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SAVE ON COSTS WITH YOUR PROFESSIONAL GUIDE TO ASPHALT MIX DELIVERY

BY SANDY LENDER, EDITOR OF *ASPHALTPRO* MAGAZINE

For the 2017 paving season, *AsphaltPro* magazine published an eight-part series on an essential area of project management for asphalt professionals: safe and timely delivery of hot-mix or warm-mix asphalt (HMA/WMA) to the paving site. For this document, we've arranged the series so you can easily offer back-to-basics best practices to share with veteran and new haul truck drivers, in addition to new tips, ideas, and case studies with logistics and technology to enhance the bottom line. Producers have streamlined processes at the plant; contractors have nailed down best practices in the work zone. With this series, it's time to harness the potential you've been missing when it comes to mix delivery and haul truck fleet management.

Whether you're an independent truck driver with your own commercial vehicle, like Steve Murray, pictured here, or a driver in a company that maintains a whole fleet of trucks for daily delivery of perishable mixes, keeping each vehicle in optimum working order is an important piece of the paving puzzle. With new engine emissions regulations and electronic data logging rules out there, advanced technology can either help or hinder the regular maintenance regimen. *All photos courtesy John Ball of Top Quality Paving & Training, Manchester, New Hampshire, unless otherwise noted.*

Part 1—Take a New Look at Haul Truck Maintenance

Let's start with minimizing downtime. At first, that sounds like an old discussion of routine maintenance; but we're going beyond the routine with this series.

Keep in mind, according to the Federal Motor Carrier Safety Administration (FMCSA), you must display a periodic inspection decal that proves your commercial motor vehicle (CMV) has been inspected within the past 12 months, but that decal doesn't prevent "surprise" roadside inspections. In other words, the decal proving you're in compliance merely protects you from being cited for a violation of periodic inspections. Operating a commercial vehicle means a state or federal inspector can stop you if they notice something that appears unsafe.

This behooves you to perform routine maintenance for best and safest operation in between your mandatory periodic inspections. Drivers must prepare a driver vehicle inspection report (DVIR) at the completion of each day's work, and must turn those in to the company, but that's only half the story.

MAINTENANCE IS YOUR RESPONSIBILITY

The haul truck driver is responsible for delivering sand, aggregate, millings, or a hotbox of one to five tons up to a body of 20+ tons of 300oF perishable asphalt mix. That's heavy duty hauling for the road-building industry, which means the truck has got to be up to par.

One of the most important items to ensure is working on your truck is the backup alarm. Many companies have instituted the policy that a haul truck with an inoperative backup alarm will not be allowed on a job. This means an independent driver could show up with a load of material and get kicked off the job, making him financially responsible for 18 or so tons of cooling mix.

Of course there's more than a backup alarm to check prior to each shift to ensure your haul truck meets your state's depart-

LEFT: These four mud flaps end in a sensible row. Steve Murray of Steve Murray Trucking, Hooksett, New Hampshire, uses four flaps to completely shield motorists behind his truck. Notice the flaps on the left and right hang from chains of seven links each. RIGHT: The chain is long and flexible enough to allow Murray to lay the mud flap on the fender where it doesn't touch the push roller of the paver. This allows good contact between the push roller and truck tire. It also protects the mud flap from tearing or from getting caked with asphalt.

ment of transportation (DOT) requirements for legal operation (See Sidebar "The Daily Walk-Around"). Independent driver Steve Murray of Steve Murray Trucking, Hooksett, New Hampshire, has a routine even after he's completed his daily inspection, but before he gets to the jobsite.

- Rinse the truck off with a 1,000-pound pressure washer.
- Make sure the windows and mirrors are clean for visibility.
- Make sure the lights are working.
- Clean the body so there's no residue.
- Then go to the job for instructions.

To track maintenance activities, drivers and mechanics have the help of modern technology. Even before large original equipment manufacturers (OEMs) joined forces to standardize data points, they were developing telematics to gather information on the way engines run, to detect faults in equipment, to schedule maintenance actions, to streamline machine safety, to monitor emissions controls, and to gather data for fleet management.

The Owner Operator Independent Driver's Association (OOIDA) has tips regarding hours of service regs and more at http://www.ooida.com/.

These are concepts that cross the entire equipment fleet; they're not unique to the haul trucks in the yard. For instance, the team at Volvo Construction Equipment has telematics packages standard on 7 articulated haulers, 23 excavators, 11 wheel loaders, and as an option on two pavers, 2 soil compactors, 4 asphalt compactors, 4 compact wheel loaders and 8 compact excavators. Then the Volvo Trucks team has the Gateway telematics system to monitor and gather data for commercial vehicles.

Other OEMs have recently released telematics solutions for on-highway trucks. In March, Caterpillar announced its on-highway truck fleet solution complementing telematics that are already standard on their construction equipment. Their VisionLink interface will now combine telematics information from virtually all assets on a jobsite including on-highway trucks, giving customers a powerful asset management tool, as well as keeping customers' heavy duty trucks compliant with federal regs concerning an electronic logging device (ELD), which will be discussed in more depth in a future installment of this series.

Telematics is, at its core, machines talking to machines. Back in the mid-2000s, OEMs recognized that many contractors have mixed fleets, which meant the end user had mixed data coming in on different types of screens. Different machines were failing to talk to one another in different languages. That had to be reconciled some way.

By Feb. 5, 2010, a team of OEMs developed and released a "first" standard with a set of data points—hours, odometer, fuel, location, date/time and machine identification information—that all OEMs could incorporate in a telematics package. The idea was to let all OEMs' machines talk to each other in the same language when "talking about" those specific data points. Fleet managers know there are more data points than the six listed in this paragraph, and OEMs kept working to make the standard more robust for the end user. The International Organization for Standardization (ISO) published the final standard—I5143-3—Nov. 30, 2016.

This gives contractors and fleet managers confidence that the data-monitoring across the fleet is gathering, interpreting and delivering information in a uniform manner.

YOU'RE RESPONSIBLE... EXCEPT WHEN YOU'RE NOT

No matter what tier level your engine is, you are responsible for keeping it, and the components surrounding it, in top working condition. You'll want to test the freezing point of the coolant before winter—every

winter. Check the belts and hoses on a regular basis, too. Make sure the air cleaner indicator gives you a good reading.

Consider the new after treatment systems available now. You want to monitor whichever system your engine manufacturer uses and perform basic maintenance as the OEM recommends. Pay close attention to the type of lube oil the manufacturer recommends, which we'll discuss further in just a moment. The team at Wolter Group LLC, Brookfield, Wisconsin, reminds you, "The after treatment will not function properly unless you use the specific low ash oil."

Something to be aware of when dealing with your Tier 4 engine is liability. While you can take care of routine cleaning and checks on your own, error codes indicate problems that may require professional help. During the "What's Now" Speaker Series that took place on the CASE Construction Equipment stage during CONEXPO-CON/AGG 2017, Dave Piech, who is the vice president for engine compliance NAFTA, CNH Industrial, shared emissions regulatory news and what he anticipates for future emissions standards. He mentioned onboard diagnostics (OBD) and liability.

OBD offers advanced—and advancing—technology to assist operators, but the "right to repair" comes into question. If you receive a warning light or fault code from your OBD regarding your Tier 4 engine, you may be breaking the law if you make the repair yourself. Piech explained that changing the way an engine runs has both safety and environmental impacts. "If anybody goes in and adjusts how an engine runs, that may be a violation of the law," he said.

Wolter Group states on its website: "It is best to check with the engine manufacturer representative first before replacing the oil or coolant. Additionally, if there is an error code flashing on the display, your best bet is to call the nearest servicing dealer so they can diagnose and fix the problem."

Part of your responsibility in maintenance is to change the fluids and filters under the hood regularly. Think about oil changes for a moment, because even this tried and true, routine maintenance item saw change as of 2016.

