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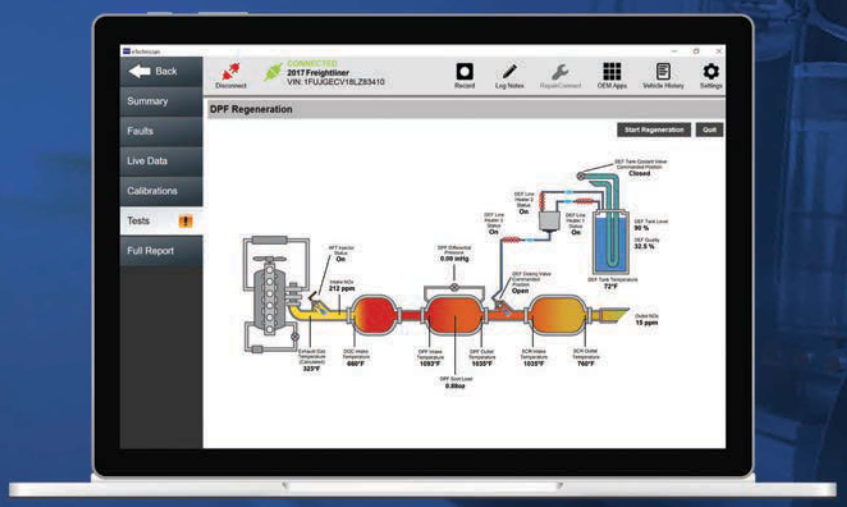

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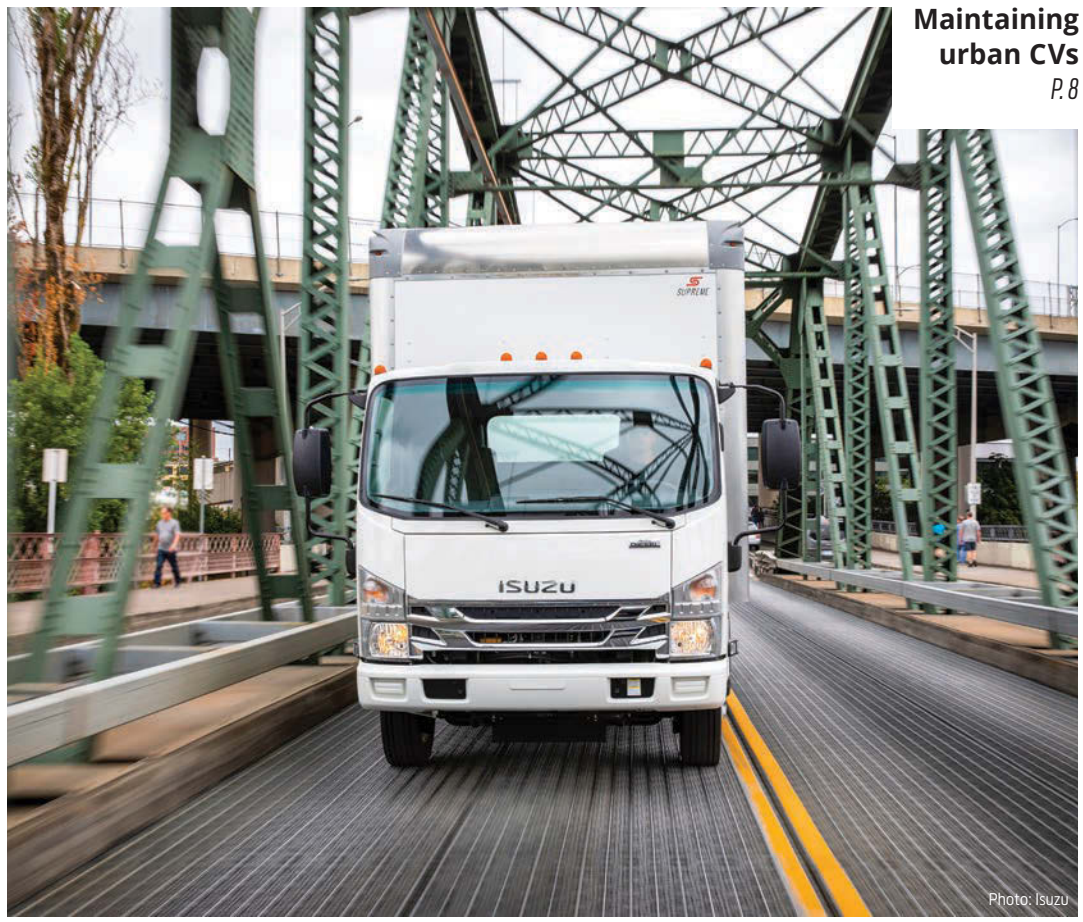

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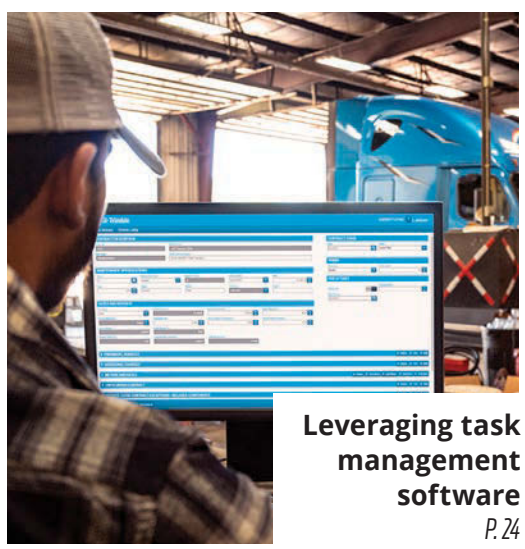

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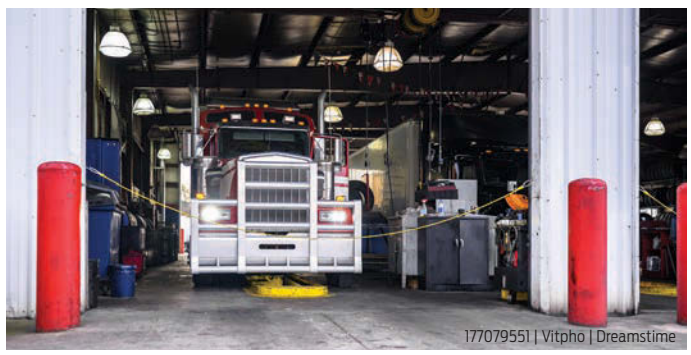
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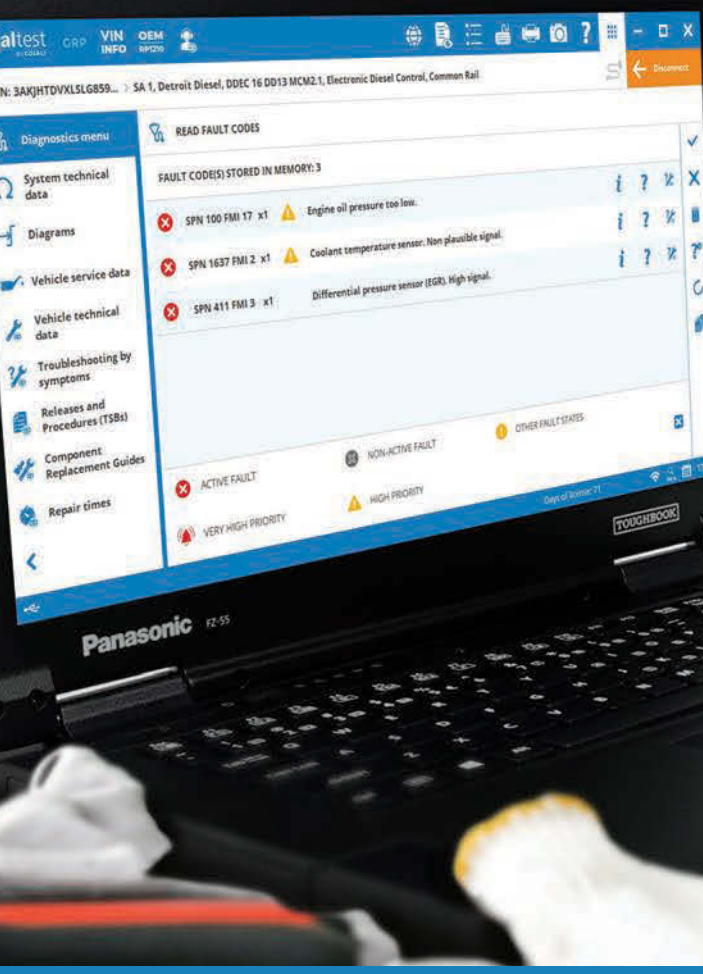

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The national lampooning of vocations

How the educational system has treated vocational students is no laughing matter.

By John Hitch
Editor

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In the mid '90s at my suburban Cleveland, Ohio, high school, shop class was a joke. Those who enrolled in those courses loved it as it was a place where lax teachers let students goof off and sometimes make a crummy birdhouse or ash tray. The administrators likely valued it as a holding pen for all the future blue-collar grunts to languish while the studious little college-prep kids fervently analyzed the Age of Enlightenment or read *Wuthering Heights*.

The funny thing is all kids in all classes goof off, and at least the kids in auto shop understood some basic DIY skills and learned how to change a tire. Meanwhile, I couldn't make it through a few chapters of those boring British "classics."

Funnier still, I really thought college was the only path to success, as that was the approved propaganda of the time, as disseminated by parents, teachers, and media. As my family was broke, and I had an aversion to debt, I joined the military to get college money. It was brutally hard work, occasionally a grand adventure, and I learned an appreciation for dirty workers while cleaning out ballast tanks and sopping up hydraulic (and worse) fluids. Not enough to go into the trades, though. I used my G.I. Bill money on a journalism degree—just as the recession hit and that industry crumbled. Womp womp. I worked two jobs just to make ends meet for damn near a decade.

At the same time, one of my best friends since kindergarten, who never got good grades and was written off by teachers as a loser but excelled in auto shop, used that time to work his way up from quick service joints to larger service centers. He's now an ASE-certified master diagnostic technician at an auto dealership. He and his wife and three kids live comfortably, and also took in his three nephews after their mother passed. This was made possible by that master mechanic salary—and no student loan debt. Over the years, he's fixed up thousands of struggling friends' and acquaintances' junkers on the side for free or at a big discount. He was the best man at my wedding and one of the greatest men I know. Being a technician helped him become that.

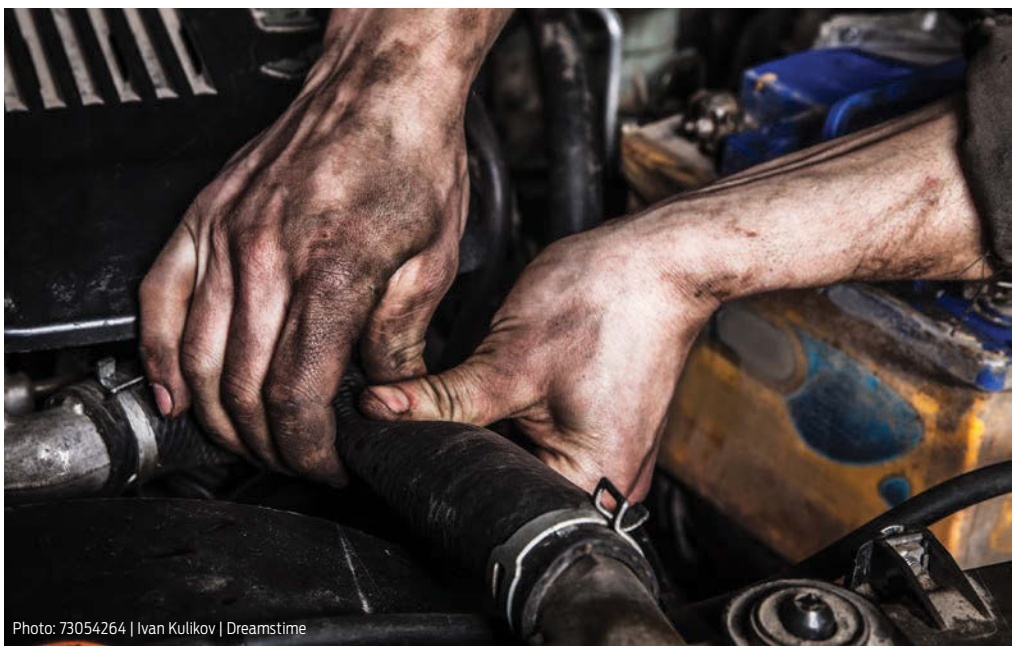
There's another great man I know—or at least interviewed once—named Mike Rowe, who hears stories like this all the time. The host of *Dirty Jobs* and several other shows has become the trades' most effective champion through his peerless storytelling, biting humor, and knack for using common sense. Since 2008, he has also fronted mikeroweWORKS Foundation, which offers a scholarship program for the skilled trades that emphasizes work ethic over grades. The non-profit has awarded 1,400 trade school hopefuls a total of $5.2 million so far.

Rowe's journey is too long to detail here, and it's best to hear him tell it, but at the Virtual Diesel Expo, hosted by Diesel Laptops and Alliant Power, he provided his own high school musings in the late 1970s.

As a high school freshman, his school had woodshop, metal shop, auto shop, and welding clinics. "By the time I finished, it was all gone," Rowe explained.

Rowe argued that the "boneheaded, inexplicable decision made 40 or 50 years ago to remove shop class from high school" was a root cause of the current skills gap. The U.S. Bureau of Labor Statistics projects that every year until 2030, the industry will need to fill about 28,000 diesel technician jobs annually.

Another cause of the current skilled trade shortage, and what worries Rowe, is that "most of the people in that industry right now are over 55, and they're retiring faster than ever, and there's nobody in the pipeline."



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Language has also detracted those under 55 from choosing a track in the trades over college, Rowe said. "Remember, back in the day, it used to be called the vocational *arts*. And the first thing we did was we took the *art* out of it and that just left 'vocational training,' which doesn't sound quite as good," he explained. "And then we hyphenated it to 'vo-tech'... And then we changed it from vo-tech to shop. Then we walked around behind the barn and shot it in the head."

I don't know if keeping the "arts" in would have helped much, as those classes are usually the first to have funding cut. But I have seen the prestige of trades rise from joke professions to serious career paths in the last decade or so. And a lot of college graduates likely see their blue-collar friend living a lot better than they do. A local vocational arts institute called Polaris Career Center is so busy, there's a waiting list for the heavy trades. The automotive repair track has three people waiting.

"Enrollment has very much gone up with all the news about the jobs and the stereotypes that aren't so much anymore," related Cindy Crisler, enrollment coordinator at Polaris for 11 years. "There's definitely been an increase in interest in our programs. We're getting a different kind of student, a better student."

Maybe it's not the students who changed for the better, but the adults, who probably now realize that when you need something done, one skilled friend with perpetually oil-stained hands is worth a dozen English majors who probably did read every page *Wuthering Heights*, if such a person exists.

And ideally, parents, teachers, and influencers of any kind will encourage the next generation to take a serious look at the trades, particularly working on commercial vehicle maintenance. Because without functioning trucks, America and its economy will become a laughingstock. Or at least more of one.

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MAINTENANCE LAWS OF THE CONCRETE JUNGLE

Traversing through congested urban environments can wildly impact component wear and maintenance intervals. Here's a guide to tame downtime.

By Gregg Wartgow

[IN VEHICLE]

There has been a booming trend toward last-mile delivery, and fleets are looking to a handful of vehicle types to provide such services, primarily step vans and medium-duty trucks. Most of these vehicles are well known by maintenance providers, with electric vehicles being the exception. But now that they are running more often, fleets must account for the dangers lurking in every corner of the concrete jungle.

» The Mack MD Series is well-suited for last-mile delivery. From a maintenance standpoint, the hood can be tilted to make inspections and service access easier.

