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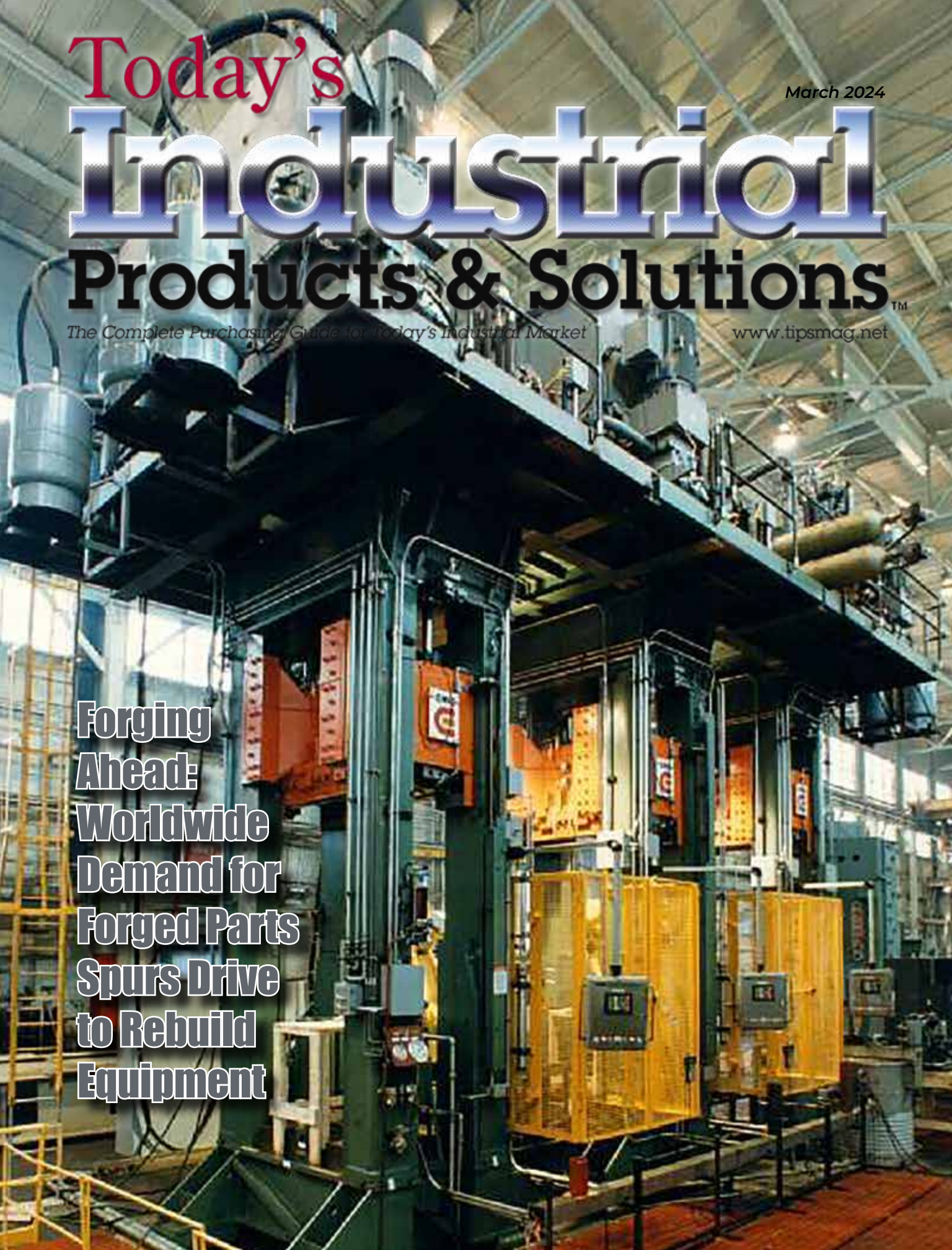
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