

SUMMER 2009

Equipment Manager

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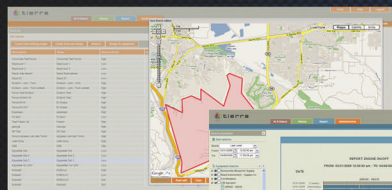
Page 18

Page 26
A Look at Deterrent
Technology

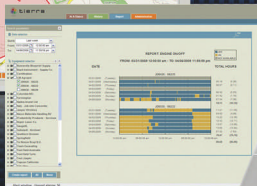
Page 33
Storm Recovery

Page 36
Managing Emissions-
Related Maintenance

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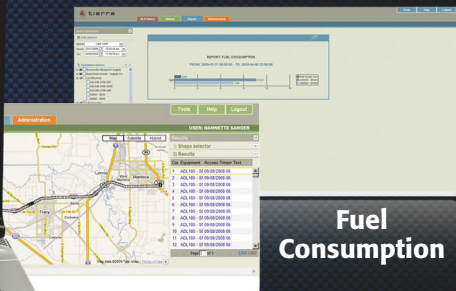
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Summer 2009

CONTENTS



18

MANAGEMENT

18 Five Strategies For Machine Disposal

Managers have their favorites, but choosing the correct option depends on evaluating advantages and disadvantages

STRATEGIC ISSUES

26 A Look at Deterrent Technology

Equipment theft can be reduced through the use of various loss-prevention technologies

BEST PRACTICES

33 Storm Recovery

Katrina knocked Barriere off its game, but a return to performance management has it hitting its benchmarks again

MAINTENANCE MANAGEMENT

36 Managing Emissions-Related Maintenance

With increasing costs associated with emissions compliance, maintenance cannot be overlooked

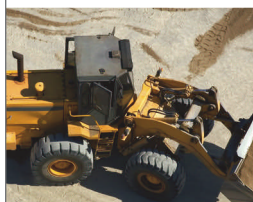
DEPARTMENTS

5 Executive's View

AEMP: Now More Than Ever

7 AEMP News

- Foundation Scholarships
- Asset Management Symposium
- Coming Soon: CESP Designation
- CEM Institute



26



34



37

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AEMP: Now More Than Ever



By Stan Orr, CAE, AEMP Executive Director

Difficult economic times are creating challenges for everyone in the asset-management profession: you the asset manager, as well as your business partners in the Equipment Triangle — the manufacturer and distributor.

AEMP recognizes those challenges, and as with all businesses, the organization faces its own challenges. That is why we are being proactive in creating more value for anyone choosing to be a part of this organization. Now more than ever, AEMP can provide you with the tools you need to survive these trying times.

For instance, we recognize that travel restrictions are creating challenges to attend national conferences where we offer world-class education. As such, AEMP is developing a range of educational offerings designed to deliver best practices directly to you. They are part of a new program called AEMP University, and when deployed will save you time and money while providing you with the tools you need to manage and maintain your fleet.

- Online study courses to aid those seeking to obtain the Certified Equipment Manager credential. These courses will allow you to save hundreds of dollars on the costs associated with attending AEMP conferences to participate in a CEMI. Think of it as a CEMI on your desktop.
- Traveling education courses are now being put together to deliver live educational and networking opportunities in your area. Three are tentatively planned for the coming year, and will include a meal, networking, and an industry expert speaking on the hot topics of today: emissions, telematics, and fleet survival in an economic downturn.
- AEMP, in partnership with *Construction Equipment*, will continue to offer free webinars. These highly successful webcasts are not to be missed!

Benchmarking is increasingly being utilized to provide companies with critical insight into operating costs for their fleets. This provides companies with the data they need to take a closer look at ways to reduce costs, increase productivity, and feed the bottom line. In the coming months, AEMP will be conducting the industry's first benchmarking survey. AEMP will collect and produce aggregate benchmarking numbers on everything from shop costs to staff expense to warranty costs and more. As a participant in this survey, you will be provided with results to enable you to see how you stack up against other companies. This valuable tool will provide you with insight on ways to reduce costs as well as identify strengths and weaknesses within your organization. We encourage you to participate in this landmark survey.

AEMP is increasingly being recognized as the go-to organization for the profession and the industry. We encourage you to stay involved and participate in the plethora of education and networking opportunities. Now more than ever, AEMP is your best partner.

A stylized, handwritten signature in black ink, appearing to read 'SO'.

Stan Orr, CAE
Executive Director

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AEMP FOUNDATION ANNOUNCES 14 Scholarship Recipients

The AEMP Foundation is pleased to award scholarships to 14 students planning to enter the technician profession. The scholarship competition is open to students all over the United States who are interested in pursuing a career as a heavy-equipment technician.

The AEMP Foundation is committed to addressing the current critical technician shortage by assisting those who wish to make a career as a heavy-equipment technician. This year, the Foundation was delighted to see a record amount of interest in the scholarship program. By raising awareness of the critical role of the professional technician, the Foundation hopes to help meet the needs of the industry's future.

This year, scholarships were awarded to:

MITCHELL COLYER OF FAIRFIELD, ILLINOIS. Mitchell is a second-year AEMP scholarship recipient. He has been awarded the FFA State Degree award and is currently applying for FFA American Degree. Mitchell has been excelling at Rend Lake College with Dean's List honors and is anxious to gain experience with computerized testing equipment.

KLAYT KINYON OF LEWISTON, IDAHO. Klayt is the Foundation's other second-year scholarship recipient. Klayt is currently attending Lewis-Clark State

College and is enjoying the diesel technology program. Klayt gained a massive amount of technical knowledge his first year and is excited to start a full-time job in the summer and see what his second year at LCSC has in store for him.



Zane Osgood was awarded the 2009 Slezak Scholarship.

ZANE OSGOOD OF ISCHUA, NEW YORK. Zane kept

busy through high school as the President of FFA, patrol leader for Boy Scouts, a participant

in varsity swim team, track and field and National Honor Society. In addition to that, Zane also repaired machinery on his family's farm, and worked as an intern bulldozer operator at a local contracting company. Zane will be attending Alfred State College where he will be studying heavy-equipment and diesel technology.

CHRISTOPHER SHIRLEY OF HEDGESVILLE, WEST VIRGINIA.

Christopher was the recipient of the prestigious Eagle Soar Award through the FFA as well as a National Technical Honor Society member. Chris's grandfather sparked his interest in mechanics at an early age, helping him turn an old lawnmower into a spiffed up pulling tractor. Chris is looking forward to studying at Wyotech in the fall.

KEVIN MCKINLEY OF FAIRLEE, VERMONT.

Kevin was the class president of the heavy-equipment program as well as a National Technical Honor Society member. Kevin hit the ground running in his high school's heavy-equipment class, drawing on his experiences from projects with his dad. Kevin will be attending Washington County Community College in the fall.

COLTON NETHERS OF NEWARK, OHIO.

Colton participated as a 4-H safety leader for nine years and was also involved in FFA. He was also in a Skills USA Diesel Mechanics Skills Competition and placed third. Currently, Colton loves his position as a diesel technician at Kokosing Construction and would like to continue working for them after he finishes his studies at Northwestern University.

ETHAN PERKINS OF EAST HENDERSON, TEXAS.

Ethan was involved with his high school's football team and FFA program. His passion for diesel technology started when his dad towed home a broken down '66 GMC truck and Ethan became interested in learning how to maintain and fix diesel equipment. Ethan is looking forward to studying at the Universal Technical Institute in Houston, Texas.

BRANDON CHARLESWORTH OF MILLVILLE, NEW JERSEY.