Photo: Mack Trucks

For that reason, fleets with urban routes may need to re-evaluate their preventive maintenance strategy.

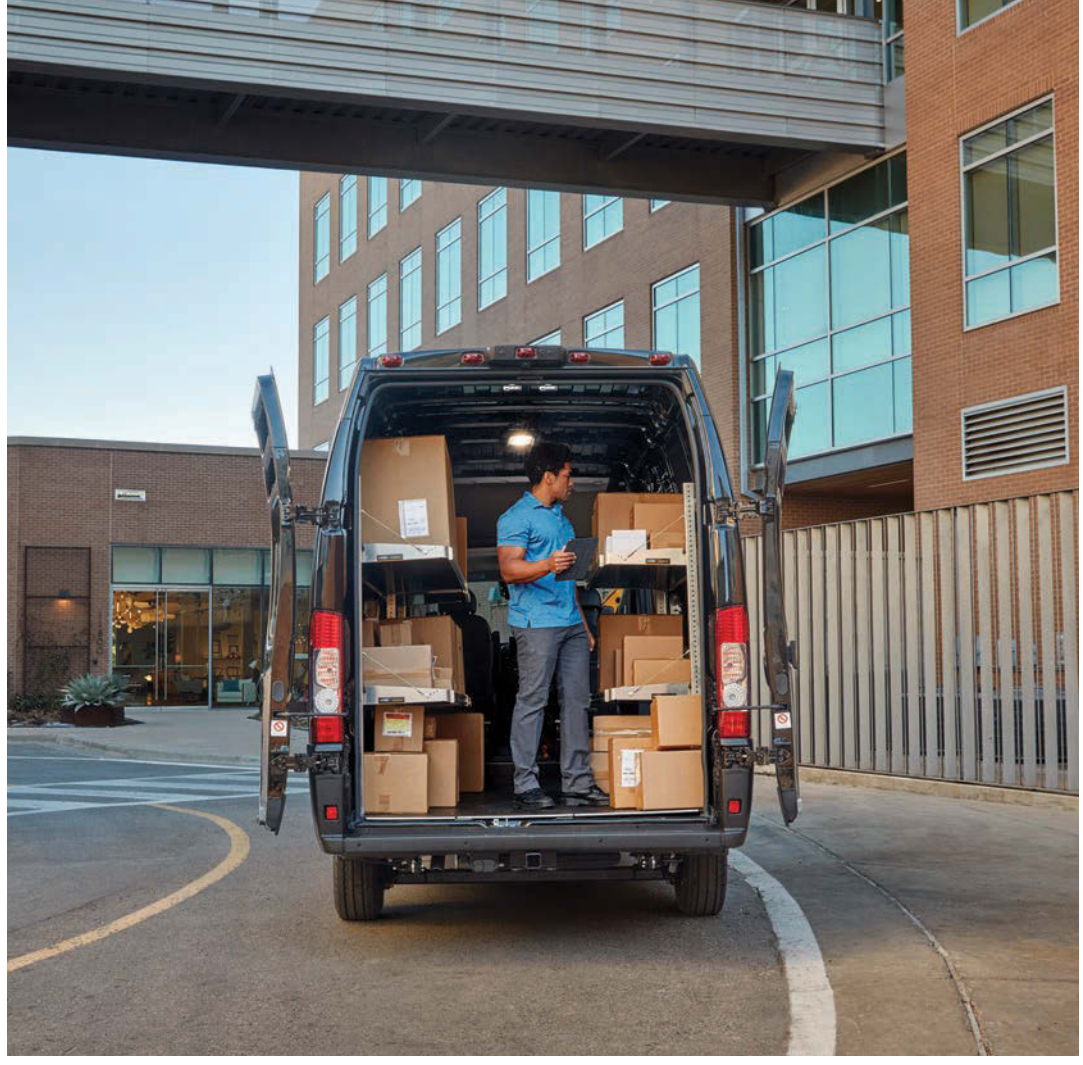
"These fleets have more stop-and-go driving and increased idle time," said Meena Narahari, director of total cost of ownership and uptime at Navistar, which makes International trucks. "Delivery fleets also deal with higher levels of traffic congestion and can create more risk with weather-related incidents. Drivers have to be more attentive to avoid accidents and costly collisions. In this way, technology is critical in helping customers be more efficient with last-mile delivery."

For instance, Navistar recently launched a partnership with Nauto, a predictive vehicle safety company that uses artificial intelligence and camera technology to provide in-vehicle alerts that help prevent collisions and encourage safer driving. "This kind of technology is inexpensive to install and has a compelling ROI for fleets," Narahari said.

Densely populated areas are also thin on open space. "Urban routes can mean narrow streets, tight corners, and unexpected obstacles," said Dayle Wetherell, VP of medium-duty sales at Mack Trucks, which re-entered the Classes 6-7 markets in 2020 with the Mack MD Series.

Looking to tire maintenance here will go a long way. "Correct tire inflation will help ensure better vehicle control while also increasing tire life," Wetherell said.

But safer driving is just one piece of the profitability puzzle on an urban route. Fleet maintenance teams must also remain on heightened alert for malfunctioning vehicle systems and excessive wear caused by the unique rigors of urban environments.



» The Ram ProMaster's spacious cargo area and lower load-in height make things easier on drivers. Technicians can make things easier, too, by making sure doors, lights, and ADAS features are all functioning properly.

Photo: Ram CommercialTrucks

» Ford Pro's E-Transit is gaining popularity on urban routes. With no engine oil to change or transmission fluid to flush, scheduled maintenance generally includes tire rotations, cabin air filters, and brake fluid changes.

Photo: Ford Pro

Make high wear a high priority

One way to keep last-mile commercial vehicles going is by stocking an ample inventory of high-wear items and being ready to replace them ahead of schedule.

"Typical items to keep a regular eye on are brakes, tires, fluid levels, liftgates, reefer units, and mirrors," explained Brian Tabel, executive director of marketing at Isuzu Commercial Trucks of America. "Look at the time a vehicle is being used along with the mileage. You may have to move up the maintenance based on time."

That is because a last-mile delivery vehicle is placed under a lot of stress in a relatively short amount of time. It's all about the duty cycle.

"The first thing a technician should think about is mileage accumulation," said Dave Sowers, head of marketing at Ram Commercial Trucks. "Last-mile delivery vehicles will rack up mileage pretty quickly, but not nearly as quickly as an OTR truck. Technicians shouldn't let that lower mileage fool them.

"What's important to realize is that within that mileage accumulation is the cycling that happens," Sowers continued. "The wear and tear per mile is much higher on a city delivery vehicle."

It's also important to note the rigors of urban delivery will affect parts differently.

"While some of the components on these vehicles suffer less wear than under normal conditions, such as transmissions and differentials, other components [face] three and four times the wear, such as tires and brakes," said Terry Rivers, VP of maintenance and technical training at Cox Automotive Mobility Fleet Services, which represents the unification of Cox Automotive's Dickinson Fleet Services and Interstate Truck Center brands.

"An eight-year-old vehicle with 70,000 miles might have 5,000 engine hours on it, which would be equivalent to roughly a quarter million miles under a different drive cycle," Rivers said. "Thus, the severe-duty-cycle maintenance schedule is required. In my 40-plus years of experience in this industry, the severe-duty-cycle schedule is rarely adhered to."

Rivers pointed out that the severe-duty maintenance schedules developed by the OEs have been developed for a reason.

"The wear and tear on brake components is excessive with all of that stop-and-go," Rivers said. "The transmission rarely gets out of second gear, while the rest of the transmission remains in like-new condition. Thus, regular transmission maintenance is required. But additionally, the constant acceleration and deceleration cause excessive exhaust back pressure and crankcase pressure, which can contaminate the fresh air intake components."

A technician must keep a vigilant eye on all of those maintenance items. Tire tread is another one. "Slow-speed traffic and frequent turning can lead to tread being scrubbed off on the road like cheese on a grater," Rivers explained. "This is one of the top four pain points of fleets. Every scenario is unique, with road surfaces and temperatures playing a role in tire wear, which is why mileage isn't always the best indicator."

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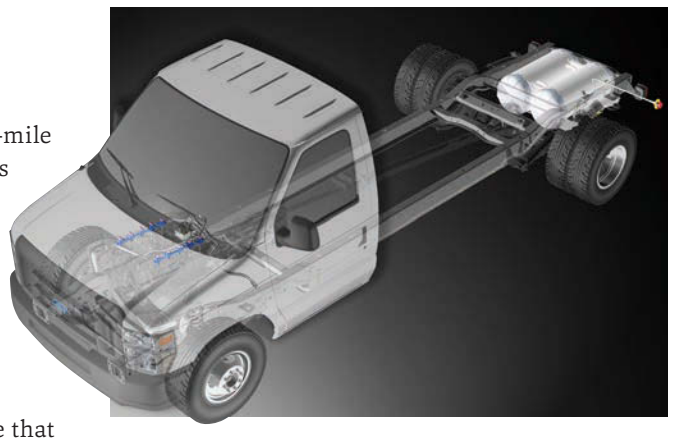
Body operation can take a beating

The number of daily stops on a last-mile route, according to Ram Commercial's Sowers, is generally in the 150 to 200 range. "That doesn't include the stop-and-go traffic the vehicle also needs to contend with," he pointed out. "Those are physical stops at a home or business. That's where a lot of the wear comes into play."

Drivers going in and out of a vehicle that many times can impact several things the typical heavy-duty technician isn't used to, at least not those who normally service OTR vehicles. Fleet technicians should also recognize that delivery drivers are under a lot of pressure to improve cycle times and often work in a hurried fashion. For instance, it's not uncommon for a driver to shift a vehicle into park while it's still rolling. Similarly, it's not unusual to leave the sliding door open while completing several adjacent stops.

"Doors, hinges, and latches get cycle times that are unbelievable in this type of application, so the technician really has to pay attention to them," Sowers emphasized. "It may simply be a matter of lubing them, which is something technicians did all the time back in the 1960s. Then things like plastics came along which alleviated some of those needs. But now that we're seeing these high-use cases again with final-mile, technicians need to start paying attention again. A door that won't latch properly on a delivery vehicle is a vehicle-down situation just like a blown transmission."

Malfunctioning lighting is also important. With the growth in last-mile delivery, drivers often find themselves operating in the dark. As Sowers pointed out, technicians won't necessarily see more wear and tear on these systems, but ensuring proper function is more important than ever—and that includes interior lighting.



» The Roush CleanTech propane autogas fuel system, as shown here on a Ford E-450 cutaway, uses a dual manifold tank made of steel. The system also features stainless steel fuel lines, rails, and injectors dedicated to the higher pressures of a liquid propane system. A unique fuel rail pressure control module is also included.

Photo: Roush CleanTech

"On our Ram ProMaster van, for instance, we run LED lighting with motion detectors," Sowers said. "This benefits the time-conscious driver who doesn't have to worry about flipping switches on and off. But it also creates a lot of demand for electrical energy which drives the maintenance. Technicians need to really make sure that batteries are in good condition. Most city delivery vehicles remain running all day, which is helpful for the battery, but there is a lot of demand on it as well."

Another automated body operation feature on the ProMaster relates to parking. When the driver unbuckles the seat belt and gets out, the vehicle is automatically placed into park and the parking brake is applied. "These systems are reliant on knowing that the door is open," Sowers explained. "Technicians need to make sure things like door switches are working. In the past, a dome light wasn't a big deal. Now it's an integral part of essential safety features. Technicians need to take the time to make sure these things are working properly."

When it comes to safety features, advanced driver-assistance systems (ADAS) have become rather common on light- and medium-duty vehicles used on urban routes. Congested traffic, intersections, parking lots, and loading docks create ample opportunity for abuse.

"ADAS features such as parking sensors and forward collision mitigation don't do any good if the sensors are damaged or covered up with something," Sowers said. "The technician can do a simple visual inspection followed up by an electrical inspection with a diagnostic tool on the ADAS sensors. We see that fleets are willing to invest in these systems, and technicians can help make sure they continue to work properly."

» Freightliner customers have been making deliveries in two all-electric vehicles, the eM2 box truck and eCascadia Class 8 truck (pictured), in conjunction with two pilot programs, Innovation Fleet and Customer Experience Fleet. Fleet maintenance facilities looking to service BEVs do need to think about on-site charging infrastructure.

Photo: Daimler Truck North America

Alternative fuels

Some fleets are finding that alternatively fueled vehicles, particularly battery-electric vehicles (BEVs), are ideal for urban routes. The lower operating cost and elimination of emissions are important benefits. Furthermore, vehicles tend to begin and end their day in the same location, making charging easier.

"Ram's first BEV offering will be in its ProMaster line, and final-mile delivery is a big reason why," Sowers explained. "Fleet maintenance facilities should start preparing for this trend by thinking about charging facilities. If a vehicle comes in for maintenance, the technician needs to charge it up to perform diagnostics. The technician will also need to charge the vehicle up before giving it back to the customer. Other than that, many other preventive maintenance items will persist. Positioning itself to service BEVs is a great opportunity for a fleet maintenance facility."

See Pg. 14 sidebar for more on urban-route BEVs.

While much attention has been focused on the gravitation toward BEVs, fleets running urban routes have another alternative energy option for their delivery vehicles: liquid propane.

"A couple of our most popular delivery vehicles for city applications are the Ford E-350/450 and F-650/750," said Mario Genovese, field service manager at Roush CleanTech, a developer of propane autogas systems for medium-duty Ford commercial vehicles and school buses. While the truck features themselves make those vehicles ideal for delivering goods in an urban environment, the fact that they run on propane autogas is an equally important benefit.

"Liquid propane is cleaner than gasoline due to the carbon content in the propane molecule itself," Genovese explained. "The molecular structure of propane is C3H8. That means it is composed of three parts carbon and eight parts hydrogen. The molecular structure of octane (gasoline) is C8H18."

The big benefit for fleets is a reduction in emissions. Additionally, operating costs can be reduced because of the lower price of propane versus gas or diesel. An argument could also be made that the lower carbon and oil contamination characteristics of propane could result in longer engine life, according to the U.S. Department of Energy's Alternative Fuels Data Center. From a maintenance standpoint, technicians don't have to worry about learning new, complicated procedures.

"One of the many benefits of liquid propane autogas is that the maintenance is very similar to gasoline," Genovese said. "We recommend that all of the OEM maintenance intervals and specifications be followed, with the addition of changing out the propane fuel filters which are rated for 50,000 miles."

A Roush CleanTech propane system does have some unique components. However, Genovese said the basic concepts of engine operation, diagnosis, and repair remain the same.

"Essentially, the entire gasoline fuel system, from the fuel tank to the chassis fuel lines and the fuel rails/injectors on the engine, have been removed and replaced with the liquid propane system," Genovese said. "There is also an additional control module that controls the operation of the propane system as well as unique software in the manufacturer's ECM to control engine and fuel system operation."

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There is an important safety component to be considered regarding technician training with both BEVs and propane autogas. With a BEV, technicians should complete the required high-voltage training in order to safely work around the batteries. Training is also required to safely work on a propane fuel system because the tanks, lines, and fuel rails are under a higher pressure. "Take caution to ensure that the system has been properly depressurized before attempting any repairs," Genovese emphasized.

When it comes to fleet vehicles operating in urban environments, regardless of the fuel they use, technicians will be dealing with some things they are familiar with, along with a few nuances specific to the vehicles being serviced and the duty cycles those vehicles endure. At the end of the day, tires, brakes, lights, and doors still need to be inspected and maintained to remain in good working order. A technician may just have to pay a little closer attention in a much shorter interval, right down to that very last mile.

For related content go to
FleetMaintenance.com/in-the-bay

» Xos battery-electric step vans are being used by various fleets ranging from FedEx Ground operators to Loomis cash-in-transit vehicles.

