Win the Battle for Talent**
*Lori Shaffer, Kimberly-Clark*

11:00 AM - 12:00 PM

**Session on Advanced Manufacturing**
*Brought to you by Grid Dynamics*

**Best Plants Panel Discussion**
*Winners of the 2022 IndustryWeek Best Plants Awards*

**Public Speaking Training as a Lever for Manufacturing Improvement**
*Dave Watkins, Michelin North America*

# 2022 SHOW PREVIEW

## CONFERENCE SESSIONS CONTINUED

Session details are subject to change. Updates can be found at **mfgtechshow.com**.

### WEDNESDAY OCTOBER 19, 2022

1:30 PM - 2:30 PM

| Advanced Manufacturing | Continuous Improvement | Leadership & Workforce |
|---|---|---|
| **Building and Managing a Digital Twin Based Semiconductor Manufacturing Operation**<br>*Paul Schneider, Intel Corporation*<br>*Jeff Story, Intel Corporation*<br>*Paul Touloukian, Intel Corporation* | **Session on Continuous Improvement brought you by a preferred partner from *IndustryWeek***<br>*Speaker coming soon!* | **Using AR & VR in Promoting Workforce Safety, Training & Collaboration**<br>*Thembani Togwe, Johnson & Johnson* |

3:00 PM - 4:00 PM

| | | |
|---|---|---|
| **How to Accelerate Continuous Improvement with a Lean, Digital Approach**<br>*Martin Cloake, Raven*<br>*Tyler Bennett, Lester Building Systems* | **A Lean Strategy for Supply Management**<br>*Paul D. Ericksen, IndustryWeek*<br>*Rick Bohan, Chagrin River Consulting* | **Session on Leadership & Workforce**<br>*Brought to you by*<br>ScreenCloud |

### THURSDAY OCTOBER 20, 2022

10:30 AM - 11:30 AM

| | | |
|---|---|---|
| **Enabling Smart Mobile Robots Using 5G Private Networks on CBRS – An Ericsson Case Study**<br>*Per Treven, Ericsson North America* | **The Value of Visual (Management)**<br>*Brian Peshek, Hiab* | **Winning Over Skeptical Workers**<br>*Saso Krstovski, Ford Motor Company* |

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An IndustryWeek Leadership Event

# EXCELLENCE IN ACTION PLANT TOURS

Thursday, October 20, 2022, 11:30 AM

*One (1) plant tour is included with the purchase of a full-conference pass. Pre-registration is required. Plant tour spots are limited and are first-come, first-served.*

### Charter Steel Plant Tour

Tour participants will see safety solutions focused on reducing employee exposure, automation solutions to optimize efficiencies/performance, and advanced manufacturing solutions such as a billet ID Robot.

### General Motors Parma Metal Center Plant Tour

Tour participants will experience a high-level walk-through of our manufacturing processes including transfer press lines, high-speed progressive press lines, and multi-cell, resistance and laser welding metal assembly operations.

### Vitamix Plant Tour

Participants will see the lean journey, quality MDI, blade automation cell, a production cell, warehouse MDI, and shipping MDI. Participants will be able to see CI in multiple locations, understand some of the process, and visually see lean transformation.

# EXHIBIT FLOOR HOURS

| | |
|---|---|
| **Tuesday, October 18, 2022** | 3:30 PM - 6:00 PM |
| **Wednesday, October 19, 2022** | 9:30 AM - 5:00 PM |
| **Thursday, October 20, 2022** | 10:00 AM - 12:00 PM |

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*All images courtesy of Oshkosh Corp.*

The Joint Light Tactical Vehicle (JLTV), manufactured by Oshkosh Defense for the United States armed forces.

# LEADING THE TECHNOLOGY CHARGE AT OSHKOSH

## Technology initiatives blossom when leadership earns employee trust.

**By Dennis Scimeca**

"Digital transformation" is jargon. Companies don't morph into entirely different organizations simply by adopting tools such as data analytics, virtual reality/augmented reality (VR/AR) and automated guided vehicles (AGVs). They can, however, become better versions of themselves.