After 11 years of involvement with

Boy Scouts, Brandon earned the prestigious award of Eagle Scout in 2008. Brandon is also a bugler in American Legion and lettered in the Millville Marching Band. Brandon is looking forward to sharpening his welding skills and studying diesel technology at Lehigh Career and Technical Institute this fall.

SAMUEL BOYLE OF POLSON, MONTANA. Sam kept busy in high school with his participation in cross-country, track, and pep band. Sam earned the "Coaches Award" for the 2008-09 cross-country season. Sam also holds the honor of an Eagle Scout after serving as senior patrol leader in his Boy Scouts troop. Sam is excited to start his studies at Montana State University-Northern.

ROBERT EDWARDS OF HEDGESVILLE, WEST VIRGINIA. Robert was involved with the Hedgesville 4-H group and the FFA, where he earned the Eagle Soar Award. Robert's favorite classes have always been diesel technology, and he's ready to study diesel "full time" at Wyotech in Blairsville, PA.

MITCHELL MADRU OF FRANKFORT, OHIO. Mitchell was busy in high school, serving as vice president of the local 4-H chapter and participating in FFA, Skills USA and golf. Mitchell hopes to obtain an associate's degree in Hydraulic Power and Motion Control, eventually working as a diesel technician. Mitchell will be studying at the Ohio State

University Agricultural Technical Institute.

CODY KING OF SEYMOUR, TENNESSEE. Cody has always been interested in trucks, tractors and heavy equipment, and has worked on anything he could get his hands on. He simply loves learning how things work. Cody is looking forward to studying diesel technology at Tennessee Technology Center in Knoxville, TN.

CHADWICK JACKSON OF PINEVILLE, WEST VIRGINIA. Chadwick is a three-year letterman in baseball, is a four-year academic letterman and a member of National Technical Honor Society. Diesel technology has always interested Chadwick. Thus far, he's attended a two-year program at the Wyoming County Career and Technical center. Now he's looking forward to attending

West Virginia University Institute of Technology to pursue an associate's degree in Diesel Technology.

CHRIS BAXTER OF ALBION, ILLINOIS. Chris is a four-year participant on the football team, member of the Diesel Club and FFA. Chris is interested in a career where he will be challenged to continue learning new technologies and updates. Chris will be studying at Wabash Valley College in the fall.

This year the program was able to provide additional scholarships with the generous support of the Foundation's annual donors, Terex, Bechtel, Delta Rigging & Tools, and the Association of Construction Equipment Managers.

For more information on the AEMP Foundation scholarship program, visit AEMP.org.



Mitchell Colyer, 2008 Slezak Award winner, attended the 2009 Annual Conference as a guest of the Foundation.



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Third Annual Asset Management Symposium Should Not Be Missed!

Make plans to attend the AEMP Asset Management Symposium, Oct. 27-28, 2009, in Chicago.

This year's agenda has been developed to provide an irrefutable return on budget investments. From keynote speaker and indus-

try expert Charles Vander Kooi to economist Dave Reinders, the Management Symposium will give you the solutions you need for these uncertain economic times.

This year's Symposium, Survival in a Turbulent Marketplace, is full

of sessions that will give you practical solutions you can implement the day you get home. Immerse yourself in current industry issues such as: obtaining optimal appraisals, learning when to dispose or acquire, and knowing how to act and how to react.

You will also have the opportunity to network and learn with the industry's most experienced fleet managers, distributors and CEO/CFOs. Share ideas and brainstorm solutions to the industry's most pressing problems during two days of speaker sessions, networking receptions and roundtable discussions.

Find out more information or register at www.aemp.org. We guarantee this is a valuable opportunity. Register before September 1st to stretch your budget even farther by saving 10% on your registration!



The Asset Management Symposium will feature roundtable discussions.

Coming Soon: Certified Equipment Support Professional Designation

In March 2010, AEMP will introduce a professional designation for equipment suppliers. The Certified Equipment Support Professional (CESP) designation will demonstrate a supply professional's depth of understanding of fleet-management skills and their ability to interact with all fleet-related professionals. The CESP designation will be a recognized standard for judging the qualifications of on- and off-road equipment suppliers.

The CESP will provide a high standard of certification to supply professionals. Yet, the CESP designation is an attainable goal for equipment suppliers who

want to be identified as exceptional. The CESP designation indicates that the Equipment Manufacturers' or Equipment Dealer representative has demonstrated — through professionalism, knowledge, experience and training — that they can easily communicate with equipment-management professionals in the industry and that they have demonstrated a depth of understanding in the 16 competency areas of the Certified Equipment Manager manual.

More information on the CESP will be available in spring 2010. Please call 970-384-0510 with questions.

2009 Asset Management Symposium & Certified Equipment Manager Institute Survival in a Turbulent Marketplace

Chicago, IL (Hyatt Regency O'Hare) • October 27-28, 2009

Connect with fellow fleet managers, distributors and CEO/CFO's seeking the management solutions needed in the turbulent marketplace. Highlights include:

- Industry expert Charles Vander Kooi: *"Egg Sucking Dogs & What Contractors Need to Know"*
- Economist Dave Reinders: *"The Future of the Equipment Industry"*
- Sustaining Fleet Value: The Impact of New Emissions Standards
- Dispose or Acquire? Managing Assets in a Changing Market
- Economic Forecast: Knowing When to Act, When to React
- Building Owner Understanding of the Value of the Equipment Department
- Optimal Appraisal: Best Practices in Sale Preparation

Certified Equipment Manager Institute



Join your peers for the CEM Institute (CEMI) and earn your Certified Equipment Manager Certification (CEM) or Equipment Manager Specialist (EMS) designation. The EMS is a new program designed to assist developing equipment managers during the first five years of their equipment management career. CEMI registration includes the study manual, review of exam subjects with industry leaders, and some meals. Applicants must apply by 9/29/09. The exams will be administered on 10/29/09. Contact AEMP at (970) 384-0510 for more information.

Register before September 1st for a 10% discount! Additional information and registration forms can be found at aemp.org.

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Rise to the Top of Your Profession

The next Certified Equipment Manager (CEM) Institute will be held Oct. 27-28 in Chicago, IL. Take this opportunity to elevate your professional standards, enhance your performance, and demonstrate knowledge essential to the successful practice of equipment maintenance and management. Join a distinguished group of peers nationwide who have chosen to attain the highest level of professional excellence.

In addition to the Certified Equipment Manager (CEM) designation, this year, AEMP is unveiling the Equipment Manager Specialist (EMS) program. The EMS program is a learning opportunity and exam designed to assist the new equipment manager, with five or fewer years of experience. An EMS candidate will increase his

or her knowledge of the industry in preparation for eventual certification as an equipment manager. EMS candidates must complete an application and take the EMS Exam. Candidates have the opportunity to attend the CEM Institute and network with top industry professionals and an industry mentor. The EMS Exam will be premiering at the October CEM Institute.

The CEM and EMS credentials are the key to enhanced professional stature. The CEM Institute is a comprehensive, 16-hour preparatory course for the CEM and EMS exams.

Institute sessions will be led by industry experts and cover the necessary skill sets needed in Finance, Information, Policies and Controls. Please see the chart below for more details on what topics will be covered.

Who Should Attend:

Candidates for the CEM exam must have at least five years of experience as an equipment manager and meet the requirements listed on the CEM application. Candidates for the EMS exam have no required experience levels, but they must complete an application, be employed in the equipment maintenance/management industry, should possess a desire to develop professional skills, and aspire to become a Certified Equipment Manager (CEM).

