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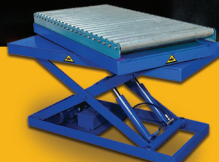
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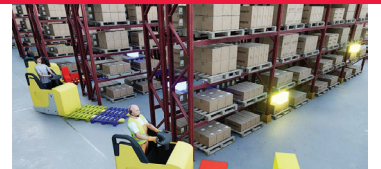
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A New Year's Perspective

I mentioned in the last issue that a change was coming, and you've probably noticed that it's here.

The 2026 print edition is a little smaller in trim size, a little thicker in content, and, to me, more satisfying to hold. Inside this issue, you'll find three editorial brands working together under one cover, connecting product discovery, operational insight, and supply chain perspective into the same conversation.

The role of New Equipment Digest has always been to help you begin the research process—showing what's available and what problems new technologies are intended to solve as you evaluate your options.

But discovery is only part of the equation.

The addition of content from Plant Services and Material Handling & Logistics reflects the way modern operations actually function. Readers don't make technology decisions in isolation—they make them in the context of how equipment will be maintained, how systems will be used, and how materials will move through the facility. Technology decisions don't sit with one team anymore. They involve engineering, maintenance, and logistics—and this issue is structured to reflect that.

The Plant Services perspective focuses on the reliability side of that equation, exploring topics that help teams understand how equipment behaves once it's installed. The focus is centered on long-term performance and the methods and strategies that ensure uptime rather than downtime.

The coverage from Material Handling & Logistics adds perspective on the movement of products and materials through warehouses and distribution networks, highlighting how workflow design and technology trends are shaping operational strategy in the years ahead.

These topics are becoming more important as companies manage labor constraints, demand variability, and ongoing automation investment.

Together, these three brand perspectives reflect how operations actually function. Technology discovery, reliability, and material flow influence one another every day inside a facility. You'll see this three-brand format throughout the year, giving each issue a broader operational perspective while maintaining the product focus you expect.

As we move through 2026, I'm grateful to be able to keep delivering this magazine to you in print. The industry we cover is constantly changing, but the need for practical information that helps you make better decisions remains the same.

Thank you for reading, for trusting this publication as part of your research process, and for joining us on the journey this year.

Here's to a productive year of solving real problems with real solutions.

— **Laura Davis**, Editor-in-Chief

NED

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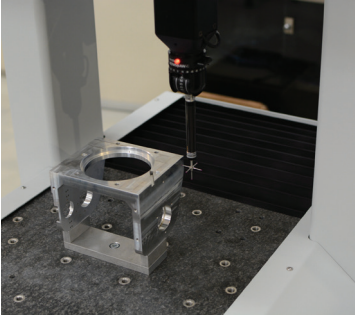


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An all-in-one motion amplification and vibration analysis system for industrial diagnostics and predictive maintenance, **Iris aiOne** combines cameras, AI analysis, and accelerometer-based measurements, enabling vision-based motion analysis with automated asset identification and vibration severity evaluation. It monitors assets such as motors, pumps, and pipes and assigns vibration severity levels using a visual alert system.



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The **MasterHandler** electric tugger has been upgraded to improve control of 4-swivel and mixed-caster load configurations, addressing load drift during movement. The tugger has a max load capacity of 13,000 lb (5,897 kg), and a stabilizing leg that creates a consistent control point, keeping loads straight and stable. The tug stays close to the load, improving maneuverability in small spaces.

MasterMover, Inc.

More online: newequipment.com/55353154

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Wright's Metric Service Wrenches are perfect for restricted clearances with their 30° angle and slim design. The lineup includes 21 sizes, ranging from 19 to 65 mm (0.75 to 2.5 in), and two larger SAE sizes, 64 and 65 mm (2.5 in). Stamped size markings offer quick identification, and all wrenches meet ASME B107 standards.



Wright Tool

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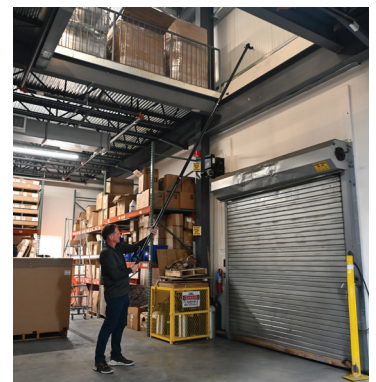


Upgraded CNC Mill With EtherCAT Motion

Upgraded with EtherCAT servo motion control and higher spindle output, the **770MX CNC mill** delivers 2 hp continuous and 4.5 hp peak power on single-phase power. The machine reaches 450 in/min (11 m/min) feed rates, has a 14 x 7.5 x 13 in (356 x 190 x 330 mm) work area, includes a touchscreen with load meters, and is available factory-assembled with ATC and coolant or as a self-assembly model.

Tormach, Inc.

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Remote Inspection Camera

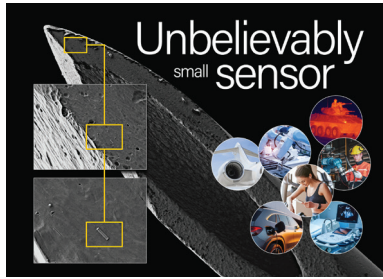
Designed for ground-level inspection of overhead beams, ductwork, and rafters, the **VAC-DIV2-CAMKIT** converts carbon fiber extension wands into a remote camera system that streams live video and images to a smartphone. It supports before-and-after documentation, integrates with existing vacuum systems for combined inspection and cleaning, and helps facilities meet proactive dust-control practices referenced in NFPA 660.

Goodway Technologies Corp.

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Dart Controls, Inc.

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High-Speed Thermoformer Boosts Output

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NEXT MSS is a modular professional tool storage cabinet system featuring more than 60 configurable modules, including cabinets, work-tops, and accessories. Designed for modern workshops, it installs quickly to uneven floors with dual kick plates, and includes a 10-year warranty. It integrates with digital configurator software and supports over 200 foam tool layouts.



Sonic Equipment

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Reliability Under Water: How Baxter Healthcare Rebuilt an Essential Supply Chain After Hurricane Helene

The storm tested every system and every person—revealing the true power of maintenance and reliability leadership under pressure.

by Anna Townshend, Managing Editor, Plant Services

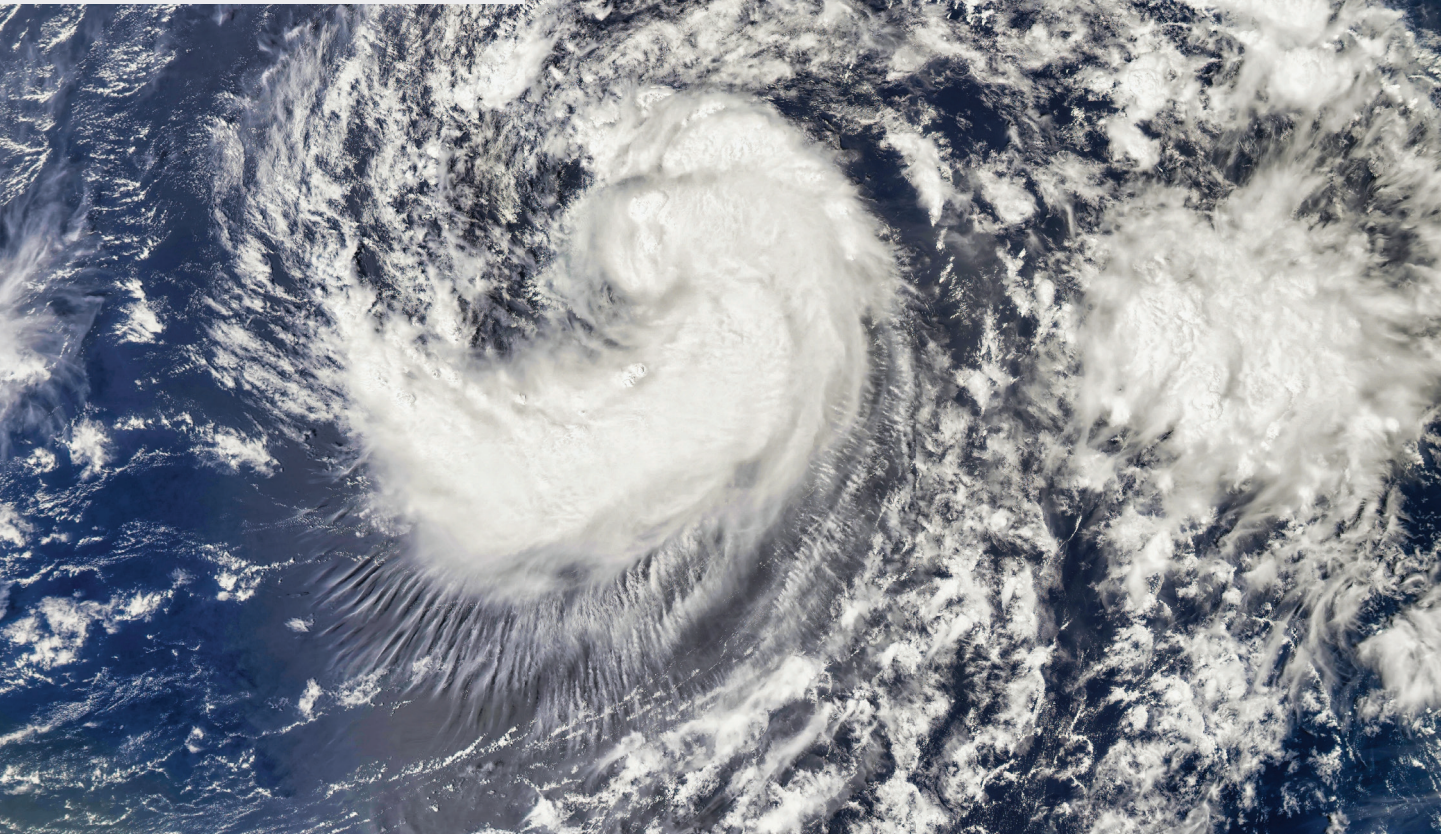
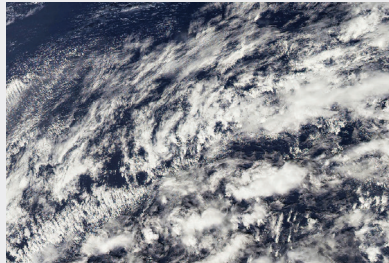
When Hurricane Helene roared through the mountains of western North Carolina, it didn't just take down trees and bridges—it nearly took down a lifeline for U.S. hospitals.

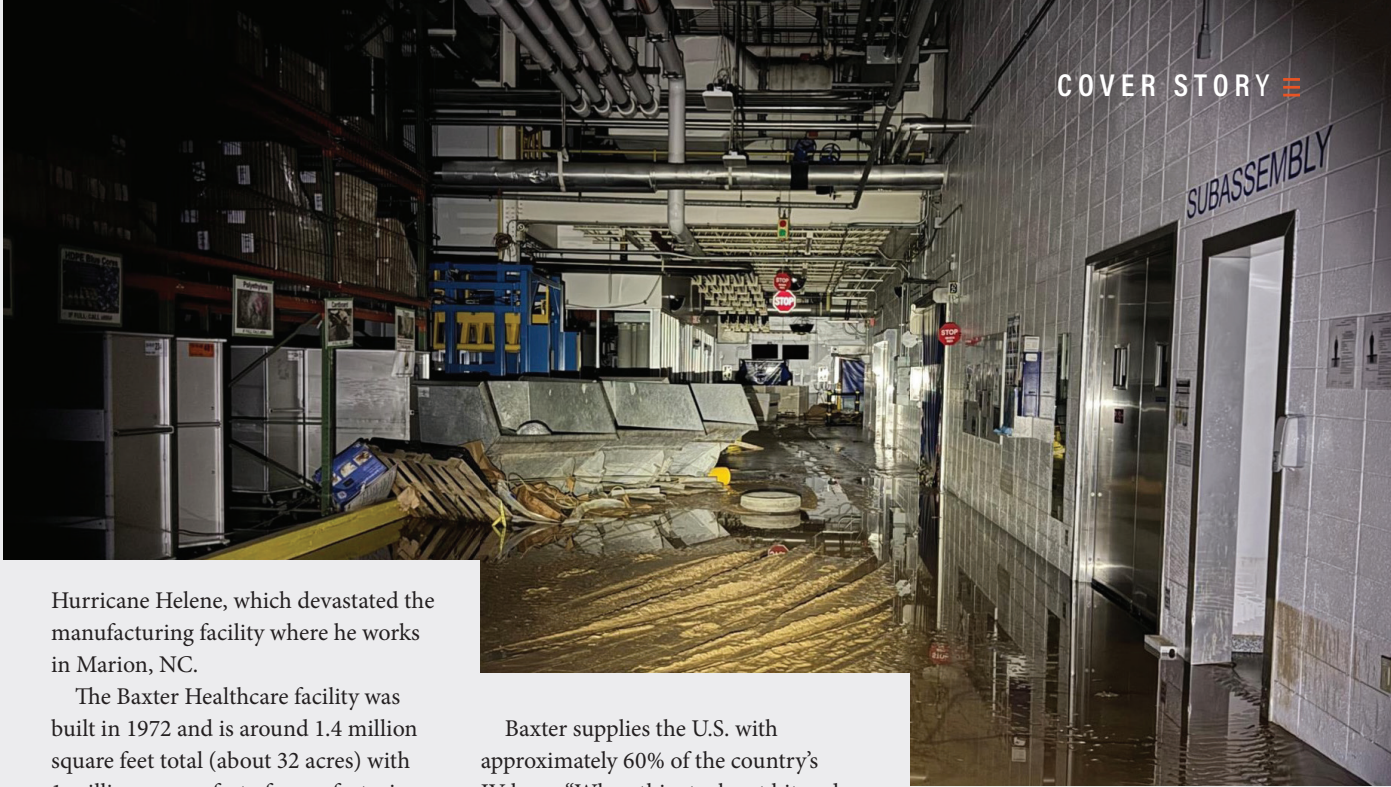
At Baxter Healthcare's North Cove facility, mud and floodwater swallowed production floors, silenced machines, and threatened the nation's critical supply of IV bags. The team at Baxter Healthcare learned that resilience isn't

just a plant metric—it's a human one. And still, in the middle of that chaos, reliability principles quietly proved their worth, reminding everyone what

reliability really means when everything breaks at once.