Photo: Xos

Leveraging the benefits of BEVs on urban routes

City delivery is the ideal application for fleets to begin making the migration to battery-electric vehicles (BEVs). Shorter routes and slower speeds are among the many reasons why.

Steve Ivsan, head of program management at Xos, a BEV manufacturer founded in 2016, said that when a fleet considers purchasing a BEV, it should not look at it as just purchasing a vehicle. The fleet is also purchasing the necessary support that goes with that vehicle, along with the opportunity to reduce operating costs.

"Especially with the price of fuel right now, it's fairly apparent that one of the major BEV cost-of-ownership benefits is fuel," Ivsan said. "But maintenance is arguably even more impactful when you move to an electric powertrain."

"There are far fewer parts and systems to maintain on an all-electric van and less service required overall," said Andrew Walker, Ford Pro commercial van brand manager. "For example, you don't need to perform a lube/oil filter change or a transmission flush on an E-Transit." And since there are fewer mechanical parts, there's a lot less lubricating that has to take place on a regular basis.

Ivsan said brake life could also be extended on a BEV, which benefit from regenerative braking. An electric motor helps decelerate the vehicle by providing drag when the brakes are applied, or the driver's foot is taken off the accelerator pedal. That drag helps produce electricity, which helps charge the batteries. The other benefit is that the drag helps alleviate some of the work required of the braking system, resulting in less wear and tear on the friction brakes.

BEV MAINTENANCE IS STILL REQUIRED

Despite all of the benefits of BEVs, brakes still need to be inspected regularly and serviced at the proper time. Furthermore, there are other key maintenance processes that must be completed at regular intervals on an electric powertrain, often every 12 to 36 months. "Those include air compressor oil and filter changes, low-voltage battery checks, high-voltage wiring checks, e-axle or drive motor lubrication, and cooling circuit flushing," said Kevin Otzenberger, product marketing senior analyst for Daimler Truck North America, which makes Freightliner trucks.

"I have seen some OEM maintenance schedules that recommend 5,000-mile intervals consisting of tire rotation, tread depth measurements, and fluid levels," said Terry Rivers, VP of maintenance and technical training for Cox Automotive Mobility Fleet Services. "The tools required can fit in the palm of your hand, and the standard repair time for this interval on some electric vehicles is one-fifth of an hour. The vast majority of shops, if not all of them, already have the tools to perform most maintenance intervals on most BEVs."

According to Otzenberger, service centers that plan to work on electric vehicles will need at least one or two technicians trained in high voltage (HV) who are qualified to decommission vehicles, ensuring that other employees can safely work around the HV components.

"Freightliner service center HV battery specialists, or decommissioning technicians, are required to complete 'HV Level 3' training, which is a multi-day, in-person training course with hands-on vehicle experience," Otzenberger pointed out.

When it comes to fixing minor dings and dents, which could very well happen in an urban environment, Ivsan said technicians are not likely to run into anything that stumps them. "We, [at Xos], aren't using any extravagant materials in the frame, bumper, wheels, or body panels," Ivsan said. "Our vehicles have a steel frame, maybe some fiberglass composites on the hood, steel doors, and a steel cab structure."

Something new that fleet maintenance facilities will have to adapt to is the need for charging infrastructure. Vehicles will need to be charged to enable a technician to perform diagnostics as well as before being returned to the customer.

The establishment of charging infrastructure throughout the country is an ongoing process still in its early stages. In the meantime, Otzenberger said fleets will have to be self-reliant, installing charging stations on their properties for depot charging.

Fleets running multiple shifts in a day must carefully plan for fast-charging sessions of two to three hours using 100 to 150kW DC fast chargers. Additionally, fleets running multiple BEVs can look to a charger management system that automates the process of charging vehicles sequentially, rather than simultaneously, based on priority.

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Lighting THE way

Industry experts illuminate which lighting SPECIFICATIONS and MAINTENANCE PRACTICES will keep costs low and eliminate fines and violations.

By Seth Skydel

[ELECTRICAL]

It's long been established that lighting issues on commercial vehicles such as tractor-trailers are the cause of many violations and fines, not to mention a large portion of fleet maintenance expenses. According to Federal Motor Carrier Safety Administration Analysis & Information data, some of the most common roadside inspection violations in 2021 were related to not having required operable lamps, inoperative turn signals, and defective lighting devices.

One year earlier, during the 2020 International Roadcheck event, the Commercial Vehicle Safety Alliance's (CVSA) annual high-volume, high-visibility inspection and enforcement initiative, out-of-service lighting issues in the U.S., Canada, and Mexico accounted for almost half of the overall violations.

Photo: 636956680 | Willowpix | Getty Images

Each year, CVSA highlights categories of violations during International Roadcheck to bring awareness to certain aspects of a routine roadside inspection, and in 2021 results on more than 40,000 commercial motor vehicle inspections painted a similar picture.

Last year, CVSA inspectors found 1,367 lighting issues, accounting for 14.1% of all vehicle out-of-service violations. The lighting violations, which ranked third after brake systems and tires, included headlamps, tail lamps, stop lamps, turn signals, and lamps on projecting loads.

To help fleet maintenance operations address this costly challenge, *Fleet Maintenance* assembled a panel of subject-matter experts from leading lighting manufacturers to discuss challenges on tractors and trailers, and the latest equipment trends to overcome them.

These experts also weighed in on how telematics technology helps detect broken and nonfunctioning lights. Finally, the group provided advice on ways that fleet maintenance operations can improve their lighting maintenance strategies.

Fleet Maintenance: What are the lighting challenges on tractor-trailers and the latest equipment trends to help address them?

Paul Sniegocki, Clarience: The environment is always demanding. Trucks and drivers face any and every condition, meaning their lights must stand up to just about anything; and so, robust designs and manufacturing methods can help overcome this.

Additionally, as we move to electric vehicles, customers are looking for low current draw. With Clarience Technologies' A2Z for eMobility initiative, our team of companies is addressing this concern by developing low amp draw lighting solutions and adaptive response technologies.

Kyle O'Dell, Optronics: Rising cost is the biggest challenge that tractor and trailer owners are facing currently. This has caused fleets to take a more serious look at total ownership costs of lighting systems. The entire industry has embraced the conversion from incandescent to LED lighting because of all the LED systems' advantages.

Drawing less power allows wire gauges to be reduced, and with copper prices almost doubling from a year ago, this helps offset the higher initial costs of LED lights. LED lights that are fully sealed and electronics with the latest SMD (surface mount diodes) can offer a lifetime of trouble-free service, which reduces downtime and service costs.

Mark Blackford, Grote: Traditionally, a major lighting challenge is the demanding environment in which commercial vehicles operate. On the road, vehicle lighting and wiring are frequently exposed to shock, vibration, corrosive chemicals, moisture, temperature extremes, and road hazards. In addition to these ever-present dangers, equipment availability has recently become a more critical concern for fleets, making downtime for maintenance or repairs more costly than ever.

The best solution is to ensure that tractors and trailers are outfitted with premium LED lights and harnesses that are designed to operate as a system. This will minimize downtime and allow a fleet to field road-ready equipment that can easily stand up to the challenges of the highway.

Kevin Koyle, TecNiq: If properly engineered, an LED light will outlast the life of the vehicle, so the focus needs to be on areas of concern like corrosion at the connection and physical damage. Using a properly sealed connector, made from the correct material, will reduce corrosion issues and lead to less failures on the road. Using quality components meant for harsh environments leads to less failures for both lights and grommets.

Lights and components engineered for the environments that tractors and trailers are used in should last the lifespan of the vehicle without any issues and help avoid any DOT violation fees. Although lights look the same, there are differences in construction that improve the quality of the components. Thermal management, proper high-quality circuit boards, precise sonic welds, and proper gasket material will all lead to lower fleet costs.

Al Anderson, Peterson Manufacturing: Corrosion is the number one reason trailer wiring harness and lighting systems fail and need to be replaced. Lights are always one of the top three CSA violations. Unplanned troubleshooting and replacement increase costs along with the associated unscheduled downtime, having an impact on every part of the fleet.

We designed our Defender and PetersonPATRIOT modular harness systems to provide a very strong defense against moisture intrusion and corrosion in trailers with a modular layout. These systems have a distribution module that connects all the lighting components to a small-footprint central hub. Additionally, an integrated moisture barrier feature of the wiring harnesses provides excellent corrosion resistance. The modular design of both systems allows efficient troubleshooting and repair, and easy installation when needed.

FM: How does telematics technology come into play to help detect broken or nonfunctioning lights?

Cliff Creech, Phillips Connect: Lights are the most frequently repaired item on a trailer, but when nonfunctioning, they can put your driver and fleet at risk for a CSA violation or even an accident on the road. Through telematics, the driver or fleet manager will receive an alert if a tail light is inoperative.

Our system, the Phillips Connect Lite Sentry, monitors resistance; if a light is broken, the resistance changes. We take it a step further by not just telling you the light is broken, but by pre-checking the light circuits on a parked trailer, indicating whether the light is broken before the driver dispatches. This gives the fleet the opportunity to safely replace the faulty light and eliminate unnecessary downtime.

Anderson: By alerting the driver and the fleet maintenance department to a nonfunctioning light, repairs can be made proactively. That limits costly over-the-road repairs, eliminates violations that might be found during CVSA inspections, and helps to keep a fleet's equipment operating safely.

Koyle: Often when a light is out, the light is what gets blamed. Telematics can determine if there is another issue that is playing a role in that circuit. Being able to monitor each circuit and reference the data may show an issue with the wire or connector, as well as if there are electrical surges or ground issues causing the premature light failure. Being able to reference the data, in real time or recorded, can provide more detail into the problem than just a nonfunctioning light can.

Blackford: Outage detection systems, such as Grote Guardian, can detect light outages, short

PANELISTS

Al Anderson, VP of sales and marketing, Peterson Manufacturing, is a recipient of the TMC Recognized Associate and Silver Spark Plug Awards, which recognize professional excellence in commercial vehicle maintenance.

Mark Blackford, director of national fleet sales, Grote Industries, has over 35 years of experience in the heavy-duty vehicle industry and specializes in aftermarket consolidation and OE specification to maximize safety and profits.

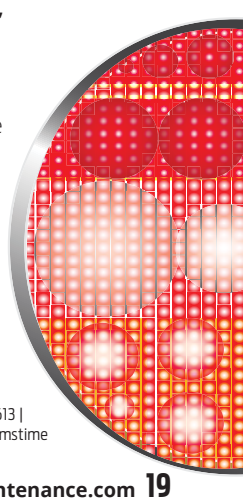
Cliff Creech, director of sales engineering, Phillips Connect, has 20 years of experience in fleet maintenance and evaluates new sensor solutions and helps design telematics solutions.

Ron Fay, technical support specialist, Phillips Industries, has over four decades spent in the heavy-duty trucking commercial vehicle industry with varying positions in maintenance and product management.

Kevin Koyle, technical sales director, TecNiq, has worked in the LED lighting sector since 2007. He is a graduate of Western Michigan University.

Kyle O'Dell, director of engineering and product development at Optronics International, directs the new product development group and oversees the company's FMVSS 108 compliance testing program.

Paul Sniegocki, CTO and EVP for Clarience Technologies, joined Truck-Lite in 1992 and has served as VP of R&D, director of engineering, and in several other roles.



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circuits, missing lamps, and even intermittent connections, and interface with a telematics system to communicate that information to the driver or the fleet maintenance office. This can greatly increase the efficiency of repair work and help minimize downtime and the risk of CSA violation exposure. In the near future, as technology advances and the utilization of telematics data develops, we envision detection systems with the ability to predict, not just report, lighting failures, leading to even greater safety, efficiency, and savings.

Sniegocki: Telematics technology enables connectivity of information and data. For example, our Road Ready Light-Out Detection System provides awareness to the back office. With its newest feature, Virtual Tether, information such as this can be communicated to the driver for proactive action. The system connects to the J-560 port and provides instantaneous data to the driver via edge computing.

O'Dell: The telematics technologies that are being incorporated into trucks and trailers aid in detecting issues with lights and wiring but still cannot fully replace an operator walkaround. With small 3/4" marker clearance LED lights drawing less than 0.05 amps, it is extremely hard for even the most advanced system to detect if one of these lights fails, so there is no substitute for the maintenance department performing routine inspections and for operators to perform daily walkarounds to inspect the lighting.

FM: How can fleets improve their lighting maintenance strategies?

Anderson: There are several things a fleet can do to ensure a good lighting system maintenance strategy. When spec'ing new equipment, be sure to ask the manufacturer to use the most moisture- and chemical-resistant connectors available on both the wiring harness and lighting components. Peterson believes that AMP-style connectors provide the best moisture exclusion available.

Be sure drivers do thorough pre- and post-trip inspections and report any problems to the maintenance department for attention. On 7-way trailer cords and J-560 connections, be sure the cord fits securely into both the tractor and trailer connection points. Also, be sure both connection points are free from corrosion and that the 7-way cord itself isn't damaged or worn.

Train technicians not to use test light probes to check for current in a wiring harness when troubleshooting. The slightest intrusion into a wiring harness will allow moisture and corrosive chemicals to get into the insulation and cause almost immediate problems. And be sure to use a high-quality dielectric grease on connections where appropriate.

Connections should not be disconnected unless repair or replacement is required; there is no periodic PM needed. A light's functionality can be determined by bench testing the light from a power source of the proper voltage or by replacing the light with a known-good unit. When working with LumenX lights, do not grease the silicon-sealed connectors. Greasing the terminals will prevent the silicone seal from seating properly and will lead to undo corrosion. Apply dielectric grease to 0.180 bullet connectors anytime they are disconnected or replaced.

» Grote noted quality brand lights and harness system utilizing uniform terminations can guard against corrosive chemicals, moisture, temperature extremes, and road hazards.

Photos: Grote

Sniegocki: Choosing the light with the most robust design ensures your light has a long lifetime and can operate in any conditions. Additionally, using a light-out detection system enables maintenance departments to increase uptime. In most cases, problems and potential maintenance can be identified before they become major issues.

Ron Fay, Phillips Industries: Lighting maintenance strategies are not just about maintaining the lights alone. Lights need power to operate. When a light fails, it might not be because the light itself is bad; it often is due to corrosion in the electrical system, which is highly susceptible to corrosion.

Routine PMs should be performed every six months, or more frequently in highly corrosive environments, using a plug and socket brush with electrical cleaner to clean 7-way connectors at the front of the trailer. After every cleaning, reapply dielectric grease on the plug and socket pins to keep corrosion at bay.

When a faulty light needs to be replaced, clean the contacts on the pigtail with an electrical cleaner and use a blowgun to clear residual cleaner and old grease before installing a new light. When a lighting failure happens and it's not the light, always start where the symptom first appears (for example, at the connection at the back of the lamp). Then move toward the front of the trailer with continuity or voltage drop testing along the electrical system to diagnose where the problem could be.

O'Dell: Coming out of the winter months, fleets should perform a thorough inspection of the lighting systems on their trailers. Throughout the winter months, drastic temperature changes, snow and ice buildup, and salt and chemicals used to treat roadways can cause connection points to fail. Roads treated with sand and salt can also cause physical damage to the face of lights that need to be checked for cracks and chips that can be potential moisture leak paths into sealed lamps. The chemicals being used to pretreat roadways today are particularly corrosive to copper wiring and unsealed connection points.

Maintenance departments should pay particular attention to these areas, as the warmer months will speed the rate of corrosion. If a connector is not fully seated, it should be fully disconnected, inspected for any corrosion, cleaned, and repacked with dielectric grease before reseating.

Blackford: Routine inspections by technicians trained to diagnose wiring and lighting issues can have an outsized impact on the amount of downtime a rig undergoes. Fleet maintenance departments can also make use of the failure data from telematics systems to help identify problem areas and take corrective or preventive steps.

Ultimately, a successful lighting maintenance strategy starts with the installation of a quality, branded lighting and harness system utilizing uniform terminations on all new equipment.