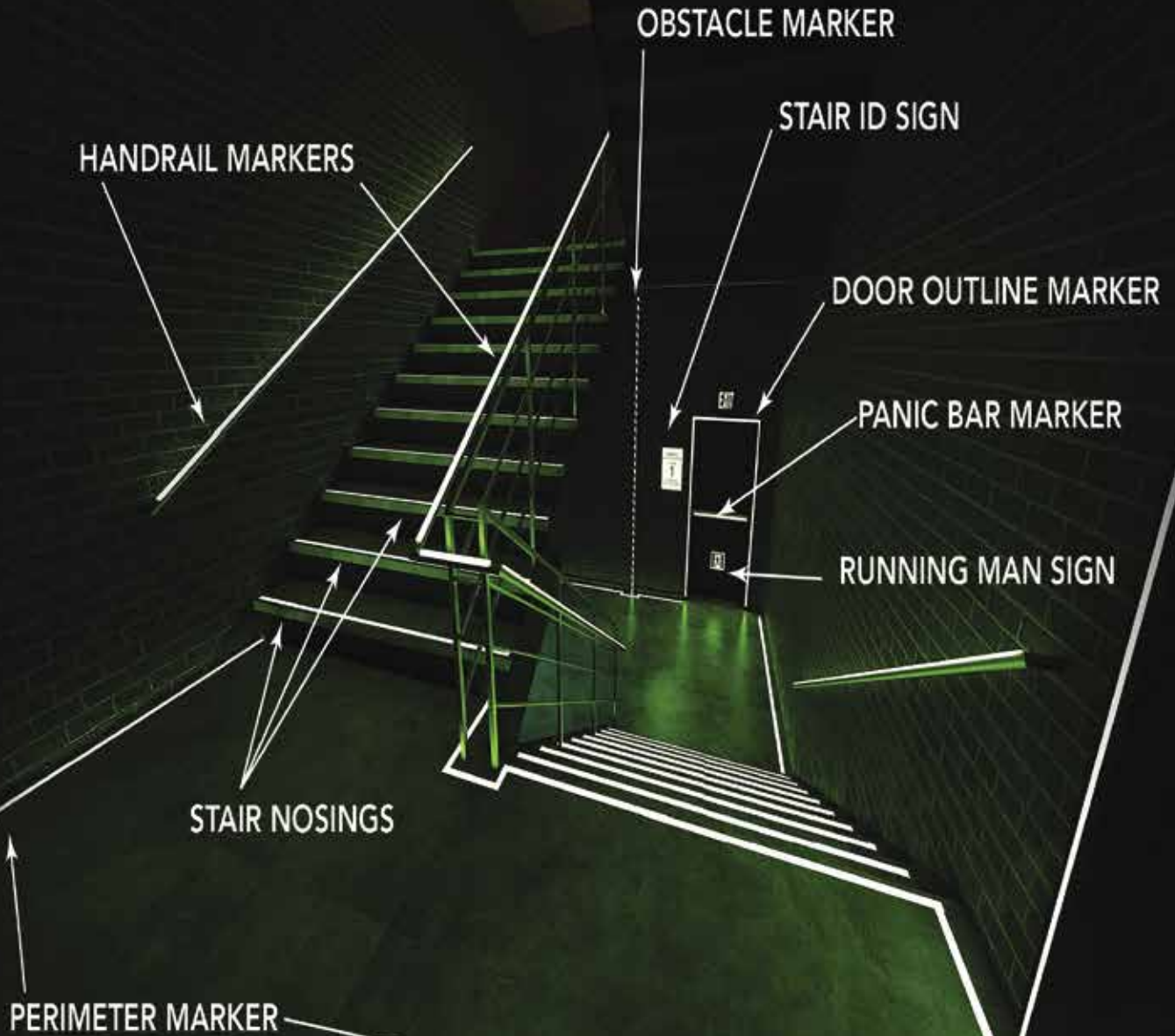
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Today's Industrial Products & Solutions