In October at the Society for Maintenance and Reliability Professionals (SMRP) annual conference, Robert (Bobby Lee) Gilliam, reliability engineering superintendent at Baxter Healthcare, recounted his personal and professional experience of





Hurricane Helene, which devastated the manufacturing facility where he works in Marion, NC.

The Baxter Healthcare facility was built in 1972 and is around 1.4 million square feet total (about 32 acres) with 1 million square feet of manufacturing space. It fills, packages, sterilizes, and ships IV bags. “We mix our own solution there. We pull 1.8 million gallons of water a day from the ground there,” he said.

Baxter supplies the U.S. with approximately 60% of the country’s IV bags. “When this stock got hit and we went down, there was an IV bag shortage due to this facility going down,” Gilliam said. The facility, depending on uptime, produces around 1.8 million units a day. One other interesting side

note about the IV bags is that Nike uses the same machinery to make its Nike Air bags. “If you wear Nike Airs, the same machine is used to make an IV bag,” Gilliam said.

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Hurricane Helene tests the limits of maintenance and reliability

Last fall, it rained for a week straight leading up to Hurricane Helene, and the storm dropped 40 trillion gallons of water in western North Carolina through the night on September 27, 2024. “This is enough water to fill up the Cowboys Stadium 51,000 times. That’s how much water fell on our area. Also, there was no warning of this. We didn’t know that it was going to be this bad. No one was prepared for it. We didn’t have fuel stored up. We didn’t have food stored up, so it was amazing to see how the community came together,” he said.

Western North Carolina is a mountainous area, where the terrain added to the flood damage. “If you’ve never been to the mountains, the mountains have valleys. We call them hollers, where I’m from, so you’ve got the hollers and the water just funnels



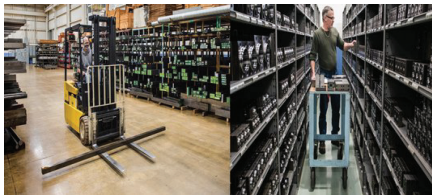
down into streams and creeks,” Gilliam said. The water created more than 2,000 mudslides, also destroying about 2,000 bridges.

“There are back roads that you can take to get to places, but if you don’t

know those back roads, it was really hard to get to where you needed to go,” Gilliam said. Some bridges still haven’t been replaced. The Baxter Healthcare facility got a temporary bridge rather quickly after the storm, and they only recently opened the new replacement bridge about a year after the storm.

During Hurricane Helene wind speeds on Mount Mitchell were

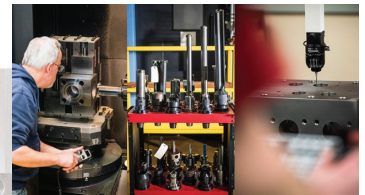
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recorded at 140 mph, which started taking down trees. In total, about 821,000 acres were damaged from flooding and downed trees. During the storm Gilliam was on the phone with his father-in-law who was noting each tree as it went down around and on the house. “He had to cut over 100 trees to get from his house to the main road, and his driveway isn’t very long,” Gilliam said.

At the North Carolina Baxter facility, along with the main bridge, the damage inside and out was like nothing they had ever seen, Gilliam recalled. The cooling ponds outside of the facility were completely filled with sand and debris, and the concrete foundation was busted. The facility inside was entirely covered with mud. The building layout is basically a straight line, and the flooding came in through the back of the facility and ran all the way throughout, covering everything in mud and water.

“While I was in there doing assessments on equipment, I actually found a salamander in some of the drains, and there were fish that were found as well throughout the facility. So it was definitely different times,” he added.

After the storm, 170,000 homes and businesses in the area were without power, and 108 people lost their lives, including one former Baxter employee.

“Some people were without power for months. It wasn’t just a little power outage. I was very fortunate. I live on the main road, and I got power back within a couple of days. When that happened, I had neighbors come over. They set up a supply station at our house, and we fed people. My neighbors were cooking and smoking ribs and pork butts, and we fed over 54 people one day just from my front yard. My mom came and stayed and was doing people’s laundry, and I’d go to work all day and come back and there would be 10 people in the house needing to take showers. It was a great moment to see how community truly comes together in a disaster home,” Gilliam said.

During his free time, Gilliam likes to fish, and he showed a picture of the first trout he caught after the storm. “I remember catching that fish. This is going to sound crazy, but I almost cried because I didn’t think there was going to be trout in the water. All the banks had been stripped of the laurel bushes, we call them, and all the moss had been stripped off the rocks. Everything was just different. These mudslides would come down stream beds, and they would cause a huge log jam. It would dam up the creek, and then all that would release and then everybody below it just felt the wrath of the water that was coming.”

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Monumental clean up restores the country's IV bag supply

While Gilliam was helping his family and community, he was also working long hours at Baxter to repair and restore production. Production in one area was restored within a month, but it took incredible investment and manhours. “It took a lot of money to make this happen,” he added. The production line for one-liter IV bags, which were the biggest demand, was the initial focus.

Gilliam has a strong background in maintenance, where he started at Baxter. This has helped him as reliability supervisor and also proved useful in the throes of disaster. “In that moment of disaster recovery, it wasn’t time for me to be preaching reliability engineer. It was time for me to take on new incentives to help the company get up and start producing product quicker,” Gilliam said.

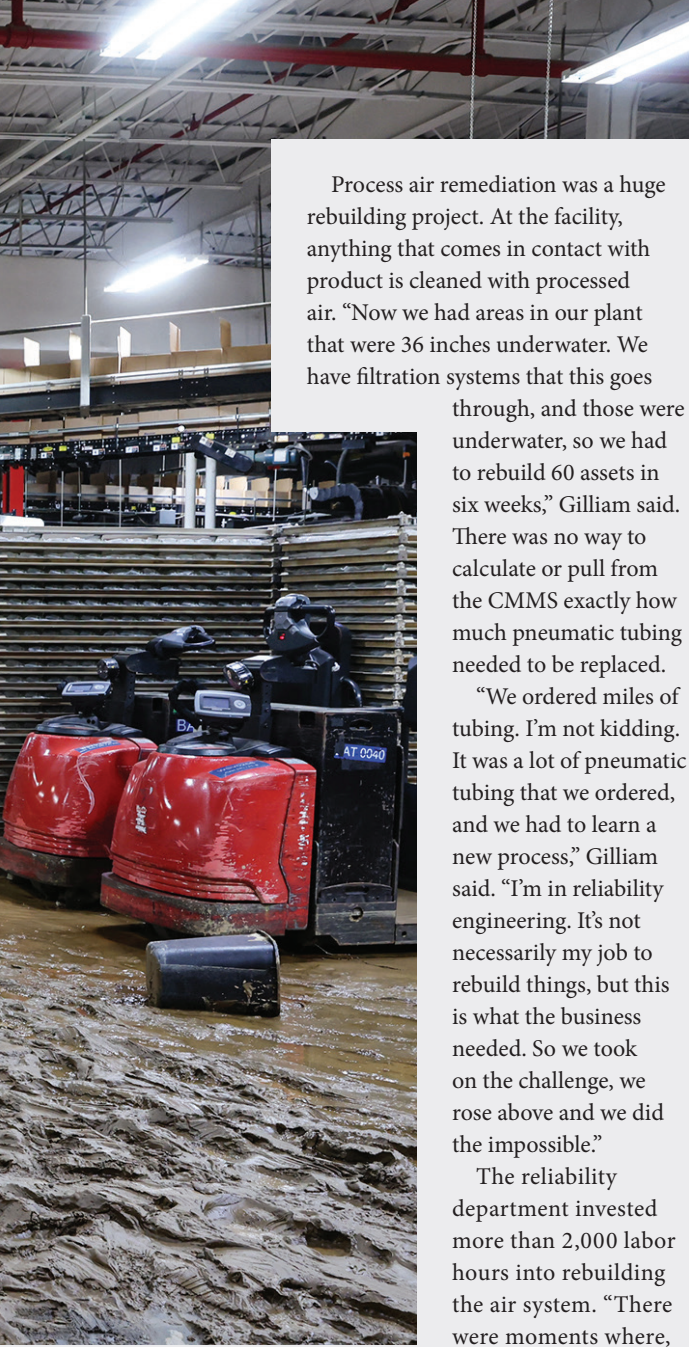


More than 2.5 million hours of labor went into the cleaning effort. Gilliam said that included 26,000 maintenance hours in three months, and the number is probably higher because not everything was documented. “There was a long time there we were working without any power,” Gilliam said.

Employees were working excruciating hours, six to seven, 12-hour days straight, and also trying to do repairs and put their

lives back together at home. Gilliam finally convinced his boss to do a split schedule. “We were killing our people. These people also have a life outside of Baxter, so now we’ve got to try to balance the business and their personal life,” Gilliam said. The staff split on a Tuesday through Saturday and Sunday through Thursday, 10-hour a day schedule.

The facility also had 5,000 additional helpers to clean the site, including local help and third-party contractors. “People running shovels. People using toothbrushes,” Gilliam said. “If it looked muddy, by golly, you scrubbed it.”



Process air remediation was a huge rebuilding project. At the facility, anything that comes in contact with product is cleaned with processed air. “Now we had areas in our plant that were 36 inches underwater. We have filtration systems that this goes

through, and those were underwater, so we had to rebuild 60 assets in six weeks,” Gilliam said. There was no way to calculate or pull from the CMMS exactly how much pneumatic tubing needed to be replaced.

“We ordered miles of tubing. I’m not kidding. It was a lot of pneumatic tubing that we ordered, and we had to learn a new process,” Gilliam said. “I’m in reliability engineering. It’s not necessarily my job to rebuild things, but this is what the business needed. So we took on the challenge, we rose above and we did the impossible.”

The reliability department invested more than 2,000 labor hours into rebuilding the air system. “There were moments where, gosh, one day I think

I worked 18-19 hours to try to get some stuff done and things in place, things that needed to happen,” Gilliam said. “Maintenance did a fantastic job at rebuilding these assets.”

Gilliam said one thing to remember in disaster recovery is don’t let pride get in your way. “Pride is a luxury that sometimes you can’t afford. I’m a reliability engineering superintendent, but it wasn’t time for me to flex that muscle. It was time for me to pick up the broom and sweep. It was time for me to jump in with mechanics and work with them and snatch chains out or cylinders, run new cables,” Gilliam said. PS

Further reading: The importance of CMMS data discipline and an accurate asset hierarchy when it comes to disaster recovery: www.plantservices.com/55327638

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FROM THE COVER



Robot Dog Adds Force-Sensing Manipulator Arm

The force-sensitive **Manipulator Arm for the Vision 60 quadruped UGV** enables remote tasks such as opening doors, retrieving objects, and handling equipment without sacrificing mobility. The arm features 6 DoF, a 25 lb (11 kg) gripping force, 3 ft (1 m) reach, 22 lb (10 kg) max payload, and continuous support of 8 lb (4 kg) at 20 in (50 cm).

The robot traverses rocks, sand, hills, and stairs, and operates in unknown environments even if vision sensors fail. It's IP67 rated for dust-tight protection and submersion to 3.3 ft (1 m).

Ghost Robotics

More online: newequipment.com/55337863

Blue Laser Scanner Reduces CMM Noise

Reducing noise in CMM scan data, the **L100NX laser scanner** has a 450 nm blue light laser, a stripe width of 4 in (110 mm), and a scanning rate of 530,000 points/s for faster inspection of large components. ESP technology measures shiny surfaces and multimaterial assemblies without surface prep. It can rotate for complex geometries, and the FoV projector simplifies setup.

