

UNLOCKING INSIGHTS  
INTO DOOR SYSTEM SERVICE

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RIGHTSIZING YOUR MAINTENANCE  
MANAGEMENT SYSTEM SOLUTION

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# FleetMaintenance

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With competition from EVs heating up and the EPA enacting stricter emissions rules, OEMs must speed forward with new I.C.E. innovations to keep pace.

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## THE AMAZING EMISSIONS RACE

2025





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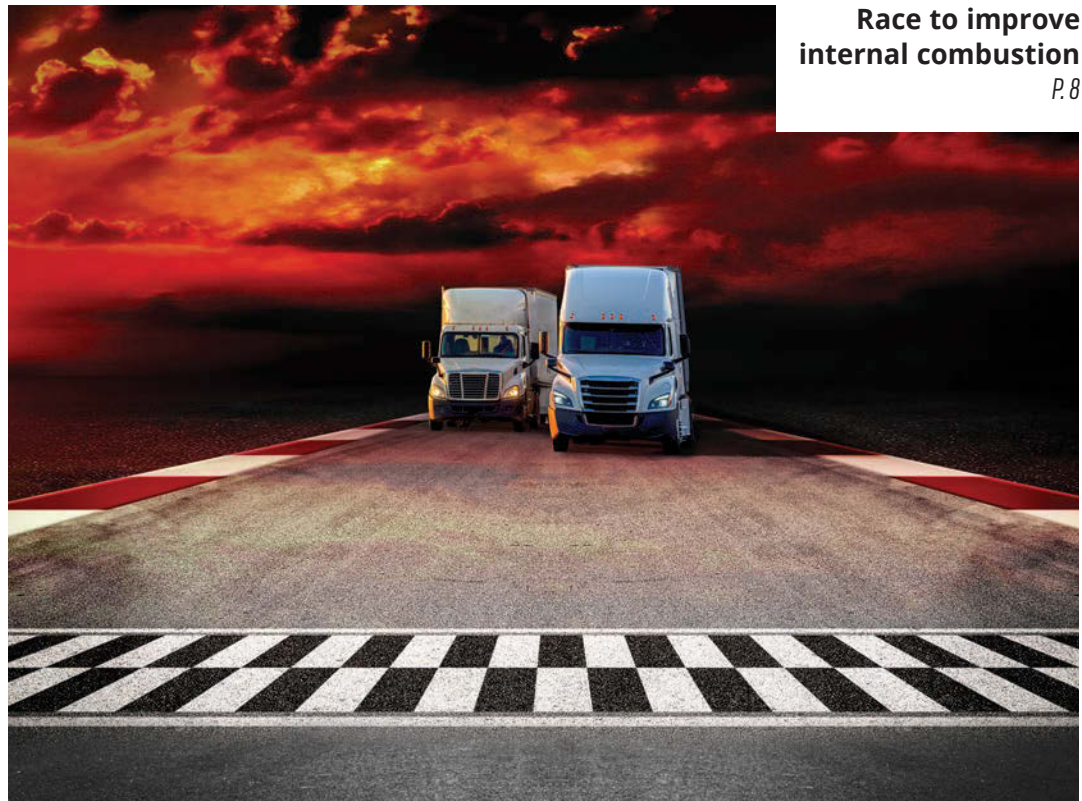
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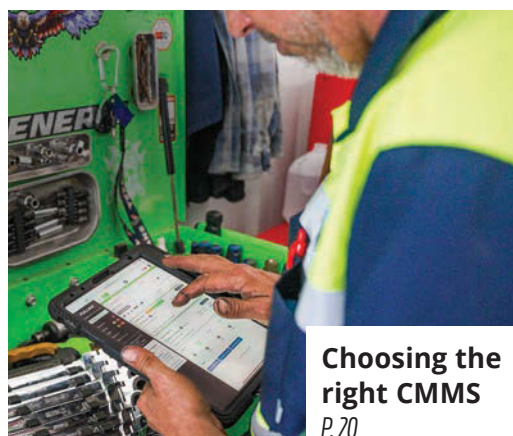
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**Want to contribute?** Contact us at [editor@FleetMaintenance.com](mailto:editor@FleetMaintenance.com)

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### The future of propane autogas engine technology

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# Mastering the toughest management skill: Self-maintenance

To get the best uptime, give yourself better downtime.



By John Hitch  
Editor-in-chief



@Hitched2Trucks



**Of all the Billy Joel lyrical advice I should** have heeded, who would have thought it would be “workin’ too hard can give you a heart attack (ack-ack-ack).” But that’s exactly what happened to me as I was approving the last issue before sending it off to the printer.

As much as I would love to shift the blame, this one was on me. You see, I wanted to start the year off with a killer issue, (over)worked through a few consecutive weekends, and one quiet Friday morning—pow, right in the ticker—my very own myocardial infarction. The funny thing is I thought it was indigestion for an entire day, and only after 20 hours of heaving chest pain and radiating numbness did I seek a non-web-based medical opinion.

They found a total blockage in one small artery. This was likely due to genetics, along with foregoing exercise and sleep for more working nights and weekends. And Red Bull. Too much Red Bull.

Luckily, only the good die young. So, I survived, with just one stent as a parting gift from a two-day hospital stay. A weekend in the cardiac ICU is plenty of time to contemplate the usual post-heart attack concerns: my own mortality, my family’s future, and if I will ever know the heavenly taste of a cappicola, ham, and salami sandwich again.

My most demented thoughts were about work, though. I would be forced to take time

off, so who will handle the day-to-day stuff like newsletters? What about the March issue? And we have a supplement—how will that get done?

In my two weeks off, I learned to accept that a drive for excellence can very well take you over the edge, and it’s better to coast in cruise control every so often than go full throttle and overheat—or worse—cause an accident.

I imagine it’s the same for a lot of other managers out there, especially those running fleets and maintenance departments. The country needs you folks a heck of a lot more than they do another snarky magazine editor, so hopefully, you will consider heeding some of the following management advice I came up with over the past month.

## Aim for higher health metrics

I used to scoff when my last corporate workplace would hold an annual 5K run. Who had time to don dorky company T-shirts and jog around downtown when stories needed to be written and web traffic needed to be driven? Improving quality and data were everything to me, as I had to show my bosses how valuable I could be. I carried that mindset over to the management level, though the only person I was trying to prove something to was myself... and I would never be satisfied.

So for all the KPIs you are trying to improve, focus more on how far you can walk or run per day, or lowering your LDL cholesterol (the bad kind) year-over-year. Remember, as famed football guru Bill Parcells said: “Availability is the best ability.” So you can kill it in the data department one year, but your shop will still be in far worse shape if you work yourself to death the next. And the better you feel, the better your decision-making will be.

## Plan for your own absence

Whether you’re a shop owner or floor supervisor, you should always have a strategy in place for planned or unplanned leave. No one plans for a heart attack (except maybe the CIA), but if you have one, or some other health problem or accident

go more smoothly if you know your employees know how to get into the shop and can access various schedules and dashboards.

The big questions to ask yourself are, as things stand now: “How long can the business survive without me?” and “How much work will I have to do when I get back?” For me, it was about two weeks off, supplemented by a few emails and phone calls. Luckily, I work with some great colleagues who kept up the positive momentum.

Having all your files organized in a sensible manner and uploading critical folders to SharePoint or other cloud services can help give your team the tools they need to succeed. In a large business, the IT department could likely access your crucial emails and files, but regarding smaller independent shops, you may want to consider sharing spare key and password locations with a significant other or trusted employee.

## A matter of trust (& empathy)

This shouldn’t need much explanation. If you give your employees time off to take care of their lives, handle emergencies, and always treat them fairly, it comes back to you. If you overload your techs with unfulfilling tasks and get on their case for missing work if their kid is sick, then you’re setting up the exact expectations they will have for you if you need to leave work for a medical follow-up or rehab work.

You’re also unlikely to retain capable people to handle things while you’re gone, leading to more stress when you return.

## Maintain a healthy work/life balance

This is a constant struggle for remote workers such as myself, as there is always work that could be done and my commute is a staircase. I’ve set boundaries, such as taking a full non-working lunch hour and walking for 20-30 minutes instead of reading emails. Weekends are now reserved for quality time with my incredibly supportive wife and kids, not catching up on lagging projects.

And as I try this sobriety from workaholism, Mr. Joel’s song “Vienna” makes a lot more sense, too: “Where’s the fire, what’s the hurry about? You better cool it off before you burn it out.”

I’m certainly trying, and I hope you do, too. ▀



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VP of Maintenance, Kyle Neumann



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# THE **AMAZING** EMISSIONS RACE

With competition from EVs heating up and the EPA enacting stricter emissions rules, OEMs must speed forward with new I.C.E. innovations to keep pace.

By Seth Skydel

[ IN VEHICLE ]





In January, the U.S. Environmental Protection Agency entered the final new rule for model year 2027 and later heavy-duty engines in the Federal Register, solidifying stricter NOx emission standards and extended useful engine life cycle targets for engine manufacturers to hit.

For instance, the new standards call for heavy-duty commercial vehicles to limit NOx emissions to 0.035 grams per horsepower-hour during normal operation, 0.050 grams at low load, and 10 grams at idle. This is the first increase in NOx emissions standards since 2010 when aftertreatment systems became ubiquitous.

“There’s no question the rules will be a challenge for manufacturers to meet, but in ways different than previous emissions milestones,” said Allen Schaeffer, executive director of the Diesel Technology Forum, a non-profit advocacy group. “Technically the required NOx emissions reductions are significant, to the tune of 82% lower than today’s levels—which are already near zero (0.20 g/BHP-hr.).”





The EPA has also drastically increased the definition of what a heavy-duty engine's useful life period should be, which Schaeffer is more concerned about.

"The more significant impact of the rules are the business side of the useful life and warranty requirements, which have jumped from 435,000 miles to more than 800,000 miles for an OTR tractor," he explained. "This means that all parts of these emission control systems must be able to function for much longer periods of time than today, and manufacturers will be on the hook warranty wise at some level for how well the units perform not just in years 3 and 4, but in years 7 and 8, assuming about 100K miles a year. So there is a significant business/economic aspect to this rule that is new for manufacturers, and will certainly drive up the cost of a new truck."

Another challenge is that OEMs not only have to improve on diesel engines, but concurrently develop battery-electric and fuel cell electric vehicles to comply with zero-emission guidelines in California and several other states.

"That makes balancing those investments with the next round of emissions standards development and compliance particularly challenging from a business perspective," Schaeffer noted.

On the positive side, he noted, the first and second owners would benefit by having more warranty coverage pertaining to some of parts of these engines.

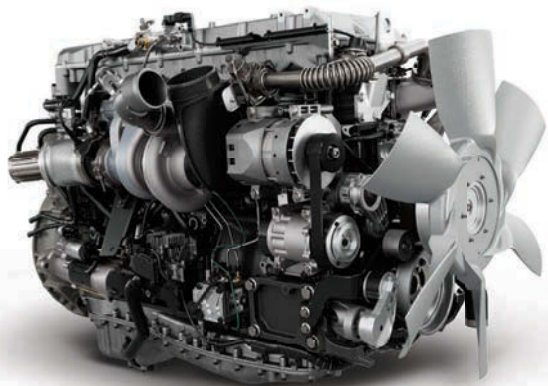
But the big question is if engine manufacturers can find a way to eke out even more emissions control than they have already?

"I think they can get there mostly with improvements to the technologies we have today, such as new SCR configurations and combustion enhancements," Schaeffer asserted.

The good news is OEMs' engineers have already spent a lot of time figuring out how to meet these more stringent emissions standards and will continue developing new technology and designs over the next few years.

Cummins, North America's leading engine maker, has already been researching and testing some promising new innovations, which should be ready in time for 2027 rules, according to Matthew Spears, executive director for global regulatory affairs at Cummins.

"You can definitely expect to see new engine hardware and new aftertreatment hardware," he said last fall at the American Trucking Associations' Management Conference and Exhibition. "There are a number of technology paths that could or should be available to comply."



» The S13 is Navistar's final internal combustion engine, CEO Mathias Carlbom said.  
Navistar



» The SPIER System from SPI.Systems Corporation is an upfit that can be used to reduce emissions on any diesel truck, from current models dating as far back as 2010, including highway and work trucks.

SPI.Systems Corporation

One of these may be Catalyzed Diesel Exhaust Fluid technology, or CAT-DEF, a catalyst- and surfactant-modified diesel exhaust fluid solution developed by the Southwest Research Institute. Spears explained this technology uses a modified Cummins X15 engine that employs a different valve train to allow for cylinder deactivation, along with a second aftertreatment system on the upstream selective catalytic reduction (SCR), located between the turbocharger outlet and diesel particulate filter.

According to Dr. Charles E. Roberts Jr., director of the Commercial Vehicle Systems Department at the Southwest Research Institute, "A combination of surface-active agents and heterogenous catalysts blended into CAT-DEF reduces deposits by 90% with potential reductions up to 98%."

Spears noted hardware changes like this will increase DEF consumption, but not by a significant amount.

New regulations aside, engine makers have also worked to continuously improve their on-highway diesel engines to stay ahead of the competition. And if those weren't enough, engine makers have responded to the call for decarbonized solutions by delving more into advanced fuels, including propane, natural gas, and even hydrogen.

In short, there will be several new engine options coming in the next few years, and fleets will first have to figure out which fit best for their application and region. And then maintenance departments, dealers, and independent shops will have to find ways to support these engine types.

There's a lot to keep up on, so *Fleet Maintenance* asked the manufacturers themselves how they plan to cross that emissions finish line in four short years.

## OEM progress

### Cummins

Last year was a bold one for Cummins, with the leading engine maker acquiring Meritor, a leader in making brakes, axle, and other components.

**"The more significant impact of the rules are the business side of the useful life and warranty requirements, which have jumped from 435,000 miles to more than 800,000 miles for an OTR tractor."**

Allen Schaeffer, executive director, Diesel Technology Forum

"We continue to see enhanced integration with different elements of the powertrain, including through our transmission joint venture, Eaton Cummins, and with axles through our acquisition of Meritor," said Katie Zarich, director of on-highway communications at Cummins.

She agreed with Spears that the new standards are obtainable.

"The EPA 2027 Low-NOx Final Rule provides clarity and allows Cummins to refine its product plan and concentrate our resources on delivering those solutions," said Zarich. "The next generation of medium- and heavy-duty fuel agnostic engine platforms will meet those regulations."

Zarich also noted that field tests help the company learn more about how engines and powertrains perform in the real world and help fleets evaluate new features and developments.

### Daimler Truck North America

The latest advancements in the Detroit heavy-duty lineup are the Gen 5 updates to DD15 and DD13 engines, reported Len Copeland, product marketing manager. "More than 50% of the parts of the engines are included in the update," he said. "Updates that improve fuel economy for the DD15 had ripple effects as well because to enable them we increased the compression ratio to 21:1 and that required strengthening the block, the head, and many other internal parts.

"Another large area of focus with the Gen 5 update were new features that improve aftertreatment performance," Copeland continued. "One of those was the introduction of Thermocoating.



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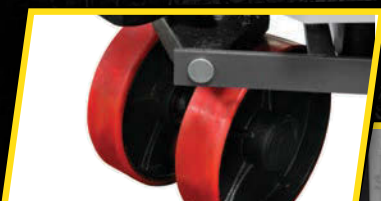
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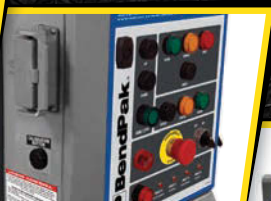
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When the vehicle begins to coast during a regen event, it engages by fueling three cylinders and applying engine braking on the other three. That adds zero torque to the flywheel but keeps the aftertreatment system very hot, resulting in less time to complete a regen event and a more complete regeneration.”

### Mack Trucks

At Mack, Andrea Brown, director of product management—complete powertrain, pointed to a holistic approach to drivetrain integration for optimum performance and lower operating costs. For example, the manufacturer recently made Mack Predictive Cruise Control with Econo-Roll standard for on-highway models.

The solution combines the mDRIVE automated manual transmission with GPS and monitoring of speed, engine load, and road topography when cruise control is set. The next time a truck is on the same route, it automatically knows the optimal speed and gear strategy for the upcoming terrain, improving fuel efficiency.

### Navistar

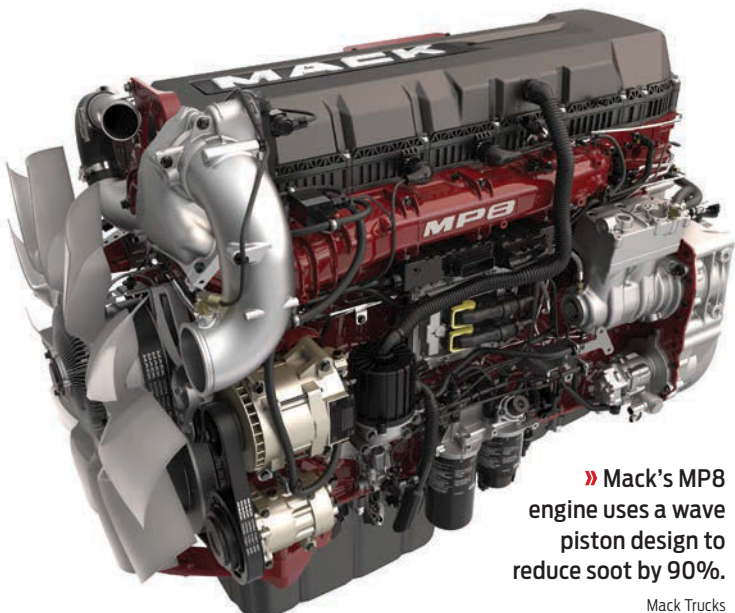
Navistar recently introduced the International S13 Integrated Powertrain.

“It’s much more than the engine,” said Chet Ciesielski, VP of Navistar’s on-highway heavy-Duty truck business. “Each component of the integrated powertrain was developed concurrently to ensure compatibility and that resulted in up to a 15% fuel efficiency improvement, a reduction in CO2 emissions, and a weight reduction.”

The S13 is designed with SCR as its primary emissions reduction technology. Without an EGR cooler that means 100% of the exhaust flows to the turbocharger in normal engine operating conditions, Ciesielski explained. That allows for a fixed geometry turbocharger and dual stage aftertreatment that deliver improved emissions control because with the EGR cooler eliminated, less soot and particulate matter are generated.

### Paccar

Paccar, which makes the MX-11 and MX-13 engines for its Peterbilt and Kenworth brand trucks, did not offer many details on the future, but Carl Hergart, director of strategy and planning



» Mack’s MP8 engine uses a wave piston design to reduce soot by 90%.

Mack Trucks



» Earlier this year, DTNA unveiled the Freightliner SuperTruck II.

DTNA

## SuperTruck II pushes future engine improvements

By Josh Fisher

“Diesel will remain the predominant propulsion choice for the foreseeable future—because it suits 100% of all applications,” asserted John O’Leary, DTNA president and CEO, to media in Las Vegas at the end of January. “It remains the most cost-effective and efficient way to move goods and people. And we’re far from done with it.”

The next day, DTNA revealed its Freightliner SuperTruck II. The SuperTruck program was initiated by the U.S. Department of Energy (DOE) as a 50/50 partnership with OEMs to improve long-haul Class 8 vehicle freight efficiency.

Freightliner’s version reached 12 mpg during testing. That was due not only to powertrain improvements, but aerodynamic, tire, and energy management ones as well. The powertrain specifically reduces fuel consumption by 5.7% fuel consumption over SuperTruck I. The noncertified prototype Detroit 13-liter engine features two-stage turbo and interstage cooling and a 13-speed overdrive transmission, and the powertrain can achieve lower downspeeding and more significant fuel savings through reduced drag overdrive.

SuperTruck II’s powertrain also features split cooling. The system consists of

high-temperature and low-temperature cooling circuits, working with two-stage turbocharging and Exhaust Gas Recirculation (EGR) cooling on the engine. Together, these technologies create more efficiency gains, enabling more aggressive downspeeding.

