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PROBLEMS SOLVED

I currently work for a company full of problem solvers. This is extremely productive and efficient—no matter what the challenge, there is an absence of finger-pointing and an abundance of sleeve-rolling to improve upon that challenge.

It has not always been that way throughout my career and, from what I hear, it is not this way in many companies or government fleets. The common thread seems to be that when things go wrong, projects have struggles or schedules aren’t being met, the equipment organization is one of the first suspects as the primary contributor to the problem. This seems especially true when the challenges are financial.

We’ve all heard the statement “survival of the fittest” when it comes to the animal kingdom. Simply stated, only the fit and strong are able to survive in what could be described as a pretty competitive environment. The same can be said about the companies we support and the careers we’ve chosen. If we are not strong and fit, we will not survive, nor will our companies benefit from what we should be able to contribute. Being strong and fit requires investments in ourselves and in relationships with those we work for and with. We should be continually striving to improve our knowledge base. The career of equipment/asset management requires knowledge and abilities in a number of areas to be effective. This can be found through the AEMP website with online courses and at conferences in classroom settings alongside fellow professionals. Additional involvement and attendance with the association will establish and build relationships with others in the industry, revealing how they deal with similar issues and challenges. Obtaining the Certified Equipment Manager (CEM) status further confirms your knowledge and experience. Relationships within your organization will strengthen when you gain confidence and bring information, solutions and ideas for improvement that benefit the organization as a whole.

Building a culture of problem solvers as opposed to finger pointers requires an investment in knowledge and relationship building. No matter the organization, if the right personnel are in place they will all strive to be successful. The only way you, as an equipment professional, can be a valued contributor to that success is to understand the challenges and apply your experience, knowledge and insight. Instead of being a scapegoat when problems arise, you will be sought out as a leader who provides solutions.

Guy Gordon, CEM
Chairman of the Board and CEO
Anywhere and Everywhere in the World
AEMP LAUNCHES GLOBAL AVAILABILITY OF CEM EXAM

BY STAN ORR, CAE • PRESIDENT & CSO, AEMP

No matter your job title, regardless of industry, most professionals view continuing education as a must. By and large, asset managers feel the same way. For these professionals, one of the biggest opportunities for continued growth is AEMP’s Certified Equipment Manager (CEM) credential. It’s the only recognized standard for assessing the qualifications of a manager of heavy off-road equipment or a municipal/government fleet.

Since its first official exam date in 1996, the CEM has been well received in the industry, with nearly 250 certified professionals to date. Traditionally, the exam has only been offered twice a year, at AEMP’s two annual meetings, making logistics a challenge. But those challenges are now a thing of the past. In September, AEMP announced the global availability of the CEM exam. This move, which we officially launched in November 2012, is making the CEM exam available numerous times throughout the year and in more than 165 countries worldwide.

We’re very excited to announce the new CEM exam format. The association has never been able to offer the exam this way before, so it’s groundbreaking, both for AEMP and for fleet managers around the world who want to achieve this highly sought-after certification. We expanded CEM testing to open up the exam to those who previously felt it wasn’t possible, due to time and travel constraints. Now the certification is a realistic goal for all asset management professionals, regardless of where they are in the world.

WHY THE CEM?
The importance of the CEM goes back to when it was first conceptualized in 1996. AEMP and a group of our active members identified a need in the industry for a professional certification program that was focused on the science of fleet asset management. The CEM program has gone through some changes and evolution throughout the years, but the core objective has always remained—to advance the asset management profession and industry as a whole. Of the nearly 250 asset management professionals who have earned the CEM designation, nearly all of them would readily attest to the value.

What we hear most often from CEMs is that the exam really helps them see the complete fleet management picture in their day-to-day operations. It gets them thinking on a higher level, which makes them more valuable to their organizations.

NO EASY FEAT
While many of the industry’s best and brightest have achieved the certification throughout the years, obtaining it is far from easy. Those looking to substantiate their expertise and dedication must begin preparing several weeks in advance and devote numerous hours to studying. They also have to pay their dues, at least figuratively; a CEM candidate must have at least five years of on-the-job experience, among other qualifications. The final step in earning the CEM credential is passing an exam consisting of 100 multiple-choice questions and eight real-life, scenario-based essays.