Keep Paperwork on the Daily Walk-Around

There's more than a backup alarm to check before each shift to ensure your haul truck meets your state's department of transportation (DOT) requirements for legal operation. With electronic data logging (EDL) regulations in legal flux, you'll want to err on the side of caution and keep a paper trail whether you've started using EDLs or not. Starting under the hood, make sure these items are included on your daily pre-shift walk-around list:

	Good	Not Good
Motor/Engine	❑	❑
Check Oil/Oil Pressure	❑	❑
Other Fluid Levels	❑	❑
Transmission	❑	❑
Radiator	❑	❑
Belts & Hoses	❑	❑
Air Lines	❑	❑
Battery	❑	❑
Horn	❑	❑
Headlights	❑	❑
Direction Lights	❑	❑
Strobe Lights	❑	❑
Marking Lights	❑	❑
Windshield Wipers	❑	❑
Windows	❑	❑
Mirrors & Side Mirrors	❑	❑
Fire Extinguisher	❑	❑
Flags, Flares, Fuses	❑	❑
Spare Bulbs & Fuses in the Glove Box	❑	❑
Starter	❑	❑
Defroster/Heater	❑	❑
Clutch (or automatic transmission)	❑	❑
Backup Alarm	❑	❑
Foot Brake	❑	❑
Air Compressor & Gauge	❑	❑
Parking Brake	❑	❑
Steering	❑	❑
Trip Recorder	❑	❑
Frame	❑	❑
Tarp/Canopy	❑	❑
Fuel Tanks	❑	❑
Front Axle	❑	❑
Suspension System	❑	❑
Wheels & Rims	❑	❑
Tires	❑	❑
Reflectors	❑	❑
Safety Decals	❑	❑
Muffler/Exhaust	❑	❑
Mud Flaps	❑	❑
Tailgate	❑	❑
Direction Lights	❑	❑
Taillights	❑	❑

Source: John Ball of Top Quality Paving & Training, Manchester, New Hampshire

As fleet managers may have recently learned, heavy duty engine oils (HDEO)—labeled API CK-4 and FA-4—are part of the nomenclature in the Proposed Category 11 (PC-11) oil standard that hit the marketplace December 2016. PC-11 is the category in which we find the CK-4 and FA-4 specs. Some of the goals of upgrading from the former CJ-4 oils to the PC-11 category are to protect engines no matter what level of shear stress the oil will undergo in the engine, to protect against oil breakdown due to oxidation under higher operating temperatures, and to safeguard fuel economy.

We'll lean on the Shell ROTELLA® Products website at rotella.shell.com for a breakdown of what's different about the high temperature high shear (HTHS) viscosity oils available to the marketplace:

> In order to meet goals for more fuel-efficient engines and fewer emissions, many next-generation engines will run at higher operating temperatures. This will require changes in engine oil composition, so they can withstand more heat without sacrificing engine protection. It will also mean that instead of one category of engine oils, we'll have two—CK-4 and FA-4. CK-4 engine oils will be a direct replacement for the engine oils you're using now. You'll be able to buy the same viscosity grades and oil types (conventional, full synthetic, synthetic blend) you're using now, and they'll be "backwards compatible" to ALL current vehicles. They'll just also conform to the new PC-11 standards. The new FA-4 engine oils will be offered in lower viscosity grades and are designed primarily for next-generation engines to help maximize fuel economy without sacrificing engine protection. These FA-4 oils may have limited backwards compatibility, and would be labeled as such.

If you feel the need to spend seven or eight minutes on this, Chevron has prepared a series of short videos at www.deloperformance.com debunking myths about PC-11 and the like. The point for this article is to let you know that you'll find new oil specified for your Tier 4 compliant engine. If you pick up the API CK-4, it is designed to work optimally with older and newer engines. If you pick up the FA-4, it is designed to work optimally for the 2017 engines.

Telematics is, at its core, machines talking to machines. The Guardian system from Roadtec, an Astec Industries company, allows machines to notify mechanics, operators or even personnel back at the OEM headquarters when it's time for routine maintenance or when a system has "moved" out of its optimum settings. Depending on the type of package—or subscription—the contactor has opted into, a technician in the home office or OEM's office can troubleshoot remotely or send a mechanic to perform maintenance in a timely fashion. *Photo courtesy Roadtec, Chattanooga.*

MAINTENANCE MATTERS FOR THE QUALITY OF THE JOB

Keeping the haul truck in top notch condition does more than keep you in compliance with the DOT. If you're an independent driver, you want contractors to hire you again, thus having a truck that contributes to bonus-worthy quality works in your favor. If you're part of a company that maintains its own trucking fleet, each vehicle is a piece of the paving puzzle. Each piece requires maintenance for optimum performance. Start at the top.

You want to inspect the tarp—or canopy—each day to ensure it has no rips or tears. Look at the mechanism that lowers and raises the canvas to ensure it moves smoothly and completely. In other words, you don't want the device to stop short, leaving the tarp to hover a foot or two above the HMA in the bed. This leaves room for wind to whip in and cool the top of the material into a segregated shell while you drive from the plant to the job site.

Independent driver Steve Murray Trucking's Murray installed a Slide-n-Go cover system from Cramaro of Stuart, Florida. This system runs on two cables that unroll and retract the canvas along rails, forming

a lid on the truck body when closed. "If you have arms on the cover, you have to watch those don't hit wires," Murray cautioned.

"With the system Murray has, it holds the heat in the body," John Ball of Top Quality Paving & Training, Manchester, New Hampshire, said. "You don't want the tarp flapping like a sail as you drive down the road. You'll lose heat from your perishable material."

While inspecting the tarp before your shift begins, look into the truck bed. You'll want to make sure it's clear of clumps of yesterday's mix, of course, but look for debris that may have blown in overnight. Take the time to pick out plastic wrappers, soda cans and anything else that has gotten in. Anything you see in the bed of the haul truck will get covered with mix and then will get carried into the hopper of the paver. Once it's in the hopper, it will likely go into the mat, creating a quality control problem that spells deducts later. As the haul truck driver, you can stop that financial loss with just a few minutes of cleanup during your pre-shift walk-around.

Another way you can make your vehicle appealing to the paving crew is to make it compatible with paving equipment. For example, does your haul truck have a trailer hitch at just the right height to "grab" and tear the rubber on the front of the hopper? That leads to a potential mess each time trucks charge the hopper—giving laborers extra shoveling to do and an extra repair for the mechanic. The crew won't be excited to re-hire you if you tear up the equipment. Instead, remove the trailer hitch on those weeks when you'll be hauling asphalt.

Your truck will be more compatible with the paver if you can get the mud flaps out of the way, as well. Each individual state department of transportation (DOT) has different requirements of haul truck mud flaps—splash guards. You won't find guidance on the FMCSA site because it doesn't dictate policy on this item, but your state DOT will have regulations for the height the flap can hang from the ground, how much of the back tire it must cover, and the angle of flying debris it is to block. Check with your DOT's website to make sure you start out in compliance. Then look into systems for easily lifting the flaps out of the way.

When you back the truck to the paver, you stop before making contact. When the paver operator moves the paver forward and brings the push rollers into contact with your vehicle, the push rollers are to touch the back wheels of the haul truck. If the mud flap is in the way, the push rollers now have the opportunity to deliver a jerking motion as the tractor moves forward. This will cause segregation in the mat. The push rollers also have the opportunity to tear the mud flaps. This means a repair for you later and possibly a chunk of polyurethane in the mat, which is another quality control problem. The push rollers also have the opportunity to leave asphalt mix on the mud flaps, which means more cleaning for you at the end of your shift. None of those scenarios is an efficient use of time or materials.

You're not on a break. You're getting the mud flaps out of the way, and then you're getting yourself out of the way and back to the safety of the cab.

Instead, look for a system that will let you press a button in the cab to hydraulically lift the mud flaps when you enter the paving work zone. Or use this idea from Murray. He has extended the outer flaps of his rig from heavy duty chain. The chains keep the flaps hanging at the proper height for his DOT regs, and allow him to physically place the flaps on the fenders to keep them out of the way while he discharges the load. Let's look at this in-depth.

When you back the haul truck to the paver, you don't want a mud flap between the push roller and the truck tire. We've already pointed out that individual state DOTs have different requirements of haul truck mud flaps—splash guards. You won't find guidance on the FMCSA site because it doesn't dictate policy on this item, but your state DOT will have regs for the height the flap can hang from the ground, how much of the back tire it must cover, and the angle of flying debris it is to block. Check with your DOT's website to make sure you start out in compliance.