A smart engine lubrication circuit minimizes internal pumping losses, thus reducing engine parasitics by actively proportioning flow to the most sensitive components.

Innovations from this demonstrator truck will eventually end up on future production models, just as the first SuperTruck paved the way for modern Freightliner Cascadias.

Navistar, Volvo and Paccar (Kenworth and Peterbilt) are also developing prototypes.

Peterbilt unveiled its SuperTruck II, developed in conjunction with Cummins and other industry partners, last fall. The 15L Cummins engine also employs a 48-v mild hybrid system to power auxiliary systems. dual loop The exhaust gas recirculation (EGR) system has been made dual loop, and Waste Heat Recovery system converts waste heat into useful power, which improves efficiency and reduces CO2 emissions. Cummins reported that due to the recovery system and other improvements the SuperTruck II engine achieved 55% brake thermal efficiency (BTE).



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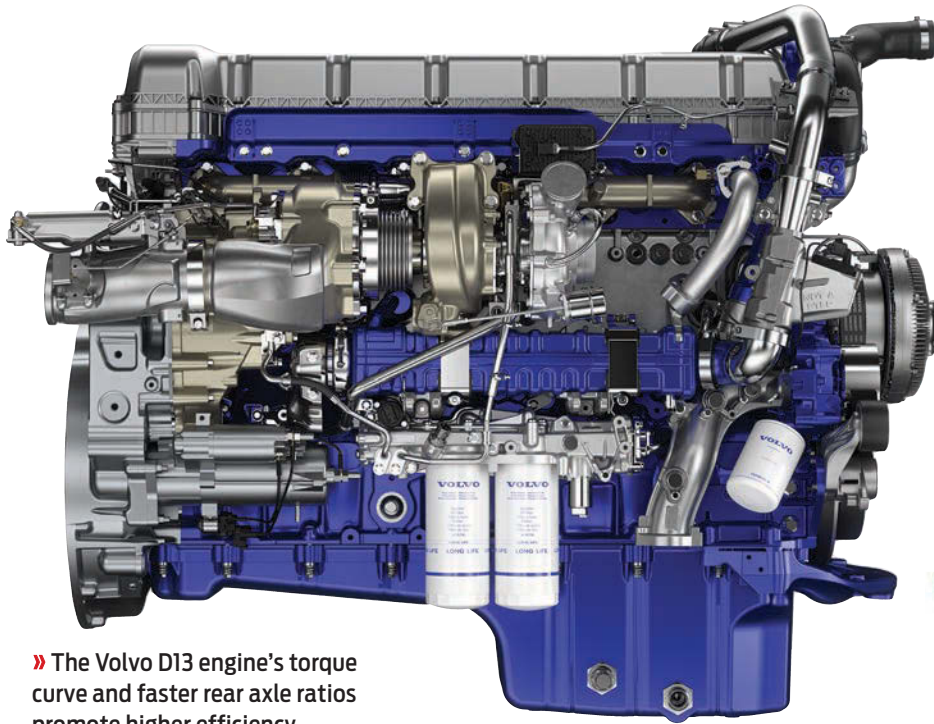


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» The Volvo D13 engine's torque curve and faster rear axle ratios promote higher efficiency.

Volvo

for Paccar Powertrain, did say: "Paccar Powertrain is positioned to meet the global emissions and fuel economy requirements over the coming decades. Alongside our significant efforts to develop a full lineup of electric powertrains, we will continue to invest and provide a product offering of clean diesel internal combustion powertrains for our customers for years to come."

### Volvo

Volvo's latest advancement is I-Torque, a blend of powertrain components including the OEM's D13 Turbo Compounding engine, 13-speed transmission, map-based I-See software, and ratios ranging from 2.15 to 2.17. The engines are designed with downspeeding to deliver higher torque and horsepower at lower rpm, noted Duane Tegels, product marketing manager, powertrain, Volvo Trucks North America.

For the powertrain, Volvo paired the 13-speed I-Shift with the D13 Turbo Compounding engine's torque curve and faster rear axle ratios to allow the drivetrain to use the top three gears at road speed for the most efficient application. Top gear is used when traversing rolling hills while direct drive delivers greater power and efficiency on steeper grades, and underdrive uses torque multiplication to gain more pulling power, Tegels explained.

That approach allows the transmission to control the engine's available horsepower for both grade and speed. To assist the transmission, I-See's map-based software defines topography before a truck ascends or descends over terrain, allowing the drivetrain to disengage from the engine during descent in cruise, increasing its efficiency. It also downshifts before climbing a hill to manage momentum for a more efficient ascent.

### Help from the fleets

While some manufacturers are not ready to comment on future engine products, improving the total cost of ownership by bringing efficient designs to market is a common goal. Overall, they all noted that developing solutions that

meet new emissions standards will be a key focus.

"The next generation of diesel engine development will continue to reduce GHG emissions, which will support the industry and our own sustainability goals over the next decade," Ciesielski said.

DTNA partners with fleets each time it develops new engine technology and provides them with units ahead of production to trial in their everyday operations, Copeland related. "These partnerships help us validate products and gain feedback while fleets get a preview of the engines prior to large order changes," he said. "That allows for confidence-building in the engine changes as well as technician prep and parts support readiness for new products."

"Connecting with the customers and verifying products in multiple duty cycles and environments is essential," Tegels explained. "Volvo places engineering prototypes in fleets to verify satisfaction, fuel efficiency, performance, and overall durability."

Mack is also in constant contact with customers through field sales and service experts to communicate their needs back to engineering teams, Brown noted. "We use this information to help direct product decisions," she said.

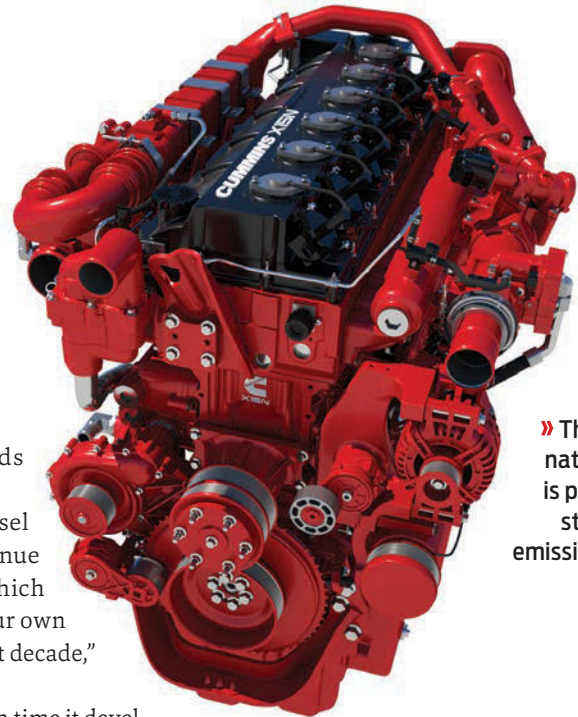
"Working with fleets on new technologies enables a robust and proven product at time of launch," Ciesielski said. "Many of our fleet customers are at the forefront of pushing for advanced technologies to help drive down total cost of ownership through better fuel economy, greater reliability, and longer lifecycles. They work closely with us to evaluate new products through pilot runs over many miles and help refine the designs."

Still, there are challenges for fleets and manufacturers to overcome as they learn about and adopt new engine technologies.

For example, fleets who plan out vehicle lifecycles and maintenance requirements are

**"It's a big decision to change from something that is working to the unknown because that can affect different areas within a fleet's operation."**

Duane Tegels, product marketing manager, powertrain, Volvo Trucks North America



» The X15N is a 15-l natural gas engine is part of Cummins strategy to lower emissions from newly sold engines by 30% by 2030.

Cummins

challenged about how to ensure equipment purchasing decisions and in-house training requirements align with the pace of change for new technologies, Ciesielski pointed out.

"New technologies always have some level of hesitation and are adopted by some fleets faster than others," Tegels said. "It's a big decision to change from something that is working to the unknown because that can affect different areas within a fleet's operation. Typically, new technologies come with new components, requiring technician training on service procedures, and there's the need to stock new parts and consider how a driver interacts with the truck."

Additionally, Zarich noted, resale value is important to customers. "And there is a learning curve with respect to maintenance intervals and serviceability," she said. "We are doing a lot of work to help communicate what this means for our customers."

For Copeland, the biggest challenge that OEMs and fleets share is how to improve engines the most while impacting fleets the least. "This balance is one that we work on constantly from the outset of engine development by bringing the customer into the process, often years in advance of product releases," he said. "Many years ago, the biggest issue with releasing new engine technologies was receiving real-time feedback and determining the root cause when there were failures. Today, we've put those issues behind us." ■

*Additional reporting by Josh Fisher and John Hitch.*

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# Alternative fuel engine outlook

Along with diesel, manufacturers are also looking ahead at alternative fuel engine solutions, including propane, natural gas, and hydrogen.

"The X15N big bore natural gas engine is essential to our commitment to improve NOx," said Katie Zarich, director of on-highway communications at Cummins. "It produces up to a 10% fuel economy and GHG improvement over an ISX12N and can be specified with ratings matching diesels up to 500 HP and 1,850-lb.-ft. of torque. Its size is also reduced compared to a diesel X15 and it weighs more than 500 lbs. less than a current 15-liter diesel and is 200 lbs. lighter than the current ISX12N.

"Our vision for a zero-emissions future includes internal combustion engines running on net zero-carbon fuels," Zarich continued. "We expect to see alternative fuels play a significant role in the future as we ultimately transition to net-zero technologies. Propane is already widely distributed, is low cost per mile, and offers reduced greenhouse gas emissions. Natural gas, and particularly renewable natural gas, also offer significant environmental benefits. And there is tremendous momentum for hydrogen."

Last year, Cummins unveiled a fuel agnostic powertrain solution with a common architecture designed to provide the flexibility needed to start integrating low carbon fuel technologies.

The H2 ICE low-emission internal combustion engine program, according to Zarich, allows for enabling next generation fuel agnostic midrange and heavy-duty engines by incorporating parts and components from existing platforms to drive cost advantages while also delivering reliability and durability equal to diesel. "H2 ICE will be familiar for our customers," she said. "It looks like an engine, it sounds like an engine, it fits where an engine normally fits, and mechanics know how to work on it."

At Detroit, product marketing manager Len Copeland noted the goal of offering only carbon-neutral vehicles by 2039 is centered on a dual-track strategy focused on battery-electric and hydrogen-based technologies.

"Hydrogen can be the better solution for flexibility and particularly in demanding heavy-duty transport and long-haul applications," he said. "The availability of corresponding infrastructure and sufficient green energy will be essential for a successful conversion to these zero-emissions technologies."

Daimler Truck also has a joint venture with Volvo Trucks—an independent company called cellcentric—to accelerate the development and use of hydrogen-based fuel cells for heavy-duty commercial vehicles. Prototypes have been undergoing testing on tracks and public roads in Germany since last year, and a North American introduction is targeted for the end of the decade.

The company also has plans to collaborate with Cummins to upfit a Freightliner Cascadia with a Cummins hydrogen fuel cell powertrain for use in North America. Upon successful validation, initial seed units are intended to be available mid-decade.

As part of the Volvo Group, Mack also will be able to take advantage of any future advances in hydrogen fuel cell technologies that cellcentric develops, said Mack powertrain director **Andrea Brown**. "We already offer trucks that run on diesel, CNG, and electricity," she added. "While diesel is the most popular fuel at the moment, we continue to monitor market conditions and local market regulations to deliver trucks that run on the fuel that best meets the needs of our customers."

Navistar already offers the electric International eMV Series medium-duty truck and IC Bus CE Series school bus and has other zero-emissions solutions in development. "We believe battery-electric vehicles have a clear advantage over fuel cell electric vehicles," said Navistar VP **Chet Ciesielski**. "But fuel cell electric vehicles also have a compelling use case in certain applications to make the best use of clean energy resources."

At Volvo Trucks, current offerings include renewable diesel and biogas driven products, and work is underway to develop fuel cell technology that can utilize green hydrogen. "There will be a need for

a combustion engine running on renewable diesel and biofuels as a complement to battery electric and fuel cell electric trucks," said John Bartel, director, product strategy-driveline. "Green hydrogen is another potential fuel source that could be used in a fuel cell electric or internal combustion engine.

"The different bio and renewable fuels have pros and cons in terms of their potential to replace diesel and their climate benefit," Bartel added. "But we believe the road to a decarbonized transportation future falls within various paths and that there is not a single solution to fit all applications."

For Cummins, a key challenge will be matching technology and infrastructure readiness. "While we see investment in infrastructure taking place, much more will be required to allow for adequate support of these new technologies," Zarich said.

"OEMs have to plan out their long-term investments," Ciesielski said. "Future solutions will require a much broader group of stakeholders to help build out an ecosystem that is supportive of new technologies."

## PROPANE AND NATURAL GAS UPDATES

Already proven in a variety of truck applications, propane and natural gas fuel system adoption and development is continuing.

In 2022, ROUSH CleanTech achieved its second emission-reducing certification for a Ford 7.3-liter V8 engine. Earlier, the company's propane engine in Blue Bird buses was certified to the optional ultra-low nitrogen oxides of 0.02g for the 2022 model year and beyond, making it 90% cleaner than today's emissions requirements.

The certification addresses the standard for reducing emissions from escaping the tank during refueling. For propane buses, the requirement is met by using a low-emissions quick-connect fill valve, which limits fuel vapors in the atmosphere.

In other propane news, Power Solutions International (PSI) announced that the Port Newark Container Terminal (PNCT) in Newark, New Jersey, after ini-

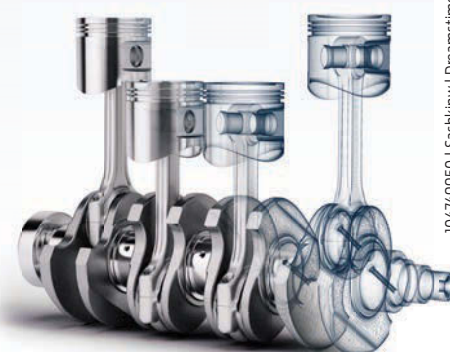
tial success with a prototype propane-powered port tractor, decided to move ahead with replacing its entire diesel-powered port tractor fleet and convert to propane. Throughout December, PNCT conducted a side-by-side analysis of a MAFI propane port tractor with current diesel models. The comparison accounted for fuel efficiency, run time, torque, power, and emissions output.

The MAFI port tractor is powered by PSI's 8.8-liter, 270-HP/565 lb.-ft. propane engine that is certified by the U.S. EPA and California Air Resources Board (CARB) to 0.02 grams of NOx per brake horsepower-hour (g/bhp-hr) in mobile, off-road applications. The spark-ignited, water-cooled engine can run on propane, natural gas, or gasoline.

Westport Fuel Systems offers its HPDI fuel system technology enabling heavy-duty trucks to operate on alternative low-carbon fuels with the same power, torque, efficiency, and performance as diesel engines. The system delivers a significant tank-to-tailpipe CO2 reduction over diesel, the manufacturer stated.

The HPDI fuel system technology uses compression ignition combustion initiated via late cycle direct injection of a small quantity of pilot fuel, followed by direct injection of a primary gaseous fuel, including methane, bio-methane, or hydrogen.

"Westport HPDI is a compelling technology when compared to fuel cell and battery electric vehicles, delivering a lightweight and simple modification available today for current internal combustion engines," said Westport CEO David Johnson. "The system is cost-effective for OEMs to industrialize and affordable for fleets to acquire while offering near-zero greenhouse gas emissions for heavy-duty, long-haul trucking."  
-Seth Skydel



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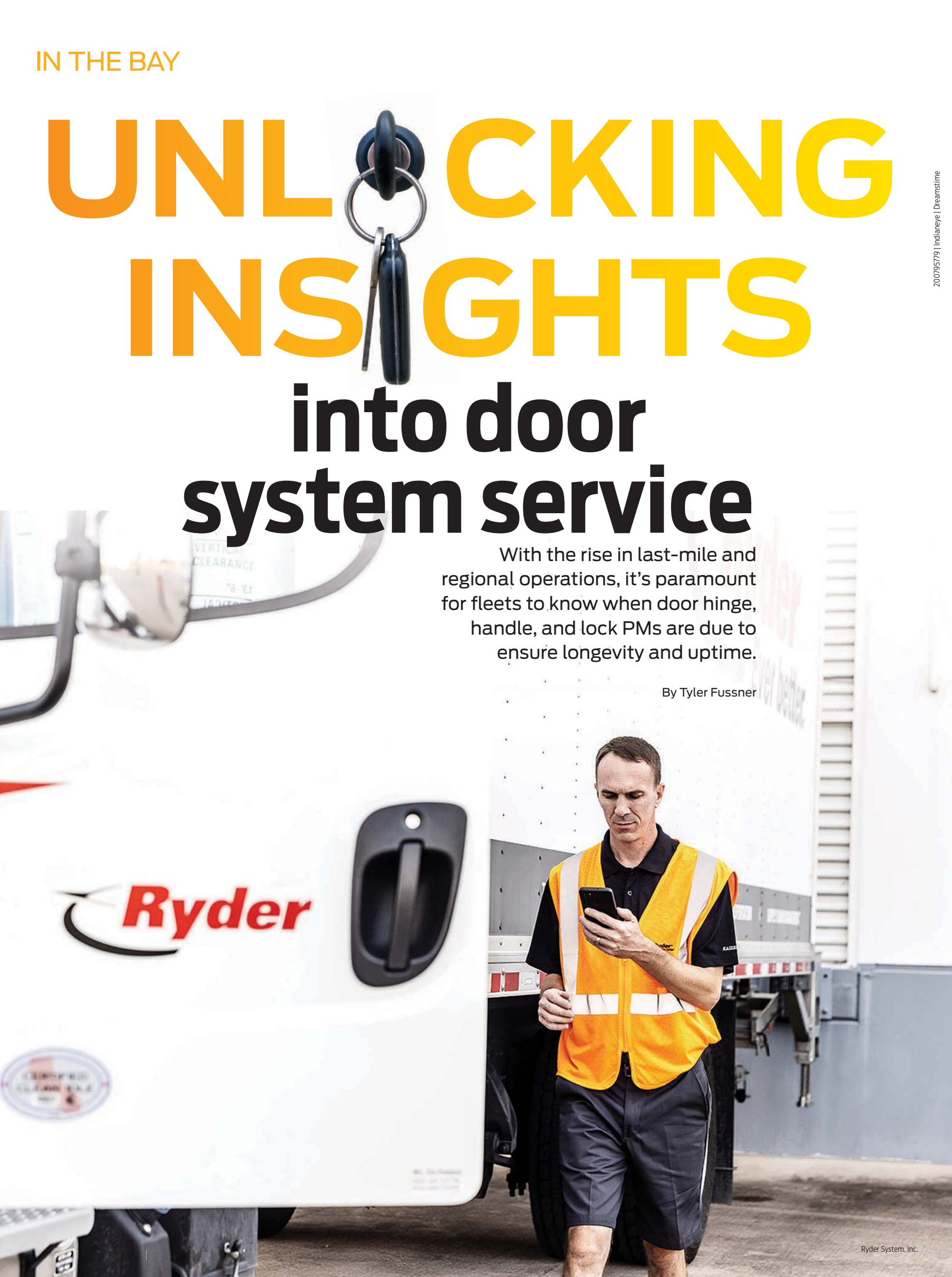
IN THE BAY

# UNLOCKING INSIGHTS

## into door system service

With the rise in last-mile and regional operations, it's paramount for fleets to know when door hinge, handle, and lock PMs are due to ensure longevity and uptime.

By Tyler Fussner





## [ DIAGNOSTIC & REPAIR ]

It's no secret that last-mile delivery and regional haul operations have been on the rise in the transportation industry. As such, it is fair to assume that the cycle rates for vehicle doors, latches, locks, hinges, and related components have increased alongside the growth of start-stop vocations in comparison to on-highway applications.