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Forging Ahead: Worldwide Demand for Forged Parts Spurs Drive to Rebuild Equipment

By Del Williams

With defense industry demand ramping up worldwide, working with an experienced OEM to rebuild equipment is often the fastest, most cost-effective way to increase production.

Today, global demand for rebuilt forging equipment is surging, driven in part by a dramatic rise in the need for military ordnance spurred by Russia's invasion of Ukraine. As in past wars and conflicts, the demand for forged parts often increases as governments seek to replenish depleted stocks of artillery shells, tanks, aircraft parts, and weapons. According to recent news reports, numerous nations have committed billions for new ordnance purchases in 2024.

To meet this demand, forgers are dusting off sometimes decades-old unused or underutilized forging equipment and seeking complete rebuilds from the Original Equipment Manufacturers (OEMs) to ramp up production quickly, even if new forging equipment is ordered and on its way.

"Rebuilding is often the fastest, most economical means to get worn or mothballed equipment back into production when purchasing new equipment may not be feasible. As such, it can bridge a gap in production before new equipment can be purchased, manufactured, and delivered," says Justin Wildfire, Rebuild Engineer, Products and Part Sales, Ajax-CECO-Erie Press (ACE), the largest forging equipment supplier in North America, with over a century of experience in custom designing and building presses and forming machines.

According to the Forging Industry Association, "Forged components are found in virtually every defense implement, from rifle triggers to nuclear submarine drive shafts. Heavy tanks, missiles, armored personnel carriers, shells, and other heavy artillery are common defense-related applications of forged components."

A forging's versatility of size, shape, and properties also makes it an ideal component in bulkheads, wing roots

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Robust demand for forged components is also expected to increase in the automotive, aerospace, and power generation markets through the end of this decade. According to Grandview Research, the global metal forging market valued at USD 74.36 billion in 2021 is projected to grow at a compound annual growth rate of 7.7% from 2022 to 2030.

Given the demand, several scenarios could lead manufacturers to rebuild forging equipment instead of purchasing new, according to Wildfire.

Rebuilding is reconstructing a machine by removing all its parts and repairing or replacing them with OEM components to return them to manufacturer specifications. This can include replacing high-wear items such as bearings, bushings, seals, and liners and inspecting and repairing the frame.

Rebuilding is often more efficient and cost-effective than purchasing new and is ideal for quickly getting equipment operational again in as little as a few months. Consequently, forgers opt to rebuild aging forging equipment, which can date back to the 1920s in some instances.

In some instances, the forging equipment may no longer be in use, requiring updating, modifying for new product lines, or servicing to be restored to original specifications. A rebuild can also increase the produc-

tion capacity of slow, inefficient, or unreliable equipment.

According to Wildfire, the high-impact nature of forging eventually takes its toll over time. When this occurs, parts will inevitably need to be replaced, and a rebuild may be the best solution to extend the life of the forging equipment.

At this point, the choice is to contact the OEM to rebuild the equipment or contract with a third-party rebuilder. The decision is significant, given the need for a complete, dependable rebuild that will perform as expected for many years.

Rebuilders often use a reverse engineering process to create their parts or have them machined at local CNC shops. Although this approach may work in the short term to “get the equipment up and running,” it ignores the long-term view.

Even rebuilders with experience working on various other types of equipment, such as stamping presses or injecting molding machines, may only partially appreciate the forces exerted during the forging operation.

According to Wildfire, critical engineering design data is lost when an independent rebuilder reverse-engineers a part, resulting in inferior part construction and premature wear or component failure. “Often they are rebuilding a machine without truly understanding the original design intent or the loads that will be placed on the parts and equipment,” he says.

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tions, there is the risk of a wrong or sub-optimal part being used in the rebuild. Given the loads placed on a forger, even minor material changes can significantly affect equipment longevity.

Consider that forging equipment has to take the highest impact and accept the highest pressure of any metal-forming equipment. Simple aspects of a design, like the size and placement of a corner radius, can affect the longevity of a component.

There is also the risk of working with a rebuilder who takes shortcuts. A conscientious rebuilder will try to reverse engineer how the forging equipment was built, which may lead them to contact the OEM to source the correct part and access engineering drawings. However, some shops will apply a fresh coat of paint and not do all the work needed.

An incomplete or incorrect rebuild can be very costly to a manufacturer. Forging performance may be sub-optimal, the forging equipment may operate less efficiently, and the life of the equipment may be shortened. Often, there is no warranty offered on the rebuild. Notably, there can also be operator safety risks and OSHA compliance issues.

