



# Fleet Maintenance

All Maintenance, All Vehicle Classes, All Management, All the Time

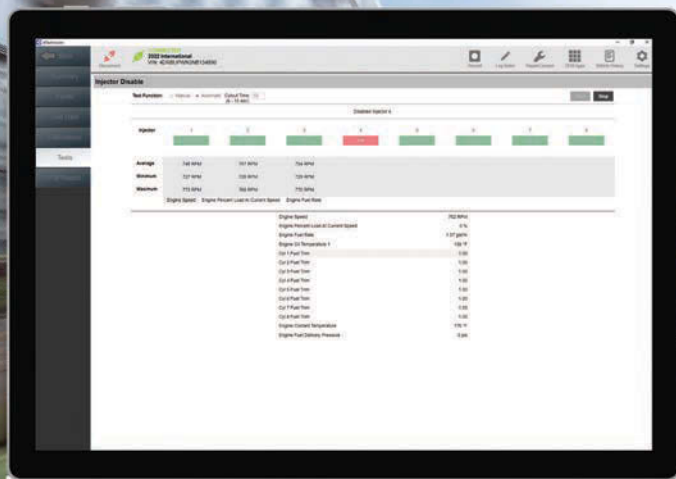
IS AN ALIGNMENT  
**THE ANSWER?**

Page 12

# TECHNICIAN TRAINING IN 3-D

Leveraging technologies such as augmented reality and virtual reality can elevate the capabilities and proficiencies of heavy-duty technicians.

Page 18



eTechnician™

NEXIQ Technologies – The Number 1 Name in Commercial Vehicle Diagnostics

## DIAGNOSTIC COVERAGE FOR PSI ENGINES

The new NEXIQ Technologies PSI Engines Module adds coverage for Last-Mile Delivery vehicles (sometimes called ‘final mile’), IC Bus school buses, and work trucks to its eTechnician™ diagnostic solution. And for technicians tasked with maintaining these types of fleets that’s great news. It’s also good news for eTechnician™ subscribers because eTechnician™ now has a diagnostic solution for just about every type of vehicle in the commercial vehicle market. Coverage includes diagnostic capabilities for vehicles with Power Solutions International® (PSI) engines using the MT88 Engine Control Module (specifically 6.0L and 8.8L engines, as well as 8.8L LPG and 8.8L CNG engines). Broad bi-directional support is augmented with a wide range of programmable parameters, and technicians have the ability to view diagnostic parameters, read faults (active and inactive), and clear inactive faults.

### Here’s a sample of just a few of the special tests for PSI engines:

- Injector Disable
- Reset Learned Data
- TCIS (Trip Information Reset)
- MIL (Malfunction Indicator Light Command)
- O2 Heater
- Fuel Pump Control
- Fuel Open Loop Command
- Fan Control
- Canister Shut-Off Valve (Leak Test)
- Evap Service Bay Diagnostic Tool
- Throttle Position Sensor Min Learn Reset (TPS)
- Main Powertrain Relay Reset
- Block Level Multiplier Learn (BLM)

NEXIQ Technologies has more than 40 years of experience enabling access and diagnosing issues across all makes and models of Class 3 to 8 commercial vehicles.

For a free, no obligation 14-day trial, contact one of our distributors via [nexiq.com/Distributor](http://nexiq.com/Distributor).

**NEXIQ**  
TECHNOLOGIES®

800-639-6774 [nexiq.com](http://nexiq.com)

Disclaimer: Product specifications and data are subject to change without notice to improve functionality, reliability, design, or otherwise. Availability of tests and configurable parameters is dependent on both the vehicle concerned and the module loaded.

©2021 IDSC Holdings LLC. All rights reserved. eTechnician is a trademark of IDSC Holdings LLC. NEXIQ Technologies is a registered trademark of IDSC Holdings LLC. All other marks are trademarks or registered trademarks of their respective holders. Specifications subject to change without notice.

[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)

# PROVEN RELIABILITY AND TOUGHNESS



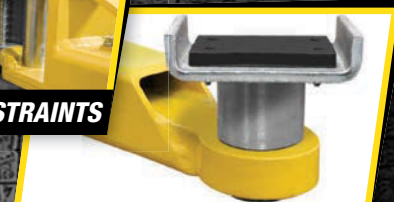
BendPak Model  
**XPR-18CL**  
Two-Post Lift



**SUPER-DUTY TELESCOPING ARMS**



**AUTOMATIC ARM RESTRAINTS**



**FRAME CRADLE PADS**



BendPak Model  
**PCL-18B-6**  
Mobile Lift System



**FULL MOBILITY**



**SIMPLE OPERATION**



**ADJUSTABLE WHEEL FORKS**

As a fleet operator, you face many challenges and dealing with equipment downtime shouldn't be one of them. That's why BendPak lifts are designed and built to be some of the most dependable and safe lifts in the world. Constantly changing work conditions and long hours can be tough on fleet operators, but through smart engineering and unmatched reliability, our lifts will ensure your workforce is always moving at maximum efficiency. Check out the full line of BendPak heavy-duty hydraulic vehicle lifts at [bendpak.com](http://bendpak.com) or call us at **1-800-253-2363**.

1-800-253-2363 • [BENDPAK.COM](http://BENDPAK.COM)

©2021 BendPak Inc. All rights reserved.



[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)

p. **12**

## Equipment

### Is an alignment the answer?

A lot goes into maximizing tire life, including properly performed all-axle alignments at all the right times.

- » Evaluating an alignment provider
- » All-axle alignment checklist
- » Evaluating alignment equipment

p. **18**

## » ON THE COVER

### In The Bay

#### Technician training in 3-D

Leveraging technologies such as augmented reality and virtual reality can elevate the capabilities and proficiencies of technicians.

- » Augmented reality versus virtual reality
- » Considerations for AR and VR adoption

p. **28**

## Shop Operations

### What fleets should know about cybersecurity

Cybercrime has seen a rapid increase, and fleets who do not take precautions are especially vulnerable to these often costly attacks.

## SPOTLIGHT ON...

p. **32**

### Body & Cab

#### Pulsating brake lamps and their impact on fleet equipment

How fleets can benefit from current FMCSA brake light regulation exemptions.

p. **34**

### Under Vehicle

#### The great brake balancing act

Balancing air disc brakes and drum brakes is no easy task, but doing so can pay dividends in optimal safety and efficiency.

## SPECIAL SECTION

p. **38**

### TMC Fall Meeting Preview

#### TMC SuperTech returns for 2021

The national technician skills competition will be held during the council's fall meeting.



AR/VR in class and in the bay

P.18

Photo courtesy of DTNA

## Importance of vehicle alignment

P.12



Photo courtesy of Big Rig Alignment



## Fleets and cyber safety

P.28

## VIEWS FROM THE EXPERTS



### 36 Management

Complex versus complicated maintenance

By Joel Levitt  
SPRINGFIELD RESOURCES



### 37 Training

Technician shortage toolkit

By George Arrants  
ASE EDUCATION FOUNDATION



### 50 Guest Editorial

Evolution of heavy-duty engine oils

By Darryl Purificati  
HOLLYFRONTIER LUBRICANTS

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

→ **On the cover:** Photo courtesy of Wallace State Community College and 30408408 | Saulius | Dreamstime.com

## DEPARTMENTS

### FROM THE EDITORS

#### 8 Uptime

Lessons learned post-pandemic

#### 10 Editor's Note

Technician safety: Priority No. 1

#### 48 Fleet Parts & Components

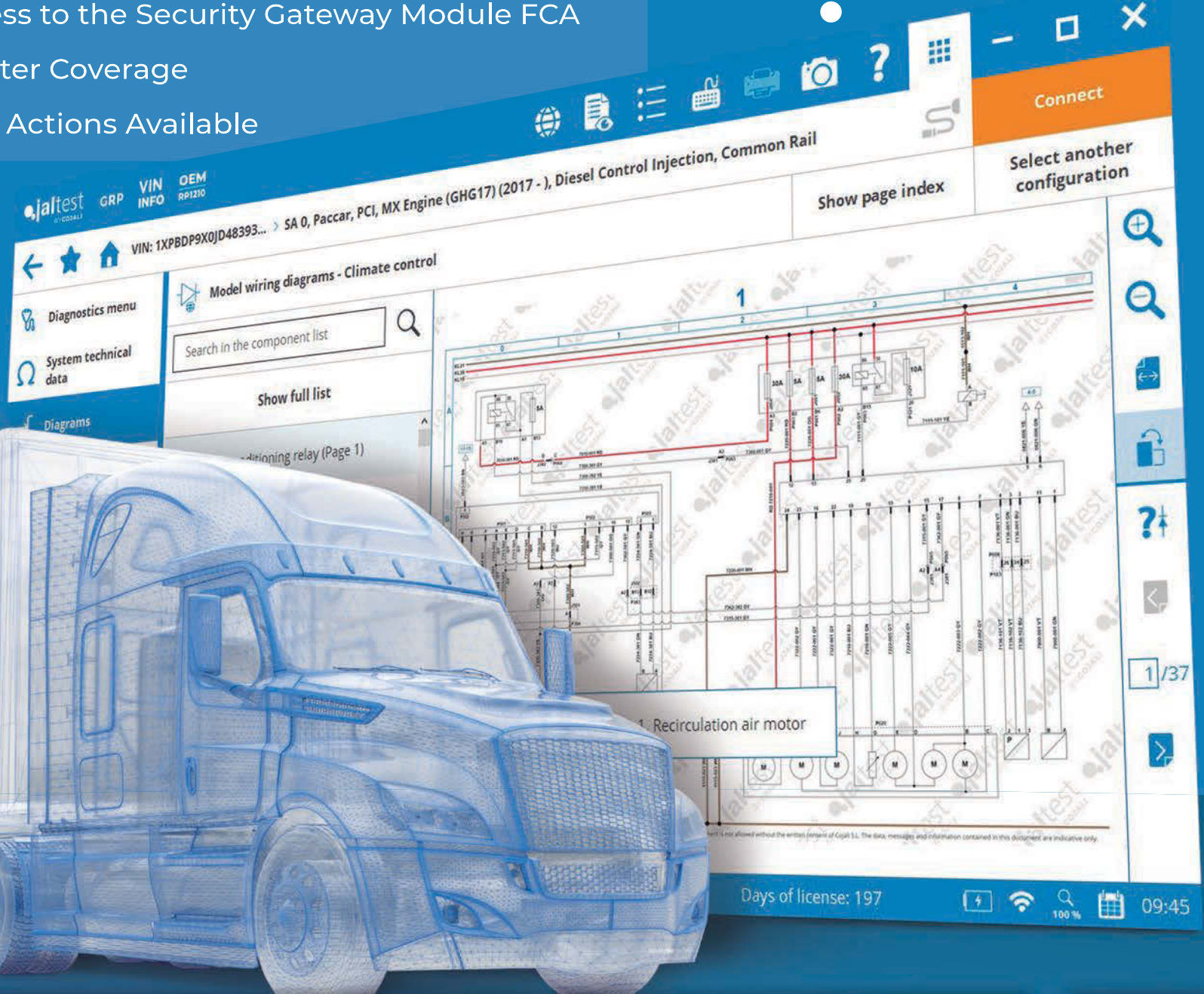
What's new in products for more efficient fleet operation.

#### 49 Tools & Equipment

A roundup of the latest tool and equipment offerings.

#### 49 Classifieds

- ✓ Interactive Wiring Diagrams of all the Truck: both Electric and Mechanical
- ✓ Access to the Security Gateway Module FCA
- ✓ Greater Coverage
- ✓ New Actions Available



## 3 UPDATES THROUGHOUT THE YEAR!



- Dealer Level Features & Support
- Full Access to Technical Info
- Latest Systems & Innovations

Renewing your License is only highly recommended.

# YOUR CALL!

# 800-975-1865

info@cojaliusa.com

## ➔ EXCLUSIVES

Visit the official website of *Fleet Maintenance* for more information from stories in this issue, plus online exclusives on pertinent topics in the fleet maintenance management industry.



## SIGN UP FOR THE FLEET MAINTENANCE NEWSLETTER

Stay up-to-date on industry news and events, new product launches, and more.  
[FleetMaintenance.com/subscribe](http://FleetMaintenance.com/subscribe)



Photo courtesy of Lubrizol

### ARTICLE

#### Modern engine oils unlock formula for success

Engine oils add efficiency to improve fuel economy and, ultimately, total cost of ownership.

[FleetMaintenance.com/21226115](http://FleetMaintenance.com/21226115)

### ARTICLE

#### Calibrating engines to reduce fuel costs, emissions

By adjusting engine performance through a quick firmware installation, Derive's VQ Efficiency is saving fleets on fuel and cutting emissions.

[FleetMaintenance.com/21225320](http://FleetMaintenance.com/21225320)



Photo courtesy of Derive



### READ ANYTIME, ANYWHERE

Read the digital edition online at  
[FleetMaintenance.com/magazine/48563](http://FleetMaintenance.com/magazine/48563)

#### Want your own issue?

There are two simple steps to get a free subscription:

1. Go online to:  
[FleetMaintenance.com/subscribe](http://FleetMaintenance.com/subscribe)
2. Complete the online subscription form. *That's all there is to it.*

### ARTICLE



Photo courtesy of Wallace State Community College

#### Diesel tech school uses VR, money to attract students

Wallace State C.C. uses virtual reality and a 'learn while you earn' approach to attract students to the trade and fill the tech shortage.

[FleetMaintenance.com/21225534](http://FleetMaintenance.com/21225534)

### ARTICLE

#### Two important steps toward electric vehicle adoption

What can fleets be doing today to aid in the research and advancement of zero-emission trucks?

[FleetMaintenance.com/21224391](http://FleetMaintenance.com/21224391)



Join the conversation:  
[Facebook.com/FleetMaintenanceMag](https://www.facebook.com/FleetMaintenanceMag)



Follow us on  
[Twitter.com/fleetMx](https://twitter.com/fleetMx)



Connect with us  
[LinkedIn.com/company/fm-mag](https://www.linkedin.com/company/fm-mag)

### FLEET MAINTENANCE

**EVP Transportation** Reggie Lawrence  
[reggie@fleetmaintenance.com](mailto:reggie@fleetmaintenance.com)

**VP/Market Leader - Commercial Vehicle Group** Michael R. Uliss  
770-516-4704 | [mike@fleetmaintenance.com](mailto:mike@fleetmaintenance.com)

**Editorial Director** Erica Schueller  
[erica@fleetmaintenance.com](mailto:erica@fleetmaintenance.com)

**Editor** David Brierley  
[david@fleetmaintenance.com](mailto:david@fleetmaintenance.com)

**Associate Editor** Tyler Fussner  
[tyler@fleetmaintenance.com](mailto:tyler@fleetmaintenance.com)

**Contributors** James Alfred, Josh Fisher, and Gregg Wartgow

### Fleet Maintenance Multimedia Account Executives

**Multimedia Account Executive - West** Dave Haggett  
847-917-0287 | [dave@fleetmaintenance.com](mailto:dave@fleetmaintenance.com)

**Multimedia Account Executive - Southeast** Peter Lovato  
231-233-2660 | [peter@fleetmaintenance.com](mailto:peter@fleetmaintenance.com)

**Multimedia Account Executive - Northeast** Larry Schlagheck  
248-444-1320 | [larry@fleetmaintenance.com](mailto:larry@fleetmaintenance.com)

### Tool & Equipment Multimedia Account Executives

**Multimedia Account Executive - Midwest** Diane Braden  
920-568-8364 | [diane@fleetmaintenance.com](mailto:diane@fleetmaintenance.com)

**Multimedia Account Executive - West** Mattie Gorman  
920-563-1636 | [mattie@fleetmaintenance.com](mailto:mattie@fleetmaintenance.com)

**Multimedia Account Executive** Kylie Hirko  
920-563-1666 | [kylie@fleetmaintenance.com](mailto:kylie@fleetmaintenance.com)

**Multimedia Account Executive - East** Cortni Jones  
920-568-8391 | [cortni@fleetmaintenance.com](mailto:cortni@fleetmaintenance.com)

**Production Manager** Patricia Brown  
920-568-8317 | [pbrown@endeavorb2b.com](mailto:pbrown@endeavorb2b.com)

**Art Director** Erin Brown

**List Rental Representatives** InfoGroup

**Michael Costantino** 402.836.6266 | [michael.costantino@infogroup.com](mailto:michael.costantino@infogroup.com)  
**Kevin Collopy** 402.836.6265 | [kevin.collopy@infogroup.com](mailto:kevin.collopy@infogroup.com)

**Audience Development Manager** Jaime DeArman

### ENDEAVOR BUSINESS MEDIA, LLC

**CEO** Chris Ferrell

**CRO/CMO** June Griffin

**CFO** William Nurthen

**COO** Patrick Rains

**Chief Administrative and Legal Officer** Tracy Kane

**EVP Key Accounts** Scott Bieda

**EVP Transportation** Reggie Lawrence

**EVP Special Projects** Kristine Russell

### SUBSCRIPTION CUSTOMER SERVICE

877-382-9187; 847-559-7598  
[Circ.fleetmag@omeda.com](mailto:Circ.fleetmag@omeda.com)  
PO Box 3257 • Northbrook IL 60065-3257

### ARTICLE REPRINTS

For reprints and licensing please contact Brett Petillo at Wright's Media  
877-652-5295, ext. 118 or [bpetillo@wrightsmedia.com](mailto:bpetillo@wrightsmedia.com).



*Fleet Maintenance* (USPS 020-239; ISSN 2150-4911print; ISSN 2150-492X) is published 10 times a year in February, March, April, May, June, July, August, September, October, and December by Endeavor Business Media, LLC, 1233 Janesville Avenue, Fort Atkinson, WI 53538. Periodicals postage paid at Fort Atkinson, WI 53538 and additional mailing offices. **POSTMASTER:** Send address changes to *Fleet Maintenance*, PO Box 3257, Northbrook, IL 60065-3257. Canada Post PM40612608. Return undeliverable Canadian addresses to: *Fleet Maintenance*, PO Box 25542, London, ON N6C 6B2.

**Subscriptions:** Individual subscriptions are available without charge in the U.S. to qualified subscribers. Publisher reserves the right to reject non-qualified subscriptions. Subscription prices: U.S. \$48 per year, \$93 two year; Canada/Mexico \$70 per year, \$131 two year; All other countries \$103 per year, \$195 two year. All subscriptions payable in U.S. funds, drawn on U.S. bank. Canadian GST#842773848. Back issue \$10 prepaid, if available. Printed in the USA. Copyright 2021 Endeavor Business Media, LLC.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recordings or any information storage or retrieval system, without permission from the publisher.

Endeavor Business Media, LLC does not assume and hereby disclaims any liability to any person or company for any loss or damage caused by errors or omissions in the material herein, regardless of whether such errors result from negligence, accident or any other cause whatsoever. The views and opinions in the articles herein are not to be taken as official expressions of the publishers, unless so stated. The publishers do not warrant, either expressly or by implication, the factual accuracy of the articles herein, nor do they so warrant any views or opinions offered by the authors of said articles.

# TRIPLE THREAT THAT GETS IN YOUR GRILLE

NEW! MAXISYS MS909CV

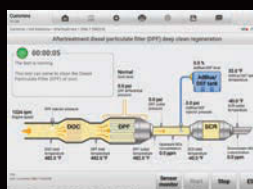


## 3-IN-1 HEAVY DUTY REPAIR



### INTELLIGENT DIAGNOSTICS

- + Covers Over 80 Makes & Models
- + Lightning-Fast All System AutoSCAN
- + Module Topology on Select Vehicles



### ADAS CALIBRATION

- + Complete ADAS Calibration\* for Class 3-5 Vehicles
- + **NEW** Dynamic ADAS Calibration for Class 6-8 Vehicles

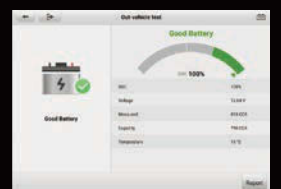


\*Additional Purchases Required



### BATTERY ANALYSIS

- + Generate HD Battery Test & Health Report
- + Current Clamp & Multimeter Included



**MS906CV**  
TRIAGE  
SERVICE



**MS908CV**  
ADVANCED  
DIAGNOSTICS



TEL: 1.855.288.3587 | WEB: AUTEL.COM  
EMAIL: USSUPPORT@AUTEL.COM | AUTEL.COM  
FOLLOW US @AUTELTOOLS   
©2021 Autel U.S. Inc., All Rights Reserved  
[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)



SCAN TO WATCH ▶  
TRAINING  
VIDEOS  
YouTube



**AUTEL**®

# Lessons learned post-pandemic

Takeaways as we progress through the 'after times' of the pandemic.



By Erica Schueller  
Editorial Director



## “The only constant is change.” It’s a phrase

I often repeat to myself and has been a working mantra when it comes to handling unanticipated or unexpected events.

I sometimes cringe when I hear some process or change occurring in the post-pandemic world referred to as “the new normal.” The fact is, we’re constantly operating under new circumstances—and we always have—it’s just that the solutions developed to address a set of challenges had been accelerated due to a significant event that happened to all of us at the same time. Collectively then, we could all relate to our “old normal” morphing into something different.

## All about balance

Over the last year-and-a-half, it’s been a whirlwind of change. There have been changes to our group and our brand with an organizational restructure in February 2020 to form the Endeavor Commercial Vehicle Group. While managing those changes, we were all figuring out how to operate during a global pandemic—adjusting schedules, plans, and processes both personally and professionally.

This meant creating a patchwork of working hours while balancing out family needs. Canceling flights, rescheduling meetings remotely, and figuring out how to get a five-year-old through kindergarten using group video chats and connecting remotely with teachers were all new challenges.

I, like my son and so many others, am over Zoom. Video conferencing fatigue is real. However, it played a very necessary role at the height of the pandemic when we were unable to connect in person.

Thankfully, kindergarten graduation was in person, and now it’s official that I’ll see many of you in person again soon too.

I’ve booked my first flight since February of 2020. How fitting that this one is for the American Trucking Associations’ Technology & Maintenance (TMC) fall meeting and exhibition, considering my last attended event before the pandemic was the TMC 2020 spring meeting and exhibition.

