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JUNE
2025

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2025 Reliability of Everything™
CULTURE IMPROVEMENT AWARD

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Motion

Chris Pacer is Motion's Senior Vice President, Group Executive – Eastern US. He has over 30 years of experience in the industry and makes customer satisfaction his top priority.

WHY MOTION?

One of the most important skills I've learned over the years is the "art of listening." Listening with intent and focusing on the conversation's real core is the key to unlocking new opportunities and building trust. When we truly listen upfront, we can respond in impactful, innovative ways that help drive tangible results.

At Motion, listening to customers is at the very heart of what we do. It's how we build trust, deliver value and provide unmatched support. And with a large network of local representatives, we ensure that we're always there for our customers whenever and wherever they need us.

So why do customers choose Motion?

FIRST, WE LISTEN.

Over the years, I've been fortunate to have engaging conversations with many different customers. No matter the industry, the priorities are often the same: keeping operations efficient and lowering the total cost of ownership. But solutions aren't one-size-fits-all; every customer and every operation is unique.

Motion's expertise runs deep. Shown, a team works on an axial flow fan solution on-site.

That's why we start by listening and *then* asking qualifying questions that help us uncover pain points and better understand their top priorities. This determines the right solutions to let our customers meet the moment.

SECOND, WE ACT.

At Motion, we pride ourselves on being responsive, whether it's a routine inquiry or an emergency. So when you call us about a gearbox failure at 2 a.m., we're there. Our local teams are available 24/7/365 to help troubleshoot the issue and get you running again ASAP. But responsiveness isn't just about reacting to problems; it's also about anticipating and eliminating them before downtime occurs.

THIRD, WE DELIVER INNOVATIVE SOLUTIONS.

Our customers face unique challenges, and our teams solve them with innovative products and services. Whether upgrading a lubrication system, implementing IoT-enabled condition monitoring, or splicing a conveyor belt with precision, we get it done with expertise and ingenuity. I've always admired Motion's ability to be innovative and deliver results that exceed customer expectations. Our teams often help them achieve outcomes they once thought impossible.

Listening is where it all begins, but it's what we do next that makes the difference. Whether it's a local representative providing on-site support or leaning into our specialty shops, services or solutions groups, our customers count on us for fast, reliable service backed by our industry-leading expertise.

At Motion, we're here to help you succeed – every step of the journey. With our expansive network, there is a Motion location near you. To find out more, visit **motion.com**. Δ

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How Food-Grade Lubrication Certification Is Shaping Industry Standards

Why the new FPL badge was built and what it means for food-grade lubrication

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COVER STORY

2025 Reliability of Everything™ Culture Improvement Award

We salute this year's winner:
Perdue Farms, Concord, NC

Cover image: Michael Annino + Shutterstock-AI

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THOMAS WILK
From the Editor

THE AWARD GOES TO...

What would you say is more difficult – building a strong reliability program at your facility, or maintaining it over the next 5+ years?

Admittedly this is sort of a trick question, as both are difficult to achieve. Building a reliability program from scratch involves a combination of training, PM improvement, and technology selection that is centered on keeping critical assets from failing unexpectedly.

However, the skills required to build a reliability program are very different from the skills required to continue that success in the face of employee churn, leadership turnover, and unpredictable changes in the business landscape. Also, without a champion who can communicate the value of the program to all levels of the organization, the program risks slowly fading away.

This is why, starting this year, Plant Services is very proud to partner with the University of Tennessee's Reliability and Maintainability Center on the Reliability of Everything™ Culture Improvement Awards. These awards recognize people from real-world plant environments who have worked hard to make a difference in improving culture and operations, maximizing the use of asset data and engaging workers at all levels.

Awards are given in up to three different categories (Culture Start-Up, Sustaining Culture, and Culture Innovation) and are based on three criteria:

- **measured improvement in R&M metrics (25%)**
- **measured improvement in culture and impact on R&M/operations (50%)**
- **documented journey/process used with lessons learned (25%).**

Dr. Klaus Blache announced this new partnership at this year's MARCON event, both as a continuation of the good work begun in 2019 by Efficient Plant magazine and the RMC, and as a celebration of winners past, present, and future. The cover story for this issue features the sole 2025 winner, Perdue Farms in Concord, NC in the category Best Sustaining Culture.

Everyone here at Plant Services is thrilled to be part of this celebration of reliability culture and maintenance program success. More importantly, nominations are currently open for the 2026 Reliability of Everything™ Culture Improvement Awards!

Apply at: https://rmc.utk.edu/the-reliability-of-everything-culture-improvement-awards-submission-form-awards/ Δ

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JOE KUHN

Leadership in Action

FOCUS YOUR JOURNEY ON THE FEW

And don't try to fix the whole system at once

A few years ago, I visited a plant in Texas. The plant leadership was several months into their reliability journey having accepted best practices.

The maintenance manager was very intelligent and passionate about the reliability roadmap created in partnership with a consultant. New processes were created and workers were trained for the following: planning and scheduling, job kitting, inventory management, rebuilds, preventative maintenance, predictive maintenance, problem solving, storeroom, overhauls, precision maintenance, planned work execution, unplanned work execution, lubrication, and governance of the whole reliability system.

However, early enthusiasm was beginning to wane. Unplanned equipment downtime continued at a consistent pace. Maintenance costs continued to rise. Everyone was doing more work with no recognizable impact. Doubt was aggressively verbalized in meetings as well as on the shop floor with operators and technicians.

During my visit, I attended the reliability lead team meeting. This monthly discussion was attended by the plant's leadership team including these managers: plant, production, maintenance, safety, human relations, engineering, continuous improvement and finance. The meeting was led by the maintenance manager who gave a status update by showing 64 PowerPoint slides of the change efforts underway for the reliability initiative. No questions were asked. At slide 35, the one-hour meeting ended.

In my one-on-one conversations with leadership, I heard the following reasons repeated for why results did not follow the deployment of these best practices: Perhaps our plant is unique. Best practices may not work here because of our product, processes, and culture. Sound familiar?

Joe Kuhn, CMRP, former plant manager, engineer, and global reliability consultant, is now president of Lean Driven Reliability LLC. His YouTube Channel offers content on creating a reliability culture as well as financial independence to help you retire early. Contact Joe Kuhn at *joekuhn1964@gmail.com*.