While onboard vehicle technologies and the use of telematics have seen widespread adoption, there seems to be an uncaptured data set pertinent to last-mile and regional duty cycles: cycle rates on door hinges, locks, and related systems. If a fleet is increasing the number of times a driver enters or exits a vehicle, opens and closes cargo doors, or engages and disengages locks, it is up to the maintenance department to make sure that all systems remain functional to maintain the safety of operator and cargo alike, all the while ensuring vehicle uptime and the mitigation of system failures.

### Monitoring usage

The Technology and Maintenance Council's (TMC) Recommended Practice (RP) 424 Door Hardware Performance Requirements establishes the minimum performance requirements for door hardware used on heavy-duty vehicles. As stated in this RP, TMC advises the seals, latches, handles, locks, and more to remain fully functional for a minimum of one million miles for on-highway applications.

For duty cycles other than on-highway operation, such as last mile or regional, the RP suggests thresholds should equate to a time period of four years based on the average expected cycle use of such devices in those vocational conditions.

Furthermore, RP 424 states that performance validations should include—but are not limited to—strength, dust resistance, vibration resistance, ozone, corrosion resistance, low and high temperature evaluation, chemical resistance, and water resistance. It also suggests that components such as door seals be evaluated in conjunction with the mating surfaces that they are fitted between during normal use.

Though RP 424 is intended to establish guidelines for heavy-duty on-highway operations, it is a good reference point for maintenance personnel who monitor cycle rates on last-mile and regional commercial vehicle doors and related hardware. However, in order to ensure that such systems are functioning as intended and are not nearing end of life or imminent failure, some fleets may look to capture more accurate data to get a better understanding of the actual cycle rates and functionable timeline.

David Kegley, director of training and development at Ryder System Inc., said that currently, "There's nothing that we are using today that tracks that piece [of data] that says this is how many times a door opens and closes."

However, in brainstorming with people in Ryder's Technical Assistance Center, Kegley related that the door does contain a switch that

actuates the dome light within the cab. It would be possible to track that information and use it to accurately assess the number of times a vehicle door is opened and closed.

"If we had that data, we could use it the same as we do for starters or really anything that you think about when we start changing it by cycle time," Kegley said. "We know that there is a limited life to any mechanical piece of equipment. Depending on how it is used or abused could change that a little bit, but there's always that limit. And if we knew what the limit was [for doors and related components] and we could measure it, you could always get ahead of things."

getting weaker. So, on the next inspection, tell the tech to check it out. Do you notice that the hinge is bending?"

He noted that a door failure leads to vehicle downtime and higher costs for the fleet.

Bhardwaj added the computer-aided method works because it's purely "data analysis, and it's giving an insight in a way that you can't get by manually trying to analyze this data."

For delivery fleets, having a precise measurement of stops and packages could also be used to monitor cycle rates on doors and hinges.

"Tracking the usage rates on doors and locks starts with your understanding and accuracy of the stops your drivers are making," suggested



» Avoid additional stress on hinges through the smooth opening and closing of all doors.

107780307 | Supached Pokasaeng | Dreamstime

**“If you know the number of stops, you can determine how many times it’s necessary to open and close doors, locks, and hinges.”**

Angelo Cinquegrana, AVP and GM, Amerit Fleet Solutions NAS Segment

Another method for tracking cycle rates is to correlate door usage with ignition cycles, explained Shiva Bhardwaj, CEO of Pitstop, a software solution provider that implements vehicle data and predictive analytics to improve fleet uptime.

But artificial intelligence isn't required to get ahead of door issues.

"A lot of it comes down to physics," he said. "People think it is some sort of complex algorithm; it's actually quite simple." Bhardwaj related how a last-mile delivery fleet came to Pitstop for insight into failing cargo door hinges on their vans.

"We looked at the ignition cycle, on and off, because you couldn't get that back door opened and closed [without cycling the ignition]," Bhardwaj said. "We correlated, 'Typically, in your fleet when your ignition cycle hits 400 or 500, then there's a likelihood that this hinge is

Angelo Cinquegrana, AVP of field operations and GM for Amerit Fleet Solutions (AMS). "You have to know how many stops and roughly how many packages are going to each location. If you know the number of stops, you can determine how many times it's necessary to open and close doors, locks, and hinges."

### Seeing the signs

The good news is that immediate and catastrophic failure of such systems is rare. Rather, there are warning signs that the maintenance department and vehicle operators should be aware of that could point toward service and repair needs.

The number one indicator of need for service is noise.

"If there's ever noise opening the door ... think about a driver having to open and close that door multiple times a day ... that can get a bit





» Technicians should inspect for wear and tear during PMs on cables, latches, and related hardware.

224366487 | Mr.chaiyasit Duangchay | Dreamstime

annoying,” Kegley related. “Noise is actually one of the bigger complaints that we have when we start identifying things.”

Another top identifying factor is looseness. Door handles or hinges that feel loose are another indicator that service is needed.

“You may need to put more effort into opening or closing the door,” said Dirk Woerpel, manager, Ford Pro NA marketing and strategy. “Doors are meant to be tight fitting; if it doesn’t feel smooth and tight, it may be a sign that a part is wearing out.”

Kegley recommended paying special attention to latch adjustments during installation or repair to avoid looseness.

“The latch itself has an adjustment to it. And when you replace either side of that, you’re going to want to make sure that it is adjusted so that

the door stays snug,” he said. “If you read through the manuals, most of them use the word ‘firm.’ It has to close ‘firm’ and stay snug. If it’s loose on the seal, it’ll rattle, and that’ll cause extra wear. Any time any of the hinges or the latches are replaced, even if they’re removed for some other repair, when you put those back on again, you want to make sure that door has a firm feel when it closes, and it’s snug when it’s latched so it doesn’t vibrate.”

Cinquegrana recommended replacing the latch and lock in sequence, together.

“You don’t always need to replace the hinge with it, but if you’re replacing any pieces that interact together, it’s a good tip to replace all the pieces at once so they continue to interact well together,” he explained. “Replacing a worn piece and keeping a semi-worn piece can temporarily solve an issue, but it won’t fix the problem entirely.”

Cinquegrana also noted that keeping an eye on usage patterns may help fleets identify abuse or neglect.

“If Driver A makes 30 stops less than Driver B, but Driver A is seeing more wear and tear on the doors, locks, and hinges, that could indicate misuse in some capacity or some type of part failure,” he said. “More important than how frequently your drivers are using the doors and locks is how your drivers are treating those assets.”

When a fleet spots warning signs of failure, good technicians will want to diagnose the root cause. The most common culprit in this case is a lack of lubrication.

“The most important thing is lubrication,” Kegley emphasized. “Lack of lubrication is definitely the death of any of those components. Abuse is always there, but lack of lubrication is probably the key thing that we see when we see the failures.”

There are, however, other tips that drivers and technicians should be aware of to avoid unnecessary wear and tear on door components.

“Encourage drivers to treat a vehicle as if it were their own,” Woerpel offered. “What we’ve found in working with many last-mile delivery companies is that drivers are under pressure to deliver a lot of packages in an eight-hour shift. Often, the driver will get out of the vehicle and let the door slam closed on its own. This creates more wear and tear on the hinge and door stopper than usual, and it can cause these parts to wear out more quickly. Sometimes, the driver kicks the door open, putting strain on the door’s hinges. It’s similar for the sliding doors. Often, a driver will hop from the front seat to the back, grab a package, and go out the sliding door, closing it with a heavy slam.”

Woerpel also explained that Ford Pro Telematics software offers in-cab coaching capabilities for support in helping to manage and change operating behaviors.

“Connected vehicle data, sensors, and technology that learns driver behaviors to adapt vehicle performance are all going to play a part in helping to prolong the vehicle lifecycle long term,” he said.

The low-tech solution?

“The best practice to avoid abuse or misuse is to slow down and open, close, and shut latches, locks, and doors appropriately,” Cinquegrana noted. “Avoid slamming doors, kicking doors open, and knocking doors shut, for example.”

“[These components] live pretty long without the abuse of flying wide open or getting rattled loose,” Kegley agreed.

Also, ensure the door is closed before moving the vehicle.

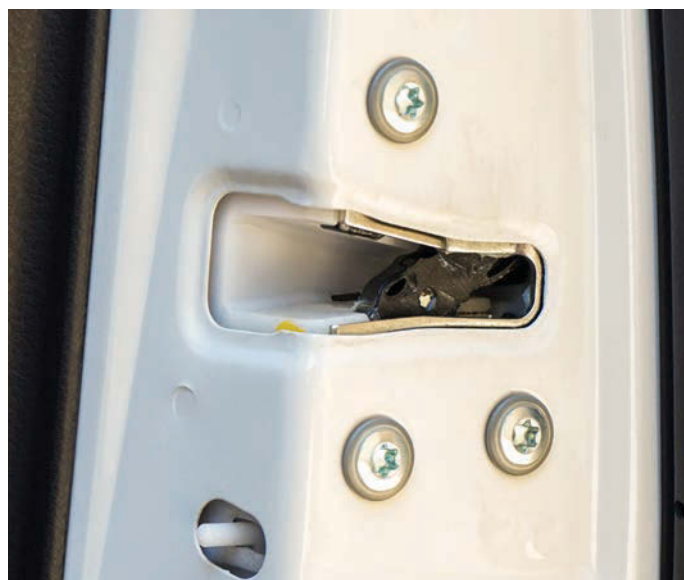
“We found that there are a lot of incidences where somebody thinks they are just going to back up a little bit and they have the door open, and when they back up, the door gets caught on something,” Kegley said. “Don’t move the vehicle with the door open. It sounds simple. It sounds funny. But it has caused some situations.”

Another measure to prevent unnecessary wear on doors and their components is to avoid stacking packages against the door, hinges, latches, etc. Cinquegrana suggested operators keep the surrounding area of the door free and clear so that unwanted pressure from the weight of the packages is not applied to any door components.

## Lock-tight preventive maintenance

The key to uptime, in this instance, is thorough and consistent preventive maintenance. Doors, locks, hinges, and other related components should—if not already—be accounted for in a fleet’s PM inspection list. And beyond maintaining the vehicle, maintenance costs can also be adequately controlled through rigorous PM, as Ryder’s Kegley attested.

“We actually went through and looked at the cost of replacement door handles,” he said. “Think about how last mile has really kicked up in the last two to three years. When we went back and looked at the cost that we’re having per vehicle, just average cost of door components, we’re pretty much flat. We’re just a little bit lower than what our cost was per vehicle in 2018. Even with the



» Lubrication is the key to uptime when servicing door latches and locks.

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high usage, and the fleet count which has gone up about 30%, the cost per vehicle right now is still pretty flat with where we were before in that field.”

Kegley adamantly attributed this to Ryder’s preventive maintenance practices.

“We schedule our trucks for an interval, and part of that PM inspection is the door, locks, catches, hinges, all that stuff,” he said. “As long as we maintain the same preventive maintenance practices that we’re doing and pay attention to those when we do replace it, I think we’re going to stay right there.”

The maintenance team’s strategy should be to use all the tools and information available to best structure the PM to account for the door system in its entirety.

“While we design vehicle doors and hinges to last for the life of the vehicle, fleet managers can add a visual inspection of doors, locks, and hinges to a regularly scheduled maintenance program, for example, every 10,000 miles,” Woerpel said. He continued, stating that the Ford Pro Telematics app is one tool fleet maintenance management can use to track physical inspections prior to vehicle operation, “which can help to track emerging maintenance needs.”

TMC’s RP 1401 Cab and Body Preventive Maintenance Inspection Procedures is another tool fleets can use to structure their PM. This RP offers a standardized preventive maintenance procedure for truck bodies using a checklist that covers many light- and medium-duty vehicles. It is just one section of what should be a comprehensive PM manual for light- and medium-duty vehicles but can point maintenance teams in the right direction to establish guidelines when addressing doors and related systems and components.

The RP itself does not provide specific time or mileage intervals to which such PM inspections should be taking place. Rather, such intervals should be determined by maintenance management based on vehicle specification, application, OEM and component manufacturer recommended intervals and warranties, and vehicle maintenance history.

RP 1401 details specific steps technicians should take, along with points and components of emphasis to be focused on, when performing a PM pertaining to the door system. Most importantly, the RP suggests that technicians lubricate all door latches, hinges, and locks during the PM.

“The best preventive maintenance practices for doors and locks are to keep them well lubricated, especially in colder climates, to help prevent rusting, collecting of water, or freezing,” Cinquegrana stated. “During every PM, these locks and latches should be lubricated.”

“Lubrication is the secret to longevity,” Kegley agreed. He related that Ryder uses a single food-grade lubricant across its fleet—whether it is for the rear doors or side doors, because they want to accommodate anything that customers may be hauling inside the vehicles.

AMS prefers to use white lithium grease on locks and latches, Cinquegrana explained.

“In colder climates, white lithium grease can make a drastic difference in preventing wear and tear on locks and latches,” he said, adding that AMS uses WD-40, or “something similar,” when lubricating hinges.



» Fleets can get creative in tracking cycle rates for doors to have a better understanding of the lifetime expectations of related hardware in order to perform service ahead of failure.

Ryder System Inc.

### Technology and Maintenance Council Recommended Practice 424 Door Hardware Performance Requirements

TMC RP 424 establishes the minimum performance requirements for door hardware used on heavy-duty vehicles. TMC expects the following list of door hardware and components to remain fully functional for a minimum of one million miles in on-highway applications.

- Seals
- Latches
- Handles
- Hinges
- Linkages/rods
- Springs/clips
- Locks
- Window lift mechanisms (either manual or powered)
- Screws
- Knobs
- Switches (door mounted)
- Electrical connections
- Mirror mounts
- Armrests



### Technology and Maintenance Council Recommended Practice 1401 Cab and Body Preventive Maintenance Inspection Procedures

TMC RP 1401 offers a standardized preventive maintenance procedure for truck bodies using a checklist that covers many light- and medium-duty vehicles. It suggests that, when performing a PM on doors, technicians should:

- Check for ease of operation. Lubricate rollers and slides.
- Check spring counterbalance for attachment and operation.
- Check locks for proper operation.
- Check condition of seals. Replace any that are worn or torn.
- Check that doors close and latch tightly.
- Check overhead door tracks for secure mounting and condition of channels. Lubricate rollers.
- Check rear door cables for secure attachment and fraying. Replace any frayed cables.
- Check door panels (inside and outside) for any signs of leakage. Replace seals as needed.
- Check door strap for secure mounting. Check for fraying, wear, or weak spots.
- Check door strap for attachment per manufacturer’s recommendations.
- Lubricate all door latches, hinges, and locks during the PM.

And during a PM, the experts suggested replacing dirty or old lubricants without hesitation.

“If it is dirty, we clean it with a cleaning solvent,” Kegley said. “But looking at what we’re seeing, it’s mainly as long as we keep them lubed at the intervals, we get pretty good life out of them.”

Whatever a fleet’s strategy for monitoring usage or their capacity to see the warning signs for

service in the doors, latches, and hinges, what is most important is adherence to a thorough preventive maintenance schedule.

“Do the basic things right, and you’re gonna stay okay,” Kegley surmised. ▀

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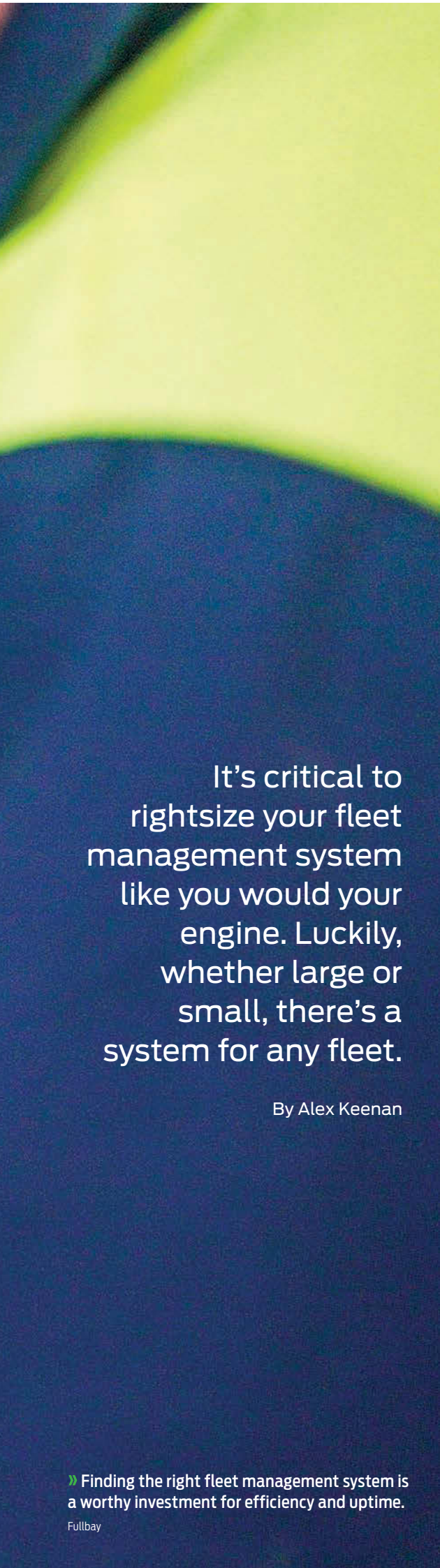




# RIGHTSIZING

your fleet maintenance system





## [ SHOP MANAGEMENT ]

**J**amie Hagen is the proud owner of a small fleet called Hell Bent Xpress. Not only does he run the South Dakota-based fleet, but he's also dispatcher, light maintenance technician, fleet manager, and, sometimes, even driver. He's a quite capable social media manager, too, and often shares his trials and tribulations, along with fuel efficiency wins, on Twitter and LinkedIn. He's known to post updates whenever he purchases a new truck, and these posts have been more frequent the last few years. He's a Mack guy through and through and his fleet just hit a dozen in January with their latest purchase of a 2023 Anthem with the Super Econodyne package and Bahama Blue Metallic paint job.

"Certainly it's not much, but for a guy who is nobody special and grew up with welfare on a small farm, it feels like a milestone every time we are able to add and grow," he posted on LinkedIn after obtaining that newest Mack Anthem.

Since 2021, Hell Bent Xpress has tripled its fleet size. It's still obviously a very small fleet, but with all the roles Hagen fills for his company, his workload likely surpasses most fleet managers in the business.

To ease that workload, Hell Bent Xpress hit another big milestone in the fall of last year: purchasing a fleet maintenance platform. Hellbent went with Samsara's platform because they also handle the fleet's electronic logging devices (ELDs) and cameras.

"They sold me on the whole platform because we could not only have our ELD, but we could also have cameras, dispatching, and maintenance tracking," Hagen recalled. "It sounded better than me writing everything down."

Hagen noted in the earliest days of his freight shipping business that "everything was on a notebook, and then we switched to a little form, and then in a file. And then it seemed way easier and quicker to look up [fleet data]."

For Hagen, organizational necessity was the tipping point for investing in a fleet management system, especially with his burgeoning fleet growing to a dozen trucks.

"It saves time, but the biggest thing was just getting lost in the sauce," Hagen clarified. "It's starting to become apparent that I need more organization, [and] if I'm not going to hire somebody to do these roles, which when you're this small you really can't afford to do, it's cheaper to digitize than to bring another human being onboard."

But finding the right fleet maintenance management system can be an investment in and of itself, and one that a busy fleet or shop might hesitate to allocate time to. However, the investment is often well worth it, as the benefits can drastically improve uptime, reduce costs, and overall give managers more peace of mind. And the best part is, there's an

option for every fleet out there, big or small. The only question is which is the right size for your fleet?

### Visibility and transparency

One of the main benefits of a maintenance management systems is the ability to have a constant, real-time data feed monitoring a fleet's performance. But while smaller fleets question the need to monitor a low number of assets, having an immediate view of every vehicle's health and status can provide immediate investment returns.