When:

October 27-28, 2009. The exam will be held on October 29, 2009, from 8 a.m. – 12 p.m.

Where:

Chicago, IL, at the Hyatt Regency O'Hare

Registration:

Enrollment is limited and you must demonstrate minimum requirements needed to take the CEM exam. For both the CEM and EMS exam, applications need to be completed 30 days in advance of the Institute. The application requires a \$40 processing fee.

More information on Institute and Exam can be found online at aemp.org under the CEM drop-down window at the top of the page.

FINANCE	INFORMATION	POLICIES	CONTROLS
Financial Management	Benchmarking	Employee Training	Outsourcing
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Five Strategies for Machine Disposal

Managers have their favorites, but choosing the correct option depends on evaluating advantages and disadvantages

By G.C. Skipper, Contributing Editor

Like cattlemen in the Old West, there comes a time when fleet professionals have to thin the herd, that is, sell or trade aging equipment.

We'll look at five options: trade-ins, auctions, selling direct to another user, like-kind exchange (really a form of financing), and equipment brokers. Fleet managers should understand and be able to evaluate the advantages and

disadvantages of each method in order to decide which option works best for any given machine.

Paul Hendrix, equipment pricing analyst for IronPlanet, has seen the machine-disposal world from all sides. During the past 20 years, he has worked on the sales side for two major OEMs, has sold used equipment through a used-machine dealership, and has worked for both of the country's

largest auction houses.

"I've been exposed to these transactions from a lot of different angles," Hendrix says. "I've dealt with just about every one of these ways to dispose of equipment, including like-kind exchange."

The advantage of trade-in, he says, is convenience for the seller. Relationships with the dealer have already been established and so has the level of trust. "Convenience is something that is very high on most contractors' list right now," he says. "They have so many irons in the fire that they simply don't have time to dispose of used assets on their own."

Trade-ins also provide a flexible transaction that allows fleet managers to trade multiple units or only one unit. Usually the deal can be done at one place, and a trade-in can become a negotiation point if new equipment is being purchased.

The downside of trade-ins, Hendrix says, is that the price could be at or below wholesale, especially if the seller doesn't know the market and the demand for that piece of equipment.

"The way dealers show the numbers to a seller is through over-allowance," Hendrix says. "They



One of the advantages of auctions is flexibility. Fleet managers can offer a single unit or multiple machines for sale. (Photo courtesy of Insituform Technologies)



A boom inspection prior to delivery is conducted by Jim Pauley, service manager, Leslie Equipment. (Photo courtesy Leslie Equipment)

fluff up the number on the new unit and show more for the trade than the actual number, which is much lower. That over-allowance is compensated for by the new piece involved in the trade-in. It all comes down to the seller's level of knowledge. He's really got to be aware of what's going on."

Barth Burgett, CEM, vice president of equipment and support, Kokosing Construction, says about the only advantage to trade-ins is that it's a fast way to dispose of equipment.

"We only use trade-ins as the last method of equipment disposal," Burgett says. In the present down economy, dealers may be more inclined to take more risks on what the trade-in is worth, he says, but in a seller's market, "you don't get your true value."

"The dealer has hidden pockets, meaning there is a lot of negotiating that goes along with a trade-in," Burgett says. "Dealers tend to put

more value on the new unit (since) they don't know what they are going to get out of the trade-in unit."

Pat Crail, CEM, fleet information manager, John R. Jurgensen Company, also advises sellers "to look at the entire deal" when it

"If the equipment is in really bad shape and you don't have records on it, you won't get a good price at trade-in."

Todd Perrine, CEM, Leslie Equipment

comes to trade-ins. One reason, is because the seller is depending on the "regional footprint" of the market, which might not yield top value. "You may sacrifice some residual value in that machine for the ease of disposal," he says.

Crail concurs, however, that a trade-in can be advantageous when

it's connected with the purchase of a new machine. "Sometimes you can get a pretty good deal with very little effort."

Another trade-in advantage, said Guy Gordon, CEM, director of asset management, Insituform Technologies, is that it's a simple process.

"If I accept the value offered by the dealer, I just trade," Gordon says. "I don't have to prep the machine for sale. I don't have to transport it a long distance. I don't have to market it, and I don't have to deal with third parties, that is, handling bills of sale and making sure I'm covered through liability."

As a former equipment manager and now on the dealer side, Todd Perrine, CEM, Leslie Equipment, identified two advantages of trade-ins. One, a good relationship with a dealer allows the dealer to know a lot about the machine. He has historical records that show how the machine has been serviced, how often, and what was done. With this type of documentation, Perrine says, the dealer will give more value for the trade-in.

On the other hand, if there are no historical files, a trade-in won't provide top value. "If the equipment is in really bad shape and you don't have records on it, you won't get a good price at trade-in," Perrine says.

A second advantage is that dealers know how much they can obtain for the unit, which means there is no question about what the seller receives for the trade-in. By comparison, he says, "auctions are a crap shoot. The price may be good one day but not the next. Also, have your accounting folks look at the tax breaks both ways."

Auctions do have advantages, Perrine says. Equipment is guaranteed to sell and provide a quick return on investment. There is a much wider audience of potential buyers, depending on whether the auction is online or local. Auctions are good when downsizing fleet and liquidating some equipment.

Indeed, says IronPlanet's Hendrix, auctions have evolved into an effective fleet-management tool.

"The biggest difference between online auctions, as we have, and traditional auctions, is that traditional auctions offer more services, such as painting, detailing, minor repairs," Hendrix says. "But the

ment. They also offer inspection services that provide potential buyers with detailed reports on a particular unit.

"They touch on key aspects of the equipment and give you information that is substantial to help you through the bidding process," he says.

Auctions can be reserve or no-reserve. No-reserve auctions usually have stringent guidelines to which sellers must agree, such as the seller won't bid on his own equipment, will not have a representative to bid on his equipment, and will not buy his own equipment. In a no-reserve auction, Gordon says, the seller is agreeing

and take the equipment home.

Crail is a strong believer in auctions, he says. "In the last three or four years, our company has been pretty heavily tilted toward auctions. You get a pretty good return if you are dealing with an auctioneer who is plugged into the global market. But you do have to pay close attention to recent auction values, particularly a no-reserve auction."

Crail advises fleet managers to research prices in the marketplace and check recent auctions to see what a particular class of equipment sold for. "You don't want to get any surprises on auction day," he says.

Burgett's take on auctions is quite different.

"It's like a dead man walking," he says. "They really want to get your machine in the auction; then it sells below what you wanted. The auctioneer has no risks, just the outlay for the service. If the machine brings only X amount, he still gets his 8 or 10 or 12 percent for performing the service. The least choice of getting rid of equipment is between a trade-in and an auction. At auctions you have the least amount of control in determining your own destiny."

Auctions are usually not a good choice for specialized equipment, such as tunnel-boring machines or any machine built for a particular type project. A highly specialized machine put into an auction would end up targeted to a small bidding population, Gordon says.

"They don't do that well," Gordon says. "In cases like that, with a limited number of people in the market, selling the equipment yourself to another user is probably the best way to go."



Todd Perrine, CEM, Leslie Equipment, does an equipment quality check as part of his pre-delivery process. (Photo courtesy Leslie Equipment)

mark up for these services is pretty substantial. With online auctions, the piece of equipment stays in your yard, you maintain control over it, and you decide what repairs, if any, should be done."

Gordon says an advantage of online auctions is the seller does not have to transport his equip-

ment to sell the machine for whatever the highest bid is.