Instead, as an alternative, it can be advantageous to

work with the OEM for an equipment rebuild. The OEM has the original design specifications, critical materials, and clearance specifications to jump on rebuilds and quickly finish the work. A vast range of information is required for a quality rebuild, such as critical data on high-wear parts, the material grade of the steel, the heat-treating process utilized, and the required clearances used in the engineering of that forger.

"If a 60-year-old forging machine had a secondary heat treat surface coating as part of the original design specification that wore off over the years, it would not be apparent to a third-party rebuilder. Not adding a replacement surface coating during a rebuild could compromise longevity. However, the OEM keeps documentation on all modifications, which will be reviewed when replacing parts," says Wildfire.

With large spare part inventories, choosing an OEM can reduce service times compared to going to a rebuilder, who would first need to purchase a piece of steel and then machine it. The parts and the rebuild are also backed with a warranty from the OEM.

In addition, a rebuild can include significant automation upgrades when working with the OEM. For example, tasks once performed manually – such as moving heavy steel rods, pipe, and other stock in and out of

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equipment – can be automated to improve worker safety. Many manual tasks can be replaced with a robot’s mechanical “hand” or by integrating servos that lift, insert, and deposit materials. Even tasks such as automated tooling changes can be completed with the push of a button.

Rebuilds can be approached in several different ways. The forging equipment can be sent to the OEM for rebuilding; the OEM can send repair personnel to the manufacturer’s facility to rebuild equipment on-site, or the OEM can supervise a rebuild by maintenance staff. This allows the in-house staff to ask questions and better understand the operation of the equipment they are maintaining.

According to Wildfire, the OEM will typically perform a quick initial assessment of the forging equipment to determine how “true” it is if it is running. This involves measuring squareness and parallelism and checking for cracks and failure points. Afterward, the scope and timeline of the rebuild can be jointly determined by the OEM and the customer based on their requirements and priorities.

Since a manufacturer can have various types of forging equipment that need rebuilding, it can be advantageous to work with an OEM with the expertise and experience necessary to reliably bring a wide range of systems back to full productivity.

ACE, for example, has spent the past two decades acquiring established forging equipment brands and can now service, rebuild, or refurbish forging machines from Ajax, Chambersburg (CECO), Erie Press, and LNF as the OEM. In addition, they similarly service all other brand-name forging equipment.

“The full range of forging equipment can be rebuilt by ACE, whether hammers, mechanical presses, hydraulic presses, or stretch forming equipment,” says Wildfire.

On a recent rebuild, Wildfire reviewed the engineering drawings of a hammer originally designed by Erie Press in 1927. The hammer was still in production, and the user sought to rebuild its top-end cylinder with some seals and rings.

“We provided engineering assistance to determine which parts needed to be replaced. The serial number led us to a set of prints developed around 1927. And we have worked on older machines than this,” says Wildfire.

ACE also recently rebuilt an Erie Press hydraulic sizing press and a Bliss mechanical press for the government. ACE is rebuilding several vertical hydraulic press lines for the same facility that will be used to manufacture artillery shell casings.

As defense contractors and other manufacturers consider how to meet the rising production demand for forged parts, rebuilding their equipment with the OEM will often be the fastest and most economical choice.