Like many, I will be rusty at this whole travel thing. Now, I risk overpacking (carrying on for a five-day trip used to be a piece of cake; now I don’t know what to bring) and mis-timing airport arrivals and departures (I could usually arrive at the gate consistently within 10 minutes of boarding, coffee in hand.).

Live events will be a welcome change when it comes to educational sessions and product announcements. Meeting in person allows us to see and touch new products on the show floor, ask questions of product managers, make



» Live events will be a welcome change post-pandemic. But it’s all about finding balance.

113664734 | Anyaberkut | Dreamstime.com

## Like many, I will be rusty at this whole travel thing.

connections for future stories and content. That happens more organically face-to-face, and through making more meaningful connections with industry experts and colleagues.

But just like the overwhelming feeling of being on the road three out of four weeks in a month, it’s truly about balance. Now that I’ve experienced both ends of the spectrum, I’m looking forward to having the ability to optimize my schedule with a mix of both remote and in-person events.

There is no doubt that coming out on the other side of this pandemic has fundamentally changed our approach to conducting business.

When it comes to remote conferences, meetings, and training, it’s important to recognize the tools, products, and technology developed to make those connections happen more seamlessly. Companies have worked to foster greater engagement through new technologies like virtual reality and augmented reality. The ability to connect with someone remotely when and where it makes sense can help to further optimize employee training. It saves time and money to not take technicians away from the bays longer than they need to be.

Read more about how VR and AR technologies are helping to further improve and optimize the technician training experience on page 18.

## More data, greater responsibility

With all of the technological advancements, digitization, and remote communication comes one more sticking point that has been further highlighted—the need for more comprehensive cybersecurity efforts to mitigate data breaches and the risk of hackers holding information for ransom.

This has become an increasing concern with the move to many employees working remotely, which can increasingly compromise data security. But even for those who work on location or in an office setting, fleets must ensure employees are trained to keep information secure and to have a playbook in the event there is a data breach.

Check out page 28 for more on how to better prepare your fleet to help reduce the chances of a cybercrime occurring in your business, and what you can do to better plan in the event of a cyberattack on your operations.

As things continually change, it’s worthwhile to reflect on how things once were, and how they are now; but also to acknowledge that things will inevitably be different in the future. The first step is acknowledging that change is inevitable. The next is being prepared to handle that change.

As we all make our way out of our collective shells, eyes blinking into the sun, I look forward to reconnecting with industry colleagues and meeting some of you for the first time. I am excited to catch up with each and every one of you during an upcoming in-person event. See you soon. ■



# YES! WE MADE IT

## AUTOMOTIVE & HEAVY-DUTY DIAGNOSTIC TOOL

**TRUCK  
COVERAGE**

CUMMINS DETROIT FREIGHTLINER FUSO HINO INTERNAIONAL ISUZU KW  
PETERBILT STERLING VOLVO...



All Systems Diagnosis



Bi-directional Control



10.1" Touch Screen



2.0GHz Quad-core



Android™ 9.0

**SECURITY GATEWAY ACCESS By FCA** | **CODE ASSIST By IDENTIFIX**  
• AUTOMOTIVE ONLY •

# Technician safety: Priority No. 1

The bottom line is important to every fleet, but the most important assets in the maintenance bay are the people.



By David Brierley  
Editor



@DavidBrierleyFM



## Keeping equipment properly maintained

to maximize uptime is one of a fleet's top priorities, but another priority should be kept even higher: keeping the staff safe. After all, vehicles are not a fleet's most important asset—its people are.

In the maintenance bay, the people are the technicians who keep the trucks on the road as much as possible. Taking steps to keep them safe on the job is the maintenance department's top priority.

Keeping technicians safe is important for obvious reasons, but it has some less apparent positive results as well. Staff members who feel safe are more likely to remain with the fleet, which is more important than ever considering the current technician shortage. It also helps maintain the fleet's uptime: an injured employee may require time away from work to recover, for example, meaning less available staff to keep vehicles up and running.

Holding regular safety meetings, keeping a clean and well-organized shop, and providing high-quality safety gear are a few ways fleets can keep maintenance staff safe.

## Safety training

It is imperative for fleets to hold regular safety meetings with technicians to keep them up to date with the latest safety codes and procedures. Holding regular refresher courses helps ensure everyone knows how to stay safe, how to keep the shop in safe condition, and what to do in case of an emergency.

Showing employees the location of critical safety gear is also important, especially for new hires who may not know their way around the shop yet.

## Shop conditions

Another factor important to technician safety is the condition of the workspace. Employees should be trained to keep their work areas neat and to put tools and other items back where they belong after use. They should avoid cluttering their areas with tools, cords, air hoses, and other potential trip hazards. A well-organized shop is a safe shop.

There should also be a plan in place to keep the shop clean. Sweeping dirt and debris from the floors and cleaning tools and equipment are steps that should be taken on a regular



» Mobile maintenance staff should have lighted and reflective vests for proper visibility during roadside service.

Photo courtesy of Coast Products



» Safety gear should be certified by ANSI. This is especially important for gear such as safety glasses, hard hats, and protective gloves to ensure they are manufactured to high enough standards to protect technicians from cuts, abrasions, and impacts.

Photo courtesy of Coast Products

basis to make sure the shop is a safe place to work. Any fluid spills should be cleaned up immediately to avoid slips and falls.

Adequate lighting is another consideration that directly impacts technician safety. Providing proper lighting in the bay allows technicians to work more effectively, but also allows them to see potential hazards that may be hidden in a poorly lit space.

## Safety gear

It may seem obvious, but safety gear needs to provide safety to those using it. While most safety gear performs this function well, cutting corners and purchasing discount gear from unverified sources could put technicians at risk of an injury.

**Holding regular safety meetings, keeping a clean and well-organized shop, and providing high quality safety gear are ways to keep maintenance staff safe.**

When selecting safety gear, be sure that each protective item is certified by the American National Standards Institute (ANSI). This is especially important for gear such as safety glasses, hard hats, and protective gloves to ensure they are manufactured to high enough standards to protect technicians from cuts, abrasions, and impacts.

Having the proper safety gear for the task at hand is another consideration fleets need to take. For example, mobile maintenance staff should have lighted and reflective vests for proper visibility during roadside service. Likewise, technicians working on electric vehicles will need properly insulated tools as well as gloves to mitigate risk of shock from high voltage systems.

Providing proper protective gear is one thing, but making sure technicians use it is another entirely. Ensuring the safety gear in your shop is comfortable encourages technicians to keep it on all day. This may mean spending a bit more rather than purchasing the least expensive gear, but it is worth it to keep your employees safe.

Keeping maintenance staff safe is more important than ever, and not just for a fleet's bottom line. It can also help attract and retain talented technicians and—most importantly—it is the right thing to do. ■

# CV TECH

 Commercial Vehicle  
TECHNOLOGY CONFERENCE

Available for a limited time

## MISSED THE LIVE EVENT? WATCH ON DEMAND.

[FleetMaintenance.com/cv-tech-registration](https://FleetMaintenance.com/cv-tech-registration)

Technology Driving the Trucking Industry:  
CV Tech brought together trucking industry professionals to explore how current and future technologies are impacting equipment and maximizing productivity.

### Topics:

- Regulatory impact on new vehicle technology adoption
- North American Fleet Research on Commercial Electric Vehicles
- Considerations with electric truck adoption
- Latest diesel engine advancements
- Smart trailer technologies
- Optimizing fleet performance, efficiency and safety through telematics
- Predictive maintenance and remote diagnostics
- Interoperability and data integration

View the full list of topics available for viewing at [Endeavor.swoogo.com/cvg-tech/agenda](https://Endeavor.swoogo.com/cvg-tech/agenda)



Marquee Sponsor:



Sponsors:



Brought to you by:

**FleetOwner** **FleetMaintenance** **AMERICAN TRUCKER** **TRAILER BODY BUILDERS** **BULKTRANSPORTER** **RefrigeratedTransporter**

# Is an alignment the answer?

A lot goes into maximizing tire life, including properly performed all-axle alignments at all the right times.

By Gregg Wartgow

[ CHASSIS, BODY & CAB ]



» It's helpful to have a dedicated technician who's responsible for alignments. That person can become well-trained and highly proficient, which are key ingredients to achieving the accuracy and consistency a fleet needs.

Photo courtesy of Hunter Engineering

Fleets spend a lot of time and money trying to get more life out of their tires. But according to John Ashal, president of Big Rig Alignment Co., many fleets are missing the one essential ingredient in a holistic tire management program: alignments.

“A high-performing tire is not only properly mounted and inflated, but also properly balanced,” Ashal explained. “Furthermore, a high-performing tire must be centered on the hub of a mechanically sound, properly aligned vehicle.” Big Rig Alignment specializes in OEM factory alignment programs.

It's not just tire wear that fleets should be concerned about.

“Wheel alignment affects a multitude of vehicle characteristics,” said Doug Felt, technical training manager for Hunter Engineering, a manufacturer of heavy-duty vehicle alignment equipment, wheel service equipment, and other products. In addition to premature tire wear, Felt points to:

- Fuel economy
- Directional stability
- Braking performance
- Cornering
- Steering effort
- Ride quality

While some of those characteristics impact the bottom line, some also affect the driver.

“Constantly fighting the vehicle's tendency to leave the intended path will fatigue a driver quickly,” Felt pointed out. “Poor ride quality makes for an uncomfortable trip.”

Don't forget about safety, which is compromised when braking performance is less than intended and/or the vehicle is constantly moving to the left or right of the intended path.

## “An improperly aligned vehicle is placing additional stress on suspension and steering components.”

Doug Felt, technical training manager, Hunter Engineering

Regular alignment checks can help keep Compliance, Safety, Accountability (CSA) scores lower by reducing a fleet's exposure to out-of-service violations and associated vehicle downtime.

“Infractions relating to tires, wheels, suspensions, steering mechanisms, frames, and driveline components can often be avoided by identifying problems during alignment checks,” said Chris Schutt, technical training specialist for Bee Line Co., a manufacturer of computer laser wheel alignment, tire balancing, and frame correction equipment.

“An improperly aligned vehicle is placing additional stress on suspension and steering components,” Felt added. “Premature failure of kingpins, wheel bearings, and tie rod ends is common.”

As noted, there are numerous reasons why a fleet should take alignments seriously. The reason why many don't, however, is because an alignment sometimes isn't the solution. Alignments must be performed correctly at the right times.

“As we go out and look at tires in the field, only 50% of the irregular wear on steer axle tires is due to an alignment problem,” said Mike Beckett, president of MD Alignment Services, a provider of alignment equipment, training, and consulting services. “That means half of the steer axle problems are the result of other causes. On drive and trailer tires, less than 10% of the tire wear problems result from misalignment. If a fleet is just sending trucks in to get alignments to fix all of their tire problems, the odds are that they won't be happy.”

## Warning signs of a bad alignment

Beckett has personally been performing heavy-duty alignments for roughly 50 years. He said there are a handful of common causes of irregular tire wear that are not alignment related. “The ability to identify the tire-wear pattern before taking any corrective action is the most important part of the diagnostic,” Beckett said.

Technology & Maintenance Council (TMC) Recommended Practice (RP) 642 has a section on tire wear identification. The RP explains how wear patterns such as cupping and diagonal wear are indications of a non-alignment problem. Possible signs of an alignment issue are rapid shoulder wear and one-sided wear. The biggest indicator is feathering.

“Feathering occurs when you slide a tire sideways,” Beckett explained. “That's why feathered wear always indicates an alignment problem, whether there's feathering on one front tire or both of them. Drivers and technicians should regularly check for feathered wear.”

TMC RP 642 explains that if the steer tires have feathered wear in opposite directions, the problem is likely a toe condition that could be remedied per the guidelines in TMC RP 219. However, if the feathered wear goes in the same direction on both steer tires, there is a definite alignment issue to correct. Or, if one steer tire shows normal wear but the other is feathered, it could be a combination of toe issue and misalignment. Beckett's advice is very simple: “If you feel feathered wear at all, get an alignment done.”

“A simple, quick check for feathering can be done during the pre-trip inspection,” Big Rig Equipment's Ashal added. “The driver can run their hand across the steer tires. If it feels smooth in one direction but rough in the other direction, there is some feathering going on. There's also a good chance that some rubber has worn off. The vehicle is also starting to pull a little, typically to the right. An experienced driver is going to notice that right away and should let the fleet manager know.”

Hunter Engineering's Felt says technicians can also help keep an eye out for feathered wear. Additionally, there are some other signs of improper wheel alignment to look for.



» The MD Alignment QCT system reportedly allows a technician to conduct a 10-minute alignment check on any truck. It consists of two hard-metal laser bar instruments and two high-readability laser targets. Rather than rely on expensive computers, this alignment system relies on analog targets and a technician's eyesight.

Photo courtesy of MD Alignment Services

## Evaluating an alignment provider

If a fleet decides that it would rather outsource its vehicle alignment services, Technology & Maintenance Council (TMC) Recommended Practice (RP) 642 has some advice on choosing a good alignment partner.

- **Ask the alignment provider specific questions.** This will help expose any “holes” in their alignment service itself and/or their level of expertise. For example, ask for data showing how they maximize tire tread life. Ask if their alignment service includes the rear axles.
- **Ask the alignment provider for references.** Michael Beckett of MD Alignment Services couldn't agree more. “Talk to other fleets and find out what they think,” he suggested.
- **Ask questions to help authenticate the alignment provider's credentials.** Ask if their shop is certified by an alignment equipment supplier or association. Are the individual technicians certified? Do the technicians have the proper commercial driver's licenses so that they can test drive a vehicle after performing the alignment? Does the shop keep a calibration log you can view so you can get an idea as to how precise and repeatable their alignments are?
- **Other alignment-related services.** Can the shop also do steering wheel centering, tire rotations, vibration analysis, wheel balancing, truing, and suspension and spring services? All of these services go hand in hand with alignment as part of a holistic tire management program.

“Technicians should inspect all tires for signs of excessive camber wear, which occurs gradually,” Felt recommended. “Front wheels are more likely to have excessive camber angles. Excessive camber causes more load to be placed on the shoulder of the tire, causing the shoulder to get hotter. The result is a smooth wear pattern near the shoulder of the tire.”

## Setting up an in-house alignment program

If a fleet decides to bring its alignment services in-house, Ashal said there has to be a strong commitment and even stronger accountability.

“A fleet shouldn’t just buy an alignment machine and stick it in the corner of the shop,” he said. “A

fleet also shouldn’t treat alignments like a lube service where anybody does it if they have some free time. It’s helpful to have a dedicated technician who’s responsible for alignments. This person should be well-trained. Then he or she will become an expert and also develop a good routine that helps with quality and consistency.”

Investing in the right alignment equipment is equally important. There are numerous options out there ranging from around \$1,000 to literally tens of thousands of dollars. When choosing the best option for its shop, a fleet needs to keep a few things in mind: usability, accuracy, and return on investment (ROI).

According to Ashal, very few alignment machines are truly repeatable. That is why he advises a fleet to ask an equipment provider for independent testing numbers before deciding on a purchase. “At the very least, the equipment manufacturer should be willing to demonstrate the repeatability of their equipment,” Ashal added.

Once a piece of alignment equipment is in the shop, a technician needs to make sure it is calibrated on a regular schedule to ensure precision.

MD Alignment’s Beckett said the frequency of calibration will vary slightly from one piece of alignment equipment to the next, as well as how often the machine is being used. That said, the tests Beckett helped conduct as part of the TMC Task Force on alignment equipment found that the typical computerized alignment machine needs to be calibrated roughly every 20 cycles.

“If the alignment equipment is off every time you check it at 20 cycles, you better start checking it more frequently,” Beckett said. “You may also have to find out if something is wrong with your machine that is causing it to drop out of calibration.”

Speaking of calibrations, Bee Line’s Technical Training Specialist, Chris Schutt, said fleets should look for alignment equipment that is user-friendly and easy for technicians to calibrate themselves. “If you have an alignment unit in your shop that can’t be self-calibrated, you’re going to experience downtime while you wait for service,” Schutt pointed out.

# HIGH PRIDE OF OWNERSHIP

# STARTS WITH LOW COST OF OWNERSHIP



PRO Series™ LHS



PRO Series™ LHD



PRO Series™ LHT

The Cooper® PRO Series™ is a SmartWay verified, on-highway, long-haul line-up that delivers savings to your fleet through competitive pricing, innovative rubber compounds which balance rolling resistance and long mileage, and a highly engineered casing designed for multiple retreads. Combined with low cost of ownership and a superior warranty, Cooper® PRO Series™ tires are sure to meet your bottom line expectations. See the full line at [CooperTruckTires.com](http://CooperTruckTires.com)



**FLEET SOLUTIONS™**  
National Account Program



**COMMERCIAL SERIES**  
**PRO WORK SEVERE**

[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)

## Best practices for heavy-duty alignments

Sometimes calibration isn't the problem. Sometimes a technician isn't following proper alignment procedures.

"That is operator error, and we typically find that it is due to inadequate training," Beckett pointed out, adding that a technician who can perform brake jobs needs about a day's worth of good alignment training.

Another possible cause of improper alignment is the fact that the technician is using factory specifications. The problem with that, Beckett explained, is those factory specs are based on getting a truck through the assembly line in a certain amount of time. In a real-life setting, however, a fleet needs a much tighter tolerance when it puts the truck out on the road.

"Over the years, we have created a 'performance' spec," Beckett said. "Our numbers are always within the factory build spec but are nowhere near as broad."

## All-axle alignment checklist

TMC RP 642 includes an all-axle alignment checklist for technicians to follow:

- Check tire inflation pressure
- Road test vehicle to determine vehicle-handling dynamics
- Check steering, suspension, and frame components, as well as axles
- Check brake drum centering
- Check wheel bearing endplay
- Check wheel/tire runout
- Check tire mounting
- Inspect tires for irregular or unusually fast wear
- Check vehicle ride height
- Check steer axle spindle height
- Position vehicle in the shop's alignment area by driving straight ahead with minimal use of brake and throttle
- Make sure the alignment area is flat and level, or at least where a known value can be compensated for
- Measure and record alignment parameters
- Road test vehicle

Fleets should also think about how much an alignment might change during a vehicle's initial delivery from the factory to the fleet.

"We've found that up to 50% of vehicles see a significant change in alignment," Beckett said. That's why an initial alignment check is important once the fleet takes delivery of a new vehicle. Then, another check is often necessary within the first 30

days of operation because the vehicle's parts are settling in. This is where drivers and technicians can monitor for feathered wear on the steer tires.

"We like to check trucks again at 60 days, only now there is a considerably lower probability that a truck needs adjusting," Beckett said. "By the time we do a 90-day check, almost all have quit changing."



**Isuzu N-Series gas and diesel trucks have GVWRs from 12,000 to 19,500 lbs. and body lengths from 10 to 20 feet. Visit your local Isuzu dealer to learn how Isuzu trucks can drive your business, any business, whatever it may be.**

Vehicles are assembled from component parts manufactured by Isuzu Motors Limited and by independent suppliers who manufacture such components to Isuzu's exacting standards for quality, performance and safety. Please see your authorized Isuzu dealer for additional details.  
© 2021 ISUZU COMMERCIAL TRUCK OF AMERICA, INC.

# ISUZU

FleetMaintenance.com/Inquire

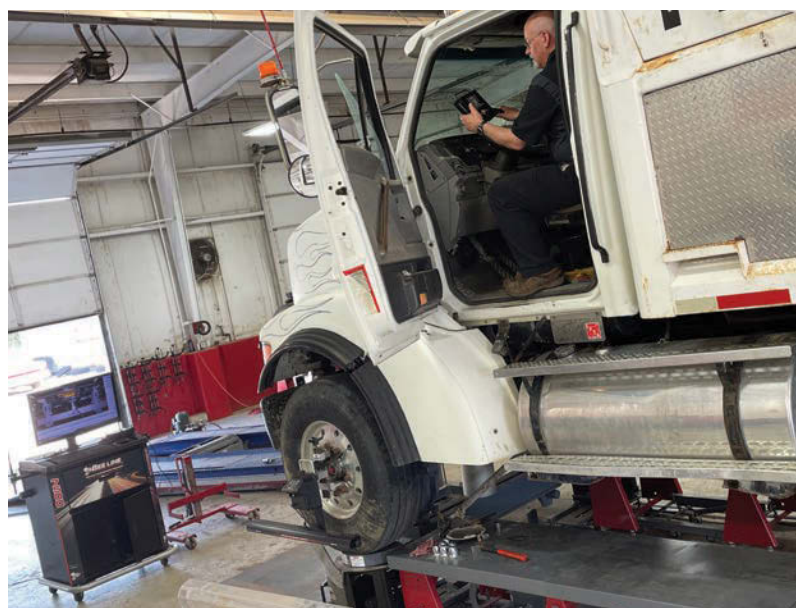
# Evaluating alignment equipment

Accuracy, repeatability, and longevity are important considerations when selecting alignment equipment.

Chris Schutt, technical training specialist for Bee Line Co., said accuracy, repeatability, and longevity are important considerations when selecting a piece of alignment equipment. Service cost is also key. "You don't want a piece of alignment equipment that requires expensive or inconvenient software updates, expensive replacement components, and other after-the-sale costs," Schutt said.

Doug Felt, technical training manager for Hunter Engineering, said wheel alignment machines are available in various forms. Each style has its own set of pros and cons.

**Mechanical** equipment represents the oldest and simplest of the designs. In many cases, this equipment is also the least expensive. One downside is that this equipment can be user-intensive. "The technician makes a multitude of decisions on equipment setup which makes it challenging to have repetitive



» **Regardless of how much it costs, alignment equipment must be accurate, easy to use, and help the fleet show a positive ROI over a desired period of time.**

Photo courtesy of Bee Line Co.

results," Felt said. "Furthermore, measurements may be interpreted differently between users. Also, front wheels are not referenced to the rear wheels in most cases."

**Mechanical/digital** systems typically measure rear wheels mechanically and front wheels digitally. "One benefit is that digital measurements mean finer measurements and no need for interpretation," Felt pointed out. This equipment is also slightly less user-intensive. On the down-

side, the technician still must make a multitude of decisions on equipment setup for rear wheels. Thus, rear wheel measurements may be interpreted differently between users, and front wheels are not referenced to the rear wheels in most cases.