Once you get against the paver, the mud flap could get damaged or even torn off. That gives you two problems. First, it takes you out of compliance with the DOT. Second, when bits of polyurethane or rubber material fall into the hopper or onto the roadway, they cause problems in the mat.

Depending on the thickness of the lift, the problem could be anything from missed density that hinders your ability to get a bonus, to a pothole next week. The best thing to do is lift the mud flaps out of the way. Murray shared a good idea to make this process quick and easy.

As you can see in the pictures on these pages, the mud flaps in the center of the tailgate are fixed in place. The mud flaps on the left and right hang by chains comprised of seven links each. The configuration allows the bottoms of the flaps to line up nicely.

When Murray gets to the paving zone, he parks the truck, engages the parking brake, and walks to the back of the truck to position the mud flaps out of the way. He lays them on top of the fenders. The length of the chains easily allows this. Then he returns to the cab and moves his truck to the place where he can begin backing into position.

Keep in mind, when a haul truck driver exits his cab, he must wear his personal protective equipment. Make sure the safety vest is clean and bright. Wear a hard hat to protect yourself in the event of an emergency. If you have safety gators, make sure you wear them to give yourself that extra flash of safety yellow that will alert everyone to that fact that you're out of the truck. Stay aware of your surroundings at all times and don't dilly-dally. You're not on a break. You're getting the mud flaps out of the way, and then you're getting yourself out of the way and back to the safety of the cab.

After discharging the load, you'll drive to the area that's been designated to clean out the truck body. At that site, you can pull the mud flaps back into position for legal operation on roadways again.

As you can see, haul truck maintenance goes beyond changing fluids and filters on a regular basis. It goes beyond handling the big emergency repairs that crop up. By performing daily inspections and regular maintenance, you keep your vehicle in compliance and enhance your ability to contribute to a quality paving team.

In this staged photo, Steve Murray of Steve Murray Trucking, Hooksett, New Hampshire, demonstrates how some drivers may be required to spray their truck bodies with release agent by hand. The plant may have a station set up before the loadout area where the truck driver will exit the safety of the cab, ascend a platform, and use a wand to lubricate the truck bed. If this is the case, he will wear his safety vest and be aware of his surroundings when out of the truck. There's no dilly dallying when out of the cab at an active plant.

Part 2—Take a New Look at Best Haul Practices

In the last section, we took an in-depth tour of maintenance. In the next section, we'll look at safety aspects. This installment gets down to business with one independent driver's great ideas and adherence to regulations in particular.

Steve Murray of Steve Murray Trucking in Hooksett, New Hampshire, cut his teeth at Pike Industries, headquartered in Belmont, New Hampshire. He's been driving independently for 35 years—25 of those hauling asphalt—and he takes safety and operations seriously. His current rig is a 2007 Kenworth tri-axle, and you better believe he has it decked out for optimum performance. Beyond the truck, Murray knows his job responsibilities inside and out, and knows how to be an indispensable member of the paving team.

GET TO THE JOB

The driver who works as a member of the team follows directions and communicates with the rest of the crew. One of the first steps upon arriving at the plant is to take note of the signs posted for your benefit.

"We all have CBs," Murray said. "The plant will post which channel you should be on when you're on site."

When you pull through the gates, make sure your citizens band radio is set to the correct channel to receive instructions and communicate with the plant manager. Follow the signs to unload material or proceed to the loadout area.

Depending on the plant's setup, you may be required to spray release agent in the bed by hand. If this is the case, you must wear your safety vest and be aware of your surroundings when out of the truck. There's no dilly dallying when out of the cab at an active plant. If the plant is equipped to automatically spray the bed, you can stay in the safety of the cab and merely drive under the spray system.

The release agent isn't just a mechanism to help you with cleaning later. The release agent—as its name implies—assists in the proper release of material from the body of the truck. Murray went a step further and

"When you get into a paver, get off the CB radio. Get off the phone. Take the three minutes out of your day to pay attention. Be aware of the guy you're working with."—Steve Murray

installed a plastic liner made for asphalt in the bed of his truck. It allows the asphalt to slide and not build up.

"Letting material move as a mass is important to keep it from segregating when you're charging the hopper," John Ball said. He's the proprietor of Top Quality Paving and Training of Manchester, New Hampshire. Similar to Murray, he began his career with 30 years at Pike Industries, working 10 of those years as Pike's director of training.

The next step is to drive under the silos, using stoplights or marked bars along the loadout scale to help line up under the correct silo gate for loadout. Ball shared that to deliver mix with minimal segregation, drivers—and plant operators—should start by loading haul trucks in a three-drop method under the silos. To do this, pull the truck under the designated silo to receive one drop in one end of the truck bed. Then move the truck back for the second drop. Then move the truck forward to receive the third drop in the center of the truck's body.

The plant owner can set up a system of numbered or lettered stop signs or bars, or an actual traffic light, to help direct this operation. Loadout controls available from any number of plant or controls manufacturers can make it easy on the plant operator and safer for the driver under the gates.

For example, Ken Cardy, the president of Libra Systems Inc., of Harleysville, Pennsylvania, explained that the Libra Silo Safety System will not allow a drop to occur if the truck is not detected under the selected silo. Then the user has the option to be prompted prior to discharging the first drop, or every drop.

"The system can be set up for three drops," Cardy shared. "In fact, the number of drops can be set to any value and they can be configured on a truck-by-truck basis. Further, for producers that use trailers or 'pups,' the user can specify the number of drops to put in each vessel."

Even ticket-retrieval after loadout has become automated to the point that drivers can collect the paper from a kiosk on their way off the loadout scales or past the control house without leaving the safety of the cab. You will give this ticket to the dump man at the paving site, so keep it close at hand.

One of the more obvious tools haul truck drivers have available to them nowadays is global positioning systems (GPS). That doesn't mean you want to plug in the address of the nearest business to the work zone and take off from the plant, following the voice prompts from your Garmin™.

Your smart phone or GPS on the dashboard may not know that the job foreman has set up a route that keeps all haul truck traffic away from a nearby school or away from a congested area that would not only slow production but also give material time to cool while you sit in a traffic jam for an hour. Murray explained why you don't want to merely set your own route and schedule.

"It's imperative that everybody goes the same way," he said. "If everybody goes their own way, load one ends up arriving as load six. And if someone breaks down at 2 in the afternoon, you need to be able to find him."

When Murray is hired for a job, the owner doing the hiring typically gives him instructions, but he recommended double-checking driving directions with someone who has been at the job site. "Usually the owner of the company gives me directions, but the best person to get directions from is the foreman on the job. The worst person to get directions from is the dispatcher, because that person has no clue where the job is."

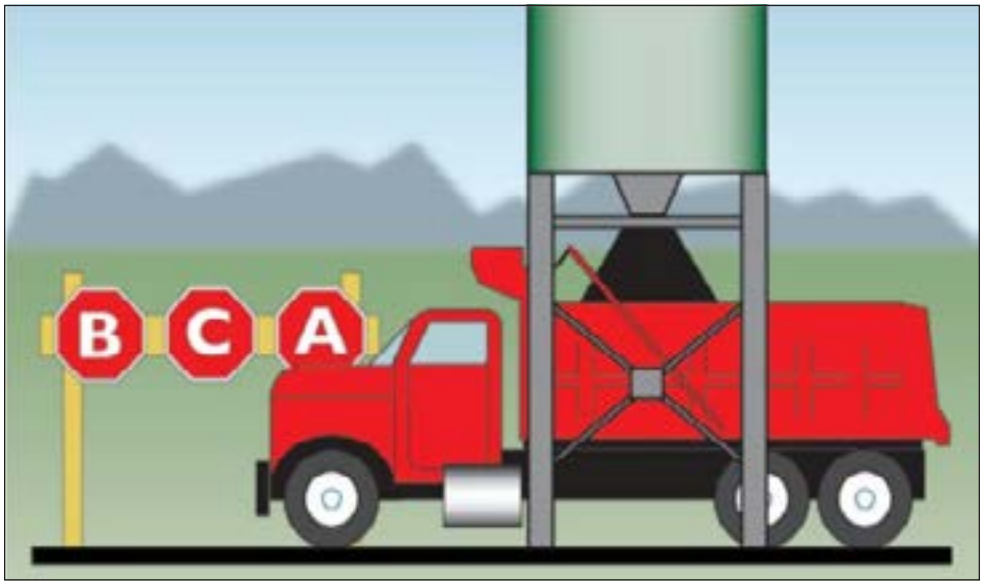
When in doubt, ask. "It's to the advantage of the people you're working for if you all communicate," Murray said.

