

**BRAKES: SPEC'ING, INSPECTING,  
AND MAINTAINING**  
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**HEAVY-DUTY EQUIPMENT  
TRENDS OF 2023**  
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# FleetMaintenance

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## Shop Tools OF Champions

**All the tools  
top maintenance  
technicians turn to  
for winning uptime.**

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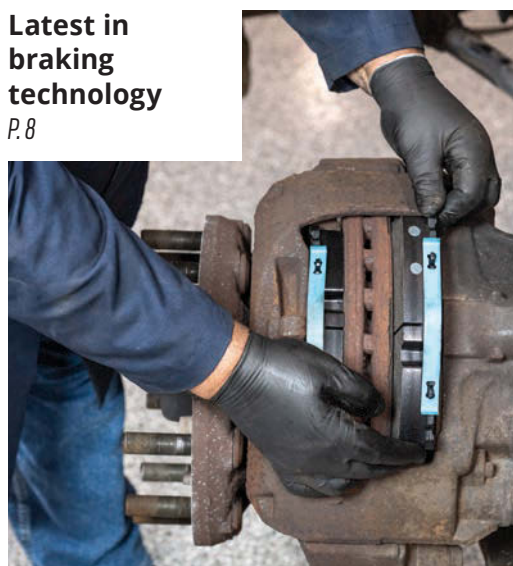


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**Want to contribute?** Contact us at [editor@FleetMaintenance.com](mailto:editor@FleetMaintenance.com)

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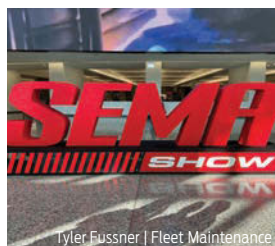
### Most important KPIs for maintenance effectiveness

With the amount of data in trucking, it's easy to get overwhelmed. Here's four of the most important key performance indicators to pay attention to.  
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# FleetMaintenance

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# When picking the fleet of the future, choose wisely

Don't let the push for cleaner trucks shove you down the wrong path.



**By John Hitch**  
Editor-in-chief

.....

**@Hitched2Trucks**



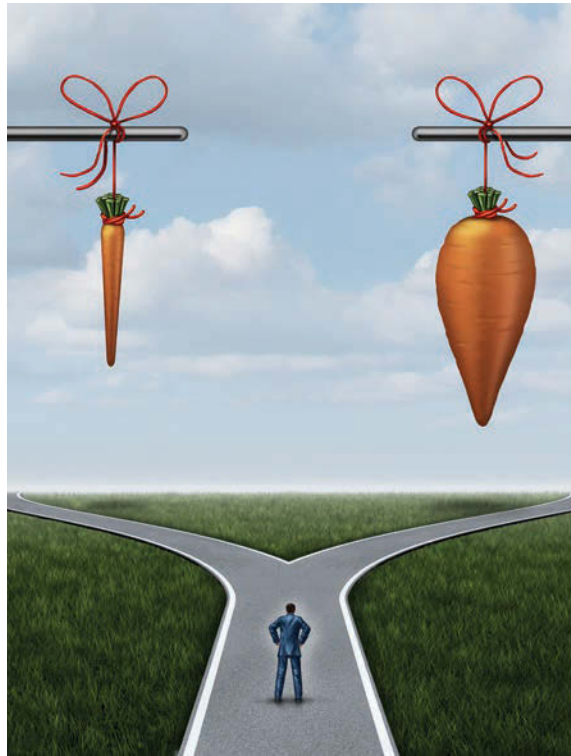
**By the end of the decade, fleets are** poised to have far more electric vehicles to manage and maintain. According to Statista, worldwide medium-duty EVs will more than quadruple from now until 2025, and then nearly double (to 302,000 units) from then to 2026. In the heavy-duty sector, there's just under 2,000 electric trucks now; by 2026 there will be 22,000. From there, it's presumed exponential growth will ensue.

This leaves little time for commercial vehicle operators to decide what their individual fleet of the future should look like. The important thing to remember is that there is probably no one “holy grail” to get you through this climate crusade. Like Indiana Jones, you must “choose wisely,” as the shiniest object—or one with the most government incentives—might not make sense for your application.

First off, there's two big reasons to not procrastinate: the carrot and stick brandished by the federal government. The carrot is all the available incentives via the Infrastructure Investment and Jobs Act and Inflation Reduction Act (IRA). These pieces of legislation include billions in investments and incentives to purchase battery-electric and fuel-cell electric vehicles. The IRA specifically allows up to a \$7,500 tax credit for light-duty commercial vehicles (14,000 lb. GVWR).

Meanwhile, the stick is the Environmental Protection Agency (EPA)—which plans to tighten greenhouse gas emission standards for model year 2027 and beyond “for subsectors where electrification is advancing at a more rapid pace,” which will likely impact buses, delivery trucks, and short-haul tractors. Heavy-duty vehicles may also get new GHG emissions standards for MY 2030.

But, if I had to guess, the combination of government ineptitude/corruption paired with a fragile grid will not support the rate of electrification politicians are aiming for. So, perhaps sticking with a diesel platform and implementing biodiesel makes the most sense for your application while also reaching net emission targets. A study from the Diesel Technology Forum and Stillwater Associates of medium- and heavy-duty trucks in 10 northeastern states found using “100% renewable diesel resulted in three times larger cumulative GHG reductions by 2032 than the EV scenarios.



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“Using B20—a 20% blend of biodiesel with 80% petroleum diesel—provided about the same cumulative GHG reduction,” the DTF noted. Plus, the IRA did also include some token tax credits for renewable biofuels.

On the other hand, the shiniest object might work out for larger fleets, such as Pepsi, which recently received 100 Tesla Semis. The Semi's range is 300 to 500 miles, depending on the battery configuration, and that is the sweet spot for regional hauls. The sleek design is also on brand for the Pepsi Generation and works as an eye-catching rolling billboard, although arguably not as much as a harrier jet.

For a more grounded alternative, Freightliner, Volvo, and Kenworth's electric trucks might not have as long a range or Tesla's mystique, but they have proven track records and much wider service networks. A Pitt Ohio driver on a pickup-and-delivery route I spoke with is already in love with his Volvo VNR Electric for its smooth ride and quiet operation.

Ultimately, the unfamiliar fuel-cell electric vehicles might make the most sense in the near future. The FCEVs being developed now have a longer range than BEVs and don't generate emissions. The problem is that producing hydrogen takes a lot of energy.

Green hydrogen, processed using renewables, is gaining momentum, though. The infrastructure law includes \$1 billion for a Clean Hydrogen Electrolysis Program that cuts green hydrogen costs and the Department of Energy's Hydrogen Shot program is working to reduce green hydrogen cost from \$5/kg to \$1/kg in a decade.

During a recent visit to green hydrogen producer Plug Power's innovation center in Rochester, New York, I received a glimpse of a possible zero-emission future firsthand. Along with seeing how Plug makes license plate-sized membrane electrode assemblies for their fuel cells and electrolyzers, Plug representatives detailed how its electrolyzers produce liquid hydrogen using hydroelectric power from Niagara Falls. Plug also makes tankers to haul the liquid hydrogen (which is colder than liquid nitrogen), fuel cells (for forklifts and facilities), and light commercial vans through a joint venture with Renault. The company has several projects across the globe and expects to produce 500 tons of liquid green hydrogen per day in 2025, up from 9.1 tons in 2022. Revenue also is projected to climb from \$1.4 billion next year to \$20 billion in 2030.

Andy Marsh, Plug Power president and CEO, told me hydrogen benefited most from the IRA, and that the incentives will help accelerate Plug's cost proposition. "Every time we doubled the number of units in the field, our costs declined by about 25%," Marsh said. Plug is also working to slash the amount of iridium in its electrolyzers, as the global chase for rare earth metals could get ugly.

"Hydrogen is really the Swiss Army knife of this transition to renewable energy," Marsh offered. "We're going to help the world get to net zero."

This solution has found buy-in from large fleets, including Amazon, Walmart, and Home Depot. FreezPak, a New Jersey-based cold chain logistics provider, has used Plug's hydrogen-powered forklifts since 2014. Co-CEO David Saoud said the hydrogen forklifts take only 90 seconds to refill, versus 10 hours for electric, allowing for higher productivity. He can't wait for hydrogen trucks to become available, as he already has the infrastructure at the cold storage facilities, and indicated FreezPak will adopt whatever FCEV is first available, leasing diesel trucks until that happens. ■



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# Brake Check-in

A refresher on what fleets need to know to spec, inspect, and maintain their braking systems.

By Seth Skydel

[ BRAKES, TIRES & WHEELS ]

» Kevin Pfost, Bendix's coordinator of technical service, performs a brake inspection.

Bendix Commercial Vehicle Systems

If there's one thing on commercial vehicles that operations and maintenance professionals need to understand, it's braking systems. Not getting a truck to start rolling on time will cause delayed deliveries and missed work. Not getting it to stop will cause all that and a whole lot more, including property damage, injuries, and even death. Improper brake maintenance also will leave fleets and shops vulnerable to "nuclear" verdicts.



The good news is that fleets that keep up to date with the latest braking technology, as well as related preventive maintenance and inspections, shouldn't lose any sleep over brake issues. And to ensure your rest, we've put together a comprehensive look at the current brakes on the market, along with some tips on how to avoid downtime caused by out-of-service violations and prevent or mitigate collisions.

Before getting into that, let's revisit the proper braking standards for stopping. As a key element of safety, commercial vehicle stopping distances are codified in law. Specifically, FMVSS (Federal Motor Vehicle Safety Standard) 121 calls for air brake systems to fully stop tractor-trailers in no more than 250 ft. when loaded to their gross vehicle weight rating (GVWR) at 60 mph. This is true for commercial vehicles using either air disc brakes or S-cam drum brakes.

## Drum or disc? Fleets weigh in

So which type of brake can better help you meet these FMVSS standards?

According to Bendix Commercial Vehicle Systems, a 6x4 tractor-trailer going 60 mph takes 200 ft. to stop with air disc brakes and 225 ft. with drum brakes. An independent test of Bendix ADB22X air disc brakes completed on a test track by Pitt Ohio revealed that at 55 mph, these ADBs stopped 15 ft. earlier than drums.

"Fifteen feet is the length of a car," noted Jeff Mercadante, VP of safety at Pitt Ohio, a perennial fleet safety award winner. "When you get up to 70 mph, you're talking closer to 50 to 60 ft."

Drum brakes, though, make up the majority of systems in trucking, as they initially cost less. ADBs, however, have gained market share in the last decade. In 2015, ADB adoption was about 15%, while in 2020 it doubled to 30%. ADBs have fewer parts for quicker servicing, which can lead to higher uptime and a better total cost of ownership. But that hardly settles the debate.

Terrance Wall, senior manager of maintenance technical support at Ryder, pointed out that for decades, S-cam type drum brake systems have been the "go-to" standard for medium- and heavy-duty trucks and tractors.

"Drum brakes are a consistent economical solution that provides common components across multiple vehicle platforms as well as weight classes," he said. "And since the implementation of reduced stopping distance regulations in 2013, drum brake lining manufacturers have improved materials to meet or exceed the stopping distance requirements."

"Although air disc brakes do have a slightly shorter stopping distance, drum brakes still easily meet the requirements," Wall continued. "Air disc brake systems do have an advantage when brakes heat up and brake fade becomes more evident, but with a multi-vocational fleet, a uniform and economical option becomes the primary focus second only to safety."

For Ryder, that is where drum brake systems have an advantage. When operating a wide variety of vehicles and with multiple repair locations, standard practices that include uniform training, tooling, and maintenance procedures are para-

mount to maximizing the useful life of brake components while maintaining the safety and cost effectiveness of the brake system.

Penske Truck Leasing, meanwhile, mostly specs ADBs. "To capitalize on their full benefit, however, both the tractor and trailer need to be equipped with air disc brakes," noted Chris Hough, Penske's VP of maintenance, design, and engineering.

Air disc brakes benefit the Penske fleet in several ways. In the area of safety, Hough noted, they provide shorter stopping distances and reduced brake fade. From a maintenance standpoint, there are fewer moving parts and grease points, and no need to measure brake stroke. Also, pad replacements are a relatively quick and simple process. Penske shops also are stocked with brake vendor-specific tools, along with hub handlers and various gauges to measure the remaining brake pad life and to inspect the rotor condition.

Hough also pointed out that ADBs have helped reduce the number of units placed out of service for brake stroke compliance issues during roadside inspections. "When it comes to ROI, there are some segments that are hard to measure," he explained. "In general, we have found that ADBs provide a lower brake maintenance [cost per mile], provide our customers with improved stopping distances, and increase uptime."

The advent of new technologies such as lane departure, electronic stability, and adaptive cruise control, which are now being integrated with ABS systems, also contribute a great deal to extending the life of foundation brake systems, he added. ADB systems also offer electronic pad wear sensors, which can provide data via telematics to assist in PM interval planning and procedures.

"All brake component manufacturers provide specific maintenance procedures to ensure optimal performance and life from these components," Hough said. "By integrating these procedures into your brake maintenance program, coupled with the utilization of the correct tools, the maximum useful life at the most economical cost can be realized."

"ADB systems provide benefits such as less time required to replace lining material and fewer components to lubricate," Hough continued. "However, even with these benefits, ADB systems typically cost more to maintain and are difficult to standardize across a multi-vocational fleet without maintaining a larger inventory to accommodate the different spec and lining requirements."

For example, some operations with repeated stop-and-go applications, such as refuse and inner city routes with multiple deliveries, can realize cost savings from shorter maintenance times and extended pad life when ADB systems are equipped with the proper friction material.

However, he cautioned that the ease of getting an accurate measurement of the lining material on both the front and rear of the rotor is consistently a drawback on currently designed ADB systems. This, in turn, typically leads to less than full utilization of the lining material if the pads are being changed prematurely.

"It is important to carefully analyze the duty cycle and operation of the fleet to determine the optimal type of brake system that makes economic sense but also provides the maximum

## Brake tools in the shop

According to Kevin Pfost, coordinator, technical service at Bendix Commercial Vehicle Systems, these are the shop tools and equipment needed to properly maintain and repair air disc and drum brakes:

- Friction wear gauges
- Tape measures and micrometers
- Magnetic base and dial indicators
- Borescopes and inspection mirrors
- Disc brake hub and rotor jacks
- Drum dollies
- Torque wrenches

Additionally, he recommends that fleets and service providers use manufacturer training as well as reference Service Data Sheets and troubleshooting guides.

Product innovations also impact how brake system service and repairs are performed, related Denisse Pedraza at Haldex. "Haldex offers a complete toolbox with all required items for air disc brake service," she explained. "Our toolbox is standard; the only unique tool necessary to remove ModulT pads is a Torx 55-bit for making brake adjustments, which is included."

Shop tools and equipment for properly maintaining and repairing brakes is something to discuss with brake suppliers, noted Chuck Brodie at ZF. "With our MAXXUS L2.0 system, you can replace brake pads with basic tools, but ZF also has tool kits for deeper maintenance such as guide pin bushing replacements," he said. "For ABS, you need our diagnostic software, TOOLBOX Plus, to go with your basic toolset."

useful life while retaining maintenance efficiency for your technicians," Hough stated.