CULTURE CHANGE REQUIRES FOCUS

What advice did I provide?
One word: focus.
Focus is saying "no" to a lot of things. There will be critics; there will be different agendas; corporate will get upset you are not working on their pet projects. Do not give up your power. This is where the plant manager earns his pay. The plant manager must have the ability to align and focus resources to make significant business impact all while preventing distractions from other organizations (aka Corporate).

Furthermore, you have undoubtedly heard the phrase, "If everything is important, nothing is important." This holds true for reliability best practice culture change. Being excellent in everything is a panacea. You cannot have 64 priorities; not even 10. Best case, you will make glacial progress across a massive front. The lack of tangible results will cast the reliability effort on top of the pile of good ideas that did not work at your plant.

Instead, leaders need to answer this question: What three changes can we make in our plant, that if we all aggressively drive for excellence over the next 12 months, will make a dramatic impact on our business? Examples of small changes that will drive excellence over the next 12 months:

- **Preventative maintenance: completion percentage is 25% per month.**
- **Predictive maintenance (PdM): currently just 2% of our technician workhours are the result of PdM anomalies found on inspection routes.**
- **Wrench Time (WT): job efficiency measured by WT is 15%; best practice is 50%.**

VIDEO REFERENCES

The 5/25 Rule
↗ https://youtu.be/gkhtYs22bLI

- **Lubrication:** year after year lubrication failures are the number one cause of downtime and expense.
- **Motor failures:** year after year unplanned motor failures are the number two cause of downtime and expense.
- **Precision work:** the number three common downtime event is not executing maintenance work with precision. Examples: shaft alignment, rebuilds, overhauls.

Take inspiration from the movie Moneyball. In 2002, general manager Billy Beane of the major league baseball team Oakland A's, must build a team of players with a payroll of $41M to compete with the New York Yankees' payroll of $126M. Billy chose to implement a system that focused on getting unconventional talent that was undervalued by traditional baseball experts. They also relentlessly focused on getting on base over batting average, home runs, stolen bases and player technique. The A's ended the season with the same number of wins as the Yankees.

Billy's journey will be very similar to the reliability journey at the plant. There will be critics and setbacks, but you must focus on a few strategic levers for success. This "focus on a few" concept is also supported by Warren Buffett's 5/25 rule. Buffett instructs the change agent to focus on five critical priorities and ignore the remaining 20 at all cost.

OBSERVATION LEADS TO QUICK WINS

Once the three focus areas are agreed upon, where should you start? Go to the shop floor and observe.

By observe, I am referring specifically to "Chalk Circle Observation," a process developed by Taichi Ohno of Toyota. These observations are hours or even days long in duration. Chalk Circle sets the observer in an imaginary circle placed on the floor to see wastes. Examples: observe technicians installing a new pump; observe a PM being executed; attend a planning meeting to see how work is prioritized for the following week.

The brilliance of Chalk Circle is it identifies actions you can take in mere days often at zero cost. These simple and free actions can be implemented for quick wins leading to organizational momentum. If there is disagreement about an action, consider calling for a 90-day experiment; worst case is that you learn something. From this platform of results, set plans to make more strategic changes in your three focus areas that take more time and resources to implement.

ACTIONS YOU CAN TAKE ON MONDAY

- Watch the video on Warren Buffet's 5/25 Rule.
- Identify the 5-7 biggest opportunities that are year after year the reliability killers in your plant.
- Ask yourself and your leadership team, have we made any progress on these 5-7 killers in the last five years?
- Introduce the concept of "focus on a few." Δ

SHEILA KENNEDY
Technology Toolbox

MOVEMENT IN INDUSTRIAL MOTOR TECHNOLOGY

Modern options create opportunities and resolve challenges

Industrial motors and controls are foundational to operational efficiency, productivity, and performance. Any elevation in motor efficiency, reliability, or control contributes positively to business goals. Recent advancements include distinctive motors and drives, a centralized motor control center, and an accessory for solving a unique motor analysis challenge.

BOOSTING EFFICIENCY AND CONTROL WITH ADVANCED MOTOR TECHNOLOGIES

Highly efficient motors are notable for reducing electricity consumption and energy costs. The new PrecisionFlow motor from **Nidec** is an electronically commutated (EC), field-adjustable motor for ventilation and pumping applications. It offers up to 85 percent efficiency, exceeding common permanent split capacitor (PSC) motor efficiency by up to 30 percent, according to Nidec.

"With PrecisionFlow, you get optimized speed and torque control which reduces energy waste and cuts operational costs. The motor is also built to handle demanding applications with precision and durability, and smart control systems to fine tune each motor to deliver consistent, controlled flow," explains David Wood, engineering manager at Nidec/U.S. MOTORS.

The ACS8080 medium voltage drive platform from **ABB** provides motor control with digital capabilities and supports faster failure detection and troubleshooting with advanced condition monitoring and diagnostics. Designed for performance, efficiency, safety, and precision, the platform's modularity enables users to customize the drive to meet their specific process, application, or system.

Uptime and the ability to adapt to specific application needs are essential for medium voltage drives, says Paulo Cesare, product engineering and quality manager at ABB Motors and Drives North America. "That is why the ACS8080 is built on the proven technology of ABB's extensive experience with air-cooled medium voltage drives to ensure product reliability," he adds.

FLEXLINE 3500 from **Rockwell Automation** is a centralized low-voltage motor control center (MCC) that meets IEC 61439-1&2 safety standards. It combines motor control and power distribution in one package, enabling a small footprint on the production floor.

"The FLEXLINE 3500 MCC features smart, connected devices via EtherNet/IP to boost productivity and reduce downtime," observes Diego Wilches, global product manager of low voltage IEC MCCs at Rockwell Automation. "And the smart devices are designed for easy maintenance. Withdrawable unit designs offer quick and safe replacements without disrupting production."

MOTOR DESIGNS AND ACCESSORIES DRIVING PERFORMANCE IMPROVEMENTS

Axial flux motor advancements are widening the technology's appeal. The W80 AXgen axial flux motor from **WEG Electric Corp.** offers space and weight savings, energy efficiency, and improved sustainability for the industrial equipment market. For OEMs and systems integrators, the electric motor's compact size and light weight minimize space usage and reduce logistical costs and CO2 emissions.