**"If I'm not going to hire somebody to do these roles... it's cheaper to digitize than to bring another human being onboard."**

Jamie Hagen, owner,  
Hell Bent Xpress



» Hellbent Xpress owner Jamie Hagen with one of his 12 trucks.

Courtesy of Jamie Hagen

It's critical to rightsize your fleet management system like you would your engine. Luckily, whether large or small, there's a system for any fleet.

By Alex Keenan

» Finding the right fleet management system is a worthy investment for efficiency and uptime.

Fullbay



“We find that people who run a number of assets, there’s lots of overhead—lots of costs associated with running those assets. And sometimes they don’t need all of them,” said Will Wycks, chief marketing and product officer, Chevin Fleet Solutions, which offers the FleetWave platform.

The platform includes a code-free report builder called KPI Wizard that allows users to quickly add or remove items from a list of best practice fleet industry key performance indicators.

“FleetWave analyzes lots of data to provide clear insight in order to say ‘What is the right size of the fleet that you need to run?’” Wycks noted.

The data analytics aspect is something every fleet can take advantage of, as every vehicle and shop is generating data all the time.

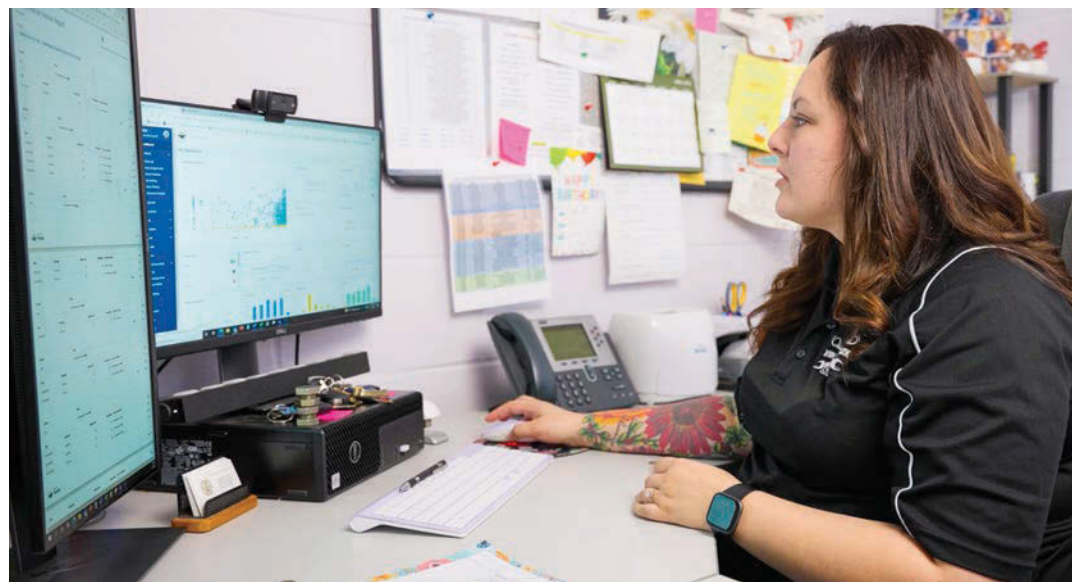
“I would encourage anybody trying to understand their fleet costs or compliance to consider fleet management systems, because if you can’t measure it, then you can’t manage it,” Wycks said.

For specific example, one of the maintenance platform Fleetio’s customers was a small landscaping company called ProQual Landscaping. As their business grew, they realized that they needed more insight in managing their maintenance operations.

“As they expanded, they were spending too much time on repairs and experiencing high vehicle downtime,” said Daniel Simpson, product marketing manager at Fleetio. “When ProQual became a Fleetio customer, they immediately adopted our custom digital inspection forms. This gave them insight into the state of their fleet and allowed them to set up unique maintenance schedules for each type of asset they had.”

After adopting the fleet maintenance system that helped them “create proactive maintenance plans,” the Tempe, Arizona-based fleet cut costs by 33% in the first half of the year versus the previous timespan without one, according to Jeremy Bader, ProQual Landscaping’s Implementation Manager. This is because the platform combines OEMs’ maintenance recommendations with fleet inspection data.

“It takes the guessing game out of maintenance,” Bader said. “Everyone knows when a vehicle will be out for service and everyone knows when it’s supposed to be back.”



» Fleet management systems increase communication between the front and back ends of operations. Fleetio



» Most CMMS platforms include accessible dashboards for tracking metrics and KPIs.

Chevin Fleet Solutions

**“I would encourage anybody trying to understand their fleet costs or compliance to consider fleet management systems, because if you can’t measure it, then you can’t manage it.”**

Will Wycks, chief marketing and product officer, Chevin Fleet Solutions

But managing fleet costs isn’t just limited to maintenance schedules. It can also help smaller fleets decide when it’s time to grow their business or how they can stretch the vehicles they already have.

Meanwhile, this transparency into fleet efficiency is even more important for fleets with several hundred trucks at their disposal. Like the differing KPIs any one fleet might choose to

monitor, management solutions also vary in their applicability for each business.

There’s no one-size-fits-all solution, noted Matt Wiedmeyer, CTP, director of fleet services at Fleet Advantage, which provides fleet lifecycle management solutions. What’s good for a grocery chain’s fleet might not work as well for a heavy hauler.

“An entirely different system may be better because their units work on an entirely different dispatch system and aren’t home every night,” Wiedmeyer said.

So, how does Fleet Advantage help its customers?

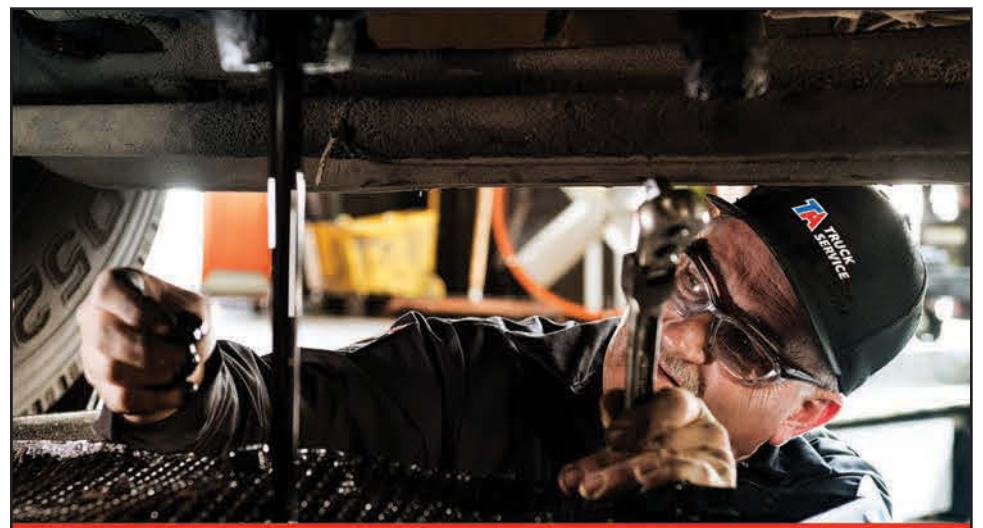
“We’ll sit down and we’ll talk with them,” Wiedmeyer continued. “We will look at what their highest costs are, whether it’s tires, brakes, or the aftertreatment system, the things that can sometimes kill a fleet.”

Identifying these pain points are particularly critical for large fleets, when each minute issue a smaller fleet might be able to postpone is multiplied across hundreds of vehicles, leading to marked financial losses.

This is especially true in the years following the COVID-19 pandemic, which have been rife with vacillating costs, inflation, and supply chain difficulties that hindered expenditure management for fleets.

“In [these] times, it’s important that you ground yourself,” said Brian Antonellis, SVP of Fleet





Operations at Fleet Advantage. “If a customer came to us and said, ‘Hey, [my fleet] feels kind of erratic; I’m having trouble getting trucks,’ we would say, ‘Okay, let’s start from the beginning. Let’s understand your data.’”

This prompts Fleet Advantage to drill down into the fleet’s components, financial costs, and miles per gallon to create a plan that leads the customer to their intended stability.

“And it’s not just about a one-year strategy, but it’s about a three- or five-year strategy around making sure we set them up on a lifecycle [where] we’re going to understand what the cost is,” Antonellis explained. “We’re going to understand how it’s going to change over time and then help them get back to a place where they feel comfortable.”

## Compliance and inspections

Nowhere is this transparency and visibility more critical than in vehicle inspections, a topic that all fleets large and small must address. Whether it’s via Fleetio’s GPS tracking a driver’s path around a vehicle during an inspection or Zonar’s Electronic Verified Inspection Reporting (EVIR) solution, which requires operators to scan specific tags in each inspection zone before they can move on, federal compliance is a key asset of many fleet management systems.

“The primary constraint that we all need to comply to is [Department of Transportation] compliance,” said Dave Walters, senior solutions engineer, Trimble. “So, we always start there. We have to have a PM system that supports DOT compliance. Are we inspecting the vehicles at the proper time? Are we maintaining compliance when we go to California? Do we have a current California BIT inspection on file?”

These granular questions are particularly impactful for smaller fleets, where the consequences of a violation are less easily absorbed than by a larger organization. But even so, a bigger transportation company may be more vulnerable to insufficient pre- and post-trip inspections, or pencil-whipping, simply for their size making accountability and enforcement more difficult.

“If you look at safety overall, the violations that are found at roadside inspections are typically tires, mirrors, and brakes,” said Fred Fakkema, VP of Safety and

Compliance, Zonar, and former commander of the Commercial Vehicle Division of the Washington State Patrol. “Those are all critical components of your pre-trip [inspection]. So, we set it so it’s done right, and done right the first time to ensure vehicle checks are up to code.”

Killpack Trucking experienced this inspection verification firsthand as well as the resulting maintenance and communication benefits.

“Before switching to Zonar, they were doing inspections on the honor system, kind of like what some fleets still do on paper,” Fakkema recalled. “Drivers come in after completing the trip, they leave a piece of paper on the dashboard to indicate what needs to be fixed. Well, when you think about that, and the maintenance person reading the writing, you realize this may not be the clearest way to share information about necessary safety and compliance updates for the vehicle.”

## Communication and efficiency

Communication issues such as these between drivers, technicians in the shop, and back-office management are another frequently mentioned benefit of fleet management systems for organizations large and small.

“I don’t have to wait for a check engine light come on, [for] a driver to see it [and] evaluate whether or not he wants to call me,” Hagen said. “[Samsara] automatically sends me a notification, whether they like it or not; it’s completely autonomous.”

Additionally, fleet management systems provide their users with constant access to their fleets, regardless of where they are or what they’re doing—at least, as long as they have a solid internet connection.

“I don’t have to be at my desk to access information; I can just hit the app,” Hagen continued. “I can find my loads, I can dispatch, I can look at my maintenance, I can look at the live feed of the video going down the road.”

But this efficiency extends beyond real-time asset information. For maintenance shops, management platforms can organize technical information as well.

“Over the years and even to this day, we see a lot of platforms out there that have a telephone book of information, or it used to be the CD ROM [in the shop],” said Chris O’Brien, chief operating officer, Fullbay. “It was overwhelming; there

# Planning For Your Next PM

By **Daniel Mustafa**

Director of Technical Service for TA Truck Service

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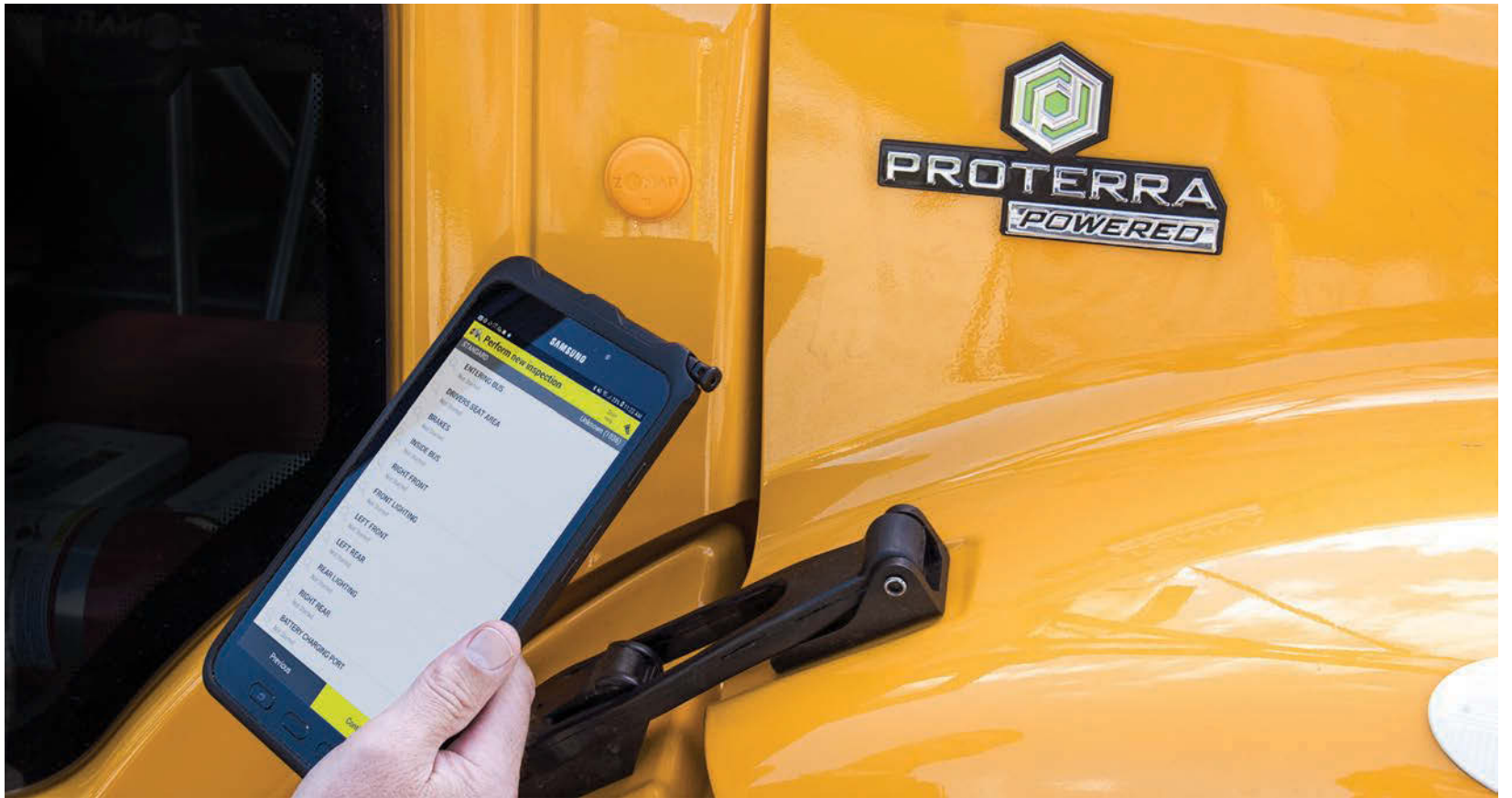
With these PM options in mind, we hope you’ll stay safe and productive out there on the road. Visit your nearest TA Truck Service for all your preventive maintenance needs. Our highly trained technicians are ready to help, no matter what make or model you drive.



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» Zonar utilizes a patented Electronic Verified Inspection Reporting system that places tags at strategic points around a vehicle, ensuring thorough inspections.

Zonar

were three-ring binders that were bigger than the accounting department... We have all of that baked into our software.”

Meanwhile, larger fleets need streamlined communication more than ever.

“For fleets with 500 to 600 trucks and multiple depots in multiple locations, that digitized communication makes life a lot easier given the volume of repair that’s taking place in a big fleet,” said Mark Wasilko, Decisiv VP of marketing. “It certainly improves that fleet manager’s ability to oversee and better control the process.”

Sometimes this digital communication translates directly into time savings, as it did for a large linen service delivery operation using Shell Fleet Solutions’ Fleet Maintenance Hub.

“Their pain point was the amount of time one of their divisions was spending on consolidating invoices when it came to maintenance,” said Jim Perkins, director of fleet solutions, Shell. “So, we introduced the product to them, [and] they wanted to trial it at this one particular distribution center. If they could just save 10% of the time they were spending on maintenance administration, they were sold.”

According to Perkins, the company signed up for the solutions platform within two weeks thanks to their administrative efficiency.

## When a fleet maintenance system is right for you

Having considered the various benefits of maintenance management systems for various sizes of fleets, then comes decision time. Ultimately, fleet management must calculate the cost/benefit analysis and whether the price of a platform outweighs the savings they gain from it or not.

**“When you put it on the other side when you have 1,000 vehicles, now you’re talking huge scale. And small changes can make huge improvements to your bottom line and to your time-saving.”**

Jim Perkins, director of fleet solutions, Shell

“If you think about the small fleet, somebody that only has a handful of vehicles, costs and savings are almost critical to their survival at the time,” Perkins reasoned. “When you put it on the other side when you have 1,000 vehicles, now you’re talking huge scale. And small changes can make huge improvements to your bottom line and to your time-saving.”

Additionally, there is the argument to be made that beyond cost savings, the maintenance visibility offered by various platforms is more critical than ever, especially as fleets need to stretch the viability of their vehicles due to the delay in getting new parts and components.

“[For] a fleet that doesn’t even have its own shop to do PM work or is relying on local ISPs to do the PM work, that portal access to the network, so they can track the work being done, is every bit as important to a small fleet as it is to a midsize fleet or a large fleet,” Wasilko agreed.

O’Brien distilled down fleet considerations for a management platform even further.

“Should I have a fleet management platform?” O’Brien asked. “I go back to some questions to ask [fleets], starting with ‘Do you repair your own equipment?’ And that would be the first indication of should you have management: Absolutely.”

O’Brien argued that when a fleet provides its own repairs, it takes on a measure of legal responsibility for any accidents or repairs due to accidents for the vehicle, making maintenance management not just a question of convenience, but one of public safety.

In the end, whether or not a fleet procures a fleet maintenance management platform and which one they select is entirely driven by the fleet manager and the KPIs they want to achieve for their business. The decision will be different for each fleet, with the common goal of greater ease for managers, technicians, and drivers alike.

“[A maintenance management system] simplifies the day-to-day responsibilities for fleet owners by automating maintenance workflows,” Simpson said. “It allows them to reduce fleet costs and focus on running their primary business.”

And ultimately, being able to focus on what they do best—getting necessary goods, parts, and supplies from one end of the country to the other—without worrying about downtime for maintenance is all that any fleet needs for smooth operation.

“On the maintenance side, it’s a no-brainer when they put the whole package together,” Hagen concluded.

The only question that then remains is what fleet managers and owners will do with their newfound time and peace of mind.

“Before, things would slip through the cracks,” Hagen explained. “Now, it’s freed me up to add more equipment.” ■

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» PTOs can power any number of truck mechanical systems.

Altec

# Fresh look at old-school power on demand

PTOs have been faithfully serving truck fleets for over a century now. Are they about to enter into the modern age?

By James Alfred

**T**he International Harvester company generally gets credit for introducing the first viable power takeoff drive (PTO) in 1918. And ever since, these virtually bulletproof drive systems have been letting vocational truck owners do far more than simply transport goods. PTOs can power any number of mechanical systems on a truck—from booms and buckets to powered accessories like augers or cable reels.

But in an age of connected, self-diagnosing components, systems, and vehicles, even tried-and-true PTOs are undergoing changes that will allow them to perform even better for fleets.

Tim Bauer, VP of aftermarket at Eaton Vehicle Group, said most of the improvements for PTOs in the current market are around material enhancements to improve durability and reliability. He noted there are also more options offered in terms of gear ratios, mounting types, and other tweaks to accommodate higher pressures and lower-speed pumps.