## Avoiding OOS violations

No matter what types of brakes are employed by a fleet—and it may even be a mix of both on the same tractor-trailer—the driver and maintenance team must keep a close eye on their systems because the Commercial Vehicle Safety Alliance (CVSA) will be watching.

Unfortunately, not all fleets do. In the 2022 CVSA International Roadcheck commercial motor vehicle inspection and enforcement initiative, brake system issues resulted in the largest percentage of violations: 25.2% in the U.S., Canada, and Mexico combined. In fact, brakes were the top reason for out-of-service violations in both the U.S.



» ZF's OnGuardMAX and other automatic emergency braking systems have been made possible by innovations in braking technology.

ZF CV Solutions

## Making the right connections

Digital technology also is helping to prevent brake issues. To help fleets make more precise decisions about brake maintenance, the PreSet Plus SmartHub provides actionable insights on wheel end components from a sensor applied to the hub barrel and alerts fleets about issues with brakes, noted Isaac Otto, product manager at ConMet Digital.

ConMet Digital also offers SmartAir, which provides line pressure monitoring for visibility into trailer emergency-brake air pressure. Real-time data from the system is available on the ConMet Digital dashboard and soon through a driver mobile app, where users can set alerts for information during pre-trip or maintenance inspections as well as on-the-go.

"Line pressure monitoring gives drivers visibility to brake drag as a result of improperly connected air lines, debris in the pneumatic system, or forgetting to release the parking brake," Otto explained. "Trailer applications are where SmartAir line pressure monitoring becomes crucial for identifying slow air leaks across one or more trailers."

"Fleets face mounting needs for efficiency and increased uptime, and inspections and violations can delay deliveries and sideline vehicles, causing costly downtime," he continued. "Actively monitoring brake air pressure can help fleets and drivers take corrective action before hitting the road, reducing the chance of costly fines and violations."

(24%) and Canada (38%), and 26.1% of violations were second only to tires in Mexico.

According to FMCSA's Motor Carrier Management Information System, common out-of-service violations for all of 2022 included: brake hose or tubing chafing and/or kinking (Violation code 393.45B2), inoperative/defective brakes (393.48A), brakes out of service (396.3A1BOS), and missing or defective parking brake system (393.95B).

It's impossible to know all the different variables and events that led to all of these violations. What is known is that the last line of defense, the driver, likely missed something on their pre-trip inspection.

"Considering that a high percentage of violations for brake issues are air leaks and chafed air hoses, a big part—but not all, of course—of these could be avoided with a good pre-trip inspection," noted Keith DiRuscia, manager of fleet maintenance at Pitt Ohio. "We still keep our preventive maintenance intervals at a point where we catch most brake thickness and cracked lining at the shop level."

Drivers are the last line of defense, though, and former Washington State Patrol officer Fred Fakkema, currently VP of safety and compliance at Zonar Systems, offered some tips to help drivers avoid these types of brake violations.

"While conducting pre-trip inspections, listen for leaks and look at the hoses and valves," he said. "It's very easy to see chafing and check the connections. A visual check of slack adjusters and wheel ends is also important during the pre-trip. Many drivers believe that since there are automatic adjusters, there is no reason to look. But they are still mechanical and need to be maintained."

Fakkema urged that drivers not get complacent. Issues such as pressure loss or an inoperable parking brake should be discovered during a proper pre-trip. It is important that fleets are proactive at all times.

"Once a fleet realizes they may have an issue with brake violations, it may be too late, and they will have already received numerous roadside inspections with brake violations," he said.

"A fleet should always have pre-trip inspections and identify brake violations in their ongoing in-service training. The training and reinforcement of these issues are vital—not only for the safety of the driver but also for all motorists on the road."

Fakkema noted that seven of the top 20 CVSA violations were for brakes.

"If you stop and think about that, the mechanism that stops an 80,000-lb. truck is among the most noted violations," he explained. "That alone should encourage the driver to do a proper pre-trip inspection to get in that safety mindset before leaving the yard."

## Better solutions for better braking

To help keep those 80,000-lb. tractor-trailers and all other commercial vehicles stopping as they should, manufacturers have continued to churn out continually better braking technologies that exceed FMVSS requirements.

"The OEMs have an additional 10% better than FMVSS requirement, and all production brakes must meet those requirements," said Chuck Brodie, field service team leader at ZF Commercial Vehicle Solutions.

Because brake manufacturers all have the same basic stopping requirements, they have to set themselves apart in different ways. Here's how several of the leading brake OEMs have done that.

### Meritor

In 2020, Meritor introduced the EX+ LS single piston air disc brake designed for linehaul, city pickup and delivery, and trailer applications. According to Alicia Wong, director of brakes at Meritor, the lighter mono-block air disc brake is the result of five years of development.

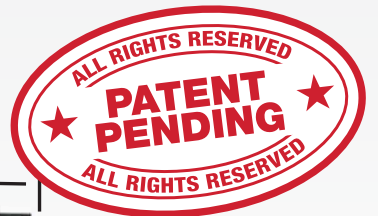
"The EX+ LS brakes include features of our EX+ platform, such as the adjuster mechanism, and have new advantages such as an improved sealing system with fewer entry points for moisture, enhanced taper wear performance, and an approximately 20-lb. weight reduction on a 6x4 truck," she said.



# How do *you* plan to service **EV battery** packs?

The BendPak EV2400SL is a push-around full-rise scissor lift table that is perfectly suited for EV battery pack replacement. With its compact design, this space-saving scissor lift can be easily transported anywhere in the workplace, making it ideal for multi-bay facilities or workplaces with confined areas. To learn more visit [www.bendpak.com/EVLIFT](http://www.bendpak.com/EVLIFT).

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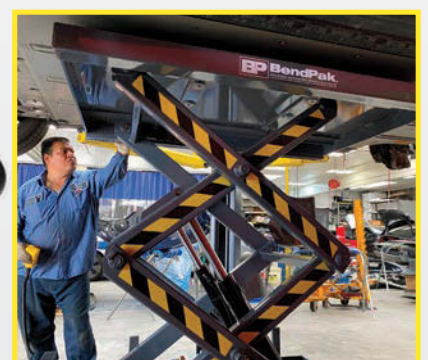
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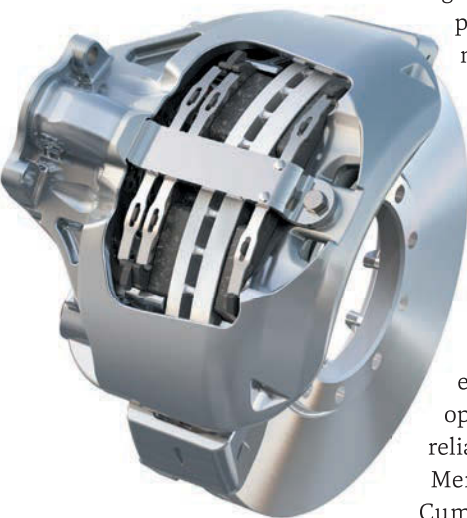
“Meritor continues developing and testing new technologies for overall brake health, such as positive pad retraction, a solution that improves brake drag and fuel efficiency, and enables longer pad life,” Wong continued. “We have also developed smart sensor-based products, such as a pad wear warning indicator that enables wear prediction and proactive maintenance planning.”

In addition, Meritor has in the works an equivalent solution in a lining wear indicator for drum brakes. “Collectively, these new technologies support fleet technology and information requirements for trucks and trailers, and contribute to TCO optimization, uptime, and reliability,” Wong said.

Meritor was acquired by Cummins this year, and time will tell how this will further push Meritor’s braking systems forward.

#### » Meritor EX+ LS air disc brake

Meritor



#### Bendix

Commercial vehicle safety technologies are increasingly complex, and full-stability systems are mandated for all new trucks, pointed out Mark Holley, Bendix director of marketing and customer solutions, wheel-end.

“Ultimately, these systems depend on consistent stopping power at the wheel ends to work at their best,” he said. “That’s where air disc brakes shine—and it’s a big part of the reason that adoption rates for ADBs are now approaching 50% on trucks and tractors.

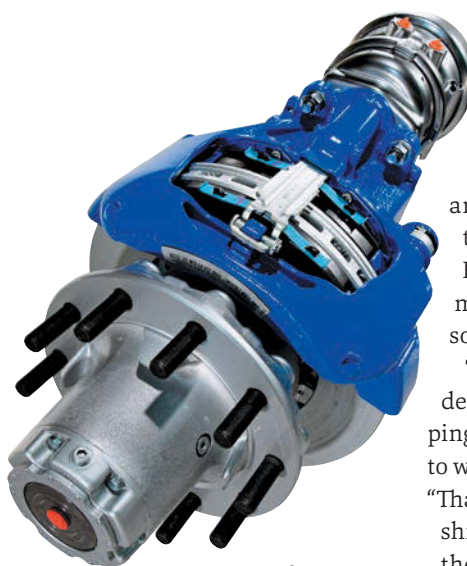
“Air disc brakes also provide shorter stopping distances than drum brakes,” Holley continued. “At 60 mph, a fully loaded tractor-trailer stops in about 225 ft. with drum brakes. In our testing, air disc brakes showed a 12% improvement by reducing the stopping distance to roughly 200 ft., and some of our testing showed up to an almost 75-ft. difference when drum brake fade becomes a factor.”

Brake fade can happen when heat friction on the drum causes it to expand away from the friction material. This lengthens the pushrod stroke needed for the brake to contact the drum frictional surface, weakening the stopping power.

Bendix also offers pad wear sensing on its ADB22X air disc brakes. The technology removes the guesswork from friction replacement because it uses a sensor to determine when the pad is nearing its end of life, then generates a diagnostic code that can either be sent to the fleet office via telematics or pulled by a technician using a diagnostic tool. This enables fleets to make sure they have friction

#### » Bendix ADB22X-LT for trailers

Bendix



available and proactively schedule maintenance while also protecting costly components like rotors from being damaged by worn-out friction.

Holley also pointed out that electric commercial vehicles will be spec’d with air disc brakes and that Bendix is actively engaged in numerous projects with commercial EV OEMs. The EVs will employ regenerative braking, which will reduce wear on any brakes by capturing that stopping energy in the motor and converting it to electrical energy that is stored in the battery.

#### ZF CV Solutions

ZF, which folded Wabco into its newly formed CV Solutions group, is also high on ADBs.

“Air disc brakes really shine in conditions that heat the brakes up more than the defined test,” ZF’s Chuck Brodie explained. “Long downhill runs, stops from higher speeds, and multiple stops are where drum brake performance can be impacted more than on disc brakes.”

ZF’s latest foundation air disc brake offering, the MAXXUS L2.0, has been in production since 2020. And these will also help steer the future of higher degrees of autonomous driving.

“From a purely pneumatic and mechanical setup, brake system evolution led to stability control, increasing safety, and adding more SAE Level 1 and Level 2 functionality to enhance safe and efficient driving,” Brodie related. “Looking ahead, with fully integrated deceleration control, brakes will include regenerative braking capability and with that bring in efficiency and reduced friction brake maintenance.

“To put it simply, the driver tells the system how fast they want to decelerate by applying the brake pedal, and the system will use the most efficient combination of engine brake, retarder control, and regenerative braking when available to achieve the driver’s demanded deceleration,” he explained further. “That makes for an easy-to-operate system with optimized efficiency and brake friction material life.”

#### TSE Brakes

Air disc and drum brake systems technology continues to evolve, noted Patrick McNamara, VP of sales and marketing at TSE Brakes. Two key items that are available from the company are ADB brake pad sensors and, for drum brakes, the TSE-Sense system, which monitors not only brake stroke but also service and parking-brake status.

#### » The TSE Sense Intelligent Air Brake Chamber continuously monitors brake stroke and can detect several performance issues.

TSE Brakes



#### » Wabco MAXXUS L2.0

ZF CV Solutions

**“Air disc brakes really shine in conditions that heat the brakes up more than the defined test.”**

Chuck Brodie, ZF

“Those solutions assist fleets with planning preventive maintenance and provide fleets with real-time data with regard to the brake performance,” McNamara said. “The TSE-Sense system can also assist with early indication of when to service based on brake stroke. That not only keeps brakes operating at their optimum but also prevents out-of-service events as fleets are notified in advance that they are approaching out-of-stroke parameters.”



## Haldex

In 2018, Haldex began offering the lightweight Gen II version of the ModulT ADB for trailers. This year, the Swedish brake maker came out with ADBs for trucks, based on the Gen II design, starting with medium-duty DBT22 MD.

The ModulT product line also includes the DBT22LT caliper for 22" wheels. Design features include a single casting that reduces weight by avoiding the need for an extra interface and more bolts. Because the system employs a single tappet mechanism, rather than twin, fewer parts overall are needed.

In combination with its air disc brake, Haldex also offers the fully sealed LifeSeal+ spring brakes for all truck, tractor, and trailer applications equipped with air disc brakes.

"Standard spring brakes wear out quickly, usually from corrosion and contamination ingress through the vent holes," said Denisse Pedraza, commercial product manager for disc brakes and actuators at Haldex. "That results in premature breakage of the power spring, which leads to unscheduled repair and replacement, costly downtime, roadside repairs, and even unsafe or inadequate braking performance. With LifeSeal+, the spring chamber is completely sealed, so contaminants cannot get in and the actuators last twice as long as traditional vented actuators.

"Braking systems are continuously evolving," she continued. "In 2026, we will release the Haldex

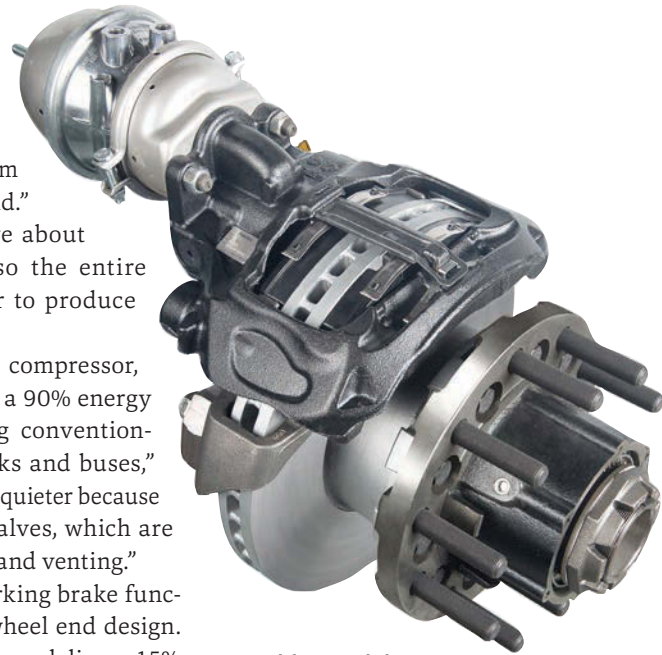
EMB, an electromechanical brake. The EMB is much simpler than existing pneumatic systems because it is electrically controlled and actuated from the brake pedal to the wheel end."

She added these EMBs have about half as many components, so the entire system is lighter and simpler to produce and install.

"Because it does not need a compressor, the high-efficiency EMB offers a 90% energy savings compared to existing conventional pneumatic systems on trucks and buses," Pedraza added. "The EMB is also quieter because there are no compressors or valves, which are typically noisy when charging and venting."