Anupam Khare, senior vice president and chief information officer at Oshkosh Corp., understands that employee buy-in for technology initiatives depends on making a real difference in their lives. He previously held roles at United Technologies, Koch Industries and Dupont and joined Oshkosh in 2018 with a mandate to align the company's digital and business agendas, find passionate sponsors for technology initiatives to champion new solutions and focus only on projects that embody Oshkosh's "people first" culture.

"Since [the technology plan] came from business strategy, all of the executive leadership were involved, and we had high level buy-in completely," says Khare. "The beauty of this framework is we do fewer projects, more impactful projects, more effective projects that solve real business problems."

The strategic plan focused on trust in technology and trust in the teams that delivered it. "We said, 'Forget about any new technology discussion—first we need to solve basic problems, make technology interaction friction-free,'" says Khare. "When we did that, employees would feel like, 'Man, these guys are here for *me*.'"

Khare began with a small but important quality-of-life improvement for everyone across the company. "Several interactions with the service desk were automated through a chatbot. We made sure the time it takes to get a response from our service desk improved. We

Anupam Khare

also empowered people through self-service," he says. "There were tens of smaller steps like this which we took, which are tactical in nature, but they create the foundation for a strategic relationship."

"Digital evolution" is what Khare is *actually* leading, an organization-wide effort to pave the way for new innovations and improved quality of life on the shop floor, changing the way one of the largest vehicle manufacturers in the United States operates.

What follow are three examples of very cool projects Khare tills the corporate earth to make possible.

## Predicting Supply Chain Reliability With AI

> **"Our vision was a data-rich company. We're in an unpredictable world, where the external world is unpredictable [and there are also] internal variables. How do you create predictability around that and be confident about your decisions? And that's where we use descriptive analytics, predictive analytics and prescriptive analytics."**
>
> **ANUPAM KHARE**
> *Senior vice president and chief information officer*

In-house data scientists at Oshkosh are using artificial intelligence to develop 25 different deep-learning algorithms, also called models, one of which focuses on supply-chain prediction.

"We have hundreds of parts that go into a particular vehicle, and those hundreds of parts come from thousands of suppliers," says Khare. "That's the magnitude we're dealing with."

Oshkosh breaks down into four business segments: fire and emergency, access (for instance, aerial platforms and material handlers), commercial (cement mixers and refuse trucks) and defense. Producing such a wide range of vehicles requires unique parts and processes, thus creating a complex supply chain.

"We're pretty consistent about how we measure those suppliers and what's important to us," says Sean Ketter, vice president of Global Procurement and Supply Chain and a speaker at 2021's *IndustryWeek* Manufacturing & Technology Show.

"Every single thing you can do to fix a supply chain shortage I've probably tried, or my colleagues have tried in some way," Ketter continues. "The one thing that we never tried, or the one thing that we didn't have the ability to do until recently, was the idea of using all the data that we've got."