**Fully digital** systems are offered as either a four- or six-sensor set. Since all wheels are measured digitally, measurements are finer with no need for interpretation. Setup is easier and operation is more efficient. "Six-sensor sets can measure a steer axle and two drive axles simultaneously," Felt pointed out. "This is great for a quick alignment check of two- or three-axle vehicles. This equipment is also great for diagnosing

**“One benefit is that digital measurements mean finer measurements and no need for interpretation.”**

Doug Felt, technical training manager, Hunter Engineering

alignment-related pulls caused by tandem scrub. This equipment does require a greater initial investment."

**Quick check commercial** systems allow someone to drive a vehicle between the digital pedestals to measure all direct tire wear angles. Felt said this setup can allow for the measuring of a three-axle truck and two-axle trailer in 15 seconds, providing instant results with no need for a technician. "The fleet does need to dedicate space in its shop for this setup," Felt added.

**Floor alignments.** Felt said performing wheel alignments on a flat floor has advantages and disadvantages. On the plus side, aligning on the floor is convenient with no need for additional investment. A shop has additional length when needed so it can service longer vehicles. A trailer can also be measured while attached to the tractor. On the downside, access to alignment adjustments is reduced. "Additional labor time is needed in some cases to remove cross tube when front total toe cannot be adjusted due to binding," Felt explained.

**Pit alignments** also have pros and cons. Felt said one advantage is that a pit allows easier access to front-toe adjustment and rear-axle adjustments when the pit is of a T-configuration. Adjustment time is also typically reduced, and fleets have that extra length when needed. Disadvantages include the initial cost of pit installation. "In some instances, a pit is simply not an option for some shop locations due to environment," Felt added.

**Alignment lifts** also allow easier access to front-toe adjustment and rear-axle adjustments. Initial cost could be of concern for some fleets. "The length of the alignment lift runways determines the size of vehicles a shop can service," Felt added.

**HUTCHENS ORIGINAL PART:  
BUILT TOUGH AND READY TO WORK**



**GENUINE HUTCH REPLACEMENT:  
SAME AS THE OEM AND A PERFECT FIT**

**GENUINE HUTCH  
REPLACEMENT PARTS**

When you replace an original Hutchens part with a Genuine Hutch replacement, it's like getting another original. Because Hutchens originals and Genuine Hutch replacements are identical. In material, design, and performance.

A comforting thought, especially when the part has to be as reliable and durable as this rocker. With over 70 years of engineering, quality control and customer service behind every Genuine Hutch part, they're built to perform.

If you want to keep your trailers on the road, in service and out of the shop: Always look for the Hutch mark. All Genuine Hutch parts are backed by a 5 Year warranty.



**Hutchens Industries**  
The Difference is Durability. The Quality is Hutchens.

215 N. Patterson Ave. | Springfield, MO 65802-2206



**Always Ready to  
Take Your Call  
(800) 654-8824**

[www.GenuineHutch.com](http://www.GenuineHutch.com)



[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)



That is why TMC RP 642 recommends checking alignment after an initial break-in period of 15,000 to 30,000 miles, or no more than 90 days. Technicians are advised to inspect tire/wheel assemblies for tire wear. An all-axle alignment is also recommended after this break-in period. Then, an all-axle alignment is recommended every 80,000 to 100,000 miles, or 12 to 18 months.

Bee Line's Schutt said fleets should design preventive maintenance (PM) programs and schedule PM intervals based on vehicle types, the environments they work in, and their duty cycle.

According to Schutt, light-duty and in-town commercial vehicles should have an alignment performed about every six months. This includes vehicles engaged in last-mile delivery. At the other end of the spectrum, heavy-duty long-haul vehicles should be scheduled for alignment service at least once every year.

Vocational vehicles create a different scenario. Schutt said alignment needs vary depending on the terrain and duty cycle intensity. "A good rule of thumb is that the more demanding the operating environment, the more often an alignment should be performed," he noted.

Hunter Engineering's Felt said it's important to examine the factors that may cause wheel alignment to change.

**Road conditions.** Highway surfaces are relatively easy on heavy-duty vehicles since they are relatively smooth with no sharp turns. On the other hand, two-lane black-top roads may be less smooth and require more turning on the front wheels. Then, city roads present a mixed bag of surface types, sharp turns, and defects. Gravel roads are inherently hard on suspension and steering components.

**Ride height (spring height) changes.** A vehicle carrying heavy loads will have ride height changes before a vehicle carrying light loads. Those changes may occur rapidly if a vehicle is loaded to capacity.

**Road defects.** Potholes, bumps, and dips often stress the suspension and steering components, causing alignment angles to change.

"Vehicles used in harsh conditions will require

frequent wheel alignments," Felt said. "Vehicles driven primarily on highways may need wheel alignment once or twice a year. The best advice is to have the wheel alignment checked often because one never knows when changes to suspension and steering components occur."

Alignment services can either help fleets save money on tires or simply become another operat-

ing expense. It all depends on whether an alignment is needed, and whether the fleet is willing to commit to accuracy. When all of those factors are in alignment, bringing alignment services in-house can be a really wise investment. ■

For related content, visit:

[FleetMaintenance.com/equipment](https://www.fleetmaintenance.com/equipment)



# THE POWER

TO MOVE THE LOADS YOU NEED TO MOVE.

**FREEDOM ON THE OPEN ROAD, OFF ROAD AND EVERYWHERE IN BETWEEN.**

The complete line of Freedom Heavy-Duty batteries is designed and built to deliver the power your fleet needs to get work done. Freedom commercial batteries are engineered and tested for extended life and consistent, superior performance.

Built by Clarios, a world leader in battery technology.

VISIT [FREEDOM-BATTERIES.COM](https://www.freedom-batteries.com) TO VIEW OUR COMPLETE LINE OF HEAVY DUTY, AUTOMOTIVE AND SPECIALTY BATTERIES.



**FREEDOM** BATTERY | BUILT TO GIVE YOU THE FREEDOM TO MOVE

[FleetMaintenance.com/Inquire](https://www.fleetmaintenance.com/Inquire)

# TECHNICIAN IN 3-D

Leveraging technologies such as augmented reality and virtual reality can elevate the capabilities and proficiencies of heavy-duty technicians.

By Tyler Fussner and Josh Fisher

## [ EMPLOYEES & TRAINING ]

**K**eeping up with modern truck maintenance is a towering task. As trucks become more high-tech, it can be difficult for seasoned technicians to keep up, and even more difficult for novices to know where to start.

Augmented reality (AR) and virtual reality (VR) technologies are changing not only how technicians are trained, but also how they work. These mind-bending technologies are being deployed through various hardware and software solutions across multiple areas of the industry—from young students being introduced to what the commercial vehicle maintenance industry has to offer to real-time virtual collaboration during repair.

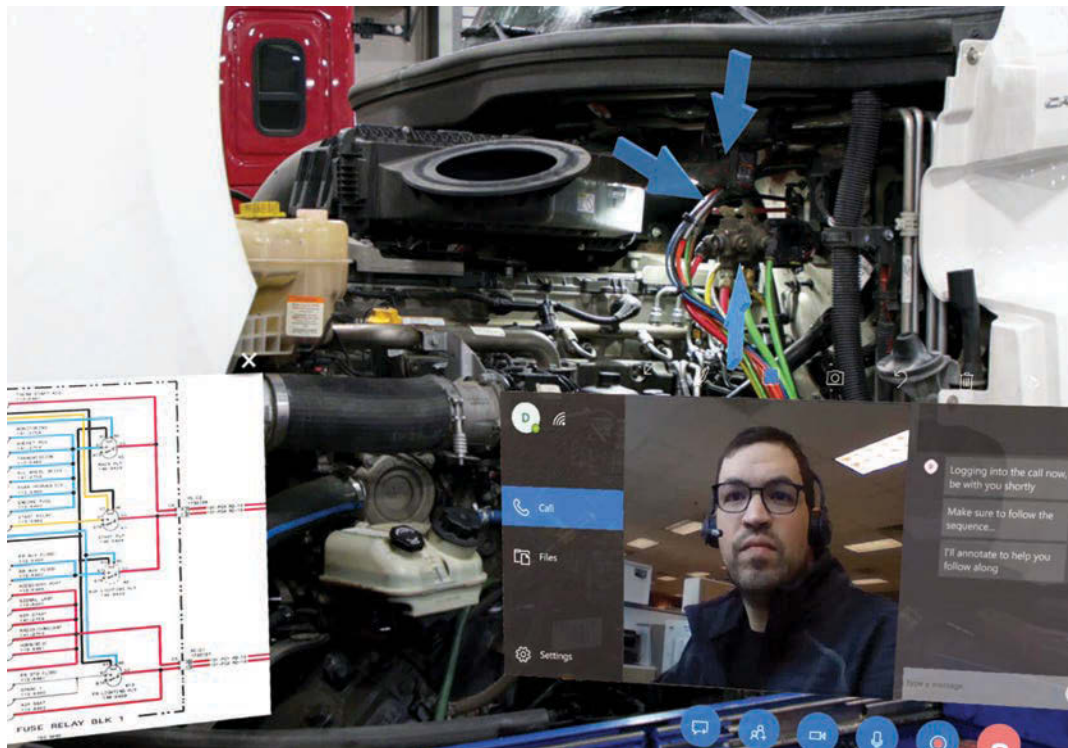
Understanding how AR and VR technology can be leveraged can help the industry successfully navigate advances in vehicle technology, recruit and onboard qualified technicians, and continue to move the maintenance bay into the 21st century.



# TRAINING

» Leveraging AR and VR technologies can help move maintenance into the 21st century.

Photo courtesy of Wallace State Community College and 30408408 | Saulius | Dreamstime.com



» Both AR and VR technologies allow technicians to learn in a digitally enhanced environment.

Photo courtesy of DTNA

## Augmented reality versus virtual reality

### Distinguishing between the different advanced technician training technology options.

With virtual reality (VR) and augmented reality (AR) becoming more commonplace in today's society, it is important to know the difference between the two.

VR takes users out of where they physically are and creates a new reality somewhere else.

"VR is when you put on the headset and you're immersed in an environment that is outside yourself," said Beth Rutter, North American director of industry and customer engagement at Tradiebot Industries. "You've taken yourself out of your office or classroom and put yourself into a spray booth or a flight simulator."

AR, on the other hand, is an interface between your current reality and virtual reality, she said. "You're standing in a real place in real-time, but you're overlaying something that's not with you into that environment."

A simple version of augmented reality is the QR code,

which is usually a square-shaped matrix barcode.

"Most people are familiar with QR codes," Rutter said. "That's an augmented reality where you can take a picture of it and call up information."

For vehicle maintenance, the potential of AR grows, particularly as vehicles become more complicated, noted Rutter, who works in the collision industry. With the right AR program, a technician can point their phone at a truck that needs to be repaired and then see specific repair procedures pop up on the screen.

Think of a rental car company, Rutter said, which has many vehicles on the road, several of which get into small fender-benders.

"Back in the day, that was no big deal," she recalled. "They would just send them over to the local body shop. They popped the bumper off, stuck some putty on it, shot some color on it, and sent it back at the end of the day."

Those days are over, though.

"We can't do that anymore because there are sensors

in that bumper," Rutter continued. "And those sensors are attached to a lot of other things. Taking that bumper off now compromises a whole bunch of other systems in that vehicle. The AR component normalizes that process."

A modern body shop technician would pull out a phone, take a picture of the vehicle, and run it through a smartphone app that calls up information from the cloud.

"Now, you can look at the vehicle through the camera on your phone—in the app—and it populates with information on the vehicle," Rutter said. "You've got little icons stuck on various parts of the car as you walk around the vehicle. The AR changes as you walk."

And when the technician working on that bumper touches the icon, it shows where the clips are to remove the bumper, the tools to use, and the repair procedures.

"It might also tell you that you need to disconnect the battery or other related but not necessarily known operations right on your phone," Rutter added. "From a document standpoint, that's huge."

## Virtual immersion

AR and VR technologies offer multiple benefits to the maintenance industry, one being the ability to learn in a digitally enhanced environment that presents a level of engagement unattainable through other means.

The technology available to create these virtual environments has been developed beyond just costly headsets. There are now several entry-level smartphone and tablet applications available that interact with objects—from showing where all the sensors are hiding behind a bumper to overlaying step-by-step guides into a technician's field of view. Using a smartphone app, a user can point a phone at equipment and see an augmented overlay of supplemental icons and other information on the phone screen that updates as the phone's camera moves. And if that technician wants another set of eyes on the engine they are working on, an expert can log in remotely and virtually climb under the hood.

## Recruiting the next generation

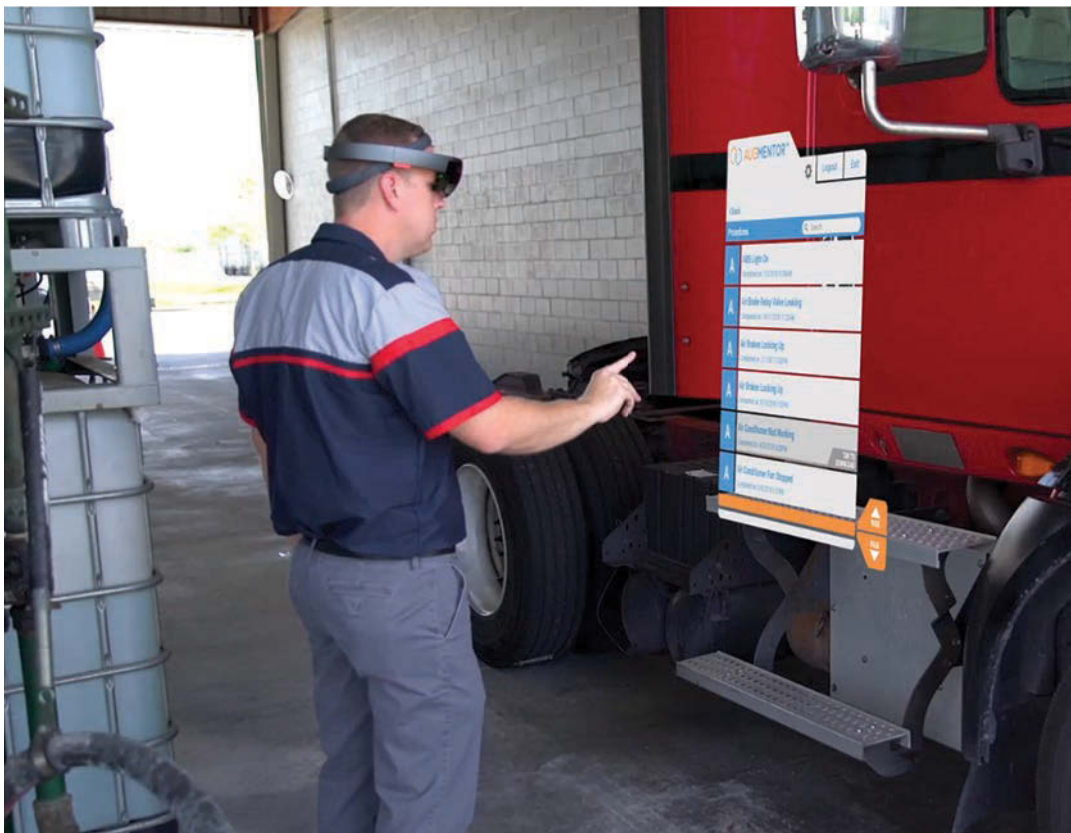
Another benefit of AR and VR technologies is that they offer a different medium through which the maintenance industry can offer exposure to the next generation of potential technicians. During the American Trucking Associations' (ATA) Technology & Maintenance Council (TMC) Spring Meeting, the organization announced the release of an AR game designed to attract, foster, and welcome a new generation of skilled technicians to the industry.

Based on TMC's National Technician Skills Competition, the app—called TMC SuperTech: The Game—is geared toward younger students and is available as a free download for smart devices on Apple iOS and Android platforms.

"We thought that having a smart device game app would be a great way to reach a broad audience of middle and high school students to get them exposed to the idea that being a commercial vehicle technician is a valid career path," said Robert Braswell, TMC's executive director.

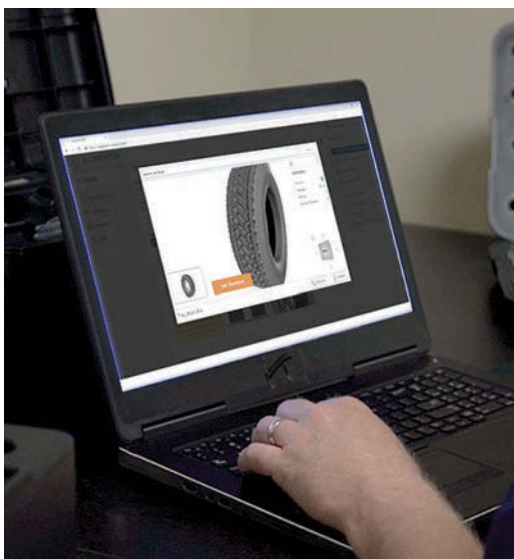
Design Interactive worked with TMC to develop and deploy the game. Matt Johnston, division head of commercial solutions at Design Interactive, explained that the game places the player in the role of a technician. Within the game, the player positions their phone screen toward a flat surface such as a floor or desk. Through the screen using AR, the player views a city landscape with trucks moving throughout. The player receives an alert when a truck is in need of repair, with the option to send the truck to the maintenance shop in the game.

"It has an animated sequence where the parts [are presented] and they have to make the right decision," Johnston explained. "Then they get points for doing things right, and how quickly they make these repairs, and send that truck back to the road. "[The app] is intended to give them a little look at what running a maintenance shop might be like, what performing the repairs might be like, but leveraging this cool technology too makes it a little more fun. It's a bit of a halo on the industry."



» A look at how AR-enabled goggles create interactive menus for technicians.

Photo courtesy of Design Interactive



» Technicians can use AR to inspect equipment before ordering it.

Photo courtesy of Design Interactive



Braswell explained that the game does more than just introduce the concepts and applications of vehicle repair management. It also presents resources to get students engaged in the industry.

“When you download the game, you can click and self-direct yourself [to resources providing information] about becoming a technician, find out about scholarships,” he said. “We are directing folks to the TechForce Foundation, which is our partner in this outreach effort, because they are very well suited toward social media that is attractive to students to get them interested in [the industry].”

Braswell added that information is available for students to learn how to talk to their parents, guidance counselors, and teachers about how this is a career they would like to pursue.

“The industry is exploring all kinds of fantastic technology from electrified vehicles to autonomous vehicles. This is just another bit of technol-

ogy that can be used,” Johnston said. “I don’t know if those kids see this industry or the image of the industry as such that it reflects ‘high technology’ in comparison to the gaming industry or other places they might consider as they move forward. But it absolutely is just rife with next-generation technologies. They need to be aware of what the truth is—not just what the perceived or the assumed identity of the industry is.”

## Engaged education

Alternate reality technologies can enhance the education process for those training to become diesel technicians. Educators are leveraging such technologies to further engage students with their respective curriculum. One such program is Diesel by Distance, based at Wallace State Community College in Alabama. The program integrated a VR service from TRANSFR in April.

## “The digital coach helps nudge you in the right direction when you’re making mistakes.”

Bharani Rajakumar,  
CEO and founder, TRANSFR

“We are focused on our mission of helping to create that classroom to career pathway,” said Bharani Rajakumar, CEO and founder of TRANSFR.

The goal of the Diesel by Distance program has been to enable more engaging distance learning. Historically, the challenge with manufacturing and the skilled trades has been the need for hands-on training and distance learning has traditionally been thought of as online video, Rajakumar noted.

“We worked to understand what are all the things that someone would need to learn in order to become part of a diesel technology career pathway. We included things like replacing shock absorbers, putting together and taking apart engines, and things of that nature,” he added.

TRANSFR designed and created virtual training simulations within a virtual training facility, allowing users to don a headset no matter their location and learn the hands-on skills aligned with the program.

Rajakumar explained that the intent is to fuse education and industry learning into one experience. He said many technicians coming out of traditional degree and certification programs are showing up to the job site unable to do what the employer would like them to do on day one. TRANSFR creates and designs virtual reality training simulations with input from employers so when a student puts on the headset, they learn how to do the job before they get the job. That helps the employer make sure that someone is prepared for the job as soon as possible. It also helps the trainee get insight into what it is that they will actually be doing.

TRANSFR’s virtual reality experience also offers a digital coach within the program.

“It’s perfectly fine to make mistakes,” Rajakumar said. “We assume that everyone we are working with is a beginner, and in some way that is why they are using the service, so that they can acquire the skills to move up in their career path. The digital coach helps nudge you in the right direction when you’re making mistakes and not performing based on what an employer would expect.”

Having the ability to simulate that shop experience and bring it to the student can help expedite the onboarding process and provide firsthand real-world experience that caters to students who, generally speaking, are hands-on learners. Presenting this level of immersion can help drive home that learning experience and clarify expectations as to what the career will truly require.

“There are three different types of learners: visual, auditory, and kinesthetic,” said Beth Rutter,

# Considerations for AR and VR adoption

Taking on new technologies can be daunting. There are going to be questions up front. Not only do those in the industry want to understand what this technology is, but they want to understand the steps it will take during the research and implementation process to reach successful technological adoption and integration.

Technology providers understand the apprehension and provide guidance, insight, best practices, and questions to consider when selecting the right solution.

## HEADSETS, MOBILE DEVICES, OR BOTH?

"The goal would be any device, anywhere, anytime," said Matt Johnston, division head of commercial solutions, Design Interactive. "We know that the cost of the headsets, over time, are going to come down. There is a healthy skepticism about the technology because of the perception that it might be time consuming to create or costly to adopt."

Though, Johnston said, because of the advancements in augmented reality (AR) and virtual reality (VR) offerings, fleets have flexibility in where they want to start.

"When it comes to mobile devices, it is just a reality. Everybody has

one in their pocket, for the most part," Johnston stated. "So, we've made it available on mobile devices, and I think that it is going to be a healthy mix medium-term. Long-term, I do believe the technicians are going to have headsets. I think companies are going to see the value in hands-free heads-up information, being able to connect directly to the experts, et cetera. It is easier to fix the truck when you're not holding a phone ... but there is an investment of time, money, people, resources, in order to get that started."