EMB includes an electric parking brake function as part of an integrated wheel end design. According to Pedraza, the system delivers 15% reduced stopping distance thanks to better and more precise control of wheel speed compared to pneumatic systems. This actuator control precision results in a more stable clamp force on the rotor, increasing the life of pads and lowering brake dust emissions.

"EMB offers the level of diagnostics and redundancy in controls to support Level 5 autonomous commercial vehicles," Pedraza added. "Over the next few years, Haldex will continue developing, testing, and validating the technology with simu-



### » Haldex ModulT Gen II

Haldex

lations and physical units in readiness for EMB industrialization."

Keeping with the trend of mergers and acquisitions, Haldex was acquired by SAF-Holland Group in August.

—Additional reporting by John Hitch. ■

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# THE FLEET TECHNICIAN REPORT

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# Shop Tools OF Champions

(AND OTHER SUCCESSFUL MAINTENANCE PROS)



Some of the industry's best technicians and maintenance managers share their tool essentials to increase uptime.

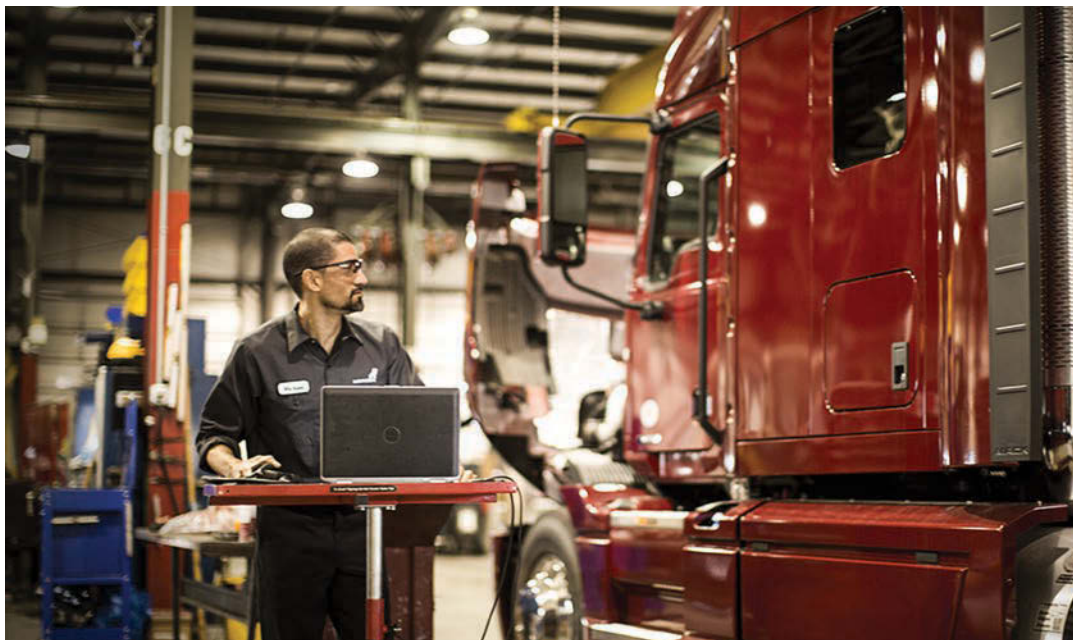
By Tyler Fussner



## [ TOOLS ]

A commercial vehicle maintenance team is only as good as the people within it. And those workers are only as productive and successful as the tools and equipment at their disposal allow. With the right tools, technicians will be at their most efficient—providing faster throughput with fewer repeat repairs—to achieve higher vehicle uptime.

*Fleet Maintenance* spoke with industry award-winning technicians as well as maintenance managers of successful repair operations to better understand how to outfit technicians and the shop with the tools and equipment that will establish the most efficient maintenance environment.



» Diagnostic software and a portable laptop were the resounding leader of the polled technicians' shop essential equipment.

Mack Trucks

### Shop essentials

So, what do the best techs and management alike consider the essentials to get the work done?

#### Diagnostic tools

"Number one, hands down, would have to be our OEM diagnostic computer," said Chris Purcell, service technician at Rush Truck Centers—Atlanta. Purcell, Grand Champion of Rush's internal technician competition, the All-Around Tech Skills Rodeo, stated that diagnostic software is utilized day-in and day-out, multiple times a day—if not on every job, then almost every job.

"We run health reports and use internet access for troubleshooting, wiring diagrams, and things of that nature," he said.

Purcell said while working at this International dealer location he mainly uses the OEM's EZ-Tech software, which includes multiple applications. He and his shop also use an all-makes software as well, but he mentioned the clear distinctions between the two.

"The OEM diagnostic software gives you detailed code descriptions," he related. "There are multiple diagnostic tests you can run. You can do snapshot recordings to help you identify different failures. The generic software typically

gives you a fault number, and then it's up to you to look it up from there. There may be a few minor diagnostic tests it will let you do—maybe a forced regen and things like that; some resets—but you've definitely got more access with OEM software. It helps to have an all-in-one versus having to go from here to there."

Purcell and his team in Atlanta aren't the only ones relying on OE diagnostic software. Bonnie Greenwood, senior shop technician at FedEx Freight's Salt Lake City, Utah, location also ranks diagnostic laptops and adapters amongst her most essential tools. Recently, Greenwood placed second at TMC SuperTech, the annual American Trucking Associations' Technology and Maintenance Council's National Technicians Skills Competitions—the highest ranking ever for a female in the competition's 17-year history. She was also the first female TMC FutureTech champ.

"I use this setup to diagnose issues and fault codes on tractors, daily," she related. "This equipment allows me to quickly assess which ECUs are present and communicating, pull fault codes, and then access any OEM program for further diagnostics."

Ryder Systems' 2022 Ryder Top Tech winner, Christopher Johnson, a technician out of Annacis Island, Delta, British Columbia, Canada, said his favorite tool is his SBT diagnostic laptop, a Dell Toughbook—a tool he uses every day in some form or another. Johnson related that he uses the laptop and its software to get vehicle health reports during services and diagnostic sessions.

"The most powerful feature is the OEM software that is installed on it," Johnson said. "Being able to diagnose, run tests, monitor values, and change parameters is extremely powerful. My main use is in the diagnosis of check engine lights and other vehicle warning lights such as ABS, traction control, and driver safety systems."

"The diagnostic laptop helps in promoting vehicle uptime by allowing us to accurately scan vehicle systems and diagnose the problem correctly the first time, and thus keeping the vehicle on the road," Johnson reinforced.

Technicians aren't the only ones who highly prize diagnostic software in the shop.

"Our number one tool that promotes uptime is that OE software, that diagnostic laptop," concurred Mark Kanitz, service manager at Rush Truck Centers—Houston. "A large percentage of everything that's rolling into our service department requires that we are communicating in some capacity with a module or a computer on that truck. And so, it really serves as a starting point to make a determination as far as what that repair path may look like."

Kanitz related that the software is used on services from engine repair to transmission repair, collision mitigation systems, and anything in between. And from a managerial perspective, Kanitz said that it is up to him to equip his technicians (more than 50 at the Houston-based shop) with the software relevant to their area of expertise.

"We have techs who tend to gravitate to a certain area and aspect of the truck, and they are more proficient with that," he said. "We have a technician who's very proficient with transmissions and gear work. I'm going to ensure that his diagnostic laptop has maybe Eaton's ServiceRanger and Peterbilt's ESA (Electronic Service Analyst) as the OE software. But it may not make sense for me to have him fully equipped with an engine program that he's not working on day-in and day-out."

Kanitz's shop employs a divide-and-conquer tactic—with the software divided and supplied to techs as needed for the specialist work they do. But this doesn't happen overnight, and it takes careful management and development to get a team equipped to execute repairs efficiently.

"When we get a technician started, we try to figure out where they excel most," Kanitz explained. "And that is when we look at it from a shop management standpoint. I want to get those guys in environments where they're going to succeed and grow. And then from there, as they continue their career with us, we look at trying to expand their knowledge and get them introduced to other areas that maybe they haven't had that natural inclination towards."

Regardless of where a tech is proficient, it is paramount they are familiar and comfortable with diagnostic software from the start.

"You think back to your typical diesel truck or heavy-duty truck compared to what it was, say 30 or 35 years ago, when everything was mechanical—to now," said Victor Cummings, Rush Enterprises VP of service operations. "The truck has become very complex."



Cummings added that technicians can no longer get by just working on mechanical components if they hope to be strong contributors to a winning shop.

“You have got to have some level of comfort with the computer, and that has presented some challenges, but nevertheless, that is where we are today,” Cummings emphasized.

Cummings also related that all-makes diagnostic software has its place in the service bay as well. “We are very diverse in what we work on, and we work on far more than just our own brand at every Rush Truck Center dealership,” he said. “So, we do purchase and use all-makes diagnostic software.” Cummings said that Rush uses TEXA across many locations but offered some insight on how individual shops can determine the best all-makes option for their operations: Shops should bring in different software and let the technicians pilot them to find out which is most effective for the work they do.

James Rolsing, operations manager at Ryder, stated that he prefers the service bay tools from Noregon Systems as his choice of all-makes diagnostic software.

Rolsing and team use the software to diagnose check engine lights from various manufacturers, among other processes, multiple times a day. He appreciates the “step-by-step” diagnostic procedures provided and the software’s ability to work on multiple manufacturers from the same tool.

“[It is an] all in one,” he said. “[We] do not need multiple scan tools and manuals.”

## Column lifts

Kanitz stated that his shop has seen tremendous efficiency gains using wheel lifts, or column lifts, as his shop leverages the equipment for both engine and chassis repairs.

“Having a good set of wheel lifts—because oftentimes you may be accessing the bottom end



» The Gray Manufacturing line of wireless mobile column lifts feature a wireless communication system and touchscreen graphic control system. Capable of lifting a variety of vehicles, these lifts have no external wires or cords, and when used at a full operating height can provide a lift height of 69”.

Gray Manufacturing



» As today and tomorrow’s commercial vehicles become further ‘electrified’ and ‘sensorized,’ technicians must have proficient capabilities in using digital multimeters and voltmeters.

234310758 | Maxim Lupascu | Dreamstime

of the engine, or you may happen be pulling out a transmission—really helps from an efficiency standpoint. Being able to get the unit up safely and also being able to get in and out of that quickly is definitely a big benefit,” he said. “That helps a lot from an efficiency standpoint versus putting your technicians in a scenario where they are having to try to figure out, ‘How do I get in and out from under the vehicle?’ or ‘How do I remove a component and get it out from under the vehicle?’”

Because of the size of his shop, Kanitz said they have multiple sets of column lifts, and that on any day one may see four sets being utilized at a time.

Cummings related that Rush uses a mix of Gray Manufacturing and Rotary lifts throughout its network, and often both within some shops.

“I absolutely love those things simply because they’re very efficient in terms of getting access to the part of the vehicle that you’re attempting to service, but also, they’re very safe,” he continued, speaking on column lifts. “I have a much higher comfort level having our technicians under a vehicle using column lifts than your typical jack stand configuration. That’s why they are my favorite tool because of the safety and efficiency that they bring.”

Rolsing agreed column lifts are efficient pieces of equipment. His preference is Stertil-Koni’s Mobile Column Lift, No. ST 1075. Rolsing said the lifts are used for plenty of repairs such as clutch or transmission work, driveline repairs, starter replacements, preventive maintenance, and so much more.

As Ryder shops use the lifts daily, promotion of efficiency is crucial with the equipment. Rolsing said such efficiency is achieved through the lifts’ ability to allow the technicians to operate in a standing position versus on their back, on a creeper. “Plus, with low profile vehicles, it is the easiest way to get underneath,” he added.

## Technician essentials

Beyond shop equipment and software subscriptions, technicians must use a litany of tools to execute their duties on a regular basis. However, some tools stand out from the pack as to their importance and impact on a technician’s ability to do their best work.

## Electrical service tools

FedEx Freight’s Greenwood said her number one essential tool is a multimeter of any reputable brand.

“Typically, I use my multimeter every day for electrical troubleshooting on everything from forklifts to tractors, and for anything from lighting issues to engine fault codes,” she said. “My multimeter allows me to get to the root of electrical problems quickly so that repairs can be made in an effective manner.”

Greenwood related that the multimeter she uses today is the same model she used back in trade school, as she is comfortable using it and knows she can trust the readings.

Rush’s Purcell said a good digital voltmeter is essential; and he isn’t so much brand specific when it comes to the tool, but just needs it to be of quality.

“There are so many sensors and different systems on vehicles now, whether it’s engine, transmission—everything is electronic,” he said. “You have got to have a good voltmeter to do the voltage checks, resistance checks, and things of that nature.”

At the top of Purcell’s checklist when determining the best voltmeter to choose from is auto ranging capabilities. Furthermore, he makes sure he has a wide range of test leads to avoid damaging connectors.

Ryder’s Johnson concurred that multimeters are a must-have. His favorite is Mac Tools’ Digital Multimeter, No. EM710, as it has excellent battery life, he attested.

Johnson uses his multimeter for diagnosing electrical systems from simple light circuit faults to complicated CAN datalink communication faults. Though his use of the tool varies from several times





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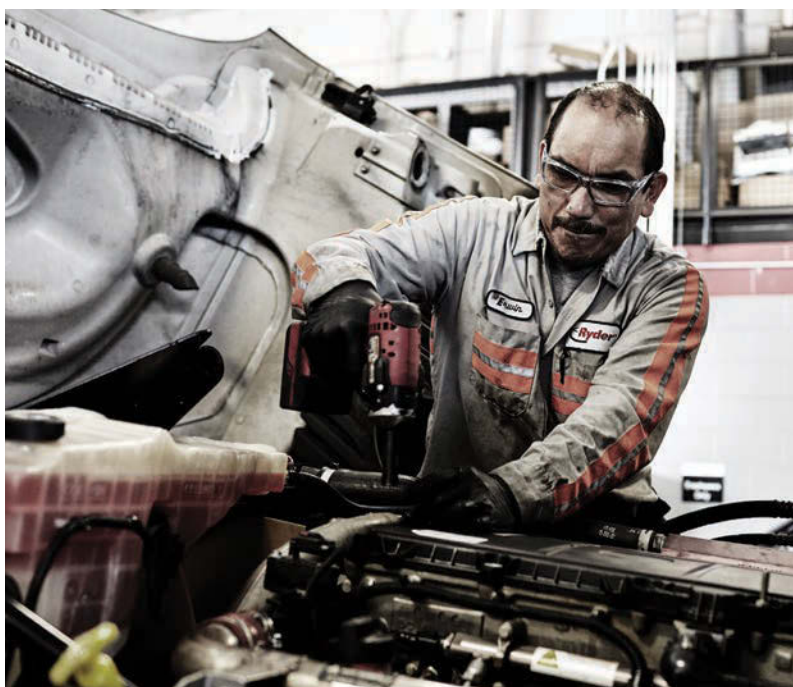
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» Cordless power tools are “dependable, resilient pieces of equipment that allow more versatility than pneumatic tools,” emphasized FedEx Freight’s Greenwood.

Ryder Systems, Inc.



» The Pelican Five Series Flashlights feature flood to spot technology, where the flood position projects a wide beam to illuminate the work area and the spot beam offers a long distance focused beam.