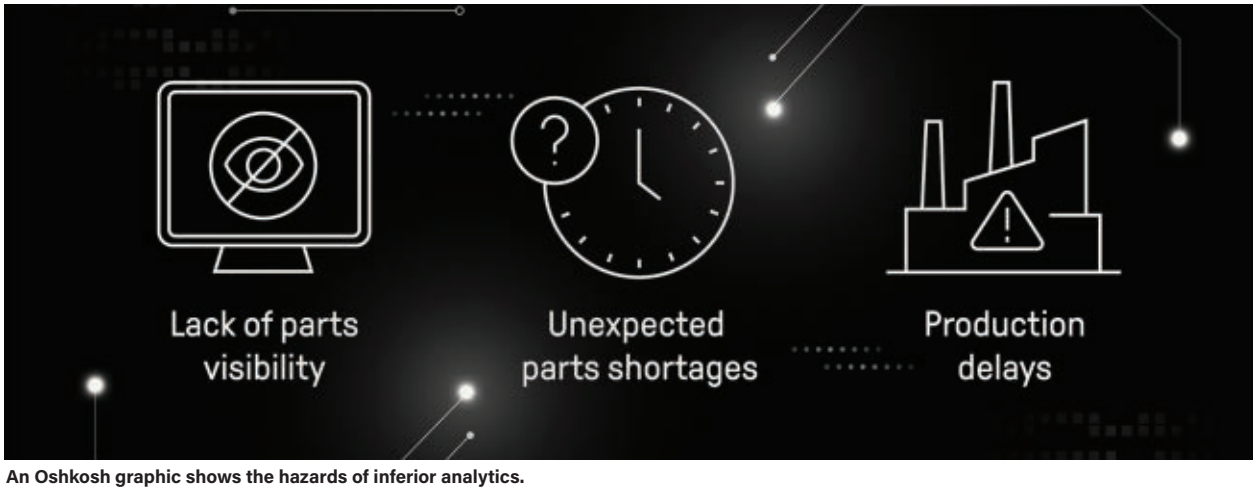
"We were confident that by taking all of our historical supplier performance information and part performance—things like on-time delivery, order quantity and percent shipped, parts that did not make the assembly line when we needed them—if we took all of that data, both pandemic and pre-pandemic, we should be able to generate an algorithm that can predict when a shortage will occur," says Colton Vollmer, senior manager of digital supply chain.

In 2021, Vollmer and his team evaluated more than 2.5 million data points gathered since 2017 in an ERP system. It took about eight weeks to train a model to analyze the data and make predictions. The model now helps Oshkosh predict supply shortages before they happen, allowing the company to manage shortages with business processes.

"We're now able to predict up to how many days late or how many days early our purchase orders from our suppliers are going to be to one of our facilities," says Vollmer.

Downstream customers appreciate the heads-up. Plant teams adjust production schedules to make sure vehicles continue coming off production lines.

The trained model now requires only two months of data to make accurate predictions. And, Vollmer's team is also considering what type of external data could complement the internal data that the model runs on to create a more robust model.




**An Oshkosh graphic shows the hazards of inferior analytics.**

## Virtual Training for Real World Safety

> We never came up with a grand strategy. We came up with a bigger vision, but we ... found champions [and said] let's solve their problem—for example onboarding manufacturing employees through augmented reality and virtual reality."
>
> ANUPAM KHARE

Access equipment manufacturer JLG, an Oshkosh subsidiary, has for six years sold VR training units to customers that purchase boom lifts, providing safe training scenarios for employees who in the real world may go up to 185 feet in the air while riding in the lift basket. Three years ago, JLG began offering VR training units for scissor lifts.

The success of these offerings inspired confidence at JLG to design a newer, more complicated VR training program for internal use that Eric Mellott, senior manager for continuing improvement and operations training, runs out of the Operations Training Center in McConnellsburg, Pennsylvania.

Trainees sit in a mockup of a forklift driver's seat and strap on a VR headset to run simulated operations. Other trainees outside the simulation see the driver's point of view on an external monitor, watching mistakes made and hearing feedback from the trainer.

"Think about the reduction on the stress of a trainee *and* the trainer. Some of these new hires, they've never been on a forklift before," Mellott says. "And now they get on a forklift for the first time in virtual reality and not have any stress about 'I'm going to hurt somebody or damage something.' That's both from a training and a trainer perspective. Our VR trainers love that they don't have to be watching and stressful [in case] this new hire has an accident."

"[VR] really helps us deliver consistent training, which produces consistent processes, which produce consistent quality in the real world on our production lines," Mellott continues. "You can place a new forklift driver in a dozen scenarios [in VR] in about a one-hour time slot. If that person was to try to experience all 12 of those scenarios in real life, it could take weeks."

Virtual reality training in action.

The virtual trainers can then give feedback to hands-on trainers at the local plants where the new hires are posted—like notes on which trainees are ready for which operations and specific concerns for the hands-on trainers to watch out for in real life.

