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Eberspaecher
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Winterization warrior

Battle the elements with these equipment solutions

The blistering dog days of summer burn off into crisp, cool nights. A chill creeps down your spine when you leave for work without a jacket. The air smolders with the smell of burning leaves and the trees reflect a kaleidoscope of color as your productive rigs roll down the road. You know what's coming. Take a deep breath, gather your wits and get ready to go to battle against cold-weather starts and corrosion. Winter is right around the corner and *Fleet Equipment* has you covered. Heed these equipment-focused tips to stay frosty and keep your trucks running through the worst old Jack Frost can throw at you.

Coolant heaters

Idling definitely keeps the truck warm to avoid freezing up in frigid temperatures. It's also a great way to waste a lot of diesel. Auxiliary power units (APUs)—both diesel and electrically powered—offer a solution to keep your

cabs warm, comfortable and powering addition creature comfort devices. (Note: For more on the fuel efficiency benefits of APUs, check out the story on page 48). When it comes to taking care of the engine, coolant heaters ensure that the engine is ready to roll regardless of how cold it gets at night.

Coolant heaters are typically started by a control switch that kick on the heater, which does a safety check of components such as flame sensor, water temperature sensor, coolant pump, fuel pump, etc. The coolant pump starts up as the heating element heats up and the fuel pump starts to draw diesel into the combustion chamber. A fuel and air mixture is ignited to heat the coolant. The temperature monitors the temperature to ensure that the recommended temperatures are maintained and your engine starts without a hitch.

Given that the coolant heater is still using diesel fuel to

create its heat, how much fuel does it save versus engine idling? We put that question to John Dennehy, vice president of marketing and communications for Eberspaecher.

"It's tablespoons compared to gallons," he said. "The fuel used by a diesel fired heater is significantly less than a diesel engine running in the same period at idle. In terms of productivity, using the heater will allow the driver to start work earlier instead of waiting around until the truck is at operating temperature. If the driver runs the truck at the dock when unloading or loading or when waiting in queue, he or she will be able to use the heater as well; reducing idling and fuel costs."

According to Josh Lupu, director of marketing for Webasto, idling can use up to 1 gal. of diesel fuel per hour. "By using a coolant heater, idling is not necessary because the coolant is circulated through the heater, warming the coolant and warming the engine—using a small fraction of what it would take to idle the engine," he said. "This fuel savings adds up quickly and can mean thousands of dollars a year."

Savvy fleet managers might be concerned about placing additional electrical burden on their trucks, given the ever-increasing number of components that are drawing power from the battery. Both Eberspaecher and Webasto explained that very little battery power is needed and that coolant heaters typically have a low voltage shutdown that prevents the heater from drawing power that the truck needs to start.

As Eberspaecher's Dennehy alluded to, you can also use the heat from the coolant heater to warm the cab. "We find a coolant heater can do everything that a customer needs, including supplemental heat to the bunk via OE heat exchanger," he said. "Air heaters only heat the cabin, and if you are not concerned about coolant temperature it is a simple solution. If you need the coolant and cabin temperature, you need to use a coolant heater."

Of course, it depends on application. In temperate climates where

engine performance isn't a concern, but taking the chill out of the morning air in the cab is, an air heater is a viable solution.

However, there is a growing case that is being made by both Eberspaecher and Webasto that a coolant heater will help keep the engine operating at the optimal temperature and improve engine performance.

"A coolant heater will heat the engine to operating temperature; therefore, the emissions systems on the vehicle can work sooner than they do today," Dennehy said. "Even in the warmer months, bringing the engine up to operating temperature is required for the emissions systems and the heater can do that. They can also help prolong your DPF filter changes by avoiding the cold starts."

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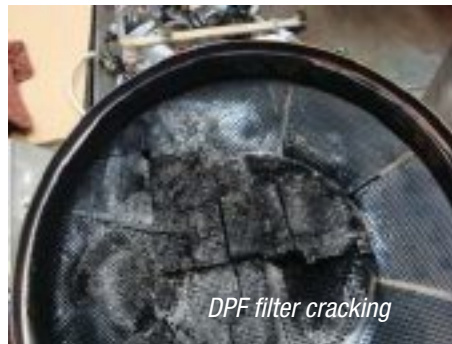
Component Coverage

Webasto's Lupu explained that a coolant heater increases exhaust temperatures rapidly, which aids in catalyst activity.

"The important point is that while a coolant heater is thought of as a cold-weather product, it actually has emission benefits year-round," he said. "It can significantly increase DPF performance which means a reduction in face plugging, wet stacking and filter overloading. Using a Webasto coolant heater can reduce PM by up to 66% and NOx by up to 40% on start-up."