Pelican Products

a week to several times a day, he emphasized the importance of having one handy, as it promotes vehicle uptime “by being able to diagnose electrical systems and circuits in an efficient manner and locate the fault. This keeps the vehicle on the road and prevents repeat shop visits.”

Rolsing posed another electrical service essential: the AutoMeter Heavy Duty Truck Electrical System Load Tester, No. BCT-460.

He said the handheld battery and electrical system analyzing tool is used multiple times a day, and is “easy to use, faster, and way more user-friendly.

“[It is a] wireless, portable tablet with step-by-step procedures and pictures, [and] information is sent to the cloud for all to use as needed,” he added.

### Cordless power tools

Eric Moore, fleet manager at Griffin Pavement Striping in Columbus, Ohio—a business that has been successfully operating since 1977—related that he and his team consider cordless tools atop their essentials for commercial vehicle repair. More specifically, the Milwaukee Tool M18 FUEL

1/2” High Torque Impact Wrench with Friction Ring, No. 2767-20.



» The AutoMeter Heavy Duty Truck Electrical System Load Tester tests both 12V and 24V starting and charging systems, along with flooded, thin plate pure lead, and AGM batteries.

AutoMeter Products

“Just about every job on our equipment has large fasteners that need [to be] loosened or removed for repairs or maintenance,” Moore explained. “Once the problem has been identified, it is pretty much automatic to reach for the M18 FUEL impact and the sockets to do the job.

“There are too many repairs that call for the High Torque Impact on our equipment, but I’d say the most common is removing 22.5-inch wheels, either for access to another component, or to switch out worn tires,” he continued.

The impact is used every single day, multiple times a day, Moore said, and the freedom from cords or air lines helps promote efficiency. He also said that the amount of available torque for removal or assembly is excellent.

FedEx Freight’s Greenwood further attested to the importance of cordless power tools. She uses a cordless 1/2” impact to remove lug nuts and a 3/8” impact for smaller disassembly/assembly projects—which ends up being nearly every job, she added.

“The batteries last for a long time on a single charge, are compatible with a wide variety of tools, and allow for quick repairs,” she continued. “They are dependable, resilient pieces of equipment that allow more versatility than pneumatic tools.”

### Flashlights

Moore and the team at Griffin Pavement Striping consider the pocket flashlight as the number one essential for commercial vehicle repair.

“It is the tool each one of my technicians makes sure to have at all times,” he said. “[It is used] on every single vehicle, every single time.”

As to a specific favorite of the shop, three out of five technicians at Griffin Pavement Striping carry the 100-lumen Blue-Point Penlight from Snap-on.

“The pocket lights are critical for diagnosis of leaks,” Moore continued, “because most [leaks] are not immediately evident in an open place, [nor] easy to get to; they are always buried under or inside of other areas. Being able to light up the

area in question makes quick work (usually) of finding the leak and identifying the best way of repairing it.”

Moore and team said the benefit of not having to drag around corded lighting equipment to each job means that diagnosis can take place wherever the vehicle is located. “No wasted movement,” Moore reinforced.

Furthermore, he said that pocket lights’ compact size and resilience are another benefit, as they are constantly dropped or covered in fluids, and still get the job done.

### Adjustable wrenches

Moore and team also raise another essential: adjustable wrenches.

“We have so many types of equipment and with all the different size fasteners, it’s just easiest to grab an adjustable wrench so you won’t have to walk back to the toolbox several times just to tighten, loosen, or adjust something on one of our vehicles or equipment,” Moore stated. “We use the adjustable wrench so much, we have about 12 of them hanging right by the overhead door most often used for entry and exit while crews are prepping for the daily projects.”

Also used on every piece of equipment every single day, Moore said that the ability to stay on task instead of wasting time changing tools is a huge benefit of the adjustable wrenches. Further, Moore said there is value in adjustable wrenches that feature knurled finishes on the interior jaws as they will grip fasteners more securely and prohibit (though, not completely prevent) rounding of the fasteners.

### Outfitting considerations

Rush’s Purcell said that financial responsibility plays a big role in determining technicians’ decisions when it comes to outfitting their toolbox.

“From a technician standpoint, you’ve got different levels [of experience]: people just starting out



and people who have been doing this for 20 years,” Purcell said. “But there comes the financial side of it. You have to be able to get what you can afford, but you also want to buy something that is going to last you long term... Get what you can afford and upgrade when you can.”

Kanitz related that as a manager, priorities go beyond just upfront expenses.

“From a managerial standpoint, the things that I’m looking for are a little different than what Chris is referring to on a per-tech basis,” he said. “We don’t expect our technicians to stomach the expense of a specialized breakout harness; the shop is going to help in purchasing and making the tooling available. From my perspective, I’m looking at one: safety. Safety is a big one; whatever we’re going to buy, we want to make sure that it is of quality, and it is safe.

“Two: I’m going to look at overall dependability and the frequency of the usage,” Kanitz continued. “Yes, cost comes into play. But I always say, ‘You can’t afford to buy cheap,’ because I don’t want to buy it four times; so, I may spend a little bit more on that front side.

“As a dealer, one of the other things I look at a lot too is what kind of warranty and support are we going to get from a tooling vendor,” Kanitz continued. “If I have an issue with something that fails, are they going to be able to adequately support it and service it? Are they going to back us up? If I’m going to spend several thousand dollars on a tool, I want to know that I’m going to have service that goes with it as well.”

Kanitz relayed his decision-making process, saying if two tools cost the same, he wants to understand the return he will yield, specifically in opportunities to gain efficiency.

Cummings agreed that supplier support is a major factor when it comes to determining where to purchase. “I want to know that we’re doing business with a supplier that is going to be here, that has been here, that I can depend upon,” he said.

And beyond support, Cummings said that understanding the ROI, as well as opportunities for business

additions, are crucial aspects in equipping the service team.

“From the business perspective, we’re always looking at return on investment,” Cummings concluded. “There are tools we don’t use frequently enough; sometimes it makes more sense to sublet certain parts of a job out. However, if we’re confident we can make the

return, and if we need it, we get it. If we know we can generate good business on a tool, cost is not the overriding factor. It comes down to this: Are we going to use it? What’s the return? Then, let’s go out there and get the business.” ■

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## HEAVY-DUTY EQUIPMENT

# TRENDS OF 2023

A review of some of the top equipment trends, including trucks, trailers, and tires, that will impact fleets.

By John Hitch

### [ FLEET MANAGEMENT ]

**F**leet managers and executives must always be aware of where the industry is heading in terms of what equipment and technology are available and how to maintain them. Because of all the changes, advances, disruptions, and supply shortages in the last few years due to COVID-19, this hasn't been easy.

"It's definitely a very dynamic market that we're living in right now," noted Nick Clinkenbeard, product manager of dry and refrigerated vans at trailer manufacturer Wabash. "And if you had a good way to predict where it's going in the future, that's a crystal ball that I think a lot of people would pay a lot of money for."

One way to better predict where the trucking industry is headed is by looking at the overall economy, though you may want to avert your eyes.

Inflation was at record highs until recently, and the Federal Reserve raised interest rates to 4% in November, the sixth straight increase.

"I just don't see how we avoid a recession," pondered Bob Costello, American Trucking Associations' chief economist, at ISAAC Instruments' User Conference last month. On the bright side, he did add that the recession "should be relatively short; it should be relatively mild."

*Fleet Maintenance* doesn't possess any crystal balls to discern whether we are in for a brief downturn, recession, depression, or apocalypse, but we do regularly commune with trucking's leading product and solution providers, and what they are saying should lift fleets' spirits a little after being sunk into the supply chain morass wrought by COVID-19.

Since the spring of 2020, trucks, trailers, and tires have all been more difficult to come by. Raw materials and components such as semiconductors became harder to obtain, and plants shut down to stop the spread of the pandemic. This led to mounting backlogs and trucks waiting for repair parts.

But for the foreseeable future, the dozen or so manufacturers we contacted indicated these issues have disappeared or become more infrequent.

“The long delays are pretty much behind us,” Clinkenbeard said on behalf of Wabash. But what about the rest of the heavy-duty trucking industry?

Here’s what industry experts, along with leading OEMs and OEs serving the heavy-duty market, are saying about their sectors, which should help fleets and shops prepare for the coming year.

## Truck outlook

How will the amount of new Class 8 trucks on the road in 2023 be impacted by the tumultuous economic situation? After non-vocational Class 8 truck sales rebounded from 168,600 in 2021 to 198,800 in 2022, next year they will dip 12.4% to 174,000, according to Act Research’s market data.

“For now, business activity in the truck industry rolls on, seemingly unphased by higher interest rates,” said Eric Crawford, VP and senior analyst at ACT Research. “That said, we expect this dynamic to shift in [the first half of FY 2023], as the Fed continues its aggressive push to subdue inflation. Cracks in the economy are becoming more evident: The impact of higher rates has begun to slow activity in the housing sector, and large layoffs have started in the tech sector.”

**Daimler Truck North America**, which makes the market leader Freightliner (40% share), noted several external forces will impact the market.

“The company’s outlook is especially subject to the further developments in the Russia-Ukraine war and its impact on the global economy as well as the development of the very high inflationary pressure and the associated central-bank increases in interest rates,” said Stefanie Lechner, a DTNA marketing communications manager focusing on the aftermarket. “The further macroeconomic, geopolitical as well as the COVID-19 pandemic development and ongoing supply bottlenecks, also harbor an exceptional degree of uncertainty.”

Lechner added, “Daimler Truck assumes no major production downtimes due to missing parts or due to the unavailability of gas.”

Fuel may be available, but it is expensive.

“Likely due to fuel prices, on-highway customers are gravitating toward down-speeding through integrated drivetrains at an accelerated rate,” offered Len Copeland, product marketing manager for DTNA’s Detroit brand.

He recommended customers select “ever more aggressive—or lower—rear axle ratios, which keep engine rpms lower, requiring less fuel to do the same work.”

Copeland noted software such as Detroit’s Axle Lube Management can “offer immediate fuel savings with no driver interaction whatsoever.”

Over at **Volvo Trucks North America**, the order board is “healthy” with sales at market level, said Johan Agebrand, director of product market-



» ACT Research projects Class 8 truck sales will drop 12.4% YOY in 2023.

John Hitch | Fleet Maintenance

ing. Agebrand also reported “seeing significant improvements in the semiconductor and transport restrictions that we—from a global perspective—ran into in the economic recovery from the COVID pandemic. The current situation we are seeing is now more in relation to labor and capacity restrictions since the economic environment has recovered.”

On the trends front, fuel efficiency has been more of a focus to Volvo customers, Agebrand said, because of fixed contract rates and decreasing spot rates.

“When the spot rates were increasing due to a shortage of transport capacity, the increase in fuel price in some sense was lost in the increase in transport rates,” he explained.

Volvo customers who spec a turbo-compound engine and I-Torque powertrain combination will have the flexibility to adjust to speed or fuel efficiency needs, “without sacrificing overall fuel economy,” Agebrand said.

Overall, a fleet that keeps up with regular maintenance according to OEM recommendations will prevent unexpected downtime and keep trucks moving and generating revenue, Agebrand said. Investing more time into training drivers will also yield a good return.

“The driver and how they utilize the truck is the biggest operating cost impact for any fleet,” he said. “Good drivers versus bad drivers can easily have a 10% operating cost difference.”

**Navistar International** experienced a healthy 2022 and expects continued momentum into 2023 while navigating various component shortages and production challenges, reported Chet Ciesielski, VP of on-highway heavy-duty truck business. “Our strong order intake has created a very strong backlog,” he added.

The company has seen supply chain improvement but does “continue to work through challenges,” Ciesielski ceded.

The International S13 Integrated Powertrain, which starts production in 2023, will provide customers with some relief. With the S13, the latest International LT Series will have 15% better

**“Likely due to fuel prices, on-highway customers are gravitating toward down-speeding through integrated drivetrains at an accelerated rate.”**

Len Copeland,  
Daimler Truck North America

fuel efficiency than one with a first-generation International A26 engine. CEO Mathias Carlbaum said this will be the final new internal combustion engine developed by International.

Ciesielski added that maintenance efficiency can be improved by leveraging OnCommand Connection connected vehicle solutions. The various features help optimize maintenance (Advanced Predictive Maintenance), reduce unplanned repairs (Fleet Health Monitoring), and drive service event efficiency (International 360).

Fleets are also adopting more advanced driver assistance systems to prevent nuclear verdicts, Ciesielski added.

That’s a trend also recognized at Paccar Leasing, which rents and leases **Kenworth** and **Peterbilt** trucks and provides maintenance.

“Among our larger fleet customers, we’ve seen a material increase in the demand for refined driver performance and safety systems to be added to the vehicles, including adaptive cruise control, collision mitigation systems, lane departure warning systems, and side object detection,” Eric Hruby, PacLease director of operations, said.

PacLease also reported an accelerated adoption of integrated powertrains and automated manual transmissions, which Hruby said are sought after for driver retention and fuel efficiency benefits.



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“Over the last 18-24 months, PacLease has seen more than an 80% take-rate for integrated power-trains and AMTs among our longhaul customers and more than 90% in the regional haul segment, an increase of roughly 20% and 15% respectively,” Hruby said.

While efficiency is in higher demand, uptime still reigns supreme.

“If I were to reference a common theme among our customers in today’s lease and rental industry, maximizing uptime is on everyone’s agenda,” Hruby said.

Telematics and other smart technologies have helped PacLease customers with uptime. Paccar Connected Truck and Paccar Solutions provides customers access to remote diagnostics, over-the-air updates, and service management portals that allow them to track live truck performance and health.

“Remote Diagnostics allows us to see any issues with a truck in real-time,” Hruby said. “This way, we can determine when and where the truck should be serviced, allowing our customers to realize more uptime.”

Keeping up with maintenance is even more important as the industry overall contends with aging trucks. In both 2020 and 2021, the average trade cycle was 8.7 years, according to American Transportation Research Institute (ATRI). That’s the highest in a decade.

“The longer a fleet waits to replace their aging equipment, the more it can compound the financial burden of unscheduled maintenance events and downtime at higher repair costs and potentially longer service times,” Hruby said.

If fleet age is not an issue, then the next priority should be ensuring there is diligence in the management and scheduling of regular preventive maintenance in compliance with OEM-recommended intervals, Hruby said.

## Trailer outlook

ATRI also found that the average trade cycle for trailers stretched from 12.3 years in 2020 to 15.4 last year. Those older trailers can only provide adequate service to fleets for so long, though.

