

DECEMBER 2018

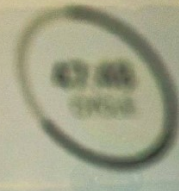
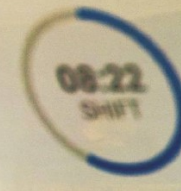
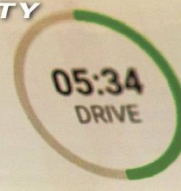
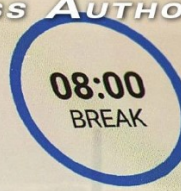
HDT

HEAVY DUTY TRUCKING

THE FLEET BUSINESS AUTHORITY

**TEST DRIVE
KENWORTH T880S
ON THE HIGHWAY**

00.00
09.26
01.49
00.00



HOS RECAP

Monday May 07

Tuesday May 08

Wednesday May 09

**PUSHING 10 MPG
WITH MACK'S ANTHEM**

**RECHARGE YOUR
ELECTRICAL MAINTENANCE**

CLASS 8 UPDATE

**ARE YOU GETTING
THE MOST FROM YOUR**

ELDS?



WHY YOUR ELECTRICAL MAINTENANCE PROGRAM IS MORE IMPORTANT THAN EVER

By **Deborah Lockridge**, Editor in Chief
dlockridge@truckinginfo.com

“Little things mean a lot” has never been so true as when it comes to electrical maintenance. Truck electrical systems have become highly sophisticated, with multiple micro-processors controlling many truck systems.

The engine controls that handle fuel management and emissions, GPS/navigation systems, collision mitigation technology, advanced cruise control, cab climate control, antilock brakes, electronic logging devices, video recording, telematics systems, power inverters, tire pressure monitoring systems, and more, all tie in to the electrical system and are a potential source of added electrical loads and points of failure.

“The electrical systems on trucks today touch nearly every component on the vehicle,” says Jeff Brakley Sr., product line manager for Maxwell Technologies, which makes an ultracapacitor start module. “There are a myriad sensors that monitor a growing number of operational parameters to maintain peak performance, improve safety and increase efficiency. All of these sensors and electronic control units present ever-increasing demands on the

truck’s electrical systems and batteries.”


Darryl Stuart, DWS Fleet Services, works with multiple fleets as a limited-time maintenance executive and points out the importance of making sure these sophisticated systems are getting the proper electrical connections.

“Any time there’s any resistance, it could alter the milliamps, could alter the signal,” Stuart says, “because today we’re essentially sending signals to control boxes to do things. You know what happens when the signal gets weak with cable or satellite TV and the screen goes all checkerboard? It’s a weak signal. With electronics, if you don’t have the proper electrical flow, it’s going to affect something, and it’s going to corrupt the data.”

More sophisticated systems call for more sophisticated maintenance and diagnostics. Yet all too often, technicians end up replacing batteries or other components, when the true culprit lies elsewhere in the electrical system.

What technicians don’t know

Realizing that electrical and electronic problems are an ever-increasing challenge, the American Trucking Associations’ Technology & Maintenance Council earlier this year offered a free online assessment of electrical knowledge for fleet and



Most fleets’ trailer lighting problems are related to failures or damage to the lighting and electrical harness system caused by corrosion.

service provider technicians.

The assessment was aimed at providing a baseline benchmark for knowledge training and reinforcement and was based on TMC’s Recommended Practice RP 1204, Mechanics Electrical Skill Evaluations.

The assessment evaluated knowledge in the following areas:

- Understanding of basic electrical concepts.
- Reading simple electrical wiring diagrams with electrical symbols.
- Performing circuit measurements with a volt-ohm meter.
- Solving basic circuit equations using Ohm’s Law.
- Knowledge regarding the data bus.

The questions were divided into four knowledge categories, Fundamental, Application, Data Bus, and Advanced. TMC recommends techs who have responsibilities for truck electrical system maintenance should achieve a minimum of 85% correct responses to the Fundamental, Application, and Data Bus category questions. Technicians



PHOTO: PAUL HARTLEY

who score 85% on the Advanced questions have demonstrated an excellent understanding of basic electrical theory.