“Rear mounted PTOs are now gaining popularity in the U.S. market,” Bauer explained. “They are great for tight spaces and typically are easier to install and set up. The rear location provides improved ground clearance and more room to directly mount the pump to the PTO and facilitates easier hose routing.”

Another important trend that is being closely watched by OEMs and suppliers is the shift toward more battery-electric trucks—particularly hybrid drive powertrains.

“Typical applications remain the same,” Bauer noted. “However, electrification on some applications will change how the mobile power systems are powered, which will require some changes to the design of the systems and the PTOs.”

Electrification of some vocational applications will certainly present some opportunities for new configurations, Bauer explained. One example is split shaft boxes designed to charge batteries. “As a result,” he added, “we continue to evaluate trends in the market and will have products available when the markets transition.”

Daimler Truck North America has been doing this for a few years, notably with the Western Star 49X. The vocational truck launched in 2021 and featured customizable PTO presettings.

“We’ve given operators the ability, through the new Driver Command Center in the instrument cluster, to control engine speed when in PTO mode simply using steering wheel buttons,” explained Dan Silbernagel, vocational segment strategy manager at DTNA.

“There have been many enhancements with new technology in electrical systems and powertrains; truck equipment manufacturers (TEMs) and fleets can interface with PTOs in new ways,” Silbernagel added.

According to Silbernagel, fleets now can specify more truck and powertrain functionality as it relates to PTO engagement and functionality than before. TEMs and fleets can spec or program safety interlocks to protect their equipment or the operator, for example, as well as program PTO parameters and body functionality through web-based applications.

He also noted DTNA’s Custom Hardware and Electronics Configurator (CHEC) tool makes it easier to limit vehicle speed when the PTO is engaged, along with several other functions. Other enhancements include the QuickFit powertrain connector and the ability to spec remote PTO engagement.

Still, fleets currently see PTOs as simple mechanical power boosters and are trying to understand how and where they need to modernize.

“For the lion’s share of what we do, the PTO is still pretty much a straightforward piece of equipment,” said Ken Calhoun, optimization manager, Altec. “That said, the moves toward electrification and connectivity are driving changes to how PTOs work and the benefits they’ll offer drivers, workers, and maintenance technicians.

“So, as an industry, we know these changes to PTOs are coming,” Calhoun added. “But it’s very uncertain right now because we’re all trying to figure out what changes to PTOs make sense and offer the most benefits for fleets.”

Kris Ptasznik, powertrain TCO and consultancy leader at Cummins, said along with many other systems now, there is a new emphasis on maximizing fuel economy and emissions while using PTOs.



“We’re seeing a trend where PTOs can be used in integration with OEM smart technologies and auto start stop to reduce idle fuel burn with battery powered auxiliary power units (APUs),” he said. “The OEM can use these settings to minimize fuel consumption and battery charging times. Are they changing how PTOs are used by fleets today? Other PTO features can be used to limit or allow PTO operation while the vehicle is moving above or below a speed threshold, grant remote PTO operation, and provide other safety locks like if the parking brake is set.”

## Options for every application

Because they are so versatile and there are so many configurations and options available, choosing the correct PTO for your application involves some serious thought to make sure you get a unit that delivers the work you need in the field.

Ptasznik said he advises Cummins fleet customers to start with basic PTO availability based on vehicle spec. From there he suggested looking at more detailed options such as front-engine, rear-engine, or transmission-mounted units. “Depending on the chassis make, model, and driveline configuration, the preferred option may not fit in the chassis,” he cautioned. “But bear in mind that a different option could be available that will work just fine.”

Other popular PTO options Ptasznik said are worth considering include shutdown timers to reduce idle times and speed adjustment systems that can prevent unnecessary fuel burn.

“We also see PTO use in arctic conditions as a means to mitigate fuel gelling and dead battery roadside call outs,” he added. “In all scenarios, running PTOs at the lowest rpm possible to meet operational objectives reduces fuel burn compared to high rpm high speed operation.”

There are basically two options: a mechanical shift PTO and a clutch shift PTO, Bauer added. He noted that mechanical-shift PTOs are more common than clutch PTO units because they are less expensive.

“Maintenance on mechanical PTOs is easier than clutch shift PTOs,” he added. “Additionally, clutch shift PTOs are normally used in applications when there are high duty cycles. The clutch absorbs most of the loads, giving a longer life to the PTO. These are used in applications where the PTO is operated from the outside of the cab, for safety reasons. Another important consideration is that clutch-shifting PTOs are generally less noisy than the traditional mechanical PTO engagement.”

As vocational vehicles get smaller, more compact, and lighter, space between the frame rails is at a premium. Therefore, utilizing the 8-bolt bottom mount option is an ideal solution. The bottom-mount location provides abundant room to directly mount the pump to the PTO and facilitates easier hydraulic hose routings. If the bottom mount is not an option, operators can use the rear-mount location. The rear location provides improved ground clearance and more room to directly mount the pump to the PTO and facilitates easier hose routing. Rear mount is only available on automated transmissions and must be ordered

from the factory with the rear mount option. The bottom mount, commonly referred to as an 8-bolt PTO, is at the very bottom of the transmission and features less ground clearance. Every transmission has this opening available.

## PTO maintenance considerations

They may be simple and relatively bulletproof, but just like with any other system on a vehicle, PTOs and other mobile power equipment require proper maintenance to ensure both continued and efficient operation. And, of course, depending on the duty cycles and other operational factors, maintenance intervals will be different for each mobile power component.

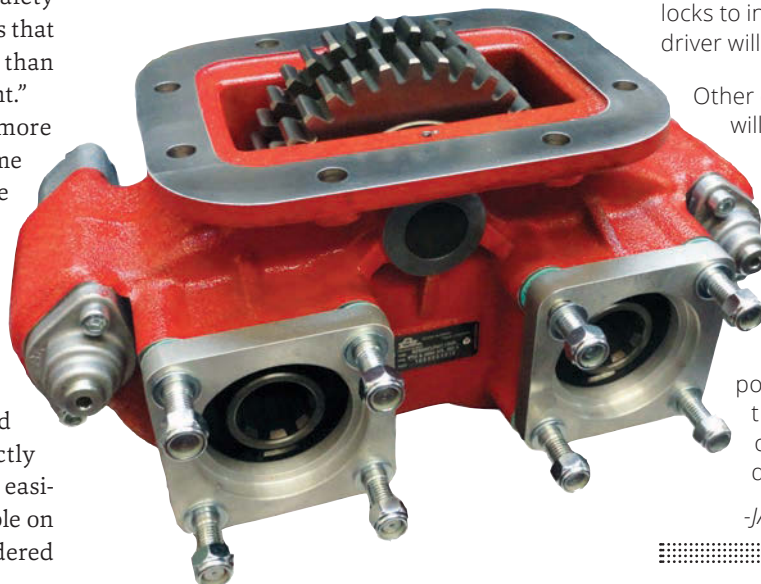
Generally speaking, simple PTO maintenance is necessary and should deliver long life in the field with very little input from your technicians. Maintenance should coincide with transmission maintenance. Maintenance can be as simple as looking for leaks and replacing seals, to removing the pump and cleaning and applying grease to the splined pump shaft.

“PTOs generally have very few maintenance issues,” Bauer said. “But one of the most common is noise. If a PTO is creating excessive or unusual noise, or the PTO noise becomes loud or persistent, the PTO should be removed and the gears should be inspected for nicks, pitting, and any type of contamination like metal shavings. If nicks or metal shavings are found, a repair or replacement should be completed to ensure continued operation.”

“Remember that with added hardware and hydraulics, system complexity increases,” Ptasznik added. “Consult the manufacturer of these components for maintenance guidelines. Increased PTO time can lead to decreased fuel economy and increased engine run time. If performing maintenance based on fuel economy or engine operating hours, increased routine maintenance event density may result.”

» **Exclusive for Eaton Fuller transmissions, the Bezaras 4200 Series is a dual-output, 8-bolt, heavy-duty PTO that features two independently air-operated outputs, with a variety of ratio and output combinations, doing the work that would normally require two PTOs.**

Eaton



## Key PTO selection questions



Getting the right power takeoff unit for your applications is a lot easier if you stick to the basics, according to Tim Bauer, Vice President, aftermarket, Eaton Vehicle Group. To do this, he advises fleets to follow the “Three Ts” of PTO selection: Looking at the Transmission, the Task, and the Truck. “You need to know the make and model of the transmission the PTO will be installed on, including mounting location(s) and torque capacities,” he explained. “And you should understand the task you’re trying to accomplish as well as the capabilities and limitations of the truck. This includes factors such as clearance issues, adaptors needed, shift type for PTO, and other operating criteria.”

Once you have a firm grasp on those requirements, Bauer said he then moves on to eight key questions he said are vital when specifying a PTO:

1. What is the make and model of the transmission?
2. What will the PTO drive or operate?
3. What speed (rpm) do you want to run the pump, blower, or winch?
4. Do you know the horsepower needed for the pump, blower, or winch?
5. What side or location do you want to mount the PTO?
6. What is the rotation, clockwise (CW) or counterclockwise (CCW)?
7. How do you want to connect from the PTO to the pump, blower, or winch?
8. Is this application going to run for short periods or for longer time periods? Will it run on an intermittent duty (5 min or less, per duty cycle) vs. constant duty (5 min and up, per duty cycle)?

When specifying a PTO for vocational applications, Dan Silbernagel, vocational segment strategy manager, Daimler Trucks North America, said he advises fleet customers to consider things like if you’ll use a dash switch or remote control panel, as well as what interlocks to include to prevent misuse and if the driver will be in the cab/seat during use.

Other considerations include if the truck will have the parking brake engaged, if a speed limiter is in place, and what the initial set speeds are.

“The challenge of selecting a PTO is the fact there are often many configurations that will work in any application,” Bauer cautioned. “The proper operation of the mobile power system goes well beyond just the PTO and requires a knowledge of the use, flow, and duty cycles to design the system to work reliably.”

-JA





» A technician inspects the underbody of a vehicle using a four-post lift, a key component to shop safety.  
Stertil-Koni

# Lessons in lift safety for the modern shop

Experts offer three ways to improve a shop's lift safety program.

By John Hitch

**B**uck Gasner has worked with lifts for more than 25 years, starting at Mohawk in the 1990s making two-post lifts. He's now business manager for DEKRA Automotive Services' machinery, equipment, and asset inspections unit, overseeing 11 lift inspectors certified by the Automotive Lift Institute. Gasner, who spent much of his career as an ALI-certified inspector, also served three terms as a class representative on the safety group's board of directors. In short, Gasner knows lifts and has seen it all.

He's also seen lift safety get a lot better over the years.

"I think we've made a lot of big gains," he acknowledged, "but I definitely think there's a lot more to be had."

One area is in inspections, which the ALI recommends are done annually. Larger, corporate-run shops typically take lift inspections seriously, Gasner noted, though independent shops, who

don't have corporate motivators, haven't really adapted to the importance of safety inspections.

During these inspections, shops will need to ensure paperwork, such as employee training, is up-to-date and the proper labeling is on the lifts themselves. [For more on inspections, check out this month's lift supplement.] But inspections can only reveal systemic problems with lift safety. Attacking the root causes will help improve a shop's safety culture and ideally prevent technician injury or vehicle damage. Gasner and other experts spoke with *Fleet Maintenance* to identify the top three. And one important note: advice here is meant to put you on the right track; but always follow OEM recommendations along with ALI and ANSI guidance.

### #1: Focus on training

Gasner often gets called in to investigate lift accidents, and while ALI doesn't track the data, he's noticed one trend.

"Anytime there's a lift accident, the most common culprit is operator error/training," Gasner said. "And in the majority of my time, an operator error still rolls back to lack of operator training."

One easy thing all shops can do is have technicians take ALI's "Lifting It Right" online course, which covers spotting, lifting, and lowering vehicles, along with basic maintenance and maintaining load stability. The course costs \$16 for the English version and \$24 for the Spanish, and takes about 30 minutes to complete.

"A big part of that training is to know how to use that [ALI/ANSI] lifting point guide," Gasner noted. This book shows the OEM-recommended points to position the swing arms on a frame-engaging lift. ALI released a digital version this year, which covers relevant vehicles from 2000-2023.

The web-based guide is in the form of a digital PDF, so techs can quickly search the make and model on their smart device. Gasner, who noted his vision isn't what it used to be, said the zoom feature is particularly useful.

It's also important to train on various types of lifts. For a frame-engaging two-post lift, a technician will need to know how to find the correct lifting points, while mobile column lifts, which raise vehicles via the wheels, have their own rules to follow.

"There are a lot more steps involved in doing brake, tire, and hub work on a mobile column, because you need to remove the wheels," noted Tim Kerr, in-ground product manager at Stertil-Koni. "You've got to pick them up, set a jack stand, and get a high-lift wheel dolly to remove the wheel and tire before you can do brake work or hub work on it. And anytime you add any additional steps, you're just adding possibly an element for human error."

Kerr noted additional lifting steps will be needed to service electric vehicle batteries, which are typically positioned center under the body. An additional scissor lift will be required to lower the battery, which weighs as much or more than an engine or transmission.

"What we have right now is actually is a transmission jack that's on wheels," Kerr said. "It has its own hydraulic piston that would come up to meet the batteries and then lower that down safely."



## #2: Watch the center of gravity

With lifts, it's important to remember what goes up can come down. This is especially true if the vehicle's center of gravity becomes disrupted, which will cause the car or truck to tip over, at minimum damaging the vehicle and at worst causing a fatality.

"When a technician pulls an engine out of a truck, or drops a differential, then that causes a shift in the center of gravity," Gasner explained. "The next thing you know, that vehicle flips one way or the other."

When considering the center of gravity, a technician should be aware of how the weight is distributed in a vehicle.

"Some guys are not going to take into consideration that they just removed the engine and transmission, which is going to be about an 800- or 1,000-lb. shift in the center of gravity," warned Steve Perlstein, president of Mohawk Lifts.

"What's the safest thing you can do?" Perlstein asked. "It's really simple. The answer is always lower the lift onto the mechanical locks. Just like your grandpa probably told you: 'Never use a jack without a jack stand.'"

This keeps the swing arms from kicking out and causing a serious incident, he explained.

"High Reach Supplementary Stands should be used whenever adding or removing components to a lifted vehicle that may cause a shift in the center of gravity—or even when any extreme torquing or shaking of vehicle may take place during the vehicle repair," Gasner reiterated.

These stands should be certified to the current edition of ANSI/ASME PASE, and should not be replaced by transmission jacks, engine stands or other unapproved substitute devices.

## #3: Know your lift capacity

Just because a lift's capacity rating exceeds the total vehicle weight doesn't mean it's safe to lift.

"I don't know how many times a guy has called us up and said, 'My 13,000-lb. ambulance has bent the arms on this 15,000-lb. lift,'" Perlstein said. "But the rear arms' capacity and the rear end of the ambulance are what matter. Don't overload the arms!"

Gasner concurred, saying that the total capacity on a

two-post lift is equally divided by the four swing arms. A 10,000-lb. lift would have 2,500 lbs. per arm, or 5,000 lbs. per axle.

"We see a lot of times where a vehicle is 8,500 to 9,000 lbs. but you may have it break like 6,000 or 6,500 lbs. on a rear axle and 2,500 on the front," Gasner said. "At that point, you are drastically overloading those rear arms."

You should not just go off the standard model weight either.

"A vehicle may say that it's 7,000 lbs. and you feel comfortable putting it on a 9,000-lb. lift. [Then you add in] the fuel tank, the auxiliary fuel tank, and the toolboxes, and all of a sudden now you're trying to lift a 9,500-lb. truck on a 9,000-lb. lift." ■

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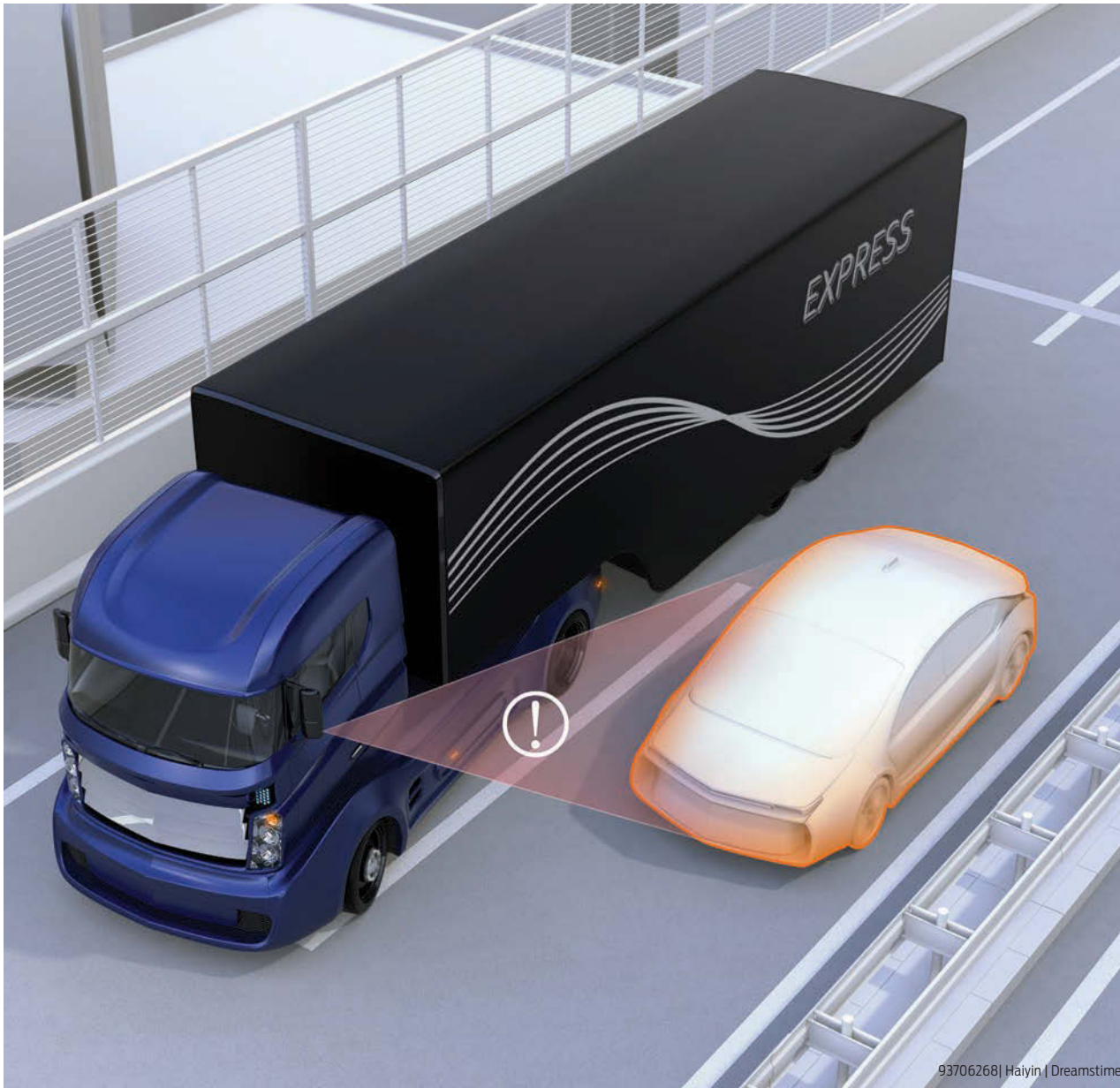
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# All-makes ADAS tools help shops keep up with increased technology

While advanced driver assistance systems have added to safety on the road, they've also added complications to even the most basic of repairs if technicians don't remember to address them.



By Mindy Long

**The amount of safety equipment on vehicles** continues to increase, and even minor repairs or routine maintenance can alter the accuracy of advanced driver assistance systems. That creates new opportunities and challenges for shops and technicians, and all-makes ADAS

tools make it easier for technicians to quickly and effectively calibrate ADAS.