Three years ago, JLG acquired and explored the functionality of an AR welding training program, opening interest in further exploring the technology. Today, JLG offers an AR-based program to teach employees about line operations and the products that come off the line.

"It's 100% interactive," Mellott says. "They are pointing, they are clicking, they are walking around the machine, they are seeing basically our CAD model in front of them in augmented reality. They're watching an assembly process, how the machine comes together."

"I had [a trainee] take the headset off after about 45 minutes and say, 'That's a lot better than PowerPoint.' That's success," Mellott says. "People are learning and engaging. You can't sleep with an AR headset on. You can sleep through a PowerPoint presentation."

## Embracing Robotic Flexibility

> I never wanted, even if my business leaders align with what I am saying, for them to go in and kind of force something, because the whole principle here is building the trust with the technology and trust with the people. People need to see the benefit, that this is how it's going to help their lives and their work."
>
> ANUPAM KHARE

When considering the roles that automated guided vehicles (AGVs) could play at Oshkosh plants, Don McCartney, vice president of Enterprise Architecture and Applications, says the company considered positive reception from employees just as important as return on investment.

"The question was, are our employees going to accept the technology as opposed to thinking that someone's going to replace their job? So, we worked through how this technology was able to augment certain tasks," says McCartney.

In January 2018, Oshkosh began deploying AGVs that can move materials between two points on a strictly programmed path, stopping if any object blocks their movement. An employee must manually restart the AGV before it continues.

After this successful use case, Oshkosh decided it wanted AGVs with a little more intelligence and deployed a second variety that can circulate through a larger number of positions, have greater flexibility on the types of materials they carry and the intelligence to navigate around obstacles.

Quality-control testing on the AGVs—making sure they successfully move from point to point and deliver materials on time—generated data Oshkosh shared with plant employees to demonstrate that the AGVs were in fact increasing material delivery speed and removing plant delays.

"Then employees began naming them on the factory floor," says McCartney. "Like, 'Hey, Edgar, I need some parts!'"

Bandwidth and network hardware requirements for the wireless AGVs provided a technical challenge during installation, to make sure the vehicles smoothly received, processed and prioritized materials requests to get parts where needed and as quickly as possible. Oshkosh also had to make sure employees felt safe around driverless vehicles trundling through the plants.

Those initial two types of AGVs currently work in six plants across three business segments, with plans to expand their use to two additional plants by 2024. Ongoing data capture allows Oshkosh to continue refining materials delivery operations by analyzing AGV delivery times and determining optimal travel routes through the plants.

In 2021, Oshkosh deployed a third variety of AGVs: much larger vehicles that can carry entire vehicle frames; do not have specific, restrictive paths to follow; and can adapt to floor reconfigurations. These AGVs work in two plants, one in the commercial segment and one in the access segment, with planned expansion into a third plant.

## Champions Lead the Way

> **"To be fair, I think, in my opinion, that our Midwest culture helps us. It is a very relationship-based culture. At every level we focus on trust and relationships. People want to work with people and whatever ideas they're giving."**
>
> **ANUPAM KHARE**

**An AGV transports a vehicle component.**

Oshkosh's defense and commercial segments use the supply-chain analysis deep-learning model. Vollmer's team also works on scaling the model for the fire and emergency and access segments, expecting the work to complete before the end of 2022.

"We measure things the same way—even though [they're] different business units, different ERP systems, the data sources are all the same, which is really nice for us because our whole, entire supply chain can reap the benefits," Vollmer says. "All the leadership supported this; it had really good visibility to everybody; [we gave] updates to vice presidents and levels on down."

"All of our supply chain leadership focuses on quality, cost, delivery, compliance, innovation. So, when you have a model like this that is so integrally tied with one of your priorities—delivery—it's not hard to get buy-in from almost every constituency you would have that's affected here," Ketter adds. "We had buy-in from all levels of the global procurement and supply chain organization."