LK Metrology, Inc.

More online: newequipment.com/55336153



Carboard Blister Packaging Machine

Easily produce fully cardboard blister packaging, including the blister and the backing, with the **CABLblue 870 Blister System**. Creating securely sealed packages that are 100% recyclable, the modular design allows for different blister shapes and sizes. The system

can produce up to 22 large-capacity blister packages/min, and features tool-free changeovers and an expandable transport pallet.

IWK Packaging Systems, Inc.

More online: newequipment.com/55336041



Configurable DC Micromotors

GXR and SXR DC motors extend the 14 mm drive portfolio with a new motor family and new sizes in an existing line. The GXR series 1437 motors feature copper-graphite commutation, while the SXR line expands with precious-metal-commutated motors in 1424 and 1437 sizes. All models integrate with planetary gearheads and magnetic encoders.

Options include multiple bearing configurations, flexible voltage variants, electrical connection choices, shaft modifications, and optimized rotor balancing.

FAULHABER MICROMO, LLC

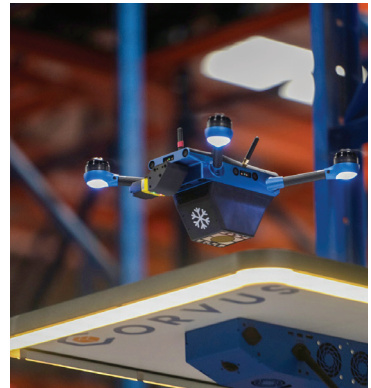
More online: newequipment.com/55316086

Dev Kit Deploys Vision Systems Faster

Built for OEM and multicamera vision deployments, the **eSDK Pro Software Development Kit** manages image acquisition, processing, transfer, and storage while reducing low-level coding through automated scheduling and memory management. It supports GigE Vision 3.0, RDMA/RoCEv2, and GenICam, enables GPU/FPGA/CPU acceleration with zero-copy data handling, and integrates with eCapture Pro Vision Software.

Emergent Vision Technologies

More online: newequipment.com/55343561



Autonomous Drones for Sub-Zero Warehouses

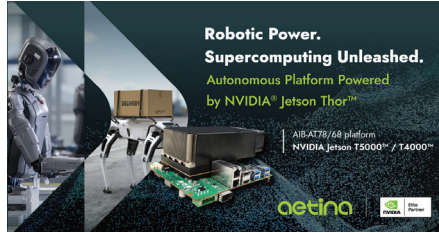
Corvus One for Cold Chain is an autonomous inventory drone designed for continuous operation in sub-zero warehouse environments down to -20°F (-29°C). The system performs high-frequency cycle counts without human entry into freezer aisles, capturing barcode data through adaptive focus scanning and stabilized flight to overcome frost, airflow, and condensation challenges.

Corvus Robotics

More online: newequipment.com/55360440

Edge AI Platform for Robotic Supercomputing

The **AIB-AT Series** compact edge AI platform for robotics and autonomous systems offers up to 2,070 FP4 TFLOPS with NVIDIA Blackwell GPUs and up to 128GB memory. It supports multimodal perception, sensor fusion, and generative AI. Features include high-speed Ethernet, MIPI camera interfaces, QSFP28 streaming, M.2 expansion, wide voltage range, and industrial-grade operation.



Aetina USA Corporation

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Battery-Powered Air Compressor

A skid-mounted, battery-powered air compressor, the **EPEQ EPRO20 Power Skid** delivers 20 CFM at up to 150 psi with zero emissions and low noise. The 48V 100 ampere-hour LiFePO4 battery supports dual-speed operation (10 or 20 CFM), a 30-gal air tank, and real-time monitoring via a 7-in smart display.

Vanair Manufacturing, Inc

More online: newequipment.com/55360302



Engine Oil for Hydrogen ICE Vehicles

BluEV H2 ICE 10W-30 is a heavy-duty engine oil for hydrogen internal combustion engines used in commercial vehicles. Its additive system reduces the impact of water-induced degradation, preserves lubrication performance, and provides resistance to corrosion and wear. The oil is compatible with current and future hydrogen engine platforms, including engines with exhaust gas aftertreatment systems.

FUCHS Lubricants Co.

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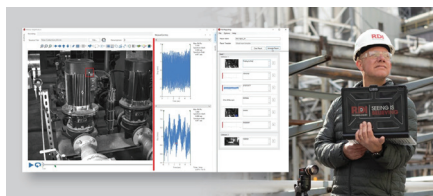


Explosion-Proof Motor for Drum Pumps

Transferring flammable, combustible, and non-flammable fluids, the **SX Series electric drum pump motor** features 2 speeds for different transfer requirements, delivering up to 17 GPM (64 LPM). With continuous operation it allows multiple containers to be emptied without overheating or loss of performance. The SX Series is available in 3 models and is built for the EFS Series drum pumps.

Finish Thompson, Inc.

More online: newequipment.com/55339326



Faster Vibration Analysis Motion Amplification Software 4.2

streamlines vibration analysis with advanced report generation that compiles amplified video, data plots, and recommendations into a single report. New automatic distance measurements validate

displacement data, while automatic GIF creation enables rapid sharing. Users can crop video precisely and define regions of interest for faster, focused Motion Map calculations, improving speed, accuracy, and communication across the enterprise.

RDI Technologies, Inc.

More online: newequipment.com/55340090

Easy, Simple TIG Welder

Syncrowave 212 is an AC/DC TIG welder that simplifies welding setup and operation. The welder produces a smooth, stable arc suitable for stainless steel, mild steel, aluminum, and titanium, enabling shops to expand their capabilities without outsourcing TIG work. Auto-Set recommends consumables and parameters, the intuitive graphic display offers easier navigation, and a compatible water cooler extends welding time.



Miller Electric Mfg.

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LUBRIPLATE PRODUCT	APPLICATIONS	DESCRIPTION
FMO-85 AW* PART NO. L0880-060 / 5 GALLON PAIL	AIR LINE OIL	ISO 22 GRADE USP WHITE MINERAL OIL *NSF H1 FOOD MACHINERY GRADE
FMO-150 AW* PART NO. L0879-060 / 5 GALLON PAIL	HYDRAULIC SYSTEMS	ISO 22 GRADE USP WHITE MINERAL OIL *NSF H1 FOOD MACHINERY GRADE
SFGO ULTRA 46* PART NO. L0916-060 / 5 GALLON PAIL	AIR COMPRESSORS	ISO 48 GRADE SYNTHETIC PAC-BASED AIR COMPRESSOR FLUID *NSF H1 FOOD MACHINERY GRADE
RCO-68FG* PART NO. L0818-060 / 5 GALLON PAIL	REFRIGERATION COMPRESSOR	ISO 68 GRADE SYNTHETIC PAC-BASED REFRIGERATION COMP FLUID *NSF H1 FOOD MACHINERY GRADE
FMO-350 AW* PART NO. L0882-060 / 5 GALLON PAIL	CHAIN OIL	ISO 68 GRADE USP WHITE MINERAL OIL *NSF H1 FOOD MACHINERY GRADE
SFGO ULTRA-100* PART NO. L0983-060 / 5 GALLON PAIL	VACUUM PUMPS	ISO 100 GRADE SYNTHETIC PAC-BASED LUBRICATING OIL *NSF H1 FOOD MACHINERY GRADE
SFGO ULTRA-220* PART NO. L0985-062 / 55 GALLON DRUM	HELICAL GEAR BOXES	ISO 220 GRADE SYNTHETIC PAC-BASED LUBRICATING OIL *NSF H1 FOOD MACHINERY GRADE
SFGO ULTRA-460* PART NO. L0985-062 / 55 GALLON DRUM	WORM GEAR BOXES	ISO 460 GRADE SYNTHETIC PAC-BASED LUBRICATING OIL *NSF H1 FOOD MACHINERY GRADE
GREASES		
SYNXTREME FG-2/220* PART NO. L0309-098 / CARTRIDGE	GENERAL GREASE BEARINGS	NLGI #2 GRADE MULTI-PURPOSE, SYNTHETIC, CALCIUM SULFONATE GREASE *NSF H1 FOOD MACHINERY GRADE
CLEARPLEX 1* PART NO. L0350-035 / 35 LB PAIL	CENTRALIZED GREASE SYSTEMS	NLGI #1 GRADE USP MINERAL OIL BASED ALUMINUM COMPLEX GREASE *NSF H1 FOOD MACHINERY GRADE

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Stop Bearing Failures Before They Start: What Every Maintenance Team Should Know About VFD Effects

Experts at Schaeffler Group discuss stray current damage and new technologies and materials to boost bearing performance.

by Anna Townshend, Managing Editor, Plant Services



As industrial plants modernize with variable frequency drives (VFDs) and more sophisticated automation, maintenance teams face new challenges in keeping motors reliable.

One of the most significant, and often overlooked, issues is damage from electrical discharge, where stray currents generated by VFDs find their path through motor bearings. The resulting fluting, pitting, and lubrication breakdown can silently erode components and shorten motor life.

Experts at motion technology company Schaeffler Group, a manufacturer of components and systems for engine, transmission, and chassis applications, largely for the automotive industry, discuss the issues caused by electrical discharge.

According to Ericka Kauer, head of the Industrial Lifetime Solutions division; Frank Mignano, condition monitoring sales manager; and Ed Kaineg, sales engineer at Schaeffler Group, addressing these interrelated factors requires both the right bearing technology and smarter maintenance strategies.

4 types of damage from current discharge

“From the increased use of variable frequency drives, we’re seeing a lot of customers struggle with current discharge and the imbalances that creates,” Kauer says. When VFDs are introduced into motor systems, they can create electrical imbalances that lead to stray currents passing through motor bearings. Over time, these discharges cause a variety of mechanical and electrical damage patterns.

“Currents are looking for a place to go, and typically, it’ll go right through the motor, through the bearings,” says Mignano.

Stray currents can lead to several forms of bearing damage, and each type leaves behind telltale signs that help reliability teams identify the root cause. Below are four common types of bearing damage caused by current discharge—and how each one develops:

- With VFD applications, the insulated gate bipolar transistor (IGBT) is the key component that switches at a very high frequency, Kaineg says. “This is the main cause of voltage potential, leading to stray current damaging bearings,” he adds.

- Fluting is a specific type of bearing damage caused by electrical currents, which can cause ridges or flutes on the bearing raceway. “Fluting is a result of the bearing’s rotation in combination with the IGBT’s high-speed switching. Fluting is not always present, so it is important to examine the raceway/rolling element under magnification to see the electric erosion damage (or melting of the material). Sometimes it is just a frosty gray color,” Kaineg says.
- Electrical current can also be an issue in terms of lubrication degradation, pitting or cratering, and cracking. “Repeated electrical discharges can create tiny crater-like pits on raceways and rolling elements, which can lead to roughness, increased vibration (and, therefore, noise), and potentially initiation sites for greater damage,” Kaineg says.
- White etching cracks (WECs) are another issue to watch out for. “Electrical discharges, especially at low current densities, can contribute to the formation of WECs. These microstructural changes in the bearing steel appear white when etched), which can lead to premature fatigue and spalling,” Kaineg says.



Boost bearing reliability with ceramic and hybrid materials

To counter the constant damaging conditions seen by bearings, engineers are turning to advanced bearing materials and designs.

Ceramic-coated and hybrid ceramic bearings offer powerful insulation and extended service life in demanding motor applications. These technologies not only block damaging current paths but also reduce friction, enhance lubricant life, and boost overall reliability in critical equipment.

Ceramic coated bearings can help with dry current, as ceramic rolling elements are fantastic insulators. “The term ‘dry current’ is used in contrast to lubricated conditions, typically referring to an electrical current passing through rolling elements and raceways without a sufficient, continuous lubricant film (such as oil or grease) separating the metal surfaces,” Kaineg says. Though no current passes through, he warns to be careful, as the voltage potential still exists. This means currents could flow down the shaft to the driven assets.

Hybrid ceramic bearings, which have ceramic balls, offer even higher reliability in VFD applications, Kauer says. Hybrid bearings have the same voltage protection, plus improved finish, low mass, and increased hardness, which will provide less stress on the lubricant. “The lubricant lasts much longer, up to three times, so, hybrids are great solution for applications where lubrication might be an issue,” Kaineg says.

Schaeffler has made significant investment in ceramic bearing industry with the 2022 acquisition of Luxembourg-based Ceraspin, which has been developing and producing ceramic products for 25 years, the majority of which are processed into rolling elements for various bearing applications.

Automated bearing lubrication systems improve reliability and workforce efficiency

Consistent lubrication is key to bearing health, but manual greasing often leads to over- or under-lubrication and inconsistent results. Automated lubrication systems solve this challenge by delivering the right amount of grease at the right time.

Mignano estimates that around 70% of bearings in the field are manually lubricated by technicians on a planned maintenance schedule. Instead, with automatic lubricators, the bearings get more frequent grease applications in smaller quantities.