JOIN THE CREW

Murray knows what the asphalt paving crew needs from the haul truck driver who brings the perishable material to the paving site. Whether you're the trucking foreman managing a fleet of in-house vehicles for a large contractor, or the dispatcher for a trucking company subcontracted for a variety of projects each day, Murray's tips can help your drivers be more efficient and contribute to a quality outcome.

First, drivers should not approach the work zone with the attitude of a private, subcontracted outsider. They should recognize that they are members of the crew striving for a bonus-worthy mat. The manner in which the driver delivers the mix will make a difference in the end result that motorists drive on and that the company gets paid for. This requires communication.

For example, during a night paving project on the Florida Turnpike, one of the crews for Middlesex Corporation, Orlando, rallied to help a new driver. The driver



Three-Drop Method

was the first of the trucks to arrive for the paving portion of the job that particular night, and the dump man guided him into the work zone. When the truck was in position, the driver didn't immediately respond to hand signals from the dump man or the paver operator. The crew knew something was wrong.

Rather than yelling or getting upset, the dump man and foreman on the job went to the driver's window and worked with him. They explained the signals and helped him get the hopper charged. The next time that driver came to the work zone, he knew just what to do. That's teamwork. Their help made the driver part of the crew that placed a quality mat.

Keep in mind, it's not the dump man's job to train truck drivers. As the haul truck driver, you want to be aware of your responsibilities, and you want to work as a member of a well-oiled machine out there.

For example, when you get to the work zone, Ball suggested you take note of how many trucks are already on the job. If you aren't the first truck to arrive, Ball said you'll enter the work zone between the cones or barrels several feet in front of the first truck in the line. You will then line up in front of the other haul trucks.

If you are the first—or only—truck on the scene, you'll slow down and enter the work zone ahead of the paver, and come to a complete stop when the entire truck body is inside the work zone. Make sure no one from the traveling public has followed you into the work zone. Look in your mirrors to make eye contact with the dump man or foreman on the job, and check your backup camera.

Murray reminds you that at this time, you will either press a button in your cab to automatically raise your mud flaps; or you will put the truck in park, engage the parking brake, double-check your safety vest, and exit the cab to lift the mud flaps manually. Be efficient in this operation and get back in the cab so you aren't in harm's way.

"FMCSA's regulations are difficult to understand, and even though applicable to interstate trucking, many state transportation enforcement agencies incorporate these for intrastate trucking compliance."—Howard Marks

"Things change very quickly on the job, so be aware of your surroundings," Murray said. "When I get on the job, I look around, and I'll get out and take care of the flaps."

Only when you re-establish eye contact with the dump man, will he signal that it's safe to begin backing toward the paver. When you put the truck in reverse, make sure you can hear your backup alarm.

You will back toward the paver, looking to the side where the dump man's working. Murray suggested keeping that edge of the body about a foot from the edge of the hopper to keep the bed centered in the hopper. You will come to a stop before touching the machine. The dump man will guide you, giving signals to nudge left or right, and when to stop to prevent a bump against the paver. He will come to you to collect the loadout ticket.

Next, the paver operator will drive the tractor slowly forward to touch the rollers to your back tires. The dump man and paver operator will give the signal for you to begin raising the body, and will give a signal when you are to stop, holding the body at a certain height, letting the material move as a mass.

Haul Truck Don'ts

- Don't bump the paver.
- Don't lock up the tires.
- Don't raise the body so high that the tailgate pushes you out of the hopper.
- Don't lose communication with the dump man.

You will keep your foot on the brake while the paver pushes the truck forward, and you will feel the pressure. If you lift your foot off the brake, the pressure of the material charging the hopper will push you off the tractor and you'll end up with a mess in front of the paver. Nobody wants to see that happen. All of this requires your full attention not only for smooth operation, but also for crew member safety.

"When you get into a paver, get off the CB radio," Murray said. "Get off the phone. Take the three minutes out of your day to pay attention. Be aware of the guy you're working with."

When the haul truck driver arrives at the plant, he will see a number of signs directing his path. One sign will let him know what channel to set his CB radio to for clear communication on site. Others will show where to dump millings or sized aggregate, where to spray the truck body, where to collect loadout tickets, and so on.

Once the material starts to move, you'll know that it's going well. Remember the release agent you sprayed in the bed when you were at the plant? That comes in handy now.

"You can feel it," Murray said. "After you've done it a long time, you can feel it shifting right. You can see the edges in the mirrors and you can hear it. It doesn't matter whether you're dumping in a paver or a windrow, you'll feel it when it's right."

FOLLOW REGS

To participate as a member of the paving crew, you must keep your truck up to spec. In the first segment, we walked through maintenance items thoroughly. Now let's

take a look at some of the new regulations that affect your rig.

Tier 4 Final (T4F) engines have brought emissions levels to their knees. As the Diesel Technology Forum's Executive Director Allen Schaeffer pointed out in the August 2017 issue of *AsphaltPro*, "Depending on the horsepower range of the machine, emissions of particulate matter (soot) and oxides of nitrogen (NOx) have all been reduced by more than 90 percent."

With high-tech engines come high-tech considerations. For example, Kristen Williams, the executive director of the Independent Equipment Dealers Association, spoke with Mark Pentz of Calvin Group Inc. in Windsor, Colorado, for the August edition of *AsphaltPro* and learned that his team sees contractor concern when it comes to maintenance costs related to the EPA's Tier 4 mandate. Asphalt contractors, of course, want to keep these machines running most efficiently.

"A few contractors have told me that they've had issues with their trucks tripping error codes while hauling hot material," Pentz shared. "There isn't anything wrong with the truck, but they still have to get someone who is certified to work on that engine to come out and reset the code. That chews into a lot of the day—something they can't afford when they are trying to lay pavement."

A spokesperson for Roadtec in Chattanooga, shared that new T4F engines are intelligent and have different severities of codes to alert operators of internal error. Luckily, paving equipment OEMs have designed intelligent systems, too. Roadtec's telematics monitors the machine, including what the engine is doing. "Guardian would alert the office, and anyone set up for alerts, that there was an issue before the engine would de-rate or shut down."

Something else promises to cut into the paving schedule: giving time off to drivers who cross state lines getting to the work zone. As of press time, fleet managers had no choice but to start learning and complying with a rule published Dec. 16, 2015, regarding the amount of time that drivers of commercial vehicles with a minimum combined gross vehicle weight of 10,001 pounds or more are entitled to have off-duty after working for a 7-day or 8-day time period.

6 Ways to Use Telematics Data

For the fleet managers and estimators reading this, Caterpillar shared June 22 through its Cat All Day e-newsletter, six bullet points for using telematics to improve your margins. Haul trucks aren't the only "machines" in your fleet using telematics; by checking the data from all those machines, you can find areas where you can bolster your competitiveness.