Representatives from other business segments, after seeing Mellott's VR forklift training program, are now considering their own VR initiatives. Mellott's team continues to refine the AR training program—like creating standard work instructions that overlay digital images, text boxes and videos over the employee's real-life view of components or assembly processes.

McCartney says an Oshkosh team is also developing an AGV concept that incorporates cobot, vision system, IIoT and AI technologies to help drive situational awareness of what's happening on the shop floor, like noting locations where parts tend to fall onto the floor and driving efforts to improve parts storage at that location or measuring plant temperatures and noise levels to inform work-environment improvements.

"Now, these are forward-looking statements. But IoT is our digital eyes and ears on the shop floor. Why can't we tap into those eyes and ears and determine additional improvements or get additional insights that we can provide back to our supervisors, that feed back into the analytics and back into the whole process?" says McCartney.

Adds Khare: "The only resistance we compete against is the attention of our people. They're busy. So how do we help them? Anything we introduce requires some time before they start getting benefits.

"But people are willing … I'll say I'm pretty excited that we get the attention we ask for." ◀

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# What's Your MENTORSHIP STYLE?

Five seriously dedicated mentors in manufacturing share their approaches and insights.

**By Laura Putre**

*Photo illustration by Tim Driver*

Guiding the next generation of workers for a company or community organization can be immensely rewarding. But, how to share a lifetime of experience is a different task for everyone. For this story, *IndustryWeek* hand-picked five dedicated mentors in leadership roles to share their backstories and best advice.

## GUSTAVO SEPULVEDA, *Robotics and Automation Business Head, Panasonic Connect*

**Backstory:** Sepulveda mentors both within his organization, a manufacturing and solutions subsidiary of Panasonic, and for a nonprofit program called Braven that helps first-generation college students. Mentoring is a vocation for him, something he plans to continue doing even when he retires someday. "I have been extremely lucky because I have had very good mentors and very good managers in my life," Sepulveda says, remembering at "least four that pushed me hard," sometimes to the point that he got upset with them. "They were brave enough to tell me the things that I really needed to do to improve. I feel a moral obligation to do the same with the next generation."

**Give Direction:** Sometimes, people confuse mentoring with motivation, but they are not the same, says Sepulveda. "If you tell someone, 'You are great, you're doing everything fine,' you're not telling that person what he or she needs to improve. They may have a short-term gain and be motivated for the next one or two weeks. And that will be it. If you really care, you need to say, 'Hey, you have to improve this.'"

A successful mentorship has three components, says Sepulveda, who usually meets with his mentees monthly. One, the mentee should not be in your department. "You cannot be his boss, or the boss's boss," he says, because the mentee will not be comfortable being open with you. Two, both parties must agree that everything in the session is confidential, so they can feel comfortable sharing their weaknesses. For the mentee, the weakness may be the current struggle they're dealing with, and for the mentor, it may be a past struggle and what they learned from it. "Sometimes the best example is when the mentor gives an example of when he himself dropped the ball," Sepulveda says. "That creates a lot of trust in the relationship." Three, it's important to reinforce that the mentor doesn't solve the mentee's problems—the mentor helps the mentee, "so that he or she finds the solution to the problem."

## SUSAN ELKINGTON, *President, Toyota Motor Manufacturing Kentucky*

**Backstory:** Elkington's first mentor was her high school teacher in rural Indiana, who encouraged her to pursue engineering. "I didn't even know what an engineer did," she recalls. "I thought I would go into math and maybe become a math teacher or statistician." She took his advice and thought she'd be an engineer forever. Elkington describes herself as an introvert, so earlier in her career, when an engineering supervisor at Toyota recommended her to lead a skilled maintenance team, she was reluctant. "But there was a mentor who said, 'Hey, no, this is something that you can do,'" she says. "You don't have to be the expert at something you don't know. You can really do well with the things that you do know, and work to learn in those other areas. And so, I took that role."