“It’s a much more efficient way to lubricate the bearing, and by doing that, it’s always providing clean grease to the bearing, which is going to extend its life and improve the reliability,” Mignano says. Schaeffler has been selling automated lubricators for more than 20 years. The Concept One automated lubricator is a gas-powered device that will empty grease into the bearing, based on a set time interval (six months or one year, for example).

A few years ago, the company released a Smart Base unit for the automated lubricator to help manage lubrication programs. It gives the status of the lubricator, such as how much time remains before a refill is needed in days or percent full. “The Smart Base will alert you if the temperature is too hot or cold for the lubricant,” Mignano says.

The Smart Base unit can bump the pressure 5 bar under gas power, and a small pump can boost pressure another 5 bar to 10 bar. “We get a little extra push, and it’ll let us know if there’s back pressure. That’s the most critical thing, are we actually getting grease to the bearing, or is the line clogged somewhere?” Mignano asks. “The Smart base measures back pressure and, most importantly, can identify whether the lube line is clogged. This lets the end user know lubricant may not be making it to the bearing, and that a visual inspection is required.” The OPTIME C1 Smart Lubricator was released in 2022 and the new FAG OPTIME C4 (4 port lubricator) was globally launched last September.

Schaeffler will train maintenance teams on-site with the new technology. “There’s a little bit of a culture change that needs to happen,” Mignano says. Manufacturers can reassign those taking manual measurements to more value-add work, such as planning and scheduling and focuses on proactive maintenance. “It allows for more time for maintenance through that efficiency gain,” Kauer says.

It also helps make operations safer. “Keeping people away from rotating equipment is always a good thing,” Mignano says. Across the board, Schaeffler sees maintenance teams shrinking for many reasons that weigh heavily on the workforce. “There used to be three to five guys in a department, now it’s one guy, maybe two, and they have no time for anything,” Mignano says. “We’re an extension of their reliability team, and they tap into our knowledge and experience in helping them maintain their assets properly.” PS



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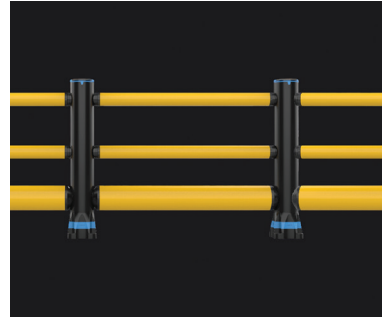
Clean-Fit Products

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Barriers Give You Impact Alerts

Increasing safety by detecting and communicating impact events as they occur, the **Safety Barrier Range** uses Total Performance technology to redistribute impact energy throughout the structure to eliminate weak points. Active Technology enables instant impact alerts, allowing teams to identify collision events immediately, investigate causes, and respond quickly.

A-SAFE



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Foundation Alloy

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Forklift Safety System

Easily identify high-risk pedestrian interactions in real time with **MākuSafe Scout**, a forklift and powered industrial vehicle safety system. The system allows forklifts to detect workers who are wearing the Ally armband and provides risk indicators based on nearby pedestrian density. Data is gathered on

pedestrian-forklift interactions and identifies where and when risk is most likely to occur.

MākuSafe

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Handheld Barcode Scanners Cut Power Use

The **Gryphon 4600 series handheld scanners** read 1D and 2D codes—including GS1 Digital Link and digital watermark—using AI-based decoding and dual-sensor optics for near-to-far performance. Options include lithium-ion or supercapacitor power with wireless charging, remote management via Datalogic Connect, healthcare-ready housings, and eco-designed construction using 70% recycled materials with reduced power consumption.



Datalogic USA, Inc.

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Flex Clamping Locators

CP741 Precision Flex Locators are quarter-turn, ball-lock locating elements for quick-change fixture applications. They deliver 0.00012 in. (0.003 mm) positioning accuracy and 674 lb (305 kg) of clamping force in a single, tool-free operation. Available in straight and tapered versions, they mount with AMWF-BU receptacles for repeatable positioning on fixture bases and plates.

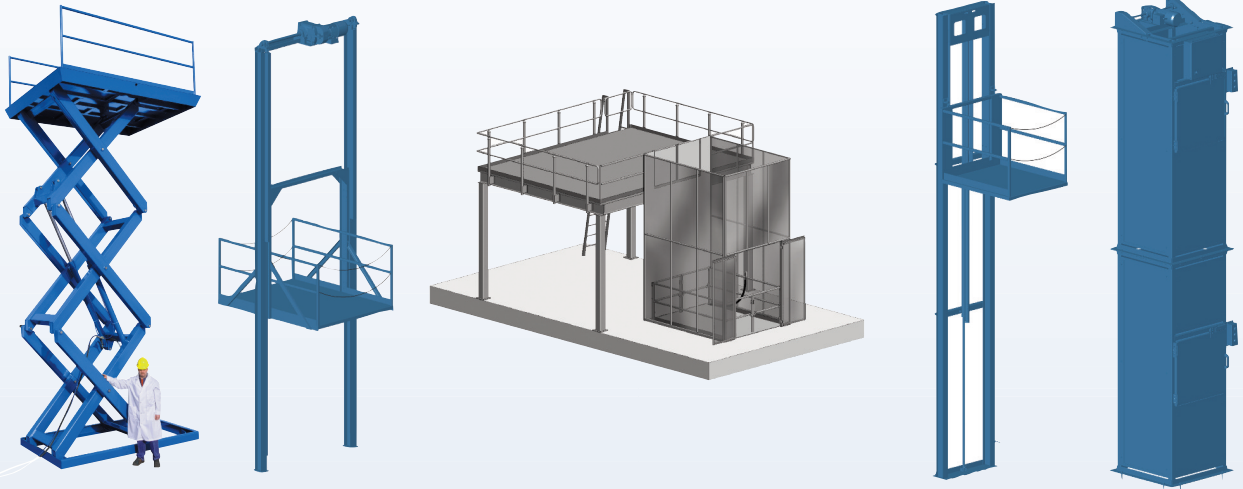
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Indeco

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Sunnen Products Company

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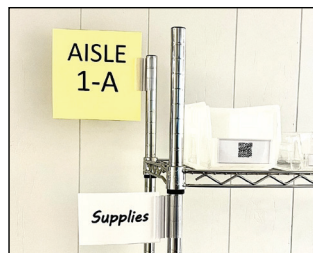
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i.Safe MOBILE GmbH

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APEM Components

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Binder USA, LP

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Uyemura

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Blackline Safety

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Peter Greven U.S. Corporation

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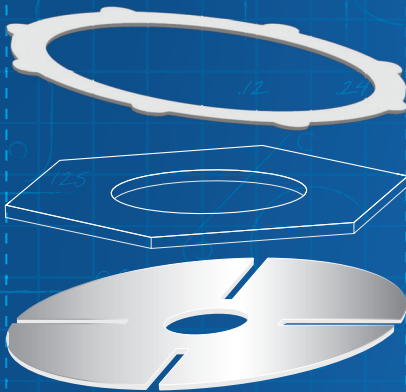
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Ask the Experts: Why do industrial motors trip on startup?

EASA electric motor experts explain why electric motors can trip during startup, and how to troubleshoot issues tied to wiring, load, or starting methods.

In this Ask the Experts feature, technical service specialists from EASA tackle topics related to electric motor application, operation, maintenance and repair. The Electrical Apparatus Service Association (EASA) is an international trade association of more than 1,700 firms in nearly 70 countries that sell and service electromechanical apparatus. For more information, visit easa.com.

This question for this issue: **What can cause an electric motor to trip its overload protection device during startup?**

Mike Howell, PE (Technical Support Specialist, EASA)

When a new AC motor trips its overload protection during startup, several factors could be at play, particularly related to starting methods and kVA code.

Starting methods. The starting method used can significantly impact the motor's performance. Common starting methods include direct-on-line (DOL), star-delta, and soft starters. DOL starters apply full voltage to the motor, resulting in high inrush currents that can cause the motor to trip if the electrical system cannot handle the surge. Star-delta starters reduce the initial voltage, but improper switching or timing can still lead to tripping. Soft starters gradually increase the voltage, minimizing inrush current; however, if these starters are not correctly configured, they can also cause issues. If the motor is inverter-fed from a variable-frequency drive (VFD), inadequate drive tuning could also prevent a successful start.

Motor kVA code. Another critical factor is the kVA code on the motor nameplate. Motors with higher kVA



Figure 1. Conveyor blockage, damaged bearings or other failed components in the driven equipment can mechanically overload a motor, causing it to trip during startup.

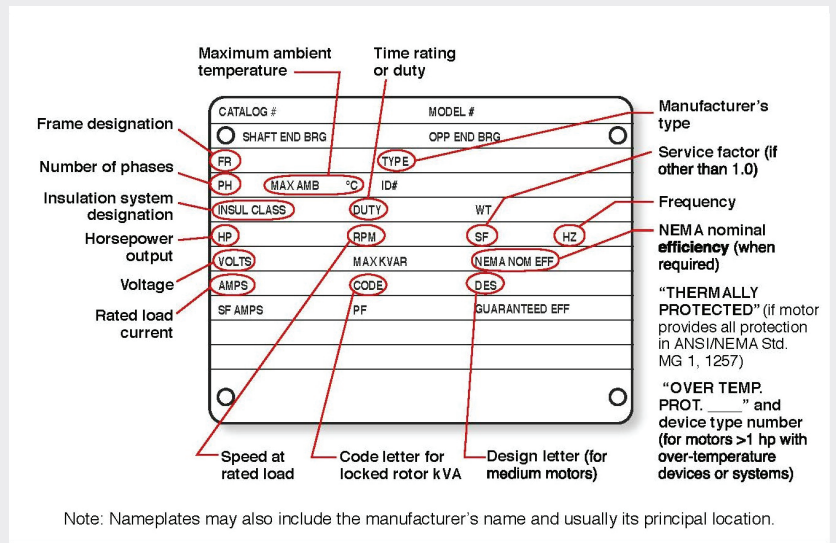


Figure 2. Besides other required data, NEMA motor nameplates typically include a kVA code, which helps determine the motor's starting current.

ratings (e.g., H vs. E) have higher starting (inrush/locked rotor) currents relative to horsepower that can exceed the capacity of the electrical system, leading to tripping. To prevent this, it is essential to ensure that the electrical system rating is adequate for the motor's kVA code.

Other issues. Besides an inadequate power supply, other potential causes for tripping on startup include incorrect wiring, faulty components, or mechanical problems such as excessive load or binding in the driven equipment (see **Figure 1**). Proper installation, configuration, and maintenance are all crucial to avoid startup tripping and ensure reliable motor operation.

Chuck Yung (Senior Technical Support Specialist, EASA)

Inrush (starting) current. If a recently replaced motor trips during starting, begin troubleshooting by comparing its nameplate KVA code letter with that of the replaced motor (see **Figure 2**). The further along a code letter is in the alphabet, the higher the motor's inrush current. For example, a motor with code letter H has a higher inrush current than one with code letter E. Higher efficiency motors typically permit more inrush current. If that's the culprit, adjust the trip settings of the starter to accommodate the increase.

NEMA kVA code letters represent kVA/hp multiplier ranges for motor starting current formulas (see NEMA Table 10.37.2 below). Starting current is referred to as locked-rotor amps (LRA) in the formulas in **Figure 3**.

Starter settings. A good second thing to check is the starter itself. Like most things electrical, settings may change over time, due to vibration or other factors.

Line voltage. Another possible cause of tripping on startup is elevated line voltage, possibly originating with the utility. For example, in some areas, nominal 480-V service can exceed 500 V. This condition may be seasonal or related to fluctuating power demands, the weather, bus stiffness, or distance from a substation.

Figure 3. NEMA Table 10.37.2

$$\text{LRA} = (\text{kVA/hp value} \times \text{Motor hp} \times 1000) / \text{Voltage} \text{ [1-phase motors]}$$

$$\text{LRA} = (\text{kVA/hp value} \times \text{Motor hp} \times 1000) / (\text{Voltage} \times 1.732) \text{ [3-phase motors]}$$

NEMA code letters for locked-rotor kVA at full voltage and rated frequency

Letter designation	kVA per horsepower*	Letter designation	kVA per horsepower*
A	0 - 3.15	L	9.0 - 10.0
B	3.15 - 3.55	M	10.0 - 11.2
C	3.55 - 4.0	N	11.2 - 12.5
D	4.0 - 4.5	P	12.5 - 14.0
E	4.5 - 5.0	R	14.0 - 16.0
F	5.0 - 5.6	S	16.0 - 18.0
G	5.6 - 6.3	T	18.0 - 20.0
H	6.3 - 7.1	U	20.0 - 22.4
J	7.1 - 8.0	V	22.4 and up
K	8.0 - 9.0		

Note: Locked kVA per horsepower range includes the lower figure up to, but not including, the higher figure. For example, 3.14 is designated by letter A and 3.15 by letter B. (Ref.: ANSI/NEMA Stds. MG 00001-2024, 10.37.2.)