Johnston is the chairman for the Task Force for Augmented and Virtual Reality Training for the American Trucking Associations' (ATA) Technology & Maintenance Council (TMC) Future Truck Committee. He said the primary goal of the task force, at this stage, is educating the industry on what the technology is, what it can do, and to answer the questions fleets have regarding adopting AR and VR.

Johnston noted that the task force is in the process of developing a list of AR/VR best practices. If a technician does not charge a device after use, for instance, the technician coming in on the next shift has an uncharged device that is not usable. Charging stations,

the number of technicians across a number of shifts, and the number of bays in operation are all considerations to keep in mind.

## HOW HARD IS IT TO USE AR OR VR?

"We pride ourselves on how easy the system is to use," Johnston said of Design Interactive's AUGMENTOR, an AR-enhanced training platform. "Given the newness of this technology, we wanted to make sure there were no special skills required, no coding. You simply have to show up and use the skills you've used elsewhere."

Whether AR or VR, service providers strive to present a technology that is intuitive and can be seamlessly integrated.

"We have seen it used with people as old as 60," said Bharani Rajakumar, CEO and founder of TRANSFR, of the use of the company's VR training facility service. "There is no question that the younger generation that has grown up with joysticks and video game controllers pick it up much faster, but you're talking about the difference between picking it up in under a minute versus picking it up with a five-minute explanation. So, it is not a huge barrier."

## WHAT IS THE ROI?

Training technicians is a major endeavor but using AR or VR can help to ease that strain, especially across multiple locations.

"Fleets are typically characterized by having a centralized headquarters, possibly having a training department, but technicians are at facilities spread across multiple states," Johnston posed. "It's very difficult, time-consuming, and costly to bring them all centrally to train or send experts out to them. Classroom XR [a feature of AUGMENTOR] allows fleets to provide instructor-led training at a distance by using augmented reality."

Understanding that not every business is ready to bring on many devices is the reason for solutions like AUGMENTOR's Classroom XR, which allows training to be disseminated throughout an organization through an instructor. Use one device to train the trainer and have that person be the champion of the technology, Johnston suggested.

"Then, we can work with that organization as a partner to walk them, over time, to that bigger deployment," he said. "By that time, the devices are more accessible, easy to use, probably less expensive, and you've now got a couple of years under your belt of using it with a high ROI."


## WHERE TO START AND WHAT ISSUES TO TACKLE

"We provide best practices in terms of how to create the content. That's usually step one—making sure that people who are used to actually fixing things and educating others on how to fix things know how to now do that effectively in the technology that we've got," Johnston explained of Design Interactive's approach to AR technology adoption.

Johnston said fleets will typically address needs presented through data. If a fleet sees a spike in fault codes associated with brakes, the initial training deployment will tackle that issue. Design Interactive coaches users on how to use the software and provides feedback on those materials.


"Then, based on the type of company and how you're structured, [we ask] 'Do you have a training department? How large is your organization?' We look at whether instructor versus self-guided is appropriate, or both," Johnston explained of AUGMENTOR deployment.


## Do You Work on Light Duty and Medium Duty Trucks?



If you're working on Light Duty trucks such as Ford F250s all the way to Medium Duty trucks, such as Fuso, Hino and UD – the all-new **MLT Pro** is just the scan tool you've been waiting for. It covers Chevy Duramax, Dodge Cummins, Ford Power Stroke and all types of Sprinters. All Class 4-8 trucks and equipment with J1939/1708 protocols are also covered, as is OBDII.

Android Scan Tool for: Read & Clear Codes, View and Graph Live Data, Full Bi-directional Controls along with Special Functions.





[www.candointl.com](http://www.candointl.com) • 909-Cando-11 (226-3611)

FleetMaintenance.com/Inquire

North American director of industry and customer engagement at Tradiebot Industries. “Guess what kind of learning is typically attracted to the repair industry?”

It is the kinesthetic—or tactile—learner, she said.

“All of a sudden, the demographic that’s attracted to collision repair and working on vehicles—whether they be automotive or heavy-duty diesel—get to learn in an environment that actually speaks to them,” Rutter said. “They get it way faster than the people who have to sit down, write stuff out, and review instruction.”

## Enhanced on-site training

Implementing AR and VR resources beyond the classroom and into the service bay can make a major difference in the aptitude of technicians. Using such technologies for on-the-job training creates a continuous learning environment.

Design Interactive’s AUGMENTOR is a training platform that is enhanced through AR. Classroom XR, an instructor-led feature, allows a single instructor to livestream training from a first-person perspective populated with AR content to remote technicians who can view the training via a web portal.

“Our tagline is ‘replicate your experts,’” Johnston said. “You basically get the expert’s approach in that headset. You put it on the head of a brand new [technician], and you turn them into an expert immediately.”

A self-guided training aspect of AUGMENTOR allows technicians to download an AR-enhanced application that grants access to specific procedures. This can be used to brush up on certain repairs or can be applied in real time as a step-by-step guide. With AR, content can be at the tech’s fingertips. AUGMENTOR also offers remote collaboration, an “over-the-shoulder” look from a trainer, allowing a remote expert to see what the technician is looking at. The trainer could test the technician’s skills, offer insight, or guide real-time troubleshooting.

Johnston posed an example of AR training and the development it can lead to for a technician.

“You’re repairing a brake and you need to make a decision whether during your wheel-on inspection to go to a wheel-off, or whether you need to repair or replace something,” he said. “Oftentimes, it’s corrosion, cracks, grooves that you see in things like the rotor or the brake pad itself. They have to make this decision, and if they make the right decision, then great. If they make the wrong deci-

sion, which could be replacing something that still had life, or not replacing something that they should have, that potentially causes downtime or costs into the system.”

To help mitigate these costly mistakes, fleets can present realistic 3D holograms instead of a line drawing in a PDF document, Johnston explained. This makes it easier to show technicians, “this is

# WHEN IT COMES TO SERVICING YOUR FLEET, WE’RE HIGH MAINTENANCE.



Red Classic provides comprehensive fleet maintenance solutions with the highest quality and safety standards. We like to say we service “anything on wheels” including material-handling equipment, trailers, class 7 and 8 tractors and everything in between. Our network of fleet maintenance shops and mobile maintenance units are located across the Southeast, Midwest and Mid-Atlantic and offer everything from preventative maintenance to heavy duty repairs. With comprehensive maintenance services, highly-trained technicians and the latest equipment and diagnostic technology, we’ll keep your equipment and your business running on time. **LET’S GET MOVING.**

980.275.5746  
maintenance@redclassic.com

**RED CLASSIC**

FleetMaintenance.com/Inquire  
www.redclassic.com



» Avatar Partners offers AR applications that allow technicians to communicate and virtually interact with workers in the field.

Photo courtesy of Avatar Partners

what you're looking for. If you see something that looks like this, then you might want to replace it. If you see something that looks like this other one, it's got some wear and tear on it, but that's normal—keep that there.” Helping them make that decision and providing those examples helps build that memory set, and ultimately technicians can make better decisions over time, he added.

Augmented and virtual reality can give students and veteran technicians the same training experience as working on an actual vehicle, according to Marlo Brooke, CEO and founder of Avatar Partners. She said her company discovered technicians have the highest memory retention through mixed reality. These days, this is a big asset as many skilled technicians are retiring, and the next generation has less experience.

“We've found the ability to literally take a Level 1 technician with zero to one month of experience

on the job and enable that technician to train at the level of a senior technician,” Brooke explained.

Thanks to the reality-altering technology, the times to troubleshoot vehicle problems are reduced by up to 75%, she noted.

“Essentially, that's because when the technician uses the augmented reality experience when performing the maintenance task, they essentially have X-ray vision into the vehicle or into the engine, for example,” Brooke said. “It really allows them to home in very, very quickly and find the problem.”

And while novice technicians certainly get a boost from AR, experienced technicians' work is also sped up by 25%, she added. This gives fleets facing attrition the ability not only to train novices to become experts but also to increase their experts' skills.

“The fleet industry needs these experts to actually become more skilled,” she said. “This

tool works very effectively in that manner to improve both the younger generation as well as skilled technicians.”

### Augmented collaboration

What seems to be one of the most promising aspects of AR technology is the idea of real-time remote collaboration—a technician in the bay working on a vehicle, wearing an AR headset, having a digital connection to a subject matter expert who can see what the technician is seeing, guide and troubleshoot repairs, and populate the technician's field of vision with diagrams, charts, images, 3D models, and any information necessary to ensure an efficient and accurate repair. It may sound like a sci-fi dream, but today this is a reality already utilized by some within the commercial vehicle maintenance industry.

## MAXIMIZE UPTIME UPGRADE YOUR REPAIR PROCESS.



**JPRO**  
PROFESSIONAL



**NEXSTEP**  
REPAIR

#1 DIAGNOSTIC & REPAIR SOLUTION with Industry-Leading Bi-Directional Functionality



**NOREGON**  
VEHICLE DATA EXPERTS

©2020 Noregon. All Rights Reserved. JPRO and NextStep are registered trademarks of Noregon.



Learn More: [www.noregon.com/jpro-FM](http://www.noregon.com/jpro-FM)  
For Available Discounts CALL: (855) 889-5776

FleetMaintenance.com/Inquire



Clean your facility or inside the truck before you disinfect



## ALL PURPOSE CLEANER

REFRESHES & DEODORIZES

Safe on interior and exterior surfaces and in the shop

[www.OilEater.com/request-samples](http://www.OilEater.com/request-samples)  
1-800-528-0334

FleetMaintenance.com/Inquire



With AR goggles, such as Microsoft's mixed reality HoloLens, a skilled technician can see exactly what the technician wearing the goggles sees in real time.

"I can put the goggles on and call a more experienced technician who can see everything I see and then guide me through the repair," said Alexandre Georgetti, director of manufacturing strategy for Eaton Vehicle Group. "You, as the more experienced one, can even draw circles and arrows on your screen, and everything you do I can see through my goggles."

Daimler Trucks North America (DTNA) successfully piloted Microsoft's HoloLens AR technology as a viable method of virtual collaboration with dealers and customers. DTNA is continuing to test the integration of AR into their operations, and throughout this testing, the company's approach has been clear—creating value.

"We really obsess over how we are adding to the value proposition we have with our business partners, the dealers, and their technicians," said Daoud Chaaya, director, field service, DTNA. "Technicians, being the hot commodity that they are, much like truck drivers these days, it's hard to get one in the door, and then the training scale or getting them up to speed and making sure they're hitting the ground running is also a concern we're trying to assist with ... We want to continue to be on the cutting edge of innovation. How do we add to that value proposition? We see where we're at right now [with] HoloLens 2.0 and how much value we can add to our technicians to speed up repairs, increase uptime."

DTNA has aligned the use of the HoloLens similarly to when a technician would contact the call center today. There is a certain "checklist" that is reviewed up front when technicians contact the call center with tickets filed. When a call center representative receives a call from a technician donning a HoloLens headset, the individual in the call center already has some knowledge of the technician's situation.

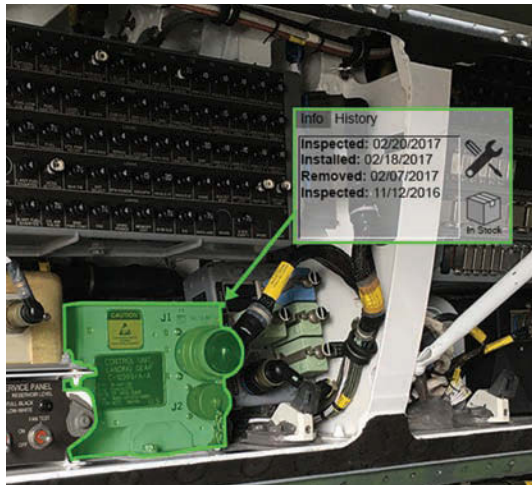
"The focus is, 'how do we minimize downtime and how do we maximize uptime?'" Chaaya said. "It's not [achieved] through the technician teaching the call center representative what they're seeing, so this [system of communication] allows the call center rep to come to the call prepared."

A substantial benefit to the HoloLens system is the ability for the call center representative to bring in a subject matter expert when needed. The ability to have multiple people with "eyes" on the issue and particular expertise addressing the matter leads to clearer communication and expedited processes.

"From the moment the technician puts their headset on, at a minimum, they have a call center on the other line guiding the repair and leveraging augmented reality to be able to parlay into the discussion service bulletins, service manuals, anything necessary for that particular issue that they're facing, and fault codes that they see that they want to show the technician documentation of on the fly," Chaaya explained. "This also allows for subject matter experts to be a part of that call. If we're talking about an HVAC issue and I want to rope in my HVAC engineer, they can also be virtually part of that call. This way, you get to bring in expertise, as needed, into a particular repair."

Such a form of augmented collaboration offers opportunities in efficiency, accuracy, and success.

"I foresee a group of connected people helping each other out," Chaaya said of the HoloLens AR



» AR can create an interactive view for technicians, guiding them through repair and maintenance procedures.

Photo courtesy of Avatar Partners

technology. "Long gone are the days where I need you to send me an email that has a video ... The video is clear, or the video is not clear, and we spend hours sending content back and forth, and people throwing their hands up in the air in frustration, not being able to address complex repairs ... This is a special tool at the dealership that allows them to connect with DTNA in real time and maximize uptime through quick goals ... It can either end up being a cool tool that sits on somebody's shelf, or, if leveraged correctly, really adds value, makes money, and leverages and pushes uptime."

## A new medium for a new normal

If COVID-19 has taught us anything it is how quickly industries need to be able to adapt to change. And through the pandemic, there have certainly been changes in the way fleets operate. As the end of the COVID crisis seems to be on the near horizon, industries must decide what best practices they implemented during this time they wish to continue, which they will leave behind, and which they would like to lean into further to create the best situations going forward. AR and VR technologies offer an avenue to pursue remote, digital engagement that many value as an established "new normal."

People are excited to find alternative ways to learn, TRANSFR's Rajakumar said. People naturally love to learn, but everyone understands the sentiment of "Zoom fatigue" and being tired of online meetings. That can be true for online learning as well, so having a new medium is an advantage.

"COVID has definitely been a catalyst because, as the saying goes, necessity is the mother of all innovation," Rajakumar said. "Now that the vaccine roll-out is underway and a lot of people are vaccinated, what we are hearing and what we are seeing is that folks are not interested in going back to the way we used to do things. The hands-on training simulations are just far more engaging. They do a better job explaining how things actually work, as opposed to just watching a bunch of videos or reading a bunch of textbooks. So, while COVID was a catalyst, I think that this medium can be here to stay, provided we continue to create exceptional experiences." ■

For related content, visit:

[FleetMaintenance.com/in-the-bay](https://www.fleetmaintenance.com/in-the-bay)



**BUY ONCE. BUY RIGHT.  
BUY A MOHAWK!**



TP-16-3SA

## TWO POST LIFTS



MP-18

## MOBILE COLUMN LIFTS



TR-25

## FOUR POST RUNWAY LIFTS



## PARALLELOGRAM LIFTS



**VERTICAL RISE LIFTS**  
FleetMaintenance.com/Inquire

[www.mohawklifts.com](https://www.mohawklifts.com)



**1-800-833-2006**



**Delo**<sup>®</sup>



# CLOGGED DPF COSTING YOU FUEL ECONOMY?

**Ash from your engine oil is likely to blame**

**90%**

**OF INCOMBUSTIBLES IN THE DPF COME FROM LUBRICANTS**

Incombustible ash particles from today's heavy-duty engine oils clog the diesel particulate filter (DPF) in engine aftertreatment systems, decreasing fuel efficiency and increasing fuel costs across your fleet. Now there's a breakthrough solution.

Get the facts at [DeloEmissionsControlCenter.com](https://DeloEmissionsControlCenter.com)

© 2021 Chevron. All rights reserved. All trademarks are property of Chevron Intellectual Property LLC or their respective owners.

[FleetMaintenance.com/Inquire](https://FleetMaintenance.com/Inquire)

**KICK  
SOME  
ASH**



## DISCOVER Delo 600 ADF: Less ash. More fuel efficiency.

Delo 600 ADF with *OMNIMAX™* Technology solves the issue of DPF ash buildup while providing outstanding engine protection. By producing 60% less ash compared to today's low-ash engine oils, Delo 600 ADF increases fuel economy retention by up to 3% to keep vehicles running stronger, longer.

Protect your engine and your aftertreatment system with Delo 600 ADF.

**It's time to kick some ash.**



# What fleets should know about CYBERSECURITY

Cybercrime has increased rapidly since office workers moved their operations into their homes, and fleets who do not take precautions are especially vulnerable to these often costly attacks.

By Josh Fisher

"access denied"

"error"



## [ DATA & TELEMATICS ]

Cybersecurity is like a virus, according to CarriersEdge CEO Jane Jazrawy.

“If you’re not protecting yourself, you can get it,” she said. “You won’t know it right away, and it’s going to be really detrimental when it happens. You’ll wish you could turn back the clock—but you can’t.”

COVID-19 isn’t the only pandemic the world will face this decade, stated Christopher Krebs, former director of the federal Cybersecurity and Infrastructure Security Agency. “Considered a low-dollar, online nuisance crime only a few short years ago, ransomware has exploded into a multibillion-dollar global racket that threatens the delivery of the very services so critical to helping us collectively get through the COVID pandemic,” he said in testimony before the U.S. House Subcommittee on Cybersecurity. “To put it simply, we are on the cusp of a global pandemic of a different variety, driven by greed, an avoidably vulnerable digital ecosystem, and an ever-widening criminal enterprise.”

Cybercrimes have been around since the early days of computer networks in the 1970s. While these crimes have steadily increased in the decades since the U.S. Defense Department’s Advanced Research Projects Agency Network (ARPANET) led to the internet, cybercrimes have reached a torrid pace since COVID-19 changed the office work landscape in the U.S. Just last spring, the FBI reported a 300% increase in cybercrimes between March and May 2020. The transportation industry has seen similar surges in attacks this year, according to Ben Barnes, McLeod Software’s vice president of IT services and chief information security officer.

“We didn’t see a lot of attacks in January and February, but in March and April, the ransomware attacks have escalated in our industry, and we don’t know why exactly,” Barnes, whose company provides transportation and trucking software solutions, said. “But if we can map these patterns and know the same thing happened last year in March and April when we saw attacks go up, we’re starting to see a pattern.”

The transportation industry has become a high-value target, Barnes said, because it is so big and “there is so much money changing hands every second of every day.”

If cybercriminals gain access to a fleet’s IT system and install ransomware, the company will face some complex decisions, Barnes noted.

“A ransomware attack in our industry can easily shut down your business for three days,” he said. “You can’t dispatch loads, you can’t pay drivers or conduct financial transactions of any sort, and you may not be able to use email. Companies that don’t have an incident response plan in place may be looking at one or two weeks of inactivity. The impact on the business can be severe and lasting.”

### Human error

More than 90% of cybersecurity problems originate from human error, stated Cybint, a firm that offers cybersecurity education and training for businesses.

“That is human error on emails, people that left open or misconfigured their router or firewall and essentially left holes for attackers to come in,” Barnes noted as examples. “Human error can come from all over the place—it’s not just one area. It’s not just email. Education awareness can go a long way.”

Cybercriminals, he said, are like most other criminals: They are looking for an easy way in. He compared businesses to a group of homes on a cul-de-sac.

“You don’t want to be the house with the doors open, no guard dog, no cars in the driveway,” Barnes said. “You want to be the house that has a security system and locks its doors. They are going to move on to attack the easier target. You don’t want to be the low-hanging fruit.”

How hackers use ransomware is evolving, according to Scott Hellberg, director of information security governance, risk and compliance for Sentry, an insurance provider for long-haul fleets and owner-operators.

“At one point, ransomware was simply malware loaded into a phishing email,” he said. “With that, [the hacker] will gain access to the machine and encrypt it.”

Now, he said, cybercriminals are taking more of a “shotgun” approach where they don’t have a specific target. The goal is to get the malware on as many networks and machines as possible. Then, once the hackers have access to a network, they decide when to activate the ransomware. Cybercriminals are “betting on the fact that most people don’t do a good job with backups and have put themselves in a position where their data is one of the most important aspects of them being in business,” Hellberg explained. And businesses without good data backup plans are most susceptible

to being held at ransom, Hellberg said. If businesses do not have a good backup system in place, cybercriminals could force the organization to pay a ransom in whatever cryptocurrency the attackers want. A cybercriminal can lock an IT system until the victim company pays for a “cyber key” to regain access.

Sometimes this malware lies dormant in a company’s network or an individual computer. Barnes said it could become like a “pyramid scheme” for hackers once they gain access. Along with selling access to various networks on the dark web, cybercriminals like to go after the same organizations more than once.

**“You don’t want to be the house with the doors open, no guard dog, no cars in the driveway.”**

Ben Barnes, McLeod Software, vice president of IT services and chief information security officer

“We’ve seen some midmarket and smaller transportation firms get hit multiple times,” Barnes said. “That is as baffling to me as any of this because if you got hit once, you’re on a list. Suppose [a hacker] has credentials to get into your system. In that case, that attacker can sell those credentials to another attacker—and that attacker will go and map out your network and find everything you have, and they will sell it to another attacker who will run ransomware on it. Well, each one of these sales puts that information out there for public knowledge, and that can be resold yet again.”

Companies that don’t tighten up their cybersecurity, make changes, or learn from the past are the companies most likely to get attacked multiple times, Barnes said.

“If a fleet hasn’t started thinking about cybersecurity yet, then they’re probably being targeted right now,” Jazrawy explained. “It’s just too late now. You should be immediately starting something now if you haven’t done it because



**\$4.2 billion**  
in losses due to cybercrime in the U.S. in 2020.



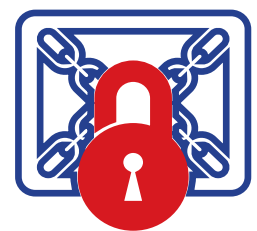
**69% increase**  
in cybercrime in the U.S. in 2020 compared to 2019



**19,369 complaints**  
related to business emails in 2020



**\$1.8 billion**  
in losses related to business emails



**2,474 ransomware**  
incidents in the U.S. in 2020

Sources: FBI, Cybint, Travelers

someone has probably found you. It's crazy not to be doing something, and that something has to include both your backend systems and your people because that is how they are getting to you."