**Listen:** "One of the key things as any mentor going into a mentoring relationship is to be open to learning," Elkington says. That means the mentor may occasionally be in the student's chair. Elkington has a number of mentees at Toyota Kentucky and other locations around the world, but she is also participating in a reverse mentorship focused on diversity. Her mentors are two younger Black employees. The reverse mentorship has helped her gain a better understanding of "what is going on in our communities with violence, some of the situations that have occurred and especially related to the murder of Breonna Taylor that impacted our community." She's learned of safety concerns from hearing others' stories. "We're not aware of what maybe Black members of our staff [encounter] on business travel," she reflects. "How some of our members have to take precautions, especially as they travel to certain areas."

## ARVIS WILLIAMS, *Vice President, Global Quality, BorgWarner*

**Backstory:** An engineer by training, Williams has spent most of her 33-year career in automotive manufacturing. Her "span of influence" at BorgWarner's 26 plants in 16 countries includes quality, program management, advanced manufacturing engineering and operational excellence. She has a competitive spirit, something she developed being the only girl in a household with five brothers. When Williams' high school teacher discouraged her from going into engineering, saying she didn't have the math chops, that motivated her to work harder to prove him wrong. Much of her mentorship energy centers on at-risk youth, especially girls; she recently led a mentoring program at BorgWarner that focused on youth in the foster-care system. "I've always represented a

first—either the first female, or the first Black American to have the positions that I have had," she says. "I want to ensure that I am not the last such candidate in any of those roles."

**Make it Relatable:** "Most of the young ladies that I work with in middle and high school have very low self-esteem in regards to taking on math and science," Williams explains. "So, they don't necessarily have an interest in STEM. I try to make them more comfortable and build a love for engineering science by explaining to them the application of math is really everything they see." Their phones become lessons in conductivity "and how electronics works to transmit data, and how it's received instantly." The chairs they sit on are the introduction to a lesson in balancing forces in relation to gravity. "They have so many of the same influences in their lives as that counselor that will tell them what they can't do," she says. "I want to be the voice that encourages them, that gives them an ability to be empowered to dream a dream and accomplish it and not let anyone stand in their way."

## DESPINA ANASTASIOU, *Global Business Development Director, Corporate Strategy, Dow*

**Backstory:** Anastasiou started out as a chemist at Dow but gravitated toward more people-centered roles. In her current position, she shapes global corporate strategy around decarbonization, digital transformation and diversity, equity and inclusion, but is at the point in her career where she writes her own path (literally, she goes in and changes her job title in the company directory when she feels it's not reflecting what she's doing). "My roles have shifted from having oversight for more than $1 billion to then being a sole contributor without even access to anybody reporting to me," she says. "That means I have very much shaped myself in the way that I view and define leadership." She has long been an active leader in employee resources groups, and mentoring is an important piece of that. "What I love doing—I think it comes very close to what I'd call my purpose—is really unlocking the potential in others." She currently has mentees "in the double digits for sure."

**Be Approachable:** The idea of a formal mentorship can be intimidating. When Anastasiou gives one of her "master classes" at Dow around topics like managing up or resilience after a setback, she sometimes shares her own experience, and afterward women will want to connect. "I've told them not to use the 'M' word if that will make them reluctant to reach out," she says. "They can just request a single meeting and say, 'Hey, Despina—you said something that resonated with me. Would you be open to meet with me so we can discuss things?' And whether we formalize it with a certain frequency or cadence, I really don't find that as valuable as being available for people when they need specific help, as long as they have a true purpose of what they're trying to figure out."

## DAAN VERKOEIJEN, *Senior Director, Operations, DSM*

**Backstory:** Verkoeijen directs four nutritional lipids plants at DSM, a global chemical company that restyled itself as a purpose-based nutrition, health and bioscience company about a decade ago. He's seen a lot of organizational changes in his 21 years at DSM and lived in five countries. Currently, he oversees facilities in Peru and Canada and in the U.S. in Wisconsin and South Carolina—and not only is a mentor himself but looks for opportunities to connect newer employees in the company with more seasoned ones.