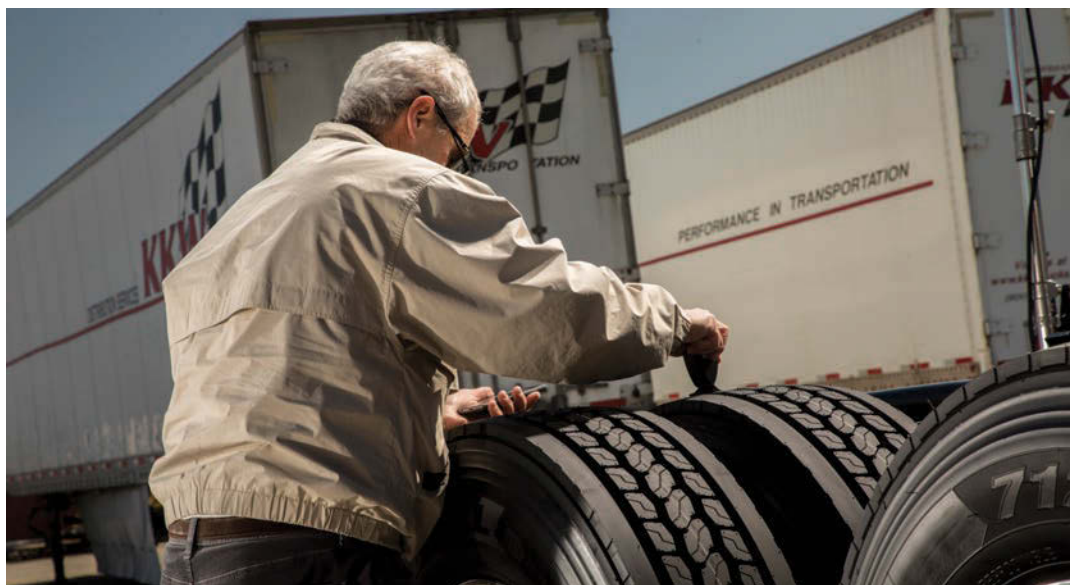
“The age of fleets is trending up, and they’re wanting to get those [trailers] replaced,” Wabash’s Clinkenbeard said.

This has led to strong orders overall. In 2021, trailer orders were just shy of 250,000 units. In October 2022, FTR forecasted this year would hit 303,000 trailer orders, with a 7% increase to 325,000 next year.

Wabash has seen some improvement in delivery over the recent months, Clinkenbeard explained, and the company’s record Q3 revenue of \$655.2 million backs that up. The Lafayette, Indiana-based company’s net sales increased 35.8% over Q2, and total backlog was at \$2.3 billion as of Sept. 30, up 20% over Q3 2021.

These new trailers are a lot smarter than their replacements, which, at 15+ years, would pre-date the smartphone boom. And now fleets can take advantage of the trailer connectivity increase by spec’ing cargo sensors and trailer telematics devices when they order them.

“With our customers, the data analytics side has grown exponentially over the last few years, and



» Yokohama released 12 different tire products since the pandemic began and expanded its Mississippi manufacturing plant. Like other tire OEs, the company also has had to increase prices over that time as well to compensate for rising rubber and other materials costs.

Yokohama Tire



» Wabash launched its new Acutherm thermal management portfolio for refrigerated trailers this fall. Using EcoNex composite material, the trailers are lighter weight, insulate better, and offer financial benefits to users.

Wabash

**“OEMs are maximizing what they can build given the constraints. Next year looks a lot like the current year.”**

David Giesen, Stoughton Trailers

we’re definitely seeing a lot more activity in that space,” Clinkenbeard said. “The way of the future is more connected assets and better visibility to your assets and how they are performing so that you can plan for maintenance rather than have the roadside calls that are costly and disruptive.”

And that data becomes more readily available for maintenance managers to drive data-driven decisions on their maintenance and improve the uptime of their trailers.

Clinkenbeard also noted that fleets’ quest for improved efficiency and uptime means more tire pressure monitoring systems and automatic tire inflation systems, both of which have seen “pretty good adoption” rates from Wabash customers.

Hyundai Translead also holds a positive outlook for 2023 “due to pent-up demand.” It also agrees that smart trailers are the way of the future.

“New technology continues to become more commonplace—there are steady increases across the industry in most items that will help reduce maintenance, increase fuel savings, or provide



useful data to a customer operation,” Sean Kenney, chief sales officer at Hyundai Translead, said. “GPS has essentially reached 100% adoption, while accessories that go along with GPS (cargo sensors, door sensors, solar panels) have become a much more common sight in the last two years.”

He added ATIS has seen steady growth, while air disc brakes and TPMS “are also gaining steam and garnering more interest with passing time.”

Because of fuel prices, aerodynamics devices could end up being adopted by “a large majority” of customers, Kenney said.

As far as smart hubs and zero-emission reefer units, these technologies just improve their efficiency rate to become cost-competitive.

“From a fleet perspective, the necessary infrastructure must be in place to utilize new technology and how quickly existing TMS software can manage the new system or environment,” Kenney explained. “It is expected that the use and application of these new technologies will be adapted to the truck/trailer industry in the near future. The time it will take will be decided on whether the needs of both supplier and user are met.”

David Giesen, VP of sales for **Stoughton Trailers**, said shortages from component manufacturers may continue through next year, though.

“The overall industry responded as good as could be expected with all the barriers that were put in place,” he noted. “OEMs are maximizing what they can build given the constraints. Next year looks a lot like the current year.”

Stoughton Trailers has taken measures internally to ensure its trailers last longer for customers. To maximize trailer life and prevent corrosion, Stoughton started galvanizing “almost all painted components,” Giesen said.

**East Manufacturing** has also experienced longer lead time, according to Chris Cooler, VP of sales and marketing, but that had minimal impact on the customer.

“We have had a few isolated instances where we did not receive materials in time for production causing us to red tag a handful of trailers,” Cooper said. “However, our close relationships with our vendor partners have kept these situations to a bare minimum.”

East has employed proactive measures since the pandemic to ensure it also has the people to assemble the trailers as well. These include labor rate increases, sign-on bonuses, referral bonuses, numerous employee appreciation events, modified pricing strategies, allocations, and more.

“We anticipate that many of these programs will be left in place through 2023,” Cooper said.

Like the rest, Cooper found TPMS and ATIS have been more adopted the past few years, though not at a significant rate. East does predict trailer telematics and other smart trailer technology will “grow dramatically in the coming years,” Cooper added.

## Tire outlook

Each of the five tire OEMs we contacted said that the pandemic disrupted production and that costs increased, which should come as no surprise, as inflation has done that to just about everything.

Unlike the other sectors, there are tire manufacturers that are still reporting delays, some of which have affected deliveries to customers.

“The tire industry seems to be in a state of flux,” said Tommy Bazzell, director of national accounts, truck stop and trailer OEM sales at **Yokohama Tire**.

He mentioned that technology, operational changes, and the growth of particular segments, such as last mile, all force the tire industry to constantly evolve and improve. Because the industry is so used to change, Bazzell said it was able to “rise to meet the challenges” of the past few years.

Yokohama Tire specifically was incredibly productive, releasing 12 new tire products during the pandemic and expanding the company’s Mississippi manufacturing plant.

Because of the recent spate of shortages, Bazzell advised that fleets focus on ensuring longer tire life.

“This involves making sure the tire used is designed for the application of the fleet,” he said. “It could also involve technologies and/or manual-based best practices to ensure proper psi and any data-driven technologies that will extend the life of a tire. These measures will also increase uptime, optimize fuel economy, enhance safety, and lower total cost of ownership.”

Another way to boost TCO is via digital monitoring.

“This real-time solution reduces downtime related to tires, increases labor productivity, keeps fleets operating safely, and allows fleets to save money by reducing non-retreadable tires and roadside emergencies,” explained Brian Cunningham, VP of fleet solutions at **Bridgestone Americas**. He noted that Bridgestone’s Last Mile Tire System allows small and midsize fleets to better manage their tire programs. The pay-as-you-go program monitors tires to optimize tire pull points and notifies servicers when low-tread depth is detected.

Aaron Murphy, SVP at **Double Coin**, agreed that fleets will have to focus on performance and retreadability, as well as lowering overall cost per mile, to stay profitable as freight volumes drop.

“If we move further into an economic downturn, these items assist a fleet in reducing their operating costs,” he said. “The lowest price is not always the answer to driving down maintenance costs.”

Fleets can’t do this alone.

“With fleets utilizing equipment for longer periods of time and with more frequency, service partners are key,”

Murphy said. “Whether that’s the manufacturer or dealer, this relationship can improve total cost of ownership.”

Sean Uys, head of U.S. Market Replacement Truck Tires at **Continental**, agreed.

“Fleets should frequently communicate with their dealers in the forecasting process,” he emphasized. “This is more important now than ever to ensure they receive the right products in this unprecedented environment.”

Jaye Young, B2B onroad marketing director at **Michelin North America**, added, “The servicing tire dealer will also play a critical role in helping to keep the fleet rolling. This could be in the simple form of making sure you are using the best tread design for your application or suggesting alternatives based on availability.”

She also recommended the use of quality components, including lube, valves, or tires. “You will either pay now to maintain or later to repair.” ■

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# Equipping for the worst: A guide to driver emergency kits

No fleet wants to get the call that one of their assets has experienced a roadside breakdown. But if they do, they'll rest easier knowing their drivers are properly prepared.

By Alex Keenan

**T**he windshield wipers on Tom Bray's Navistar International 9670 Cabover scraped and squeaked across the glass as he eked his way up Interstate 70 near Vail, Colorado, one September day in the late 1980s. *That's too bad*, Bray thought as he maneuvered past yet another accident, red and yellow emergency lights flashing through the driving weather. The Colorado resort town was truly picturesque this time of year—if he could have seen any of it. Instead, snow piled onto the roadway and columns of pine trees flanking it, blanketing the slopes of the Rocky Mountains, so all Bray could see was a sea of red brake lights.

"There were wrecks and it was just a mess," recalled Bray, now a consultant for J.J. Keller & Associates. "And the Colorado [Department of Transportation], rather than mess with it, just said, 'We're shutting the road down until we can get it cleaned up right and get everything out of the way.' That ended up taking three days."

For Bray, that meant three days at a snowed-in rest area, not knowing if he would have enough fuel to heat the cab over that time and get moving again when the weather cleared. But luckily, since Bray was well-prepared for his impromptu ski town stay, he had no trouble keeping himself warm and ensuring that his deck was clear of snow and his air lines and fuel were free of ice.

Blizzards notwithstanding, truckers are always at risk for an emergency roadside event. Fleets average 42,459 miles between roadside repairs, according to the most recent Truckload Vertical Benchmark Study, a report put out by American Trucking Associations' Technology & Maintenance Council and FleetNet America. That means if a truck travels 100,000 miles a year, the odds are the driver will have at least two roadside events. And, as Bray can attest, even in an early autumn breakdown, external forces could jeopardize the safety of the driver and create a major downtime



issue. So, how do fleets ensure that their drivers can get off the road and hasten repairs by reaching service centers when they run into problems? And how can they stay as safe and comfortable as possible when they cannot?

The Department of Transportation regulates this to an extent, but “beyond that, there’s a lot of things that drivers should carry,” Bray advised.

And while an extended breakdown affects the driver the most, the whole operation is impacted, so the entire team should take some accountability in ensuring cabs are equipped with the right tools to handle potential hazards.

To discern what those right tools are, we reached out to several sources to find what an emergency tool kit should have and why it can really be a lifesaver, or at the very least, an uptime saver.

## Tools required by law



“The most important thing drivers should have on hand is proper safety equipment,” said Eric Daniels, VP of truck care, Love’s Travel Stops. “Triangles, [a] fire extinguisher, and [a] high-visibility vest should be standard.”

Indeed, Title 49 of the Code of Federal Regulations states that all trucks and tractors must have fire extinguishers, with hazmat haulers having stricter stipulations. Extinguishers may last a long time, with an average lifespan of more than 10 years, but fleets should institute a regular inspection to verify they will work when needed.

Additionally, all vehicles must have spare fuses, warning devices (such as triangles), six flares, three liquid-burning flares, and red flags.

## Basic tool set



Whether in rain or shine, drivers sometimes find themselves the victim of small issues that, while not critically damaging to their vehicle, are enough to present them with an inspection violation.

“Drivers should have a basic tool set for fixes such as a loose mudflap or light change,” Daniels continued.

These tools can be fairly basic but may be the difference between driving freely or receiving an out-of-service violation from the Commercial Vehicle Safety Alliance (CVSA).

“You don’t need a whole [set of] craftsman tools—just some basic tools,” said Bob Seidl, driver training and development for Schneider, in a company-produced video on emergency tool kits. “We’re not asking you to be mechanics, but sometimes if all [you’ve] got to do is turn a wrench a little bit and [you’ll get] going again, well, [you should] turn that wrench.”

Seidl said a couple of crescent wrenches, open box wrenches, screwdrivers, and a vice grip are good to have on hand. Meanwhile, Norita Taylor, director of public relations for the Owner-Operator Independent Drivers Association, also suggested drivers fill out their tool kit with pliers, electrical tape, duct tape, and bungee cords.

“The mechanical ability of the driver would

determine if more tools would be justified [as well],” Taylor said.

Otherwise, combination tools and adjustable wrenches will allow a driver to switch out light bulbs, adjust trailer pins, and even tighten loose dashboards, door panels, and deck plates.

## Tire and lighting violation protection



During 2022’s CVSA International Roadcheck, over 12,000 commercial vehicles were placed out of service. Of these violations, 19.4% were for tire problems, while 12.5% were for lights, placing both in the top five vehicle out-of-service violations. But an inspector violation isn’t the only way a vehicle might end up roadside.

“Tire breakdowns make up over 50% of all roadside breakdowns for our organization,” said Daniel Mustafa, director of technical services for TravelCenters of America. “And I think that’s going to reflect the industry as a whole.”

To avoid issues such as these, Bray recommended drivers have a few other tools to patch up lighting and tire issues. First and foremost, a tire gauge is a good friend to every driver and far more reliable than a tire bat. But if a driver is far from home and finds their tire pressure is lacking, what then? One option is for drivers to keep an air compressor in their vehicle. Heavy-duty units can be purchased both as parts of tire repair kits or on their own. But there’s another option as well.

“I, and a lot of my drivers, would carry air hoses called a trigger gladhand for the tractor-trailer driver,” Bray said. “You connect it into your trailer gladhand and use that to fill tires as needed around the truck.”

Meanwhile, if a driver knows the different kind of bulbs used in their warning lights, headlights, and signals, they can also save themselves an out-of-service violation by carrying spare bulbs on board.

## Protective apparel



While a basic tool set can help get the job done and get a driver back on the road, making sure they are dressed to address issues safely, especially in bad weather or at night, is also critical.

“Start the list of things that drivers should have, and a lot of company policies [require that] you will have, with reflective, high-visibility clothing, whether it’s a vest or a jacket,” Bray recommended. “So, if [the driver does] have to get out of the vehicle on the road, whether it’s because of an accident or breakdown or whatever, they’re fully visible to everybody.”

Additionally, even drivers who don’t normally have eyewear may benefit from a pair of safety glasses to protect their eyes when making small adjustments under their vehicle. Neither of these items cost that much either, making them easy investments for drivers.

## Basic survival



Another must-have for drivers is a good stock of non-perishable food, a case of water, and a first aid kit.

“If you’re planning on being stuck for any period of time, it wouldn’t be bad to have a little water and some food,” said Rick Clasby, executive director of the Utah Trucking Association.

All of these items should be able to last for long periods, both in the heat and the cold, depending on a driver’s regional routes. Bray personally recommended small sausages as well as spaghetti and meatballs, but canned soup, granola bars, and beef jerky are also cost-effective options.