1. Use historical information to improve bidding accuracy. Before you attempt a cost estimate, take a close look at telematics data from similar jobs that have already been completed. How many machines were required to do the work? How many hours did each unit run? How much idle time was logged? How much fuel was burned? Does the data need to be adjusted for extenuating circumstances—weather delays, supply disruptions, fuel price spikes or other issues? Let facts from the past shape estimates for the future.
2. Focus on use. One of the most important things you can do to keep your bids competitive is optimize equipment use. To calculate utilization rates, consult your telematics data—comparing how many hours a machine actually works relative to how many hours it's available to work. Generally speaking, if overall fleet usage is less than 80 percent, or specific machines are running below 50 percent, you could do the same amount of work with less equipment—reducing your total cost structure and improving your overall competitiveness.
3. Customize maintenance and repair planning. Equipment manufacturers make general recommendations about the timing of maintenance and service. But depending on the environment you work in and the jobs you do, the manufacturer's plan might not be right for your situation. Adjusting the standard plan with real-world data about usage, idle time, fuel consumption and more allows you to recover the value and life built into your equipment, while maximizing uptime and reducing total costs.
4. Get serious about cutting idle time. Some industry experts say it's not unusual for idle time to represent between 40 and 50 percent of total running time. That's a huge cost driver—not just the extra fuel, but more importantly, the unnecessary maintenance expenses, accelerated component wear, wasted warranty hours and threat to resale value. Tangible data about current idling practices—at both the fleet level and the operator level—allows you to identify problem areas, set improvement goals, initiate change and measure progress.
5. Correct operator behavior. Well-trained operators can have a powerful impact on costs. To raise operator skill level, use historical telematics data to identify unsafe, inefficient or abusive techniques. Then structure training to address the issues you uncovered and use new telematics data, captured post-training, to communicate progress and reward success. It's an objective way to assess the value of your training investment.
6. Check your insurance terms. Some insurance providers offer financial incentives to companies that use GPS tracking and geo-fencing to monitor asset location and use. If you're using telematics data to reduce accidents, injuries, theft and other risks, you may be eligible for big savings that cut fixed costs and extend your margin.

You can bid with more confidence when you know more of the variables. The bidding process will always be somewhat uncertain. But with the right combination of quality data and industry expertise, you'll improve bidding accuracy, protect your margin and stay competitive.

Source: Caterpillar

According to the Federal Register final rule published in Vol. 80, No. 241, "[t]he Federal Motor Carrier Safety Administration (FMCSA) amends the Federal Motor Carrier Safety Regulations (FMCSRs) to establish: Minimum performance and design standards for hours-of-service (HOS) electronic logging devices (ELDs); requirements for the mandatory use of these devices by drivers currently required to prepare HOS records of duty status (RODS); requirements concerning HOS supporting documents; and measures to address concerns about harassment resulting from the mandatory use of ELDs. The requirements for ELDs will improve compliance with the HOS rules."

What that means for trucking foremen is being aware of in-duty schedules for drivers. The effective date of the HOS and ELD rule, was Feb. 16, 2016, and the compliance date will be Dec. 18, 2017. It's not an easy rule to digest. Howard Marks, the vice president for environmental, health & safety at the National Asphalt Pavement Association (NAPA), helped make sense of it for readers.

"FMCSA's regulations are difficult to understand, and even though applicable to interstate trucking, many state transportation enforcement agencies incorporate these for intrastate trucking compliance," Marks shared. "Drivers that haul asphalt pavement mix need to understand and comply with these or their state-specific hours of service regulations. Drivers who haul asphalt mix can take advantage of a couple FMCSA exemptions that provide some relief to the HOS requirements."

Those exemptions are just as difficult to wade through as the original rule. You have to meet certain conditions to take advantage of certain exemptions, Marks explained.

First of all, truckers hauling asphalt pavement mix from the plant to the work zone are considered "property-carrying drivers" under the HOS regulations. They are on-duty from the time they clock in until they're relieved from work. It is generally inferred that "on-duty" includes time spent waiting at the plant to load or unload material, time inspecting or servicing the truck, actual driving time, and even time resting in the vehicle while a line of trucks charges the hopper behind you. There's a list of definitions and guidance for the HOS regulations at this link: https://www.fmcsa.dot.gov/regulations/title49/section/395.2

"There are currently two primary exemptions that asphalt mix drivers can take advantage of: relief from the mandatory 30-minute break within eight hours of on-duty time and the requirement to record their duty status (RODS), through the "short-haul" exemption; and the ability to restart the driver's weekly on-duty service clock after 24 hours instead of waiting 34 hours, through the 'construction' exemption," Marks said.

The requirements for ELDs will improve compliance with the HOS rules.

NAPA's prepared guidance at http://www.asphaltpavement.org/PDFs/EH&S/SR-216-Trucking_Issues_Facing_Asphalt_Pavement_Industry-FINAL.pdf explains: "Currently, to take advantage of all available FMCSA exemptions for interstate transportation of asphalt pavement mix, which include exemptions for Record of Duty Status reporting and the 30-minute break requirement, truck drivers must travel within a 100 air-mile radius. To obtain additional relief by utilizing the 24-hour restart, truck drivers must reduce travel to within a 75 air-mile radius of their starting location, which must be the same as their ending location."

"A number of asphalt contractors have previously petitioned FMCSA for relief from their hours of service regulations, but without success," Marks said. "It appears that FMCSA has been disproportionate in providing other similar industries relief from certain requirements and after the Administration change, we [NAPA's Health & Safety Committee] thought it appropriate to re-petition FMCSA. On June 15, FMCSA acknowledged our petition request, which now starts the public comment and review period. Specifically, the industry has requested exemption from the 30-minute break requirement and extension of the 12-hour daily on-duty limit for short hauls."

Complying with the administration's HOS regulations may seem cumbersome, whether your fleet can take advantage of exemptions or not, but the goal is to keep drivers, workers around the vehicles, and the traveling public safe. It doesn't take a lengthy study to realize that fresh, well-rested drivers are less likely to be involved in an accident than fatigued drivers.

To increase the likelihood that drivers and their managers are adhering to the new regulations, FMCSA included monitoring. The point of having ELDs in commercial vehicles is to track the driver's activities and HOS. Because ELD providers—manufacturers—tend to get innovative, their research and development departments have added functionalities to the devices.

Truck drivers who were pushing back because they feared the devices represented an invasion of privacy can take note of two important points. First, the additional services the logging devices offer, such as predictive maintenance alerts, theft prevention/recovery features, and other fleet management system functions work to make the driver's job easier and reduce his paperwork. Second, the language in the regulation is crafted to warn employers against harassing drivers.

Similar to relief from other HOS provisions, short-haul drivers that are not required to maintain their written duty status would similarly be exempt from installing and using an ELD. "However, once a truck driver is unable to take advantage of the short-haul exemption, they indeed would be required to utilize an ELD," Marks said, "basically encouraging the use of ELD technology for all truck drivers regardless of their status."

As you can see, operating a haul truck for the purpose of carrying asphalt mix goes beyond getting to the paving site. Proper loadout methods prepare the material for proper discharge at the paver; and proper communication makes you a safe, efficient and quality member of the team. Next, let's tackle the vital topic of safety as it pertains not only to your rig, but also to your actions for your optimum work ethic and chances for re-hire.

In this picture, you can see extra lights and mirrors on the front of Murray's truck. He includes lights atop the mirrors and at the corners of the body. Convex mirrors provide extra visibility of areas that would otherwise be blind spots.

Part 3—Take a New Look at Safety

Editor's Note: A few of the ideas in this article involve adding lighting and other elements to the haul truck. Make sure any aftermarket safety equipment is installed in accordance with the manufacturer's specs. Then be sure to test it for proper operation before going into the field. Include aftermarket devices in routine maintenance and pre-shift walk-arounds just as you would check on standard equipment.

This installment examines a number of safety standards, as well as options, that fleet managers should have on their radar. Independent driver Steve Murray of Steve Murray Trucking in Hooksett, New Hampshire, and paving consultant John Ball of Top Quality Paving & Training of Manchester, New Hampshire, took time to photograph specific elements of Murray's 2007 Kenworth triaxle and to share the good ideas that increase its visibility and safety on the road and on the job.

"Steve is all about safety and doing his job the right way," Ball said. "His truck is 110 percent suitable for asphalt pavers."

Before they went to a local plant to start shooting, Ball provided the following list of safe and sensible trucking guidelines for drivers.

- Attend a pre-job preparation meeting to get informed on project details, the project scope and route directions. Know where, when and how to get to the work zone because we want all drivers taking the same, most-efficient route.
- Double-check that the back-up alarm, of at least 90 decibels, is on and functional, which you should have checked during your pre-shift inspection of your vehicle (see part 1 of the document).
- Do not let the plant overload your truck. Your vehicle has a registered gross vehicle weight and your state department of transportation (DOT) has weight limits for different roadways you will travel. Know and obey these limits. Provide the weight of your truck to the plant so your vehicle is in the system.
- Put a tarp or canvas on your load to protect the public from falling debris

and to protect your perishable product from heat loss.