According to WEG, the W80 AXgen is fully integrated with the company's CFW900 series of inverters, enabling the operation of multiple motors with

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VIDEO REFERENCES

PrecisionFlow Solutions
↗ https://youtu.be/NtKnLn2ctLU

ABB Motors and Drives
↗ https://youtu.be/TTLCS7CFm3Q

Rockwell Automation
↗ https://youtu.be/IjsNO-r16Xk

Donut Lab
↗ https://youtu.be/mcfoMMkhbQY

a single inverter, without requiring additional filters.

An innovative electric motor family for electric vehicles, recently announced by **Donut Lab**, directly integrates its Donut Motor into the wheel, eliminating the need for power transmission. The startup's Donut Platform supports applications such as electric vehicles, heavy-duty trucks, heavy-lift drones, and multi-terrain tracked vehicles.

"Because of the versatility of a round shape with a minimal amount of active materials, Donut Motors are easy to tailor to any rough and rugged use cases and environments," notes Donut Lab's Chief Product Officer Ville Piippo. "The added unsprung mass per wheel is in most use cases so tiny that there are no meaningful negative effects from it. Instead, Donut Motors offer many improvements in vehicle dynamics such as increased traction control precision and packaging flexibility that outweigh any small negatives in increased unsprung mass."

For motor analysis, the new Brush Lead Set accessory from **ALL-TEST Pro** is designed to enable efficient analysis and troubleshooting of AC rotors with windings. Wound rotor motors were previously difficult to test due to limited access within the motor housing and their different motor head. The Brush Lead Set is compatible with the company's motor circuit analysis (MCA) devices and its lead adapters are currently available in two standard sizes, with options for custom sizes.

The key to accurate MCA testing and analysis is "precise, repeatable measurements, which can be difficult to obtain with the limited space available on these motors," explains Andy Tomarchio, technical support manager at ALL-TEST Pro. "The new test leads use the motor's existing brush holders to make a precise and repeatable connection to the rotor windings through the slip rings." Δ

DOC PALMER

Palmer's Planning Corner

AVOID DUE DATES THAT DRIVE BAD BEHAVIOR

Don't let your CMMS mis-represent the weekly amount of work that you and your team can achieve

Measuring weekly schedule compliance simply by satisfying the work order due dates that are set in the computerized maintenance management system (CMMS) drives some bad behaviors. People end up not reporting little problems that could head off big problems. And they only report big problems when they start to work on them. Instead, best maintenance practice is to encourage the reporting and remedy of all the little defects we can find to avoid reactive work altogether.

To begin with, I favor priorities based on due dates rather than multiple adjectives. (With adjectives, where do you stop?) Consider the following very simplistic priority system:

Priority by Due Dates

0. *Emergency - Start Now*
1. *Urgent - Complete 1 week*
2. *Routine High - Complete 2 weeks*
3. *Routine Normal - Complete 1 month*
4. *Routine Low - Complete >1 month*

Priorities simply help us put work in the best order for completion acceptable to both Operations and Maintenance. Operations needs something done. Maintenance needs to know how long it can wait. Quick coordination must not be overly complicated by a slew of adjectives.

Most operators and maintainers can use their professional judgment (which is also somewhat checked by gatekeepers and morning staff meetings). The resulting priority of each work order pins down the agreement of the coordinating conversation:

Operator: *"I need this thing done."*

Maintainer: *"Does it have to be done right away or can it wait?"*

O: *"Well, it's pretty important. It doesn't have to be today, but it can't wait too long."*

M: *"Can it wait until next week?"*

O: *"That's sounds okay. Let's make it a Priority 2."*

Afterward, the maintenance force generally works in order of priority (with some bundling of less urgent work with more urgent work in the same area or asset). Maintenance completes the 0 emergencies, then the 1 urgent work, then the 2's, then 3's, and then 4's. In the short term, the finite-size maintenance force does not expand or shrink based on the workload. While we would like the workforce to be exactly sized for the work, sometimes the load of 1's and 2's exceeds what can be done this week or next.

Furthermore, I like scoring (or looking at) the median completions times for the different priorities. Are we generally completing Priority 1's within a week, 2's within a couple of weeks, and 3's within a month? How long for a 4? It helps if we can show Operations that we generally complete a Priority 3 within a month. That encourages them not making everything a 1 or 2 so that it will not die in the "black hole of maintenance."

Some CMMSs automatically set "due dates" as soon as work requests are entered with a priority. For example, when someone enters a new Priority 1 work request on a Wednesday, the CMMS sets the due date one week later as next Wednesday. This is not a bad practice in itself. The problem comes when a company measures "schedule compliance" as the percentage of all the work orders with a due date within that week that were completed within that week. So, if the company completed 60

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of the 80 work orders that had CMMS-set due dates in that week, schedule compliance would be 75%. Yet, if only a single work order had a due date that week and it was completed, schedule compliance would be 100%. Therein lies the rub.

Meeting these CMMS-set due dates should not be used for measuring weekly "schedule compliance." We should measure schedule compliance by the percentage of work orders that we scheduled (regardless of their priority or "due dates") and that we completed. If we scheduled 80 work orders and then completed 60 of those work orders, our schedule compliance would be 75%. This measure tells whether schedulers properly loaded the schedule and supervisors properly used the schedule, as well as an insight to a host of other issues including operations, maintenance, engineering, and stores practices. The score tells us how well we are in control.

Using CMMS-set due dates for schedule compliance creates a bad situation. Low schedule compliance encourages Operations and others not to report Priority 3 and 4 issues, the little proactive items such as loose or missing bolts and tiny cracks or leaks. They only report the items that they know maintenance will do right away. They do not report anything where they do not know when maintenance will do it. Generally, this situation means people will report 0's and 1's as they begin to work on them this week. They will not report anything else because they cannot guarantee its completion time. They achieve high schedule compliance. But this score does not tell them how well they are in control.

These practices are totally the opposite of the behavior we want to drive. We want a huge backlog of proactive Priority 3's and 4's to prevent future reactive 0's and 1's. Then we want to fully load schedules to drive high productivity to complete all the 3's and 4's with room to spare for completing 0's, 1's, and maybe 2's that pop up along the way. Incidentally, we will then have good schedule compliance as measured by CMMS-set due dates. But using that as a driving metric is too dangerous. It is not the way we want to measure schedule compliance.

We want a huge backlog of little things without anything breaking down. Surprisingly the schedule compliance based on CMMS-set due dates is met when we do not focus on it.