Lupu also shared results from an independent study commissioned by Webasto, which showed that PM emissions from an engine equipped with a 5 kW (17,000 BTU) Webasto coolant heater were reduced by 66% by pre-heating the engine during cold weather conditions, and by 27% during normal ambient conditions.

NOx emissions were reduced by around 40% by pre-heating



the engine in both warm and cold climates. CO2 was reduced by 29% during winter conditions and 62% during normal ambient conditions. This was tested in a normal ambient testing environment of 75° Fahrenheit. This means that coolant heaters are effectively reducing emissions and improving DPF performance year-round in any part of the country,

Webasto stated.

Both Eberspaecher and Webasto agree that coolant heater ROI is realized within one year of purchase, and in some cases, even sooner. Of course, this depends on fuel price, idling habits and heater usage.

Keeping the lights on

Corrosion is often the culprit of inoperable lighting during the winter months. The salt, sand and sludge road crews put down to fend off ice can wreak havoc with your electrical systems.

"All exterior electrical interfaces are subjected to both the moisture and the aggressive chemicals used during winter," said Mark Blackford, Grote's national fleet manager. "All electrical connections will need protection of utmost quality to deter the initial stages of corrosion. Lighting can be dramatically impacted if the harness/pigtail system is not designed specifically for the brand of manufactured lamp."

Blackford noted that once cor-



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rosion has penetrated the harness system, the integrity of the entire harness is susceptible to current and future problems. So what should fleet managers focus on to ensure a proper connection?

"The easiest point of entry for corrosive contaminants is at overmolded connectors, regardless of the type of connection," said Tim Gilbert, Peterson Mfg. Co.'s corporate director of heavy-duty sales.

Tom Begin, director of innovation and emerging technologies for Phillips, echoed that in the J560 plug and socket are most susceptible because it is frequently exposed to the elements and can trap moisture and contaminant.

"Because the seven-way plug and

socket are designed to industry standards and is interchangeable, there is a gap which can allow moisture to make its way to the front of the plug and socket where the corrosion can occur," Begin said. "Wiring, which is powered more frequently, or all of the time, will corrode much faster because of the power being applied. In the seven-way connection, this is the blue auxiliary circuit. Bottom line, if there is an unsealed connection anywhere, it is very easy for moisture to enter. Also, any wiring that is cut or nicked provides an opening for corrosion along with frayed, or worn connectors and plugs."

Gilbert listed off a few quick tips to prevent corrosion:

- Never disconnect silicone-sealed plugs (AMP, Packard or Deutsch connectors) unless absolutely necessary.
- Repair cuts in insulation or other breaches immediately, since moisture can wick down wires quite far, quite quickly.
- Only use glue-filled, heat-shrink

Fuel heater facts

Fuel heaters, such as the FTG 6400 Series diesel fuel filter/heater/water separator, utilize coolant to transfer heat to the incoming diesel fuel, and are installed on the vacuum side of the fuel system and the pressure side of the coolant system. Incoming coolant circulates through the center of a heat-absorbing head and radiates out through four circular fins. Diesel fuel is heated as it flows through the coiled heat exchanger. After preheating, the fuel flows down to the spin-on filter and the siphon tube continually purges any trapped air.

"Cold diesel fuel can have flow issues and can also restrict or clog non-heated primary fuel filters," said Robin MacDonald, sales manager for FTG Inc. "Excess or 'free' heat from the engine is transferred to the engine coolant which is then exchanged in the fuel heater/water separator."

MacDonald explained that FTG fuel heaters range from \$300 to \$600, and ROI can be realized by avoiding one unexpected cold-weather related downtime service call.

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Component Coverage

connectors when repairing wiring. And, of course, never puncture wiring with a continuity probe.

- Inspect wiring often, paying special attention to overmolded junctions.

- Ensure wires are routed so that connectors are not pulled taut.

"Keep the J560 plug, nose box terminals, and non-sealed connectors—such as PL10, PL3 and .180 bullet

connectors—liberally greased, but do not use dielectric grease on any type of plug that contains a silicone seal," he stressed. "That will prevent it from sealing properly."

When it comes to using dielectric grease, some harness systems and LED lamps are designed to use said grease and the designs of those particular modular connections provide reservoirs to hold that grease.

"When properly used, the grease forms a barrier that resists moisture

at the connection point," said Brett Johnson, president and chief executive officer of Optronics International. "However, the connectors must be inspected regularly and the grease replenished as needed. Some fleets even apply heat-shrink moisture barriers to all electrical connections to provide an added line of defense."

Inspect this Top winter tips

Fleet Equipment caught up with **Homer Hogg**, manager of technical development with **TA Truck Service**, who recommended the following cold-weather maintenance tips.