Although the commitment to preparing for the exam could be looked at as the most difficult part of the process, for many, the real challenge has been getting to an exam site during the right timeframe. But that’s all changing now. Global CEM availability comes after years of work to ensure the test could be properly administered outside of AEMP’s direct control. Because the CEM is an industry-recognized and accepted certification, the test itself has to be administered in a secure environment. Previously offering it at the two annual meetings, AEMP’s staff was
able to monitor the exam and ensure its integrity wasn’t compromised. While the test has been administered this way for good reason—to preserve the sanctity of the certification—it also presented a drawback to potential test-takers.

The limited testing options posed a challenge to fleet managers in both private companies and government agencies who simply couldn’t attend one of the two meetings for any number of reasons—scheduling, prior commitments or, especially in recent years, more limited travel budgets.

With the way the economy has been in recent years, many of our member companies have been doing more and more business outside of North America. Many of their employees are spending a good deal of time in other countries, making it that much more difficult for them to travel back to the U.S. for our annual meetings.

Unfortunately, it has become nearly impossible for those working outside the United States to obtain the CEM.

A NEW ADVANCEMENT

With the increased member demand driving the decision, AEMP and its certification commission members were determined to make global CEM testing a reality. The team put several months of time and energy into the program, and the

AEMP SEEKS 2013 FLEET MASTERS NOMINATIONS

It’s never too early to start considering nominees for the 2013 Fleet Masters Award. Each year at the Management Conference and Annual Meeting, AEMP and Construction Equipment magazine recognize excellence in the equipment industry with the Fleet Masters Award.

Presented to a fleet from both the public and private sector, the award acknowledges equipment professionals who demonstrate excellence in meeting the unique challenges inherent to delivering cost-effective and cutting-edge management of mixed fleets of on-road and off-road equipment. The Fleet Masters award will be presented at a special reception and dinner event sponsored by the Strategic Alliance Partners, as part of the 31st Management Conference and Annual Meeting, March 17-19 in Jacksonville, Fla.

In 2012, Ron Erwin, chief command vehicles for United States Air Forces, Europe and John Meese, senior director of heavy equipment for Waste Management, accepted the Fleet Masters Awards on behalf of their teams.

Applications for the Fleet Masters awards must be completed and postmarked no later than Jan. 11, 2013. For more information on the Fleet Masters award, please contact Claudine Wheeler at AEMP Headquarters, 970-384-0510, or visit aemp.org.
efforts are now paying off. Measurement Inc., and Pearson VUE, AEMP’s partner testing companies, have made it possible for the association to offer the CEM exam four times a year, worldwide and in all 50 states. AEMP offered its first official remote test date on Nov. 5, 2012.

Going forward, AEMP will offer the CEM exam in a two-week window approximately once every quarter. This adds even more flexibility to the exam by not restricting it to just one date in the timeframe. Location challenges in the United States are further minimized, as there is a test site within 50 miles of any individual who wants to take it.

While still in its infancy, and not yet at a point where results are measurable, early feedback and results have been positive. It’s very much like the EMS, also a professional AEMP certification, which earlier this year became the only exam to be offered online. Several major organizations have embraced the opportunity to take the exam in this more convenient atmosphere, and have since put several of their employees through the process. The U.S. Air Forces, Europe, Bechtel Corporation and Lane Construction are all among the companies and organizations that have multiple team members who are now EMS-certified. We’re very hopeful and confident that we’ll see similar results with the CEM exam.

For more information on the CEM and other AEMP professional certifications, visit aemp.org/certifications.

Do you know a technician who deserves national recognition? In 2013, the AEMP Foundation will recognize two outstanding heavy equipment technicians with the 25th annual Technician of the Year award. The award is sponsored by John Deere and the 2013 winners will be honored at a luncheon during the 31st Management Conference and Annual Meeting, taking place March 17-19, 2013, in Jacksonville, Fla. The honor is presented to technicians from both the public and private sector, and is designed to acknowledge professionals who exhibit technical skills as well as trouble-shooting and diagnostic capabilities. It also recognizes those who make significant contributions to the equipment technician profession.

In 2012, Master Sergeant Jeremy Parks, EMS, of the United States Air Forces, Europe and Thomas Swishelman of Kokosing Construction Company were honored with the Technician of the Year accolades.

Applications for the Technician of the Year awards must be completed and postmarked no later than Jan. 11, 2013. For more information on the Technician of the Year award, please contact Claudine Wheeler at AEMP Headquarters, 970-384-0510, or visit aemp.org.
A Worldwide Appeal
BECHTEL EQUIPMENT EMBRACES ADVANCEMENTS IN AEMP'S CERTIFICATION PROGRAMS

The global construction market has changed. More and more companies have growing international business and, as a result, employees are temporarily or permanently relocating halfway around the world for months, even years, to see projects through to completion. This change has made it necessary for everyone in the industry to adapt, not just the companies doing the work, but those allied to the industry as well.