Don't settle for looking good. Be really great! Δ

SPONSORED CONTENT
Industry Perspective

Glen Powell is a reliability engineer and Level III vibration analyst at Hydro Inc., where he supports customers around the world by troubleshooting pumps with excessive vibration, hydraulic performance issues, and reliability problems. He can be reached at *gpowell@hydroinc.com*.

UNCOVER HIDDEN PUMP FAULTS

Vibration analysis plays a key role in diagnosing less obvious issues, like resonance or soft foot

Plant Services recently sat down with Glen Powell, reliability engineer at Hydro Inc., to discuss approaches that maintenance and operations teams can take to enhance reliability intelligently. Before his current role, Glen worked as a lead engineer with the Hydro Performance Test Lab where he investigated and tested problem pumps for the nuclear (safety and non-safety related), power generation, and oil & gas industries.

PS Tell me about what it means to be a senior engineering analyst with Hydro Inc.

GP My role has evolved at Hydro out of several different experiences. When I first joined the company, I was a shop engineer doing repair drawings and things like that. I transitioned to working at Hydro's test lab, where I worked for a few years, and then I went into the field engineering side—working with our customers out in the field doing reliability and maintenance troubleshooting.

From that, I've transitioned into senior engineering analyst. It ties a lot of that together, including training, problem solving and troubleshooting directly with customers, and working with our service centers, to bring knowledge and experience to lots of different situations.

PS What are some of the limits of vibration analysis, and what are some ways people can use it as a secret weapon or an untapped opportunity?

GP It's really important because it is one of the most useful tools for reliability analysis, but it's not a silver bullet for everything. I'll give you two examples.

There are a lot of different sources for vibration at the running speed of the machine — 1X vibrations. If you find that vibration, you need to be able to dig down and say, "Is that due to imbalance? Misalignment? Or something like soft foot?"

Most likely the guys rebuilding your pump know how to balance it, and the millwrights installing it know how to align it. Vibration analysis can lead you to something that's less obvious like soft foot or a cocked bearing. If you're taking it to a second level of analysis — taking phase data, doing a survey that goes into more detail — you're able to suss a lot of that out. Your basic route-based checks are only going to reveal that there's a problem, not what the problem is.

Another example is applying vibration analysis to too many situations. I recently talked with a customer who has our sensors installed on his pump. They're getting data every 5 minutes and they're saying, "how are we going to see cavitation?" The real answer is they're not. Cavitation is not something that's best diagnosed with vibration analysis. You're going to be able to hear it and feel it, but it's going to show up in a spectrum as very broad-based noise. That's one thing I see a lot, making the mistake of thinking vibration analysis can do everything.

On the question of a big opportunity with vibration analysis? Something that isn't as well understood in plant maintenance is resonance. That condition can be very confounding to understand, diagnose, and remedy.

It's something people see as a niche problem, but I actually think resonance is at the root of a lot of bad actors . You have machines that are trashing bearings every six months when the sister pump, which is right next to it, is running for five years. The root cause isn't that they don't know how to align it; the root cause is resonance of the bearing housing. You're going to end up with repeated failures if you're not able to correctly diagnose that. That's a place where I think people need to be using vibration analysis more.

PS In a case like that, are there complementary technologies that would help you unpack exactly what is happening?

GP There's two things that I think are really useful. There's a method of taking vibration data called a modal analysis, where instead of taking data on a couple of places, you take data all over the machine and excite it while it's not operating by impacting it with an instrumented hammer.

You use that analysis to understand the mode shapes, how it's moving if it's exciting a resonance — is it twisting? Is it bending? Is it rocking? What's the actual result of that resonance condition? That will point you toward how to fix it. If you have a discharge head moving in the horizontal direction, you need to brace it that way. But if the actual resonance is twisting, that brace isn't going to do anything.

The other technology I think is really interesting is motion amplification, where you use a camera to plot how a machine is moving as it's experiencing vibration and you can dial it in to see the motion of a particular frequency . So in the case of a misalignment, you will see the misalignment happening across the coupling. It's the idea that a picture is worth 1000 words.

PS A 2023 survey done by EASA indicated that more people were holding on to their assets and trying to repair them instead of replacing them, especially high-horsepower assets. What are your thoughts on the opportunities right now for redesigning and re-rating equipment as plant conditions change?

GP Maybe five years ago, I would say it's a huge opportunity. With the uncertainty in the market, the lead times you're getting from OEMs, a lot of people see that now as not just an option, but a necessity.

Plant conditions are changing. You are running equipment where it was not originally designed. If you take a pump running back on the curve, you lose efficiency, your reliability is shot, and you're increasing vibration. You're outside of the best efficiency point and outside of the allowable operating range. You can either live with it and repair the pump when it crashes, or you can take a different approach, which is to put a little bit of your capital budget into re-rating so that the pump runs where you want it to.

> **"Something that isn't as well understood in plant maintenance is resonance."**

It's very straightforward to do a re-rate like that, and you've gained yourself a lot in terms of efficiency, but also reliability. You're not going to be having to refurbish that machine every year. You're going to get 5, 6, 8 years out of it. And with the technologies that are out there now, such as CFD analysis and designing new hydraulics, that can be turned around in weeks or months rather than waiting years for a new piece of equipment.

PS Who in your experience is in the best position to start these conversations? Is it the technicians who see an opportunity to rerate? Is it a plant manager who should be out there walking the floor looking for opportunities? Is it a little bit of all that?

GP I think it's when you have inteaction between the plant maintenance manager and operations. The maintenance managers know the problematic pieces of equipment, and operations knows what pieces of equipment are critical, what's taking up the most power, and how things are running.

Your maintenance managers and your reliability people are able to say, "hey, we can kill two birds with one stone, this is our bad actor," and the operations people are going to be like, "yeah, it's a bad actor because we run it at 130% of BEP. It's not designed for that, we're pushing it to its absolute limit."

Sometimes that's putting those lines of communication together. Often there's a natural head butting where the operators say "no, no, no, no, the dollars are coming from running this equipment" and the maintenance people are saying, "hey, you don't know dollars we're going to spend when this thing crashes." Getting them together is really important.

PS You reminded me of something that Klaus Blache down in the University of Tennessee's Reliability and Maintainability Center often says, that all proactive maintenance success stories start with the statement "here's how maintenance and operations figured it out."