- Headlights and a visible 360-degree beacon or strobe, as well as 4-way flashers, must be on before you leave the plant.
- All trucks must have a clean and visible "Construction Vehicle—Do Not Follow" sign.
- All drivers must stay with their trucks. Safety vests and hardhats should be worn at all times when you're out of your vehicle.
- No unauthorized U-turns will be made at any time. Obey all state and city traffic laws.
- CB radios, company radios or cell phones should be used for legitimate business purposes only. Think safety first.
- Obey all requests of the project manager, traffic control and highway officials/troopers. Traffic control runs the job.
- Use caution when backing and do not back up until you get direction from your dump man. He will likely have a different color vest than other workers. Look out for people, vehicles and property. Use both mirrors.
- Trucks leaving the paver should pull out to the left, allowing the next loaded truck to back up to the paver. The truck leaving the paver should go directly to the designated clean-out area.
- If you have any questions, don't hesitate to ask the project manager or plant superintendent. If you're unsure of something, ask.

The safety feature Murray considers most important on his truck is the mirrors. "I would say it's the mirrors. You've got to be able to see where you're backing up."

He includes the mirrors as a point on the pre-shift inspection, which we covered in the first part of this series. Although Murray keeps his truck in a large garage bay overnight, he still takes the time to clean off the mirrors—and windows—before the start of the day. He also has convex mirrors to help him see what's in front or on the side of his truck. Ball said to think of the convex mirrors you see on school buses. It's the same principle.

To increase their efficacy, the mirrors are heated electrically. There are heated bands on the back of the mirrors. When it's a cool morning, Murray doesn't have to worry about fog or condensation distorting his view.

Every truck driver should have the basics for safety. Make sure you double-check the expiration date on your fire extinguisher as part of your weekly routine maintenance. One of these days, you'll need to replace it. Also notice the coffee can Murray keeps under his step. That's not coffee. He keeps an assortment of nuts, bolts and screws in the can. The pipe you see under there is used at the back of the truck for leverage to open the chute to facilitate handwork.

The safety feature Murray considers the coolest on his truck is the lighting package. "You can see this thing comin' for miles," he said. Lights play a role in safety during night and day operations, and they deserve some extra attention, like keeping them clean.

LIGHT IT UP

"At night, his truck is lit up like a Christmas tree," Ball said proudly. "He has a strobe light system on the mirrors and on the top of the cab, and the back."

"I have special backup lights," Murray said. "I have a light that tells me if the tailgate is open."

Check out the pictures in this section for examples of extra lighting Murray has added to increase visibility and safety. But keep in mind, not all light is the same. In his paper "Maximum Efficiency of White Light," published July 31, 2011, physicist Tom Murphy came to the conclusion that, "the most perfectly engineered light that we would perceive as 'white' cannot achieve much more than about 250 lm/W." You can watch a short video about LEDs and their positive effect on luminous efficacy at https://www.youtube.com/watch?v=8CkXF-Vi3vU4.

lumen (lm)—a measure of light level the human eye can sense; 1 lumen = 1 candle's light from a distance of 1 foot
Watt (W)—a measure of power input; energy input
luminous efficacy (lm/W)—lumens per watt of light output (also called lamp efficacy)

From strobes to amber lights to LEDs, getting the system installed correctly requires the right hardware and wiring expertise. If you aren't an electrical engineer, don't let that stop you from adding safe lighting packages to your rig. Hire the help you need to make your vehicle the best it can be. Don't forget the easy safety add-on of reflective tape. The alternating red and white stripes catch the beams from headlights to alert motorists of your presence.

PREVENT BACKOVERS

The Work Zone Safety Information Clearinghouse confirms that "about two-thirds of road worker deaths" are caused by runovers and backovers. "More than half are by construction vehicles and equipment—especially dump trucks."

The U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) had specifics at its Work Zone Management Program website showing the primary causes of worker fatalities from 2005 to 2010 were as follows:

- Runovers/Backovers (often by dump trucks): 48%
- Collision between vehicles/Mobile equipment: 14%
- Caught in between/Struck by construction equipment and objects: 14%

The Facts and Statistics section of the Worker Safety page showed, "Each year over 20,000 workers are injured in road construction work zones....There were 106 workplace fatalities at road construction sites in 2010. Fatalities at road construction sites typically account for 1.5 to 3 percent of all workplace fatalities annually."

TOP: Steve Murray of Steve Murray Trucking, Hooksett, New Hampshire, uses a twist screw lock on each side of the tailgate. BOTTOM: To increase visibility of a percentage of the area behind the haul truck, drivers and fleet managers can install wireless or wired backup camera systems with either black-and-white or full color display screens in truck cabs. Options in today's marketplace cover the gauntlet, with robust protective covers, like the one you see here, for the cameras used on construction projects.

To decrease the likelihood that your large vehicle will be involved in one of those tragedies, you must be on high alert in the work zone. Carrying asphalt mix to the paver will require some amount of time when you're backing toward the paver. It's a necessary part of the job. In the second part of this document, we discussed making and keeping eye contact with the dump man, as well as best practices for backing to the paver with guidance from the dump man and paver operator. Remember: if you lose eye contact or communication with the dump man, stop the truck. Don't move until you have regained eye contact with the dump man.

Another way to safeguard ground personnel is in the proper execution of the pre-shift walk-around. The haul truck driver ensures his rig is in good working order during the routine maintenance check. He can also install a safeguard against the escape of mix, as Murray has done.

Once a truck body has a load of up to 23 tons pressing against its sides, older components such as a weak airline could fail under the pressure. If an air tailgate gives way from the pressure of all that weight, additional locking mechanisms that hold the tailgate closed can save the day.

Murray has installed a twist screw lock on each side of his tailgate to ensure the tailgate remains closed until he is ready for it to open. "If the tailgate pops open from pressure, the tailgate won't actually come open because these locks will prevent it," Murray said.

When the truck is stopped in the work zone, the dump man—or other ground personnel—reaches up and unscrews each of the screw locks that will allow the tailgate to open. Murray then backs his truck into position and presses a button in the cab that releases the tailgate to open fully to charge the hopper.

For drivers who have a system like this installed on their trucks, remember to watch the crew. Sometimes, ground personnel are scarce. Make sure someone has unscrewed the locks before you release the tailgate, or you'll have a problem that stops production.

Also note that other mechanisms for safeguarding the back end exist, but you'll want to choose your favorite system wisely. The screw locks that Murray uses don't get "trapped" the way a chain and eye hook can get caught. Discuss your options with your truck body OEM or aftermarket supplier so you get the mechanism that best suits the crews you deal with most often.

The placement of this oval-shaped LED allows it to shine toward the paver, illuminating the wheels and the area where the paver's push roller will come in contact with the back tire. The driver wants to see that there is nothing between his vehicle and the paver as he's backing.

Murray's truck has LEDs installed so that they shine down from the tarp/canopy track; this illuminates and outlines the side of the truck.

As you can see in the picture, the back of the truck also has a chute with an auxiliary handle in the lower center of the tailgate. This allows workers to get a shovel full of mix or allows them to load up a wheelbarrow without opening the tailgate and having a rush of material fall out. The screw locks ensure the tailgate won't accidentally come open if the air-operated tailgate cylinders or solenoids should fail when workers are behind the truck.

Now let's take a look at some additional tools and devices designed to enhance safety when backing a haul truck.

The ITCP—Every project should include an internal traffic control plan (ITCP), which you will receive from the safety director or foreman on the job. This plan will be a diagram that shows equipment location and direction of movement. It will also show where ground personnel will be located in relation to equipment. Its purpose is to coordinate the flow of both equipment and workers. Study it so you know where you are expected to enter the work zone, if there is an area where you will

be expected to turn around, where you will line up with other haul trucks, where you will be backing, where you will be allowed to clean out the truck body, and where you will be allowed to exit the work zone to return to traffic.

ITCP = internal traffic control plan
Get the ITCP from the safety director or foreman on the job.