## Print a plan

Chris Sandberg, vice president of information security for Trimble Transportation, said that larger fleets tend to have better cybersecurity plans than smaller carriers. But no matter the business size, a company's cybersecurity plan should start with examining its critical workflows, he said.

"Figure out what workflows are actually critical to your system," he said. "Then make sure you document those workflows. I always encourage people to make sure that you print them out and redo this at least annually, if not quarterly."

The printouts should include workflows and who has access to what information and network systems. The hard copies should also include procedures and phone numbers to call if there is a system breach. Sandberg suggests putting all of this critical information "in big red binders and put it everywhere."

While creating these documents of company workflows and information, Sandberg said, fleet managers and executives will learn more about their critical processes, such as who has access to what within the system.

"From there, make sure only the people that need access have access," he suggested as a way to tighten control. Most importantly, Sandberg said, have an offline system.

"It can be something as simple as somebody writing a little [computer] script, copying the files to another file share that the main users don't have permission to [access], which is what we call an offline backup," he explained. "So, if someone



**90% of cybersecurity**  
problems originate from human error



**16,012 victims**  
of online employment scams in 2020



**55% of U.S. businesses**  
have cybersecurity insurance

Sources: FBI, Cybint, Travelers

gets infected with something like a CryptoLocker virus, they can't screw up the backup."

How often a company backs up its system depends on the business, Sandberg added.

"It depends on the criticality," he said. "If the business can accept losing a day's worth of data, back it up once a day. If they can accept losing five minutes of data, copy it every five minutes. The criticality of the data is what drives the backup schedule."

McLeod's Barnes said it's important for fleets to have a playbook ready in case they are attacked so they're "not reacting in a panic." He also suggested that fleets get cybersecurity insurance.

## Training and education

CarriersEdge's Jazrawy said the most common risk to fleets right now is employees clicking on the wrong links in emails that look legitimate but lead to "a nasty website or downloads some sort of malware." She said employees in her company had received emails mimicking Jazrawy that ask those employees to do a task for her, such as buying

gift cards and relaying the gift card information back via email.

"Another time, I had a staffer get a fake email from me asking them to email back their phone number, claiming I needed to call them," she said. "This was ridiculous because I already have everybody's numbers. But if they send back their number, then [the phisher] tries to call you and take it further somehow."

McLeod's Barnes said he's commonly asked how many clicks of a bad email link it takes to infect a company's system.

"One," he said. "It only takes one click if you open something bad."

All of this is done by cybercriminals who are trying to infiltrate companies through employees. "People are by far the weakest link," said Jazrawy, whose company creates training programs for drivers and fleets. And a newer "people target" is truck drivers.

"The biggest risk that I see right now is that companies aren't training their drivers because they think that the only people who need to be

trained about cybersecurity are the people in the office because those are the people who are using the system," Jazrawy said. "I think that's a very dangerous way to think because the drivers might not be using your systems directly, but they are certainly talking or sending messages back and forth to the people who are using your system. What are they forwarding or doing without understanding?"

Barnes said companies are looking for a 100% guarantee that cybercriminals won't get into their systems.

"I don't think that exists," he said. "You have to do the right things. Getting more preventive is like how you eat an elephant—you take one bite at a time. If you've done that and you look up and half the elephant is gone, then you're into some really good, multiple phases of your security approach."

He added that those "first few bites of the elephant" aren't going to cost a company a lot in their cybersecurity journey. Just having data backup systems can go a long way.

"If you can't 100% prevent an attack and an attack happens, what do you do?" Barnes posed. "Having a good back-

FleetMaintenance.com/Inquire

up is number one. That doesn't cost a great deal of money to set up, but you would be amazed at how many transportation companies don't have reliable backups."

Jazrawy said it doesn't make sense just to train some employees on the dangers of cybersecurity.

"It's not just the company's security; it's people's personal security," she added. "They should all be educated on how to protect themselves—even when it has nothing to do with the company they work for."

Most drivers, unlike office workers, are not spending much of their time online, and that can make them even more susceptible to an attack.

"If no one explains to them what a phishing attempt looks like, they can get tricked," Jazrawy explained.

This can be a particular problem for drivers whose first language isn't English, Jazrawy said. Since many attempted cyberattacks come from other countries, a native English speaker might more easily pick up on a scam because of poor grammar or spelling.

"I've noticed that when there are issues, it tends to be non-native English speakers who fall for it because words are what is being used in a lot of these phishing emails. I think that is something to watch out for," she noted.

Jazrawy said this is something she has noticed more recently and has been working it into the onboarding process for new employees. "I have had to show my staff pictures of phishing email examples and explain why I would never actually send an email like that," she explained.

She said this is important for commercial trucking companies to explain to all of their employees.

"If you're the owner of a 200-person company and you don't talk or email with everyone every day, if someone sends a fake message from your account, an employee might not know it's not from you," Jazrawy said. "Because they don't know how you sound in a day-to-day email, they might just automatically respond because they think it's actually a message from the owner of the company."

Jazrawy created a graphic that shows new employees what type of emails she would

send, including how she would greet the recipient "I would never start a message with, 'Dear so-and-so,'" she said. And she even shows them how she would sign an email. "So, they can very clearly see what I will say and what I won't say."

CarriersEdge offers a cybersecurity course for professional truck drivers that the company also uses internally for its own employees.

"Everybody from developers to customer service goes through that course," Jazrawy pointed out. "And what we also do is when we get scam messages, we talk about them. We are constantly sharing information about fake messages going around because they're definitely increasing." ■

*This article originally appeared in FleetOwner.*



## AMERICAN-MADE INNOVATION LIFTS TO KEEP YOU MOVING



Experience  
The Gray Difference

### Minimized Downtime

At Gray Manufacturing, your ability to do business is our top concern. Our vertically integrated manufacturing process means that every component of our quality truck lifts is manufactured and built by Gray. When you need a repair or replacement part, you make one phone call. We specialize in service after the sale and are invested in your success as a service and repair facility.

**Give us a call at 1-800-821-7320 today to learn more!**

- Mobile Column Lifts
- Fork Lift & Clutch Jacks
- Shop Cranes & Presses
- Floor Service Jacks
- Engine Stands
- Much more!

[FleetMaintenance.com/Inquire](http://FleetMaintenance.com/Inquire)



1.800.821.7320 • GRAYUSA.COM





» Pulsating brake-activated lamps, in addition to standard steady-burning brake lamps, can help avoid rear-end collisions.

Photo courtesy of Optronics International | USA Harness International

# Pulsating brake lamps and their impact on fleet equipment

How fleets can benefit from current FMCSA brake light regulation exemptions.

By David Brierley



Image courtesy of Grote Industries



It may come as no surprise that traffic accidents due to distracted driving have increased sharply in recent years. A large percentage of the U.S. population using smartphones and a still relatively small percentage of vehicles on the road today equipped with advanced driver assistance systems is a recipe for disaster. As drivers text a friend or scroll through social media, their attention is diverted from the task at hand—driving—and many of them will unintentionally collide with another vehicle or stationary object.

Vehicles are required to have working brake lights and turn signals to notify drivers behind them what they are doing and help mitigate these accidents, but many times these are not enough to command a smartphone user's attention. Increasingly, heavy-duty trucks are being rear-ended by distracted drivers.

A collision poses a danger to the lives of both parties, and it can be costly as well; not only in vehicle repair or replacement, but also in litigation should the driver of the rear vehicle blame the driver of the truck or the equipment involved (e.g. inadequate trailer lighting).

For these reasons, some in the industry seek to add an extra safety device to the rear of trucks and trailers in order to grab the attention of distracted drivers: brake-activated, pulsating lamps in addition to standard steady-burning brake lamps. While some of these lights consistently pulsate, others pulse before changing to a steady burn that matches the standard brake lights.

"These lights create a novel, strobe-like lighting state when they first come on, before settling on a solid on state," said Marcus Hester, vice president of sales and marketing for Optronics International | USA Harness International. "By running this two-state sequence, pulsating brake lights are more likely to attract the attention of others on the road. Because they initially pulsate, they are different from the solid or relatively slowly blinking lighting patterns that are usually encountered and are more reminiscent of emergency vehicle lighting."

Tanker fleet Groendyke Transport did a study with 500 of their trailers to test the effectiveness of this additional light.

"Groendyke Transport started installing flashing lights tied to their brake circuit," said Mark Blackford, director of national fleet sales at Grote



Industries. “They did that on 500-some trailers, then there was also a study group of 500 [trailers] that did not have them. They ran those for three years. The data indicated over three years that there was a 33.7% reduction in rear-end collisions. During the same time, they had zero collisions at railroad crossings.”

## Regulations and exemptions

The only problem with utilizing pulsating brake-activated lights was that the current Federal Motor Carrier Safety Administration (FMCSA) regulation, 49 CFR 393.25(e), requires all exterior lamps to be steady-burning.

Groendyke Transport applied for an exemption to allow the use of an amber brake-activated pulsating lamp on its trailers in addition to the steady-burning brake lamps required by the Federal Motor Carrier Safety Regulations (FMCSR). In 2019, the FMCSA granted a five-year exemption.

In October 2020, National Tank Truck Carriers (NTTC) applied for and was granted a similar exemption for all U.S. tanker trailers, Grote’s Blackford said. Following this, Grote applied for and was granted yet a further exemption.

“Grote created and was granted a waiver, not only for all tanker trailers, but basically for all trailers: dry vans, reefers, and truck bodies,” Blackwood explained. “Basically, [this applies to] all equipment being pulled down the road, or trucks that are driving down the road.”

Now that the exemptions are in place and applicable to virtually all heavy-duty trucks and trailers on the road today, and the technology is developed and readily available, more fleets and other organizations can test pulsating brake lights to see what impact they have on fleet safety and equipment.

## Installation

There is not yet a set standard for where these lights must be mounted on the back of the trailer or how many should be used, so applications vary.

“Groendyke used a single, amber light mounted centrally on their tanker trailers,” said Jeff Geoffroy, director of marketing and business development at Peterson Manufacturing. “This provides the minimum cost as you only have one lamp and harness extension. Another option some fleets have investigated is dual upper outboard [lights]. This requires two amber pulsating lights and two harnesses.”

These are typically mounted about halfway up the back of the tank.

When Grote started working with fleets to add pulsating brake lights they wanted to place them at passenger car eye-level, Blackford said. On a reefer or dry van, however, that would typically mean the lights have to be mounted on the doors, which either swing out or roll up, making installation complicated and more costly, so Grote settled on placing the lights between the existing trailer brake lights.

Wherever the new lights are mounted, installation methods will vary based on the trailer type.

“Adding a light to the back of a tanker is a challenge because you can’t drill into a tanker nor can you weld to the tank,” Geoffroy said. “Many fleets are using a bracket with double sided adhesive to hold the lamp in place.”

While large holes should not be cut into any type of trailer, small holes for rivets are typically acceptable as long as they are not on a tank, making a surface-mount application ideal.

“Because the fleet wants it to be retrofittable and cost-effective, surface mount was the goal,” Blackford said. “When you start cutting plasma holes into the structure of the back of the trailer, there’s some integrity issues. Trailer manufacturers don’t really recommend cutting holes in the frame. The surface mount with a couple of a 3/16” rivets is the mount [Grote uses].”

No matter the trailer type, wiring should be a relatively simple plug-and-play operation. Whether using one lamp or two, both types tie into the brake light harness for power and brake signal, Geoffroy said.

Blackford noted that Grote’s lights include adapters as well, which plug into the existing brake light harness, creating Ys in the wiring.

“One of the Ys goes to the existing taillight, and the others go to this light,” he said. “There’s no cutting or splicing; it’s plug and play.”

Blackford said that once the required tools are gathered, it should take a technician about 30 minutes for the first install. If they are adding two lights to a trailer, it would be “a total of maybe 40 minutes for the pair.”

For each light installed the technician will need to drill one 3/8” hole for the wire to pass through, Blackford noted, as well as the two 3/16” rivets.

## Maintenance and inspection

Once the lights are installed, there is not much fleets need to do in terms of maintenance.

“The Grote motto for maintenance on a Grote UBS Harness LED Package is, ‘leave it alone,’” Blackford said. “We design things built to last 10 years or more unless you get into catastrophic issues with damages or repair. You don’t need to do anything other than keep abrasive chemicals off of it.”

Grote and others in the industry recommend that fleets refrain from using high pH or high alkaline chemicals, because they can have a negative impact on polycarbonates and acrylics such as lamp lenses.

Peterson’s Geoffroy noted that checking trailer lights for proper operation requires a helper or a mirror positioned behind the trailer. He also offered

the following recommended practices for inspecting pulsating brake lights and other trailer lights.

- Make sure the lenses are clean. They may be functional, but if they are dirty, they may appear to be malfunctioning to an inspector.
- Check electrical harnesses for any signs of wear or damage. Once moisture gets an entry point into a harness, it will use capillary action to wick its way throughout the entire system corroding wires, connectors, and LED lamp circuit boards.
- Ensure there are no signs of a cracked or damaged lens; this is a guaranteed entry point for moisture which will eventually corrode the inside of the light and cause it to fail.
- Have a co-worker watch the vehicle as it is driven around the parking lot; moving vehicles can have flickering lights that will never be seen when the truck and trailer are sitting still.
- LED lights have circuit boards, and if they get damaged, they can overheat. Feel the lights at the end of a drive and see if there is any excessive heat—that is a warning sign that cannot be found at the start of a shift.

Manual inspection aside, trucks today are increasingly spec’d with automated light checking capabilities, Optronics’ Hester noted.

“Many modern cabs have a lighting test switch built into the vehicle instrument cluster,” he explained. “Once the switch is turned on, the vehicle will start cycling through the different brake, turn, hazard lighting sequences, and will keep doing so until the switch is turned back off again. This will make it easy to verify that the pulsating brake lights are working properly.”

If a fleet’s vehicles do not have a light-out detection system built in, aftermarket versions are available, Blackford said.

## The future of pulsating brake lights

Pulsating brake-activated trailer lights are a relatively new concept, so adoption rates are still low. Blackford, however, expressed that Grote expects to see a ramp-up of usage amongst heavy-duty fleets.

“I expect over the next five years for the popularity of this to become fairly commonplace, and I expect that these fleets are going to be able to have some very significant data points that they can review,” he said.

While regulatory groups can sometimes be at odds with fleets and manufacturers, Blackford pointed out that all parties are in agreement when it comes to pulsating brake lights.

“FMCSA was very, very supportive of this whole initiative,” he said. “They encouraged us to go down this path when we approached them.”

While there are many positive outcomes, the most important factor when looking at utilizing pulsating brake-activated lights remains safety: preventing tragedies that may otherwise occur due to a careless traffic accident.

“I really believe in this product,” Blackford said. “I think it’s going to save lives.” ■



» Some fleets opt to use dual outboard lights. Mounting on a tank requires adhesive or brackets to avoid drilling or welding.

Photo courtesy of Peterson Manufacturing



» Balanced air disc and drum brakes deliver evenly distributed brake force and timing behavior for comfortable vehicle driving, optimal braking performance, vehicle stability, and even brake wear.

Photo courtesy of Bendix

# The great brake balancing act

Balancing air disc brakes and drum brakes is no easy task, but doing so can pay dividends in optimal safety and efficiency.

By James Alfred

**A**s with any new vehicle system, the advent of air disc brakes (ADB) changed maintenance requirements and vehicle configurations considerably for Class 8 tractor-trailer fleets. ADBs are becoming an increasingly common spec on Class 8 tractors in North America. However, most trailers, which are older than tractors, are still spec'd with drum brakes.

This difference in braking systems between the two pieces of equipment creates added service challenges for fleets because air disc and drum brakes have very different operating parameters that must be “balanced” in order to ensure optimal safety and efficiency on a tractor trailer. Unfortunately, doing so is a time-consuming process. As a result, many fleets elect not to balance brakes. However, fleets that do take the time and effort are rewarded with safer vehicles, longer brake life, and fewer associated maintenance issues over time.

“The trucking industry’s growing preference for air disc brakes versus conventional drum brakes is evident in the increasing adoption rates on both tractors and trailers,” noted Joe Kay, director, engineering, front drivetrain, Meritor. “Currently, we see the Class 8 market share of air disc brakes around 45% for tractors and around 15% for trailers. We anticipate that ADBs will account for more than 60% of the overall brake market by 2025.”

Although the adoption rate is lower, Kay added the steady ADB growth in tractors is also driving adoption in the trailer market.

“As fleets feel more comfortable with product knowledge and get to experience the benefits of ADBs on tractors, we believe trailers will follow at a faster pace than what we have seen in the past few years, potentially growing to a 40% adoption within the next decade,” he said.

### Stopping power differences

The essential issue in running both types of brakes on tractor-trailers is ADBs behave differently in that they can stop a combination vehicle in a shorter distance than drum brakes, explained Keith McComsey, product group director, air disc brake systems for Bendix Spicer Foundation.

“ADB maintain that stopping power more consistently throughout larger temperature ranges,” McComsey explained. “Drum brakes are not able to maintain consistent stopping power because of brake fade—a phenomenon where the drum heats up from repeated brake applications

representative in stop-and-go traffic, downhill descents, and/or repeated higher-pressure brake applies. Then, as the brake drum absorbs more and more thermal energy, it expands away from the brake friction. ADBs do not display this condition, since brake rotors dissipate heat more efficiently and/or when they do heat up, they expand toward the friction rather than away.”

The upshot here, McComsey said, is that maintenance managers need to understand that replacing the original friction with non-OEM friction can lead to different performance, including increased stopping distances, reduced pad wear life, accelerated rotor wear, and other issues. These changes in brake performance will then be experienced by drivers who had grown accustomed to the vehicle’s original stopping performance.

## Risks of unbalanced brakes

“Brake balancing includes, but is not limited to, the even brake force generation within a vehicle axle combination or tractor-trailer combination to ensure an equal and evenly distributed braking throughout the vehicle or combination,” said Dirk Wohltmann, director of engineering, Americas, Commercial Vehicle, ZF Group. He noted that maintenance managers should also consider other factors when running both brake types, such as the equal apply-and-release timing and pressure balance (axle-to-axle or vehicle combination), as well as the hysteresis between brake apply and release.

“At the end,” Wohltmann said, “there should be an evenly balanced brake torque throughout all involved braked axles (including trailer) in all possible braking situations: snub braking with low brake force, up to emergency braking with full torque in extreme short apply times, as well as reducing braking activity (release but hold brake). An evenly distributed brake force and timing behavior is important for comfortable vehicle driving, best braking performance, vehicle stability, even brake wear, and to prevent brake damage due to overload of individual brakes.”

And, Wohltmann added, fleets should also consider the safety risks that can arise from unbalanced brake systems.

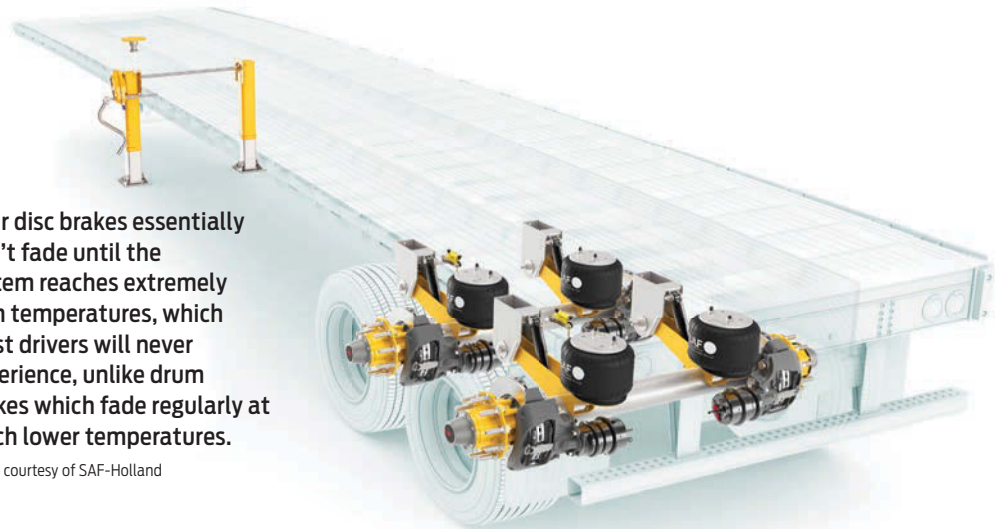
“Unbalanced brakes may lead to uneven brake wear and temperature impact, early fade-out of the drum brake with the full brake performance transferred to the remaining brakes (mostly the ADB), which would lead to lower overall stopping performance,” he said. “Other risk factors include overheating and disc rotor crack damage in ADB that could affect vehicle driving comfort and instability.”

According to Wohltmann, drivers can tell if a combination brake system is out of balance by looking for these problems:

- Early heat-related brake fade-out
- Trailer push or tractor over-braking (instability tendency)
- Individual brake overheating
- Uneven brake pad wear

Likewise, he noted, maintenance professionals can look for telltale issues such as:

- Uneven brake pad wear
- Damage to ADB or surrounding area
- ADB disc rotor cracking



» Air disc brakes essentially don’t fade until the system reaches extremely high temperatures, which most drivers will never experience, unlike drum brakes which fade regularly at much lower temperatures.

Photo courtesy of SAF-Holland



» Air disc brakes today are found on about 45% of all new Class 8 tractors and will likely be near 60% by 2025. Balancing their performance with drum brakes will be a maintenance issue for fleets for years to come.

Photo courtesy of Bendix

Optimal semi-trailer brake balance is a complicated mix of five factors, explained Tony Ryan, technical services and training manager for SAF-Holland. Those include mechanical brake force, pneumatic brake force, pneumatic balance between the truck and trailer, weight transference, and brake fade.

“Three of these factors are set before the driver takes off,” Ryan noted. “Weight transference can roughly be accounted for, but brake fade is the big unknown variable. If you don’t start with the first three correct, then you are fighting an uphill battle for safe braking of your vehicle.”

Ryan advised it takes extremely high temperatures, which drivers will never experience, to cause brake fade with air disc brakes. This is unlike drum brakes, which can more readily fade at much lower temperatures.