Billy Higgs (Technical Support Specialist, EASA)

When a new or recently repaired motor trips the circuit, simple troubleshooting steps can often resolve the issue quickly and with minimal effort.

Simple troubleshooting steps

- First, review the commissioning documents to verify that the replacement motor is the correct hp/kW rating.
- Also, ensure that an insulation resistance test was conducted immediately before installation, confirming that the motor has not absorbed moisture. If available, review the motor vendor's full-voltage test run report to verify that both current and voltage are balanced.
- Next, make sure the motor's external connection is correct for its voltage rating with no mixed-up cables.
- Then carefully inspect the interior of the junction box to identify and reposition any leads or connections that could cause an easy-to-miss ground failure at the enclosure.

Electrical system checks

- If there are fuses in the circuit, make sure they are sized properly and test correctly.

- Verify that no single-phase, phase-loss, voltage surge or unbalanced voltage conditions have occurred.
- Check the wiring system to confirm that all damage from previous motor failures has been repaired properly. For example, have shorted line leads been corrected?

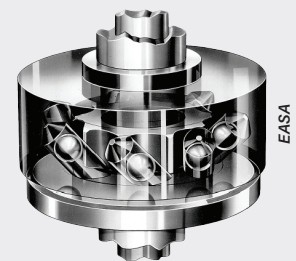


Figure 4. (above) If the motor has an anti-reversing ratchet, check its direction of rotation.

Other issues

- Determine if the driven equipment is mechanically overloading the motor. For example, if a blocked shredder or conveyor caused the previous failure, confirm that the obstruction has been removed.
- If the motor has an anti-reversing ratchet, make sure its rotation is correct (see **Figure 4**).
- Ensure that the ambient temperature does not exceed the maximum recommended on the motor nameplate. PS

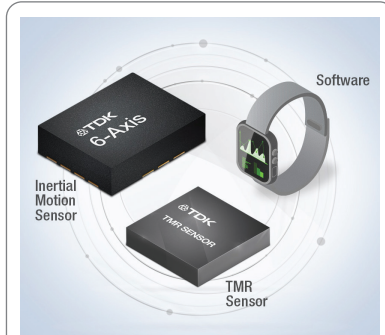


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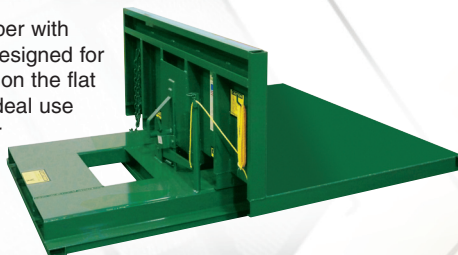
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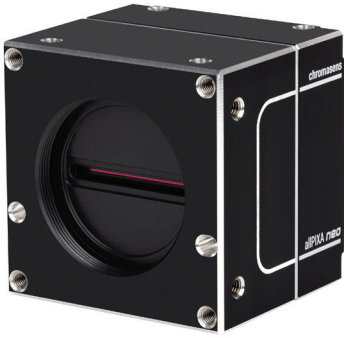
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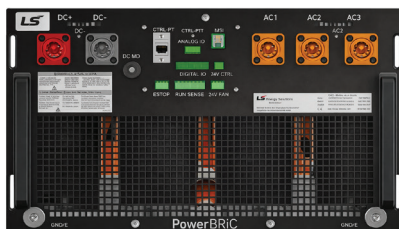
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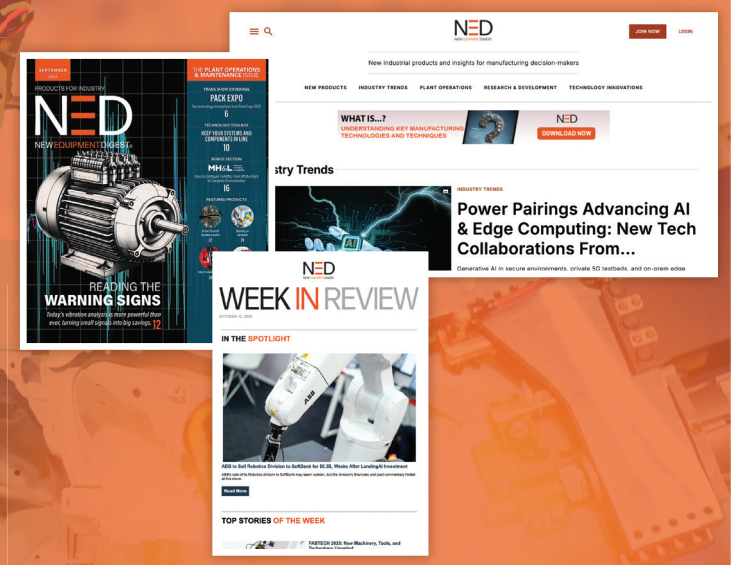
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10 Predictions That Will Redefine Logistics Technology by 2030

AI will be pervasive in logistics, but adoption will be gradual, with autonomous agents managing workflows and exceptions by 2030.

by Tara Buchler

Transportation and logistics technology will not transform in a single year—it’s an evolution. By 2030, success will be measured not by who has the newest tools, but by who can orchestrate data, AI, and people into resilient, intelligent supply chains.

1. AI Will Be Everywhere but Adoption Will Be Incremental

Prediction: Artificial intelligence will dominate forecasts, but adoption will be slower than the hype. By 2030, copilots, natural language queries and machine learning-driven forecasting will be embedded into most platforms. The next frontier is agentic AI—autonomous agents capable of orchestrating workflows across multiple systems, evolving from copilots into semi-autonomous actors managing tendering, exception handling and policy enforcement.

Takeaway: Shippers must filter hype, prioritize ROI-driven use cases, and prepare for steady layering of capabilities while positioning for AI agents to eventually operate across systems.

2. Throwaway Code Will Become Normal

Prediction: With generative AI (GenAI), low-code platforms and AI agents, enterprises will spin up

lightweight connectors and apps in days. These tools may only last 12–18 months (about 1 and a half years) but will still deliver meaningful value. “Throwaway code” will no longer be seen as a liability—it will be a competitive advantage.

Takeaway: CIOs must move from “build once, maintain forever” to “prototype fast, replace often,” supported by AI agents monitoring and repairing fragile integrations.

3. Company-Specific/Bespoke Applications Will Become Practical Again

Prediction: By 2030, AI-assisted development will make it viable for shippers to build applications designed to fit their businesses like a glove from the start, rather than endlessly customizing vendor platforms. Unlike today’s bolt-on and config-heavy customizations, these applications will combine company-specific logic with domain accelerators to deliver speed, fit and flexibility. Enterprises won’t be locked into generic workflows; they’ll shape systems around their own rules and networks.

Takeaway: Consulting firms will guide clients through this shift—deciding when to build vs. extend, designing company-specific solutions that run on AI-generated foundations, and ensuring these systems remain scalable and maintainable over time.

4. Consulting Will Shift from Implementation to Design and Orchestration

Prediction: As AI automates much of the coding and configuration work, the role of consultants is changing. The real value is no longer in technical implementation but in product-style thinking, solution design, orchestration, and change management. Consultants will need to translate operational needs into AI-enabled solutions, guide prompt engineering, and reimagine workflows across systems.

Takeaway: Firms that continue to position themselves as pure implementers will lose relevance, while those that apply their expertise toward design-driven, AI-oriented consulting will thrive.

5. Data Finally Takes Center Stage

Prediction: By 2026–2030, companies will fund continuous data governance programs rather than one-off cleansing projects. Without consistent master data quality, AI agents cannot deliver accurate or optimal outcomes.

Takeaway: Enterprises must elevate data as an asset, with ownership, continuous monitoring and investment equal to core systems.

6. Execution and Planning Will Finally Converge

Prediction: By 2030, the integration of planning and execution will become reality. Vendors are already moving toward unified platforms, and agentic AI will act as an orchestration layer, dynamically closing the loop between planning and execution. Crucially, this is about collaborative planning—it’s about building plans with execution constraints in mind. For example, a merchandise promotion must consider whether transportation capacity, lead times and warehouse throughput can realistically support it.

Takeaway: Convergence will make planning collaborative and executable. Shippers will no longer separate “what we want to do” from “what we can

actually do.” Instead, AI agents will ensure every plan reflects current execution realities, from fleet availability to port congestion. The result: fewer failed initiatives, higher promotion ROI, and a supply chain that can promise with confidence—and deliver.

7. Business Rules Must Be Digitized

Prediction: Many leading companies are already codifying business rules into systems, but by 2030, this practice will become the norm across the industry. AI cannot act on policies that live in binders, spreadsheets, or tribal knowledge. Carrier selection rules, customer service commitments, procurement standards, and compliance requirements must be digitized to enable autonomous execution at scale.

Takeaway: Policy codification is moving from early adopter practice to industry-wide necessity. Organizations that treat it as optional will fall behind in their AI journey, while those who invest now will accelerate faster adoption and better outcomes.

8. “Cloud Native” Will Fade as a Differentiator

Prediction: By 2030, cloud vs. on-premise debates will be obsolete. Outside highly regulated industries, most organizations will run on SaaS. Differentiation will move to orchestration, composability and AI agent layers.

Takeaway: Shippers should stop treating “cloud” as strategy. The real advantage lies in adaptability and agent-driven innovation.

9. Volatility Will Be the Only Constant

Prediction: Freight markets will remain volatile—with cycles of driver shortages, surges and slumps persisting. The safe prediction is not stability, but the need for flexibility.

Takeaway: Shippers should invest in nimble TMS/WMS solutions that can scale up or down, with AI agents supporting rebalancing and scenario testing in real time.

10. U.S. Sustainability Adoption Will Lag

Prediction: By 2030, U.S. shippers will still lag Europe in sustainability adoption.

Despite emissions calculators and optimization tools, cost will remain the dominant decision factor in the U.S., while regulation and customer pressure push Europe ahead.

Takeaway: Global shippers must prepare for uneven progress—compliance mandates in Europe, optional differentiation in the U.S. **MH&L**

Tara Buchler is principal of strategy with JBF Consulting, a logistics strategy advisory and technology integration firm.

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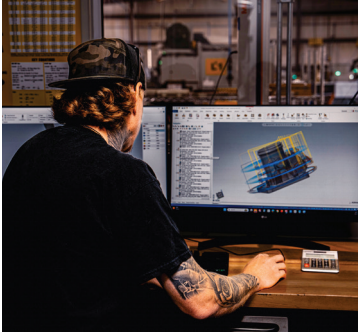


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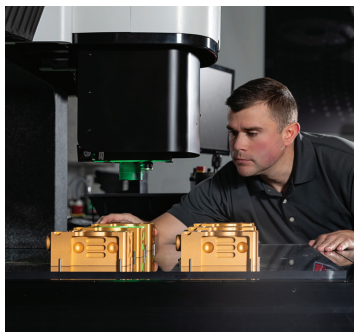
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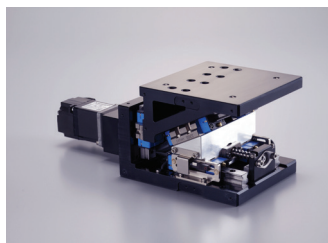
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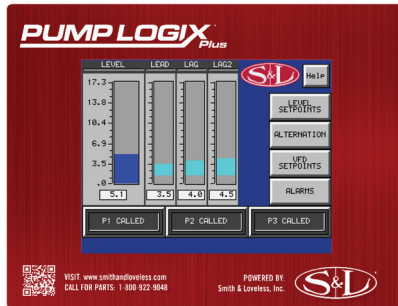
The gearboxes can be paired with most NEMA 17, 23, 34, or 56/143 servo or stepper motors. Models are compatible with a variety of integrated servo and BLDC servo motors.

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How Case Picking is Breaking Your Warehouse

by Zac Dydek

The modern warehouse runs on one critical workflow: case picking. It's the most labor-intensive and least automated process in the building, consuming nearly half of all labor hours. For decades, it's been a necessary inefficiency—essential for fulfillment, yet stubbornly manual. Despite waves of innovation elsewhere in the supply chain, case picking has barely evolved. As demand accelerates and labor pools shrink, its inefficiencies have become impossible to ignore.

More than half of the labor time in case picking—up to 55%—is spent simply traveling between picks rather than handling product. That wasted motion drives congestion, slows throughput, and inflates labor costs. In an environment where demand is rising and labor pools are shrinking, those inefficiencies can no longer be absorbed as part of doing business.

The workflow itself has hardly changed since the 1980s. Even as same-day and next-day delivery have become the norm for e-commerce logistics, case picking still relies on workers traveling long distances to locate and retrieve goods.

Warehouse management systems, voice picking and pick-to-light tools have added incremental gains, but none have solved the root issue: when workers spend more time in transit than performing value-added work, productivity, safety and morale inevitably suffer.