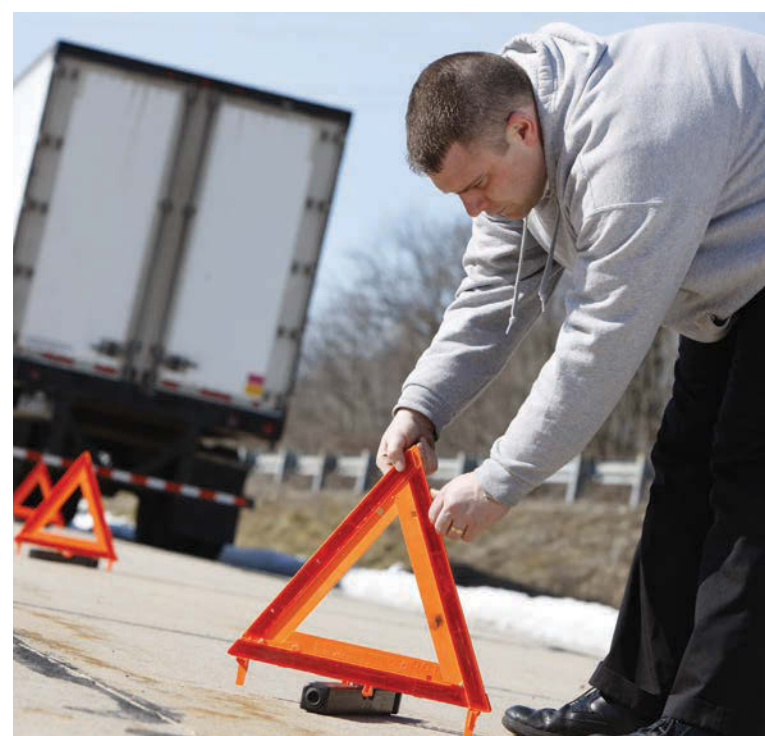
With food safety taken care of, it’s also essential that drivers be prepared to handle physical ailments as well.

“When I was a driver or as a safety person, I didn’t hurt myself so much,” Bray said. “But I came across a lot of hurt people over time.”

Whether a fellow driver slices a finger in a winch or a motorist is involved in an accident on the road, a first-aid kit is critical for themselves and others. Luckily, a basic kit with dressing pads, disinfectant, Band-Aids, tape, and scissors are all easy purchases.

“On top of that, I would also add [that] it’s important to have something to charge your cell phone,” said John Hahn, captain of the Colorado State Patrol and commander of the Motor Carrier Safety section. “We’ve become so reliant on those over the years for a lot of reasons, but most importantly, if you need to reach out and call for help, [you need to make] sure that you have a phone that is charged.”

For drivers, that means making sure they have a spare charger cord and adapter for their vehicle as well as an external battery pack if something goes wrong with the truck’s powertrain.



» “Triangles, [a] fire extinguisher, and [a] high-visibility vest should be standard,” said Eric Daniels, VP of truck care, Love’s Travel Stops.

Penske Truck Leasing



## Winter weather preparation

Finally, although not every route takes place in seasonal areas, drivers in the Midwest and northern regions need to be prepared for winter weather. Even typically warmer areas can plunge to much colder temperatures overnight, let alone mountainous regions where warm clothing is key. Having a good jacket, gloves, and handwarmers

may be the difference between a comfortable roadside experience and a miserable one.

"It's important to have some extra clothes in the vehicle," Hahn emphasized. "I always had an extra change of clothes thrown in the back of the vehicle when I worked the road as a state trooper."

As far as staying warm goes, it would also behoove most drivers to make sure they have

good bedding as well as warm clothes, including at least one emergency thermal blanket. Mylar blankets are cheap and light, making it a strong choice for easy packing.

"I [also] would add to carry tire chains for winter weather, which is the law in many states," Taylor said in regard to preparing for winter driving.

States such as California, Colorado, and Idaho require that vehicles have chains in certain areas, with Colorado's Department of Transportation mandating chains for medium- and heavy-duty vehicles.

But beyond making sure a vehicle's tires are equipped for cold weather, drivers need to have the tools to make sure the internal workings of their trucks can handle drops in temperature, too. To that end, Mustafa recommended that drivers keep air line anti-freeze on hand.

"If you find yourself in that situation where you have ice in the lines, and now air cannot get to the appropriate place at the appropriate time, this product, which is pretty much just alcohol, will thaw the truck out over time," Mustafa explained. "So, at least while you're stuck there waiting on the air to build, you can pour this product in the lines and help to thaw the vehicle out."

In a similar vein, both Taylor and Mustafa advised drivers to keep fuel conditioners handy when heading into colder temperatures.

"When driving in the northern states, you will need a fuel additive that will prevent fuel gelling," Taylor added. "Many times, a driver will fuel up in a southern state, which doesn't have winter additives, and then drive north into cold weather."

Also, if a fuel filter ends up waxing because of the cold, a driver may need to change it to get back on the road. However, this endeavor can be tricky, Mustafa warned.

"The driver can have the tools and equipment to change the fuel filter," Mustafa explained. "[But] you do have to have the right filter wrenches for your specific filter, not necessarily by brand of the truck but by brand of the manufacturer of that filtration system."

Finally, if snow is piling high as it was in the Vail blizzard that stranded Bray,

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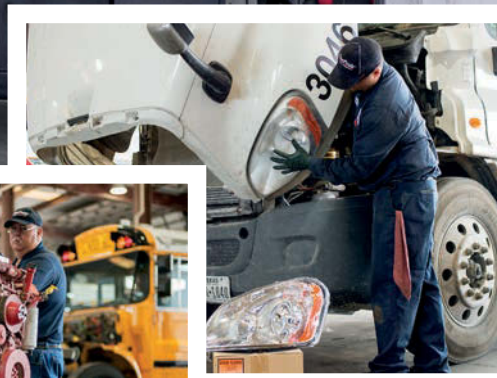
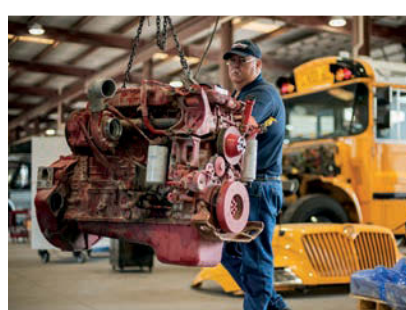
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» Pro tip: Keep a first-aid kit in the cab to treat yourself and others.

17686709 | Steve Estvanik | Dreamstime

drivers should have tools to free their trucks in slick conditions. Shovels and brooms are helpful to clear hard-to-reach areas of snow as well as keeping the underside of a truck clear if an asset doesn't have a stack exhaust, while kitty litter can help tires grip the road.

"Kitty litter can be helpful to get traction," Mustafa explained, "because with the weight of the engine, the driver, the cab, [and] all of those components up front on the vehicle, there's no weight on the tires that actually drive the vehicle forward. So, on a very small incline, a truck without weight on the drive axle can get stuck."

## Is the investment worth it?

All told, if a fleet or driver invested in all of these supplies for their emergency kit, substituting a glandhand hose for the air compressor, they could conservatively spend as much as \$450 for one vehicle. While this might seem expensive in light of the costs of fuel and maintenance, the price of a well-prepared emergency kit that may be able to get a vehicle to a shop instead of necessitating a tow could be worth its weight.

"Nightmarish would be some towing charges when broken down on the side of the road," Taylor

warned. "Many of them reach up to five figures!"

Meanwhile, FleetNet America estimates that at the beginning of 2020, the average cost to repair roadside breakdowns was \$450, excluding towing, with that cost rising 16.6% from 2021 to 2022.

As with many cases, the cost-benefit analysis of having a well-equipped emergency kit versus not can vary fleet to fleet. But at least some of the expense is worth considering if it means a vehicle can make it to a service center instead of being towed, and that a driver can be comfortable and safe while doing so. Even if a fleet doesn't require all of the items on this list, being sure to have the basics could be the difference between manageable downtime and a critical event. ■



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# Transmission transition

As the industry continues down its long path to electrification, technicians must remain attentive and agile when servicing today's evolving drivetrain solutions.

By Gregg Wartgow

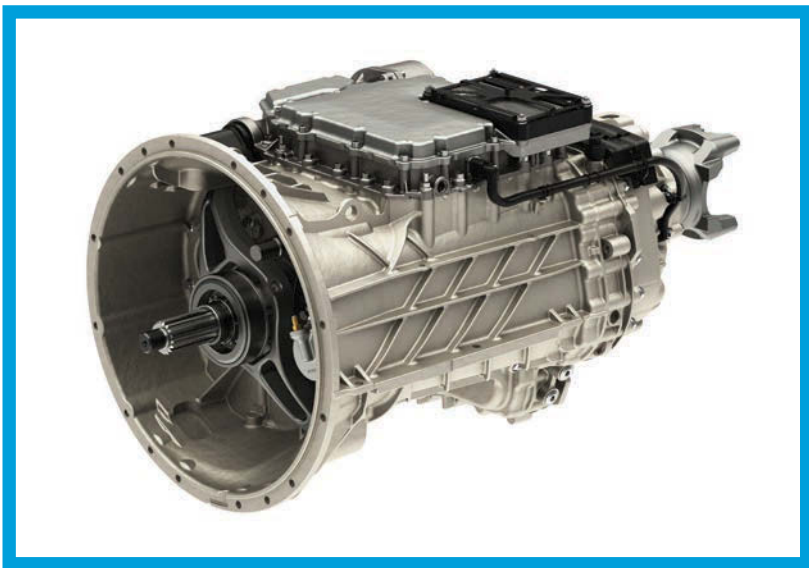
It is pretty clear that the future of commercial fleets is moving toward a day when most trucks and vans are electric. What isn't clear is when that day will fully come. In the meantime, technicians have to stay on top of all the tweaks and trends with conventional transmissions that will continue to show up in the service bay.

"Electric vehicle technology and infrastructure will need to evolve before it can fully support medium- and heavy-duty trucks and buses," said Branden Harbin, executive director of global marketing at Allison Transmission, referring to battery efficiency and charging stations. "Therefore, conventional solutions will still be necessary for years, if not decades, to come."

Automated manual transmissions (AMTs) and automatics have already gone through a fair bit of evolution, adding technological improvements that help improve efficiency. OEMs have also been pushing integrated powertrains, where the engine and transmission were designed to offer more power and efficiency together. The latest, Navistar's S13 Integrated Powertrain for International trucks, features an S13 engine mated to the new T14 (14-speed)







» The Eaton Cummins Endurant XD Series AMT provides improved fuel economy and performance, lower cost of ownership, and longer service intervals.

Eaton

AMT to offer a 15% boost in efficiency over the 2017 GHG A26 engine. Part of that efficiency boost comes from the electronically controlled clutch actuator that Navistar said “works in sync with the engine to deliver faster, smoother shift performance.” The system also does not require an air recharge after tight maneuvers, and the integrated oil and water coolant system optimizes temperature regulation in extreme environments. The powertrain is still in the validation phase before it hits customers in the summer of 2023. The S13 Integrated Powertrain was designed to be the last of its kind for Navistar, which will be focusing on electrification in the future.

On the automatic side, Allison claims its FuelSense 2.0 software can help deliver fuel savings of up to 6%. FuelSense 2.0 calibrations can be specified for Allison transmissions that support both medium- and heavy-duty vehicles. Harbin said the highest potential for fuel savings have been demonstrated in more demanding duty-cycle applications such as distribution, city transit, refuse, and construction.

Heavy-duty fleets have already fully gone through one transition from manual to automated manual transmissions.

“The manual transmission has been all but phased out of vehicle specs for medium- and heavy-duty trucks,” said James Burke, chief

» International's T14 transmission is part of the recently launched International S13 Integrated Powertrain. The T14 is a 14-speed overdrive.

Navistar

engineer at Navistar. “Nowadays, the medium-duty market primarily sees automatic transmissions, while heavy-duty trucks are typically spec'd with an AMT.”

“The continued transition to electric vehicles will eventually start a decline in any new transmission development for certain applications,” Burke continued, “but the AMT will still dominate the heavy-duty market for the next several years with incremental improvements.”

## Servicing an AMT

“An AMT is no more challenging to maintain than a mechanical transmission,” said Mark Saholsky, director of product management for Eaton Cummins Automated Transmission Technologies. “It’s just a matter of learning how they are different and how preventive maintenance practices differ.”

One difference is that AMTs are more technologically complex than a manual transmissions. Each AMT also has its own fault code hierarchy. Thus, up-to-date diagnostic software is essential.

“An AMT isn’t an item that typically requires a technician to crack the case open to make repairs,” said Len Copeland, Detroit product marketing manager for Daimler Truck North America. “The go-to tool for a heavy-duty technician is a laptop nowadays. We have spent a lot of our aftermarket investment in the development of our service routines for our AMTs. These allow technicians to plug into a truck and quickly pinpoint what is going on.”

Diagnostic software will also help technicians respond to any issues

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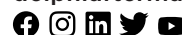


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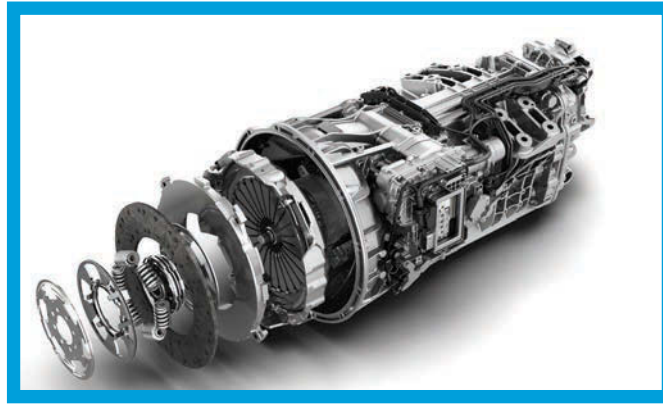


related to data links, which play a key role in AMT operation. When not functioning properly, data links can cause undesirable vehicle launches and shifting issues.

Having the ability to perform remote diagnostics on AMTs also can prove important to a fleet.

“With an AMT, a computer is essentially deciding when to shift gears and perform clutch actuations,” Saholsky said. “If the transmission system fails to perform as expected in the field, the ability to connect, diagnose, and repair from a remote location can help get the vehicle back up and running much faster. A remote diagnostics tool such as Eaton’s IntelliConnect helps monitor system performance, recognize fault codes, and initiate fault code action plans.”

Navistar’s array of connectivity and remote diagnostics were also baked into the T14, allowing for predictive maintenance and over-the-air updates to calibrate and reprogram transmission software. To optimize uptime, machine-learning algorithms will also steer what service facilities



» Detroit’s DT12 AMT incorporates features that improve durability, downspeeding, and fuel efficiency.

Detroit Diesel

in the network are stocked with critical parts to ensure parts are always available if service is needed.

Aside from the technology aspect, AMT maintenance has a couple of other differences, as Saholsky pointed out. “Heavy electrical draw can impact battery life, which may be the case with an electrically shifted AMT. That means fleets may

see shorter battery replacement cycles in the 12- to 18-month range,” he said.

With a pneumatically shifted AMT, technicians should pay close attention to the air system. To that end, waiting until the dryer fails to replace the desiccant cartridge is not a sound preventive strategy. For standard delivery vehicles and double- and triple-trailer linehaul trucks, Saholsky said every two years or 200,000 miles is a good rule of thumb. On severe-duty vehicles like dump trucks and refuse trucks, the recommended interval is once a year, or every 100,000 miles.

Routine maintenance like lubrication intervals are similar between an AMT and manual transmission. That said, AMTs require specially formulated lubricants, such as Eaton’s PS-386 synthetic lubricant, for added wear protection and fuel economy.