If the project will span multiple days, check with the foreman in charge of trucking when you clock in about any revisions to the plan. If the traffic flow has changed, your ITCP will be out of date.

Mirrors—As Murray mentioned above, the mirrors are vital to safe backing. If you see a ground worker in the mirror, stop. You can't be sure that person is walking across the path of the backing haul truck in a straight line with no stopping or tripping. The dump man needs to give the "all clear" before you continue backing.

Technologies—The Centers for Disease Control and Prevention define a blind area as "the area around a vehicle or piece of construction equipment that is not visible to the operators, either by direct line-of-sight or indirectly by use of internal or external mirrors." Some technologies that help you "see" what's behind the truck include proximity detection devices, tag-based systems, and backup cameras. Of course, a proximity detection device such as radar or sonar on the back of the haul truck will detect the paver and sound its alarm as you close in on the tractor, desensitizing you to its warning over time.

The U.S. Department of Labor's OSHA website reminded us "[t]ag-based systems can inform drivers when other employees are behind the vehicle and can alert employees when they walk near a vehicle equipped to communicate with the tag worn by the employee."

"One component of this training can include putting employees who will be working around vehicles in the driver's seat to get a feel for where the blind spots are and what, exactly, the drivers can see."—U.S. Department of Labor

Murray has six lights on each side of the body's frame.

The LEDs attached to the frame provide light when the body is raised.

Cameras—The backup camera serves as an extra eye. You may have seen the blind spot diagrams that various OEMs and organizations have put together for construction equipment such as milling machines and motor graders. As far back as 2004, David E. Fosbroke in the Division of Safety Research at NIOSH gave a presentation at the Roadway Work Zone Safety & Health Conference in Baltimore that included different methods of how those diagrams were created. He shared the example of a 54,000-pound, Ford 880 dump truck that was 7 feet, 10 inches wide and 23 feet, 2 inches long, and which researchers used to find the typical blind areas for haul truck drivers.

It's no surprise that researchers found huge swaths of ground to either side of and behind the truck are not visible to the driver, even when the driver uses the mirrors on the sides of the cab. This means the dump man at the paving site must function as the driver's additional eyes. A backup camera that transmits to an in-cab display can provide clarity as well. Most manufacturers offer these in wireless or traditional configurations to get their information to the cab display. Some offer a warning sound to get the driver's attention if the camera detects an object—or person—in its range.

The sunroof Steve Murray had installed for safety on his truck's cab allows him to see overhead wires and tree branches from the safety of the driver's seat, allowing him to lower and raise the bed accordingly. He said the $750 it cost to have the sunroof installed is the best investment he's made. In the event a driver should ever get the raised bed tangled in wires, don't try to exit the cab until utility and emergency workers have said it's safe to do so.

Not only does the backup camera's display let you see objects behind your vehicle, many provide "zones" so you can determine how close the object is to your tailgate. Other options include voice activation so you can hear when someone behind the truck calls out a warning.

Training—According to the Bureau of Labor Statistics, over 70 workers died from backover incidents in 2011. These kinds of incidents can occur in different ways. The osha.gov site shares this example:

"On June 18, 2009, an employee was working inside a work zone wearing his reflective safety vest. A dump truck operating in the work zone backed up and struck the employee with the rear passenger-side wheels. The employee was killed. The dump truck had an audible backup alarm and operating lights. (OSHA Inspection Number 313225377)."

Even though the ground worker wore a reflective vest, the driver didn't see him in the blind spot. The U.S. Department of Labor's OSHA website spells out specifics for avoiding backover tragedy. One idea in the area of training focuses on the ground personnel gaining a new perspective.

Ball said this is a great idea for new employees, of course, but also for the veteran employee who feels invincible.

"Training is another tool to prevent backover incidents," the OSHA website reports. "Blind spots behind and around vehicles are not immediately obvious to employees on foot. By training employees on where those blind spots are and how to avoid being in them, employers can prevent some backover incidents. One component of this training can include putting employees who will be working around vehicles in the driver's seat to get a feel for where the blind spots are and what, exactly, the drivers can see."

You can look up the blind area diagrams for 43 specific pieces of construction equipment at this link: https://www.cdc.gov/niosh/topics/highwayworkzones/bad/imagelookup.html

Remember: if you lose eye contact or communication with the dump man, stop.

DO YOU HEAR WHAT I HEAR?

One of the mandatory devices on the haul truck is the backup alarm, also called a reverse alarm. Murray's truck has a 95-decibel backup alarm. Every haul truck must have one and it must be functioning.

ARTBA found that "[a]larms were inoperable in 28 percent of fatalities." If something is wrong with yours, then you aren't ready to work.

Ball reminded readers that some project managers are required to kick the truck off the job if you arrive with a non-functioning backup alarm. That means the load of cooling mix is your financial responsibility.

"If the truck arrives on the job with no backup alarm, you're dismissed immediately," Ball said. "I don't want to hear any excuses. The driver can only be allowed back on the job when I see a receipt for the repair."

DO YOU SEE WHAT I SEE?

What does the haul truck driver see above him? That might sound odd at first, but think about the dangers overhead that the haul truck driver doesn't see when he's sitting behind the wheel.

The paver operator, dump man and screed operators are tasked with watching the hopper, the head of material, the movement of mix out of the truck body, the mat behind the screed and much more. Their attention is typically focused downward, not up.

If the paving train moves forward at 20 feet per minute, the paver may push the truck, with its body in the air, right into a mature tree branch or—worse—into live wires. The downtime involved when a truck gets tangled up in wires amounts to thousands of dollars at best, serious injuries at worst.

If your haul truck gets tangled up in wires, the National Institute for Occupational Safety and Health (NIOSH) best practices recommend that you do not exit the truck. Stay inside and don't reach out. Other crew members should not approach the truck and should not attempt to untangle wires.

A member of the crew will contact the utility company, of course, but will also contact emergency responders to assist. Trying to exit the cab before the utility company has ensured power has been cut off to the affected wires can result in serious injury or even death.

Some companies have wisely implemented the use of fluorescent-green colored safety cones with the word "danger" painted on them to designate utility poles with overhead hazards and the like. This doesn't mean a dangerous situation is resolved. Truck drivers still need to be on the lookout for dangers overhead.

When Murray wanted extra safety, he installed a sunroof in the cab of his truck. For the reasonable cost of about $750, Murray made it possible to see overhead obstructions and hazards from the driver's seat.

"I can see wires, trees, branches," Murray said. "It's the best investment I ever made."

When he's on a job, he doesn't have to rely on overworked and overwhelmed ground personnel to watch out for him; he can see what's above his truck and act accordingly to prevent mishaps. While he stated that each job "needs a guy on the ground watching the overheads," he has peace of mind now that he can see above the cab for himself.

"Now I don't have to worry about whether the guy on the paver is distracted."

DOWN TO BASICS

Outside of the work zone, an important element of safe driving is what you're driving on. When was the last time you checked your tires? The tires are an item on the daily pre-shift inspection list for important reasons: worn tread poses a safety risk when you reach high speeds and poor tire pressure affects driving performance. Murray puts 100 pounds of pressure in each of his tires. He also refuses to skimp on replacements when it's time to change tires.

"I don't run recaps on the tires," he said. For the 2017 construction season, he put eight new tires on the rig for a cost of around $3,000. He said it's an investment in safety. While a company's accounting department may view the use of retread or recapped tires as a way to save a few dollars, those tires wear down in short order. "If you blow a recap while you're out on a job, you're wasting money in downtime."

If a fleet manager elects to use the softer rubber of a recapped tire, our experts suggested those be used only on the back. "Never run recap on the front tires," Ball warned.

Tires with good tread also have a better coefficient of static friction between them and the road surface. Remember, the coefficient of kinetic friction will be less when the pavement is wet, slick, dirty, etc., thus stopping time will be affected. The friction force of the road works on the tire to slow the truck to a stop, to reduce the truck's kinetic energy to zero. The friction force of the road works better on a tire in good condition.

If an air tailgate gives way from the pressure of all that weight, additional locking mechanisms that hold the tailgate closed can save the day.

More than tire condition contributes to your stopping power, of course. You will include your brakes in the pre-shift inspection each day, and then consider your driving habits.