Orchestrating a Better Path

Warehouse operations need to move beyond the static assignments and outdated practices that go hand in hand with case picking. So, what does that look like in practice? Coordinating workflows more intelligently, a new approach to warehouse work called *orchestration* assigns and allocates tasks and resources in real time depending on the needs of the warehouse.

Rather than forcing workers to make constant micro-decisions about where to go next, orchestration streamlines those choices and keeps activity balanced across the facility. The result is less wasted travel, smoother workflows, and better use of both human effort and automated systems.

There's a reason we call it orchestration. The best analogy is to think of a conductor leading a symphony orchestra. Each instrument is capable on its own, but without coordination the result is noise. The same is true in warehouses. Technology like autonomous mobile robots (AMRs) increase efficiency within warehouses, but orchestration is how warehouse operations can make sure they work in harmony.

A common scenario plays out on the warehouse floor when demand spikes for a popular product. Without orchestration, pickers converge on the same aisles, carts jam the walkways, and robots end up idling because they don't know where they fit in. With orchestration in place, that same surge looks very different. Tasks are staggered so that workers and robots are routed to different areas, cases are staged for pickup rather than carried long distances, and traffic is smoothed out across the floor. The picker still handles the product, but the robot handles the travel, and together they keep goods moving without the bottlenecks that typically slow operations.

With the pace of order fulfillment and consumer demands both increasing, warehouses often face new bottlenecks such as damaged packaging or limited inventory. These issues can lead to slowdowns in picking or even create "warehouse traffic jams." Effective orchestration can help alleviate these challenges. True orchestration is not a one-way command system—it enables dynamic interaction between systems and workers, allowing them to manage exceptions or reassign tasks, such as picking to a closer robot if available, to minimize idle time and maintain efficiency.

Why It Matters Now

For operators concerned about ROI, the benefits of orchestration manifest quickly. One of the biggest is significantly reduced walking hours. When robots handle the long hauls and pickers are dynamically routed to the most productive zones, hours of unnecessary travel time are cut. Orchestration also keeps the pace of work steady. Instead of one corner of the warehouse getting swamped while another sits idle, tasks are spread out so the whole operation moves in rhythm.

Safety improves as well. By directing when and where people and machines move, orchestration reduces crowded aisles and lowers the risk of collisions. Smarter task assignments also ease the strain of heavy lifting and repetitive motions, giving employees a safer, more ergonomic workday. And because decisions are clearer, workers face less mental fatigue, which builds confidence and helps them stay focused.

Warehouses that have adopted this approach are already seeing the difference. Worker productivity has more than doubled in some cases, with labor needs reduced by more

than half and training times shortened thanks to simpler, equipment-free workflows. By rethinking how goods move across the floor, operations gain the resilience and flexibility to adapt as products and demand shift.

The Time for Change

Modern warehouses look nothing like they did decades ago. The way we order, shop and consume goods has changed radically since then. Supply chains are now global and consumer expectations for speed and accuracy would make a pre-turn-of-the-century warehouse manager's head spin. So why has the basic process of case picking remained largely the same? Warehouses that continue to depend on the same old routines are finding it harder to keep up.

Orchestration gives warehouses a way to modernize without starting from scratch. You've got systems in place already? Great: orchestration can help you build on that, coordinating people and machines so that they work together more efficiently to implement practical changes that solve today's problems. That's cutting down on wasted travel time and minimizing congestion, which matters in an environment where no two days ever look the same.

The pressures on warehouses are only going to increase, ranging from tariffs to volatile demand. It's not just customer expectations that have shifted; the very economics of warehouse labor have. Progress is a wonderful thing, but it comes with some harsh realities. Customer demand is never going to slow down. Operators can no longer absorb volatility by throwing people at the problem. Labor is likely to stay tight, and the volatility that has become the norm isn't going anywhere anytime soon, especially in light of surging tariffs.

By tackling today's problems with decades-old workflows, you're going to fall further behind. But by leveraging orchestration to increase efficiency, strengthen safety, and create operations that bend without breaking when conditions shift, you're positioning your organization to achieve long-term success. **MH&L**

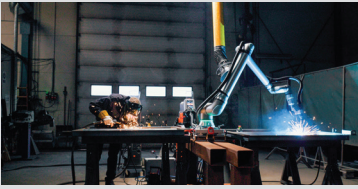
Zac Dydek is chief technical officer with Vecna Robotics, a provider of flexible material handling automation solutions.

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FROM THE COVER



Long-Reach Cobot

Offering a 69 in reach (1,750 mm) and 18 lb (8 kg) payload, the **UR8 Long collaborative robot** blends precision, stability, and compact design for installations in tight spaces or overhead systems. Compatible with PolyScope 5 and PolyScope X, it supports MotionPlus for precise coordination with linear axes, turntables, and rotary positioners.

Upgraded freedrive lets users manually guide the arm for lead-to-teach programming without layered interfaces or external tools. Weighing 30% less than the UR20, the UR8 Long delivers smoother movements, up to 30% faster cycle times, and consistent accuracy for high-throughput applications.

Universal Robots

More online: newequipment.com/55318614



Robotic Sweeper for Large Facilities

The **PUDU MT1 Max** AI-powered robotic sweeper for large-scale and complex cleaning environments uses 3D LiDAR with multisensor fusion for centimeter-level accuracy and obstacle detection up to 492 ft (150 m). With AI-based trash recognition and auto-

filtered cleaning, the sweeper reduces manual maintenance. An IP54 rating and enhanced safety features support reliable operation in challenging conditions.

Pudu Robotics US

More online: newequipment.com/55311414

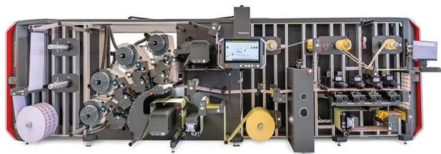
Long-Range Automatic Lubrication System

Xport Star Vario Long Range is an automatic single-point lubricator featuring electromechanical dispensing and LoRaWAN wireless connectivity for remote monitoring and control. It delivers precise lubricant discharge to bearings, gears, chains, and motors, supporting cartridge sizes from 60 to 500 cc and operating in temperatures from -40 to 140°F (-40 to 60°C).



Lubrication Engineers

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RFID Converting Machine

SpeedLiner X is an RFID converting machine that increases throughput by supporting up to four tracks for simultaneous production. It processes 4 x 1,500 inlays/min with multiple attaching units. The

machine includes automated get-ready, sync, and register functions for simplified operation. Quick changeovers, straightforward maintenance, and an upgrade-friendly modular design ensure scalability and long-term usability. Automated inlay reel changes and automated doctoring reduce downtime and eliminate manual interruptions.

BW Papersystems

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Robotic AI Platform Supports Real-Time Vision and Sensor Processing

The **EAI-1351 robotic AI platform** for industrial-edge workloads delivers up to 2,070 FP4 TFLOPS in a 130 W envelope. Built on NVIDIA Jetson Thor and Blackwell GPUs, it supports autonomous robots, real-time sensor fusion, multimodal AI, and LLM processing. It includes high-speed networking, GMSL2 camera inputs, USB and digital I/O, M.2 expansion for cloud connectivity, and runs NVIDIA Isaac, Metropolis, and Holoscan software for edge AI applications.



Lanner Electronics

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Rotating Double Swivel Lifting Connector

The **Cromox Rotating Double Swivel (CWHHD)** is a stainless-steel lifting connector with dual swivel points that allow loads to rotate safely during lifting, reducing torsion and improving handling. Made from Grade 60 AISI 316L Duplex stainless steel, it offers 0.63 t working load limit and suits cleanroom, food and beverage, pharmaceutical, offshore, and other demanding environments.

Cromox

More online: newequipment.com/55342295



Secure, Long-Distance Facility Communication

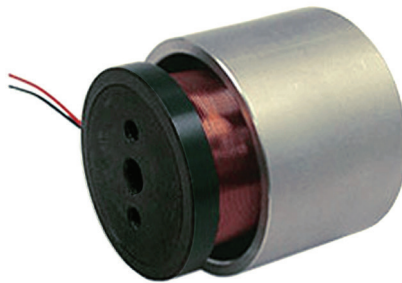
Designed for intralogistics and industrial automation applications, **NxBB hardwired data-over-power solution** transmits data over the same conductors that supply electrical power to equipment. Enabling secure, interference-free data transmission without separate cabling over long distances within a facility, it's suited for industrial settings with high electromagnetic interference, where wireless or optical technologies may be unstable.

Conductix-Wampfler

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Linear Voice Coil Motor

VCM-051-032-06 Linear Voice Coil Motor is a compact moving coil DC servo motor with a 0.625 in stroke and a larger radial air gap to reduce performance issues caused by tilting or misalignment. It measures 2 in diameter with 9.2 lb peak force and 2.9 lb continuous force output for precision handling applications.

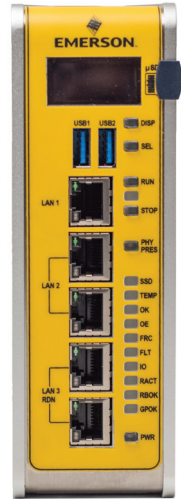


Moticon

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Safety Controller Simplifies SIL2 Compliance

The **PACSystems RX3i CPS400 Safety Controller** enables SIL2 strategies for applications such as fire & gas, burner management, and emergency shutdown systems. With 2,000 I/O points, 64MB memory, and a scalable architecture, it supports complex, mission-critical projects. Built-in protocols, including OPC UA, EGD, and Modbus TCP, provide operational visibility, while secure-by-design features and certified templates streamline system certification.



Emerson Electric Co.

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Silicone Ignition Boots

Silicone Ignition Boots for cars, trucks, RVs, outdoor power equipment, and cooking and specialty appliances provide electrical insulation protection for high-voltage cables. Available in multiple heat ranges, styles, and colors, the boots are suitable for 7 and 8-mm cables and include a 115° design with heat resistance up to 600°F (316°C).

ETCO, Inc.

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Push-Pull Aluminum Welding System

Warrior Edge Aluminum System is a push-pull MIG welding platform that features the Warrior Edge 500 DX power source, Robust-Feed Edge DX feeder, and PP 350w water-cooled MIG gun. Craft Mode and synergic WeldModes improve heat control, reduce spatter, deliver smoother TIG-like bead quality, and provide consistent wire feeding, optimized arc stability, and versatile WeldMode options.

ESAB

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Skidding System for 400T

A modular system for moving loads up to 400T, the **LHS4-2 skidding system** features tool-free hand twist track coupling and longer 56 in (143 cm) tracks for faster assembly. PTFE-coated skid pads reduce friction, while split flow pump power enables synchronous, bi-directional beam movement.

Energac



More online: newequipment.com/55360385

Yard Operations Are Suffering from Technology Fatigue

Modern yard management requires standardization, disciplined execution, and cross-site orchestration to unlock full supply chain potential.

by Rafael Granato

For decades, yards have been plagued by recurring headaches. Trucks stack up at gates. Trailers disappear into corners. Dock doors sit idle while drivers fume in detention. Spotters burn fuel circling the yard without clear direction.

Each pain point typically triggers a quick fix: add another radio, buy another trailer, authorize another overtime shift. More recently, the “pills” have changed labels. Instead of clipboards and extra labor, fixes now include gate sensors, scheduling apps, or tracking tools that promise visibility. Yet the headaches persist.

Treat the Causes, Not the Symptoms

Many enterprises fall into the trap of treating symptoms rather than root causes. They deploy a visibility tool and expect congestion to vanish. They add a scheduling app and assume dwell times will shrink. They install cameras at the gate, hoping data alone will eliminate inefficiency.

But visibility in isolation does not create flow. A dock scheduling app disconnected from live yard data simply shifts bottlenecks elsewhere. A trailer tracking solution does not resolve communication breakdowns between warehouse teams and drivers.

The result is technology fatigue: a cycle of investment in disconnected tools that never add up to transformative value. The yard remains just as chaotic, only now with more screens, alerts and dashboards.

This perspective aligns with the work of Lora Cecere, founder of consulting firm Supply Chain Insights, who has consistently warned that technology-first deployments fail when they are layered onto broken processes. Her research emphasizes that lasting improvement starts with disciplined operating models and process clarity, not tools alone.

From Management to Optimization

The distinction between management and optimization is critical. Traditional yard management, whether manual or supported by legacy yard management systems (YMS), focuses on daily execution at a single site. That may address immediate needs, but it does not create standardization, scalability, or network-wide resilience.

Optimization requires a shift in mindset. Organizations must stop viewing the yard as a local function and instead treat it as a strategic component of the broader supply chain network. That means:

- Standard operating procedures across sites.
- Consistent performance metrics and accountability.
- Integrated planning that connects the yard with transportation, warehouse and procurement functions.

This transition mirrors what happened in warehousing and transportation decades ago, when companies moved beyond standalone systems to integrated platforms. The yard is simply the last frontier.