AEMP has embraced the global shift, and the association has evolved in several ways to meet the demands of equipment management professionals around the world. Recent examples include the launch of our online virtual learning environment, AEMP University, multiple educational webinars, and the online availability of the EMS (Equipment Manager Specialist) certification exam.

Clearly, the Internet is the primary vehicle for reaching a global audience. But what happens when something simply can’t be offered online? Even in this day and age it’s a possibility. It's also the exact scenario we at AEMP, along with leaders of various committees, found ourselves in recently when looking at changes to the Certified Equipment Manager (CEM) exam.

LEADING PROFESSIONALS
More than 15 years ago, AEMP launched the CEM program to create a professional, industry-accepted standard for managers of heavy off-road equipment fleets or government/municipal fleets. Achieving the credential requires industry experience, and studying and passing the exam. Though potential CEMs can study and prepare for the exam year-round, the exam itself has traditionally been offered on only two dates per year, at each of AEMP’s two annual conferences.

For large, global companies, the challenge of certifying equipment managers as CEMs was often strictly logistical. For example, an employee working in South Africa needs to invest quite a bit of time and cost to travel to the United States to take the exam—and that’s on top of the time investment he or she is already making to prepare for the credential.

Bechtel Equipment is one company that can attest to this very challenge. A subsidiary of Bechtel Corp., one of the world’s largest construction, engineering and project-management companies, Bechtel Equipment has been a major player in the global market for years. In addition to numerous temporary job sites the company sets up to accommodate major projects, Bechtel Equipment operates 13 different worldwide offices. This includes the five major world headquarters located in Brisbane (Australia), Edmonton (Alberta, Canada), Houston (Texas, United States), Santiago (Chile) and Singapore.

Like many other companies, Bechtel Equipment strives to have all its equipment managers certified as either an EMS or CEM. With its staff growing exponentially across the globe, it has become increasingly more difficult to give every equipment management professional this opportunity. Bechtel Equipment has always
had a healthy worldwide resume of work but, as Operations Service Manager Ken Burke, CEM, said, it’s also no stranger to the “new normal” of an increased focus on global work. “We have seen tremendous growth in our global business activity in recent years,” he said. “In fact, we’re currently doing more work internationally than domestically.”

This is a primary reason Burke and other company leaders have been major players in shaping the online focus of several of AEMP’s education-based initiatives. Burke was involved in the AEMP University committee and played a role in the certification commission’s charge to bring the EMS exam online.

While the advancements to educational opportunities and the EMS exam were significant, we knew we were still missing something big. Something our association’s leaders, including members from Bechtel Equipment, had been working on for years. And something that was ready to come full circle. This ground-breaking something was going to change the way the CEM exam was offered, and open up possibilities for more equipment managers around the world.

MEETING THE DEMAND

When AEMP began offering the EMS exam online, Burke was thrilled to be able to put more of his employees through the program. It also made him and his colleagues that much more interested in seeing a similar change in the CEM exam.

“Like what we experienced with the new online format for the EMS exam, we really wanted to see an expansion in the availability of the CEM exam,” Burke said. However, he knew it wasn’t going to be quite as simple as putting the exam online. In addition to standard multiple-choice questions, the CEM exam includes eight scenario-based essay questions. The essays require the equipment manager to draw from his or her real-life experience, utilize problem-solving skills and provide a unique, thorough answer. Because of the nature of the exam, an online format wasn’t feasible. It was imperative to administer it in a secure, proctored setting—hence why AEMP’s leaders had only allowed it to take place at our meetings.

“We knew from the start it wasn’t going to be possible to offer it online like the EMS,” Burke said, speaking on behalf of the team involved with the task. “At the same time, we knew there had to be something that would open up the test to more professionals.”

Burke was right. That something was partner companies Measurement Inc., and Pearson VUE. The two companies joined forces with AEMP to enable us to bring the CEM exam to professionals in more than 165 countries around the world. Pearson VUE proctors the exam at its numerous international test sites, while Measurement Inc., collects and verifies the data, ensuring the integrity of the exam—and CEM certification—isn’t compromised. Not only is the exam now available in more locations, it’s also available at more times. We’re working with Pearson VUE to offer the test four times a year and in two-week windows each time. That increases the opportunity for professionals to take the exam from two times a year to 56. The first official test was held in November 2012.