GP I agree with that 100% because the places that work well find a way to prevent siloing of knowledge, and the places that work poorly are the places where the same failures happen over and over again.

It's not that nobody knows why the equipment failed. Somebody probably knows, but if you don't have that information crossing the boundaries, then you're never going to get to a solution. If you want to stay competitive in this industry, you can't have a pain management strategy. You have to have a strategy for health and reliability and maintenance that is eliminating the source of the pain. Δ

JEFF SHIVER
From the Plant Floor

5 COSTLY MAINTENANCE MYTHS

A few practical truths about best practices can shift the thinking of you and your team toward more proactive success

In our world of maintenance and reliability, it seems persistent myths continue to undermine thought processes and ultimately impact plant performance. While these misconceptions stem from well-intentioned approaches passed down over time, they can lead to poor decision-making, excessive costs, and higher levels of equipment failure. This column evaluates five common myths that maintenance personnel encounter, and shares some practical truths to shift your thinking, should you or your management subscribe to them.

MYTH 1: "WE CAN'T AFFORD DOWNTIME FOR MAINTENANCE"

Truth: Proactive maintenance is an investment, not an expense.
Planned downtime costs money, and there is an opportunity cost, as no saleable products are being produced, especially in capacity constrained environments. Yet, you must maintain the assets. When unplanned downtime occurs, costs rise, and profit is lost forever. And, planned maintenance is inherently safer than reactive unplanned events.

When maintenance is delayed in the interest of keeping production running, this short-term mindset often backfires. For example, a plant delayed a scheduled inspection to meet a production target. The equipment failed catastrophically during a peak shift, resulting in 16 hours of downtime, lost product, and overtime costs exceeding $150,000. In contrast, the planned maintenance would have taken just two hours on a weekend at minimal cost.

MYTH 2: "MORE PMs EQUALS BETTER RELIABILITY"

Truth: The key is not frequency, but function.
In fact, 40 to 60% of existing PM activities often add little value, because they fail to address the likely failure modes. Also, consider that 70% of failures are self-induced. So, disturbing an otherwise stable system with intrusive PMs can introduce failures. One manufacturing facility used OEM recommendations for PM tasks, including weekly inspections for components that rarely fail. After a review based on failure modes and consequences, the team eliminated 35% of tasks.

Many organizations strive for 80% or more labor hours dedicated to PMs, when in fact, world-class organizations target 30% of their hours on PMs. Focus PM efforts on addressing the likely failure modes based on the asset's operating context.

MYTH 3: "NEW EQUIPMENT NEEDS LESS MAINTENANCE"

Truth: New assets are vulnerable to early-life failures due to improper installation and commissioning.
The occurrence of "infant mortality" is well-documented. Also, personnel often are not well-trained in the new equipment and lack standard work procedures, which cause failures. A chemical plant installed a pump system without following standard commissioning protocols. Less than two weeks later, a misaligned shaft led to bearing failure. Another site suffered a bearing failure when a grease fitting was missed on the PM task list. It's common to find new line additions not being captured completely in the computerized

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maintenance management system (CMMS) equipment hierarchy, and with no assets defined, PM procedures are missing, especially if trained personnel transfer away from the site.

MYTH 4: "WE NEED MORE MAINTENANCE TECHNICIANS"

Truth: Before hiring, examine how effectively current resources are used.
Management frowns on adding headcount, and rightly so. Most plants operate at 25 to 35% wrench time, and with proper planning and scheduling, this can nearly be doubled. Couple that number with non-value-added PM tasks that waste precious technician resources.

A packaging facility struggling with overdue work orders discovered that technicians spent most of their time waiting on parts, tools, or access to the equipment. After implementing a dedicated planner role, wrench time jumped from 30 to 55% without adding staff, and reduced overtime 20% to boot. Now, they are focusing on preventive maintenance optimization (PMO) for even more success.

MYTH 5: "OUR CMMS GIVES US ALL THE DATA WE NEED TO DRIVE RELIABILITY"

Truth: Without proper asset hierarchies, failure codes, and work order discipline, reports are misleading at best.

Ever notice how the metrics always seem to rise, yet performance remains the same or worse? The value of a CMMS depends entirely on the system configuration and the quality of the data entered.

A beverage company believed their CMMS reports showed top asset offenders and the reasons for failure. But a deeper audit revealed that technicians were defaulting to specific failure codes for ease of work order entry. Garbage in, garbage out. After standardizing the asset hierarchy using improved parent-child relationships and training personnel on accurate failure reporting, the data began to support informed decision-making.

The CMMS is a powerful tool when utilized in the right way. Δ

2025 RELIABILITY OF EVERYTHING™ CULTURE IMPROVEMENT AWARD

Best Sustaining Culture – Perdue Farms, Concord, NC

Written by

Klaus Blache
Director of Reliability & Maintainability Center and Research Professor at the University of Tennessee

Charles (Charlie) Hogan IV
Maintenance Manager at Perdue Farms in Concord, North Carolina

The Reliability of Everything™ Culture Improvement Awards are a way to recognize people from real-world plant environments who have worked hard to make a difference in improving culture and operations.

The award can be earned in three categories – Best Culture Innovation (unique solution to improve culture), Best Culture Startup (improving a challenging culture/difficult situation), and Best Sustaining Culture (evidence of a sustainable top-quartile environment). Regardless of category, all three awards are based on improvement of reliability & maintenance metrics results (25%), documented journey of improvement/process used with lessons learned (25%), and improvement in culture (50%).

The sole 2025 award was earned by Perdue Farms in Concord, North Carolina in the category Best Sustaining Culture, through the leadership of Perdue Maintenance Manager Charlie Hogan. In a unique achievement, this same facility won the Best Culture Startup Award one year earlier through the leadership of Gilberto Carrera (now Sr. Director of Maintenance Reliability for Perdue Farms Food Organization). Winning this award for a second year in a row is a testament to the dedication and commitment Perdue has toward Maintenance and Reliability Excellence. The Concord Plant was their pilot plant and after 4 years continues to lead these efforts and set the bar across the Perdue Foods Division.

The awards are presented to winners at the March annual MARCON (Maintenance and Reliability Conference) put on by the Reliability and Maintainability Center (RMC) and held at the Knoxville Convention Center, adjacent to the University of Tennessee. This article is based on that submission, their presentation and some of my comments.