Toward a Yard Operating System

The alternative to piecemeal fixes is a yard operating system (YOS): an integrated framework that unifies people, processes, assets and technology into a single orchestrated flow. A YOS is designed to move the yard from tactical firefighting to strategic value creation. It does so by:

- Turning visibility into orchestration: Data becomes decision-grade, driving real-time actions rather than static reports.
- Automating manual processes: Gate check-ins, dock assignments, and task allocation happen seamlessly and consistently.
- Converting congestion into throughput: Pre-registration, mobile driver apps and digital workflows reduce dwell times and paperwork.
- Optimizing spotter performance: Real-time tasking reduces empty runs, wasted fuel and unnecessary labor.
- Enhancing safety: Standardized protocols and automated alerts help prevent incidents.



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Why This Matters Now

The yard has long been the forgotten link in supply chain modernization. Transportation and warehouse functions have benefited from decades of investment, while the yard has lagged. Today's pressures are forcing that to change:

- Labor shortages are making overtime and manual workarounds unsustainable.
- Sustainability mandates are raising the cost of wasted fuel and emissions.
- Rising customer expectations demand more reliable service and fewer delays.
- Economic uncertainty is pushing organizations to extract more efficiency from their networks.

Analysts increasingly describe the yard as the last frontier of supply chain optimization. It is where inefficiencies accumulate and where the opportunity for ROI is among the highest.

Companies that continue to rely on fragmented fixes risk falling behind on cost, compliance and service reliability.

From Pain Management to Systemic Health

Quick fixes provide temporary relief, but they do not address chronic conditions. For the yard to operate reliably and profitably, it must be treated as a system.

That requires:

- Consistency of process
- Disciplined execution
- Clear accountability
- Orchestration across all sites.

Reinvention of this kind moves the yard beyond pain management and establishes the foundation for long-term operational health.

The choice is simple: Keep reaching for another pill or invest in systemic health. The companies that choose the latter will set the standard for enterprise supply chain performance in the decade ahead. **MH&L**

Rafael Granato is vice president of marketing with YMX Logistics, a provider of end-to-end outsourced yard logistics.

- Unifying communication: Drivers, yard teams and warehouse staff operate from a shared playbook.
 - Strengthening labor efficiency: Automation and training enable leaner teams to handle higher volumes without compromising service or safety.
- Let's take a closer look at why this matters.

The Business Case for Systemic Solutions

The costs of symptomatic fixes are easy to underestimate. Over time, they add up quickly through detention penalties, wasted fuel, lost salvage loads and strained carrier relationships. These inefficiencies erode profitability, damage service levels and strain already-tight labor pools.

Systemic reinvention, by contrast, produces measurable ROI. Enterprises that have embraced an operating system approach report:

- Double-digit fleet reductions through improved asset utilization.
- Significant cuts in detention costs from tighter gate and dock coordination.

- Hundreds of thousands of dollars in annual savings through better visibility and labor alignment.
- Sustainability gains from electrification, with each electric yard truck capable of saving tens of thousands of gallons of diesel and eliminating dozens of tons of carbon dioxide annually.

This pattern mirrors what McKinsey & Company has described in its article "A New Operating Model for a New World." Rather than relying on isolated tools or localized fixes, McKinsey argues that meaningful performance gains come from redesigning how work flows across the organization. When operating models align people, processes and technology end to end, execution improves not incrementally, but structurally. The lesson for yard operations is clear: Without a coherent operating model, even the best technology will struggle to deliver lasting results.

These gains are not hypothetical. They are being realized today by organizations willing to stop treating the yard as a side concern and start treating it as a strategic lever.



Soft-Close Hinge

A soft-close hinge for industrial panels and lids, the **EC Damping Hinge** uses an embedded torque engine that applies resistance to provide controlled, smooth movement, reducing the risk of injury or equipment damage when heavy doors, lids, or access panels slam shut. Its profile is similar to free-swinging surface-mount hinges.

Southco, Inc.

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Mid-Size Electric Cushion Forklift

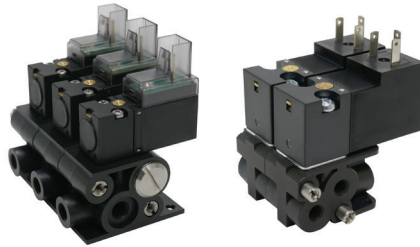
Built for durable performance, the **FBC20Q-FBC40Q Series** of electric cushion forklifts delivers 4,000 to 8,000 lb (1,800 to 3,600 kg) lift capacity and up to 312 in (8 m) lift height. The series supports tight-aisle maneuverability, reaches 12.5 mph (20 kph) unloaded travel speed, and features passive sway control plus simplified battery maintenance for multishift operation.

Mitsubishi Forklift Trucks

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Series 1090 and 1590 Stackable Solenoid Valves are compact pneumatic control platforms for precise compressed air switching. The 10 mm 1090 supports up to 50 million cycles in clean, dry air. The 15 mm 1590 offers higher flow capacity, orifice options up to 1.5 mm, and 145 psi, plus IP65 protection. Both use modular stackable designs for simplified manifold expansion.



Spartan Scientific

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Spray Mop for Easy Cleaning

Designed for industrial environments, **Mopster 2.0** is a bucketless spray mop with a built-in cleaning solution that snaps in for immediate use. Precise dosing reduces waste and cross-contamination, while a slim 4-in profile reaches tight spaces. The lightweight system features controlled dispensing, a debris-resistant mop head, microfiber cleaner compatibility, and 18 and 24-in pad options.

Hospesco Brands Group

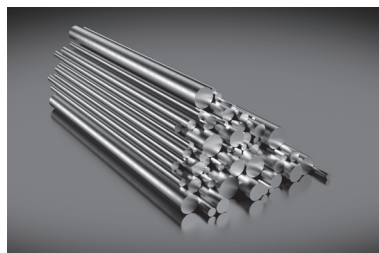
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Solid Carbide Drill Offers Extended Tool Life

Drivox-tec IKON DD170 Supreme is a solid carbide drill designed for steel and cast-iron applications. Featuring a full radial margin and 12 internal coolant grooves, it delivers smooth, vibration-free cutting and improved cooling for longer tool life. Its variable clearance tip eliminates pilot drilling up to 12 x D_c, making it ideal for demanding holemaking.

Walter USA, LLC

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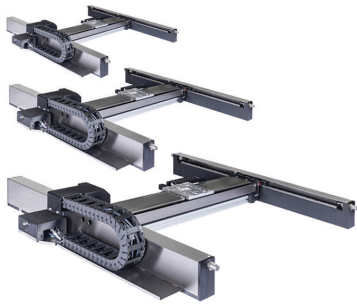


Stainless Steels Extend Tool Life by 50%

UGIMA-X is a series of stainless steels designed to improve machining performance through metallurgical enhancements that reduce chip formation and tool wear. Available in multiple grades, the materials increase productivity by up to 30% and extend tool life by up to 50%. The line offers improved repeatability and dimensional accuracy, contributing to more stable, cost-efficient production processes.

Swiss Steel Group

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Modular Precision XY Gantry System

Designed for high-throughput automation and inspection, the **X-365 Precision XY Gantry System** delivers configurable travel ranges from 8 x 8 in to 24 x 31.5 in (200 x 200 mm to 600 x 800 mm). Nanometer-class encoder feedback, high load capacity, and EtherCAT-compatible motion control support precise, coordinated multiaxis positioning in semiconductor, laser processing, and advanced manufacturing applications.

PI (Physik Instrumente) USA

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Tank-Mounted Industrial Air Compressors

Bobcat's **tank-mounted rotary-screw air compressors** for light to medium-duty use support 24/7 operation and include **SA10TD, SA10T, SA15TD, SA15T, SA20TD, and SA20T** models. Each features a 120-gal tank with optional dryer and prefilter, standard 125 psi (100 to 175 psi options), and tri-voltage plug-and-play capability to connect up to two additional machines.



Bobcat Company

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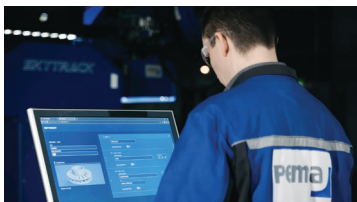
Transparent Recycled Polyamide for Eyewear

TROGAMID R is a high-performance, crystal-clear polyamide created from recycled eyewear production scrap. Designed for premium frames and lenses, it combines durability, optical clarity, and sustainability, enabling circular plastic use. The material supports high-end eyewear manufacturing while maintaining quality, and is already featured in designer collections such as Nylo Zero Milano and Roma series.



Evonik

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Streamline Robot Welding Workflows

PEMA CellControl is a software platform for PEMA robot stations, providing workflow management through a browser-based touch-screen interface. Features include drag-and-drop job queues for prioritizing welding tasks, a product database for recurring workpieces,

built-in live job monitoring and robot statuses, and outage alarms. Allowing oversight of multiple robot cells from one system, the software combines database management, live status tracking, and control tools to reduce downtime and maximize production hours.

Pemamek Oy

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Taps for Improved Thread Quality

CoroTap 100 with -PM geometry is a family of optimized straight flute cut taps for ISO P materials. The high-performance chip-breaking design improves chip control and thread quality, reducing production interruptions and eliminating manual chip removal. The tap range includes multiple geometries tailored for ISO P, K, N, and H materials. Options include straight flute taps, spiral point taps, spiral flute taps, and forming taps to address a wide variety of threading needs.



Sandvik Coromant

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Strobe Bar Light for Precise Machine Vision

With 2,500,000 lux at 8 in (200 mm) and an 800 ns rise time, the **HPS Bar Light** synchronizes with camera exposure and conveyor speeds to minimize motion blur. It integrates strobe electronics and can be used for scanning tunnels, sorting, dimensional inspection, and more. The optional 250MM Angle Changer can control the beam, attaching directly to the light.

TPL Vision

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Building the Warehouse of the Future: Four Stages Toward Adaptability

Warehouses that prioritize visibility, smarter decision-making and flexibility will be in the best position to keep up.

by Andrei Danescu



As supply chains continue to grow in complexity, the warehouse has emerged as both a challenge and an opportunity. Global disruptions, shifting customer demands and labor shortages have exposed the limits of traditional static operations, leaving organizations searching for new ways to create more intelligent and responsive environments. Companies like Amazon are increasingly turning to automation and robotics, with analysts at Morgan Stanley predicting that automation could save \$10 billion annually by 2030.

More companies are rethinking how their warehouses operate, especially in the face of ongoing change. Adaptive warehouses, designed to track what's happening in real time and respond on the fly, are becoming a practical answer to that need. Adaptability is becoming a must-have in warehouse operations. By combining automation, AI, and a steady stream of data, companies can cut down on errors, improve efficiency and make better decisions across the board.

This article outlines the four steps—the blind, observable, intelligent and adaptive warehouse—in that journey and how each stage supports greater operational performance and supply chain resilience.

1. Understanding the Blind Warehouse

Many traditional warehouses still operate with limited real-time visibility. Inventory is tracked using paper-based systems or spreadsheets, and stock counts are updated only during periodic audits. This leads to frequent errors such as misplaced items, stockouts and overstocking. With no automated data gathering or live insights, decisions are slow, reactive and prone to human error.

While these warehouses benefit from lower upfront technology costs and minimal training requirements, they are increasingly vulnerable to inefficiencies, disruptions and lost revenue. As customer expectations rise, the drawbacks of manual, disconnected processes are becoming more costly than the technologies they seek to avoid.