A reserve auction allows the seller to set the lowest price he is willing to accept. If the bid doesn't reach that price, the seller is given an opportunity to sell the equipment at the highest bid that came in or to pull it from the auction

• I'd like a joystick steering option. The next generation of operators are all heading in that direction anyway. Heck, who needs a steering wheel. • Fuel costs are killing us. So these loaders have got to be efficient. A lock-up torque converter might help that. • Monitors are great when you can see them. I've got to be an issue, so you've got to position the screen right — within my line-of-sight. Make it a decent size with large enough letters and numbers so I can read it. And I've gotta be able to see the gauges. • I've got joystick steering. Works great for loading trucks, but it's pretty hard to control during load-and-carry. If you can make that right, I'll buy it. • All machines need maintenance. But not all loader manufacturers make it as simple as the better. It's all about uptime, you know. • I've got trucks coming in all day. I flat-out need efficiency — get 'em loaded and get 'em out. So I want a loader with fast enough hydraulics to keep up. • From the operator — seems like we're up and down the ramp hundreds of times, all day long. Anything you can do to reduce cycles and make us more productive is worth a look. • Whatever you can do to reduce operator fatigue is a good idea. I'd think joystick steering would be ideal for production work. It'd be nice to not have to crank a steering wheel all day. • My boss is a real stickler about fuel usage. He doesn't like seeing machines idling. Heck, I've even seen him climb up in a cab and shut off the machine. He'd buy a machine that would shut down. • I need to know how much material we load in a day and I have to know that we're loading our trucks. Onboard payload systems let me do that. • Seeing the bucket is one thing, but I've got to see who else is around me. All-around visibility is just as important. • Nothing worse than charging into something coming up with nothin' because you can't get traction. I don't always work in ideal conditions. A traction control that kicks in at the first sign of slippage is a must. • I don't want to reach and I don't want to stretch. Controls should be right there, and go with me when I move the seat, because I don't keep it where it is. • We run several different brands of loaders. With some, you have to crank up the radio to hear the others, you can't even hear yourself think. • Unless you run one all day like I do, you don't really appreciate the machine. Makes all the difference in the world. • We have lots of equipment spread over a large area. We lock the machines and all that, but everyone knows one key fits all. A keyless starting system with a code is something we'd use. • This is more than just a machine to someone like me — it's my office. • I sit in a cab for 10 hours at a time a comfortable seat isn't just a luxury. • Would you buy a pickup with an uncomfortable seat that can't be adjusted? I wouldn't, and I don't want to sit all day in a loader like that. • Let me tell you something, in my business, out-of-sight can mean out-of-a-job. • You've already got a monitor in the cab. Why do you need two when you add a weighing system? • Rear cameras are nice, but don't give me an audible alert, too? That way I can keep my eyes on the mirrors. • I have a rearview camera on my car — why not my loader? You can cause more damage backing into something with a loader than a car. And there are no mirrors. • A cycle counter to help me count loads would be handy. • Right now I keep track of fuel usage, but seeing dollars go out the exhaust is a pain. • I want the machine's sitting



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The seller can set the price when selling to a user directly, Gordon says. "For the most part, if you have someone who is familiar with the equipment and the quality of your equipment is good, backed by good records, you may get a higher price than you could at trade-in or auctions."

The downside, however, is that you have to deal with customers, do all the paperwork yourself, and make sure your liability is covered, he says.

Burgett said Kokosing disposes of most of its equipment by selling to another user.

"We try to sell to other contractors," he says. "You may not get your information out to as many people, but we have seen better returns and less risk by doing it this way."

The biggest challenge is to get word to the right person. If you do that, the equipment will sell, he says. "You might have to hold onto the equipment longer, but you will get a fairer return on your investment."

Crail hasn't had such success.

"We haven't had a lot of luck selling direct to another user," he says. "I'm not a big fan of that because it consumes so much effort and energy on the part of fleet managers. They already are overloaded. There isn't enough time in the day to perform the duties we already have. With direct selling, you are becoming a used-equipment salesman. People want to come by, take a look, and kick tires. And often, you are limiting yourself to the local or regional marketing conditions."

Another disposal method defers taxes, Burgett says. Like-kind

A SIXTH OPTION: REPAIR IT

Fleet professionals know the stomach-turning sensation when the economy takes a rollercoaster dive. In recent months, business is anything but usual. In such cases, an alternative to disposing of aging equipment is keeping it longer, making repairs, and shooting for a second lifecycle.

Advantages include:

- Avoid a substantial capital outlay by postponing the purchase of a new unit
- Extended component life
- Accurate historical data allow repairs to extend equipment life.

Pat Crail, CEM, John R. Jurgensen, says, "You're basically weighing replacing the machine versus running it another year, realizing you may have to perform a major repair if it breaks.

"If things get slow, you can't get the utilization you need out of the machine. With the repair option, you take a gamble, but the repair option is really risk management. The risk is, if you should have a great year with high utilization, you wind up replacing some major components that you didn't expect," he says.

When you weigh those component replacements and major overhauls against the capital outlay you would have made in a new unit, it could be well worth the risk, Crail says.

Todd Perrine, CEM, Leslie Equipment, suggests managers do a cost analysis. One formula that has stood Perrine in good stead over the years is to look at what the older machine costs per hour to run; then look at the new machine and figure out how many hours you will run it, the number of out-of-service hours that you won't have with the new machine, and then evaluate the current need of your company.

If repair is the option, he says, "Think about how long you want to run that machine after you repair it. Do you want to get a complete second life out of it, or are you just trying to buy time to get you out of a pinch, get some jobs working, and improve cash flow until you can afford to buy a new unit?"

As with the other five options, repair should not be blindly chosen.

Cautions include:

- Do new models bring substantial improvements in production, ergonomics or performance that add value worth replacement?
- Would a new machine with a higher-Tier engine reduce the fleet's carbon footprint?
- Are labor costs prohibitive?
- Is the cost difference worth the unknowns, such machine performance post-repair?

"Repairs certainly are an option right now," Perrine says. "If you have an undercarriage repaired for \$13,000, that makes sense rather than lose \$10,000 or \$15,000 in equity because equipment purchases are so bad right now."

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exchange is a financial concept that boils down to how you get paid, he says.

"The money you receive from the sale of a piece of equipment does not come directly to you," says Burgett. "It goes to a third party, such as a bank or even an auction house to be used to purchase a piece of new equipment at a time still to be determined. On large sales where there is a chance of having to pay capital-gains tax, you get the funds transferred knowing that you are going to spend it on another asset."

Like-kind exchange has strict parameters, Hendrix says. For instance, if you decide to trade or dispose of Asset A and buy Asset B after you dispose of Asset A, you cannot accept the funds directly. After the item sells, you have only a certain amount of time to complete the transaction by buying the new equipment. "If you miss any of the deadlines," he says, "all bets are off."

Like-kind exchange must be used in moderation, says Hendrix. If not, it can lead to trouble.

"I knew someone who used like-

Unfortunately, the man's health declined due to cancer, there were no family heirs who wanted the business, and he wanted to sell it. The guy had a hard time getting the company sold at a time when he really needed those assets."

Equipment brokers offer a fifth avenue for disposal. Burgett says Kokosing probably sells as much equipment through brokers as any other method.

"A lot of equipment moved through brokers leave the U.S. and go to other locations," he says. "They come in, look at the equipment, and typically already have another buyer who is looking for that particular unit. I'd rather deal with brokers than auctions."

Crail says Jurgensen occasionally uses brokers, too.

"It's not frequent, but if we have something and we are not comfortable with recent auction prices and we want to get the machine out of the fleet, we might be able to get better value using a broker."