For companies like Bechtel, this is one of the greatest advancements AEMP has offered in years.

“This just speaks volumes to the growing popularity of the CEM program and AEMP,” Burke said. He also said he will be taking advantage of the expanded availability, and putting more of his equipment managers through the program. In fact, he wants to take it a step further, and make it a requirement that all Bechtel equipment managers be either EMS- or CEM-certified. That requirement will extend to potential employees as well, and be included in job descriptions.

Why such a push to certify his equipment managers? Burke says it’s simple—AEMP’s program is the best around. “It’s just an excellent program. The knowledge base that’s required to achieve the CEM is what sets apart those equipment managers from all others.”

As the industry continues to evolve and grow worldwide, AEMP will lead the charge to ensure all equipment management professionals—regardless of where in the world they might be—have the best opportunities for career development, personal growth, and enhancing their companies and fleets as a result of high quality continuing education.

For more information on the global CEM initiative, visit aemp.org/certifications/CEM.
WING IT OR BRING IT

Mark your calendars for AEMP’s 31st Management Conference and Annual Meeting. The conference will take place March 17-19, 2013 at the Hyatt Regency Jacksonville Riverfront hotel in Jacksonville, Fla.

The conference is AEMP’s premier event and is designed to be an annual gathering of industry professionals to network and attend outstanding educational seminars on the latest topics in fleet management. Seminars will be offered each day for both Essential- and Executive-level tracks.

Highlighting the conference is keynote speaker Greg Bennick, who will deliver an entertaining presentation titled “Get Involved: Let's Turn YOU Into A Leader.” With more than 20 years of entertainment and speaking experience, his high-rated presentation will engage and entertain as well as create positive transformation for attendees.

This year’s theme, “Accelerate, Aggregate, Elevate,” speaks to the main educational themes AEMP will offer. Expect world-class education in benchmarking, metrics, safety, technology and elevating the modern fleet professional. As always, AEMP is dedicated to moving the industry forward and leading the charge on the latest advancements in asset management.

Conference attendees will also have the opportunity to attend the Professional Development Institute (PDI) to aid in preparation for one of AEMP’s three professional certifications: the CEM, EMS or CESP. PDI classes are offered March 17-19, with certification exams held on March 20 from 8 a.m. until noon.

Beyond seminars and the PDI, the conference will feature several annual events. Opening day will include Bennick’s presentation along with the annual CEM, EMS and CESP certification recognition ceremony and a luncheon honoring the 2013 Technicians of the Year. The first day will close with an evening gala. Day two will feature the Fleet Masters Award ceremony, with the dinner reception sponsored by AEMP, Construction Equipment magazine and the Strategic Alliance Partners. The final day will feature the Inaugural Awards Luncheon and the swearing in of the new board and president.

Make plans to join us and elevate your fleet to a new level of efficiency and profits. Registration opens Nov. 15, 2012 at aemp.org.
# AEMP 2012-2013 Board of Directors

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*AEMP Member*

**Contact Information:**

- **Phone:** 800-758-2410
- **Website:** www.qtequipment.com
When it comes to asset management, equipment and operations are like an old married couple. They squabble and complain and irritate each other, but in the end they form a successful marriage.

"Equipment sees the fleet as family," says Mike Vorster, president of CEMP Central. "The field sees the fleet as a self-destructive means to an end. Good companies address the issues and get it right."

Louisiana-based Sunland Construction recently made major moves to "get it right." It restructured from top to bottom in an effort to eliminate bottlenecks up and down the chain of command. The old structure slowed decision making and became rocks in the road for Sunland's predominantly pipeline installation and repair projects.

Dennis Sullivan, corporate equipment manager responsible for more than 1,600 pieces of construction equipment and vehicles, says the highly diversified company has about 2,000 employees, only 60 or 70 of which work on the equipment and maintenance end of things. "We are not the dog, we are the tail," he says.

Prior to improving the organizational chart, too many decisions were run all the way to the top of the company where they waited to be acted upon, Sullivan says. Decisions were then run all the way back down.

"Before, managers across the country reported to a single vice president," he says. "Now we have a senior vice president and three regional vice presidents who report to him: one for the east, one for the west and one to oversee our integrated services. That group is made up of companies that don't necessarily fit into dyed-in-the-wool pipeline work."