## Maintenance considerations

Before deciding to begin a brake-balancing maintenance program, fleets first need to set some basic goals, said Randy Salvatora, manager, engineering systems at Bendix Commercial Vehicle Systems. He noted that “balancing” can mean different things to different people, and that at a fundamental level the ability of a brake to absorb and dissipate energy can be described as thermal balance.

“Drum brakes tend to fade and reduce their torque output as they heat up, while disc brakes provide a more consistent torque output across a wider temperature range,” he explained. “When disc brakes are combined with drum brakes, the

disc brake will absorb additional energy that the drum brake is unable to (as a result of brake fade). This can lead to a perception of accelerated wear rates of the more effective [disc] brake, because the ADBs are carrying a larger share of the braking.”

The act of “balancing” brakes in a historical context meant a routine maintenance procedure of inspection, lubrication, and adjustment of the foundation brake hardware, Salvatora noted. “The initial pressure at which a brake starts to develop torque (described as the threshold pressure) is critical to a balanced brake system. This can be influenced by many factors, including design as well as maintenance.”

If an issue is suspected, Salvatora advised that fleets reference the Bendix BW1555 brake balance procedure guidelines or the SAE J1505 Brake Force Distribution Test Procedure to quantify and measure brake threshold and pneumatic balance of the braking system.

At Meritor, Kay said, brake balancing refers to brakes equipped on an axle-to-axle configuration, adding that brakes are sized and specified by gross axle weight rating for commercial vehicles. Additionally, he noted, FMVSS121 requirements will need to be met for commercial size vehicles using air brakes.

“All in all, it is important to remember that tractor and trailer brakes must always work as a system,” Kay stressed.

“Air disc brake and air drum brake balancing ensures that each brake is able to apply and release at the same time and is able to build torque to convert energy effectively,” he added. “The brakes need to work together when applied, and we want each brake to contribute its proper amount of work—with ‘work’ defined as the amount of energy converted during the stop.”

Optimizing brake torque output for the tractor-trailer combination helps to avoid stability concerns like pushing, pulling, or jackknifing the vehicle, Kay noted.

“Universal brake compatibility for existing tractor-trailer combinations has been a desire for our entire industry for a long time,” Salvatora said. “And to that end, brake compatibility has been examined and refined during each incremental progression of commercial vehicle technology.”

He suggested fleets communicate with the vehicle manufacturer and the brake system manufacturer for guidance on servicing and troubleshooting brake system issues. ▀



# Complex versus complicated maintenance

Vehicle service and repair can be broken down into two categories: that which can be reliably resolved, and that which cannot.

**Knowing when something is going to fail** seems impossible, though predictive maintenance vendors often tout the effectiveness of their technology. Onboard computers can notify the fleet when it is time to replace a component, calculating when a failure is likely to occur.

In reality, however, many failures are not related to wear or aging, so how can we know what is going to happen and when? This discussion leads into the sales pitches for artificial intelligence (AI). Will we reach a point where there is so much data that we reliably can predict the future?

People have been thinking about these issues for more than 80 years. There is a distinction in management called “complex versus complicated.” In a thesaurus, they are synonyms, but in real life, they are used differently. To confuse the two terms could be disastrous or—at the very least—a waste of money.

For these two terms, the dictionary is useless.

**Complicated:** (adjective) *consisting of many interconnecting parts or elements; intricate.*

**Complexity:** (noun) *the state or quality of being intricate or complicated.*

A more helpful definition of the two related concepts can be found when looking at systems.

**Complicated System:** *Exhibits linear behavior and is predictable. It is equal to the sum of its parts.*

Many machines and all modern trucks are complicated. We can study them and learn the rules and eventually understand how they work. Some failure is complicated. We must follow the rules to avoid failure.

Complicated problems can be hard to solve, but they are addressable with rules and recipes, like the algorithms that place ads on a Twitter feed. They can also be resolved with systems and processes, like the hierarchical structure that most companies use to command and control employees.

**Complex System:** *Exhibits non-linear responses, unpredictable behavior to inputs.*

The systems respond to positive and negative feedback with spontaneous emergence. Complex systems cannot be adequately described by analyzing the components alone.

There are many aspects to fleet maintenance that are complex, and applying rules of thumb, following recipes, or just using algorithms will not always work. Think about the complexities of supervision or of changing a maintenance strategy. It may be possible to follow the book, but two companies following the same book could end up in entirely different places.

» Solutions to problems are more reliable when we understand the underlying cause.

68325661 | Krolone | Dreamstime.com

Unlike complicated repairs, following all the rules does not ensure success.

The solutions to complicated problems don't work as well with complex issues, however. Complex problems involve too many unknowns and too many interrelated factors to reduce to rules and processes. A technological disruption like blockchain is a complex problem. A competitor with an innovative business model—such as Uber or an Airbnb—is a complex problem. No algorithm can determine how to respond.

We can ignore this problem as an exercise in semantics, except for one point. Rick Nason, associate professor of finance at Rowe School of Business in Nova Scotia, wrote in his book, “It's Not Complicated: The Art and Science of Complexity in Business,” that when facing a problem, managers tend to automatically default to complicated thinking. Instead, they should be “consciously managing complexity,” Nason explained.

Consciously managing complexity in a business context is broadly a function of four different strategies or tactics, he said. They are:

- Recognize which type of system you are dealing with.
- Think “manage, not solve.”
- Employ a “try, learn, and adapt” operating strategy.
- Develop a complexity mindset.

If we get back to complexity for failure prediction, I hope we are on the brink of making the complexity merely complicated. Is it possible that complexity means you don't understand the system?

**It may be possible to follow the book, but two companies following the same book could end up in entirely different places.**

Just over 100 years ago, there were several “cures” for common bacterial illnesses. The illnesses acted like a complex system where the outcome was not a given. People were given various cures, many of which were poisons that worked much like chemotherapy today. They didn't work reliably until the underlying causation (i.e., bacteria) was understood, and a way to attack them directly (i.e., antibiotics) was developed.

We can look at maintaining a fleet in much the same way. Solutions to various problems work more reliably when we fully understand the underlying cause. ■



**By Joel Levitt**

**PRESIDENT, SPRINGFIELD RESOURCES**

Joel Levitt is the president of Springfield Resources, a management consulting firm that services a variety of clients on a wide range of maintenance issues. Levitt has trained more than 17,000 maintenance leaders from more than 3,000 organizations in 38 countries. He is also the creator of Laser-Focused Training, a flexible training program that provides specific, targeted training on your schedule, online to one to 250 people in maintenance management, asset management, and reliability.



» The onus is on fleets to work with partners to promote the industry.

138731417 | Adonis1969 | Dreamstime.com

# Technician shortage toolkit

Fleets need to put in the work to help ease the shortage of qualified heavy-duty technicians in the workforce.

**In 2018, the ASE Education Foundation** surveyed current and former automotive students to learn how many went on to careers in the automotive service industry. Results showed that over 40% of graduates either never went to work in the industry or left within a couple of years. Many of them were employed in other technical trades, but many were either unemployed or working in retail/food service, etc.

Our industry is full of great job opportunities, so how are we failing to attract and keep these students? There is no shortage of students studying auto, truck, and collision repair. A separate survey indicates there are over

100,000 students nationwide in high school and college programs accredited by ASE. This contradicts a popular belief that the current generation is not willing to work with their hands. The inescapable conclusion is that we have a leaky pipeline, where many students either plan to pursue a career in a different field or go to work in the transportation service industry but leave within a short time.

The ASE Education Foundation repeated the survey in May, but this time with a deeper dive to learn the reasons students do not pursue or stick with a career in automotive service. The 2021 survey results confirmed many findings from 2018. First, students in programs accredited by ASE are more likely to feel well-prepared for their careers, earn ASE credentials, and enter the industry versus their counterparts from non-accredited programs.

Among all graduates who did not choose to go into automotive service, reasons that pushed them away from the industry outpaced the reasons that pulled them toward other career fields. Lack of skills, lost interest, and could not find a job were frequently cited reasons. They took automotive training classes but were never fully engaged in the industry early on. That made it easy for them to look elsewhere. That is the first leak in the pipeline.

What can fleets do to address this leak? First, support local schools and make sure they are ASE-accredited. That means getting involved, both as a member of the school's Industry Advisory Committee (they all have one; it is required) and sharing the career opportunities available in your business. Speaking to the students and providing job-shadowing opportunities are easy, low-cost ways to do this.

A separate survey of high school automotive students showed what a difference this can make: 30% of those not taking the class the following year said they do not see a career path. In the same survey, only 27% of students said their classes had been visited by a local employer. If we do not promote our industry's many career opportunities, who will? Instructors and career counselors may help out, but the message is more impactful coming from an employer or working technician.

A substantial number of students who do join the industry after graduation leave within just a couple of years. Key reasons included low wages, management conflicts, and lost interest. This is the second leak in the pipeline.

Fleets may have experienced the other side of this coin; they hired an entry-level tech after graduation, but they did not stay. Perhaps they lacked hands-on experience and were not very productive, so they were assigned the lowest skilled jobs and the fleet could not afford to pay them much. They may have had high expectations when they graduated and were not prepared for the real world of work. It is not surprising that many of them do not last and leave the industry permanently.

Some in the industry accept these leaks, saying that entry-level technicians must pay their dues. Others counter, saying we are "eating our young." Is there a solution? The

2021 survey gives us some important clues and reasons to hope. The key is something the education community calls work-based learning (WBL). WBL can take different forms such as internships, apprenticeships, or co-ops. WBL programs have structure, so students are working on a variety of tasks that directly relate to the systems and technologies they are studying in school. WBL students work hand in hand with mentors—experienced working technicians—who help them get real experience on different systems. This takes more coordination than assigning students to perform the same basic PM tasks over and over, but the advantages are substantial.

"To truly set people up for success, we need to address this critical shortage of qualified technicians with a triangle approach," said Arica Jackson with UPS Automotive. "First, education via career and technical centers and/or our community college system. Second, mentorship-based employer engagement to allow people to actually put into practice what they have learned. Third, membership in organizations such as ATA's Technology & Maintenance Council (TMC) to provide camaraderie and exposure to the career lattice opportunities within this industry."

The 2021 survey results bear this out: 62% of graduates who are still in the industry participated in WBL while they were in school, compared to 47% of graduates not in the industry. Nearly all found it helpful in preparing them for their career.

Why does WBL make such a difference? First, everyone wants to be part of a team, do something that matters, and see a career path for themselves. Working in the shop helps students learn the business and progress. Second, these students graduate with a larger skill set and are likely to be more productive right out of school. That means they can earn more early in their careers, and we can compete on wages with other industries.

## The pathway to retention

If we want to stop the leaks in the pipeline, there are two major steps we can take to support the current students who want to become our future workforce.

First, get involved with local schools and make sure they are ASE-accredited. If not, the members of the Industry Advisory Committee can work with instructors and administrators to earn accreditation. Second, go beyond speaking and job-shadowing, and in partnership with your local schools, start a WBL program and hire students to do meaningful work in your business while they are still learning.

By working with national partners such as the ASE Education Foundation and TMC, and with area high schools and colleges, along with other service businesses, we have the tools to solve our technician shortage. It will take work but is within our grasp. Take hold of those tools and put them to work to fix the leaky pipeline and ensure the continued flow of new entry-level technicians that we all need. ■



### By George Arrants

VICE PRESIDENT, ASE EDUCATION FOUNDATION

George Arrants is the vice president for ASE Education Foundation. 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 TMC SuperTech; the National Technician Skills Competition; and TMC FutureTech, the National Student Technician Competition. His entire career has been in the automotive service and education industries.

[ SPECIAL SECTION ]

ON LOCATION IN CLEVELAND

# TMC

TURNING EXPERIENCE INTO PRACTICE

Explore a special management and career development track  
Page 40

Technical and Study Group Sessions  
Page 44

## TMC SuperTech returns for 2021

### LETTER

From the Technology & Maintenance Council

Page 39

### TMC FALL MEETING

Mastering the new realities of maintenance management

Page 42

### VMRS

Partnership produces new key performance indicator benchmarking tool

Page 46

ODYSSEY

Extreme

EnerSys

31-PC2100

**TMC OFFICERS**

General Chairman / Treasurer  
**STACY EARNHARDT**  
 Best Specialized

Vice Chairman /  
 Meetings Chairman  
**RANDY OBERMEYER**  
 Online Transport, Inc.

Chairman, Study Groups  
**WINSTON MINCHEW**  
 Old Dominion Freight Line, Inc.

Chairman,  
 Associates Advisory Group  
**JILL GINGRICH**  
 WheelTime Network, LLC

Chairman,  
 Membership & Publicity  
**PETER SAVAGE**  
 Clarke Power Services

Immediate Past Chairman  
**KENNETH CALHOUN**  
 Altec Service Group

Executive Director  
**ROBERT BRASWELL**

**TMC DIRECTORS**

**SCOTT BARTLEIN**  
 Barry Trucking, Inc.

**JIM BOYD**  
 Southeastern Freight Lines, Inc.

**CHRIS DISANTIS**  
 Aim Nationallease

**ROGER MAYE**  
 Consolidated Metco

**RADU MIHAJ**  
 Burnco Rock Products

**KEVIN TOMLINSON**  
 South Shore Transportation Co.

**RANDY TUMBARELLO**  
 Genox Transportation, Inc.

**J. DAVID WALTERS**  
 ALCOA Wheels

**TMC MEETINGS**

**CLEVELAND, OHIO**  
 September 12-16, 2021  
 2021 Fall Meeting &  
 Transportation Technology  
 Exhibition; National Technician  
 Skills Competition  
 Huntington Convention Center

**ORLANDO, FLA.**  
 March 7-10, 2022  
 2022 Annual Meeting &  
 Transportation Technology  
 Exhibition  
 Orange County Conv. Center



# TECHNOLOGY & MAINTENANCE COUNCIL

TURNING EXPERIENCE INTO PRACTICE

July 1, 2021

Dear Trucking Industry Professional:

As TMC Executive Director, I invite you to attend — *in-person* — ATA's Technology & Maintenance Council's 2021 Fall Meeting, Sept. 12-16, at the Huntington Convention Center in Cleveland, Ohio. Once again, TMC's Fall Meeting features a strong slate of educational sessions for equipment professionals, as well as a host of activity geared for truck technicians.

The theme of TMC's 2021 Fall Meeting — **Mastering the New Realities of Maintenance Management** — centers around finding answers to the environmental, economic, cybersecurity and regulatory challenges that face our industry. Many of our educational sessions will address these topics, as explained in our fall meeting promotion. Moreover, this year's fall meeting will also feature the Council's Transportation Technology Exhibition — trucking's complete technology tradeshow — featuring technical experts from the industry's top manufacturers and suppliers.

In addition, TMC's **National Technician Skills Competition** returns for 2021, albeit in an abbreviated format due to space and distancing limitations. The event — **TMCSuperTech 2021** — will feature a one-day, one-track competition for heavy-duty, trailer, and light/medium vehicle technicians. The event showcases our industry's commercial vehicle technicians, who will compete for top honors and valuable prizes as they demonstrate their diagnostic abilities through a series of skills stations. Organized by TMC's Professional Technician Development Committee (PTDC), TMCSuperTech 2021 will take place on Sunday, September 12 and feature 10 tabletop stations and a written test. Awards will be given to the top three technicians and skills station winners during Wednesday Awards Luncheon. Technicians are welcome to attend all task force meetings, educational sessions and exhibit viewing periods following the competition on Sunday.

For details, please review the material provided in our meeting brochure, found on TMC's event website: <http://tmcfall.trucking.org>. For information, call (703) 838-1763.

On behalf of TMC's Board of Directors, I encourage you to take advantage of this opportunity and join us at TMC's 2021 Fall Meeting. We look forward to seeing you in Cleveland!

Sincerely,

Robert Braswell  
 TMC Executive Director

950 N. GLEBE ROAD, SUITE 210 • ARLINGTON, VA 22203  
 (703) 838-1763 • E-MAIL: [TMC@TRUCKING.ORG](mailto:TMC@TRUCKING.ORG)  
[HTTP://TMC.TRUCKING.ORG](http://TMC.TRUCKING.ORG)



» The TMC SuperTech competition will begin with the written test at 11 AM on Sunday, September 12.

Photo courtesy of TMC

# TMC SuperTech returns for 2021

The national technician skills competition will be held during the council's fall meeting.

The American Trucking Associations' Technology and Maintenance Council (TMC) announced the return of the national technician skills competition, TMC SuperTech, for 2021. While COVID-19 forced TMC to curtail the competition in 2020, the council's Professional Technician Development Committee (PTDC) is welcoming technicians to compete in Cleveland in September.

Due to social distancing and space limitations, TMC SuperTech 2021 will consist of a one-day, one-track competition featuring a written test and 10 skills stations, organized in a table-top format similar to that of the day one track of recent TMC SuperTech competitions.

**NOTE:** The national student technician competition, TMC FutureTech, will not take place this year.

TMC SuperTech 2021 will showcase the high degree of skill and knowledge shown every day by commercial vehicle industry technicians. TMC SuperTech is the only industry-wide competition dedicated both to honoring technician professionalism and acknowledging the "best of the best." Top winners also receive valuable prizes.

All technicians are welcome to compete. Winners with top scores will be named in the categories of traditional (heavy-duty), trailer, and light- and medium-duty vehicle technicians, in addition to those earning top score in each individual station. Certified grand champions of state trucking association competitions will be permitted to compete without charge (the most recent winner from 2019, 2020, or 2021 will be recognized).

The competition will begin with the written test at 11 AM on Sunday, September 12. It will continue

until approximately 6 PM with 10 skills stations.

Skills stations include:

- ➔ Wheel end
- ➔ Transmissions
- ➔ Engines and aftertreatment
- ➔ Lighting
- ➔ Fuels and lubricants
- ➔ Coolants and DEF
- ➔ Fasteners
- ➔ Belts and hoses
- ➔ Service information
- ➔ Brakes

For the first time, technician competitors will have access to TMC's transportation technology exhibition, task forces, technician sessions, and study group sessions following the conclusion of the competition. They will have the opportunity to see what TMC's technical groups have to offer and contribute to the development of new industry standards. Awards will be presented on Wednesday, September 15, during the TMC SuperTech Awards Luncheon from 12:45 to 2:15 PM.

TMC is once again looking for the industry's best technicians. If you or one of your employees thinks they have what it takes to place their diagnostic and problem solving skills up against trucking's "best of the best," come to TMC SuperTech 2021.



## Special management and career development track

TMC's 2021 fall meeting will feature this special track on Thursday, September 16. Three sessions will be offered: one covering the use of root cause analysis and problem solving techniques to reduce waste in fleet management, one covering basic accounting skills, and one covering leadership skills development.

### Management Session 1 — Root Cause Analysis and Problem Solving Training Session: "A Deep Dive Into the Causes of Waste Within Fleet Maintenance"

Thursday, September 16 — 8 AM-12 PM

During this four-hour session, attendees will work through root cause analysis and problem solving approaches, designed to eliminate waste and increase efficiency in finding solutions. A cross-disciplinary approach will help fleet managers see each others' perspectives during this interactive session.

The session will focus on reducing waste in four main areas: tires, preventive maintenance, aftertreatment/fuel, and brakes. Attendees will be organized into groups of six to eight and shown how to complete a fishbone diagram and a value stream map to solve waste challenges. The groups will then share their results and attempt to help each person determine the low hanging fruit within his or her business based on current processes or lack thereof.

### Additional in-depth critical problem solving training

Saturday, September 11 — 9 AM-4 PM

A more in-depth critical training session will be held September 11 from 9 AM to 4 PM. During this expanded offering, we will delve into critical problem solving activities geared around the attendee's fleet maintenance business needs by using their real business data. If properly prepared with useful data, attendees will end the day with multiple projects ready to implement when they return to work. The following list is an example of the lean tools to be used: A3, Pareto, Fishbone Diagram, Low Hanging Fruit Model, Gant Chart, Spaghetti Diagram, Swim Lane Chart, Process Map, 5 Why, and more. Pre-session work will be required. Be aware, this is not a simple "watch and learn" session and you should only attend if you are serious about actively participating. Additionally, attendees should be prepared to share the good, the bad, and the ugly about their fleet maintenance operation and the potential to uncover the waste within it. Space is limited: Call TMC at 703-838-1763 or email [tmc@trucking.org](mailto:tmc@trucking.org) to sign up for the Saturday training session.

### Management Session 2 — Basic Accounting Skills for the Business Professional

Thursday, September 16 — 8-9:30 AM

This management session will focus on basic accounting skills for the business professional. Learn the jargon, standard practices, and everyday applications of finance and accounting. Elements of key Microsoft Excel features and capabilities will also be explained.



Your actions and decisions affect the financial picture for your fleet. If you are making those decisions without a solid knowledge of finance and accounting, you are operating in the dark. Finance courses for beginners are developed to meet the specific needs of non-financial people. With this training class, you will learn the basics of accounting and finance in easy-to-understand terms. What's more, you

will learn how to apply and use the information to operate more efficiently and successfully.

**Management Session 3 – Be the Manager Your Employees Want to Follow**  
**Thursday, September 16 — 9:45-11:15 AM**

Discover how great managers take extra steps to ensure their work environments are

open, trusting, innovative, and productive. As a result, your employees will respond positively. Learn to deal with loss of enthusiasm on the job. Find out an acceptable approach to employee motivation. Determine what behaviors you should model for effective leadership and which techniques do not work. This will be an excellent summary on how to take your managerial skills to the next level.

**TMC SuperTech 2019 Sponsors**

**PLATINUM**

- Aurora Parts and Service
- Fleet Maintenance
- Great Dane
- Hyundai Translead
- Lincoln Technical Institute/ Nashville Auto-Diesel College
- Noregon/JPRO
- Reliance Supply, Inc.
- Snap-on/Nexiq Technologies
- TechForce Foundation
- Transport Topics
- University of Northwest Ohio
- WyoTech

**GOLD**

- ASE
- FedEx Freight
- Hendrickson
- Imperial
- Mack Trucks Academy
- Meritor
- Mobil Delvac
- SAF Holland
- UPS
- Volvo Trucks Academy
- WABCO
- ZF

**SILVER**

- BorgWarner
- Cummins, Inc.
- Dorman Products
- Eaton
- Fontaine Fifth Wheel
- Hutchens Industries
- MAXON
- T/A Truck Service

**TMC SuperTech Past Grand Champions**

- 2005 — Steve Talmadge
- 2006 — Tyson Sontag
- 2007 — Bryan Lewis
- 2008 — Bryan Lewis
- 2009 — Christopher Tate
- 2010 — Jeff Schlecht
- 2011 — Jeff Schlecht
- 2012 — Chris Barnett
- 2013 — Mark McLean, Jr.
- 2014 — Mark McLean, Jr.
- 2015 — Eric Vos
- 2016 — Eric Vos
- 2017 — Mark McLean, Jr.
- 2018 — Philip Pinter
- 2019 — Kelby Bentley



**Experience MAC Trailer, Experience Excellence**

*Now with even more dealer locations across the United States!*



*From Dumps to Flatbeds, Transfers to Tanks, MAC Trailer has what you are looking for!*



SCAN ME!