More than 250 people completed the assessment, says Jack Legler, TMC technical director. Overall, they did not hit that 85% mark, except for in the Fundamental section. Application knowledge was 75%, Advanced 57%, and Data Bus was 54%.

“We basically found that most technicians have an adequate knowledge of electrical concepts and in general how to use a multimeter,” he says. “However, we found there was an overall deficit in skills and knowledge on the analytics side — how do we interpret the readings of a multimeter in solving electrical system problems? In addition we found a deficit in knowledge of the 1939 data bus, the data backbone in the vehicle.”

The results did not surprise Legler. “It kind of supported what people who do a lot of training and problem intervention, electrical problem fixing in the field, are seeing,” he says.

Panelists in a session on the results at the TMC fall meeting shared real-world situations where technicians weren’t able to analyze a circuit correctly or understand the implications of a meter reading and it ended up costing the fleet lots of money. Maybe the problem was a loose ground strap, but they ended up replacing the alternator.

Stuart remembers a fleet he was working with that didn’t have the best battery and electrical maintenance program.

“They spent \$4,500 to overhaul a transmission, and what it really was, was the electrical supply to the transmission had corrosion. It wasn’t getting the right voltage in milliamps. Consequently, that was a \$4,500 mistake.”

Similarly, Phillips Industries, in one of its QwikTechTips, notes that often the battery is blamed when power failures occur. “With up to half of all batteries being discarded that still have life left in them, this initial conclusion isn’t always right and is just a symptom of the real underlying problem. Frequently, the issue can be traced to the battery cables,

ranging from something as simple as a loose connection to something as severe as corrosion in the electrical system.”

TMC’s Legler emphasizes that “it’s not just a matter of plug and play; you’ve got to understand and be able to troubleshoot, follow the errant electronics, starter circuits and batteries. Everybody looks for fault trees — if I see this, I have to replace this part. We don’t want to go there, especially when you talk about these really complex interconnected electrical systems. Especially if we go to a 24-volt system, which seems likely, electrical skills are going to be absolutely critical.”

Common problems

Corrosion, parasitic draw, and battery charging are among the common issues that can largely be prevented with proper spec’ing and rigorous maintenance.

“Most electronics today are very robust, especially if they have been designed to be installed on a truck, but if they cannot get the voltage and current they need, they will