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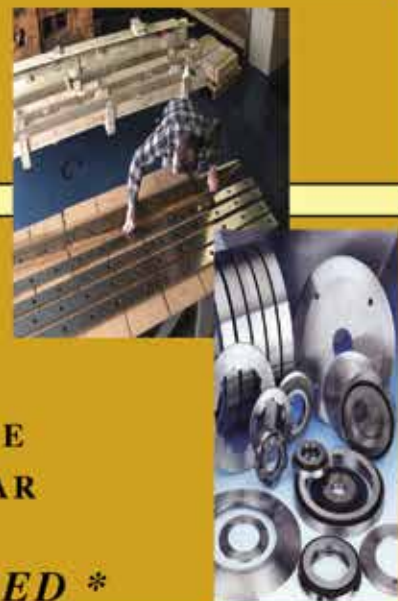
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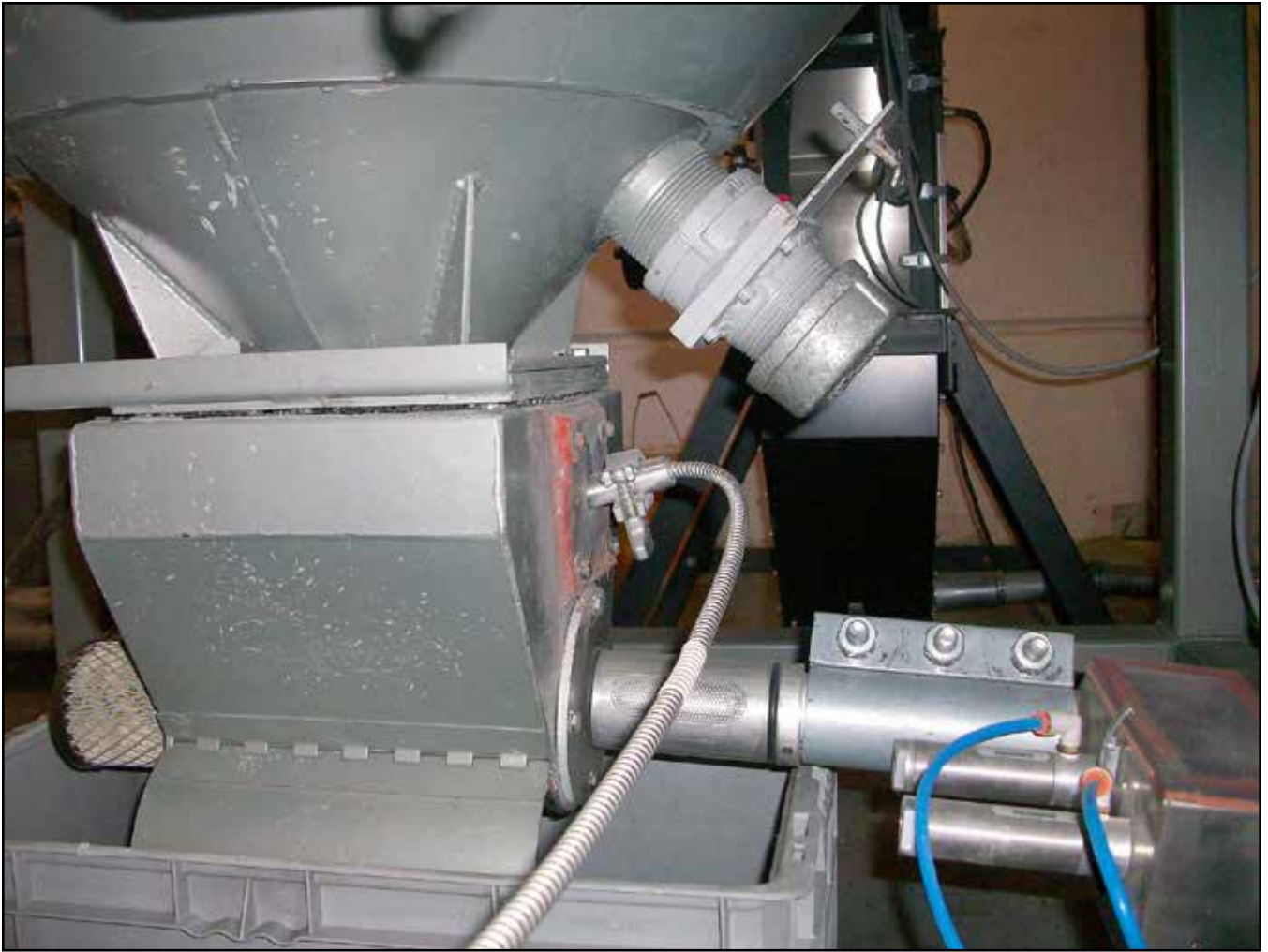


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Extraordinary Insights Mined by Analyzing Mass of Measurement Data

A new generation of specialized software is helping manufacturers to collect, track and monitor all collected data to unlock the full value of analytics.