The goal of the restructure was to push down decision making to the lowest possible level so action could be taken quicker, Sullivan says.

Equipment and operations, of course, were part of that restructure, and Sullivan says operations knows more about the equipment side than vice versa. In fact, it is his opinion that—at least in his company—operations knows more about equipment than any other entity, such as finance,
Left: Good working relationships between equipment and operations are essential, particularly on major jobs such as this Taylor Bros. pile driving project. Below: Taylor Bros. uses a Cat excavator to mine a cross passage at one of its job sites. Thad Pирте, Taylor's vice president and equipment manager, is a strong believer in treating the operations side of the business as a customer.

safety and human resources. That's because equipment and operations work hand-in-hand, he says. "We can't let our egos get in the way," Sullivan says. "Without operations, nobody works. Accounting doesn't work without them. The president of the company doesn't have a job without them. Operations makes the money and keeps everything going. We are here to serve them, not the other way around."

Guy Gordon, CEM, director of asset management for Aegion, agrees about the importance of a solid relationship with operations. "If you don't have that, there is potential for conflict of interest," he says. "If that happens, all you're doing is trying to keep up with fires. Equipment and operations have to work toward a common goal. I have talked to peers in some other organizations, and sometimes operations think they know how to run things better. It has to be a collaboration of efforts, and operations needs to do the right thing. They have to put effective equipment management practices in place. Otherwise, they'll never gain ground."

When Gordon joined the company, equipment was run by operations, he says. "To change that, he realized the new structure had to be described so it was clear what it was going to look like and how it was going to impact operations in a positive way."

"In pulling asset management away from operations, we had to decide how operations would still be involved so they would have input," Gordon says. "We accomplished that, and it has been in place now for seven years."

The role of asset managers is to take care of the equipment, he says, to make sure it is maintained correctly, that it is safe, that it is the right type of equipment for the application, and that the acquisition is what's right for the business. When problems arise, it is common to blame areas that aren't necessarily responsible for project performance. "Equipment seems to be blamed quite a lot," says Gordon. "It is important that both equipment and operations be really honest with itself to make progress."

If the blame game goes unchecked, "you never gain any ground and the relationship becomes adversarial," Gordon says.

Thad Pирте, vice president and equipment manager at Taylor Bros., says building a good relationship boils down to simply treating operations as a customer. "Many times, operational people aren't treated that way," he says. "Equipment looks at its little world, its little dynasty. That's not the way it should be. Equipment should look at itself as a servicing group."

The benefit is three-fold, he says: Everything runs smoother, equipment is maintained better, and each party knows where the other is coming from. "In general, team work," Pирте says. Again, how the company is structured plays an important role. Given the fact that most Taylor Bros. projects are fairly large, Pирте says, an equipment superintendent is assigned to a particular project. He works for that project team with moderate supervision from corporate equipment. When an equipment superintendent is on a job site, he works specifically for operations.

And Pирте knows from his own career that if that equipment superintendent "grew up with the company," that's even better. "It helps a bunch," he says. "If someone is hired from the outside and comes in as an equipment superintendent, that is a different scenario."

In addition to treating operations as a customer, another key element that cements the relationship is respect. Respect them for their position, Pирте advises, and respect their point of view. Operations has a different perspective than equipment, he says. "We look at the life cycle of equipment, for instance, as two to three years," says Pирте. "We look at what the project needs in terms of reliability—one of the biggest headaches between operations and equipment. Equipment people say, 'You're not taking care of the equipment.' Operations people say, 'It wasn't running right anyway.'"

Trust and accountability will break down that type of barrier, Gordon says.
percent is reasonable because you have to have downtime to schedule repairs.

In addition to the annual meeting at OEM facilities and spending time on operations turf, the equipment side includes operations people in all equipment functions, such as CONEXPO/CON-AGG events and OEM factory tours.

"Last year we had 55 people at Conexpo, including operations, engineers and general superintendents," Pirtle says. "They are also involved in our equipment meetings." That is important, he emphasizes, to let operations "see what it looks like" from the equipment side.

With across-the-board agreement that trust, communication and understanding are key elements that build strong relationships between equipment and operations, the question becomes, how is that done?

The easy way, but not the best way, Sullivan says, is by e-mail or telephone. Although those are the everyday tools, they are not the end-all, he says.

"Operations likes to talk to you," he says. "They want to put their two cents worth in, and that two cents is very valuable. You need to go to them and talk to them in person and let them know they are part of the team and part of the solution to any issues that come up."