"ADAS is not a subject you can really evade because just to perform simple routine tasks, whether you know it or not, you're impacting those ADAS components," said Ben Johnson,

director of product management, Mitchell 1.

Many OEMs have strengthened their position statements to require a higher number of calibrations for their vehicles, regardless of where the vehicle damage is, said Jordan Krebs, product manager, John Bean, Snap-on. "Some shops have been reluctant to engage in the practice of ADAS calibrations, convinced that calibration is unnecessary with no fault codes or without the component having been disconnected," he said. "That theory, however, is far from factual."

Adam Corron, ADAS key account sales manager for Launch Tech, said it is crucial to create awareness around ADAS. "This technology is designed to make people safer on the roads. When you get new tires, an alignment, or a new windshield, you depend on this technology to work like it did before you had your vehicle repaired," he said. "If it isn't calibrated correctly, it doesn't work as it should."

Daniel Mustafa, director of technical service for TravelCenters of America, said ADAS calibration is needed if a vehicle is involved in any collision, a windshield is replaced, or the bumper has to be removed for a repair. "None of those include normal, everyday repairs on those systems," he said.

With ADAS, even being a few degrees off on a calibration can cause the check engine light to come on or the system to malfunction. "You're not going to know it's not functioning properly until it needs to function properly," Johnson said, adding that shops aren't intentionally not doing the job. "They just don't understand that that thing they moved out of the way was critical to the operation of ADAS and those safety features."

Failing to calibrate correctly could mean a driver hits something or experiences emergency braking for no reason.

In the last five years, there has been about a 40% increase in passenger vehicles and light trucks equipped with ADAS, and the number of vehicles registered with ADAS is expected to double in the next three to five years, Corron said.

What's more, a heavy-duty element is coming fast with more and more semi-trucks having lane departure, automatic braking systems, and other ADAS features, said Stewart Peregrine, senior executive of sales, ADAS, for Autel.

The *Unpacking the Commercial Vehicle Diagnostic Market 2023* report from Noregon reported that model year 2022 trucks, buses, trailers, and other commercial vehicles feature more distributed electronics than nearly any truck ever made.

## Finding the right tool

Most ADAS calibrations require a scan tool. "Fleet shops, dealers, and independent shops are all looking for full coverage and how quickly they'll get new software," Corron said.

Most OE manufacturers require their dealers to use one or two mandated scan tools, but for the aftermarket, many options mirror OE



tool functions. “For an aftermarket shop, an aftermarket tool is probably the best option as it will have the widest coverage,” said Pete Liebetreu, Hunter Engineering’s VP of marketing.

Shops should look for ADAS tools that address all ADAS components, such as rear-mounted blind spot monitoring, rear collision warning, front camera, lidar and night vision, and ultrasound sensors on the front and rear of the vehicle.

But making a selection is more involved than coverage alone, Krebs said. “Shops must research before investing in ADAS equipment to ensure that the system they purchase does not alter OEM specifications or the target size and design,” he said.

Liebetreu said a shop’s commitment to ADAS work can be scaled, but at the very minimum, it needs a scan tool to communicate with the vehicle and initiate reset procedures. “Hunter’s ADASLink fits that bill and works hand in glove with our alignment systems for other resets as well,” he said.

A vehicle’s alignment can be crucial to proper calibration. “Autel’s IA900 incorporates diagnostics first and incorporates the alignment into the process with 3D processes and cameras for the wheels,” Peregrine said. “We have developed a way to find the center, capture the alignment, and set up a frame in under two minutes.”

The biggest challenge is finding a brand that supports all makes and models in a specified region. “There are tools that will cover a lot of vehicles, but not all makes and models,” Corron said, adding that systems need to be sophisticated enough to run a full-system diagnostics scan so technicians can see everything going on with the vehicle to determine if there is something wrong that will cause a calibration to fail or an inaccurate or less precise calibration.

However, for Mustafa, the number one requirement is that tools are user-friendly. “It is an exceptionally competitive space. Those aftermarket tools are fighting for a number one position,” he said. “I look more for features that level the playing field for a new technician versus a highly skilled technician.”

Mustafa uses Noregon’s JPRO, which he said offers graphic displays of several different systems. “We’re always trying to find a way to take a technician with six months or a year of experience and help him perform like a team member with ten years of experience,” Mustafa said. “With a tool, if I’m not familiar with the system, I can arrive at a more accurate decision with more knowledge.”

Mustafa said he has turned down tools with greater functionality because they aren’t user-friendly. “At the end of the day, our goal is to get the truck repaired and back on the road as fast as possible and as cost-effective as possible with no return issues,” he said.

Johnson said that tools differentiate themselves with the level of instruction they give to ensure the vehicle is in the right condition and that the targets are set up correctly.

## “Who will be your local support to train, upgrade, repair, and support your equipment once you buy it?”

Pete Liebetreu, Vice President of marketing for Hunter Engineering

Insurance companies often require a pre-scan report that shows anything that could be wrong before calibration and a calibration report to show it was a success. “Even if you aren’t dealing with an insurance company, this is information the customer should have access to so they can be confident the shop did it right,” Corron said.

Ongoing support and training are also essential. “There are tools out there that you can buy on the internet,” Liebetreu said. “Who will be your local support to train, upgrade, repair, and support your equipment once you buy it?”

Liebetreu added that the quality of the tools varies widely, but shops can compare features to price to make their own value decision. “But no product is a good value if it sits in a corner because you don’t know how to use it or can’t fix it,” he said.

Autel has trainers in the field who know how to complete calibrations, so they can offer first-hand guidance. “You can’t substitute that real world [assistance],” Peregrine said.

Even with having the right equipment and aftermarket tools, there may be cases where a technician needs to have OEM software. “If there is damage to radar systems or cameras and the components have to be replaced, most have to be programmed before they can be calibrated,” Corron said.

### Staying current

Change is the only constant in the ADAS market, Krebs said. “Evolving technology and more advanced features on new vehicles will pressure the market to continue developing equipment technology to match the vehicles being serviced,” he explained.

Because there are such rapid changes in technology, it is essential to ensure producers are making tools that can keep up. “Look for tools that are top of the line that will support the latest technology and adapt as technology changes,” Corron said.

Tool providers must be ahead of what is happening or work in conjunction with the OEMs. Peregrine said Autel makes multiple

updates weekly. “Over a year, there may be 30 GM updates or 12 Toyota updates. It is changing faster now than it ever has, and I don’t see that trend changing,” he said.

### Making space

In addition to having tools, shops have to have the right amount of space needed to calibrate systems. Parameters are set by OEMs, and a good percentage of shops are performing alignments in the alignment bay, but there could be obstacles in the way, such as a lift, that may interfere with the space needed. “We can get around them, but that is something to consider when purchasing,” Peregrine said.

Krebs said 30’ by 45’ is strongly recommended, with 40’ by 60’ preferred for optimal floor capacity. “Only after an OEM changes a procedure requiring less space should shops adjust their calibration area appropriately,” Krebs said.

If shops don’t have the space, customers will find a shop that does, so having calibration capabilities can become a competitive advantage. Johnson said he is increasingly seeing hub-and-spoke relationships where shops outsource calibrations and bring their vehicles to a competitor’s shop before they put them back on the road.

Collision shops have a much greater need for calibrations. “You almost can’t have an accident, no matter how minor it is, without wanting to make sure that those sensors aren’t getting knocked out a little bit,” Johnson said.

Peregrine recommends general repair shops reach out to collision centers and make arrangements to do their calibrations, which can get them a faster ROI on their tooling investments.

### Maximizing technicians’ time

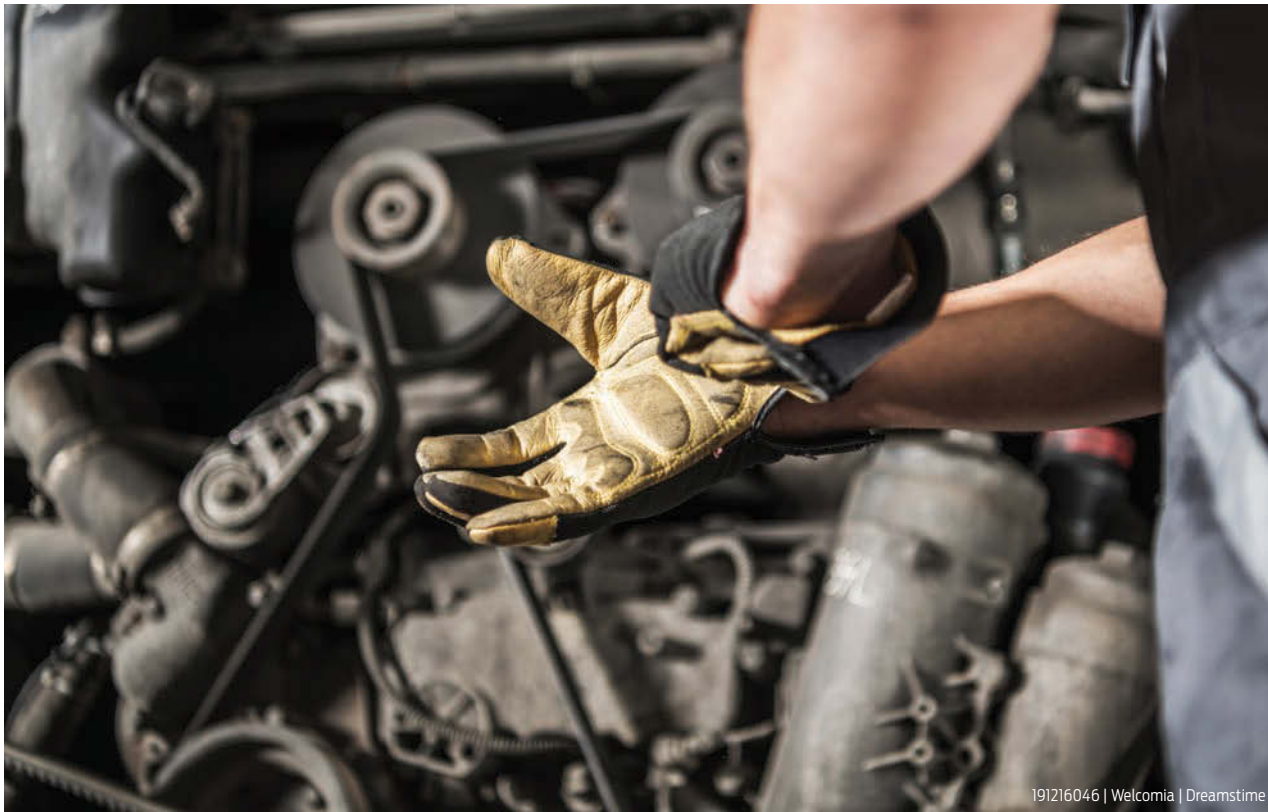
ADAS tools not only allow shops to do ADAS work but also make technicians more efficient. Increased productivity has always been one of the most compelling factors for shops purchasing tools and equipment, and a streamlined process is more critical than ever as the technician shortage worsens, Krebs said.

Effective tools also help shops attract technicians. “As a shop, you had best invest in modern equipment and tools. You are competing for technicians, and the tools they use make a very big impact on the day-to-day satisfaction of a technician,” Liebetreu said.

Technicians are mostly paid at a flat rate, so time is money. “We actually created an ADAS quick link in our truck series information system,” Johnson said, explaining that once technicians click the ADAS button, they’ll receive information about what the truck is equipped with and outline conditions that might require calibration.

“Our hope is that, regardless of whether they’re doing the calibration themselves or whether they’re getting it done, they at least understand that something’s got to be done before they release the vehicle,” he said. ■





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# Managing technician pay and quality work

Shop management experts shared insights on how to keep uptime strong and labor happy.



By Alex Keenan

**Whenever there's a discussion about the technician shortage, compensation for technicians often comes up.** Automotive technician advocate WrenchWay found that 43% of technicians considered compensation as the biggest factor in staying at their current workplace. Given this, it seems all too easy to assume that publicly increasing technician pay would solve the industry's labor problems. But unfortunately, it's not that simple.

Even among various shop owners and dealers, methods to finance their technicians' success and compensation can vary depending on the shop's size and geographical area. To help find answers, in January shop management software provider Fullbay sat down with AM PM Diesel Services CEO Dale Bowman and operations manager Chase Bowman to discuss how the business funds its technicians. AM PM provides mobile truck and trailer service, repairs, and parts. Fullbay's CEO Patrick McKittrick and COO Chris O'Brien led the discussion, in which the AM PM leaders explained how they handle funding their technicians while growing from a single mobile fleet truck to 18 shop locations nationwide.

"Our slogan for a long time [has been]: 'If you're not turning, you're not earning,'" said

Dale Bowman, adding that the main goal is to "keep the trucks running on the road."

To ensure this plays out on the shop floor, AM PM has thought long and hard about pay structure, technician hiring and expectations, and training, and shared their insights during the discussion.

## Pay structure

Productivity and uptime begin at the ground level with the technicians, and AM PM keeps that foundation strong with a solid pay structure in place.

"Generally speaking, all of our mechanics are paid off the flat time," Chase Bowman explained. "For instance, a brake job is about six to eight hours. We should get that done in about two hours so he gets paid the six hours, and then you can move on to the next job."

By this reasoning, a highly skilled technician can boost their pay to \$150,000 a year, he continued, with the addition of bonus packages and weekly stipends for added productivity, thus rewarding them for their efficiency and quality.

Both Bowmans touted the flat-pay method because it allows technicians to determine

their own pay and produce higher earnings than hourly wages. Dale Bowman noted flat pay gets a bad rap because techs don't always understand their earning potential. A technician getting paid hourly may say they are making \$42.50/hour working at a dealership, so why would they leave for a flat rate, he posited.

"You have to explain to them that working commission, when you're working in a customer's parking lot or in their shops, the work is abundant," Dale Bowman said. "You can do as much as you want to, and it's never-ending."

He theorized his technicians would say they need an offer rate of \$145 per hour to be tempted away from AM PM Diesel Services and the money they make there.

Of course, the flat-pay math doesn't always work out if the work isn't abundant.

"If you don't have the workload, like when we first open up a shop in a different location, what we will do is we'll give our technician a guarantee," Dale Bowman explained. "Basically, we'll say, 'Hey, we're kicking this off. It's a new location. For the next two months, we're gonna give you X amount of money, guaranteed. If you don't make that, we're going to offset it to make you make that. But we will see in three months, and you will see, that the profit margins are there [and] the guarantee will go away. Then you start working completely on commission.'"

As soon as a technician has been set up in a shop, maintaining a proper balance in the workload-to-technician ratio is crucial to the Bowmans, including technician distribution between shops and between fleets. For shops, that means increasing the number of hours a technician can work, possibly by moving two employees from one shop to another to increase every worker's paycheck.

Meanwhile, managing their remote operations with a fleet takes just as much planning.

"You've got to have a headcount on [the client's] equipment," Dale Bowman asserted. "The basic rule of thumb that you've got to have is for every 23 pieces of [Class 8] equipment, you've got to have one technician. If a customer has 230 pieces of equipment, that tells us we need 10 technicians. [Those] 10 technicians can handle that fleet completely from start to finish all the way from tires, brakes, oil changes, road calls, [and] welding fabrication."

## Ensuring repair quality

With such an emphasis on productivity, the flat-pay rate could lead to rush jobs and a serious drop in quality. But the Bowmans discussed how they have a system in place that emphasizes output and accuracy.

"We have lead techs at all our shops and also a service manager overseeing the work," Chase Bowman said. "But we'll handpick certain jobs and go out there and verify it was to the compliance standpoint we needed to be at, and we have very little warranty comeback work going through that process."

To ensure quality work, AM PM Diesel Services also uses an additional incentive within their pay structure.



“We have an understanding with [senior technicians] that if they have comeback work, what we do is give them the option to do the repair over and to be overseen by another technician,” Dale Bowman explained. But the second repair comes with a catch. “They have to do the labor for free, and then we provide them with the parts to do the repair. If they have something that they mess up, it’s hurting their pocket as [much] as it’s hurting ours.”

Meanwhile, if a vehicle returns to the shop with a full failure, the Bowmans will have another technician redo the job in full, taking the money the first tech would have earned without the comeback.

“And usually, if we have another senior technician watch over the repair, they learn from their mistake, and it doesn’t happen again,” Dale Bowman asserted.

### Training

Granted, neither the flat-pay structure nor the technician accountability would work without proper training of AM PM Diesel Services’ technicians, which is an investment in and of itself.

“The company is worth that cost,” Chase Bowman agreed. “That’s the cost of doing business: training your people.”

That doesn’t mean a technician’s education should be funded without checkpoints in place to ensure their progress.

“As we have more mechanics, we’re sending more of our greener mechanics with our lead techs and getting them trained up,” Chase Bowman said. “We’ll stay with them for four to six weeks, and then they’ll do a skill assessment to see if all that training is paying off. Then we get that feedback and see if you need to go through [more] training or [if this is] a replacement game, [where] we need to find another mechanic.”

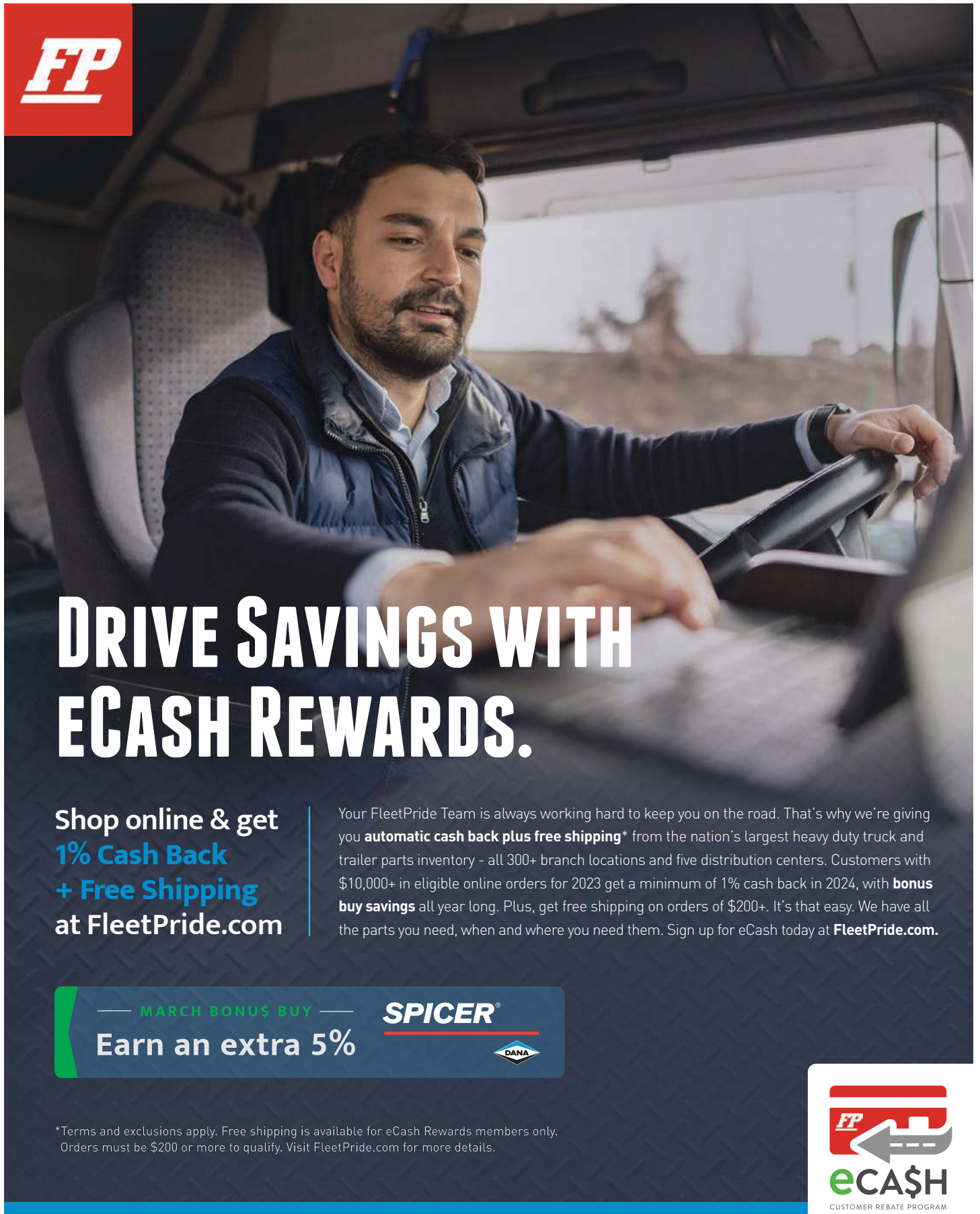
From Dale Bowman’s perspective, this means hiring technicians with the initiative and ingenuity to approach the jobs they need to make successful commissions, even if tasked with examining a part or process they haven’t been specifically trained in. When a mechanic is willing to work hard, no matter how new they are, they will improve simply by getting the job done, incor-

porating their training along with their turning and earning with the company.