- * It only takes a few inexpensive maintenance procedures to get a truck ready for the deep freeze of cold climate driving.
- * Always start with a thorough inspection of the batteries and cables. The batteries must be tested to ensure that they can handle the extra demand of extended dark hours and cold cranking conditions.
- * Once the condition of the truck's batteries is confirmed and any bad battery has been replaced, test the cables and connections with an adequate tool. When metal parts of an engine are cold, it takes more energy from the starter to crank the engine. This energy comes from the batteries in the form of electricity. If connections are loose or corroded, the additional electricity won't make it from the batteries to the starter and back home to the batteries.
- * Additionally, be sure to check the operation of the truck's defrost system, heater, coolant freeze protection and air brake systems. A quick check of the amount of moisture in the air tanks indicates the effectiveness of an air dryer. If excessive moisture is in the air tanks, replace the desiccant cartridge in the air dryer.

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"It is recommended that the seven-way plug and socket be cleaned and dielectric grease be applied [Quik-Shot Dielectric Grease Tubes] at every preventive maintenance interval, on both the tractor and the trailer sides," Phillips' Begin said. "Often, there is more corrosion at the tractor side because it is disconnected much less frequently than the trailer side. Use a seven-way plug and socket brush with water only. Do not use soap. Phillips recommends three- to six-month intervals, or more often if the vehicle is excessively exposed to winter, like conditions where deicers are commonly used on the road. After every cleaning, re-apply dielectric grease. This prevents the moisture deposited during the cleaning process from collecting and eventually causing corrosion."

"Corrosion can also occur be on screws, contacts, terminal blocks, bare copper etc., basically anywhere there is an electrical connection, it is prone to corrosion," added Heath Million, engineering director for Optronics International. "As an example, a battery will sometimes corrode

due to the dissimilar metals between the post and the battery clamp. As electricity flows the reaction causes corrosion. Corrosion can also find a path into the electrical system by starting on electrical box handles, edges, hinges, etc."

System modularity can help fight corrosion and prevent CSA violations. Attempting to maintain and service a non-modular electrical system requires cutting and splicing of wires, and that can severely compromise the system, Johnson explained. It's easy for even a seasoned technician to make wiring mistakes. Corrosion-promoting moisture can enter a system through splices and old junction boxes and begin working its way through a vehicle's entire electrical system.

"Most folks don't realize that cabling and wiring can act like a wick for moisture," Johnson said. "Once moisture gets in, it can and will travel through the system."

Modular systems provide a number of benefits. Flexibility is inherent in these systems, which use standardized connectors that can be snapped

together to form in a wide variety of power delivery configurations; electrical systems can simply branch off from a vehicle's main electrical harness line. To maintain system integrity, the modular connectors use dielectric grease to prevent intrusion from moisture and road contaminants.

"A standardized planned maintenance (PM) program is also generally recommended, which should include periodic examination of the entire vehicle's electrical and lighting systems," Johnson said. "Every lamp, wire and harness should be visually inspected and any signs of corrosion, cracks, wear areas and punctures noted and corrected immediately, in order to prevent corrosion from beginning and then spreading."

For a deeper understanding, Optronics pointed to its Bright Ideas Technical Training Program is a comprehensive instructional system that provides a fundamental understanding of electricity, vehicle wiring, lighting connections, installation and basic troubleshooting. //

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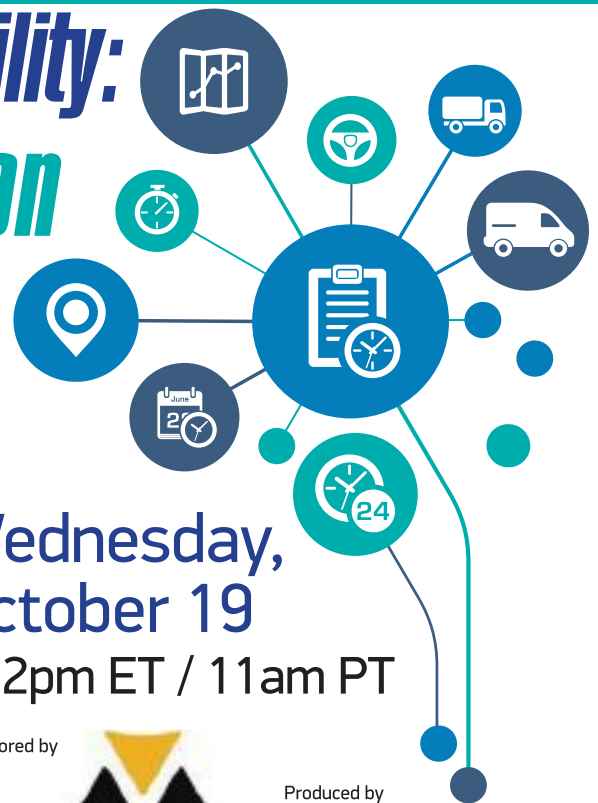
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