He illustrates with a survey Sunland conducted asking what tires should be used on trailers. "That doesn't sound very important until you consider we're talking about 300 or 400 of them," he says.

The poll went to "everyone we could think of" before a decision was made, he says. If the poll had not been taken and had someone just sent out an e-mail saying from now on we are going to use only X brand of tires company wide, "some people will do it without questioning it," Sullivan says. "You'd learn quickly that the tire that works well in South Texas in 110-degree temperatures may not be the one you want in North Dakota in 30-below temperatures."

Building trust is difficult and takes time, Pirtle says. It takes communication, and it takes reinforcement of trust when it starts to happen.

"Just do what you say you will do," Pirtle says. "If you say you'll have equipment out there that will run the length of the project with warranties, then do it. If it's not done, make it right. Fulfill your promise." EM

Mike Vorster, CEMP, Central, says following these seven steps will go a long way toward improving relationships between equipment and field operations.

1. Emphasize common interests.
   Although each side of the business has different responsibilities, they share a common bond. Both function equally in reaching company objectives: undertaking and finishing construction projects efficiently and effectively. Both groups are interdependent. Nothing is achieved if one succeeds at the expense of the other.

2. Balance responsibility and accountability.
   Although equipment managers, in many instances, are not directly responsible for 70 percent of the equipment budget, they can influence cost through good maintenance and well-timed replacement. The rub is the majority of costs depends on two factors over which they have little or no control: the work done by the machine and how machines are operated. That is operations' responsibility. Since equipment abuse and safety go hand-in-hand, clearly defined lines must be established of what is and is not acceptable. Equipment should carry single-point responsibility to its budget. Field operations must accept its role in causing equipment costs to be what they are.

3. Accept that equipment works hard.
   Although equipment is designed and built to work hard and efficiently, accept the fact that failures and the self-destructive side of a machine are a means to an end, but that end should come as late and as cheaply as possible. Nothing is achieved by deferring maintenance or abusing equipment in the name of productivity.

4. Recognize and manage abuse.
   Abuse must be treated for what it is: unwarranted, unnecessary and unacceptable. Such instances should be recorded, discussed and agreed on. That defines the fine line between abuse and fair wear and tear, and it establishes facts that ensure the responsible parties carry the appropriate costs.

5. Focus on PM and find the time to do it.
   Equipment failures are inevitable. PM relies on the ability to predict failure and the time needed to take action before failure happens. PM is useless unless there is a corresponding commitment to release the equipment from production and provide the time needed to make the repairs. If this isn't done, the machine will pick the most inconvenient time to take itself out of production and that will be more costly and take longer to repair.

6. Recognize the reality of cost.
   Squeezing repair costs to meet budget and rushing repairs to move back into production isn't a smart thing to do. Doing the right thing once is better than doing too little too often. Realize that costs are real and the necessary time to do them is unavoidable.

7. Develop a common language.
   Success requires close and clear communications between the equipment department and field operation. Both parties have to have a common language. Field managers must know the owning and operating cost calculations budget and how their decisions regarding utilization, operation and application affect the operating costs. Both parties must understand they work for the same business, and although their responsibilities differ, they share and contribute to the same success.
A TOOL FOR EMISSIONS COMPLIANCE

Telematics data enable fleets to monitor machine location, engine performance and more

BY G. C. SKIPPER

A frequently repeated opinion in the off-road industry is that technology, such as telematics, lags on highway applications by four years. Some say longer.

Bill Sauber, manager of remote technologies for Volvo Construction Equipment, isn’t buying it. “I wouldn’t say we’re lagging when it comes to telematics. We’re just doing different things with it.”

On-road vehicles, he says, are big on navigation—such as mapping out the best route to the beach—and entertainment—like accessing satellite radio.

“But that’s not critical,” Sauber says. “It’s not even applicable, for instance, to a machine running in a quarry. I would say the construction industry is further along than either automotive or over-the-road trucks in monitoring the machine itself.”

Certainly, some high-end automobiles might tell you when tire pressure is low, but fleets invest much more in construction assets. An excavator might cost $500,000 compared to a $50,000 car. Also, a machine can be responsible for uptime of four or five other assets, Sauber says.

“In construction, such data is critical,” he says. “The construction industry is, and will be, way beyond what automotive is doing because our needs are different. We don’t need to be entertained. We need to improve the uptime of the machine without adding to environmental problems. We need early warning alarms and error codes, and we need to monitor operator behavior.”