A robust system of premium, matching lighting and harnesses will require little or no maintenance and invariably cost less than systems that require routine maintenance and downtime.

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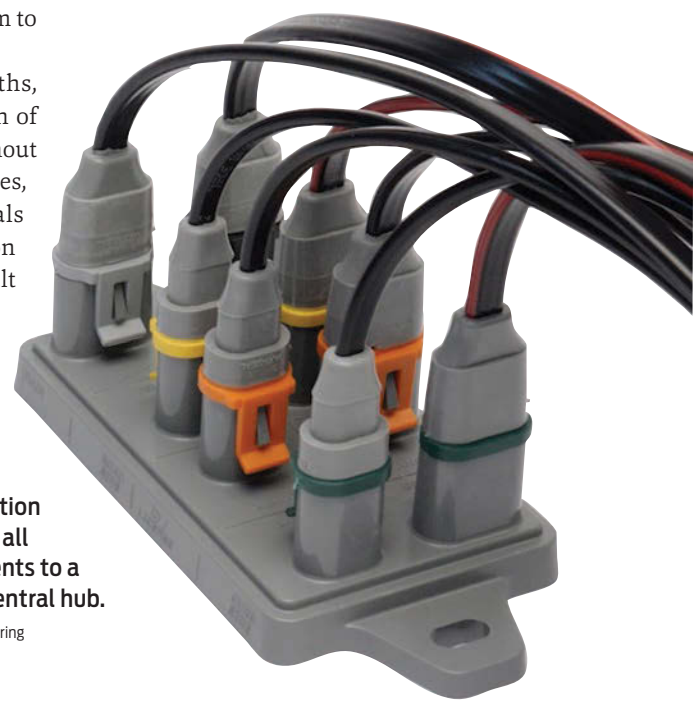

» Peterson PATRIOT Modular Harness Systems' distribution module connects all lighting components to a small footprint central hub.

Photo: Peterson Manufacturing

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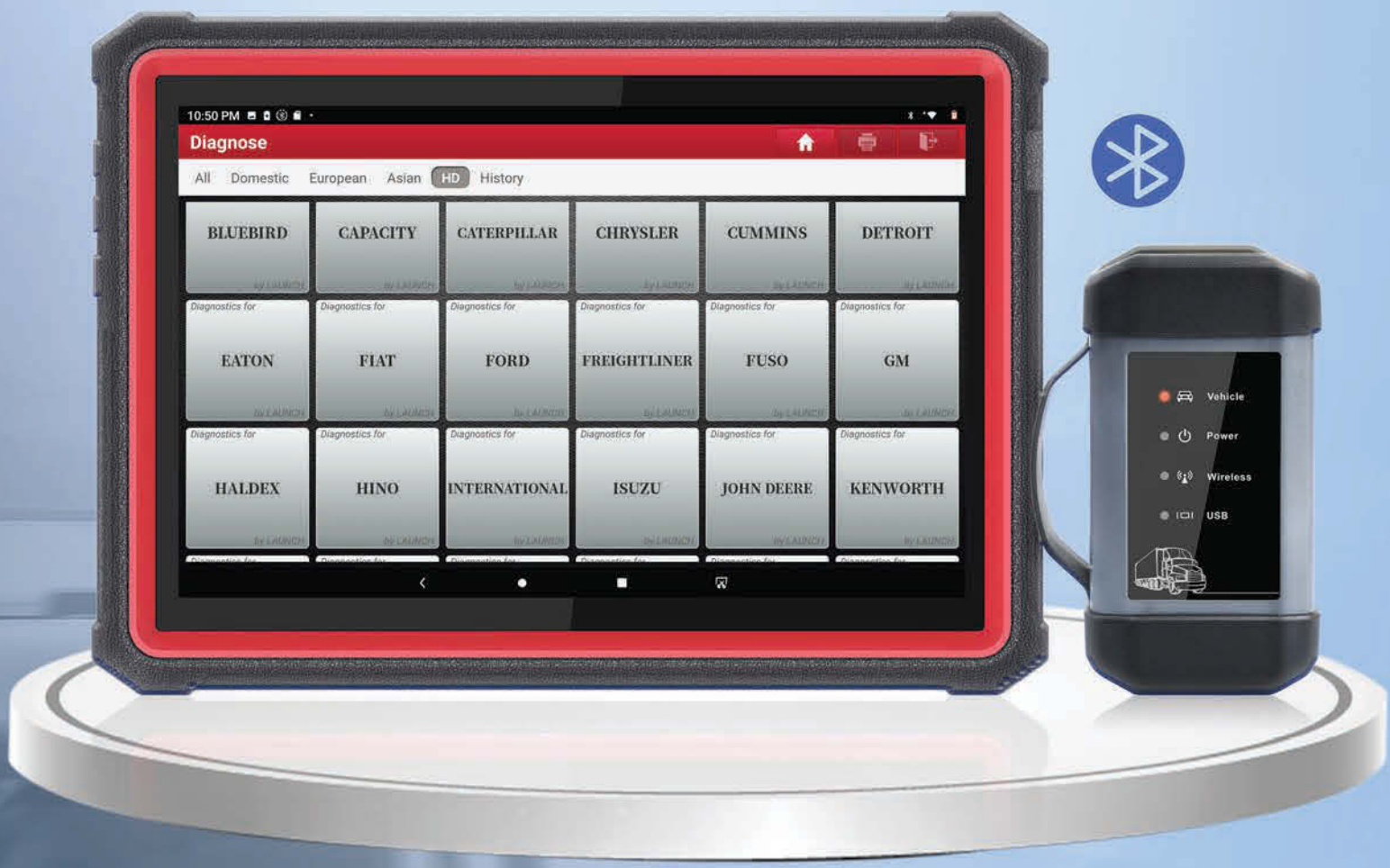

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TMT (TASK MANAGEMENT TOOLS) DYNAMITE FOR EFFICIENCY

By leveraging task management tools, fleet maintenance teams can plan ahead, which is particularly helpful amid technician and parts shortages.

By Cristina Commendatore

[SHOP MANAGEMENT]

Efficient fleet maintenance operations today have multiple software options and methods to collect the data relevant to incoming jobs, such as vehicle identification numbers, driver complaints, and other necessary information as a vehicle enters the bay. That information is then compiled into the shop's system, where technicians and maintenance managers can search for top fault codes and other problems at hand as well as delegate the right technician to perform the job. Broadly speaking, this software, known as task management tools (TMT), can be as simple as a spreadsheet—with smaller shops using Quick Books or Xcel—or take the form of a highly advanced platform using predictive analytics. The former can help you get you by, however, the latter can provide an explosion in efficiency.

These predictive technologies are being used to inform maintenance and repair departments about multiple issues that can be addressed in one shot rather than making the vehicle return to the service center several times over a two- or three-month period. They also inform maintenance departments about likely future problems, giving fleets a chance to schedule vehicle maintenance before a catastrophic event occurs.

Planning ahead

Shiva Bhardwaj, CEO of Pitstop Connect, a platform powered by artificial intelligence (AI) and machine learning (ML) to predict potential truck component failures weeks before they happen, emphasized that a fleet's best bet is to use technology to plan downtime and minimize pain points related to unexpected downtime.

"Though fleet managers know they need data to make efficient predictive maintenance decisions, they fail to mine datasets to develop insights," Bhardwaj said. "An effective fleet monitoring system leverages the power of AI, ML, cloud data storage technologies, and big data analytics to make accurate forecasts and assist technicians in identifying faults."

Pitstop software, for instance, provides fleets with a vehicle health score, informing maintenance operations of the top 15 high-risk vehicles. "Those vehicles will continue to cause downtime," Bhardwaj said, adding that the software generates reports that are automatically sent to partner service centers and drivers as needed.

Bhardwaj added this "lessens manual work and calculations, leaving little room for errors. No routine inspections are required since your [predictive maintenance] software has already conducted full diagnostics and shared the real-time vehicle health report with fleet managers."

Trimble Transportation offers a TMT software solution that provides communication between the driver and maintenance operation in real time as events happen on the road.

"By having that communication between the driver, the operation, and maintenance, we can increase our uptime, and planning and scheduling the work," explained Renaldo Adler, head of software engineering, connected maintenance, Trimble Transportation. "If you look at predictive analytics and communicate that to operations, there is a probability we can schedule the truck."

» **Trimble Transportation offers a TMT solution that provides real-time communication between drivers and technicians.**

Photo: Trimble Transportation

The same goes for an in-house repair, Adler said. Fleets can schedule a repair within Trimble's software to ensure the truck gets fixed quicker.

"Operations can schedule it through our software, which has a tool that sends the mechanic the right information available to get that truck back on the road," Adler said. He also stressed the need to know what parts and technicians are required to complete the job.

Another plus is that modern software can be wireless, allowing for over-the-air updates when a truck on the road requires an update or calibration of some sort, noted Willie Reeves, Paccar Leasing's director of franchise maintenance.

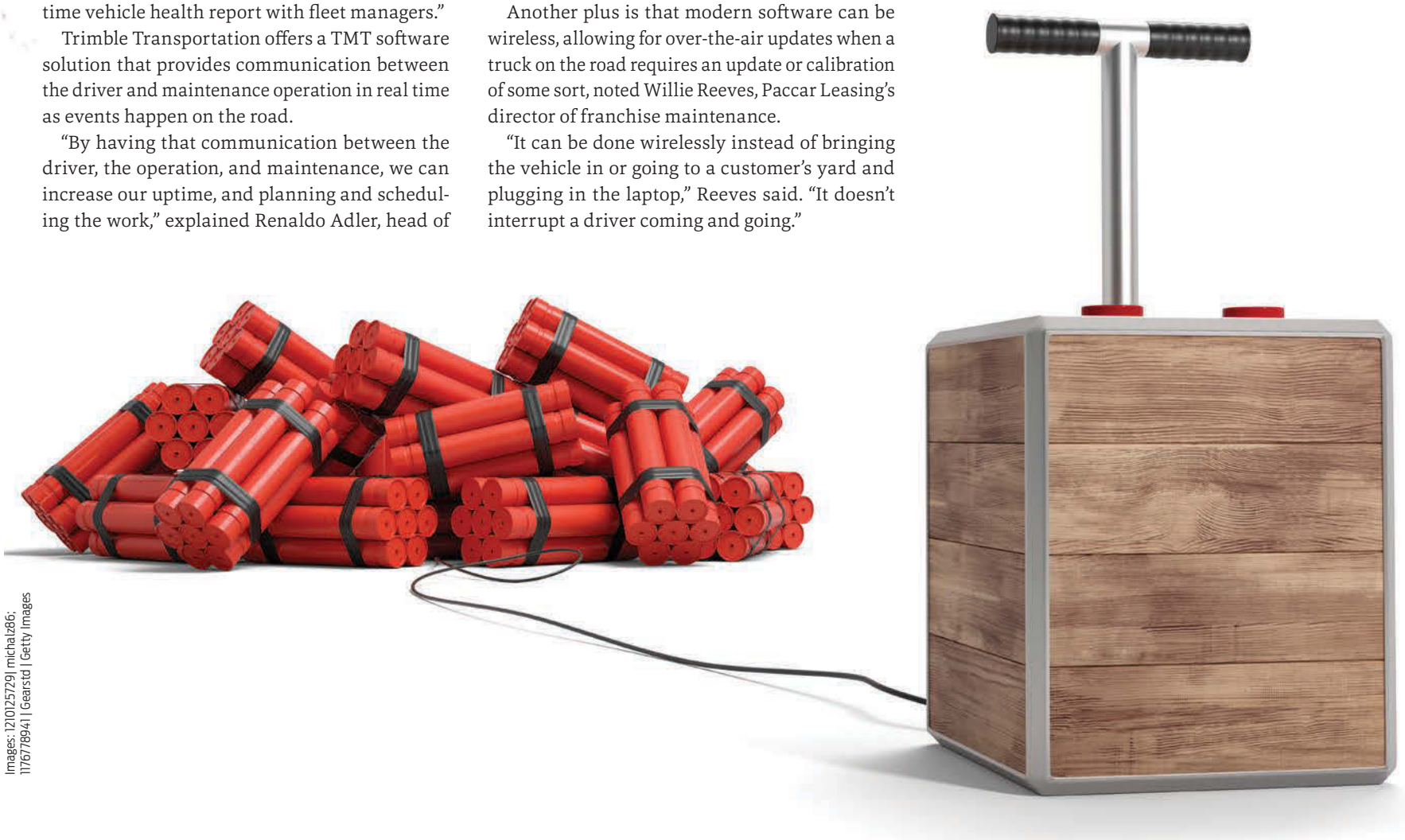
"It can be done wirelessly instead of bringing the vehicle in or going to a customer's yard and plugging in the laptop," Reeves said. "It doesn't interrupt a driver coming and going."

Enabling communication

TMT software gives maintenance professionals the opportunity to check vital units and the overall health of fleet vehicles. Operations today are relying more on sensors to track a vehicle's performance while it's out on a trip to see if the unit is operating at normal range or outside of those normal parameters, Reeves pointed out.

And these systems are only going to keep advancing at a rapid pace. It wasn't all that long ago when check engine lights and tire pressure monitoring systems were considered novelties. "Now, if we didn't have those technologies, we'd be stuck on the road," Reeves surmised.

"We are in such a microwave environment—everything has to be done instantly," he added.



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» To ensure trucks are running at peak performance, PacLease has a service provider network of more than 50,000 locations.
Photo: PacLease

"We need these technologies to communicate to the customer to let them know what's going on ahead of time."

To ensure trucks are running at peak performance, PacLease, which has a service provider network of more than 50,000 locations, has learned over the years how to best communicate potential problems with customers.

"Sometimes too much communication isn't good, so being able to filter what communication is important to the fleet owners and operators is very important," Reeves added.

Driving the user experience

Communication and selecting the right tools for Houston-based Clark Freight Lines is incredibly important to president and co-owner Danny R. Schnautz. When it comes to technology and equipment integrations, Schnautz said he refuses to put "junk" in front of his drivers. As a former professional truck driver, he can spot junk when he sees it.

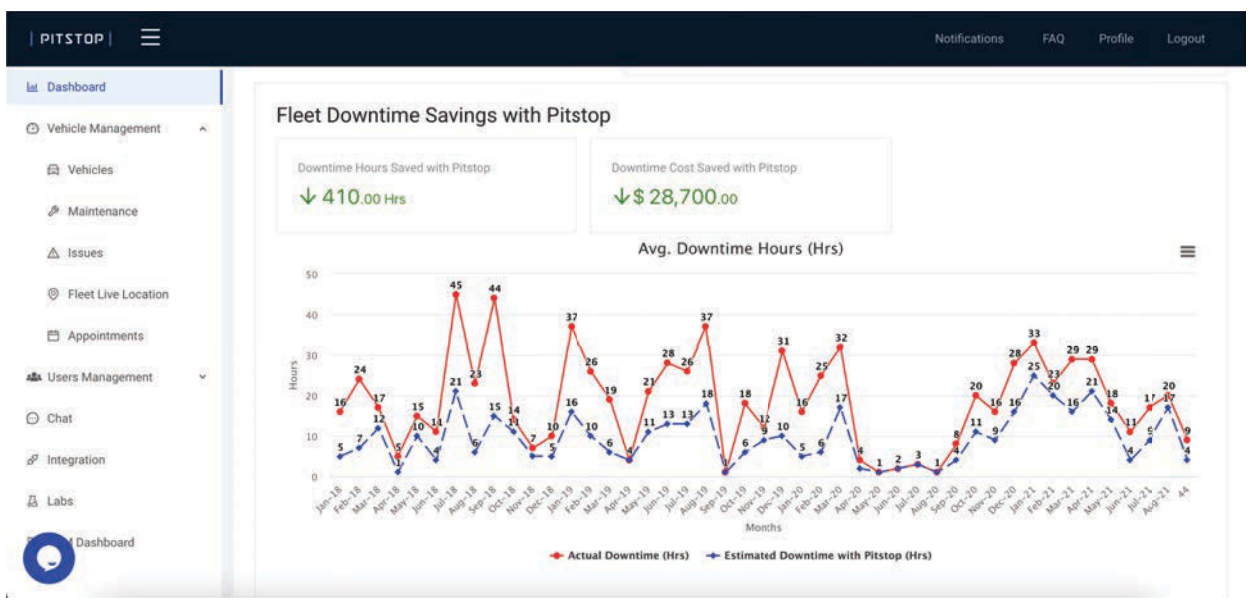
Over the years, that driver-focused mentality has made Clark Freight Lines particularly selective about the technology that its professional drivers and maintenance providers are asked to use.