THE CASE STUDY

Perdue Foods, a 105-year-old family-owned business, operates 124 facilities and employs over 20,000 associates, including nearly 10,000 farmers. The company's vision is to become the most trusted name in food and agricultural products by focusing on operational excellence through improved downtime, cost efficiencies, and sustainability.

From Gilberto Carrera's submission last year, the Perdue Foods team was well on their way through the reliability journey and working on the mid- to long-term strategies. As they worked on identifying the fundamental initiatives that they needed to focus on, multiple sources were used to put together their internal maintenance & reliability system (MRS) framework. Figure 1 shows the Perdue team's 10 key items of focus.

Charlie Hogan outlined a comprehensive overview of the company's maintenance strategies and initiatives aimed at enhancing operational efficiency and reliability. Hogan emphasized the importance of developing a maintenance and reliability culture that prioritizes asset longevity and optimal labor utilization. Key projects included significant upgrades to hydraulic systems, air compressor systems, steam management, and vacuum technologies, all of which contribute to energy savings and improved operational performance.

Hogan also credited the implementation of predictive maintenance technologies and standardized processes for lubrication and inventory management to further enhancing reliability and reducing costs. The maintenance and reliability team's recognition for their achievements underscores the effectiveness of these initiatives.

With their MRS framework defined, Hogan and the Perdue team developed a strategic Maintenance & Reliability (M&R) roadmap to layout a 1-3 year implementation plan. Six strategic initiatives were identified as fundamentals for the Near-Term Strategy (1st year); they also identified tentative initiatives for the Mid-Term (2nd year) and Long-Term (3rd year) phases. The full roadmap is provided as part of the online version of this article at **www.plantservices.com/55291529**, including the initiatives initially selected for each phase of their strategic implementation.

Since early 2024, Hogan took over the maintenance manager role and started filling up their empty seats/putting key players in positions. Each quarter, they have a team meeting, where all 50 of the Perdue M&R team members get together to go over successes and failures from previous quarters, and then review where they are going over the next 3 to 6 months.

The phases of team development follows the Forming-Storming-Norming-Performing-Adjourning model from Bruce Tuckman. Once fully staffed, it allows more flexibility to correct bad practices through process improvement plans and start building the professional workmanship into everyday practices. At every opportunity, Hogan coaches hourly, salary, M&R, Ops and Sanitation team members, to emphasize expectations for the M&R team to be the best at everything they do, including leading by example for all Perdue associates.

Year over year, they have gotten exponentially better, but like for most, it's still a journey to M&R excellence. The Perdue M&R team is sitting around 4.5% mechanical downtime YTD, with a target of 3.8%, and have three capital projects dedicated to helping them reduce/eliminate their top 3 bad actors which accounts for ~2% of the mechanical downtime YTD. Since 2020, they have reduced downtime from 10.4% (FY21) to 7.2% (FY 23) to 4.8% (FY25 at the time the graph was created for MARCON), resulting in a 54% reduction and sustaining around their 4% company target. (Note: The target for each plant starting FY24 was a 5% reduction over previous year. Therefore, the target for FY25 at the Concord plant is 3.8%.)

FIGURE 1. Maintenance & Reliability System (MRS) Framework Pillar Building Blocks

Maintenance & Reliability Systems – OPEX Pillar					Maintenance & Reliability Systems – OPEX Pillar
	Engineering Standards & Specifications	Asset Condition Monitoring / IoT	M&R Audits & PDCA	Electrical Integrity	
	Design for Reliability & Maintainability	Mobile CMMS, AR/VR, AI/ML, Technology	Ops Zone Ownership	Instrument & Controls Integrity	
	Critical Asset Care Program	Facility Integrity	Process Centerlining	Precision Work	
	Mechanical Integrity	Shutdown Management	Asset Criticality Analysis / FMEA	MRO Inventory Management	
	Asset Master Data	Lubrication Program	Predictive Maintenance	Preventive Maintenance Optimization	
	Technical Talent Management	Business Continuity / Management Systems	Maintenance Work Management	Root Cause Analysis	
	QUALITY – INTEGRITY – TEAMWORK – STEWARDSHIP				

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Hogan and the Perdue M&R team have been able to get some of their key hourly associates involved in correcting some of their top bad actors and recognized them for their successes. This has changed the dynamic for their team, for all associates to see/hear about process improvements and recognizing the efforts, and has increased employee engagement bringing their ideas and suggestions to the table.

There are many individual success stories. Just one example is from M&R lead associate, Brent Chapman, who corrected a belt failure mode and DT reduction that resulted in an annual product improvement of >1M lb. He received the excellence award for the Concord site, one of two awards given each year.

In conclusion, Perdue Farms' Concord facility demonstrates that by embracing sustainable maintenance practices and a root cause analysis approach, organizations can achieve both operational excellence and environmental responsibility. This proactive strategy ultimately supports the company's core values of Quality, Integrity, Teamwork, and Stewardship. Δ

HIGHLIGHTS OF PERDUE FOODS AWARD SUBMITTAL

Perdue Concord leadership team: Donnell Eaton, Freeman York, Charlie Hogan, Joseph Johnson, and Gilberto Carrera

Mission: To provide innovative food and agricultural products that enhance the quality of life for everyone we touch. We believe in responsible food and agriculture.

Vision: To be the most trusted name in food and agricultural products.

Values: Quality, Integrity, Teamwork and Stewardship

Perdue Farms' facility in Concord, NC, is committed to implementing maintenance best practices that emphasize sustainability and rigorous root cause analysis. As one of the leaders in the agricultural industry, Perdue Farms recognizes the critical importance of efficient maintenance strategies in enhancing operational reliability while minimizing environmental impact.

The facility's maintenance program is centered on preventive and predictive maintenance methodologies, aiming to reduce equipment failures and downtime. By employing condition monitoring technologies and data analytics, Perdue Farms can make informed decisions based on real-time performance data, ensuring that maintenance efforts are timely and effective. These practices not only extend the lifespan of critical equipment but also diminish resource consumption and waste, aligning with the company's sustainability goals.

A cornerstone of Perdue Farms' approach is the rigorous application of true root cause analysis (RCA). This methodology goes beyond traditional failure analysis, focusing on identifying and addressing the underlying causes of equipment failures rather than just the symptoms. By implementing RCA, the facility can develop targeted maintenance strategies that eradicate recurring issues and enhance overall operational efficiency.