A year and a half ago, Crail says, calls from equipment brokers were more common, but in the past nine months equipment has become easier to come by. "We don't have people beating the door down to buy equipment."

And at IronPlanet, Hendrix says he deals with equipment brokers on a regular basis.

"They come in and out of our business often. For the seller, one big advantage is just the relationship. Many brokers do a very good job connecting buyers and sellers. That relationship between broker and contractor is built on trust, and the only downside is if that trust is broken. If that happens, it can be very painful." **EM**



A contractor traded in this John Deere dozer to Leslie Equipment to upgrade to a new D Model. (Photo courtesy Leslie Equipment)

IronPlanet's Hendrix says like-kind exchange is "a great tool."

"If someone tells you that you have to pay \$10,000 in taxes and you can pay it this year or four years from now, most people will opt to pay it four years from now."

kind exchange frequently and it worked well for him," he says. "He did this for several years, buying several pieces of equipment. But what happened, the books showed he had accumulated a fairly large tax liability that was deferred.



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A Look at Deterrent Technology



This overhead view of a dozer shows the almost unnoticeable antenna of the LoCate by LoJack security system that is mounted above the open cab door on the near side. (Photo courtesy of LoJack)

Equipment theft can be reduced through the use of various loss-prevention technologies

By G. C. Skipper, Contributing Editor

Not often do good things come from crime.

The exception, however, could be construction equipment theft, according to Tim Watts, manager, physical damage insurance, Caterpillar Insurance Services.

"The rate of equipment thefts has been significant, and these thefts are what have fueled loss-prevention technologies," Watts says. "Equipment thefts from 1995 to 2001 climbed by 64 percent." When new numbers are compiled, Watts says the percentage may be even higher for this decade.

Theft ranks as the No. 1 reason for equipment loss, Watts says. Fire, vandalism, collisions and overturns

are all distant runner-ups.

Only 20 percent of stolen equipment is recovered, according to National Equipment Register (NER). NER is a group primarily funded by insurance companies to maintain national databases of such statistics plus other related data.

Although there are no definitive dollar amounts yet, NER statistics show that equipment stolen annually ranges between \$300 million and \$1 billion. Last year, 13,511 pieces of construction equipment were stolen. Skid steer loaders and backhoe loaders were the most popular among thieves.

For fleet managers who want to be proactive in loss prevention,

three types of technologies are available, depending on equipment application, geography and individual company budgets. These technologies include keyless starting, radio frequency-based technology, and GPS-based technology used in asset-management systems. Such systems also provide equipment location, maintenance information and other data. The third loss-prevention technology, geo-fencing, is an off-shoot feature of asset management systems.

Keyless starting is an up-and-coming technology that became available on selected John Deere machines about nine months ago, according to Jahmy Hindman,

product marketing manager. Keyless starting essentially removes the key switch in the cab.

"Up until the technology was introduced not quite a year ago, machine security was difficult to enforce due to proliferation of manufacturers' keys," Hindman says. "This presents somewhat of a challenge in terms of keeping folks who shouldn't be running the machines from doing so."

In John Deere's case, the key switch in the operator's cab has been replaced by a push-button start system. When the security mode is turned on, the operator must enter a personal identification number (PIN) to start the engine.

Even before the PIN code is entered, the technology allows the display of certain basic information—fuel level, engine hours on the machine and battery voltage, for example—that gives service people the basic data they need to service the machine without them having to know the PIN code.

"Without the PIN code, you can push and hold the start button all you want and the engine won't turn over," Hindman says. "When you enter the PIN, the gauge display comes to life showing additional information, such as oil pressure, transmission temperature, and so forth. However, at this point the engine is still not running. The operator can then push and hold the start button and the engine will fire up."

In applications where an operator is on and off the machine numerous times during the day, John Deere has devised a delayed operator logout, Hindman says. "It's a nuisance to have to input the PIN code every time you get on

and off the machine, so this device allows the engine to be off for a certain period of time. During that specified time interval, the operator doesn't have to input his PIN again to start the engine."

Hindman says there is a particular concern about equipment loss in urban areas, not only to theft, but to other unforeseen circumstances, such as a kid who takes the machine for a joy ride

time, say 60 minutes. That gives the truck driver plenty of time to start the machine, load it onto the trailer, and back it off when he reaches his destination. What it prevents is for the trucker to stop by his house, dig himself a basement or a swimming pool with the equipment, reload it, and continue on his way. You'd be surprised at the things we run into."

Caterpillar has an on-board control that contains a list of keys in it, according to Steve Morris, commercial parts manager. The keys are pre-programmed by the dealer for the fleet owner. A key that starts the machine must be on that pre-programmed list.

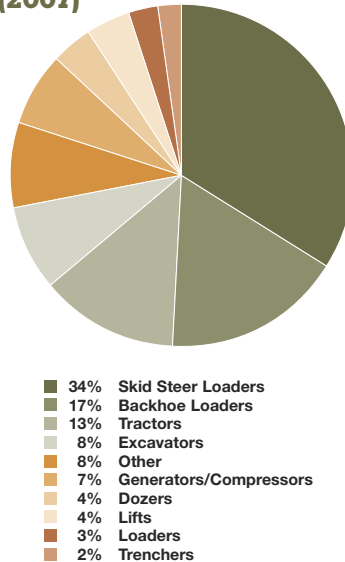
"You can put in a key, but if it's not on the list it won't work," Morris says.

The security system is integrated into the machine electrical system. "If you somehow crank the engine, the security control talks to the engine control on the data link and the engine control turns the fuel injection off. If you get around both of these deterrents—starting and engine fueling—the transmission won't work," Morris says. That technology can be installed on the machine or at the factory or in the field, he added.

For thieves who winch the machine onto a trailer, the machine can be followed by another Cat system that provides GPS tracking.

Radio-frequency technology, another type of theft protection, was introduced to the heavy equipment industry about nine years ago, according to Bob DeAngelis, senior director of LoJack's commercial division. Unlike global positioning systems that bounce signals off satellites and back down to locate a

Types of Equipment Stolen (2007)



Source: NER

These numbers represent 4,310 theft reports submitted to NER in 2007. "Other" includes more than 50 machines, including graders, scrapers and wood chippers.

and abandons it; or a disgruntled employee who cranks up the unit and uses it as a weapon to inflict property damage at a work site.

"Keyless starting also protects against misuse while the machine is in transit," says Hindman. "We've implemented a transport PIN code that allows the equipment to be turned off and restarted for a certain period of engine run

piece of equipment, radio frequency technology is designed to penetrate enclosed areas, such as garages or containers where thieves might hide stolen machines. GPS signals, by comparison, bounce off enclosed surfaces and can't get to the receiver mounted on the stolen unit.

"We've seen a huge demand from equipment owners for our device," DeAngelis says. "It is a system that can be used by small fleets all the way up to major rental companies."

LoJack's radio frequency transmitter is buried deep inside the machine or vehicle. It does not require external components, such as antennae. "We only need to tap into a dedicated power source, either 12 or 24 volts. Once the product is installed, it is forever married to the unit's serial number," DeAngelis says.

"If the equipment is stolen, a

signal is transmitted and picked up by law-enforcement agencies that have access to the LoJack security system. The signal sent out by the equipment is silent and the thief never realizes he has touched off an alarm," DeAngelis says. The signal goes to participating law officials who pick up and track the signal to the machine. Other than filing an initial police report, fleet managers don't have to do anything more. They are contacted directly by police who advise them of the recovery.