The for-hire carrier runs a fleet of flatbeds, vans, specialized trailers, and a continuously expanding collection of intermodal chassis. The carrier hauls petrochemical products as well as imported lumber, plywood, stone, and other specialty cargo like warehouse materials, large statues, and even Grand Prix cars at one point.

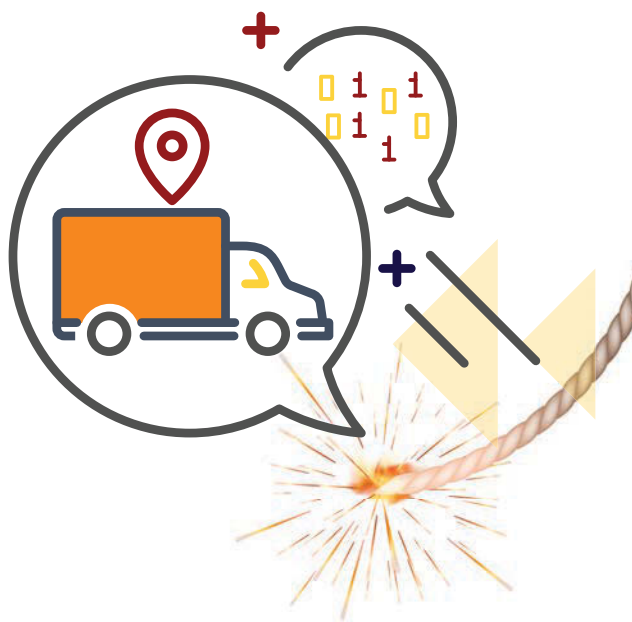
Running that fleet is a mix of company drivers and owner-operators, many of whom have been with Clark Freight Lines for more than 20 years. Company co-owners Schnautz and his brother—also a former truck driver—have found that automating certain aspects of the business has been a major timesaver for everyone. Schnautz is quick to point out, however, that regardless of advancements in technology, the business won't work without that irreplaceable human touch.

"Technology aids us; it doesn't replace us," Schnautz said. "Drivers are not interchangeable, and neither is our office staff. Using technology to complement their strengths and compensate for human weaknesses is the best place for the technology."

To assist company employees, Clark Freight Lines, which has a management app of its own under development, relies on McLeod Software.



» Pitstop Connect offers fleet downtime reports via its AI platform.
Photo: Pitstop Connect



Operational information is entered into McLeod's system so all departments within the company know where vehicles are at any given time.

"We have an obligation to the drivers to deliver the best of what's available—whether it's the best run, the best days off, the best equipment, the best maintenance schedule, or the best trailer situation," Schnautz said. "Whether a trailer is red-tagged or whether a run has increased in rate, we want to get that information in and share it with the driver."

Fleets are also leveraging drivers' electronic logging devices to view vehicle fault code information, although it's not all that detailed, Pitstop's Bhardwaj pointed out. A fleet of 100 vehicles, for instance, could have thousands of fault codes at any given time, he explained, making organizing important data that much more difficult.

Pitstop, which prioritizes fault codes by critical, major, and minor incidents, can show fleet maintenance providers an instance or description related to when an aftertreatment code comes up.

The system then will link back to a diesel particulate filter, or highlight a problem with the nozzle or the diesel exhaust fluid system.

"Fault code data seems to be there for most fleets," Bhardwaj explained. "It's a matter of taking advantage of it, which not a lot of fleets are doing today."

When it comes to mining for the relevant data to the fleet's operations and duty cycles, Pitstop collects algorithms and a few hundred thousand assets that stream through its system. The platform analyzes historic patterns, like battery voltage over long periods of time for certain truck makes and models.

Pitstop platform users can then compare their vehicles to similar makes and models and better predict when a system might fail. "Then we can say this looks like a trending critical issue because it can lead to downtime," Bhardwaj said.

"We try to learn from what has happened not just from that fleet, but for every fleet, and ensure that they have a better sense as a truck comes in," he added.

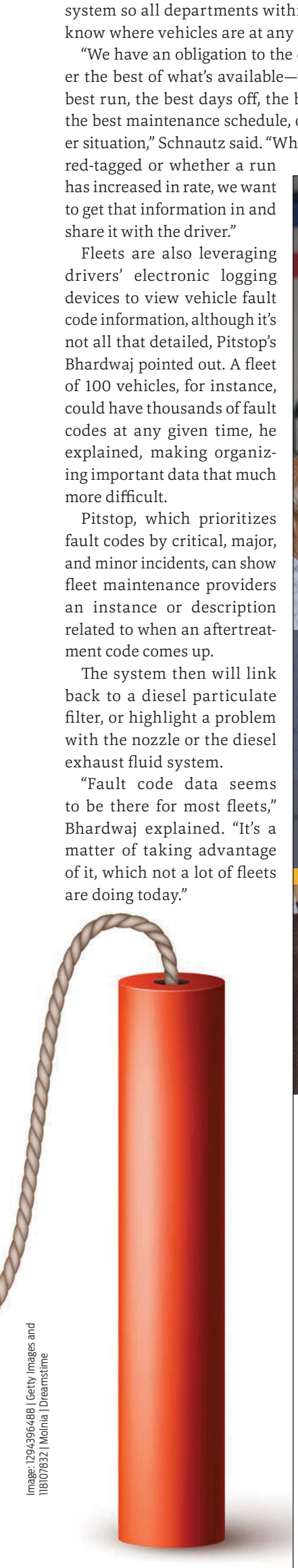


Image: 1294396488 | Getty Images and 118107832 | Molnia | Dreamstime

» Repairs can be scheduled within Trimble's TMT to ensure trucks are fixed in a timely manner.

Photo: Trimble Transportation

Technician, parts management

Even the most organized fleet maintenance operations are struggling to get trucks up and running because of ongoing technician and parts and component shortages.

The U.S. Bureau of Labor Statistics reports some 28,100 openings for diesel technicians are projected each year, on average, over this decade. Inflationary pressures have also caused a spike in commercial vehicle equipment prices, with prices being passed down from suppliers to their fleet and dealer customers.

But this is temporary, Pitstop's Bhardwaj said. When things smooth out a bit, he believes there will be a technological leap to help improve labor scheduling and maintenance management.

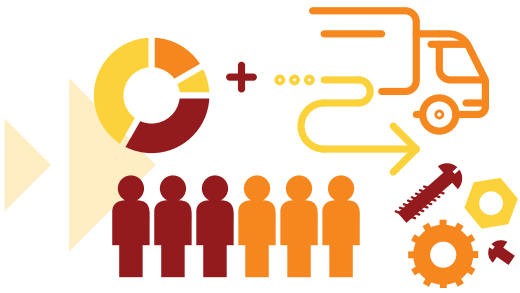
"You could probably plan 80% of the labor times more effectively," Bhardwaj said, "because you have the data from the actual truck that's coming in. Fleets can use it as a benchmark against how other people have done service. The technology can get us there, but I think it will take some time."

Future technician training will likely pivot as well, with less of an emphasis on training about what certain fault codes mean, and more around how to use software and when to make what decisions based on the data. The next step will be fitting the appropriate data into existing maintenance workflows.

"Then, things like ordering parts ahead of time and scheduling service with more accuracy ahead of time are the types of scenarios that get enabled once these solutions are adopted at a higher frequency," Bhardwaj explained.

Ultimately, it will be about feeding back vital information to the fleet and the service center so all players can stay up to date on stock inventory, recalls, and warranty trends.

Trimble does something similar today through its integration with TravelCenters of America.



"If they have a fleet of 20 trucks, they can see how those 20 trucks are doing and compare the data between the trucks."

Willie Reeves, Paccar Leasing's director of franchise maintenance

If there is a condition on the road, Trimble can make a request from its software directly into TravelCenters of America's system to inform maintenance operations when the driver will be in with the truck as well as the parts needed to turn that vehicle around quickly, Adler said.

Trimble also designed a tablet for technicians that tells them the trucks they need to work on, vehicle specs and history, and inventory needed from the parts department.

Adler explained the tablet has a common user interface to eliminate training, as technicians simply scan parts and key in numbers. The tablet also serves as a time clock for workers to manage their time throughout the day, and revisit how much time is spent on specific tasks, like changing tires and fixing brakes.

"Trucks are harder to fix now," Adler said, noting technicians today need to be more tech-savvy and use more digital tools to fix a truck. "They need more electronic data. As it becomes a more technical job, hopefully it will bring more people into that field."

One system PacLease is rolling out to help with the technician shortage is a voice-guided PM product to help train incoming technicians on how to perform preventive maintenance intervals. With voice-guided headsets, the system shows technicians how to start a PM and then has them follow modules online.

The system aims to standardize PMs for every PacLease location. "It also eliminates and removes someone from having to show someone else how to physically do a PM," Reeves said. "With that, you gain that person working in the shop rather than as a PM trainer, and it opens that person up to do more scheduled maintenance."

Speaking of PMs ...

As part of its managed maintenance program for leased customers, PacLease schedules PMs and any repairs that need to be made so fleets don't have to manage that themselves. Some of the biggest things Reeves sees from vehicles today are sensors going out and needed software updates.

"We really don't see big mechanical issues happening on units," he said. "It's mostly the electronics. Those are the things we use to give us feedback on how the unit is performing."

In today's world with parts shortages, Reeves said PacLease is trying to be more proactive with its units, as it can take anywhere from a week to a month to procure a specific part.

Being proactive also means PM consistency. To keep things consistent, PacLease integrates with Kenworth's TruckTech+ and Peterbilt's SmartLINQ remote diagnostics and telematics solutions.

"Information goes back to the fleet manager, who is managing that crucial data, and it gives them the capability to check the units in their fleet," Reeves pointed out. "If they have a fleet of 20 trucks, they can see how those 20 trucks are doing and compare the data between the trucks.

"It gives them the opportunity to move trucks around if they have a truck that is running high miles on their lease program," he added. "They can move other trucks to that area to keep the mileage down."

These days, Reeves is seeing more and more trucking companies leasing because of the rising price of commercial vehicle equipment. He added that because there are not that many trucks available in the market, companies also are holding onto

their used assets versus turning them in—making PMs even more important.

"So, they might be running them for an extra year or two until they can get new vehicles in their fleet," Reeves said. "They are working a little harder to make sure the maintenance on these units stays up to par."

Fleets today are also battling rising diesel and oil prices, so managing idle time can be incredibly important for overall total cost of ownership. One of the parameters that fleet managers can view in their software is idle time, Reeves said.

"You can see how long a vehicle is idling throughout the day, and you can come up with best practices to help reduce the idle time," he said. "Most of the idle time is done by percentages, so some units that are running regional might have a higher idle time than those running over the road. It gives managers the opportunity to decrease the idle time and keep the trucks from burning so much fuel."

The electric future

As more commercial fleets begin the transition to electric powertrains, Trimble's Adler noted that the job of a technician will become more challenging and require more safety precautions. At the same time, many in the industry anticipate that working on battery-electric vehicles and hydrogen fuel cells will be more appealing to the next generation of new talent.

The future, Adler noted, is also transitioning to a cloud infrastructure, where there is more data sharing and everyone in the industry will have the information to make better decisions and predictions.

"The OEMs are working on these too," Adler explained. "They are modeling out repairs to make predictions of when parts are going to fail. They are looking at warranties. If we make a prediction and say this part will fail, it may not be covered under warranty from the OEM. So, there is this education element that needs to go on to verify the models are going to be correct.

"Analytics plays a big part and as we get to electric vehicles, more and more data will be coming off those electric vehicles," Adler added.

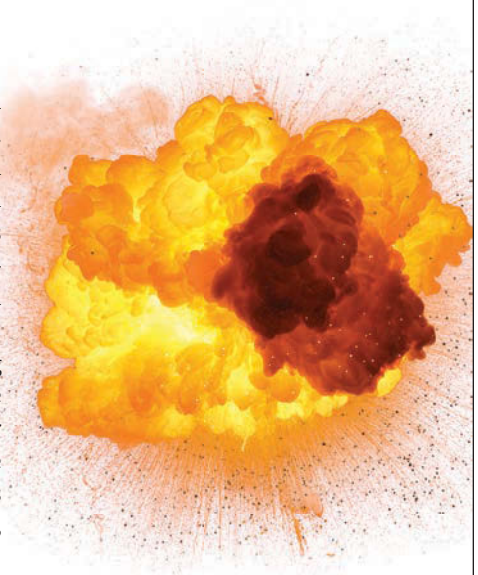
PacLease's Reeves also pointed out that electric vehicles will present new challenges for the technicians working on them, as these trucks will require different tooling, items of clothing, and training.

"I feel like technicians have a concern because they are dealing with electricity," Reeves said. "There is always a concern when dealing with electricity, and how in-depth the transportation industry is going to go with electricity.

"Electricity is one component that you can't make a mistake on because it will let you know that a mistake has been made," he added. "A lot of components today are more electronically controlled than mechanically controlled. Vehicle electricity is more like the veins running through our body; doing damage to one can cause a big breakdown."

Standardizing what wires to disconnect across the industry will also be necessary, Reeves pointed out. That has been top of mind for the technicians he works with.

Various unknowns still loom as the industry moves forward with commercial electric vehicles. But, as Reeves pointed out, everyone is on an equal playing field and learning at a pace that the industry can keep up with—for now.



Ways to use software

Pulling ELD data through a system like Pitstop's organizes parts lists, so shops can instantly see if there are shortages on certain parts. Then, they can put in orders ahead of time, Shiva Bhardwaj, CEO of Pitstop, said. In addition, he said software can be used to:

- Optimize vehicle operations.
- Make data-based decisions.
- Track decays in fuel efficiency in real time.
- Review component wear rates.
- Focus on tracking all inputs that affect that vehicle.

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The great PICKUP DUSTUP

As light-duty fleets debate between trusty ICE trucks and bold new electric models, Detroit's Big Three are picking both sides—for now.

By James Alfred

To say that the global automotive industry is at the start of an unprecedented technological revolution is an understatement. For the first time in well over a century, every single aspect of personal and commercial vehicles is undergoing an assessment and a realignment. This includes battery-electric vehicle (BEV) powertrains, alternative/zero-emissions fuels (such as hydrogen fuel cell systems), and rapidly advancing autonomous vehicle control systems, which stands poised to disrupt everything from infrastructure to vehicle design and even traditional ownership models.

It is important to remember that this revolution, though its eventual consequences may well be far-reaching, is in the early stages. And even when it gains steam, it will initially begin on the coasts of the nation and in large metropolitan areas. That means, for the foreseeable future, the vast majority of commercial fleets will be relying on tried-and-true internal combustion engine (ICE) technology, using either gasoline or diesel fuel.

For pickup, light truck, and van OEMs, this means pursuing dual technology paths in the near term until the reliability and durability of BEV powertrains are proven and gain large-scale acceptance in the marketplace.