*Experience Excellence*





» TMC's exhibit schedule for 2021 opens Monday evening with the traditional grand opening and continues Tuesday and Wednesday with protected, extended format time blocks, giving members the time they need to explore what the Transportation Technology Exhibition has to offer.

Photo courtesy of TMC

# Mastering the new realities of maintenance management at TMC's 2021 Fall Meeting and Transportation Technology Exhibition

Join TMC in Cleveland for the 2021 Fall Meeting & Transportation Technology Exhibition. This will be the first year of a three-year engagement at the Huntington Convention Center, which runs through fall 2023.



» Do you know why your batteries fail? The S.1 session will do a deep dive into battery forensics. An expert panel will discuss battery failure analysis and show attendees what to look for when conducting post-mortems on this important starting and charging component.

Photo courtesy of TMC

Comprising a broad cross-section of experienced fleets, equipment suppliers, and service providers, no other industry trade association can match the real-world experience and technical expertise of TMC's membership. By providing leadership support and opportunities to collaborate, TMC helps members develop the industry's best practices that address the critical truck technology and maintenance issues that have the greatest impact on truck fleets.

### Where industry solutions are forged

More than just a trade show, TMC is home to trucking's leading fleet professionals, vehicle manufacturers, and component suppliers. It is the industry's leading forum for getting things done collaboratively. From brakes to bearings, from scanners to software, ATA's Technology &

Maintenance Council's (TMC) study groups and task forces cover it all.

### Best educational program available

Whether your interest is staying current on equipment, maintenance, or technology issues, there is no better venue than TMC meetings to catch up on industry-specific news.

### History of cooperative development

TMC is a place for serious work, and the council's dedication to the cooperative development of voluntary industry best practices is evident through the publication of the recommended engineering and maintenance practices adopted by the industry. These practices represent 65 years of industry knowledge. Today, TMC's growth and strength comes from its pioneers and visionaries who have dedicated much of their lives to the council.

### Maximize your membership—attend TMC's fall meeting

If you are a TMC member or your company is an ATA member, you are part of an important team dedicated to improving our industry in a way that no other group can. If you have not attended TMC's Fall Meeting and Transportation Technology Exhibition before, you are missing out on an important aspect of TMC/ATA membership. Meeting veterans will attest that attending TMC meetings maximizes their membership investment. It enables both fleets and suppliers to make personal contact with an incredible cross-section of the industry's most important and influential equipment and technology specialists, putting you in touch with North America's top technical professionals and fleet decision makers.



» Shop Talk, open to all registered attendees, offers a unique chance to learn and share the tricks of the trade from the industry's best experts.

Photo courtesy of TMC

### Trailblazers in thought leadership

For fleets, this means having direct access to information on equipment and technology specifications and maintenance best practices. At TMC, equipment and technology professionals can:

- Attend the industry's most innovative educational sessions covering all aspects of vehicle maintenance and design, planned by fleets, for fleets.
- Gain and share information with hundreds of your peers at TMC's Shop Talk, a free-form discussion on equipment issues. Resolve troubling equipment issues at TMC's Town Meeting and Fleet Operators' Forum.
- Participate in voluntary standards-setting efforts through TMC's study groups and task



» Tires now have the capability to capture important data elements about their performance and health status, and telematics transmit that data to drivers and fleet back offices in an instant. Is your operation making best use of this valuable information or can it even access it in real time?

Photo courtesy of TMC

forces, which are tackling important issues such as wheel-end thermal events, electric vehicle standardization, and emerging onboard technologies.

- » Witness and participate in the most informative technical event—TMC’s Transportation Technology Exhibition. TMC’s exhibition makes available to attendees the best minds on equipment issues in the trucking industry.
- » Participate in TMC’s Future Truck Initiative. As the only industry association that is focused solely on truck technology and maintenance, TMC and its member companies work together with OEMs to create the industry’s standards for future truck technology and equipment that help ensure that the truck of the future is one that is the most efficient to operate and maintain.

**The industry’s best meeting value proposition**

TMC also includes a host of meals during the week—a big savings for budget-conscious fleets. Here is what you get for your full meeting registration:

- » Access to more than a dozen educational sessions including Shop Talk
- » Entrance to ‘Trucking’s Complete Technology Tradeshow’
- » Chance to participate in over 100 industry task forces
- » Three breakfast events
- » Two luncheon events
- » Two evening receptions

- » TMC’s Social Event
  - » TMC’s Fleet Operators’ Forum
  - » Unequaled networking opportunities
  - » Access to the industry’s best technical experts
- Fleet or supplier, TMC offers so much for you. As North America’s premier technical conference for trucking, it is an event you simply must attend to stay current on industry practices.

There is simply no other venue that offers so much information on how to maximize fleet performance and efficiency. It is your one-stop shop for fleet education, supported by the industry’s only user-driven best practices. At TMC, we are mastering the new realities of maintenance management, and we look forward to seeing you in Cleveland this September.

# H<sup>+</sup> MAAXUPTIME™

*Helping you work more efficient.*



**MAAXUPTIME™** by Hendrickson is the one-stop site that connects you with the right part the first time. This powerful, free tool streamlines the process for finding and installing Hendrickson Genuine Parts for original fit and original performance.

**MAAXUPTIME.COM . . . aftermarket solutions are a click away!**

**H<sup>+</sup> HENDRICKSON**  
Genuine Parts



### Educational sessions

#### → TECHNICAL SESSIONS

##### **The Great Debate — The Future of Tractor-Trailer Connectivity and Communications**

###### **Technical Session 2**

**Wednesday, September 15 — 2:30-4 PM**

Rapid technological advances are driving manufacturers and suppliers to developing a myriad of systems for next generation combination vehicles that promise to improve safety, maintenance, reliability, and readiness. Smart trailers and telematics are completely changing the way trailing vehicles are being spec'd, and the trend will only continue to escalate in the future.

Add to this the industry's move toward electric vehicles, platooning, and automated and autonomous truck technologies and it becomes clear the current data bus and communication systems onboard commercial vehicles will not be up to the demands of tomorrow's units. Higher voltages and greater communications bandwidth will be a necessity for these cutting-edge systems.

But what is the right solution for fleets?

When antilock braking systems were reintroduced to industry in the 1990s after a disastrous first go-round in the 1970s, government regulators and some manufacturers were keen on doubling the connections between tractor and trailer to increase capacity for other systems. But most fleets at the time objected, questioning the value of adding a second connector and cable when the costs of maintaining the industry standard seven-pin connector were troublesome enough. From this dissatisfaction emerged the PLC4Trucks solution, which preserved the single connector/cable arrangement and helped contain maintenance costs, especially those caused by corrosion.

Now the industry is revisiting the future of tractor-trailer connectivity and communications and the great debate is this: Do we need additional cables and connectors or are there other solutions that can do the job with less maintenance concerns?

This session will be organized in a classical debate format between opposing points of view on this central question. Audience mem-



bers will be able to pass judgment on the arguments presented by both sides. This is a session you will not want to miss.

##### **Electrified Vehicle Specifications and What's Important (Batteries, Motors, Energy Efficiency, Duty Cycle, & Range Capability)**

###### **Technical Session 1**

**Tuesday, September 14 — 8:30-10 AM**

Electric powertrains are fast coming to the medium- and heavy-duty Class 5-8 markets, spurred on by state and federal regulators' interest in reducing emissions and fleet interest in meeting customer-driven social, regulatory and sustainability goals. Is your operation ready for this technological revolution?

Commercial vehicle industry leaders have been closely watching developments in California that are driving adoption of all-electric powertrains. In 2020, the California Air Resources Board (CARB) updated its policy on the percentage of Class 7-8 zero-emission vehicle (ZEV) sales in the state, raising its mandated target from three to five percent by 2024. By 2030, that mandate will rise to 30 percent, double the state's original target.

Nearly all of the major manufacturers and some newcomers to trucking have either announced plans to sell or are actively taking orders now to sell commercial electric trucks. By 2021, the major vehicle manufacturers are expected to deliver electric units in albeit small volumes as compared to their conventional offers, but the numbers are expected to grow. These will join a short list of suppliers such as Lion Electric that are already producing units for commercial use.

Spec'ing electric trucks will be quite different than spec'ing their diesel counterparts. Fleet managers will have to take a fresh look at what is important in setting specifications, especially when it comes to batteries, motors, energy efficiency, duty cycles, and range capability.

Attend this session and hear from our expert panel what your operation needs to know when venturing into the brave new world of electric vehicle specification.

#### → STUDY GROUP SESSIONS

##### **Electrification is Coming ... Are You Plugged in? Infrastructure Development and Factors Fleets Need to Consider**

###### **S.18 Automated & Electric Vehicles Study Group**

**Tuesday, September 14 — 3:15-4:45 PM**

Vehicle electrification is coming and sooner than you may think. As noted in the description of our full technical session—"Electrified Vehicle Specifications and What's Important (Batteries, Motors, Energy Efficiency, Duty Cycle, & Range Capability)"—many manufacturers will be delivering all-electric offerings as early as 2021, and fleets will have to deal with the special nuances associated with these units.

How will electric vehicles be recharged and how fast? What will be the power requirements for the charging stations that will need to be installed at fleet locations and fueling stations on the road? What will the configuration be for those charging stations—vehicle side (left/right), vehicle front, or something else?

Then there are the changes that will come to the shop environment when servicing these new vehicles. How will preventive maintenance change and what additional training will your technicians need?

Attend this session and learn what fleets will need to do to prepare for all-electric vehicle infrastructure and other factors associated with taking delivery of these revolutionary trucks.

##### **Accelerating Advancements in ADAS: Ongoing Progress with FMCSA's Tech-Celerate Now S.5 Fleet Maintenance Management**

**Tuesday, September 14 — 5-6:30 PM**

Advanced Driver Assistance Systems (ADAS) can help drivers avoid crashes, whether they result from driver error or from circumstances outside the driver's control, such as sudden intrusions into the driver's lane (e.g., road hazards and other vehicles). ADAS technologies are especially helpful for avoiding or mitigating the impact of rear-end crashes, which represent nearly half of all two-vehicle crashes.

These technologies improve a driver's view of the roadway, alert drivers to impending danger ahead of or on the side of the vehicle, maintain safe travel distances between vehicles, and warn drivers if they perform a maneuver that could increase the risk of a crash (such as abrupt lane changes). Some systems even initiate braking if drivers don't (or can't).

The Federal Motor Carrier Safety Administration's (FMCSA) new initiative in partnership with the Intelligent Transportation Systems (ITS) Joint Program Office—entitled "Tech-Celerate Now"—is focused on accelerating the adoption of ADAS by the trucking industry to reduce fatalities and prevent injuries and crashes. Many industry leaders are working together on the "Tech-Celerate Now" Program, under the leadership of the American Transportation Research Institute (ATRI), the American Trucking Associations (ATA), ATA's Technology & Maintenance Council (TMC), and the Owner-Operator Independent Drivers Association (OOIDA) Foundation.

TMC task forces are working to develop recommended practices in support of this program in the areas of technician training, nomenclature standardization, specifications, and inspection/enforcement. Attend this session and learn about the current and future trends for ADAS technology and what developments your operation can expect now and in the near future. We will hear from veteran and new fleet users and designers of ADAS technology. There will also be the opportunity to test your knowledge on ADAS through a special interactive segment.

##### **How to Spec Trucks in 2022 and Beyond**

**S.3 Engine Study Group**  
**Tuesday, September 14 — 5-6:30 PM**

Spec'ing commercial vehicles has changed dramatically since the turn of the century, and even more substantial changes are yet to come. Is your operation ready for the next shakeup?

While electric vehicles are gaining much media attention these days, it is a safe bet that diesel-powered trucks and tractors will be with us for many years to come in North America. However, the way next generation units are spec'd will definitely differ from today's models.

Attend this session and learn from our panel of experts what will be the impact of new(er) challenges related to aftertreatment and emissions, automated manual transmissions, and Advanced Driver Assistance Systems (ADAS). We will also cover the impact of other important areas such as tire size, engine downspeeding, engine horsepower/torque, and vehicle tare weight. With used-truck values trending higher and higher, fleets must understand vehicle specifications' suitability for the secondary market while also taking into consideration what options used-truck buyers will expect in the coming years.

### **Battery Forensics and Failure Analysis**

#### **S.1 Electrical Study Group Tuesday, September 14 — 3:15-4:45 PM**

The ever-changing requirements of the trucking industry have driven vast improvements in battery technology. Battery manufacturers have not only had to improve the durability of batteries in general, but they have also been faced with the challenge of designing batteries for specialty applications.

But while batteries have gotten better, too many batteries are retired prematurely. In fact, some studies show as many as 50 percent of batteries returned for warranty are determined as "no trouble found." In the many of the remaining cases, battery life was compromised due to other maintenance-related issues or misapplications.

Do you know why your batteries fail? Attend this session as we do a deep-dive study into battery forensics. Our expert panel will discuss battery failure analysis and show attendees what to look for when conducting post-mortems on this important starting and charging component based on TMC recommended practice and other industry guidelines.

### **The Connected Tire**

#### **S.2 Tire & Wheel Study Group Wednesday, September 15 — 4:15-5:45 PM**

Telematics are revolutionizing truck technology and tires are no exception. Tires now have the capability to capture important data elements about their performance and health status, and telematics transmit that data to drivers and fleet back offices in an instant. Is your operation making best use

of this valuable information or can it even access it in real time?

During this session, our S.2 Tire & Wheel Study Group will host a discussion in a special talk show format—moderated by industry veteran Peggy Fisher—discussing the use and benefits of the latest tire-related technologies including tire pressure monitoring systems (TPMS), automatic tire inflation systems (ATIS), telematics, digital tire management solutions, and the cloud. These advanced technologies provide fleet managers with visibility of their tires; enable them to improve their tire programs, CSA scores and customer service; and reduce tire-related labor, breakdown and fuel costs. Experts will include fleet executives as well as technology/system suppliers.

### **Electronically Controlled Braking Systems for Automated & Electric Commercial Vehicles**

#### **S.6 Chassis & Brake Systems Study Group Wednesday, September 15 — 4:15-5:45 PM**

New requirements for reduced stopping distance (RSD) and stability are prompting manufacturers to consider emerging technologies in order to reduce response time in heavy-duty commercial braking systems, thereby improving overall vehicle safety and efficiency. TMC's Future Truck Committee—through its Future Chassis and Brake Task Force—has been exploring developing technologies in braking that utilize other methods of brake actuation beyond current hydraulic and pneumatic brake systems, one such example being an electro-mechanical braking system (EMB).

Current hydraulic and pneumatic braking systems require many moving parts that must be activated by air moving through tanks, long hoses and valves before the actual pad or disc is brought into contact with the rotor/drum surface. This process can exceed 0.5 seconds, which translates to 44 feet of travel at a speed of 60 miles per hour. EMB would reduce the number of moving parts needed and decrease actual brake application time.

Automated driving and platooning technologies for heavy-duty trucks will be enhanced by electronically controlled braking applications. Attend this session and learn how these braking applications will benefit commercial vehicle operations and what "braking 2.0" will look like in the near future.

## **Trucking's technology trade show**

**TMC's signature Transportation Technology Exhibition will be held in person during TMC's 2021 Fall Meeting, scheduled for September 12-16 at the Huntington Convention Center of Cleveland in Cleveland, Ohio.**

From brakes to bearings, from scanners to software, ATA's Technology & Maintenance Council's study groups and task forces cover it all. This is the technology marketplace for the trucking industry, and you are invited to participate.

TMC's exhibit schedule for 2021 opens Monday evening with the traditional grand opening and continues Tuesday and Wednesday with protected, extended format time blocks, giving you the time you need to explore what the Transportation Technology Exhibition has to offer.

TMC is dedicated to developing industry recommended maintenance and engineering practices in all areas of commercial vehicle equipment. Attendees include presidents and CEOs, senior maintenance and equipment executives, directors of maintenance, fleet managers, and other key decision makers responsible for millions of pieces of equipment in every possible vehicle vocation.

TMC has grown to become the premier technical exhibition for new trucking-related products and services. This is a must-attend show at which smart suppliers access the industry's leading equipment purchasers. TMC looks forward to you joining us at trucking's complete technology trade show this September in Cleveland, Ohio.

## **Other features of interest**

### **TMC Kickoff Breakfast**

**Tuesday, September 14 – 6:45-8:15 AM**

*Featuring: Shawn Ellis, Personal and Professional Development Expert*



» Shawn Ellis

Photo courtesy of TMC

Recognized as a "world leader in personal and professional development," Shawn Ellis is in demand as a speaker, workshop leader, and resilience coach to help busy professionals thrive in the face of adversity, uncertainty, and change. Ellis will present his insights on finding certainty in the midst of uncertainty, drawing on lessons from the fields of mindfulness, neuroscience, and psychology, combined with intervention coaching methodologies.

### **TMC's Town Meeting & Fleet Operators' Forum**

**Monday, September 13 – 5:15-6:45 PM**

TMC's Town Meeting provides an opportunity for the Council to present members and attendees with information about what is happening within TMC. Reports are provided regarding Council membership, meetings, and exhibits, as well as TMC recommended practices, information reports, technical policy advisories and products. Additionally, a federal regulatory report is provided by a senior representative of ATA's regulatory and policy affairs department.

TMC's Fleet Operators' Forum immediately follows the Town Meeting. Here, fleet attendees bring up equipment problems that they have been unable to resolve successfully with their product manufacturer or supplier. If you have an issue you would like raised, contact TMC at 703-838-1763 or use the following link to report your issue: [https://www.surveymonkey.com/r/TMC21A\\_FOF](https://www.surveymonkey.com/r/TMC21A_FOF)

### **Fleet Talk / Shop Talk**

**Monday, September 13 – 4-5 PM**

Fleet Talk and Shop Talk rank consistently as the most popular features at TMC general meetings. TMC's Fleet Talk is a dialogue based on TMC's Shop Talk format but open only to fleet attendees. Topics from this session will be raised at Shop Talk later in the week for open discussion. Shop Talk, open to all registered attendees, offers a chance to learn and share the tricks of the trade. At both sessions, two veteran fleet managers will discuss what works or does not work in vehicle maintenance.



» TMC has been working diligently to bring new maintenance and repair resources to its fleet members.

204911431 | Nicoelino | Dreamstime.com

## Council expands information offerings related to vehicle maintenance and repair benchmarking

Among the new TMC initiatives includes the launch of a new partnership with Decisiv to produce a benchmarking tool designed to track key performance indicators for commercial vehicle parts and labor based on the Council's VMRS.

By Robert M. Braswell

Fleet managers have long asked for benchmarking data to compare themselves to their peers, but that information has typically been hard to come by—especially when it comes to commercial vehicle maintenance and repair. With that in mind, ATA's Technology & Maintenance Council (TMC) has been working to bring new resources to its fleet members to help fill this need.

Among the new TMC initiatives includes the launch of a new partnership with Decisiv to produce a benchmarking tool designed to track key performance indicators for commercial vehicle parts and labor based on the Council's Vehicle Maintenance Reporting Standards (VMRS). This new partnership between TMC and Decisiv offers Council fleet members a valuable benefit to help them benchmark their overall parts and labor costs against actual costs captured in the Decisiv SRM platform.

After being offered initially as a TMC member benefit, TMC and Decisiv plan to provide this maintenance labor and parts data benchmarking report organized by VMRS System Level Coding based on



» VMRS provides the data for measuring performance and reliability of specific components. The new TMC/Decisiv benchmarking tool shows that VMRS is an important tool for reporting maintenance information," said Jack Poster, VMRS services manager, TMC.

Image courtesy of TMC

fleet and service provider data from hundreds of thousands of maintenance events that take place within the Decisiv platform. The report will track parts and labor expenditures and trends throughout North America, sorted by geographic location and dozens of VMRS-coded vehicle systems.

"VMRS provides the data for measuring performance and reliability of specific components. The new TMC/Decisiv benchmarking tool shows that VMRS is an important tool for reporting maintenance information," said Jack Poster, VMRS

services manager, TMC. "I think that many will agree that VMRS is the proven method used when it comes to collecting maintenance data."

"We are pleased to be partnering with TMC to deliver their membership this new level of comprehensive VMRS focused service cost analysis," said Mark Wasilko, Decisiv's vice president of marketing. The currency of the reported information will provide a new level of accuracy in the analysis of the actual costs of maintenance and repair that has never before been available. We believe it will provide critical insights that will be of immediate benefit to both fleets and service providers alike."

The new Decisiv TMC North American Service Event Benchmark reports are possible because of the rapidly growing amount of data being collected by Decisiv on over 13,000 daily service and repair events for the more than 7 million commercial assets being managed on Decisiv's SRM platform operating across the U.S. and Canada. The summaries are compiled from more than 275,000 monthly service maintenance and repair events conducted across nearly 5,000 service locations. The reports will be made available to members starting this summer. For more information, visit: <https://bit.ly/2UcqlXx>

This latest offering joins the established TMC/FleetNet America Vertical Benchmarking Roadside Breakdown Program—Benchmarkit—which is also a TMC fleet member benefit. Each quarter, members receive an executive summary of the latest findings. Additionally, fleets that participate by sharing their data are provided an analytic tool that allows them to drill into their data, comparing it to the industry average.

Benchmarkit is a collaboration between TMC/ATA and FleetNet America and is open to TMC fleet executive level members and FleetNet customers. The analytics provided via the program are cumulative and non-fleet specific.