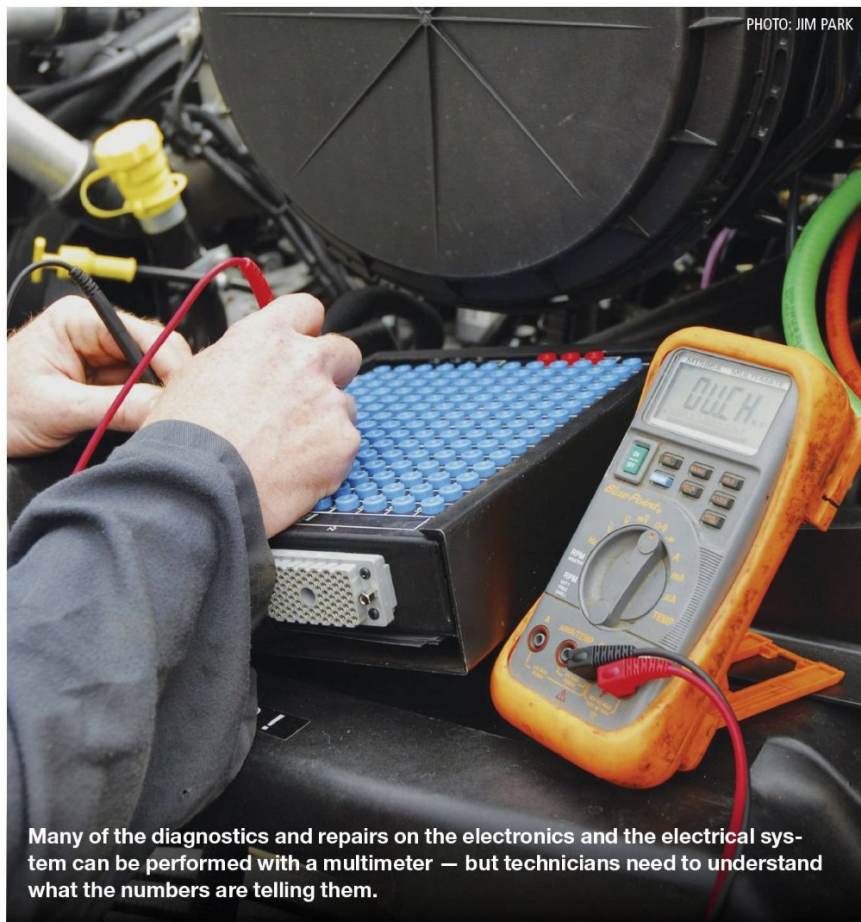


PHOTO: JIM PARK

Many of the diagnostics and repairs on the electronics and the electrical system can be performed with a multimeter — but technicians need to understand what the numbers are telling them.

not operate properly,” says Dale Henningson, chief research engineer for Purkeys, which provides battery and electrical products and tools.

And one key culprit is corrosion, which prevents the electrical system from conducting electricity as it should, causing resistance.

“Most fleet’s trailer lighting problems are related to failures or damage to the lighting and electrical harness system caused by corrosion,” says Mark Assenmacher, director of marketing at Peterson Manufacturing. “Common problems such as intermittent ‘flickering’ of lights, diodes out on LED lights, voltage drops on double or triple trailer configurations, and simply non-functioning lights on trailers may be a result of moisture and eventually corrosion entering the wire harness and lighting system.”

Why is the electrical system so vulnerable to corrosion? As the electrical system is powered and unpowered, wires heat up and expand, explains Phillips Industries in a QwikTechTip. “When wires cool and con-

tract, they draw in the air around them, including moisture and contaminants like de-icing chemicals. The molecular make-up of commonly used de-icing chemicals is about 50% smaller than traditional road salt and are hygroscopic, meaning they can pull moisture from relatively dry air, resulting in an accelerated corrosion process.”

To prevent corroded and loose connections, you can spec corrosion-resistant electrical system components. And technicians should regularly inspect and keep the wiring and connections in the electrical system clean and tight.

In addition, Phillips says, avoid splicing into wiring. “If you must repair the wire harness, or any kind of wiring, use heat-shrink terminals. Heat-shrink terminals conform to the size and shape of the wire, creating a permanent seal.”

Fleets also need to be aware of parasitic draw. If you must have devices that add too much parasitic draw, or if trucks sometimes sit for long periods of time, a solar charging system could be added to

the truck or the trailer to help keep the batteries charged and ready to go.

“If the electronics continue to draw current from the batteries after the truck is turned off, this parasitic draw can discharge the batteries,” says Purkeys’ Henningson. “If the batteries get too discharged, they won’t be able to crank the engine and the truck won’t start.

“Batteries that are kept charged will not only function better, but they will also last longer.”

Batteries also commonly suffer from amperage spikes due to failing or low-voltage batteries during engine startup, and low-capacity batteries that require high alternator charging amperage, which can lead to overheated batteries, according to Bruce Essig, national program manager for transportation at Enersys, which sells Odyssey AGM batteries.

The most common mistake fleets make, he says, is allowing batteries to get deeply discharged and then not bringing them back to a full state of charge.

“Trying to start trucks with low state of charge or weak capacity batteries can cause high amperages and low voltages. This can overheat the starter motor and can damage battery cables.”

Fleets should prevent batteries from becoming extremely deeply discharged — dropping to less than 10V due to extended storage with vehicle support loads, Essig says. This can happen over extended holidays, as well as when vehicles are in for maintenance.

The importance of the PM

The Truckload Vertical Benchmarking study from the TMC and FleetNet America looks at the amount of miles between roadside repairs for participating fleets.

Sharp Transport, with nearly 135 trucks, stood out as having much longer times between electrical-related breakdowns. In fact, during the second quarter, Sharp ran 5.7 times further between unscheduled electrical roadside repairs than the average.

So we talked to Jarit Cornelius, a former HDT Emerging Leader, who is vice president of maintenance and compliance at the Tennessee-based truckload fleet.

“It’s not something we do different,” he explains. “I just think we pay attention to the details. We treat the PM program as the most serious thing we do on a day-in and day-out basis.”