In essentially every field of manufacturing today, professionals use sophisticated equipment to track and report data collected while measuring and testing raw materials, in-process components, and finished products. However, many organizations struggle to efficiently gather, monitor, and analyze the vast amount of information they accumulate. This lack of comprehensive and global approach hinders the effective utilization of data analytics to derive valuable insights from raw data. The result is often missed opportunities to make strategic decisions, enhance performance, increase productivity, and ultimately improve profitability.

As Peter Sondergaard, Senior Vice President and Global Head of Research at Gartner, Inc. shared, "Information is the oil of the 21st century, and analytics is the combustion engine." Just like oil, data has tremendous potential value but only when it is effectively gathered and utilized.

However, with all the materials, instruments, and applications involved in modern manufacturing, it can be challenging to capture, track, assess, and effectively use the flood of data that is generated on a timely basis. Accord-

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For example, it can reduce or eliminate measurement or labeling errors at every phase of the process. This can help to ensure safety, which is particularly important in fields where precision is key such as medicine, construction, and engineering.

Logging and analyzing data can provide much needed transparency for quality assurance. Data tracking streamlines auditing by providing a definitive means to examine quality and workflow analysis. Ongoing tracking can help to pinpoint exactly where an issue arises, making it easier to investigate and address any manufacturing problems.

Tracking and analyzing data can also identify important patterns and trends in testing.

“Being able to automatically and effortlessly log data not only means you can review information from previous tests, but also analyze the data, draw conclusions, and make informed decisions for the future rather than merely reacting to problems as they occur,” says Bogart.

Data Tracking and Analysis Simplified

To help manufacturers attain the utmost value from their data, OEMs have developed a new generation of software to streamline the collection and analysis of production measurement data.

As an example, Kett has introduced its Tracker™ System, a data collection and analysis software solution that gives organizations the ability to monitor, synthesize, display, and report information from manufacturing related measurement devices over time. This can include, for instance, factors such as the moisture measurement or organic composition analysis of everything from raw inputs to finished products.

The system is comprised of a collection of software programs that allow processors to log and analyze data they collect on each device. The single analyzer version is a database with display and output functions for a single Kett measurement device. Using multiple analyzers gives users the ability to simultaneously collect, display, monitor, and send out data from several devices all in one place.

A positioning module allows users to add location data

ing to the Forbes article Big Data: 20 Mind-Boggling Facts Everyone Must Read, “At the moment less than 0.5% of all data is ever analyzed and used.”

Now industry innovation is helping manufacturers to gain key insights into their products and processes by enabling them to effectively interpret data from every test given even at mass volumes.

“Having access to tools that allow you to automatically store, track, and analyze the information gathered [from test instruments] can help processors unlock the greatest potential value from their ideas, processes, and products. This kind of analysis means users can take logs of test results and let the data “speak for itself” to help engineers and management recognize patterns and draw accurate conclusions. In some cases, the data analysis may help them make accurate predictions to drive future growth,” says John Bogart, Managing Director of Kett US, a manufacturer of a full range of moisture and organic composition analyzers.

According to Bogart, effective data tracking and analysis offers significant benefits to many areas within manufacturing from R&D, process engineering, and plant management to quality assurance, maintenance, corporate management, and even regulatory compliance.

The Many Benefits of Data Tracking

For manufacturers, implementing an effective data tracking system can be crucial to maintaining quality assurance and ensuring optimal results for a product or process.



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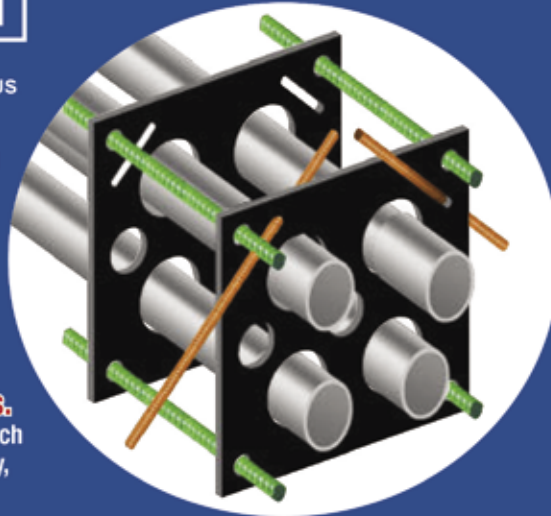
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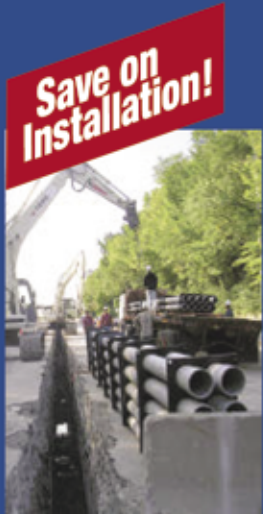
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for instrument readings and other measurements. This enables integration of the information with linear actuators and/or robotics, which can facilitate making real-time adjustments in production equipment as required to improve quality or efficiency.