Furthermore, Perdue Farms is dedicated to fostering a culture of sustainability within its maintenance operations. This includes integrating environmentally friendly practices, such as using energy-efficient technologies and sustainable materials, in maintenance activities. By prioritizing these initiatives, the facility not only reduces its carbon footprint but also sets a benchmark for industry-wide sustainability efforts.

SUMMARY OF SELECT KEY INSIGHTS:

- **Legacy of Trust and Quality:** Perdue Foods' longstanding history of over 100 years highlights its established reputation in the industry. This legacy not only fosters customer loyalty but also attracts partnerships with farmers and suppliers who value trustworthiness and reliability. The company's commitment to maintaining high standards is evident in its operational practices and community engagement, reinforcing its brand as a leader in the food sector.
- **Strategic Roadmap for Reliability:** The MRS framework, which focuses on strategic pillars and initiatives, is a clear representation of how Perdue Foods plans to enhance its operational capabilities. By concentrating on reliability as a core business strategy, the company ensures a proactive approach to maintenance that is aligned with its long-term vision. The structured roadmap allows for measurable improvements in asset management, which is crucial for sustaining high levels of productivity.
- **Environmental Responsibility:** Perdue Foods is not only focused on operational efficiency but also on sustainability. Initiatives such as upgrading to energy-efficient compressors demonstrate the company's commitment to minimizing its environmental impact. These efforts not only reduce operational costs but also position the company as a responsible corporate citizen in the eyes of consumers increasingly concerned about sustainability.
- **Data-Driven Decision Making:** The implementation of predictive maintenance technologies, such as oil sampling and vibration analysis, represents a significant shift towards data-driven decision-making in maintenance practices. By leveraging technology, Perdue Foods can anticipate potential failures before they occur, which minimizes downtime and enhances overall operational efficiency. This proactive maintenance approach is indicative of modern practices in the manufacturing and food production sectors.
- **Training and Succession Planning:** Hogan's emphasis on training and building a professional culture is vital for sustaining the operational excellence of Perdue Foods. By investing in the professional development of team members and emphasizing succession planning, the company ensures that it maintains a skilled workforce capable of adapting to future challenges.
- **Cost Savings and Efficiency:** The successful reduction of costs—from $25,000 to $2,000 for pump replacements—illustrates the effectiveness of the maintenance initiatives implemented by Hogan's team. Such significant cost savings not only enhance the company's bottom line but also reinforce the value of in-house maintenance capabilities. By reducing reliance on external contractors, Perdue Foods can allocate resources more efficiently.
- **Recognition and Awards:** The achievements of the maintenance and reliability team, recognized through several awards, highlight the effectiveness of the company's initiatives. These accolades not only boost morale but also serve as a benchmark for other teams within the organization. Recognition fosters a culture of excellence and encourages continuous improvement, which is vital in today's competitive landscape. Δ

HOW FOOD-GRADE LUBRICATION CERTIFICATION IS SHAPING INDUSTRY STANDARDS

Members of the International Council for Machinery Lubrication reveal why the new FPL badge was built and what it means for food-grade lubrication

Written by

Paul Hiller
ICML Marketing Manager

Food and pharma lubrication practitioners face unique challenges with their machine lubricants and lubrication programs. They must contend with numerous regulations, priorities, and practices that are simply not common or necessary in other environments.

The International Council for Machinery Lubrication (ICML) offers a specialty certification badge for Food Processing Lubrication (FPL), developed by a remarkable, multi-national team of industry professionals. This article provides some insight into the development and relevance of the FPL badge from several members of ICML's development committee:

- **Mohamed Ibrahim**, Senior Mechanical Engineer, QatarEnergy
- **Roberto Trujillo**, Senior Technical Consultant, Noria Latin America
- **Michael Holloway**, President, 5th Order Industry
- **Garrett FitzGerald**, Senior Principal Engineer – Maintenance & Reliability, Eli Lilly and Company
- **Rich Wurzbach**, President, MRG Laboratories

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Why was the topic of food-grade lubrication selected to be among the first specialty badges produced by ICML?

Ibrahim: This selection was guided by the industry's recognition of its critical relevance and urgency. The safety and quality of lubricants used in food processing directly impact public health, making it an essential facet of industrial operations.

Challenges related to maintaining food-grade standards are pervasive across various sectors, so as consumers become increasingly discerning about the products they consume, ensuring the highest standards of food-grade lubrication has become a shared priority.

Holloway: Unlike other industries in the U.S., products used in and around food processing equipment are heavily regulated and have specific requirements. The regulation was established by the U.S. Food and Drug Administration (FDA) with NSF International acting as the product certification body. In no other industry is there a direct consideration or influence of product chemistry in terms of safety.

While certain manufacturing plants may adopt rules for non-flammable product or biodegradable chemistry, the products in the U.S. must be formulated in accordance with a special code (21 CFR 178.3570), and the formulation ingredients in the product must be listed as safe. This code is strict, and acceptable products such as oils, grease, antioxidants, and surfactants must comply. These requirements can make product development very challenging.

FitzGerald: I work in the biopharma sector, so all lubricants that have the potential for incidental contact are heavily regulated. As such, all of the subject matter in this FPL badge is directly related to day-to-day roles. Every maintenance intervention we make, in terms of lubrication, is made with the consideration for impact to product. Therefore, selection of suitable products—technically suited to the challenge at hand, but also appropriately formulated and certified—is critical.

Wurzbach: As an instructor that teaches to the ICML certification exams, I happen to work in a region that has a very high concentration of food production manufacturers. Since there are so many companies working in food production in this region, there tends to be mobility among these professionals,

moving from location to location and company to company. And the idea that an international certification could be obtained by someone in that industry, and then be recognized and honored and utilized as they move to another location and bring that knowledge and competency with them through the FPL badge certification, would be a great benefit.

Is there anything new that you personally learned about food-grade issues while developing this badge?

Ibrahim: As I am working in the oil & gas industry, I was already familiar with the importance of regulatory adherence and contamination control, but the extent of regulatory intricacies across different global regions was eye-opening. The diversity in lubrication practices, even within specific food processing sectors, underscored the need for a nuanced understanding of regional variations.

Trujillo: Standards and norms are in constant change. There are innovations in lubricant formulation and many techniques to learn.