And for commercial vehicle owners and operators, a lot more time, consideration, and money will go into what has traditionally been a fairly straightforward annual event: refreshing your fleet. Soon, all-new powertrain options and capabilities will be on the table, and new calculations will enter into the picture. For example, at some point, it seems likely a fleet that has traditionally been 100% ICE vehicles will have to factor in vastly reduced resale values for those trucks at trade-in time—assuming, of course, that BEV trucks and vans eventually gain market dominance. And the same consideration may be the case for companies looking to trade in vehicles without autonomous control systems.

In the meantime, however, there is still work to be done. In Detroit specifically, the Big Three OEMs—Ford Motor, General Motors, and Stellantis—are still building trucks with cutting-edge powertrains to help you do it. And they are developing powertrains for everyone, including those ready to try out powerful yet quiet plug-in pickups, and those who just want a tried-and-true diesel- or gasoline-powered truck to get to the end of the workday.

Dual paths

Where do things stand today with the Big Three in terms of BEV and ICE production?

For now, not much has changed for fleet managers determining which type of ICE is best for their applications, according to Connor Dunlop, Ford Pro truck brand manager. "Fleet managers generally choose the powertrain based on the truck application," he explained. "Gas trucks are generally chosen for applications with lighter duty cycles and lower torque requirements. Customers with high-capacity PTO requirements or the need to tow fully laden trailers over long distances tend to prefer diesel powertrains.

"Telematics tools like Ford Pro Telematics can help fleet managers analyze their vehicle usage and make informed operating and purchasing decisions in the future," Dunlop said.

Daniel Tigges, commercial product and sales support manager at Chevrolet, said that generally, gasoline-powered trucks account for around three-fourths of sales, with diesel making up about one-quarter, although he cautioned that those trends vary over time and according to a wide range of external factors.

Tigges also noted that General Motors CEO Mary Barra announced at the 2022 Consumer Electronics Show that the company will introduce fully electric versions of its HD trucks by 2035. "Without question we are seeing more fleets interested in battery-electric commercial vehicles," Tigges said. "We are seeing incredible interest for the 2024 Silverado EV Work Truck. And these all-electric HD trucks will be engineered to deliver effortless heavy-duty hauling and towing while offering customers amazing new features and a range needed to get the toughest jobs done."

At the same time, Chevy engineers are working on new ICE designs that are helping deliver better performance and better fuel economy while also helping reduce emissions, Tigges added. He pointed out that diesel engines deliver higher horsepower and torque, especially at low rpms where it is most useful for towing and moving heavy loads. "They also deliver better overall fuel economy," he noted. "But that is often offset somewhat by higher fuel prices per gallon. They also generally have higher maintenance costs. Gas engines typically have a much lower acquisition cost which provides a big total cost of ownership advantage. Commercial buyers tend to buy diesels when they have use cases that require maximum performance."

Similarly, Dave Sowers, head of Stellantis-owned Ram Commercial Trucks, said that Ram

» Ram Heavy Duty's available High Output diesel engine can tow up to 37,100 lbs. thanks to a torque rating of more than 1,000 ft.-lb.

Photo: Stellantis

is committed to having fully electrified solutions in a majority of its segments by 2025 and a full portfolio of electric solutions for all of its segments no later than 2030. But, he added, right now, Ram customers really want the best of both worlds: They want gobs of power in as economical an engine as they can possibly get.

"When we talk to heavy-duty buyers, they tell us they're looking for both towing capability and engine performance," he said. "And Ram Heavy Duty's available High Output diesel engine enables the most powerful, most capable pickup in the segment to tow up to 37,100 lbs. Ram Heavy Duty was the first to break the 1,000 ft.-lb. torque rating envelope."

Sowers said that to meet those seemingly conflicting customer demands, Ram chose three robust ICE engine offerings for the Heavy Duty:

- 6.4L HEMI V-8 with "best-in-class" standard gas engine power produces 410 hp at 5,600 rpm and 429 lb.-ft. of torque at 4,000 rpm—featuring VVT with Fuel Saver Technology cylinder deactivation
- 6.7L Cummins Standard-Output Turbo Diesel produces 370 hp and 850 ft.-lb. of torque (Ram 2500 and 3500)
- 6.7L Cummins High-Output Turbo Diesel produces 420 hp and 1,075 ft.-lb. of torque (Ram 3500)

For the off-road drivers more concerned about speed and power than fuel, the Ram 1500 TRX's 6.2 V8 engine roars up 702 hp and can tow 8,100 lbs. It gets 14 mpg at most, though.

On the flipside, Ford Pro is all in on electric work horses over fossil-fuel guzzlers.

"Obviously, all-electric trucks are a hot topic at Ford, as we just started production of the F-150 Lightning—the only full-size electric pickup available now—with a starting price less than $40,000," Dunlop said. Ford does not yet offer a BEV option for Super Duty, he noted.

On the ICE front, Dunlop said the 7.3L gasoline V8 in the 2022 Ford Super Duty is the most powerful gas engine in a full-size pickup, delivering the best gas horsepower (430 hp at 5,500 rpm) and torque (475 ft.-lb. at 4,000 rpm) in its class. "For the toughest applications, the third generation 6.7L Power Stroke V8 Turbo Diesel engine offers 'best-in-class' diesel horsepower at 475 hp at 2,600 rpm (lower than any other engine) as well as an available 1,050 ft.-lb. of torque at 1,600 rpm," he said.

» **Chevrolet's new Advanced Trailering System with an in-vehicle app offers a host of customized trailer profiles, pre-departure check lists, and trailer lighting diagnostics, among other options.**

Photo: Chevrolet

"And building on those options, all Ford Super Duty pickups (other than the F-250 with 6.2L V8 engine) feature the Ford TorqShift 10-speed automatic transmission that has been engineered to optimize drive ratios and leverage the available horsepower and torque to improve the overall operating performance."

Advanced technologies like direct injection and variable valve timing are helping to provide better performance and fuel economy, Tigges said, adding that new PTO options are now helping customers use that power better for jobs and fleet vehicles. "For example," he noted, "On the Chevrolet heavy-duty Silverado, we offer an Allison 10-speed transmission with an integrated PTO. This design eliminates the need to buy an aftermarket PTO unit to attach to the transmission. It saves upfit time and costs and is more efficient, quieter, and transmits more power."

Earlier this year, Chevy revealed the 2024 Silverado EV, which will use GM's Ultium EV Platform. Expected specs include a 400-mile range, 780 ft.-lb. of torque, and 0-60 mph in under 4.5 seconds. Max trailering will reach 10,000 lbs.

New technology everywhere

The transportation revolution isn't just taking place under the hood. New light- and medium-duty trucks are receiving a host of new technology upgrades inside the cab and out—all with a laser-like focus on helping fleets work smarter, harder, and more efficiently.

In fact, Ford's Dunlop argued that some "new" technologies have already transitioned to the status of "must-have" vehicle systems. "Telematics are important no matter what size fleet you have," he said. "Ford Pro Intelligence makes it easier than ever for commercial customers of all sizes to use telematics to improve their vehicle uptime. Ford Pro Telematics Essentials is a complimentary web-based application that's available to all our customers who have gas-powered Ford vehicles with embedded modems in their fleets. It provides instant odometer readings, diagnostic trouble codes, recall notifications, trackable maintenance alerts, and information around engine hours and oil life. It will even relay warning lights so fleet managers can resolve issues faster without having to wait for drivers to report issues—potentially avoiding costly repairs down the line. And customers who want to access more advanced capabilities can easily upgrade to the Ford Pro Telematics subscription service that offers additional productivity features, including GPS tracking, driver behavior insights, support for non-Ford commercial vehicles, a mobile driver app, and more."

» **Like other Ford F-150s, the Lightning leverages Pro Telematics Essentials—a web-based application that helps fleets manage utilization, maintenance, and range.**

Photo: Ford Pro

Thanks to GM's OnStar Vehicle Insights, Tigges said Chevrolet and GMC vehicle owners now have access to electronic features like oil life, air filter, and brake life monitoring. "Vehicle Insights not only advise when maintenance needs to be done but can help predict when it will be needed based on how the truck is being used," he added. "This allows fleet managers to schedule maintenance to keep their vehicles running at maximum efficiency."

Additionally, Tigges said, smartphone apps are becoming a valuable interface between vehicles and owners/fleet managers as well. "Silverado HD offers great towing capability along with the Advanced Trailering System with an in-vehicle app that offers customized trailer profiles, pre-departure check lists, trailer lighting diagnostics, trailer tire pressure monitoring system module, and ability to create and sync trailering profiles with the myChevrolet Mobile App," he said. "Outside of the Advanced Trailering System, Silverado HD also offers Electric Parking Brake hookup assist, brake gain memory on integrated trailer brake controller, and trailer theft alert."

With new pickups, technology both under the hood and in the cab will be driving great changes in the years ahead. The truck of the future is always a year away. But new technology is changing how fleets work—and *will* work—in ways that seemed unthinkable just a decade ago.

Photo: Teledyne FLIR

Will shops warm up to THERMAL IMAGERS?

These non-invasive tools can quickly diagnose many vehicle issues through temperature readings and are becoming a hot new way to decrease downtime.

By Tyler Fussner

Though they are not prevalent in today's shop, thermal imaging cameras have proven an effective, non-invasive method of inspection and evaluation for vehicle components. By using infrared light to measure variations in temperature, these devices allow technicians to immediately determine if further work needs to be conducted—ultimately speeding up the repair process.

Other benefits of thermal image inspection include assisting in diagnostics, helping pinpoint trouble areas and defects, presenting status reports on systems, and even creating transparency and providing verification throughout the repair process.

"I see this technology becoming as commonplace at some point as the handheld temperature sensors," said Talon Thomas, product management technical engineer at Noregon Systems, of thermal imaging. Thomas previously served as a technician and believes thermal imaging cameras will one day become the go-to temperature scanner and possibly replace other diagnostic methods.

Currently, thermal cameras can be costly, and technicians can use other tools and techniques to provide the same results. So, are they worth it?

"It can be one of those tools that just sits around in the shop," Thomas said, "but, when you need it, it becomes very useful."

Thermal imaging cameras reveal differences in temperature, displayed as different colors on the spectrum, with red being hotter and blue colder.

"These cameras display hot and cold temperatures as colors, so you can easily troubleshoot issues related to heated seats, catalytic converters, drivetrain components, and much more," explained Michael Fisher, product manager, K-Tool International. "They provide a quick visual inspection to see if there is more labor involved and if your intuitions are correct, as well as eliminate unnecessary steps when trying to find a problem with a vehicle."

Thomas believes the vehicle repair industry will realize the technology's usefulness as it becomes more accessible.

"It will happen because the price point started coming down to where technicians can afford it as part of their toolkits versus something only shops could afford," he said.

Teledyne FLIR is one manufacturer trying to increase overall adoption of thermal imagers. The company provides cameras for the military and emergency response, with its sensor technology placed on everything from drones to smartphones. Automotive maintenance might not be as obvious a place to use infrared imaging as firefighting or a special ops mission, but there are plenty of reasons in the shop to use one.

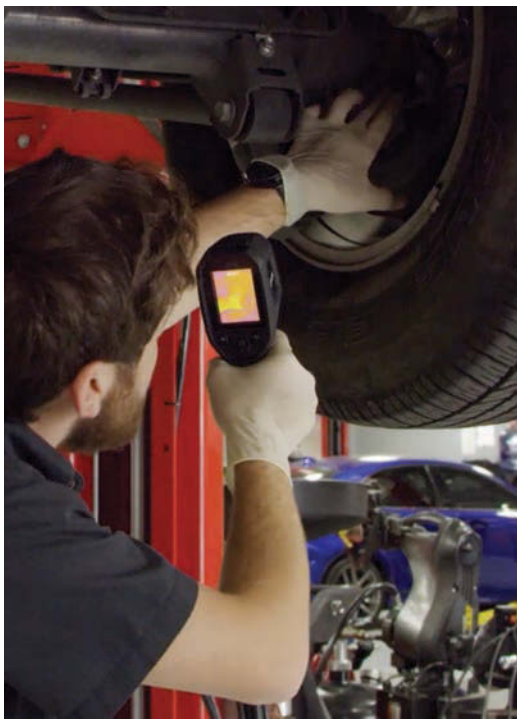
"Operators can move from simply detecting to understanding specifically where a given problem is located," said Chris Bainter, VP of business development and marketing for Teledyne FLIR. "Thermal cameras also allow for more discreet temperature measurement spots than spot pyrometers, which image a larger area and give an average measurement value"

Thermal imaging tools provide thousands of points of measurement in an easy-to-interpret image, while spot pyrometers only provide a single point of measurement.

"With a spot pyrometer, technicians must guess where the problem lies," Bainter explained. "They risk missing smaller hot spots that could be indicative of a problem. Therefore, thermal imagers provide more actionable results that will improve productivity and accuracy while saving time and associated costs."

Thomas attested that employing them for "specific use cases to go after a specific symptom" will improve thermal imagers' usefulness.

"Good technicians that already have a good diagnostic skill set, without even telling them, would already know what the use cases could be," he explained. "It is one more thing to make your life a little bit easier. You can actually see the problems instead of having to hunt and feel for them."



» Inspecting a vehicle's wheel end following a test drive can reveal temperature differentials, implicating further diagnostics and/or service.

Photo: Teledyne FLIR

Thermal inspection applications

Knowing how and when to use thermal cameras can boost ROI and speed up the diagnostic process. So, let's assess the areas, systems, and components of a commercial vehicle that can benefit from the application of thermal imaging. That way, fleets can determine if these cameras will be a valuable tool each shop should have, or merely a cool gadget with limited applications.

Wheels, tires, and brakes

FLIR's Bainter suggested that after a road test, technicians can inspect tires for irregular heating patterns. Heat spots could indicate variations in inflation, vehicle misalignment, or defects in the tire itself.

Inspecting brakes with thermal imagers can reveal issues, Fisher stated. "The thermographic load must spread evenly throughout the whole brake disc with no grooves or rings showing."

Fisher suggested that techs measure the temperature of the driver-side brake followed by the passenger-side brake across the same axle and compare the results.

"The temperature should be within a few degrees of each other," he said. "If they are 10, 20, 30 degrees off, there may be a brake fluid issue that needs to be addressed."

An infrared camera will detect nuanced differences in temperature out of reach for a tech, such as around the caliper, which could indicate a mechanical failure.

"Stuck pistons may be causing one caliper to stick, causing abnormal wear and heat on one rotor," Bainter pointed out. "The same might also be true for a stuck parking brake with a damaged cable. Both situations should be visible in thermal imaging due to the heat they generate."

"If you have a brake chamber that is ruptured and it's not working, or you have a slack adjuster that is seized, or the S-cam itself is seized, you can take the truck for a test drive, really romp on the brakes, and get them hot," Noregon's Thomas explained. "Then use the thermal imager to walk around the truck and see which wheel ends are hot versus which ones might be cool. The ones that are cool, you may have a braking system application problem there."

THERMAL IMAGING PRODUCTS

Innova Electronics Corp.

With advanced infrared technology, the **Multi-Purpose Infrared Inspection Camera**, No. 3360, uses thermal sensors to target and record temperatures. Users can turn thermal images into a photo that can be stored and viewed at a later date.

For more information visit **FleetMaintenance.com/21246000**

Teledyne FLIR

The **Thermal Camera**, No. TG275, features infrared guided measurement (IGM), has a temperature range up to 1,022 degrees F, is drop-tested with an IP54 enclosure, and can hold up to 50,000 images. It also features a laser for precise measurements.

For more information visit **FleetMaintenance.com/21113424**

K-Tool International

The **Thermal Image Camera**, No. KTIXD275, features a 2.4" LCD display, a temperature range of -4 to 752 degrees F, and trigger-operated laser pointer and image capture, as well as six color palettes (White Hot, Iron Red, Hot Iron, Arctic, Rainbow 1, Rainbow 2).