For the construction industry, telematics is much more than the buzz word de jour. It may turn out to be the most important tool fleet managers have, not only for tracking machine health and safety, but also simultaneously staying in compliance with an increasing number of emissions regulations.

True, the instability of the economy has caused some environmental enforcement agencies, such as the California Air Resources Board (CARB), to back off a bit as it tries to reposition itself as “business friendly,” but the compliance issue will not go away. It simply means fleet managers have shifted the emissions issue, “rightfully so, from the front burner to the back burner,” says Tom Remy, director of sales-construction for Navman Wireless.

Remy, who is located in San Diego, is well versed in California diesel emissions regulations, a state with the reputation of being flag bearer to the nation when it comes to controlling emissions. California’s complexities of compliance stems from the state’s 35 separate air districts, he says, “these districts are not aligned by zip code.”

“Visualize the air above those districts as part of the compliance zone,” Remy says. “The regulations can change from zone to zone. These air districts are self-funded, which means they stay alive by writing tickets for violations.”

To enforce the emissions regulations, for instance, California relies on what Remy calls “smoke police” to monitor job site equipment and ticket machines that are not in compliance.

“The smoke police sit up on a hill, for example, and use binoculars to watch construction sites below,” he says. “They’re looking for visible signs of smoke. If there isn’t any smoke and it’s 1:30 a.m., and lunch time, they focus in on the equipment parked in a line. If an operator has left a machine running, the smoke police can see the little ring caps going up and down on the smokestack. If that’s the case, they swoop down, possibly getting 20 machine [idle] violations all at once.”

With equipment moving from job site to job site in different locations, it becomes difficult—but necessary—for fleet managers to know what air district they are in, what
The low-hanging fruit is simply to teach the operators not to run unnecessary idle time. Modern machines prefer to work rather than idle, but you still have some carry over today of the old attitude. It all gets down to four data points—location, hours, fuel burn, and some measure of productivity such as working versus idling. Realizing the full benefit of telematics is a progression. — KEN CALVERT, KOMATSU

the rules and regulations are in each district, and to comply with that particular district's regulations, he says.

Enter telematics.

"There is no better way of doing that than by telematics," Remy says. He uses the word in a generic sense to explain systems like Navman's that is made up of a combination of GPS and cell phones to automatically provide fleet managers with hours and location information. For construction fleets, the system also uses sensors that monitor engine rpm and a calibrated oil pressure switch to determine whether the machine is working or not.

In a situation where machines are moving in and out of air districts, telematics enables geo-fencing to be set up around the various work sites or even around the machine itself. That tells the fleet manager if a unit is operating where it is supposed to operate, Remy says.

"If you don't have telematics, you may not even know a piece of equipment has moved 10 miles and has entered a different air district."

Ken Calvert, director-product support systems for Komatsu America, says the real value of the technology is that it delivers the data most important to fleet managers.

"They want to know where the machine is and how many hours it worked," Calvert says. "That's typically what you get in a manual report, but as the fleet manager gets more data he becomes interested in more data: hours on the machine and the job site it was working on, information that isn't just for maintenance scheduling, but also for a company's internal accounting and how to bill time and costs to certain jobs."

As asset managers learned to trust the basic data they received from an automated system, they moved to another level. As fuel prices carved out greater chunks of budget allocations, they became more interested in fuel economy, Calvert says. They began to ask themselves, does it make more sense to buy new technology just from the fuel savings aspect?

"They began to incorporate fuel burn—not just for costing or accounting costs—but also to determine if the fuel they were buying was ending up in the machines they bought it for," Calvert says. "The low-hanging fruit there, is simply to teach the operators not to run unnecessary idle
time. I think this is still in its infancy, a paradigm shift. With the old machines, you just left them running because they were hard to start. Modern machines prefer to work rather than idle, but you still have some carry-over today of the old attitude. It all gets down to four data points—location, hours, fuel burn and some measure of productivity, such as working versus idling.

"To get your arms around all that is hard, but the basic stuff comes first. Realizing the full benefit of telematics is a progression," he says.

Another example of how telematics can help off-highway fleets stay within local and federal regulations is in noise control.

"We have customers who work in an urban environment where regulations prevent you from starting a machine before 7 a.m. If you do, you can be fined," says Nick Redd, industry support manager for Caterpillar's commercial work site group.

If a machine starts before 7 a.m., therefore violating the noise ban, telematics sends an alert to the back office, to cell phones and e-mail addresses of the production or equipment manager, "so he can either get the machine shut down or coach the operator to prevent it from happening again."