During its 2021 Spring Meeting, TMC released the results of the fourth quarter 2020 Vertical Benchmarking Roadside Breakdown survey. During the fourth quarter 2020, the average fleet operated 36,315 miles between unscheduled roadside breakdowns, which is largely in line with previous quarters. The frequency of unscheduled roadside repairs varied widely between the three verticals involved in the program (truck-load, tank, and LTL). The data indicates that the maintenance practices of the best-in-class fleets in each vertical resulted in lower costs for those fleets. For more information, visit: <https://bit.ly/3qclXxt>

Earlier this year, TMC also partnered with Fullbay, a service shop management platform software firm out of Phoenix, Arizona, in creating the first *State of Heavy-Duty Repair* report. The report covers repair shop demographics, inventory management, technician hiring and shortages, and shop technology and software. The heavy-duty repair space also indicated its top three challenges as hiring technicians, inefficiencies in repairs, and properly managing inventory.

TMC is also updating its Fleet & Service Provider Average Standard Repair Time (SRT) Survey. The purpose of the study is to aid in establishing baseline repair times that will improve shop productivity and profitability. This will be the third year





# FLEET PARTS & COMPONENTS

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



## » Covers a range of Isuzu models

The **ABS Wheel Speed Sensors**, No. 970-5212, from **Dorman Products** are direct replacement ABS wheel speed sensors designed to match the fit and function of an original equipment sensor. Made of quality materials with factory-style electrical connectors, this sensor has undergone try-on and material testing to ensure a quality fit and reliable performance. Applicable for Isuzu NPR 2010-07, Isuzu NPR-HD 2020-12, Isuzu NPR-HD 2010-08, Isuzu NQR 2010-08, and Isuzu NRR 2010-08 models.

For more information visit [FleetMaintenance.com/21226700](http://FleetMaintenance.com/21226700)



## » For Freightliner Cascadia 2018-07

The **Windshield Seal**, No. 750-5200, from **Dorman Products** is designed to match the fit and appearance of the original part on Freightliner Cascadia 2007-18. Made of quality materials, it is engineered for reliable performance and durability to properly seal the windshield channel.

For more information visit [FleetMaintenance.com/21226702](http://FleetMaintenance.com/21226702)



## » Removes injector deposits

**TotalArmor Clean450** from **Lubrication Specialties, Inc.** is a multifunctional aftermarket additive that improves ignition, power, and fuel economy. This additive is engineered to remove "sticky" injector deposits including both External Diesel Injector Deposits (EDIDs) and Internal Diesel Injector Deposits (IDIDs). Developed to provide a significant performance boost and raise cetane numbers by seven points, this additive resulted in restoring power by 87% in a modified Peugeot CEC F98-08 DW-10 test.

For more information visit [FleetMaintenance.com/21226876](http://FleetMaintenance.com/21226876)



## » Weighs just 66.9 lb

**WABCO MAXXUS L2.0 Air Disc Brakes** from **ZF's Commercial Vehicle Control Systems Division** weigh just 66.9 lb. ZF engineers have developed an advanced adjuster mechanism that is designed to continuously and precisely maintain optimal running clearance between the brake pads and rotor even under extreme conditions, thereby minimizing the risk of hot runners. In addition, MAXXUS L2.0 air disc brakes feature the company's most advanced taper wear mitigation system, with an offset integrated pressure plate and larger piston that is designed to provide more consistent, precise pressure across the full pad face, ensuring more even pad wear.

For more information visit [FleetMaintenance.com/21226885](http://FleetMaintenance.com/21226885)



## » Permanently bonded steel shell

**Motor Wheel** re-colored their **CentriFuse Drums** and **CentriFuse HD Drums** to blue and red, respectively. Genuine Centrifuse brake drums are specified for a wide range of commercial trucking operations. Drum construction (material fusing technology) ensures exceptional drum strength. CentriFuse offers safety, low cost of operation, and proven performance for maximum equipment uptime, the company said. The blue and red colors symbolize Made in America.

For more information visit [FleetMaintenance.com/21226892](http://FleetMaintenance.com/21226892)



## » 30,000-lb fully tested rating

The **CURT PowerRide** is a fifth wheel hitch that features a 30,000-lb fully tested rating and a 7,500-lb vertical load limit. Features include a cast head with multi-directional tilt, a self-resetting handle, enhanced portability, and no welding or fabricating required for installation. The hitch uses two interlocking jaws to fully wrap the kingpin for less chocking. The self-resetting handle resets the jaws to the ready-to-couple position after uncoupling. PowerRide features a one-pin head removal system for installation and removal. The fifth wheel head is equipped with a wear indicator that also contributes to smoother towing and eliminates the need for grease or a lube plate. PowerRide is tested to SAE J2638 specifications for safety.

For more information visit [FleetMaintenance.com/21226895](http://FleetMaintenance.com/21226895)

## » Available in 32- and 55-Diesel Gallon Equivalent (DGE) tank capacities

The **Vocational Side Mount System** from **Momentum Fuel Technologies** is a compressed natural gas (CNG) fuel system in a smaller diameter side-mount 32- and 55-diesel gallon equivalent system. The smaller diameter system is integrated on the frame rail of the truck, providing up to 18" of ground clearance—beneficial for construction and vocational users. It is equipped with GreenLync 2.0 technology providing an in-dash driver message center, Cummins engine ECM integration, and telematics support. Fuel lines are color-coded yellow, and PRD live lines are red for safety. Features include integrated Momentum fuel management module with chrome one-touch fuel door latch, Type IV cylinders with quarter-turn ball valves, and NGV1 and HD fill ports available on driver and passenger side.

For more information visit [FleetMaintenance.com/21226705](http://FleetMaintenance.com/21226705)



## » Enhances scrub and wear resistance

**Michelin's X MULTI T-SA Pre-Mold Retread** is designed to address the scrub and stresses in spread and tag axle applications while also providing mileage performance in regional operations. A rubber compound enhances scrub resistance and wear rate. It is available with a 16/32" tread depth in six tread base width/tread width with wings configurations. The **X ONE Line Energy T2 Pre-Mold Retread** is designed to lower the TCO for line-haul through improved tread wear and fuel savings. Microsipes and a solid shoulder help reduce irregular wear. A winged tread provides shoulder adhesion to the casing, while waded grooves help prevent stone drilling and wide grooves promote water evacuation. It meets SmartWay requirements and is available in a 375/425 tread base width/tread width with wings size with a 13/32" depth.

For more information visit [FleetMaintenance.com/21226899](http://FleetMaintenance.com/21226899)





# TOOLS & EQUIPMENT



A roundup of the latest tool and equipment offerings.



## » Measures 6.5" in overall length

The **Matco Tools 20V+ Cordless Infinium 3/8" Brushless Impact Wrench Kit**, No. MCL2038HIK, features a patented impact mechanism that reduces vibration. Its compact design measures 6.5" in overall length and its brushless motor technology provides 600 ft-lbs of breakaway torque. The impact wrench has four LEDs to illuminate the entire work area clearly and to light the way in poorly lit shop environments or engine compartments. In addition, the composite glass filled nylon housing is durable against drops and resistant to shop chemicals while the soft rubber over molded handle provides a comfortable and confident grip.

For more information visit [FleetMaintenance.com/21204657](http://FleetMaintenance.com/21204657)



## » Heavy-duty gator clips provide secure connection

The **Lisle Corporation Relay Pro 12V and 24V Relay Tester**, No. 60150, tests relays by simply clipping the test leads onto the relay terminal pins using a 12V or 24V DC power source. It tests a wide range of four and five pin relays including shielded, non-shielded, relays with different pin sizes, and four pin normally closed relays that other testers may incorrectly show fail, the company says. The tester automatically determines the relay configuration, allowing the fully insulated gator clips to be connected in any order. Its 45" power leads with heavy-duty gator clips provide a secure connection to the power source.

For more information visit [FleetMaintenance.com/21208068](http://FleetMaintenance.com/21208068)



## » Press fits front seal to engine block and crankshaft

The **CTA Front Crankshaft Seal Installer Tool - 6.6L Duramax Diesel**, No. 3879, is designed to fit front seal to engine block and crankshaft for proper fitment of inner and outer seal body. It services GM/ISUZU 6.6L Duramax 2001+ GMT800, 2500HD, and 3500. To install, simply set new seal on inner body of tool and attach outside ring of tool to the end of the crankshaft assembly. Then, turn forcing screw to press in new seal. The tool is comparable to GM's factory tool J-44642, the company says, and works with CTA's Rear Crankshaft Seal Installer Tool - 6.6L Duramax Diesel, No. 3878.

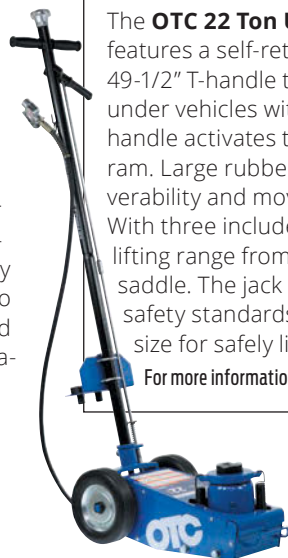
For more information visit [FleetMaintenance.com/21208448](http://FleetMaintenance.com/21208448)



## » Protected against water and dust

The **Ledlenser P7R Core Flashlight** emits up to 1,400 lm and features Smart Light Technology for custom light functions. The versatile lamp is powered by a 21700 Li-ion battery, which can be easily charged via its magnetic charge system. Thanks to Flex Sealing Technology, the P7R Core is protected against water and dust, and can be used underwater for a short time.

For more information visit [FleetMaintenance.com/21211478](http://FleetMaintenance.com/21211478)



## » Includes three saddle attachments

The **OTC 22 Ton Under Axle Jack**, No. UA22, features a self-retracting, spring return with long 49-1/2" T-handle to let users easily position jack under vehicles with long overhangs. One pull of the handle activates the self-retracting 22-ton capacity ram. Large rubber-tired steel wheels aid in maneuverability and movement on most types of terrain. With three included saddle attachments, it has a lifting range from 8.27" to 10-2/3" using the longest saddle. The jack meets all five ASME PASE-2019 safety standards for service jacks and is an ideal size for safely lifting heavy-duty vehicles.

For more information visit [FleetMaintenance.com/21212195](http://FleetMaintenance.com/21212195)

## » Available in 1/4", 3/8", and 1/2"

The **Milwaukee Tool Extended Handle Ratchets** are designed with features that offer accessibility for work in tighter spaces. The ratchets have a 90-tooth design delivering 4 degree of arc swing. The 4 degree of arc swing combined with a slim profile head and a flush directional lever contribute to increased accessibility. The all-chrome finish provides the ratchets with easy cleaning. They also feature longer handles, increasing leverage in applications challenged by stubborn nuts and bolts. The ratchets are available in sizes: 1/4" (No. 48-22-9005), 3/8" (No. 48-22-903), and 1/2" (No. 48-22-9050).

For more information visit [FleetMaintenance.com/21212356](http://FleetMaintenance.com/21212356)



## CLASSIFIEDS

Call Mike Uliss at: 770-516-4704  
MIKE@FLEETMAINTENANCE.COM

## ADVERTISER INDEX

| Advertiser                   | Page  | Advertiser                   | Page    |
|------------------------------|-------|------------------------------|---------|
| Autel US Inc.                | 7     | Isuzu Truck                  | 15      |
| BendPak                      | 3     | Kafko International          | 24      |
| CanDo International, Inc.    | 22    | Launch Tech (USA) Inc.       | 9       |
| Chevron                      | 26-27 | Mac Trailer Enterprises      | 41      |
| Clarios                      | 17    | Mohawk Lifts (LiftPoint USA) | 25      |
| Cojali USA, Inc.             | 5     | Nexiq/Snap-on Diagnostics    | 2       |
| Cooper Tire & Rubber Company | 14    | Noregon Systems              | 24 & 52 |
| Gray Manufacturing           | 31    | Premier Manufacturing        | 30      |
| Hendrickson                  | 43    | Red Classic Transport        | 23      |
| Hutchens Industries, Inc.    | 16    |                              |         |



**Best motor oil money can buy!**

Wholesale prices  
[bestautofluids.com](http://bestautofluids.com)  
412-328-0294

Contact Mike Uliss  
to Place Your Ad Here  
770-516-4704  
mike@fleetmaintenance.com



» High-performance engine oils can extend oil drain intervals, reducing scheduled maintenance costs.

165982476 | Wattanaphob | Dreamstime.com

# The journey and continued evolution of heavy-duty engine oils

As commercial vehicle engines advance, engine oils keep up by providing lower viscosity, greater oxidation resistance, and improved aeration control and shear stability.

**Engine oil is the lifeblood of heavy-duty trucks.** It protects the internal workings of the engine to help it run efficiently and reliably. Heavy-duty engine oils have evolved to meet the needs of modern fleets and today's engine technology, but how and why have they changed, and what is the future for heavy-duty engine lubricants?

## Engine oils in focus

The role of engine oil is important to consider before exploring the advances in modern lubricant technology. High-quality lubricants can maintain and improve the efficiency and performance of heavy-duty fleet engines. By minimizing metal-to-metal contact between moving components, as well as reducing pumping and rotational losses, engine oils can improve the engine's efficiency and fuel economy.

Lubricants also provide vital protection to the internal workings of the engine to prevent wear, which can result in unplanned maintenance and downtime. The right choice of lubricant can help prevent this, saving fleet managers and maintenance teams both time and money.

## Modern engine lubricant needs

Heavy-duty trucks and engines have evolved considerably over recent decades. This has consequently driven innovation in engine oil development to ensure that they meet the needs and challenges of modern fleets.

For example, new engines run at higher temperatures, so they need more durable engine oils to help prevent oxidation and wear. The latest engine architecture also features tighter internal clearances and therefore require lower viscosity lubricants that can flow more easily around the engine to provide protection. It is this engine design, combined with the desire across the industry to improve

fuel economy and efficiency that has driven the transition toward low viscosity engine oils.

The most recent oil standards, API CK-4 and FA-4, address these challenges by providing greater oxidation resistance along with improved aeration control and shear stability. This results in enhanced engine protection and efficiency and, in turn, improved fuel economy. Added to these key benefits, today's high performance engine oils also offer the potential to extend oil drain intervals, which can reduce scheduled maintenance costs and help keep fleets on the road for longer periods between oil drains. Maintaining a vehicle's warranty is a key consideration when extending drain intervals, so it is crucial to involve the OEM in the process and seek support from expert lubricant technical service advisers. Extending oil drain intervals should always be undertaken in conjunction with an oil analysis program.

## The next steps for heavy-duty engine oils

In the near future, it is likely that the industry trend toward lower viscosity engine oils will continue to drive lubricant innovation and achieve even better fuel efficiency for fleets. This can be seen within API CK-4 engine oils and the ongoing transition to their counterpart, API FA-4 lubricants.

By looking to the passenger car industry, we can understand the low viscosity journey that the heavy-duty industry is on. Passenger car engines are becoming more efficient due to legislation and demand for greater fuel economy and lower emissions. This has resulted in lower viscosity engine oils that offer superior protection and maximize engine power output for greater performance. The passenger car industry is several steps and years ahead of the heavy-duty fleet sector, but it is forging a pathway that we will likely follow as we head toward lower viscosity grades such as SAE 0W-20 and SAE 5W-20 lubricants.

Also on the horizon is PC-12, which will be developed based on Phase 3 of the greenhouse gas emissions regulations from the Environmental Protection Agency and California Air Resources Board. An announcement regarding PC-12 has yet to be made, but it is expected to be timetabled for 2027 and to continue the trend toward lower viscosity grades such as SAE 5W-30 and SAE 5W-20.

Heavy-duty engine oils began a journey toward lower viscosities several years ago, and today the industry is continuing on that pathway with engine architecture and technological developments forging the way. PC-12 is beginning to appear on the horizon, and as the roadmap has been marked out by the passenger car industry, it will be here sooner than we think. ▀



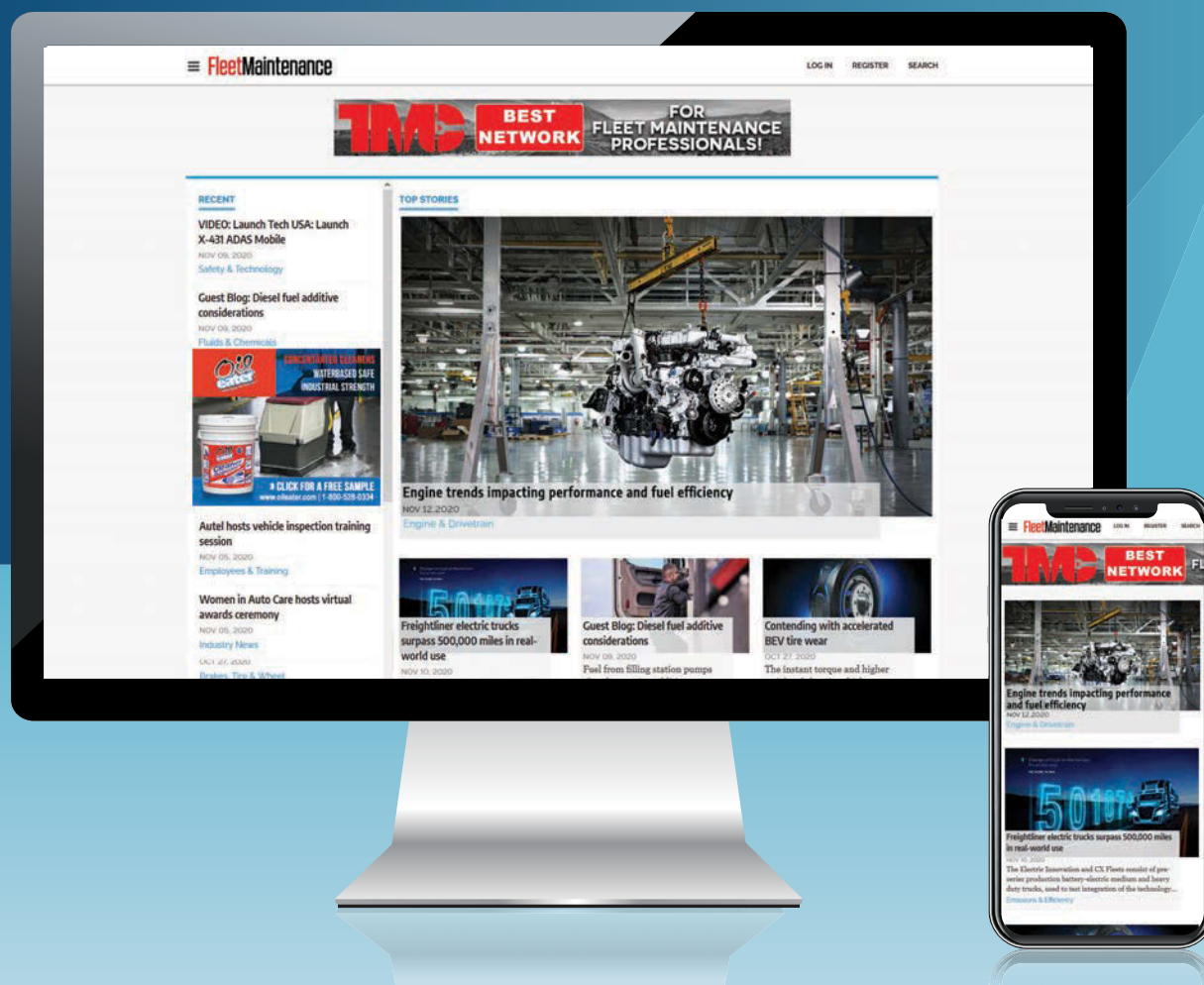
### By Darryl Purificati

SR. TECHNICAL ADVISOR, OEM/AUTOMOTIVE AT HOLLYFRONTIER LUBRICANTS & SPECIALTIES, WHICH INCLUDES THE PETRO-CANADA LUBRICANTS BRAND

Darryl Purificati has 27 years of experience working in the oil and energy sector as a technical advisor. He joined Petro-Canada in 1994 to support its lubricants business and the Petro-Canada Lubricants brand. Darryl has successfully undertaken various roles including Lubricants Research and Development, OEM Sales, Fuels Quality, and Technical Services. Since 2012, Darryl's expertise has been utilized across the industry in his role as industry liaison and technical advisor for OEM and driveline products. Darryl is also widely involved within the industry as an active member of the American Petroleum Institute (API), ASTM International, and the Society of Automobile Engineers (SAE).

# FleetMaintenance

Same great *Fleet Maintenance* content, new website



**Fleet Maintenance has a new URL** dedicated to delivering the critical content you've come to expect to help you maximize vehicle uptime for your fleet, including:

- » Fleet maintenance & management best practices and procedures
- » Identifying ways to improve and optimize shop operations
- » Investigating how current and future technologies will impact maintenance processes

**DON'T MISS OUT! TAKE A TOUR!**

**[www.FleetMaintenance.com](http://www.FleetMaintenance.com)**



# MAXIMIZE UPTIME

## UPGRADE YOUR REPAIR PROCESS.

Improve your shop efficiency to maximize uptime. Pair JPRO® Professional with NextStep® Repair for the most comprehensive diagnostic and repair tool available today. JPRO gives technicians the tools to thoroughly diagnose and troubleshoot vehicle issues and NextStep Repair's step-by-step instructions remove the guesswork from repair work.



**JPRO**  
PROFESSIONAL



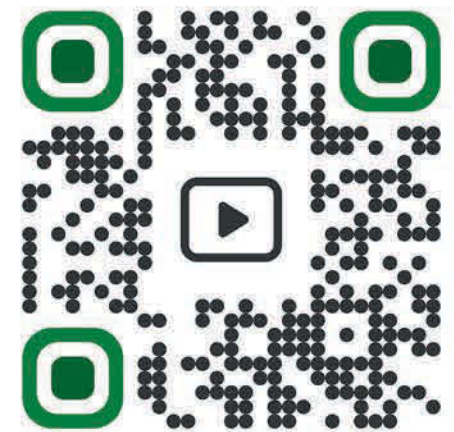
**NEXTSTEP**  
REPAIR



**NOREGON**  
VEHICLE DATA EXPERTS

For available discounts call: (855) 889-5776

Learn more: [www.noregon.com/jpro](http://www.noregon.com/jpro)



**LEARN MORE /  
VIEW COVERAGE**