The Tracker™ Software allows integrating data collection tables and graphs as needed from non-Kett devices, making the system a one-stop-shop for manufacturing data collection and analysis. The system provides modules for distributed data management so multiple authorized users can view, analyze, manage, and send out process control management data simultaneously.

“The Tracker™ System is designed to serve as a single collection point for data and analysis that can be applied across all sectors and industries,” says Bogart.

The data tracking and analysis system delivers even more value for manufacturers when used in conjunction with smart measurement devices. On the production floor, “smart” equates with the ability to continually monitor conditions such as product and input moisture

content in real-time to optimize quality. Assessing proper moisture level in products and processes is essential for many reasons such as meeting regulatory standards, ensuring proper chemical reactions and drying, maximizing shelf life and deterring mold, as well as increasing selling price and decreasing shipping cost.

One example is Kett’s KB30 in-line NIR moisture meter system. With a response time of 0.2 seconds, +/- 0.01% accuracy, and a moisture measurement range of 0.00-100.0%, the device can be used to assess extremely variable and rapidly changing products, as well as processes where quality is critical. The quick response time enables faster production line rates with superior moisture measurement. It has been used in various industrial production lines to test pharmaceuticals, chemicals, foods, textiles, minerals, lubricants, pulp/paper goods, and personal care products.

According to Bogart, the technology is “smart” because all of the calculations are performed inside the sensor and measurements are sent on a 24/7 basis to smartphones, PCs, and other devices without having to be

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directly connected. If desired, these instruments can prompt operators and managers with alerts as needed.

When the smart device's monitoring capabilities are integrated with accompanying Kett Tracker™ data collection and analysis software, improved error detection, defect analysis, and product quality result.

"With all these meticulous readings and with every instrument geared toward accuracy in every moment, comes a great deal of data," explains Bogart. "It only makes sense to provide a place to store, track, and analyze all this information. This is a wealth of information that's right at their fingertips, and the right lens can unlock this information."

As an example, when two smart sensors were used to run different production lines at a manufacturer, the devices' real-time capability detected periodic, wildly fluctuating moisture values that caused their extrusion process to go out of control. After investigation, it was determined that the manufacturer's electrical circuits had not been adequately isolated from the effects of a nearby power plant's operation on shared power lines.

As more industries and sectors look to improve their processes and inform their decisions, effectively collecting and analyzing data will become even more critical. Manufacturers that take advantage of the latest tools to track and analyze their data will not only improve their production quality and efficiency but also position themselves for growth in the future.

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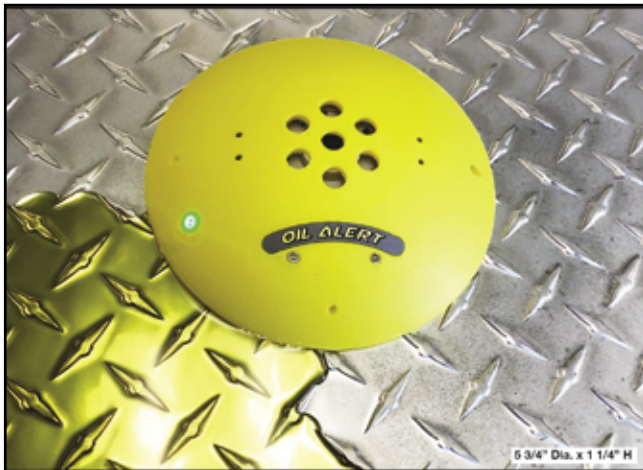
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