**Find What Fits:** DSM has a formal mentoring program that matches people through a questionnaire, but Verkoeijen has had the most success setting up mentorships informally. "I have a large network of people I know," he says. "So, if I talk to somebody and they say, 'I would really be interested in the mentoring program,' we talk it through." He'll ask if they want to go through the formal program or prefer to be paired with someone in his network that he thinks would be a good fit. "Knowing both people, I'm more certain there's a click," he says. "I can connect a process engineer in Mulgrave, Canada, with a process engineering manager with more experience in Kingstree, South Carolina. And I know personality-wise the chance that that works out: It's 90%. And then it's just, 'Connect and talk, and if you like it, set your own frequency. Because sometimes it's nice to have somebody to talk to that's not your boss.'" ◀

**Senior Editor Laura Putre** can be reached at *lauraputre@industryweek.com*.

# Why Your Workplace Should Be Psychologically Safe

By Adrienne Selko

Psychological safety is achieved when an employee feels that they can be their authentic self, especially in a team setting, and not suffer any negative consequences as a result. That an employee should have a safe environment where they can be who they are every day at work became especially important due to the pandemic. As companies adjusted to circumstances, an open atmosphere was essential.

Jean Angus, president and CEO of Saint-Gobain Life Sciences, a Solon, Ohio-based manufacturer of materials and solutions for the pharmaceutical, medical and biotech industries, says when she took leadership of the division's performance plastics group, encouraging creativity was critical.

"For everyone to bring their best ideas to the table, they had to feel they are working in a safe environment," says Angus

## A Baseline of Security

"Psychological safety is tied directly to a company's culture," says Angus, adding that at more than 350 years old, Saint-Gobain has a foundation of deep respect for employees and inclusivity.

For example, it uses employee resource groups (ERGs) to provide leaders input from networks for women, veterans, LGBTQ, Asian Americans and a multicultural group, Leading Efforts to Ancestral Diversity (LEAD).

## Engagement Spurs Innovation

"If people come to work exactly who they are, they are going to be more engaged," Angus notes, adding that Saint-Gobain surveys employees annually to measure engagement. This is especially important in a competitive job market, as a 2021 Gallup survey showed that 80% of employees are not engaged.

There is a strong business case for employee engagement, Angus notes. As mentioned, innovation becomes easier as employees are less likely to fear failure and more likely to challenge the status quo.

"I saw firsthand how psychological safety supported employee engagement," Angus wrote recently on LinkedIn, recounting a story from early in her career when she was part of a technical team. "Despite lacking certain technical skills, I felt empowered to ask questions, try new things and bring a fresh perspective to the team ... I could share when I didn't understand something without being judged or dismissed ... It was one of the most productive and innovative teams I've ever been a part of."

**Jean Angus, president and CEO of Saint-Gobain Life Sciences.** *Image courtesy of St. Gobain*

## Psychological Safety Actions

To ensure a safe environment when the pandemic began, Saint-Gobain leveraged existing safety structures, including an employee assistance program and ERGs. "We created a COVID taskforce ... to leverage those tools to address workforce needs during the pandemic," Angus says.

The company empowered sites to make decisions locally. For example, one Midwest facility was having trouble with childcare, so employees created a community-wide program to address that.

LuAnn Heinen, vice president of Business Group on Health, says other companies are also acting. Her nonprofit specializes in optimizing workforce strategy through health, benefits and well-being solutions. She notes that winners of 2022's Best Employers Award for Excellence in Health and Well-Being used a variety of tactics:

- Well-being/engagement platform (98%)
- Assessing employee experience with health and well-being benefits (95%)
- Employee testimonials to communicate health and well-being benefits (91%)
- Deploying well-being champions (89%)

Angus says improving communication was also important. Saint-Gobain used CEO chats over coffee and hotlines for employees to share concerns. Business Group on Health winners used similar practices, including:

- Communication campaigns with senior leaders, managers, and ERGs
- Fireside chats with company leaders
- Weekly messages from CEOs, encouraging employees to share personal stories
- QR codes for targeted resources
- Well-being platforms and hubs

## Mental Health's Importance

The Business Group on Health's winners have a high interest in mental health, says Heinen, adding:

- 91% have addressed burnout
- 88% offer family, adolescent and/or pediatric mental health
- 86% have benefits that address suicide
- 82% have mental health allies or champions in place
- 80% have initiatives and benefits that address substance use disorders

Angus says Saint-Gobain's pandemic response and its focus on psychological safety will make adjusting to whatever the future holds somewhat easier.

"When employees can bring their best self to work, they prosper—as does the company," Angus says. ◀

**Talent Senior Editor Adrienne Selko** can be reached at ***aselko@endeavorb2b.com***.

# Continuous Improvement Is the Heart of the Best

**Without a mindset geared toward improving, always, the future is dim.**

**By Jill Jusko**

Continuous improvement is on my mind as I write this column. Of course, it's generally never far from my mind, but it is particularly up front and center now because we just announced our 2022 *IndustryWeek* Best Plants Awards winners. This annual award is one of the ways our staff celebrates manufacturing excellence in North America—by sharing the stories of extraordinary plants and people with the IW manufacturing community.

I've long coordinated this awards competition and get a particular thrill when we finally announce the winners. The competition is a rigorous process that demands a lot from participants, and we appreciate their efforts.


*© Tashatuvango | Dreamstime.com*

This year's honorees are four manufacturing facilities that demonstrate the kinds of successes that are possible when you bring together the right people and the right processes, focused on doing the right things for the right reasons.

One of those "right things" is continuous improvement. Whether it be employing lean, Six Sigma, a homegrown production system or simply a shared mindset, no IW Best Plants winner—or any high-performing facility for that matter—will tell you that a laser sharp focus on improving, continually, isn't a key component to their success.

If you do hear that it isn't, also be prepared to hear less and less from that manufacturer—because without a mindset geared toward improving, always, the future is dim.

I bring this up not only because continuous improvement is almost always on my mind, but also because I was irked the other day to overhear a discussion that boiled down to "continuous improvement is passe." So yesterday. Thankfully I didn't hear those words from someone I work with closely. I won't say fisticuffs would have ensued, but my response likely would have been more vocal than anyone desired.

No plant ever got better without someone first saying, "There must be a better way." The difference is that in a manufacturing enterprise populated by a continuous improvement mindset, the workforce never stops saying that. One improvement leads to the next, and so on and so on.

Sometimes that improvement is a process change. Sometimes it's a technology change. Sometimes it's as simple as rearranging shelving or as important as removing a well-worn hose. And sometimes it means trying something out, discovering it's not the right fix and letting go. Because improving through failure is also valuable.

I've visited many IW Best Plants Award winners over the years, and not one has ever remarked that they set aside continuous improvement as means to success. If anything, the exact opposite is true. They've doubled down. Moreover, continuous improvement isn't the mindset of just the leaders; it's the mindset of everyone.

So, as I applaud the 2022 *IndustryWeek* Best Plants Awards winners, I also applaud what all the best facilities and enterprises know: They can and will be better tomorrow.

## Hear from the Best

I'm closing with a little plug, two plugs, in fact. First, don't miss your opportunity to hear directly from the 2022 IW Best Plants winners at the upcoming Manufacturing & Technology Show, which is being held in Cleveland Oct. 18-20. Not only will this year's winners be honored during an awards ceremony, but also they will be sharing their knowledge and experiences during a panel discussion.

Secondly, the 2023 *IndustryWeek* Best Plants competition will get underway soon, so be on the lookout for announcements at ***www.industryweek.com***. As far as we at *IndustryWeek* are concerned, we can never celebrate manufacturing excellence too much.◀

**Executive Editor Jill Jusko** can be reached at ***jjusko@endeavorb2b.com.***

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