For more information visit **FleetMaintenance.com/21268271**

Snap-on Diagnostics

The **Diagnostic Thermal Laser** combines temperature readings of up to 1,800 degrees F and thermal imaging capabilities by featuring both laser and thermal components. It features thermal image blending, plus a visible-light camera to provide more detail.

For more information visit **FleetMaintenance.com/21257954**

Powertrain

In the engine, thermal cameras will also reveal abnormalities via higher or lower temperature ranges of specific components.

"Thermal cameras can highlight issues such as overheating," Fisher said. "This could also help decide if there are internal issues without having to remove components for diagnosis."

Cooler exhaust temperatures can reflect insufficient combustion, Fisher continued, indicating internal issues of the working conditions of the engine.

Exhaust system leaks, cracked manifolds, failed gaskets, and clogged catalytic converters can all be inspected through thermal imaging, which can pinpoint the locations of leaks and cracks, Bainter said.

A thermal imager can also aid in diagnosing failing injectors, as well as misfiring or low pressure in cylinders, Bainter continued. A suspected cylinder's manifold will show a lower temperature than others through stark contrast across the cylinders.

"A thermal imager can reveal if a misalignment of pulleys is causing overheating and putting stress on the belt," Bainter said of diagnosing a repeatedly failing accessory belt with thermal imagery.

Furthermore, thermal imaging can be used for validation of vehicle temperature sensors and readings.

Aftertreatment

"Especially as it relates to heavy-duty trucks' DPF and SCR system temperatures, their temperatures are very important for normal regeneration system function and SCR system operation," Thomas emphasized. "Regeneration validation is another thing; you can watch it ramp up and make sure that the DPF and the DOC are actually getting to temperature."

Suspension and drivetrain

Temperature scans can reveal excessive friction from worn components, Bainter stated. Temperature differences in shocks across an axle can reveal if one (the cooler of the pair) is not operating to specification.

HVAC

A thermal imager is particularly useful for testing whether the air conditioning system is working properly, Bainter said.

"Initially, technicians can use a thermal camera to measure outlet temperature, compare outlets, and then determine if one is completely or partially blocked," he continued. "They can also check surface temperatures of high- and low-pressure lines for damaged insulation. Meanwhile, failing thermostats, or clogged/blocked radiators or coolant lines, will be apparent when only part of a radiator shows it's working properly, or a line has a sudden change in temperature at one spot along the hose where a blockage is located."

"You can look directly at the line sets to know whether or not the compressor is pumping," Thomas reinforced. "High pressurized refrigerant is hot. And so, you can see that contrast to the low side of the refrigerant line to verify that the compressor is pumping."

» **Thermal imaging can validate vehicle temperature sensors and readings.**

Photo: K-Tool International

"If you have an orifice or thermal expansion valve that is external from the evaporator core, you can watch the temperature drop across that orifice to judge whether or not the temperature of the refrigerant going into the evaporator core would be cool enough to perform well inside the cab in terms of cooling off the cab," he continued. "If it's not, you have an idea of where to start diagnosing things and potential places to look right off the bat without even pulling out any other tools yet."

Cabin

Throughout a truck's cab, thermal imaging cameras can be used for a scope of inspection points. Water that infiltrates the cab will evaporate and leave a 'cold spot' that can be detected and often lead technicians to tracing the source of a leak, Bainter said. Seats with heating/cooling systems can be inspected as they are exercised to reveal any failures. Rear window defrosters can be inspected across gridlines when activated, allowing technicians to diagnose and pinpoint any failures.

Furthermore, dashboard switchgear for components with a high current draw, such as accessory driving lights or heated seats, may carry abnormal resistance or shorting; if that is the case, they will heat up and as such, failing switches and/or relays can be spotted through thermal inspection.

Electrical

These devices provide a straightforward way to uncover apparent temperature differences in industrial three-phase electrical circuits compared to their normal operating conditions, Fisher explained. "By inspecting the thermal gradients of all three phases side by side, technicians can quickly spot performance anomalies on individual legs due to unbalance or overloading," he said.

Fisher posed an example of cooling fans under the hood not shutting down; a thermal camera could be used on the cooling fans' relays. If a relay is "glowing red," it means that the relay position is stuck 'open.' This provides a quick inspection of the relays to target further diagnosis and repair.

Technicians can also use thermal imagers to uncover corroded wiring connections or fuses, Bainter pointed out, as such issues cause increased resistance and overheating. "Electrical tape, connectors, or wire loom might conceal these issues to the

» **Instead of opening up an engine, a technician can use a thermal camera to see if there is overheating or if exhaust temperature is too low, which could indicate a combustion issue.**

Photo: Teledyne FLIR

naked eye, but a thermal imager could pinpoint them easily," he explained.

Thomas concurred that the application in chasing high resistance and loads throughout harnesses and connectors is an excellent use case for the technology.

"Anywhere you have high resistance, you start generating heat in wires or connectors," he said. "With thermal imagery, you can see the temperature differential in a bundle of wires around the one that has higher temperature based on the loads running through it. You can trace down circuits and find out where the higher resistance may lie in the circuit."

» **Thermal imagery can provide a 'before and after' to verify completed repairs and ensure components are operating to specification.**

Photo: Teledyne FLIR

Batteries and electric vehicles

Though EVs do not have a combustion engine, heat is still generated throughout the vehicle, and that energy is dispersed in places like the battery pack, motors, and gearboxes, Thomas mentioned—all of which can be detected through thermal imagery. Take motor performance, for example.

"Even though these are brushless motors, many of them will not have a service interval for the bearings that support the heavy rotor," Thomas said. "If they do seize up, you'll lose efficiency and [experience] a lot more heat and power loss. Eventually, you'll have component failure. At that point, the motor will start to almost destroy itself. It may be a good thing to look at components that may be wearing faster than others." Thomas suggested getting under the vehicle after a test drive and using the thermal camera to inspect the motors, gearboxes, and axles for any excessive heat differences.

"That's going to be very important with electric trucks—keeping the battery range," he said. "If you have something that is pulling energy, such as a failed bearing, it is going to reduce mileage and overall range; at the same time, those components can be very expensive. You may want to catch it sooner than later before it decides to destroy itself."

Thomas also offered thermal imaging cameras as an effective, non-invasive testing method for the high-voltage cables that are within the electric vehicle architecture. "You can't really load-test the high-voltage cables with their insulation and the very high voltages," he said. "You will have to resort to other means of testing insulation breakdown. There are industry standard practices for doing that, but when looking for high resistance in any of those cables, thermal imaging would absolutely help and be completely non-invasive."

Any battery packs in series can be inspected through thermal imagery, Fisher said, as a dead pack within a series can easily be detected through temperature differences compared across the bank.

Refrigerated units

Thermal cameras can be used to inspect and diagnose aspects of a reefer trailer. Fisher noted components such as the reefer's air driver system, wires, and connectors can be inspected to trace issues, as well as spotting leaks between panels on the trailer that could be causing a loss of temperature control.

"Go along the seams where they rivet the aluminum panels to a trailer to see if they're properly assembled, or where there's insulation in between, because that would be an exit point for the coolness or the heat to come in," he suggested.

Confirming suspicions

Essentially, most any part, system, or component on a vehicle can be inspected by thermal imaging cameras. Because of the speed of such a tool, it is a great way to initiate the repair process. Did a vehicle roll into the bay with a suspected issue? Did the driver convey any suspicions or concerns with system performance? A thermal imaging camera can quickly be utilized to target such complaints and reveal a visual confirmation of performance inadequacy.

"Automotive maintenance and repair professionals need the right tools available to find and diagnose problems quickly—tools that can keep additional labor costs to a minimum," Fisher emphasized. "With today's complexity of automotive electrical and computer systems, many technicians are relying on high-tech equipment such as thermal imaging cameras and the latest test and measurement tools to ensure they can diagnose and perform the job to get it done quickly and efficiently. Thermal imaging cameras offer a reduction of unnecessary labor costs to locate problems and/or solutions."

Using thermal imaging cameras can point out the issue area immediately, saving time before the task of deeper diagnosis and inspection.

Fisher related the issue of a dead cylinder. If a thermal camera quickly assesses that a single cylinder is cold compared to the rest, the shop already knows the subsequent work to be done. "You know how much it costs to tear down the engine and do the repair," Fisher said. "You can bring this information to the customer and say, 'Look. This is what is wrong with the vehicle. If you want me to go further, it is going to cost this much and take this long.'"

"More than anything, thermal imaging would go a long way toward helping validate customer concerns," Thomas concurred. "Trucks don't come into the shop for no reason; they usually come in with some sort of concern ... Say the customer concern is that the truck is not doing a regen. You can use that technology to actually look at the temperature rise and increase in the aftertreatment system without even doing anything invasive, without even hooking up a service tool."

To read the full story, visit: ***FleetMaintenance.com/21267693***

Photo: 19237114 | Laura Gangi | Dreamstime

Inflation jumps ahead as top economic concern

Worries about the effects of the pandemic on health, education, labor, and the supply chain have been usurped by a new threat: out-of-control inflation.

When last we visited in this space, we said that our outlook for the economy in 2022 and beyond would hinge on the resolution of four factors, all of which start with the letter "S." Those were shots, schools, saloons, and supply.

Shots referred to the public health issues caused by the pandemic. And, as of the middle of 2022, those issues have largely been addressed through the vaccination program, the development of herd immunity, and a better understanding of the disease. While we can't say that the problem has been solved, we can say that it does not present the same obstacles we faced a year ago.

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.

Schools referred to the problems associated with the quarantine and subsequent reopening of the economy. It had to do both with how and when the schools were open and the effects of their not being open on the workforce. Again, we appear to have wrestled this problem to the ground. While the solutions are still evolving, we no longer have to contend with the same degree of impairment we had as recently as the end of 2021.

Saloons referred to the effects of the pandemic on the leisure and entertainment sector of the economy. At the time of the outbreak, the leisure and entertainment sector was the largest category of total payroll employment. This sector also took the heaviest hit and has taken the longest to recover. Indeed, as of April 2022, employment here was still below where it had been in February 2020, with hiring at hotels and restaurants still lagging behind their pre-pandemic levels. What has happened in this sector best embodies the structural changes that have taken place across the economy, affecting the supply of, the demand for, and the price of labor.

The last element was supply—and this was the supply chains. Yes, chains. There is one for goods, which gets all the press because pictures can be taken of the stacked-up containers, and there is one for labor, which is harder to show. Both were severely disrupted, and both are still being restored. And, most importantly, the effects of those disruptions are driving what is now the principal economic problem we face: inflation.

Inflation is defined as a widespread and long-lasting rise in the level of prices. Because prices are the most important signals in a market economy, it is crucial to understand how and why prices are changing so as to be able to understand the signal they are sending.

The most widely used measure of inflation is the year-over-year percent change in the All Items Consumer Price Index (CPI). This statistic, which goes back to 1914, is compiled and published monthly by the U.S. Bureau of Labor Statistics. It is based on a basket of goods and services we all consume and seeks to measure the cost of living. Think of it as the nation's shopping cart. The number it produces is the aggregate inflation rate, which, not surprisingly, will not match our individual inflation rates, because your shopping cart and my shopping cart don't have the same things in them. But your shopping cart and my shopping cart are part of the nation's shopping cart.

The rise in the inflation rate from 0.2% in May 2020 to 8.2% in April 2022 was primarily driven by disruptions to the supply chain for goods. Of special note was the rise in the price of gasoline from $1.87/gallon the week of April 27, 2020, to $4.43/gallon the week of May 9, 2022. That rise reflects both the resumption of driving and the movement of goods following the reopening of the economy together with the rise in the price of crude oil associated with the higher demand for fuel.

What must fleets change to adjust for the rise of prices without sacrificing fleet efficiency?

This process is being repeated across the economy, with higher demand meeting constrained supply. The result is higher prices. The question now is how much longer will this dynamic persist?

The answer will be determined by how quickly we remove the remaining supply constraints, and by how much demand is curtailed by both the higher prices themselves and the actions of the Federal Reserve to slow aggregate economic activity. We expect some unpleasantness to ensue.

For businesses buffeted by the cross currents of inflation, the first priority is to secure the supply chains. For labor, this requires taking steps to retain and, if possible, recruit the people needed to generate the revenues that will sustain the business. For materials and equipment, this requires special attention to the price and availability of the items needed to generate the revenues that will sustain the business.

Weathering the inflation storm requires active responses to the price signals coming from all the markets you are a part of. The main question for fleets is what should be changed to adjust for these higher prices without compromising fleet efficiency?

FLEET PARTS & COMPONENTS

What's new in products for a more efficient fleet operation.

Designed for the 22.5" by 8.25" and 22.5" by 14" wheels

The **Aerodynamic Drive Cover + Wheel** from **Alcoa Wheel Products** is an exclusive cover plus wheel system designed for the 22.5" by 8.25" and 22.5" by 14" wheels, Nos. ULA18x, 84U61x, and 84U64x. The cover's design powers fuel efficiency while weighing less than comparable solutions, the company said. Its design features a unique approach in attachment style. The cover provides a measurement-free installation process. It is also affixed to a ring, which is secured in the flange groove of the wheel (patent-pending flange design), leaving the hub unburdened by heavy brackets and ensuring appropriate mounting consistency and for maximum results. Additionally, the cover features a 9" inspection opening, which allows for a clear view of all wheel-end components, eliminating the need for wheel cover removal during pre-trip, post-trip, road-side inspections, and tire inflation. According to the company, the system saves up to 0.96 gallons of fuel per 1,000 miles.

For more information visit **FleetMaintenance.com/21268227**

For Ford Transit 2007-2020

The **Suspension Ball Joint**, No. BJ87355PR, from **Dorman Products** is designed for Ford Transit vans, model years 2007 through 2020. This innovative OE FIX ball joint replaces the original and allows a -0.5-degree to +1-degree camber adjustment while the ball joint remains installed on the vehicle. The upgraded design restores proper vehicle handling, saves time when alignments are needed, and reduces future service costs and the frequency of tire replacements. The solution is designed to simplify the alignment process, restore proper front-end alignment, and reduce future maintenance costs.

For more information visit **FleetMaintenance.com/21268237**

Four radar sensors detect objects in a driver's blind spot

Mack Trucks announced the **Sensata Technologies PreView Multi-Sensor Collision Warning System** is available for order on the Mack LR, Mack LR Electric, and Mack TerraPro models. Sensata uses four radar sensors—one on the front, one on the rear, and one on each side of the vehicle—to detect objects and vulnerable road users (VRU) that may be located in a driver's blind spot. When a VRU is detected, an audible alert is sounded and the A-pillar lights flash, offering drivers a notification. The PreView radar system is available as an option and is factory-installed on new builds. Customers may also retrofit their trucks with the system by contacting their local Mack dealer. PreView is always on. The system requires no maintenance unless something damages it, or a software upgrade is made available.

For more information visit **FleetMaintenance.com/21268221**

SmartWay-verified drive tire tread

The **Bandag B713 FuelTech** drive tire tread from **Bridgestone Americas** is engineered to increase retread value for fleets. The tread is SmartWay verified and delivers fuel efficiency as well as improved wear life without compromising on traction or reliable performance. Innovations to the Bandag B713 FuelTech design include a proprietary compound that delivers 30% longer wear life and 7% better wear for more miles of low fuel cost performance; 3D siping that features 130% more biting edges for improved traction; and a continuous shoulder design that distributes weight and torque more evenly to fight irregular wear, which can lead to premature tire removal. The Bridgestone Bandag B713 FuelTech tread is available in four different sizes: 210, 220, 230, and 240.

For more information visit **FleetMaintenance.com/21268225**

Provides weight savings and stability

Hendrickson Truck Commercial Vehicle Systems scaled the **SOFTEK** platform to accommodate the Classes 4 and 5 medium-duty electric vehicle segment. SOFTEK, the front steer axle and suspension system featuring Hendrickson's STEERTEK front steer axle, is integrated with the front mechanical spring suspension and lightweight clamp group and provides weight savings and ride quality. In addition to SOFTEK, Hendrickson's Snake Spring technology has been incorporated into the rear suspension system for this platform and delivers additional weight savings and optimized ride and stability characteristics.