Since entering the construction market in 2000, LoJack has been involved in the recovery of more than 3,200 pieces of equipment, DeAngelis says, not including machines recovered that didn't have the system on them.

"In many cases, when the LoJack equipment is found, other stolen equipment is also found," he says. "At the end of 2008, we reached a

milestone: More than \$100 million worth of assets have been recovered in the construction and commercial areas."

LoJack also offers a device designed for asset management called LoCate. It features a combination of GPS and cellular technology and provides real-time asset location, geo-fencing, daily engine hours, and utilization reporting.

It uses a satellite antenna mounted in an open-air location on the machine. "It is not truly a covert system," DeAngelis says. "But its strength, along with the combination of GPS and cellular technology, is that, combined with LoJack, the systems deliver a total solution for asset management and theft protection."

Ken Calvert, director, IT support, for Komatsu, says, "Although helping customers lower owning and operating costs is the primary purpose for our system, KOMTRAX, the GPS system has had several successes helping customers recover stolen machines. In these incidences, authorities went to the last reported machine location and found the unit. Additionally, KOMTRAX has features that allow fleet owners to almost observe progress along a highway when a machine is being moved on a flat-bed trailer."

Lorne Fleming, CEM, director of the equipment division for Grace Pacific, says he is a "big proponent" of GPS.

"This is probably the most significant tool in our arsenal as asset managers," Fleming says. "We all have access to on-board computers and vehicle systems. GPS technology is completely applicable to anything you want to use it for."



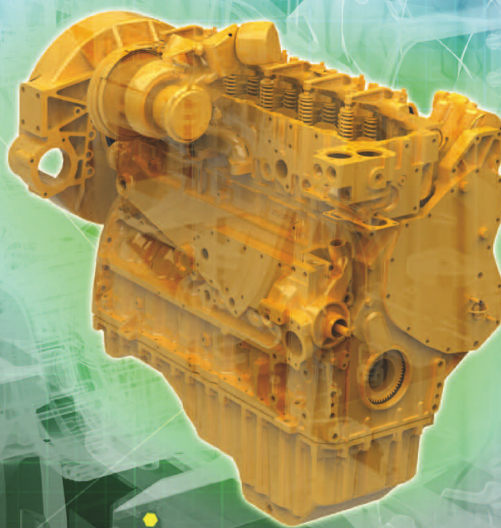
Florida police in a January 2009 recovery action zero in on a piece of equipment stolen from an equipment rental company. It was recovered through the use of a LoJack security system installed on the machine. (Photo courtesy of LoJack)

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A feature of GPS is geo-fencing, where an imaginary fence is positioned around a piece of equipment or around the jobsite itself. A device inside the vehicle “tells the machine it will not go past a certain point,” Fleming says. “If it does, the system says, “we are going to tell on you.”

If the vehicle drives across the geo-fence, the fleet manager is notified immediately that the machine is moving outside the fenced-in area. How the fleet manager is notified depends on how the program is set up, Fleming says. Fleet managers can be contacted by e-mail, computer or telephone, for instance.

Fleming says he has had stolen vehicles recovered through GPS. “Suddenly the GPS pings and if the equipment is not anywhere near our jobsites, but is sitting over in the wacky part of town where someone is getting ready to ship it off to somewhere, you pretty well know you’ve got a problem.”

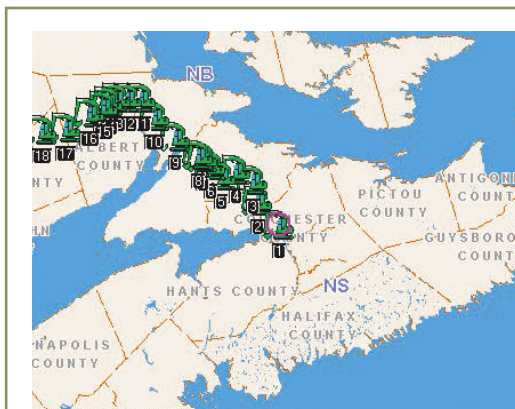
Fleming, and others interviewed, says if one machine is recovered, the system’s paid for itself. Even so, ROI is hard to quantify because if the deterrent technology works, the fleet manager may not know a theft attempt was made unless he finds traces of cut wires or other physical damage when he goes to the work site.

Many larger fleets justify the cost of security technology within the GPS package, which also performs an array of other management duties, such as tracking operating hours, service intervals and, generally speaking, the overall health of the machine.

“That is the attractive thing

about the GPS device,” Watts says. “It has multiple uses. That multiple use is also one way to justify the return on investment.”

With such technology being installed by OEMs and in the aftermarket, it’s not surprising that almost all insurance companies offer fleet professionals certain discounts in the form of either a premium credit or a deductible waiver, says Watts.



This screen capture from Komatsu's KOMTRAX shows the movements of a machine loaded on a flat bed trailer. (Image courtesy of Komatsu)

“Premium credit is a premium reduction,” Watts says. “It will apply if the fleet manager has GPS or any other anti-theft device on the machine—and the device is in working order. Insurers offer a variety of premium payment plans to meet their customers’ needs—monthly, multiyear or annually—anyway the fleet owner prefers.

“Nearly every policy has a deductible that is required before any payment is made on a loss,” he says. “In the event a deductible waiver exists, the fleet manager doesn’t have to pay the deductible if he has an operating anti-theft device on the machine when it’s stolen.”

The amount of the deductibles, Watts says, averages around

\$1,000, depending on the value of the machine or the entire fleet.

NER’s Ryan Shepherd offers candid advice for fleet managers before they rush out and buy the first deterrent technology they see.

“Contractors should be very careful of what service they subscribe to,” Shepherd says. “Make certain it is a complementary fit with the area they work in. For instance, if you are a contractor in the State of Montana,

you might not want to have a radio frequency type system on your equipment. Radio frequency systems perform better in urban or populated areas where frequency towers are more common. This type of system has a defined market space, so in that regard, the tower transmitters are more effective in higher population zones. Outside those areas—such as Montana—the system becomes less effective or law enforcement doesn’t have access to the technology.”

Shepherd’s second piece of advice is to find out which equipment is more targetable. “If [skid steers] make up 25 percent of your fleet, concentrate on those machines out there on the job—the units that are the biggest target for thieves and have the biggest demand in the black market.”

Third, says Shepherd, fleet owners should thoroughly understand the capabilities of the technology they are about to purchase. “Make sure the salesperson explains all the bells and whistles. Make sure you have a good comprehensive understanding of the system you are considering.”

Of course, registering equipment with NER is an alternative theft deterrent itself. **EM**



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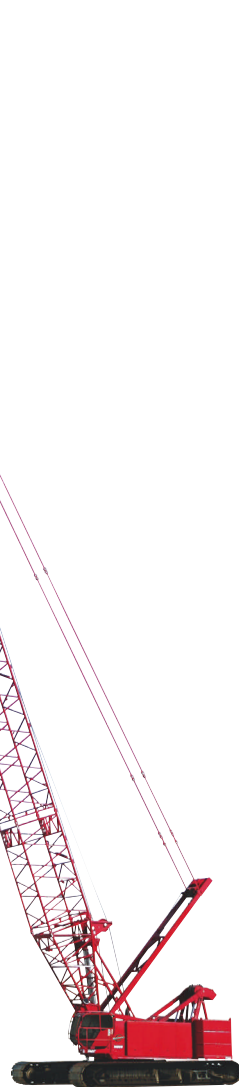
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Storm Recovery

Katrina knocked Barriere off its game, but a return to performance management has it hitting its benchmarks again

By G.C. Skipper, Contributing Editor

Mention the name Katrina, and you immediately have Ben Tucker's attention.