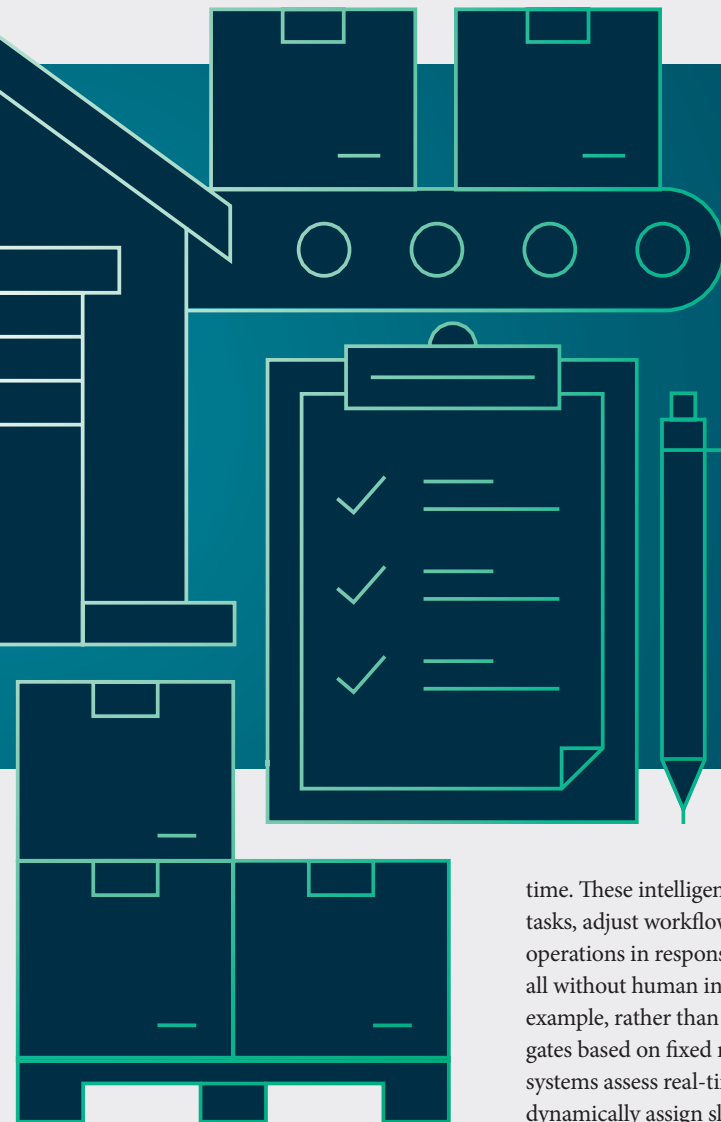
2. Improving Visibility with the Observable Warehouse

The first step toward modernization is visibility. In the observable warehouse, real-time tracking tools such as autonomous inventory systems, barcodes and warehouse management systems replace manual processes and provide more accurate views of stock and space. A study done by Auburn University's RFID Lab found RFID tags, specifically, enable an increase in inventory accuracy from 63% to 95%.

This is just one piece of the broader toolkit; with autonomous data-gathering systems, warehouses are able to reach a new level of visibility and data capture at scale. However, while data collection improves dramatically, insight generation and decision-making still rely on humans. These systems operate in silos, requiring teams to interpret data and take action manually. As a result, decision-making remains reactive, though more informed.

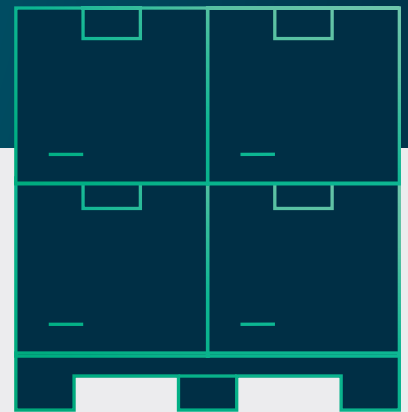
3. Driving Decisions with the Intelligent Warehouse

In the intelligent warehouse, the introduction of artificial intelligence and machine learning transforms data into proactive insights. AI models forecast demand, flag anomalies and recommend resource allocation strategies, helping teams act faster and



“According to a report by McKinsey & Company, applying AI-driven forecasting to supply chain management can reduce errors by 20% to 50%, underscoring the potential for adaptive systems to significantly improve responsiveness and accuracy.”

*cnythzl
DigitalVision Vectors
Getty Images*



more accurately. This stage introduces basic automation of repetitive tasks like inventory tracking and slotting, freeing employees for higher-value activities.

While human oversight is still required to validate insights and decisions, the process becomes far more agile and scalable. Forecasting errors are reduced, costs are better controlled, and warehouse operations become more responsive to market shifts.

4. Reaching Full Autonomy with the Adaptive Warehouse

The adaptive warehouse represents the final stage: a self-optimizing environment where AI agents act autonomously to manage and improve operations in real

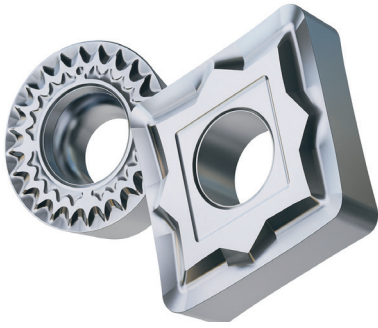
time. These intelligent agents can assign tasks, adjust workflows and even reroute operations in response to disruptions, all without human intervention. For example, rather than allocating truck gates based on fixed rules, adaptive systems assess real-time conditions and dynamically assign slots to reduce dwell time. Inventory slotting strategies are updated automatically based on live demand and predicted patterns, and worker schedules can be adjusted in real time to meet changing needs.

According to a report by McKinsey & Company, applying AI-driven forecasting to supply chain management can reduce errors by 20% to 50%, underscoring the potential for adaptive systems to significantly improve responsiveness and accuracy. This model not only boosts efficiency and accuracy, but also supports workforce transformation. As manual tasks are automated, employees shift into supervisory or innovation-focused roles. Additionally, adaptive systems contribute to sustainability by minimizing waste, energy use and resource consumption.

Why Make the Move to an Adaptive Warehouse

As warehousing demands continue to shift, the facilities that prioritize visibility, smarter decision-making and flexibility will be in the best position to keep up. Tools like real-time data and AI-driven automation are not just about keeping pace, they are becoming essential for staying competitive and meeting new standards for accuracy, speed and resilience. By making the switch to an adaptive warehouse, companies can transform the ways in which they operate and deliver value, ensuring they stay ahead in the dynamic warehouse automation market. **MH&L**

Andrei Danescu is CEO and co-founder of Dexory, a provider of real-time warehouse visibility and automation solutions.



Turning Insert for Superalloys

The **TS0501** finishing-grade turning insert is intended for lights-out machining and aerospace and energy production. The grade uses a Duratomic coating and edge geometry for high-precision finishing of heat-resistant superalloys. It offers wear resistance, thermal stability, and can be integrated into existing toolholders. It is offered in multiple geometries and chipbreakers.

Seco Tools, LLC

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FROM THE COVER

UV Laser Systems for Fast Microprocessing

Part of a new line of UV lasers, the **Linear UV Laser System** and **Class 1 UV Laser Workstations** offer ultra-high-precision



microprocessing of delicate, heat-sensitive materials, including plastics, glass, ceramics, metals, printed circuit boards, and coated surfaces.

Supporting pulse durations from nanoseconds to femtoseconds, both systems produce minimal heat-affected zones, have a power range of 1 to 55 W, and accommodate marking, cutting, and cleaning applications. The Linear UV Laser System offers high marking speeds, on-the-fly operation, and flexibility. The workstations maintain certified Class 1 safety standards and can be integrated into inline, automated production systems for seamless workflows.

Laserax

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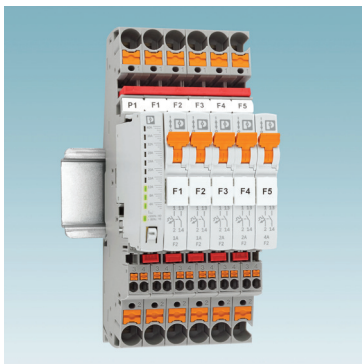
Pipe Milling and Rehabilitation Tool

FlexShaft KM-1004 Milling Machine is a high-speed, heavy-duty system for drain cleaning and pipe milling up to 80 ft (24.4 m). Designed for 1.25 to 4 in (32 to 102 mm) pipes, it supports 1/4 and 5/16 in cables and delivers wall-to-wall cleaning. It removes scale, corrosion, grease, roots, and obstructions for pipe rehabilitation and restoration applications.

RIDGID



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Phoenix Contact

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National Pump Company



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Durabook Americas, Inc.

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Winter Work Gear for Arctic Blasts

Ergodyne's Winter Work Gear line is a collection of PPE for workers in cold conditions. The **Winter Warming Kit** offers warming patches, a hi-vis beanie, wool socks, and coated work gloves. The **Winter Skull Cap with Rechargeable LED Light thermal beanie** gives warmth with hands-free illumination. The **Winter Bump Cap Beanie** is a thermal beanie with a removable bump cap. The **Reflective Balaclava** provides full face and neck protection with high visibility.

Ergodyne

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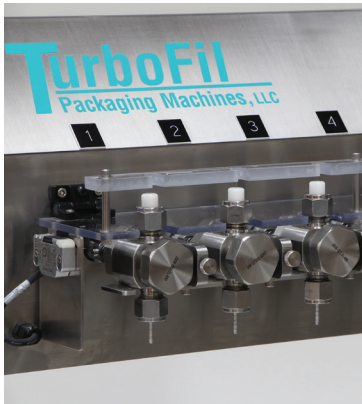


Pallet Matching Tech for Picking Efficiency

Best Pallet Matching technology is a warehouse assignment system that automatically determines which two or three pallets are the optimal match for each worker's picking tasks. It analyzes incoming orders with varying priorities and continually adjusts pallet assignments for accuracy and efficiency, assigning pallets based on the most effective combinations for productivity, rather than just one criterion.

Lucas Systems, Inc.

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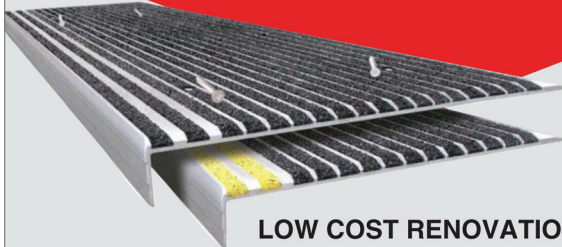
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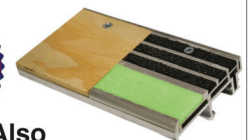
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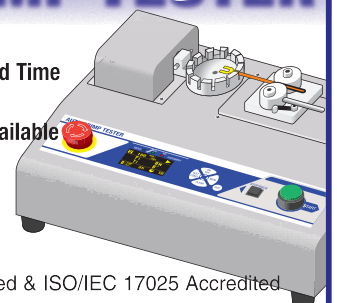


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Trek Into Reliability

This year marks the 60th anniversary of Star Trek, a show that holds a special place in the heart of many engineers and technicians out there. If you're holding this magazine, chances are good that you've seen one or more episodes and movies, perhaps multiple times.

One of the things I find amazing about the show, aside from its sheer longevity, is the wide variety of equipment it introduced. In fact, the show has inspired scientists and engineers to develop many of these technologies several hundred years ahead of schedule. Need a handheld communicator device? Look no further than your smartphone, which also includes a voice activated computer and basic medical apps to monitor your health. Other real-life examples include tablet computers and 3D printers, and technologies like Google Translate bring us closer every day to practical, portable universal translators.

This year is also my 12th as chief editor of Plant Services, a publication with a special focus on industrial asset management. So when I watch Star Trek, I'm also watching for ways that things break down on the Starship Enterprise. And they break down a lot, especially the transporter, the warp engines, and the holodecks (i.e., advanced virtual reality chambers). I suppose if the crew is not actively encountering new cultures or exploring odd space phenomena, then something has to go wrong with the ship in order to get the story going.

It's this break-fix dynamic that reminds me of a common challenge in maintenance and reliability, that of work teams trying to break free of a reactive mindset. Everyone recognizes that a reliable plant is a safe plant, and that the best kind of operations are those with no surprises, where the equipment runs as expected.

Unfortunately, there's also a reason why Star Trek never just shows an hour of the Enterprise flying through space, all engines nominal and all crew well-rested. There's a certain excitement in looking mechanical catastrophe in the face and overcoming it. The war stories that maintenance engineers tell over morning coffee and share at professional events are never quiet, problem-free stories.

This month's cover story focuses on one of those stories, the case of the plant crew at Baxter Healthcare in North Carolina that lived through Hurricane Helene in 2024. The recovery operation was long and tedious, but it was made easier thanks to all of the reliability best practices already implemented throughout the plant.

It's human nature to be proud of overcoming emergencies, and crises will always be with us. Ironically, the most boring story is also the best kind – no story at all, where equipment and teams run reliably. Here's to leaving most of the exciting stories of equipment breakdowns to Star Trek, and to proactively reducing them in our own lives.

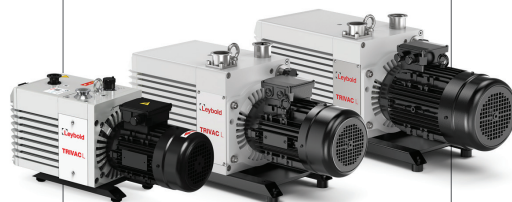
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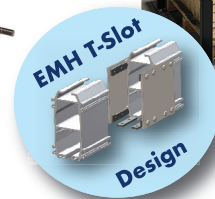
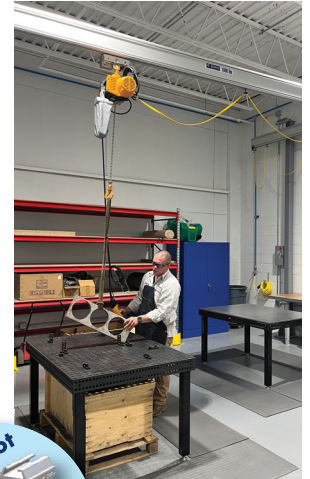
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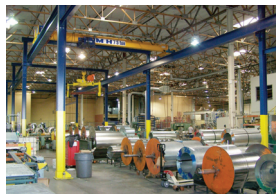
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