The first step of this process means sending the senior technician on site to diagnose the vehicle before passing off the repair job to a newer employee.

“He may not be the fastest guy at it, but he’s gonna get better,” Dale Bowman asserted. “We


know the truck’s diagnosed, right? [The senior technician] can go out there and say, ‘Hey, take this water pump off and replace it.’... And then, when that technician has done the job, the senior technician will go out and say, ‘Hey, let’s go look at your work. [If] the water pump’s good [and] not overheating, [and] there’s no leaks, [then] good job.’”



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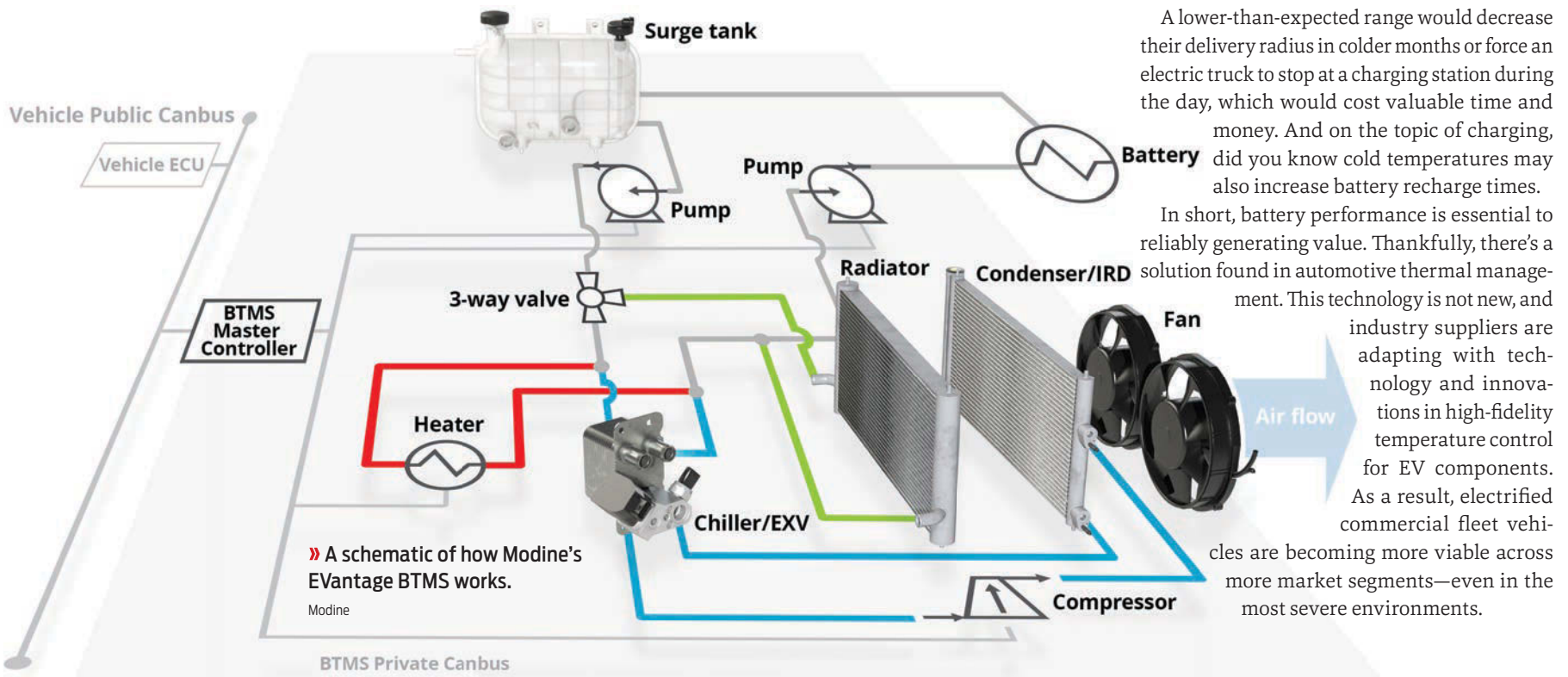
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A lower-than-expected range would decrease their delivery radius in colder months or force an electric truck to stop at a charging station during the day, which would cost valuable time and money. And on the topic of charging, did you know cold temperatures may also increase battery recharge times.

In short, battery performance is essential to reliably generating value. Thankfully, there's a solution found in automotive thermal management. This technology is not new, and industry suppliers are adapting with technology and innovations in high-fidelity temperature control for EV components. As a result, electrified commercial fleet vehicles are becoming more viable across more market segments—even in the most severe environments.

# How battery thermal management systems protect EVs in cold weather

Frigid temperatures can wreak havoc on lithium-ion batteries by reducing range and extending charging time, but BTMS can mitigate these issues.

**Record-breaking cold weather affected** more than half of the United States population this past winter, but commercial fleet vehicles did anything but hibernate, keeping up with consumer, commercial, and industrial demands no matter the weather.

But experiencing arctic events and cold snaps during some of the busiest times of the year raise questions for fleet operators about how the next generation of transportation, electric vehicles, will respond to freezing temperatures. After all, as experiences with smartphones show, temperature extremes in either direction negatively affect battery life and device operation. What happens when lithium-ion battery

technology, the same as used in smartphones, is used to power commercial EVs?

Regulating the temperature of EV batteries, traction motors, and related electronics is a prerequisite for reliable operation. In this regard, EVs and petrochemical-fueled vehicles are similar. Cold weather can reduce battery capacity as the chemical reactions inside batteries slow down, increasing the internal resistance. This depletes the charge faster and reduces vehicle range. And keeping a respectable and consistent range is crucial for EV fleets, because commercial EVs, by definition, must be productive assets.

## Thermal management in the electric age

Thermal management is one of the least visible—but most critical—frontiers in EV transportation, because temperature impacts vehicle range, charging time, and the working lifetime of the battery. In commercial vehicles, these systems must efficiently manage temperature, respect space constraints, and reliably survive the harsh operating environments in which heavy-duty vehicles are deployed.

The battery pack needs to be maintained within a temperature window during charging and operation, typically 25 to 35 degrees C (77 to 95 degrees F), to deliver peak performance. A battery thermal management system (BTMS) will provide heating or cooling depending on the battery pack's temperature. On a cold winter day, a BTMS will heat the coolant that circulates the battery pack to maintain its optimal temperature. A key consideration in BTMS design is optimizing temperature control while minimizing power draw to ensure that work



**By Gina Bonini**

VICE PRESIDENT AND GENERAL MANAGER OF ADVANCED THERMAL SYSTEMS FOR MODINE

Gina Maria Bonini is the Vice President and General Manager of Advanced Thermal Systems for Modine. She is responsible for leading the company's commercial electric vehicle initiative and driving global revenue in the zero-emission mobility market. Previously, Gina served Tektronix as the General Manager of the Component Solutions and Technology Solutions Organizations.



» The BTMS installs near the battery to ensure the modules remain at an optimal temperature for operation and charging.

Modine







vehicles are as reliable as their predecessors and deliver the range required to get the job done.

Modine has found its EVantage Thermal Management System can provide the needed control to ensure colder weather doesn't put the freeze on a fleet's operations. The system can integrate into any chassis design and combines state-of-the-art, proprietary Modine heat exchanger technology with tailored smart electronic products. With the included master thermal controller and Modine-developed firmware, the compact system has been proven to regulate battery temperature while minimizing power draw.

### Keeping fleets on the road all winter

Commercial electric vehicles should include a BTMS designed to regulate battery temperature to maximize range and minimize charging time. A BTMS will do its job even in winter, but there are a few important things fleet managers and drivers can do to help optimize efficiency and uptime in cold weather.

While frigid temperatures may reduce vehicle range by up to 40%, nearly two-thirds of cold-weather range reduction can be attributed to conventional cabin heating. Drivers can easily mitigate this by using comfort functions with less power draw, like heated seats and steering when possible, and turning those functions off while not in the vehicle. Similarly, connecting to charging infrastructure whenever possible, especially in cold conditions, significantly benefits commercial EVs. When plugged in, a BTMS can maintain the battery pack's temperature to avoid extremes. Storage condition is another stress factor impacting battery capacity and working lifetime. Vehicles stored in a heated or insulated space will require less time to warm to optimal temperature when service begins. To that end, indoor storage helps prevent battery degradation due to continued exposure to extreme temperatures.

### As the seasons change

The southern parts of the U.S. usually warm up before the Midwest and the Northeast, which means that road-fairing commercial vehicles can experience a wide range of ambient operating temperatures in relatively quick succession. Just as a BTMS works to maintain optimal battery temperature in cold weather, it provides the cooling function in warm weather and as the battery self-heats during operating and charging cycles. The switch between cooling and heating, as well as the intensity of each, are managed automatically by the system. In this regard, the burden

of seasonal changeover and maintenance tasks is actually lower for EVs.

While seasonal, temperature-related maintenance looks different for EVs than their internal combustion engine predecessors, fleets should pay attention to each vehicle's diagnostic and maintenance software, including thermal management systems. Commercial EVs should include tools

that help fleet owners perform the regular and preventive maintenance steps necessary to keep their vehicles running or troubleshoot problems quickly. Through proactive monitoring, the right software, and following maintenance schedules, fleet owners have the tools to keep EVs running year-round; that's not all that different from the world of diesel and gasoline engines. ▀

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## » Adjustable height and width

The **EGR Universal Multi-Purpose Bed Rack**, No. RTRK0001, is finished in a black powder coat that matches the surface of the EGR RollTrac. This high-quality multi-purpose rack features adjustable height and width for most mid-size and full-size truck platforms. The Universal Multi-Purpose Bed Rack offers multiple configuration options including cabin roof height for long loads and a lower height for other applications. The racks can be separated to use just the front section and added to the rear if required. The side connecting bars feature mounting tracks for extra accessories such as recovery tracks and other tool mounts. The Universal Multi-Purpose Bed Rack features a 330-lb. dynamic load capacity (road driving) and a 250-lb. off-road capacity.

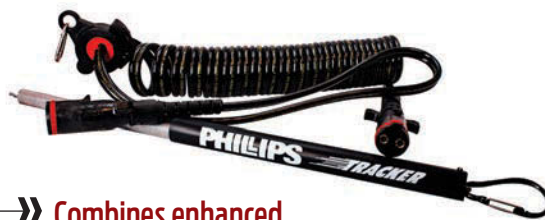
➔ For more information visit [FleetMaintenance.com/21295129](https://FleetMaintenance.com/21295129)



## » Minimize noise and vibration

Dana Incorporated now offers genuine **Spicer automatic transmission end yokes** specifically designed for replacement on Allison transmission applications. The Spicer commercial-vehicle automatic transmission end yokes are precision-engineered and manufactured by Dana specifically for Allison transmission applications. The end yokes are designed to help minimize noise and vibration and keep drivelines running smoothly. Spicer heavy-duty end yokes are designed to deliver OE-quality and a cost-efficient solution that boosts uptime and makes repair jobs easier.

➔ For more information visit [FleetMaintenance.com/21295117](https://FleetMaintenance.com/21295117)



## » Combines enhanced WEATHER-TITE M2 with cable support

Phillips Industries made two product enhancements to its WEATHER-TITE M2 liftgate electrical assemblies designed for corrosion prevention and introduced the **M2 Charge Kits**, combining the enhanced WEATHER-TITE M2 with easy-to-install cable support. WEATHER-TITE M2 features dual pole J3082 plugs that are unbreakable, non-corrosive, and molded to the electrical cable. The WEATHER-TITE seal at the front of the plug blocks moisture and contaminants from traveling past the connected union inside the socket, preventing corrosion in the liftgate electrical system. The M2 Charge Kit is a back-of-cab charging system that includes the enhanced 15' coiled WEATHER-TITE M2 cable with 48" lead and a 25" QWIK-CHANGE tracker spring kit with QWIK-CLAMP for charging cables.

➔ For more information visit [FleetMaintenance.com/21295131](https://FleetMaintenance.com/21295131)



## » Available for International MV and HV trucks

The **International Premium Dual Drive** modification from **Fontaine Modification Medium & Heavy Truck Operations** makes it just as comfortable for a driver to operate a refuse collection vehicle, street sweeper, or road-stripping truck from the right side as the left. Fontaine's Premium Dual Drive modification adds a right-hand drive station to International MV and HV trucks for applications that require an operator to be able to drive from either side. It provides significant improvements over Fontaine's other dual drive offering, including increased legroom. Fontaine engineered the International Premium Dual Drive modification to make the right-side driving position virtually identical to the ergonomics of the OEM left-side position. The International Premium Dual Drive modification can be performed on new MV and HV trucks as part of Fontaine's ship-thru agreement with International, so the process is seamless and cost-effective for the customer.

➔ For more information visit [FleetMaintenance.com/21295120](https://FleetMaintenance.com/21295120)

## » For Mack 2022-07, Volvo 2022-07

The **Exhaust Gas Recirculation Gasket**, No. 903-2000, from **Dorman Products** is designed to match the fit and function of the original gasket on specified vehicles, and is engineered for durability and reliable performance. No. 903-2000 is made to fit and fully restore part functionality after the original gasket fails. It is made from quality materials to ensure reliable performance and long service life, backed by a team of product experts in the U.S.

➔ For more information visit [FleetMaintenance.com/21295125](https://FleetMaintenance.com/21295125)







# TOOLS & EQUIPMENT

A roundup of the latest tool and equipment offerings.



### »» Features a spring ratchet locking mechanism

The **Lang Tools 2-pc Internal/External Retaining Ring Pliers Set**, No. 1487, features a spring ratchet locking mechanism that securely holds against snap ring tension, a thumb release allowing for smooth and controlled tension release, and a cushion grip for comfort. The internal ring size ranges from 3-1/16" to 6-1/4", and the external ring size ranges from 3-1/2" to 6-1/2". The pliers set includes two sets of replaceable tips (size 0.120") that come in straight, bent 45-degree, and bent 90-degree angles.

» For more information visit [FleetMaintenance.com/21283574](https://www.fleetmaintenance.com/21283574)



### »» For Ford 3.5L and 3.7L EcoBoost engines

The **ProMAXX Intake Manifold Repair (IMR) ProKit** allows technicians to easily remove broken fasteners on Ford 3.5L and 3.7L EcoBoost engines. The kit includes signature machine-shop tooling and precision components to make an on-the-truck repair. The EcoBoost IMR ProKit quickly bolts right onto the cylinder head and uses the company's trademarked Extractorless repair application to speed up repair times and eliminate broken extractors. All accessories to complete an on-the-truck repair are included.

» For more information visit [FleetMaintenance.com/21284098](https://www.fleetmaintenance.com/21284098)



### »» Compact design at 12" high

The **Makita USA 40V Max XGT Cordless Work Light**, No. ML009G, delivers bright illumination, versatility, and convenience. The ML009G has three modes of operation that provide 10,000 lm on high, 4,000 lm on medium, and 2,000 lm on low. The ML009G offers up to 14 hours of continuous illumination with two 4.0Ah 40V Max XGT batteries on low. The worklight is dust-proof and water-resistant (IP65 rated), measures 12" in height, and can be mounted on an optional tripod light stand individually or with two worklights. A convenient carrying handle folds down when needed.

» For more information visit [FleetMaintenance.com/21284101](https://www.fleetmaintenance.com/21284101)



### »» Provides 200A of power

The **H&S AutoShot HSM200 PRO MultiMIG Welder**, No. HSW-6422, provides 200A of power for MIG, TIG, and stick applications on either a 115V or 230V line. Welder features voltage, wire speed, amperage, and full Synergic scroll-down settings for steel, aluminum, and silicone bronze on a 5" LCD display. AC TIG functions allow the user to TIG any metal with three wave forms for aluminum TIG welding. The spool gun selection switch, euro-connect flange for torch and spool gun, and high-frequency start foot pedal connector are standard. Package includes MIG, torch, TIG torch with foot pedal, electrode holder, ground clamp, MIG wire, TIG torch kit, and dual gauge regulator with hose.

» For more information visit [FleetMaintenance.com/21284689](https://www.fleetmaintenance.com/21284689)



### »» Ideal for small service bays

The **XA12 Alignment Scissor Lift** from **Rotary Lift** is ideal for service bays with a minimum bay size footprint of 12' by 23'. With a 78" to 164" four-wheel alignment wheelbase range and 12,000-lb. lifting capacity, the XA12 was engineered with space and flexibility in mind. Its open front and rear design provide technicians with greater access to vehicle adjustment points, making wheel alignments and other repairs easier to perform. Additionally, the XA12 features adjustable radius gauges and comes standard with two 6,000-lb.-capacity air-operated rolling jacks, longer rear slip plates, and hinged ramps that automatically self-check and drop down when the lift is raised.

» For more information visit [FleetMaintenance.com/21293316](https://www.fleetmaintenance.com/21293316)



### »» Easily transportable and compact

The **JohnDow Industries Static Grounding Reel**, No. JDI-SGR75, is designed to work with fuel products needing a grounding wire. Extendable to 75', the easily transportable, compact Static Grounding Reel is ideal for any hazardous areas with potentially dangerous static electricity such as refueling stations, aviation refueling, and stationary and mobile fuel delivery trucks, among others. Features include slow retraction, a ratchet-locking mechanism, auto-release during wire over-stretching to maintain safety at all times, and three mounting options (ground, wall, ceiling) with a mounting template.

» For more information visit [FleetMaintenance.com/21284685](https://www.fleetmaintenance.com/21284685)





» Designed for R-1234yf vehicles

The **TEXA Konfort 760 2-Gas Touch A/C Recovery Machine** is designed for R-1234yf vehicles. The unit comes stocked with airtight oil bottles and features fully automatic service management, a scale locking/unlocking device, and a refrigerant weight accuracy check. The Konfort 760 also sports a 10" color multi-touchscreen display and Wi-Fi connectivity. A Bluetooth module allows users to connect the station with several accessories such as an A/C efficiency kit. The Konfort 760 2-Gas Touch also comes with a built-in thermal printer and a dedicated APP so operators can follow service and charging procedures remotely from their phone.

➔ For more information visit [FleetMaintenance.com/21287276](https://FleetMaintenance.com/21287276)



» Offers local and remote capabilities

The **asTech All-in-One** is a comprehensive tablet-based solution with both local and remote capabilities, allowing for OEM and OEM-compatible diagnostics, ADAS calibrations, and programming on a vehicle. The All-in-One features asTech's capabilities and OEM vehicle coverage, including those utilizing the DOIP, CAN-FD, and secure gateway protocols. With the All-in-One, users can scan using 1,000+ remote OEM and local OEM-compatible diagnostic tools; conduct remote and local calibrations, initializations, and parts programming; access 400+ certified remote technicians; and access local OEM-compatible pre- and post-scan reports.