As equipment director for Barriere Construction, a highway-and-heavy construction company operating throughout southeast Louisiana, Tucker not only experienced firsthand the horrendous hurricane of August 2004 and its destruction of equipment, buildings and people, but he also learned just how disruptive the storm was to the internal workings of his own company. Management vigilance of Barriere's internal data stream was severely interrupted. The stream kept flowing, but no one had time to pay attention to it.

Maintenance performance benchmarks, the safeguards that helped the company win the 2004 AEMP Private Fleet Masters Award, were knocked off the tracks. But when the business strategies were reestablished, the restoration was so successful that this year—five years after the storm—Barriere was named AEMP's Private Fleet Masters Award winner for a second time.

The return to normal, however, was no easy task. It took half a year of man hours and the application of past lessons learned to complete the job.

Six months after the "Notorious Lady" left town, "We were living in

a reactive mode," Tucker says. "This was the first disaster we had ever gone through. We lost about 25 percent of our work force. Some people who were fleeing the storm never came back. We lost about \$1.2 million worth of equipment that had to be replaced—backhoes, excavators, wheel loaders—and other units were damaged and had to be repaired."

Although Barriere's maintenance shop was being used only for dispatch—99 percent of its repairs are outsourced—Tucker had to hit the streets calling on vendors to return relationships back to business-as-usual status.

Swamped with the necessity to regroup, rehire and "get things rolling again," no one had time to pay attention to the data still being collected and stored in the company's work-order system. For obvious reasons, nobody was following through on the data or tracking it. As a result, maintenance "costs were going through the roof," Tucker says.

At the end of the hectic six-month period, company owners realized that fleet costs were rising and told Tucker, "to get back to what I was doing before the storm."

Tucker knew exactly how to execute the "fix it" order. He called on management know-how he had

learned in 2000 when his company hired a consultant to help reduce maintenance costs that had reached 15 percent of company revenue.

"We spent twice as much then on maintenance than we spend now and were doing half the volume of work," Tucker says. After the consultant's management assessment, a decision was made to adapt one specific business concept that had worked successfully in the oil fields and manufacturing companies.

That concept was to manage equipment, not people, and it led to the outsourcing of the majority of company fleet repairs and maintenance, as mentioned earlier.

"We took that process and molded it to our environment," Tucker says. "In doing so, we had to implement week-long training programs for equipment technicians and operators. We had 33 production crews, and we called every one of them in for the training."

The concept worked. Maintenance costs as percentage of revenue dropped dramatically, and business operations flowed along smoothly—right into the path of Katrina.

Since that earlier experience had taught Tucker how to batten down the hatches, so to speak, he turned his attention to the key performance benchmarks so necessary to a

profitable fleet operation. They included tracking preventative-maintenance compliance; monitoring the number of PM work orders generated and how long it took to complete a work order; conducting internal audits of equipment condition; determining if superintendents were conducting monthly equipment inspections; if operators were doing weekly maintenance checks on the units and, in Tucker's words, "tracking whether those inspections were just pencil whipped or were quality reports."



Ben Tucker, equipment director at Barriere Construction, successfully reestablished maintenance performance benchmarks that had been seriously disrupted by Hurricane Katrina. The company was named 2009 Private Fleet Master Award winner.

Other key benchmarks were tracking utilization of owned and rented equipment; monitoring equipment damage; keeping up with the amount of training per operator; cost of fuel, tires, and equipment-replacement value cost as part of company revenue; and looking at maintenance revenue as a maintenance cost by equipment category.

"My whole fleet, for instance, may cost \$8 an hour to operate," Tucker says. "We watch to see if that number goes up or down and by how much, and what revenue was generated. You

can only do so much, but we look at that and make sure we stay within our budgeted equipment rates."

Also tracked are emergency repairs by percentage and the percentage of crews that had emergency repairs.

To put the end results into some type of framework, maintenance costs prior to Katrina were about 1.2 percent of revenue. When Katrina hit, costs increased to about 2 percent. Now that maintenance performance benchmarks have been reestablished, the percentage has dropped below 1 percent.

To reverse the upward trend in maintenance costs, Tucker returned to a system he used before the storm slammed ashore. Called Total Process Reliability (TPR), personnel from different divisions throughout the company, such as production, maintenance and management, were called in for monthly meetings to review Key Performance Indicators (KPI)—the benchmarks just mentioned.

"Our TPR Committee started meeting again regularly to see how much training was being done in each division," Tucker said. "We also identified where we were having problems and, basically, put everything back in place." Tucker visited the company's primary vendors that included the local Caterpillar dealer, a hydraulics company, a tire distributor, and a trucking company that handles all Barriere's on-road fleet.

Because of the influx of new hires caused by the storm, training became an essential ingredient of company recovery.

"We had to train operators, bring people up through the ranks to make sure they knew how to operate the equipment, and how to do the required daily inspections and weekly maintenance. The new peo-

ple didn't always know what to do or what they were accountable for," Tucker says.

The most important factor in such an undertaking, he says, is using the KPI to "track and trend."

"For example, we do a mean time between corrective action and failure. You have categories of equipment, so you make sure your work-order system is set up to track classifications of repairs, breakdowns by priority and repair class. The work order system has to be set up for tracking and trending. We do that by using a Pareto Chart that shows, for instance, 10 components on a machine, such as hydraulics, fuel systems, tires and undercarriage, body and appearance and so on. You set up the work orders, and when you trend everything out you will find that the 80-20 rule is true—80 percent of what goes wrong happens with 20 percent of the parts.

"The graph on the Pareto Chart shows where those parts are on a machine," he says, "so when you are doing PMs, technicians can focus on those specific components that are causing the most problems. With that data, you can get a mean time between corrections and failures. You put in a line of defense before failure, and you can expand that time to failure out further."

Using this approach, Tucker has been able to extend his oil drains from 250 to 350 hours, for example. "We know our oil will last up to then without having any problems. It is simply PM optimization," he says.

"You must have certain schedules and maintain your auditing process," says Tucker. "You have to be held accountable for what you do on a daily, weekly and monthly basis."

"That," he says, "is mentoring." **EM**



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**CONSTRUCTION
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Managing Emissions-Related Maintenance

With increasing costs associated with emissions compliance, maintenance cannot be overlooked

By Brian Jacoby



Selective Catalytic Reduction technology that will be used in many 2010 diesels will require additional maintenance around the DEF filters.

In the past 10 years, fleet managers have been dealing with the effects of diesel emission regulations both on-highway and off-highway. Notable issues have been ongoing changes to environmental policies targeted at reducing pollution levels of particulate matter (PM), nitrogen oxides (NOx) and non-methane hydrocarbons (NMHC); the utilization of ultra low sulfur fuels (ULSD) and biodiesel; and developmental changes in engine hardware and emissions strategies.

To further complicate these challenges, this is occurring at a time when rising costs of engines, fuels and maintenance are a key concern for fleet managers.

Although many have argued the true cost to outweigh the benefit to industry from these changes, it is less arguable the environmental benefits that can be derived from the sweeping changes in the emissions regulations. As an example, the strict standards in place for ULSD enabled advanced pollution control technology for cars, trucks and buses so that engine manufacturers could meet the 2007 emissions standards. Moving forward, engine manufacturers have the flexibility to meet the new standards through a phase-in approach between

2007 and 2010. The program also includes various flexible approaches, including additional time for some refiners and special provisions for small refiners.