Steven Bowles, senior product specialist for lubricants at Citgo Petroleum, said there has been another industrywide trend developing with AMT fluids.



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“These fluids have been trending down in viscosity and may also have the viscosity noted in different ways,” Bowles pointed out. “You might see an SAE 75W-90 or an SAE 40, and both may be similar viscosities. Technicians must be observant and not confuse 75W-90 axle fluid or gear oil with a 75W-90 AMT fluid. That’s because the axle fluid or gear oil typically has EP (extreme pressure) additives that may not be recommended with the components found in transmissions.”

As for automatics in the MD segment, Bowles recommended looking for an Allison 668-approved fluid, as Allison has significant market share in the market.

Speaking of 668-approved fluids, Bowles said technicians should also realize that a TES 668-approved fluid is backward-compatible with the older TES 295 specification. This is one area where fleet maintenance facilities can consolidate transmission fluids by simply going with a TES 668 for both newer and older Allison automatic transmissions, such as Citgo’s SynDurance 668 ATF.

## Electric slide

Regardless of how fast the industry shifts to EVs, fleet technicians do need to be prepared because EVs are on the rise, as evidenced by the growth in the medium-duty segment. But that doesn’t mean technicians should become overwhelmed with anxiety.

“One key benefit of EV transmissions is that technicians and fleets already have all of the tools and knowledge required to service them,” said Matt Deschaine, global product strategy manager for clutch and light-duty transmissions at Eaton. “Eaton’s heavy-duty EV transmission—with its four forward gears, no back box, no clutch, and no clutch actuator—has greatly simplified the overall drivetrain service strategy. The transmission will only need an oil change on a preventive maintenance schedule and regular troubleshooting in case of a failure.”

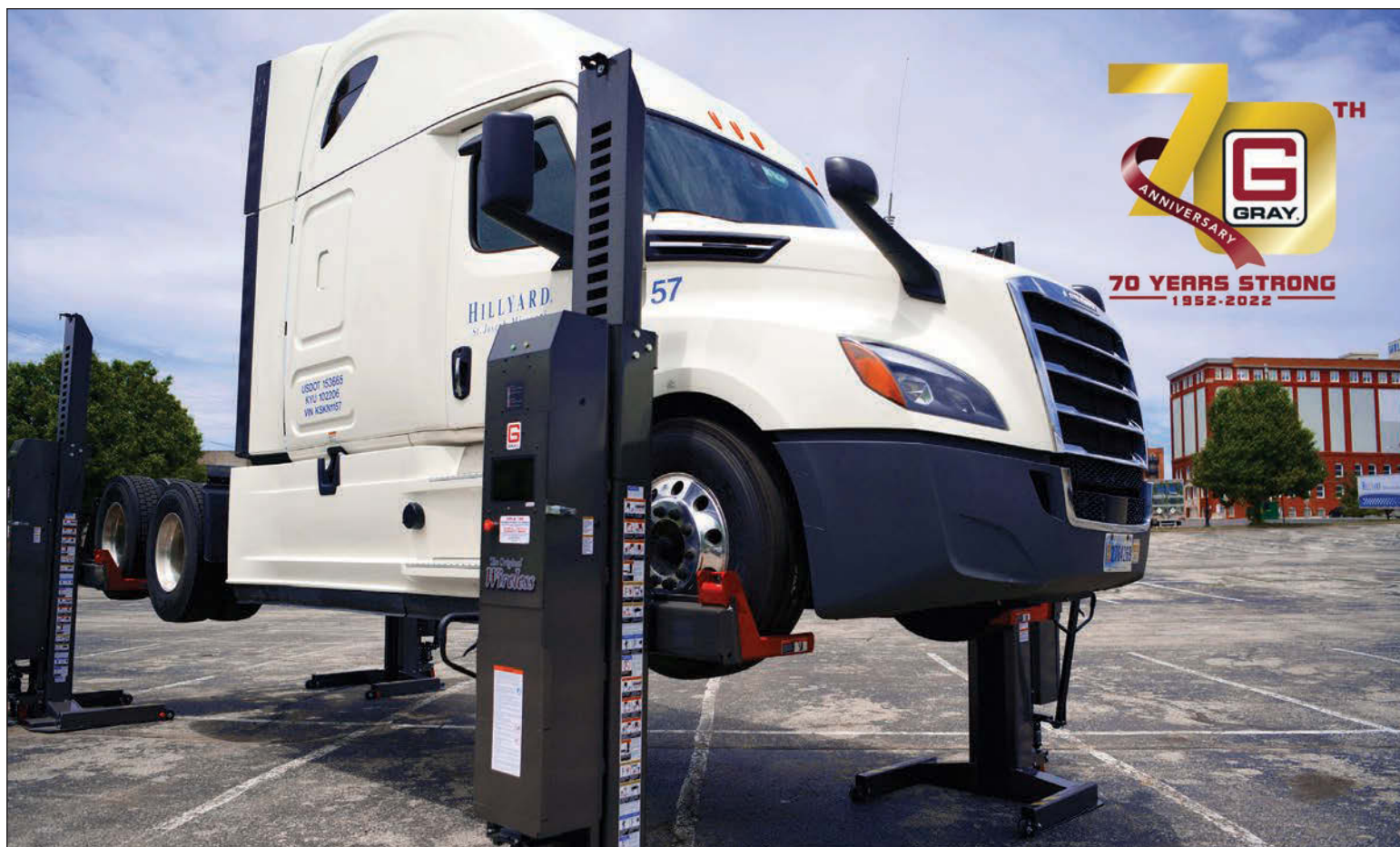
Allison’s eGen Power family of fully electric axles, introduced in 2020, currently consists of four models. The eGen Power 100D is specifically designed for heavy-duty trucks such as 6x2 tractors.

The 100S is a single-motor variant designed for heavy-duty 6x4 tractors and heavy-duty straight trucks as well as medium-duty trucks and school bus applications.

Whichever solution is spec’d, Harbin said electrified drivetrains generally require less maintenance than a conventional transmission. That is because systems like Allison’s eGen Power e-Axles

replace the traditional axle, engine, and transmission by combining them into one system. While some maintenance is needed, there are fewer moving mechanical components, resulting in less friction and wear.

“In addition, unlike conventional drivetrains, Allison’s e-Axles do not require regular fluid and filter maintenance,” Harbin pointed out. “Depending



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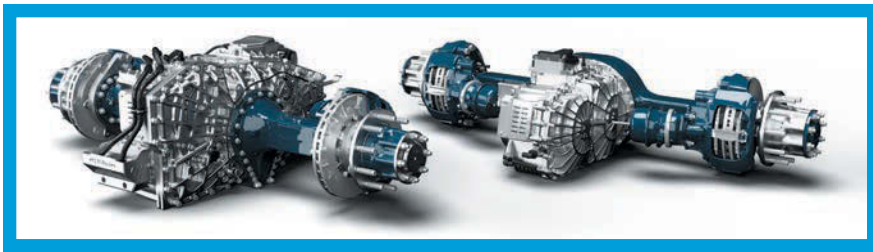
- Mike D.



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» Allison introduced the eGen Power family of fully electric axles in 2020. Currently consisting of four models, these e-Axles are modular and designed for easy integration into an existing vehicle chassis.

Allison Transmission

on vocation and duty cycle, the fluid and filter may last for the vehicle's lifetime."

One instance where a fluid or filter change may be required is if there is another primary failure in the e-Axle or a suspected failure of the cooler system. "Allison does not anticipate these types of failures from our e-Axles," Harbin said. "But in the event that one did occur, a technician may be instructed to change the fluid and filter. One reason this may be recommended is to eliminate the chance that any debris made it into the fluid."

Other than that, technicians should simply continue inspecting brakes, wheel end suspension and mounting points, cooling connections, and cable connections. "These are unique interfaces that do not always exist with our conventional transmissions," Harbin pointed out. "That's why we would recommend that technicians establish new inspection locations for these interfaces."

The reduction in maintenance doesn't mean there won't be plenty of adaptations a technician will have to make, as they will have to act differently when working around the high-voltage cables, with the EVs likely cordoned off in a special bay rigged for the work.

Those components also make the act of picking out various fluids more complicated.

"The increasing use of EVs also changes the types of fluids required, because these fluids often have to be compatible with batteries, electric components, and wiring," Bowles noted. "Off-the-shelf fluids are being used today for electrified applications, but you can expect tailored e-fluids with the next generation of more compact, integrated designs."

There will be plenty more to learn about EV e-powertrains as they come into the market, and fleets can expect a lot of changes as the next generation of EV designs are introduced and EV market share continues to grow. But in the meantime, conventional transmissions will continue to drive the industry, with incremental improvements for many years to come. Shops and fleets will have to keep their eyes on both to make the transition more smooth. ■

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# What signals will help predict the economic outlook?

While the next six months of the economy appear rough, watching pricing, freight rates, inflation, interest rates, and more will help leaders in the transportation industry know what to expect.

**Inflation continues to dominate the economic news** for many reasons, and the most important is the role that prices play in how, when, and where goods and services are produced, transported, and sold.

At Mackay and Co., we noted that both consumer and producer goods prices were adversely affected by the disruption of their supply chains during the pandemic that closed the global economy and the reopening that followed.

One of the results of these disruptions was to provoke a change in the stance of the Federal Open Market Committee (FOMC), the policy-setting entity of the Federal Reserve Board, toward raising interest rates in an effort to quell some of the inflationary forces at work.

In this piece, we will briefly review what has happened to several important measures

of inflation, discuss their prospects going forward, and then take a look at what signals we can look for to see when and how FOMC will undertake its next policy shift. Spoiler alert: They can't raise interest rates forever.

Based on what we know now, it appears the rate of inflation, as measured by the seasonally adjusted year-over-year percent change in the All Items Consumer Price Index (CPI), peaked at 9.0% in June 2022. While this is the most widely followed measure of inflation, it is not the only one. And FOMC looks at several other measures as it considers what to do about inflation.

The somewhat slow descent of the CPI from its peak (it was still at 8.2% in September) has to do both with how the index is compiled as well as the performance of the prices involved in that compilation. The CPI is a weighted index, meaning that some components receive more emphasis than others. The largest components of the CPI are those involved with the consumption of shelter. Their combined weights are almost 30% of the index, and those prices are still rising faster than they were a year ago. Moreover, they are expected

to continue at or above their current pace for at least another six months.

On the other end of the weighting scale are items like gasoline and airline fares. Together, those series account for about 4% of the index. But those prices are rising at extremely high rates (42.9% for airline fares, 18.2% for gasoline), so their weighted contributions are substantial. Here, again, we expect their pace of increase to be sustained well into 2023.

Another set of prices we previously mentioned were those of truck transportation services. Here, we have seen a bit of easing from the peak composite rate of 24.9% set in May to 16.3% as of September. Most of that easing has happened in the long-distance segment of the market. In September, local freight rates were up 19.2% from their year-prior level; little has changed from the peak rate of 21.2% they set in April. Recent news in the trade press suggests there could be some further easing in freight rates, but significant and lasting declines will only come as freight volumes slacken.

This brings us to FOMC and the path of interest rates. One of the surest ways to slacken freight volumes is to have a recession, and there are many who think that the rate increases that have already taken place could be enough to bring about such an event.

FOMC never wants to start a recession, but it cannot be indecisive in its fight against inflation. Over the next several months, we expect FOMC to declare victory and stop raising rates. That declaration is likely to come after a three-stage process.

In the first stage, you can expect to see the president of one of the regional Federal Reserve Banks (there are 12) making speeches about how it might be time for FOMC to change course.

In the second stage, you can expect to see a member of the Board of Governors of the Federal Reserve (there are seven) start to make speeches along the same lines. It is also possible that there will be dissents in the vote taken at the end of each FOMC meeting on the policy action that is announced. So far, all of the votes to raise rates have been unanimous.

The third and final stage will be when Fed Chair Jerome Powell speaks on the subject either in the "forward guidance" section of the press conference that follows FOMC meetings or in Congressional testimony associated with the several appearances he has to make on Capitol Hill every year.

Keeping on eye on these signals will better prepare the transportation industry for the road ahead. ■



## By Robert Dieli

ECONOMIST, MACKAY & COMPANY AND PRESIDENT, RDLB INC.

Mackay & Company specializes in market research for commercial trucking, construction equipment, and agricultural machinery. The company provides strategic research and analysis to vehicle and component manufacturers, distribution and service channels, industry associations, and private equity firms. With a long career managing portfolios and coordinating domestic economic forecasting programs, Dieli began RDLB, Inc. in 2001. In this role, Dieli serves as an advisor to many firms in the trucking, consulting, and financial services sectors. He is also an economist with Mackay & Company.





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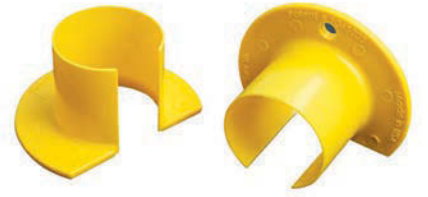
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# TOOLS & EQUIPMENT

A roundup of the latest tool and equipment offerings.

## Tool Review



### Ingersoll Rand 1211MAX High Speed Ratchet

This fall, Ingersoll Rand launched the 1211MAX Series High Speed Ratchet, a slim but sturdy pneumatic tool available in 3/8" and 1/2" drive models perfect for wrestling bolts free from engine blocks and other tight fits under the hood.

The company touted gaudy power stats including 80 lb.-ft. of torque and 625 rpm for a much faster operating speed than competitors or previous models. Two internal innovations, the twin hammer and true ratchet mechanisms, were designed to keep that power contained to the tool, so only bolts are ripped free, not a technician's skin.

In theory, that all sounds great. But how does it fare in the real world? I asked John O'Brien, a master diagnostic tech at a Toyota dealership in the Cleveland area, and one of the most brutally honest people I know. He's been an automotive tech for 25 years, and he tried the 1211MAX-D3 (3/8") for six weeks, starting in September.

"I think that it's absolutely incredible," O'Brien stated. "It takes bolts out two or three times faster than anything I've used before."

He explained how convenient the slim profile is to get to water pumps and timing covers, while the speed

and power make the tool "just faster and more reliable than a normal impact gun."

O'Brien said the ratchet loosens the bolt "without compromising your fulcrum point," which means that torque focus does not travel up the handle and take your arm with the bolt. He noted the smooth operation will also prevent future knuckle dings. "It's very effortless when you pull the trigger," he said.

There's only one problem the master tech has: He let other shop technicians try it out and now it is more often than not somewhere in their bay. One even personalized the 1211 by attaching a hinged fitting to the air connector to prevent air hose tangles.

"I often have to dig through his toolbox to find it anytime I need it," O'Brien joked.

In the late 1990s, impact ratchets could be found in most toolboxes, O'Brien explained, but they fell out of favor as impact guns and battery-powered tools rose in popularity.

After using the 1211Max and seeing how it reduces time per job, he is convinced air ratchets like this "will become a part of everybody's toolbox again."