For more information visit **FleetMaintenance.com/21267236**

Engineered to withstand extreme heat and carbon buildup

The **Heavy Duty Exhaust Gas Recirculation Valve**, No. 904-5098, from **Dorman Products** is designed to match the fit and function of the original valve on specified vehicles: 2006-03 Cummins ISM, OE Nos. 3101917, 3102317, 3102745, 3103077, 3103361, 3103765, 3103824, 3104230, 3104875, 4921905, 4955421, 4955421RX. Made of quality materials, it is engineered for reliable performance and durability. This valve is designed to withstand extreme heat and carbon buildup and is a reliable replacement for a failed original EGR valve.

For more information visit **FleetMaintenance.com/21268240**

Dual frequency for both 315MHz and 433MHz

The **Alligator Sens.it RS+ Sensor** is applicable for use in 99.98% of all vehicle models, the company said. The Sens.it RS+ Sensor is a customizable, universally compatible, and cloneable option that reduces service time and saves costs on storage and logistics. Dual frequency for both 315MHz and 433MHz, 100% OEM functionality, and a 30% improved battery life over previous sensor designs rounds out the list of benefits. Sens.it RS+ TPMS Sensors are easy to install and program. They replicate full OEM functionality and are compatible with all leading programming tools.

For more information visit **FleetMaintenance.com/21268220**

Includes rear, front, and side view cameras

The **Platform AHD (Analog High Definition) Camera Systems** from **Continental** are designed to enhance the driver's view and improve fleet efficiency with the extended visibility. Continental's AHD Camera Systems feature 2 Mega Pixel cameras with high image clarity and infrared lights for enhanced night vision. The camera line includes rear, front, and side view cameras. The displays work with both CVBS and AHD camera inputs. Video can be stored in a DVR for future driver analysis and training. Offered with 7" and 10.1" AHD displays, the cameras feature IP67 enclosures that are waterproof and dust tight. The systems are available with dual voltage (12V and 24V) and offered in different cable sizes.

For more information visit **FleetMaintenance.com/21268244**

TOOLS & EQUIPMENT

A roundup of the latest tool and equipment offerings.

Solid steel housing and barrel design

The **AIRCAT .401 Shank Super Duty Air Hammer**, No. 5250-A-T, offers solid steel housing and barrel design for added durability. It features a 3" long piston stroke, 3/4" diameter steel piston, 2,500 bpm, and a contoured cushion grip. Multiple front exhaust ports direct exhaust and debris away from the user. The four-position air regulator and variable speed trigger provide ideal user control. Tool measures 9.25" in length, weighs 5.5 lbs., and includes a heavy-duty quick-change safety retainer.

For more information visit **FleetMaintenance.com/21247058**

Features a stabilization bar for faster cuts

The **KNIPEX Tools CutiX Universal Snap Knife**, No. 90 10 165 BKA, features an extendable stabilization bar that keeps the blade from bending for quicker cutting. The stabilization bar can be engaged or retracted based on application and allows the user to apply more pressure directly on the blade. The CutiX also features a hardened steel pin to secure the blade. Constructed with a lightweight magnesium housing, the knife has non-slip gripping surfaces and two separate sliders—one for the blade and one for the stabilization bar. Suitable for all 18mm snap-off blades, the CutiX comes with two blades that have seven cutting points stored in the handle.

For more information visit **FleetMaintenance.com/21247811**

Dual battery bays for double the run-time

The **Durofix 1" Cordless Jumbo Impact Wrench**, No. RI60176, features 3,000 ft.-lb. maximum reverse torque and five stages of pre-set tightening torque: 250, 500, 800, 1,250, and 2,200 ft.-lbs. Utilizing 60V Li-ion battery technology and a brushless motor, the tool is designed to provide power, efficiency, less heat, and less maintenance. The impact wrench has an auto-shutoff for stage one to four and offers dual battery bays to double its run-time. It also has an adjustable side handle and two side LEDs. Available with a 2" or 6" extended anvil.

For more information visit **FleetMaintenance.com/21249595**

Available in three sizes

The **ESCO U-Joint Pullers** are designed to eliminate the use of dangerous, damage-causing vice and socket or hammering methods by providing a safer solution while assisting in the damage prevention of joints, bearing caps, yokes, or driveshafts. Cast out of high-quality, heavy-duty steel, the U-Joint Pullers are manufactured to withstand rigorous daily use. The U-Joint Pullers are available in three sizes: Automotive U-Joint Puller, No. 40302, for automotive applications; Intermediate Medium Duty U-Joint Puller, No. 40301, for Classes 3-5 trucks and equipment; and Heavy Duty U-Joint Puller, No. 40300, for Classes 6-8 trucks and equipment. They're for use on bearing cups with diameters ranging from 1.25" to 1.75".

For more information visit **FleetMaintenance.com/21236731**

Comprehensive database of over 200 vehicle models

The **TOPDON Phoenix Smart Diagnostic Tool** performs online programming and coding and allows users to access other vehicle modifications for Volkswagen, BMW, Porshe, Toyota, and more. It supports five different protocols, provides access to the FCA Secure Gateway, and features topology mapping. Its modular diagnostics and communication interface consists of a rugged, heavy-duty VCI dongle equipped with J2534, DoIP, CanFD, D-PDU, and RP1210 protocols. Its interface also includes step-by-step guided procedures based on code for Volkswagen, Audi, Skoda, and Seat vehicles. The Phoenix Smart provides a comprehensive database of over 200 vehicle models, intelligent diagnoses, and a wide array of maintenance functions.

For more information visit **FleetMaintenance.com/21242490**

Double barrel internal locking system

The **SP Tools USA Diagnostic Cart**, No. SP44550LG, features four drawers, 27" Sceptre curved monitor, and a spacious lower compartment for storage needs and cable access. It measures 34" in length, 24" in width, and 62.25" in height (when closed). It's made from 14.5-gauge steel and has a double barrel internal locking system for extra security as well as SP Cliklok drawer locking system to ensure drawers stay closed. Additionally, the cart includes a wireless Logitech keyboard and mouse, heavy-duty swivel locking casters, and SP Max BBS drawer slides. Available in black, silver, red, and blue.

For more information visit **FleetMaintenance.com/21255605**

Dipped handle for added grip

The **Matco Tools 8-pc Long Reach Pliers Set**, No. LRP8SET, is designed to enhance the ability to reach the job at hand and access cramped, confined areas with an extended 11" reach for each plyer. The pliers feature a dipped handle for added grip and comfort. The set includes long nose; 20-degree, 45-degree, and 90-degree bent nose; duckbill; 1/2" and 3/4" hose grip; and diagonal cutters.

For more information visit **FleetMaintenance.com/21247060**

Offers dual-voltage 120/230V flexibility

The **ESAB EMP 210 MIG/Stick/TIG Welder** is lightweight and offers dual-voltage input power flexibility, offering ideal portability for around the shop. The multi-process MIG/flux cored/stick/lift TIG welding system has a 10-200A output, a stable Lift TIG arc at low amperage for finesse welds, and the power to run stick electrodes up to 5/32", including 7018. Additionally, it features a large easy-to-read LED display with digital controls for fast and accurate operation and can run off a generator with a 10 kVA output.

For more information visit **FleetMaintenance.com/21250494**

High cut resistance without the bulk

The **Brass Knuckle SmartCut Gloves**, No. BKCR4420, offer A4 cut resistance with double-coated protection that combines slip resistance and permeation protection in a dexterous glove. The gloves feature a water-based polyurethane base coat on full fingers and palm, plus a second coat of foam nitrile for added grip security for oils, petrochemicals, fuels, and most acids. The sandy grip finish increases abrasion resistance and cut protection. This layered protection is breathable and flexible, delivering high cut resistance without the bulk. A full knit wrist provides a snug fit and prevents dirt, debris, and cold from getting inside the glove.

For more information visit **FleetMaintenance.com/21251147**

For use on gasket seals such as oil pans, transmission pans, and more

The **Lisle Corporation Gasket Separator**, No. 50210, is for use on any application with a gasket seal such as oil pans, transmission pans, and differential covers. Simply drive the tool between the gasket and then use a hammer from the side to separate the pan from the gasket. The blade is made from hardened carbon steel. Replacement blade, No. 50200, is available (sold separately).

For more information visit **FleetMaintenance.com/21250499**

Universal for light- and heavy-duty diesel engines

The **Mueller-Kueps NOX Sensor Thread Restorer Kit**, No. 506 021, is designed to allow technicians to professionally restore the NOx sensor hole thread without damaging the exhaust system. The kit is universal for light- and heavy-duty diesel engines. It features an alignment guide at the front of the restorer to ensure proper angle and is extra short, enabling it to be used with a socket or ratchet spanner for narrow spaces. The time-saving tool can also be used for the diesel particulate filter as well as any exhaust sensor, even those located in a catalytic converter. Available in sizes M20 by 1.5 and M22 by 1.5.

For more information visit **FleetMaintenance.com/21247056**

Can be used on up to 12 cylinders

The **OTC Digital Compression Tester Kit**, No. 5606-DG, is designed to help determine the mechanical condition of the engine's cylinders. The digital gauge is easy to read and can display pressures in psi, kPA, bar, and kg/c. It also can measure, record, and play back compression readings on up to 12 cylinders for quick testing and diagnosis. Specialized adapters work on both flat and tapered seat plugs. A convenient push-button side release valve relieves pressure for repeat testing. The kit includes standard and specialty adapters and is stored in a blow molded case. Works on gasoline engines, including domestic, import, motorcycle, marine, snowmobile, ATVs, and small engines.

For more information visit **FleetMaintenance.com/21245988**

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ADVERTISER INDEX

Features an LED worklight

The **Marson BT-5 Battery Powered Riveter** from **Howmet Fastening Systems** is designed to deliver reliable performance at a valuable price point. The BT-5 is lightweight and offers an ergonomic grip. It also features an LED worklight and has a stroke length of 0.866". The Marson BT-5 kit includes nose tips for 1/8", 5/32", and 3/16" rivet diameters. An optional nosepiece allows users to install 3/32" rivets as well.

For more information visit **FleetMaintenance.com/21237289**

Stamped with sizing for visibility

Milwaukee Tool has expanded its **Socket Lineup** with the addition of 49 new sizes, bringing their full offering to 191 different sizes and 16 ratchet and socket sets. These sockets are designed to be versatile and feature a Four Flat side design that deters rolling and allows the socket to be used with a wrench. Milwaukee's lineup of sockets now include more sizes in 1/2", 3/8", and 1/4" drives. All sockets are stamped with sizing for better visibility.

For more information visit **FleetMaintenance.com/21244241**

Features EZ-sensor programming

The **ST-1 TPMS Tool** from **Schrader TPMS Solutions** features EZ-sensor programming and an ID-Sync function for matching scanned IDs to vehicle ECU IDs. The tool triggers OE sensors for all cars in North America, Europe, and Asia. It displays all sensor data (pressure, battery, temperature, ID, frequency) and indicates OE sensor and service kit part numbers. In addition, it provides TPMS ECU relearn procedures and retrieves and decodes TPMS DTC information. The TPMS tool has a 2.8" LCD screen, protective rubber sleeve, is Wi-Fi capable, and comes with a quick-connect cable and carrying case.

For more information visit **FleetMaintenance.com/21247062**

Applies additional force to the wheel hub

The **ProMAXX Tommy Rail** is crafted from solid, hard-coated American aluminum and attaches to the outside of the lower push flange, creating a powerful structural link similar to an automotive rear-end four-bar linkage setup. Designed to work with the company's Tommy Wheel Bearing Puller, the tool allows technicians to apply even more force to the wheel hub to make any wheel bearing removal quick and easy on select Ford and Subaru models. The tool is made in the U.S.

For more information visit **FleetMaintenance.com/21249599**


Photo: 133527729 | Auremar | Dreamstime

Troubleshooting tech shortage with area schools

By working with ASE-accredited educational institutions, finding entry-level technicians will be less of a problem.

You need more service technicians. If not today, you will need them soon. Ideally, you would have a process for "growing your own" that ensures a steady supply of new talent for your shop. But you are already very busy taking care of customers, ordering parts, and maintaining trucks. You may not have much time for, or expertise in, running a training organization for entry-level technicians.

The good news is that high schools and colleges in your community have already identified young people interested in careers in the service industry and are providing them with the fundamental technical training they need to get started. Those schools are your potential partners, but you must cultivate the partnership. And like most things in life, the more you put into the relationship, the more you get out of it.

By George Arrants
VICE PRESIDENT FOR ASE EDUCATION FOUNDATION
George Arrants works with instructors and administrators to develop partnerships with local businesses and industries through program advisory committees. He is the past chair of the Technology and Maintenance Council's TMCSuperTech, the National Technician Skills Competition, and TMCFutureTech, the National Student Technician Competition. His entire career has been in the automotive service and education industries.

Which should I target: high schools or colleges?

If your need for technicians is immediate, you might assume that colleges are a better bet than high schools. College students certainly have some advantages: Most will be over 18, have transportation, and be available for part-time work during the school year. But don't overlook the potential in high school students. The best students may continue their studies in a college program or go right into working full time. In either case, they are likely to already be employed when they graduate from high school, so you shouldn't wait.

You might also think that your shop insurance prohibits employees under 18, but this may be a bad assumption. Check with your insurance agent to verify whether minors can be employed under your policy and any restrictions that apply. In addition, many states have regulations to specifically allow 16- and 17-year-old students to work in repair shops when participating in a structured work-based learning program. The most common restriction is that minors may not drive business- or customer-owned vehicles on public roads, which is a good rule to follow in any case. That doesn't prevent them from working on the vehicles.

How do I find schools near me?

Here is the good news: There are over 2,300 ASE-accredited high school and college programs across the U.S., so chances are there are one or more in your area. Visit aseeducationfoundation.org/find-a-program to find one. The list includes a contact name and phone number for each school. If you know of schools close by that are not accredited, we can work with you to help them earn accreditation. That benefits you, the school, and the students.

You are also likely to find that there are more automotive than truck/diesel programs. That is true just about everywhere, but don't let that hold you back. You can still partner with and contribute to the overall success of an automotive training program and recruit those students to come work for you. Much of the knowledge and skills obtained in an automotive program are transferable to the medium- and heavy-duty truck world.

Why is ASE accreditation important?

You know what skills entry-level techs need to work in your business. It is critical that the schools educating your future employees know what those skills are as well. ASE program accreditation ensures that schools have the complete course of study, tools, equipment, facilities, support services, adequate budget, and qualified instructors to deliver instruction aligned with current technology and repair practices defined by the service industry.

Furthermore, every ASE-accredited school is required to have an advisory committee composed of service business owners from the community. If you aren't already a member, joining the committee is the first thing you should do. This committee is the opportunity for you and other local stakeholders to hold the school accountable and ensure that students are learning the skills they will need to work for you.

What does an advisory committee do?

Advisory committees typically meet for one to two hours twice a year. Meetings are held at the school or virtually. The members are local business and industry owners, managers, and technicians, along with educators and administrators from the school. Parents and local elected officials may also be part of the committee. Its purpose is to assist the school administration and the program with guidance and recommendations from an industry or employer perspective on ideas such as equipment purchases, skills needed by local industry, and certifications that students can earn while in school that provide value to employers. Members of the advisory committee also assist the school in obtaining and maintaining ASE accreditation for the training program. If you want to see your tax dollars wisely spent and benefit your company at the same time, this is the place to do it.

What is the overall value of school-industry partnerships?

When a fleet service business supports a local school's training program, it is not only building the future pipeline of talent for its service departments, but it can also grow community awareness for its company, find candidates for a variety of jobs in its company, and build teamwork and morale.

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