Short Elliott Hendrickson Inc. (SEH®) of St. Paul, Minnesota, prepared the lengthy article "The Truth About Speed Limits, Explained by an Engineer" for its consulting website. In that article, Morgan Abbott, P.E., explained that road classifications and prevailing speeds play into a DOT's decision to raise or lower a roadway's speed limit, but all decisions are made for the traveling public's safety.

It behooves you to drive at—or slightly below—the posted speed limits along your route. Remember, your 54,000-pound vehicle weighs an additional 20 tons when you're on your way to the work zone. It will take longer to stop when you see a problem in front of you.

In additional to "no speeding," ARTBA's workzonesafety.org includes a number of back-to-basics driving tips, including:

- Make sure all cargo is secured before startup.
- Check all your safety equipment/devices before startup.
- Wear your seatbelt. It's mandatory.
- Be careful when changing lanes; change only when necessary.
- Keep a safe distance from vehicles in front of you.
- Be especially cautious at rail crossings.
- Don't eat, drink or talk/text on the cell phone while you're driving or backing into the paver.
- Back up as little as possible (refer to the ITCP for guidance).

Other basics you want to be aware of include cleanliness. Ball is a stickler for keeping all heavy equipment clean to improve your inspection and routine maintenance success. He also recommended the haul truck driver take the time to clean out the cab to keep trash, soda cans, papers, asphalt and other items from falling under the brake pedal or making pedals slippery and messy. As Murray indicated earlier in this article, you'll want to keep mirrors and windows clean—and free of cracks—so you always have a good view of your surroundings.

As you can see, operating a haul truck safely takes attention to all the details. It starts with the pre-shift inspection to ensure all the safety devices, as well as regular truck components, are functioning properly. Standard features on the haul truck are in place to provide the basics for safe and efficient operation, but you can add more lights and more features to enhance your safe working environment.

Next, we'll look at the loadout and delivery operation at one large facility for specific ideas that can improve your fleet management. Management there has taken fleet management, loadout and delivery to new, safe, automated heights.

The command center at Harrison Construction's Rutledge Pike office gives dispatchers a live view of all operations. This center was updated in the summer of 2017 to include 12 work stations where employees monitor and direct the company's 50 haul trucks and additional 50 to 100 trucks it hires daily. Photo courtesy Melody Cook of Harrison Construction.

Part 4—Take a New Look at Fleet Control

As we near the completion of this series for you, we'll look at one producer's loadout and mix delivery system in particular. The team at Harrison Construction in Knoxville, Tennessee, has gone above and beyond setting up a command center to track trucking, and they've worked with Libra Systems Inc. of Harleysville, Pennsylvania, to make it happen. Todd Quigg, the president of Harrison Construction, worked directly with Ken Cardy, president at Libra.

Cardy explained that truck tracking solutions have heretofore been ported from the ready-mix industry, and those lack key functionality necessary for asphalt. Realizing there was an unfulfilled industry need, members of Harrison Construction approached the team at Libra to jointly develop a live truck tracking module that addressed the specific requirements of asphalt and aggregate suppliers.

"We previously partnered with another Oldcastle company to develop the first-ever dispatch scheduling solution for the industry," Cardy said. "It was a logical next step to partner with Todd and his group to extend the scheduling software with the first industry-specific live truck tracking module."

What they developed is officially named the Dispatch Scheduling & Live Truck Tracking Module, also known as a Transportation Management System (TMS) from Libra Systems. It does what it sounds like—it tracks the haul trucks in real-time.

"The Libra software allows for centralized order-taking, assignment of jobs to production facilities, and scheduling of trucks across all sites," Cardy explained. "Live truck tracking provides an easily-grasped visual indication of truck status, allowing the dispatchers to efficiently manage trucks and optimize hauling. For Harrison Construction, the result has been a highly profitable reduction in overall trucking costs. With truck costs of $150,000 to $180,000 per year, saving one to two trucks a day really adds up and makes a very attractive ROI. Further, customers are more satisfied and outside truckers

remain loyal to Harrison because they have confidence that Harrison will optimize their time and revenue."

Quigg explained how those savings come into play, and how that benefits Harrison's customers in the area: "Implementing the TMS forced us to embrace telematics on both our internal trucks, as well as hired haulers. These tools give us feedback on driver behavior as well as when waste is occurring during the delivery cycle."

Quigg shared that customers appreciate the feedback his company can offer when employees in the command center notice potentially wasteful practices. For example, if haul truck B is sitting at a certain location along the route to a paving work zone, idling for an extended period of time, the TMS shows this in real time. A Harrison employee is able to locate the vehicle through the TMS tracking. If something is wrong with the truck, the telematics systems will alert the owner; if the problem is a driver who has gotten lost, only an alert dispatcher in the command center will be able to solve the problem.

To implement the technology, Quigg and team built a state of the art command center for dispatch and fleet management. The operations center houses 12 people, six for ready-mix concrete logistics, four for asphalt and aggregates delivery, and two to dispatch mechanics. The room is roughly 30 x 30 and has 12 workstations. The knowledge wall has four screens dedicated to ready-mix and four dedicated to asphalt and aggregates. Employees can see a live video stream from cameras mounted on the pavers. The overall remodel took about 4 months to complete once details were finalized.

Because Harrison Construction is part of a larger paving family, Quigg needed to take the TMS concept to Oldcastle management before implementing it. He described it as a "culture change" that he was asking the overall team to make.

"Many change-management projects require our workforce to challenge old beliefs, such as 'we've always done it this way,' and then focus on process improvement," Quigg shared. "Previously, we had very little visibility to the delivery cycle and could not make real time changes to truck demand. Now we have more visibility than we ever had, and are working to deliver material in the most efficient manner possible."

"We approached the development and implementation as a possible cost reduction as we drove efficiency in our operations," Quigg continued. "We are continuing to work to develop tools to track improvement and increase the time a haul unit is productive."

John Ritenour is the dispatch manager for Harrison Construction, and he shared what initially seemed complex about the system. "The live dispatch summary, when we were discussing implementation, seemed very overwhelming and very labor intensive to enter all the data that used to be on one sheet of paper. Now, we live with it every day and it shows where we are effective and where we need to focus our efforts. We get instantaneous feedback on how the delivery cycle is operating and it allows us to tailor each delivery cycle to the needs of the crew or plant."

The savings and the introduction of additional efficiency were top selling points for the team to embrace the system.

"This tool can allow the back office to take management of trucks off the paving crew foreman, plant operator and trucking foreman, and put it into an office setting where communication and visibility allow for real-time decision-making," Quigg said.

Todd Quigg is the President of Harrison Construction.

"If your field personnel will support the change, it can make their lives better and grow the bottom line of your company."

So far, using the truck management system has already realized the savings of one truck per day for Harrison operations. That came about for their team through precise trucking fleet management. When the dispatcher knows exactly how many tons are on the job, he has the ability to check in with the foreman on site and communicate about actual yield. He then knows when it's acceptable to remove a truck from rotation before loading it with perishable material and sending it to a work zone that doesn't need it. Dispatchers can work with the job superintendents prior to job startup to assess an accurate number of trucks needed for a project.

"I believe that adoption of this tool and process change will save at least one truck per day [for an operation]," Quigg said. "As you do the math for that savings, over the course of a year, the return on investment for the tools is met within the first year."

As this document demonstrates, keeping the haul truck in safe working order takes attention to detail. The driver works in concert with members of the dispatch and paving teams to bring a perishable product to its destination safely and efficiently. It's a team effort to keep the asphalt paving project on schedule. But it's a quality-minded team with a common interest in keeping everyone safe throughout the job. AP

Libra's Ken Cardy listed the main benefits the Harrison Construction team realizes with this system:

- **Libra is the only company to offer a dispatch solution that is purpose-built for the asphalt industry.**
- **Coupled with a telematics solution, Libra TMS allows for active management of supply chain in real time, taking the team from passive to active management.**
- **TMS gives the operations team a live look at where the trucks are in regard to the estimated delivery cycle.**
- **TMS has the potential to save money by eliminating inefficient practices such as over-trucking.**