➔ For more information visit [FleetMaintenance.com/21285266](https://FleetMaintenance.com/21285266)



» Enables handsfree operation

The **Tool Aid Clamp Probe Set**, No. 21200, is designed to allow a technician to test for voltage drop on top battery posts. The probe enables handsfree operation and works with standard 4mm banana plugs. Its probe swivels and adjusts in height to test where needed. The 21200 is ideal for testing recessed connections and is available individually as the No. 21215 (black) and No. 21216 (red). Includes clamp tips for added grip.

➔ For more information visit [FleetMaintenance.com/21287722](https://FleetMaintenance.com/21287722)



» Self-gripping jaw design

The **Matco Tools 3-pc Cobra Pliers Set**, No. PC3SG, now available in green, offers a gripping surface that has special hardened teeth, is wear resistant, and grips any shaped object (round, square, hex, or flat). Self-gripping jaw design and self-locking ability prevents slipping off the workpiece. The pliers open wide with an easy pushbutton—adjust once and it stays while fine-adjustment provides optimum opening for different size workpieces. The pliers also feature a guard to prevent finger and hand pinching as well as a thin head to fit into tight spaces.

➔ For more information visit [FleetMaintenance.com/21292747](https://FleetMaintenance.com/21292747)



» Capable of lifting up to 4,000 lbs.

The **BendPak Mobi-EVS EV4000SL EV Battery and Powertrain Lift Table** is a push-around full-rise scissor lift table that is ideal for EV service and battery pack replacement. The 40" by 60" platform is capable of lifting up to 4,000 lbs. With a press of the button on the pendant control, the space-saving lift platform elevates to more than 6' in less than 20 seconds, the company said. Other notable features include full-length utility trays on both sides, a stowable tow bar, a heavy-duty 12V DC power unit with deep cycle battery, an onboard battery charger, manual floor locks, and zero-thrust casters. The lift also meets or exceeds ASME PASE 2019 standards.

➔ For more information visit [FleetMaintenance.com/21294597](https://FleetMaintenance.com/21294597)

» Available in multiple different flow rates

The **Exair TurboBlast Safety Air Gun** can produce up to 23 lbs. of force with the simple press of a button trigger and is the ideal solution for blowoff applications. The TurboBlast features a cast aluminum handle with a rugged elastomer grip that's UV resistant, chemical resistant, and insulated from heat or cold. All models include an integrated nozzle guard for safety. Models are available with an adjustable gate valve to control blowing force on the fly or without the gate valve. The TurboBlast is CE compliant, meets OSHA standards, and is available in multiple different flow rates and extensions up to 6' long.

➔ For more information visit [FleetMaintenance.com/21285259](https://FleetMaintenance.com/21285259)



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» Palm coating adapts to most environments

**Magid VersaTek Work Gloves** feature a palm coating engineered to read the work environment, adapt to it, and adjust the worker's grip for objects that are wet, dry, slick, abrasive, or oily. Along with the intelligent coating technology, VersaTek gloves are also designed for maximum comfort and flexibility so workers can maintain natural hand movements and precision when handling small parts. VersaTek is available on select Magid AeroDex and DX+ Technology styles.

➔ For more information visit [FleetMaintenance.com/21293315](https://FleetMaintenance.com/21293315)



» Offers OBD-II and EOBD compatibility

The **TOPDON UltraDiag** mid-level diagnostic scanner offers full-system diagnostics of all electronic control systems and maintenance service functions on various makes and models. The UltraDiag offers OBD-II and EOBD compatibility, giving technicians even more capabilities to work on a variety of U.S. and European vehicles. The ArtiFolder automatically saves all scan reports so that previous repair information can be reviewed and compared.

➔ For more information visit [FleetMaintenance.com/21284683](https://FleetMaintenance.com/21284683)



» Offers 1,250 lbs.-ft. of loosening torque

The **AIRCAT 1/2" Composite Impact Wrench**, No. 1125, weighs 3.8 lbs. and offers 1,250 lbs.-ft. of loosening torque and 1,000 lbs.-ft. of maximum torque. Other notable features include a twin hammer mechanism, a patented ergonomic handle design, a patented quiet-tuned exhaust that reduces noise level to 87 dBA, an easy-to-use forward/reverse power management lever, and a low-weight, durable composite housing with a magnesium hammer case. The tool measures 7.1" in length.

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## TOOLS & EQUIPMENT



### » Cleans and dries heavy multi-ported parts

The **Renegade I-Series 4824 Pass-Through Wash, Rinse, Dry Parts Washer System** is designed to deliver multi-stage continuous cleaning efficiency to clean and dry heavy multi-ported parts transported via inline conveyorized operation. Each wash and rinse stage compartment contains a 512k BTU gas immersion heater and spray manifolds with strategically placed nozzles to deliver high-pressure force and high-temperature cleaning. The 225k BTU gas-heated dry stage contains dual zones with a 15hp air blower in zone one to remove residual water from even hard-to-reach cavities and two 2hp heated recirculating blowers in zone 2. The wash zone measures 48" by 24" and has a 750-lb. conveyor belt weight capacity.

» For more information visit [FleetMaintenance.com/21294593](http://FleetMaintenance.com/21294593)



### » Long lasting and durable adhesive

The **Dent Fix Equipment Cold Adhesive Glue Slide Hammer Set**, No. DF-CGS71, is a lightweight kit designed to enable auto body professionals to quickly and safely move large areas of metal efficiently. The kit includes the company's 2.8-lb. Slide Hammer, 50 grams of Mammoth Tar Cold Glue, and four tabs. For strength and durability, each tab is made of aluminum. Tab sizes include: 22mm by 57mm and 36mm by 80mm rectangular tabs and 38mm and 52mm round tabs. The Mammoth Tar Cold Glue provides almost instantaneous, strong adhesion and will not harm the finish of the vehicle, the company said.

» For more information visit [FleetMaintenance.com/21289557](http://FleetMaintenance.com/21289557)



### » Includes over 100 SKUs

**Mayhew Tools' Made in the USA Screwdriver Product Line** includes over 100 SKUs and are available both individually and in sets. Notable features include ergonomic acetate tri-lobular handles for maximum strength and torque transfer, ribbed necks for fingertip control and a non-slip grip, and a durable black oxide finish for corrosion resistance. All blades are manufactured using tempered high alloy steel for strength and durability. Each tip is precision CNC machined to industry specifications with tight tolerances for secure and reliable fastener engagement. All screwdrivers are made in the U.S. and exceed ANSI, ASME, and government standards (GGG, ISO).

» For more information visit [FleetMaintenance.com/21292744](http://FleetMaintenance.com/21292744)

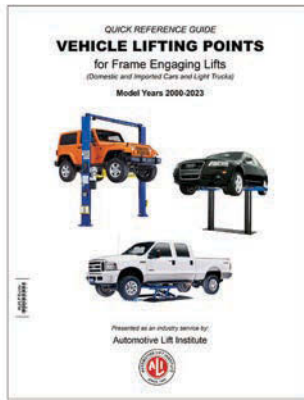




» Has a 3x zoom lens

The **Mueller-Kueps LED Penlight**, No. 904 980, features a 3x zoom lens for wide or narrow beams. With a 40m beam spread and ability to emit up to 260 lm, the penlight is ideal for under-the-hood or under-the-vehicle applications. It's also rechargeable via USB, has a red/green charge indicator, and is made of aircraft aluminum.

➔ For more information visit [FleetMaintenance.com/21293671](https://FleetMaintenance.com/21293671)



» Aims to prevent vehicle lift accidents

The **Automotive Lift Institute Digital Vehicle Lifting Points Guide (2023)** covers cars, SUVs, vans, light-duty trucks, and electric vehicles from model years 2000 through 2023. It's designed to help prevent car lift accidents by making it easy to quickly look up OEM-recommended lifting points. Lifting points are showcased in more than 250 undercarriage images. The digital version has the same content and layout as the familiar print guide, with the added benefit of always-on access through any device for maximum convenience. Users can find a vehicle quickly via a keyword search function and are able to highlight or make notes as needed.

➔ For more information visit [FleetMaintenance.com/21293319](https://FleetMaintenance.com/21293319)



» Soft rubber-coated handles

The **SP Tools USA 6-pc Premium Plier/Cutter Set with EVA Foam**, No. SP32916, contains six commonly used pliers, including 10" quick-snap, 8" combination, 6" and 7" HD diagonal cutters, 8" HD long nose, and 8" bent nose precision pliers. The set features soft rubber-coated handles for limited slippage and multi-positioned channels for more gripping power. It is made from chrome vanadium electric steel that has been forged and multi-stage oil-hardened. The quick-snap pliers offer "self-gripping" teeth to prevent slippage. The set comes in a custom-cut foam insert carrying case for easy organization and mobility.

➔ For more information visit [FleetMaintenance.com/21287267](https://FleetMaintenance.com/21287267)



» Provides braking in under two seconds

The **Milwaukee Tool M18 FUEL Braking Die Grinder with Slide Switch**, No. 2939-20, is designed to deliver 11A corded power and can remove up to 12" of weld bead using one M18 Redlithium XC5.0 battery. Equipped with RAPIDSTOP technology, the die grinder provides braking in under two seconds for enhanced safety. Its Powerstate brushless motor delivers 27,000 rpm, allowing users to maintain grinding power while in tight spaces. Additionally, the cordless braking die grinder is compatible with 2" accessories and features a spindle lock design for one tool accessory change.

➔ For more information visit [FleetMaintenance.com/21290696](https://FleetMaintenance.com/21290696)

» Additional foot of lead wire

The **Thexton Extended Back Probe Spoons**, No. 914X, are designed to access electrical circuits from the rear of the connector to prevent piercing wires and possibly damaging the circuit. The 914X is ideal when space is limited for back probing. The additional foot of lead wire offers flexibility and assures a good connection with voltmeter. Made in the U.S.

➔ For more information visit [FleetMaintenance.com/21294596](https://FleetMaintenance.com/21294596)



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# Fleet management systems

## » Fleetio Fleet Management Software and Maintenance System

**Fleetio** features a variety of solutions to monitor and track a fleet's performance and lifecycle. The service includes preventative maintenance reminders, electronic driver vehicle inspections records (eDVIRs), and digital work order forms that include service duration tracking, cost subtotals, and supply and fee tracking. The dashboard also includes service reminders, cost reports, equipment status, and more. ProQual Landscaping, a fleet with 85 assets in Tempe, Arizona, used the platform's proactive maintenance plan to save 33% in the first half of one year versus the previous. "Fleetio takes no brainpower to know where to go or what to do; it's simple," noted Jeremy Bader, ProQual Landscaping Implementation Manager in a Fleetio case study. "The bulk upload feature allowed us to take all of our electronic documents, send them to Fleetio, and we were up and running within hours."

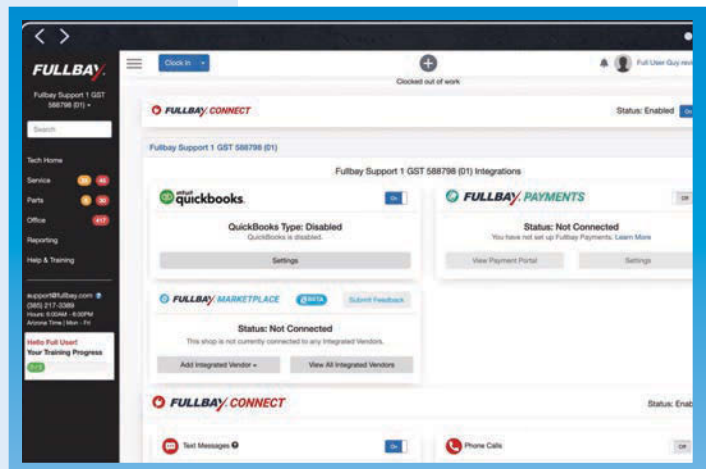
➔ For more information visit [FleetMaintenance.com/21296289](https://FleetMaintenance.com/21296289)



## » Fullbay Repair Shop Management Software

The **Fullbay** platform is a web-based heavy-duty truck repair and shop management program that compiles every facet of information a shop may need in one convenient dashboard. From estimates and invoices to inventory management, Fullbay can manage parts across multiple locations, generate service orders, and track a shop's revenue and efficiency. "There's a very large report called the Fleet Cost Reader report in Fullbay," said Chase Bowman, operations manager, AM PM Diesel Services. "I love that report; [there's] so much useful information on there that a lot of people overlook, but it tells you how your customer fleet is operating."

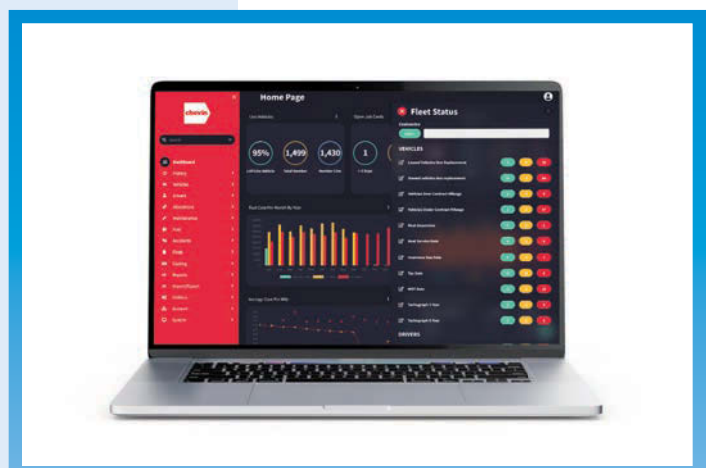
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## » Chevin Fleet Solutions' FleetWave

**FleetWave** provides a unified dashboard for fleets that include fuel costs, maintenance, and repair services as well as purchase order and invoice reminders. The platform also features driver training reminders and an easily accessible maintenance schedule for all of a company's assets. "Having machinery that is on high demand and then not utilized until next season, and then having other machinery operating continually all year round are some of the challenges we face with managing our fleet," said Joydee Caton, fleet manager, Hinkler Park Plantations. "FleetWave gives us the ability to monitor them according to their use."

➔ For more information visit [FleetMaintenance.com/21296310](https://FleetMaintenance.com/21296310)



## » Zonar EVIR Mobile

**Zonar EVIR Mobile** differentiates itself from other providers with its patented Electronic Verified Inspection Report solution, which works with its other offerings for predictive maintenance and management. The platform offers GPS tracking on vehicles and equipment, and the inspection system utilizes RFID tags that will not allow a driver to progress until they've scanned the tag. "If I see an inspection is done in under six minutes, I know that the driver didn't spend enough time looking at each zone," said Glen Hand, Bridger Steel's inventory and logistics coordinator. "I can then coach them toward better practices."

➔ For more information visit [FleetMaintenance.com/21218221](https://FleetMaintenance.com/21218221)







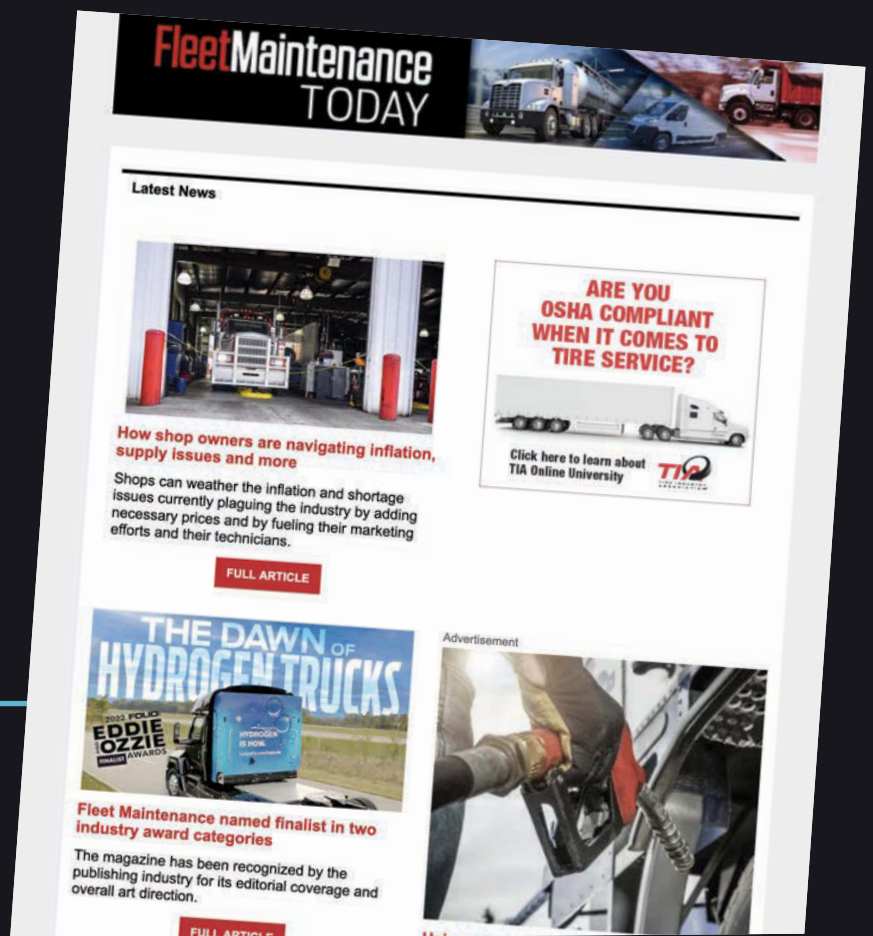
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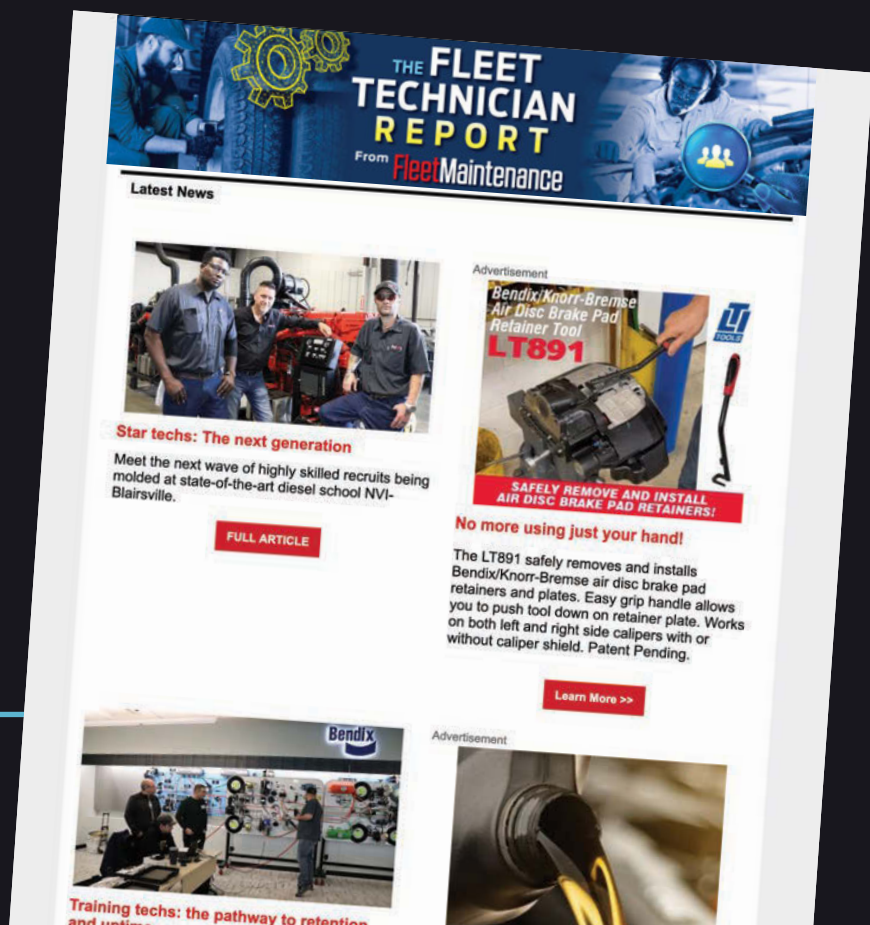
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