Once this action is fully implemented:

- 6 million tons of smog-causing nitrogen oxide emissions will be reduced each year. Soot or particulate matter will be reduced by 110,000 tons a year.
- An estimated 8,300 premature deaths, 5,500 cases of chronic bronchitis, and 17,600 cases of acute bronchitis in children will be prevented annually.
- An estimated 360,000 asthma attacks and 386,000 cases of respiratory symptoms in asthmatic children will also be avoided every year. 1.5 million lost work days, 7,100 hospital visits, and 2,400 emergency-room visits for asthma will be prevented.

EPA Heavy Duty Highway Diesel Program

Fuels development since 1993 has played an important role in the overall strategy to reduce emissions. Maximum benefit in reaching target levels of improvement can be achieved when combined with engine design, the use of emissions hardware, and lubricants. Overall, cleaner fuels have led to many performance opportunities that may not have been as advantageous without this improvement. Now, with most of the industry either converted to ULSD or soon to be moving in that direction, a more clear focus of new fuels development opportunities can be explored.

Biodiesel

Biodiesel is the next evolutionary change to show promise for improving overall net emissions. Whether derived from vegetable-based or animal-fat sources, the use of biodiesel as a fuel brings benefits in meeting EPA-regulated emissions as well as improved lubricity and solvency, the former characteristic leading to less

wear of components where fuel is used as a lubricant and the later in reducing deposits and cleaning fuel systems. Also, because these fuels contain no petroleum products, they can be blended at any level with petroleum fuels to create a biodiesel blend usable in diesel engines.

Conversely, beyond the well-documented issue of reduced energy content and the associated reductions in fuel economy, other concerns have surfaced. These concerns include cold flow and water issues as well as fuel stability and the potential for increased concentration of fuel in the oil sump.

The impact of fuel instability or fuel degradation can be quite significant, either through the creation of corrosive acids or engine deposits. These deposits can impact filters and fuel systems and lead to poor operation of the engine. The natural oxidative stability of biodiesel fuels varies in relation to the bio-material used in the manufacturing process. Biodiesels produced from animal fats do not contain natural antioxidants while vegetable-based sources vary widely in the amount of natural antioxidants they contain. The solvency and cleaning effect of biodiesel is compromised once the fuel begins to degrade, and it will create deposits that will impact the operation of the engine. In older engines, it is possible that the initial use of biodiesel could release accumulated deposits and foul filters and fuel systems. The same effect can occur when filling storage tanks with biodiesel for the first time. It should be noted that exposure to the air during long-term storage of these fuels can also compromise biodiesel stability.

Biodiesel fuels contain compo-



As fleet managers have worked to familiarize themselves with the changing world of fuels, lubricants and hardware, they will also have to make changes in the way they perform maintenance.

nents that have a tendency to attract and retain water from atmospheric moisture. Therefore the potential exists for water to be present in the fuel system, bringing with it all the operational problems that arise when fuels contain water, including biological growth and ice formation during cold weather. The presence of water also assists in the development of corrosive elements in the system and increases the likelihood of continued oxidative degradation.

Fuel dilution with biodiesel becomes an issue that goes beyond traditional concerns regarding decreased lubricant viscosity and increased wear. This is especially true for units operating with DPF technology in which post injection is used. When using post-injection technology, excess fuel will coat the walls of the cylinder liner during the DPF regeneration process and end up concentrating in the oil sump. Due to biodiesel's lower volatility, larger amounts of unburned

fuel remain in the cylinder with each combustion cycle than are seen with petroleum fuels.

When post fuel injection is not in use, fuel dilution continues to occur at levels higher than seen with petroleum fuels, and these levels increase with the fuel blend percentages. Fuel concentration in the oil sump can increase to the point where a B5 fuel, in effect, can be in the sump in concentrations that would make it appear that a B20 fuel or higher is in use. This occurs again, because biodiesel has lower volatility than other petroleum products (fuel and oil) they associate with in the engine. Under these conditions not only does lubricant viscosity decrease, bringing all the wear-related issues associated with this condition, but significant interactions occur between the engine lubricant and the fuel. This increases the degradation of the engine oil beyond what is seen when petroleum fuels dilute lubricants.

Additionally, there remain concerns that high fuel dilution levels reduce the TBN of the oil. With decreasing TBN values and increasing levels of oxidation and acid formation appearing in oil-analysis reports, maintenance managers often find themselves reducing drain intervals from previous levels.

Under winter conditions, there is a difference between the behavior of biodiesel and petroleum fuels. Biodiesel will begin waxing and at higher temperatures instigating fuel system problems before conventional fuels. The cold temperature flow of biodiesel is also impacted by the fuel blend, and above B10, fuel flow becomes an issue. Traditional winter fuel additives may not be effective when mixed with biodiesel

fuels, and some biodiesel additives have proven harmful when added to fuels in which the diesel portion was already treated with traditional cold flow additives. Aside from added costs, the harmful effects of over treating could impact deposit formation in engines, leading to increased wear and oil consumption.

As fleet managers have worked to familiarize themselves with the changing world of fuels, lubricants and hardware, they will also have to make changes in the way they perform maintenance. Standard maintenance schedules will likely have to include a more comprehensive schedule to include the following: Air intake systems, fuel injectors, turbochargers, EGR systems, PCV valves, particulate traps, and electronic engine control units and its associated sensors. Any other add-on, emissions-related component whose primary purpose is to reduce emissions or whose failure will significantly degrade emissions control is also subject to added attention.

This maintenance will include more frequent adjustment, cleaning, repair and/or replacement of these components to ensure they are operating at peak performance. Otherwise, any reduction in performance could lead directly to disabling overall system efficiency. On another note, this will mean added training and the use of new technologies in order for maintenance to be completed properly.

Technicians will be responsible for the proper methods and utilization of tools necessary to complete the task.



The use of biodiesel as a fuel brings benefits in meeting EPA-regulated emissions as well as improved lubricity and solvency, the former characteristic leading to less wear of components where fuel is used as a lubricant and the later in reducing deposits and cleaning fuel systems.

At the end of the day, managing emissions-related maintenance will be both challenging and opportunistic for fleet managers. There is much to learn and much more to experience in order to develop time-tested best practices that will ensure keeping the fleet maintained at world-class levels. For many managers, they are up to the task and look forward to playing their part in a more emissions-friendly industry. **EM**

—Brian Jacoby is director field engineering & technical support for BP Lubricants USA Inc.

EMISSIONS STRATEGIES - SCR TECHNOLOGY

In an effort to further reduce greenhouse-gas emissions from vehicles, the Environmental Protection Agency (EPA) enacted significant NOx emissions reductions for heavy-duty, on-road diesel engines for 2010. In order to meet the new requirements, most diesel engine manufacturers adopted Selective Catalytic Reduction (SCR) technology. SCR technology has been successfully used in Europe for years and has proven to provide near-zero NOx emissions levels while delivering improved fuel economy and reliability.

SCR technology works by injecting Diesel Exhaust Fluid (DEF) into the exhaust upstream of the systems catalyst. The heat causes the DEF to turn into ammonia, which reacts with the NOx and catalyst to form harmless nitrogen gas and water vapor.

DEF is a nontoxic, nonhazardous, high-purity mix of 32.5 percent automotive-grade urea and 67.5 percent

deionized water. DEF quality is defined by the ISO 222141-1 2006 standard. Furthermore, the American Petroleum Institute (API) developed a quality certification program to ensure the stringent ISO standards are met in North America.

Engine maintenance:

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- The DEF filter will need to be changed every 200,000 to 300,000 miles, and can be easily changed in minutes.
- Engine components last longer due to less heat being generated and fewer contaminants. The result is longer overall engine life.

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