- John Hitch

### Updated four-mode speed settings

The **DeWalt 20V MAX XR 1/2" High Torque Impact Wrench with Hog Ring Anvil** delivers up to 1,030 lb.-ft. of maximum fastening torque and 1,400 lb.-ft. of maximum breakaway torque. Its Precision Wrench mode helps prevent overtightening in forward and run-off in reverse for added user control. Additionally, the impact wrench features updated four-mode speed settings, a variable speed trigger, and an on-tool LED. It measures 8.8" in length and 9.1" in height, and weighs 6.4 lbs.

For more information visit [FleetMaintenance.com/21279777](https://FleetMaintenance.com/21279777)



### 520-lb. caster capacity

The **Homak Manufacturing 43" Big Dawg 6-Drawer Service Cart** features a 25" deep design with six drawers. Lockable top till includes a power strip for storing valuables or electronics. Drawers are secured by a lift latch feature to prevent drawers from accidentally opening. Each drawer is fully extendable, can hold up to 100 lb., and is lined with non-slip PVC foam. The service cart also offers a UV protective high-gloss finish and chrome casters. Caster capacity of 520 lb. keeps all tools convenient and portable.

For more information visit [FleetMaintenance.com/21282275](https://FleetMaintenance.com/21282275)



### Ideal for removing stickers, silicone adhesives, and more

The **Fast Orange Citrus Blaster Adhesive Remover** is designed to remove sticky messes. The unique gel formula penetrates deep into the mess, softening it and loosening its grip on the surface below. It can be used on both interior and exterior automotive surfaces without fear of damage. Ideal for removing stickers, silicone adhesives, fresh road paint, asphalt, bugs, tar, and more. Available Q1 2023.

For more information visit [FleetMaintenance.com/21285256](https://FleetMaintenance.com/21285256)



### Rated to 1,000V AC

The **Wiha Tools 26-pc Insulated EV Essential Tool Kit** includes 1,000V-AC rated, insulated VDE screwdrivers, sockets, ratchets, extension bars, wrenches, pliers, cutters, cable stripping knife, and tweezers. Featuring a SoftFinish cushion grip handle with a slip guard design, exact fit precision machined tips for reduced cam-out, and induction-hardened cutting edges and jaws for ideal sharpness and longevity. They are also rigorously heat-treated for maximum strength. The tools come in a plastic shell case with compartments for secure storage, organization, and custom-fit trays with finger-recesses for easy tool retrieval.

For more information visit [FleetMaintenance.com/21287271](https://FleetMaintenance.com/21287271)



### Tool reviewers wanted!

In these pages we share hundreds of new tools every year, but what a company claims and what maintenance professionals experience could be quite different. *Fleet Maintenance* wants to find out what that user experience is actually like, so we're investing more time and space into hearing from technicians out in the field. If you are interested in sharing your thoughts on tools you've used, or would be open to trying out new ones, or represent a company that wants to provide tools or shop equipment for reviews, please email: [editor@fleetmaintenance.com](mailto:editor@fleetmaintenance.com).



## » Has padded 4.8" hooks

The **Snap-on 3,000 Lumen Underhood Slim Light**, No. ECUHE300, is an extendable, low-profile light built with accessibility and versatility. With padded 4.8" hooks and a 48.4-80" extension range, the underhood light is ideal for a wide variety of vehicles. Its low profile provides technicians more accessibility and with up to 3,000 lm, it provides uniformed lighting across the entire engine compartment. Its durable design protects it from water sprays or dust particles and with only 3.5 hours of charging time via USB or rechargeable battery needed, technicians have up to 15 hours of run time for hard-to-see jobs.

➔ For more information visit [FleetMaintenance.com/21287254](http://FleetMaintenance.com/21287254)



## » Emits up to 2,000 lm

The **Streamlight ProTac 2.0 Headlamp** is a rechargeable headlamp powered by the company's SL-B50 battery pack, which charges directly via an integrated USB-C port. The light provides three operating modes: high, medium, and low. On high, it delivers 2,000 lm and 14,500 candela; on the medium setting, it provides 650 lm and 4,200 candela; and on low, it offers 110 lm and 750 candela. Run times range from 25 hours on low to 2.25 hours on high. Additionally, it has a multi-function, push-button switch that permits one-handed operation of the light's momentary and constant on modes.

➔ For more information visit [FleetMaintenance.com/21287239](http://FleetMaintenance.com/21287239)

## Looking for a Full Service DPF Tool for Commercial Vehicles?

If you're looking for a mid-line code scanner to diagnose medium to heavy duty commercial vehicles and you don't want to break the bank, then look no further! Introducing the all-new **HD Code Pro**.

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## » Checks for voltage drop on circuits

The **Lisle Corporation Digital Test Light with Load Tester**, No. 28800, is a 3V to 30V DC dual polarity digital test light that can also apply load to get an instant voltage drop reading. The light works as a regular test light, but when the button on the tool is pushed, it applies an 800mA load at 12V DC to easily check for voltage drop on circuits. It includes a 48" cord with heavy-duty alligator clamp for secure connections. Not computer safe with load applied and not for use on airbags, the company noted.

➔ For more information visit [FleetMaintenance.com/21287246](http://FleetMaintenance.com/21287246)



## » Ideal for diesel repair shops

The **ProMAXX DEF Doser Decomposition Reactor Repair ProKit** allows diesel technicians to quickly complete repairs on Cummins ISX, ISB, ISC, ISL, Navistar N9, N10, N13, and Paccar MX-11/M-13 engines. The included machine-shop-grade drill bit and tap tooling removes broken bolts and chases the threads, restoring them to factory new. The kit is ideal for diesel repair shops that work on vehicles such as Cummins-powered engines.

For more information visit  
[FleetMaintenance.com/21287263](http://FleetMaintenance.com/21287263)



## » Available in 18" and 13" sizes

The **Milwaukee Tool M12 FUEL Bandfiles**, Nos. 2482-20 and 2483-20, are available in both 18" and 13" sizes, and are designed to deliver fast spot removal. The bandfiles feature two speed adjustment settings (high 3,600 sfm and low 1,800 sfm), a lock-on button, a variable speed trigger, forward and reverse functionality, and are resistant to belt slip. Both are also equipped with a 360-degree tool-free arm rotation to improve access in hard-to-reach applications. When equipped with an M12 Redlithium XC 4.0 battery, users can remove up to 50 spot welds using the 18" bandfile and up to 40 spot welds with the 13" bandfile on a single charge.

For more information visit  
[FleetMaintenance.com/21287272](http://FleetMaintenance.com/21287272)



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## » Three kits to choose from

The **Off-Highway Automotive Kits** from **Pico Technology** are designed for fault diagnosis on trucks, tractors, forklifts, boats, combine harvesters, excavators, and more. The kits contain a modified PS4425A PicoScope with additional protection to withstand off-highway conditions. The accessories that are included help users quickly connect and easily carry out non-intrusive and non-invasive measurements on a wide variety of systems and components found in these vehicles. There are three kits to choose from: Entry (No. PQ324), Expert (No. PQ331), and Elite (No. PQ332).

For more information visit [FleetMaintenance.com/21284688](http://FleetMaintenance.com/21284688)

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ISAAC Instruments

# How telematics is changing maintenance

The benefits are unlimited, but devices need service, too.

There are many technology investments out there to improve fleet uptime, but dollar for dollar, none can transform your operation from reactive to proactive as much as the right telematics solution. And a proactive approach is absolutely critical right now, as effectively managing and anticipating vehicle maintenance needs avoids unnecessary equipment failures and costly emergency repairs.

Without telematics, fleets are usually reacting in triage mode after a vehicle has already broken down. Paperwork is often handled manually, preventing fleet managers from focusing on monitoring operations and analyzing data in real time. The result is a maintenance program that is highly unpredictable, extremely costly, and imposes a safety risk to its drivers.

Conversely, properly leveraging telematics can help ensure vehicles are operating at their peak performance. That translates into less downtime, higher fuel economy, and generally more efficient performance fleetwide. This also leads to better safety ratings, lower insurance costs, and more on-time deliveries.



**Melanie Simard**

DIRECTOR OF COMPLIANCE, CLIENT SERVICE & TECHNICAL SUPPORT, ISAAC INSTRUMENTS

Melanie Simard is director of compliance, client service & technical support at ISAAC Instruments. She brings these groups together to ensure ISAAC clients receive best-in-class service and support, and to demystify all questions relating to regulatory compliance. She has over 20 years in the trucking industry, including stints as a driver, dispatcher, and compliance manager.

## Reactive vs. predictive maintenance

Looking into the future, the goal of telematics is to identify the tractor-trailers that will need replacement parts or maintenance work before any actual problem materializes. Advances in predictive maintenance are slowly being accomplished through artificial intelligence (AI) and the better analysis of existing data. At ISAAC Instruments, there is a team focused on the enhancement of artificial intelligence capabilities, including predictive maintenance. But it would be a mistake to wait until some future date to invest in maintenance technology. Every truck on the road today generates large amounts of data and diagnostic codes. Telematics solutions immediately notify maintenance managers to problems and help prioritize fault codes to minimize downtime. Besides more rapidly uncovering emerging vehicle problems, leveraging telematics can help fleets make data-driven decisions when it comes to scheduling maintenance. You can target the vehicles most in need of service, which minimizes unplanned maintenance events and catastrophic failures.

Telematics can also help create maintenance schedules for your fleet based on the utilization of vehicles. These solutions help prevent the over-maintenance of lightly used vehicles.

## Utilizing a Smart DVIR

While the maintenance staff may be responsible for keeping equipment in optimal condition, drivers also have a critical role to play in identifying

potential maintenance problems during pre- or post-trip inspections. Electronic driver vehicle inspection reports (DVIRs) sync to a fleet's backend and alert managers to any and all problems in real time. This ensures minor issues are caught and fixed before they turn into far more significant problems. One safety executive shared during a recent webinar that ISAAC's customizable Smart DVIR has resulted in a more than 50% increase in notifications from drivers of possible equipment issues. Drivers are able to transmit photos directly to the home office with the ISAAC tablet to show the maintenance team exactly what is going on. The team can immediately begin to diagnose the severity of the problem, and management can decide whether to tell the driver to pull into the nearest truck stop or complete the delivery and then return to a terminal for a closer look.

## Savings over the long term

Research from the Technology & Maintenance Council and FleetNet America show that fleets with best-in-class maintenance practices have lower costs than competitors. By performing regular maintenance—and catching small problems before they grow larger—they are able to cut the frequency of emergency repairs and prolong the life of vehicles.

This is of growing importance to the many fleets holding their equipment longer, which a recent Fleet Advantage study attributed to lingering supply shortages related to the COVID-19 pandemic. Maintenance costs tend to increase during a vehicle's lifetime as parts begin to break down more frequently. But vehicles that receive consistent and high-quality maintenance, guided by telematics, are sure to have a lower total cost of ownership.

## Even telematics devices need maintenance

Even the best maintained equipment will inevitably break down or sustain damage. That includes not only tractor-trailers but electronic logging devices, too. When choosing a provider, fleets should consider hardware maintenance as well and how they will perform long term in harsh environments. How well that provider supplies replacement parts is also vital, as ELDs are federally mandated and a broken one will keep a truck off the road. ISAAC Instruments ensures 95% of spare parts orders or replacements reach their destination the next day after shipping. To minimize downtime, fleets should also keep several spare tablets, additional cables, antennas, power supplies, and other accessories such as tie wraps at their most critical locations. That way, they are better prepared for any unexpected problems.

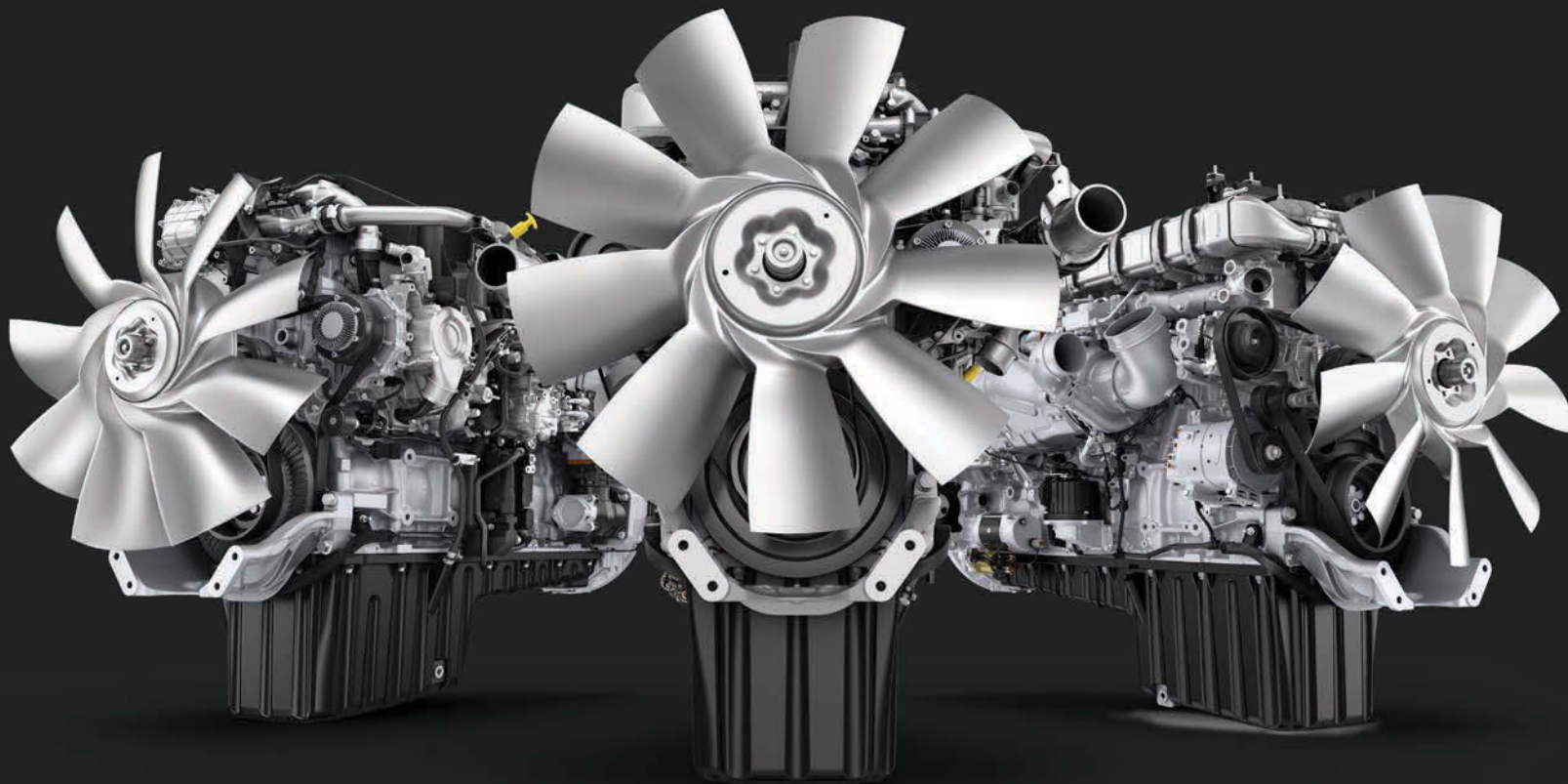
No matter how safety-conscious a truck driver or fleet is, it is impossible to avoid equipment maintenance and repair issues. However, with advanced planning and the aid of technology, fleets can limit the impact these inevitable problems have on their bottom lines. ■





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