Wurzbach: Given the need for such precision, I learned it is important to communicate to food production practitioners how all the lubrication best practices would impact their ability to deliver precise quantities of lubricant by setting up auto-loop systems or by creating routes for manual grease lubrication to ensure that these limits are not exceeded, [including a] focus on seals within gearboxes and other oil-lubricated equipment and how they need to be set up and managed to ensure that there is not an excessive amount of even food-grade lubricant getting into the food product.

I also learned more about what [food-related industries] really need their folks to understand and learn. There's a widespread misunderstanding that if you purchase a food-grade lubricant and you use it within your facility, then you are compliant with the regulations.

The truth of the matter is that the regulations are much more complex. They actually address the quantitative amount of a lubricant that's getting into the food process. So, you can't just say, "Well, I can just grease all day long and fling that grease all around because it's food-grade." That's a misconception, and this subtlety is addressed in the regulations.

What emerging technologies do you anticipate will impact food-grade lubrication practices?

Holloway: There are constant advancements for products that are odorless, tasteless, colorless, physiologically inert, and non-toxic from the various base oils such as mineral oils, PAOs, esters, and silicones to the additives such as anti-wear additives (friction modifiers, extreme pressure additives), antioxidants, corrosion inhibitors, viscosity modifiers, pour point depressants, surfactants, dispersants, and emulsifiers and antifoam agents, all of which are plant derivatives! They achieved this through genetic modification. It's amazing what you can do with bioengineering. In the years to come, you will witness a departure from petrochemical feedstocks and process vats in favor of plant-based product and biological reactors.

FitzGerald: Regulator requirements will continue to increase over time. This will be a significant challenge to those specifying and formulating lubricants in the future. There will be pressure to move facilities to "only food-grade" lubricants to prevent potential for cross-contamination. Practitioners in the future will have to be able to balance this need for compliance with the fundamental need for robust lubrication of rotating equipment. Lubrication management remains the foundation block of rotating equipment reliability.

Trujillo: Industry 4.0 and automatization may benefit this industry branch, allowing a better way to apply lubricant in exact quantities/frequencies and avoiding over-lubrication. New lubricant formulation and certified food-grade lubricants and plants are one of the most important advances in this space, ensuring lubricants are formulated and produced following the rules. Δ

Note: *this article is an abridged version of the full conversation located at:*
Part 1: *plantservices.com/55280529*
Part 2: *plantservices.com/55282521*

THE CAPTAIN

Captain Unreliability

CUT THE WRONG CORNERS

Make sure you keep only your essential workers when times get tough — managers, directors, & VPs

In the world of modern business, only one strategy reigns supreme when times get tough: cut the people who actually do the work.

Forget the hardworking folks on the ground floor who manufacture the products, deliver the services, and generate the revenue that keeps the lights on. Let's slash their ranks! Because, clearly, if a company is struggling, it can't possibly be due to a lack of direction from the top. No, no, it's those pesky frontline employees holding us back with their "hands-on" contributions to productivity and revenue.

Now, before you go gasping about "logic" or "common sense," let's clarify that there's a method to this madness. You see, having more managers, directors, and VPs in the hierarchy is essential. And while these executives may not know how the machinery operates or the service is delivered, they're adept at what truly matters—strategic vision (preferably in buzzwords).

Let's talk numbers here. When you cut one factory worker or service technician, sure, you might lose a bit of output or delay a project. But when you add another Vice President of Visioning Synergy or a Senior Director of Future Growth Potential, what you gain is priceless. How else would we spend the entire day crafting 10-page memos, building PowerPoint decks, and holding meetings to discuss the next meeting? This is high-impact work that you simply can't put a price on.

Some might argue, "But what about productivity?" Well, that's the beauty of this approach: if anything goes wrong, there are plenty of employees left in the lower ranks to blame. If profits tank or projects fall behind, we can point fingers at the very people who are left to carry an increasing workload with fewer hands. After all, we've invested in a Director of Blame Allocation for a reason.

And don't worry about morale, either. There's no better motivator than a "streamlined" workforce. By cutting staff at the ground level, we can actually increase employee engagement. Just think of how engaged they'll be when they're doing the work of three people. And for any minor dips in morale, we've got a Chief Happiness Officer whose primary job is to remind the remaining employees that they're "lucky to have a job at all."

Now, let's address the elephant in the room—leadership. Some critics claim that instead of hiring more executives to make up for our leadership gap, we should invest in developing the skills of our existing managers. But who has time for that? Leadership development is costly and time-consuming. Why train our current leaders to actually understand the operations or empathize with the front-line workers when we can simply add another layer of management to handle "strategic oversight"? This way, we can achieve the illusion of leadership without all the bothersome empathy or connection to reality.

And think of the ripple effect. By bolstering the upper echelons, we can implement a cascade of new processes and policies that the actual workers will have to figure out on their own. A constant state of change keeps the workforce on their toes, constantly adapting to the latest reorganization.

Some might call this approach "unsustainable" or "short-sighted," but we call it "smart business." Because, in the end, the true goal of any company isn't profitability or productivity; it's looking as complex and hierarchical as possible. When future investors or buyers peek under the hood, they'll see layers upon layers of VP titles, and they'll know—*this* is a company with vision.

And who knows? Once we've finally eliminated the last of those pesky employees who are actually doing the work, maybe we can achieve our ultimate corporate dream: an organization of managers managing managers, reporting to executives who answer only to other executives, in a streamlined, productivity-free paradise. Δ

Captain Unreliability is a satire of the state of manufacturing in 'Merica, USA, by an industry professional known for using humor to get the point across. Email him at *Captain.Unreliability@ReliabilityX.com*, or follow him on Twitter: @CUnreliability.

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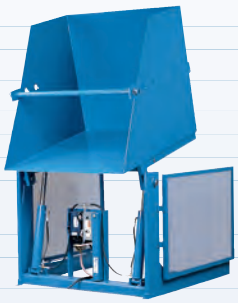

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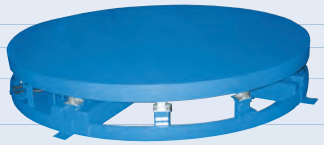

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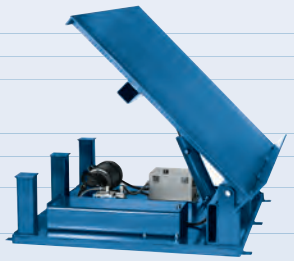

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