That same telematics data also can be used as historical information. "You may have a neighbor file a complaint that you are starting the machines prior to a specific time," Redd says. "Potentially, you can use that data to prove whether or not the machine violated the noise regulations."

Machines also have diagnostic devices that sense when components are not working properly, which can be a signal that emissions may be affected.

"When you think about emissions, there is no way on a machine to know the exact emissions coming out of it," says Joe Mastanduno, account manager, rental marketing for John Deere Construction and Forestry. "That is all tested in laboratories. All the data generated by sensors can be accessed remotely. That's one of the benefits of telematics—tracking machines," he says.

"The word telematics encompasses a lot of areas," says Chris Juliano, sales director, OEM Controls. "Our system focuses on fuel consumption, fuel distribution, and machine utilization."

Most construction fleets "are aware of telematics, and most use something," he says. "But I think the penetration rates [of telematics use] are low. OEMs have shipped a lot of systems to fleets that typically have only 5 or 10 percent of their units equipped with telematics. If a mixed fleet has 500 machines and 22 of them have telematics, it's not changing the way they do things," he says.

"Our customers often have several systems from the OEMs, but our devices are simpler and suitable for widespread application. Ours simply tell you where the machine is, how many hours it is running and whether it is idling or working. The other half of the equation is fuel distribution and consumption. That's where we fit in,"

Barth Burgett, vice president, equipment support operations, Kokosing Construction, says they stick to the basics.

"Maybe somebody smarter than us has figured out how to automate all the information, but at this point and time we use various reports to closely monitor who the operator is," he says. "If there is a variation beyond what we set as
our guidelines, we talk to the operator's supervisor, who addresses that behavior."

Burgett says a grade card can be produced for operators who use several different machines. Excessive idle time breaks emissions regulations, and it also costs the company money. "I have the ability to look at that data every day," he says.

Keeping an eye on emissions compliance is important to Kokosing, Burgett says, "because a lot of municipalities open their bidding process only to contractors who manage their equipment in a manner that provides a healthier and safer work place."

In the process of upgrading and managing equipment, Tier ratings become important, says Burgett. "You have to look at that," he says. "We are not heavily regulated in the areas where we work, so we don't have the situations many contractors are faced with. But when we buy an asset, we consider buy versus rebuild. We continually work to improve our Tier rating, which is everybody's responsibility."

Waste Management is strongly focused on how telematics plays into emissions control, according to John Meese, senior director of heavy equipment. Although a number of units in the mixed fleet are aging, a strong rebuild program helps older machines adapt to the technology.

"Any time we do a rebuild," Meese says, "we build in the highest level of telematics that the machine will adapt to. Some of the units can't report very much, but we upgrade those machines that are capable of using the technology."

Not only can telematics help on the environmental front, but it also identifies safety violations due to operator behavior.

"In one recent incident, an operator at a transfer station was consistently doing high speed backward and forward shifting—at 13 miles an hour," Meese says. "We like to see vehicles at transfer stations not exceed 5 miles an hour. Telematics is an invaluable technology from a safety standpoint and from a maintenance standpoint."

Bill Ashworth, a Komatsu dealer whose customers include construction and mining companies as well as municipalities throughout Alabama, Georgia and the Florida Panhandle, says the use of telematics is destined to become huge as the economy turns around and companies start replacing older machines. As fleet managers become more aware of what telematics can do, he says, even smaller fleets are beginning to use some form of telematics.

One reason is that equipment dealers now can provide more useful information to their customers. "We can communicate the advantages of that technology, for instance, in reducing fuel consumption," he says. "That's critical as fuel prices go up."

With awareness climbing, and with associations such as AEMP and its Telematics Standard spearheading efforts to make it easier for mixed fleets to interface with the various OEM telematics systems, where does the technology go from here? It is shifting its emphasis.

Redd says OEMs initially concentrated on the equipment side: how to use the machine and how to service it at the right time. Now focus is beginning to move to the production side: how productive the fleet is, how much material is being moved, how much is it costing to move that material, and how much fuel is burned to move it.

"OEMs are becoming more and more interested in providing that kind of value to our customers," he says. "As we add more value to the production side, I think we will see telematics really take off in the next two or three years."

That shift in emphasis could well be the turning point when it comes to convincing upper management to commit to such a major investment.

"Now both sides of the fence—equipment and production—are looking for the same thing," he says. "When that happens we will see adoption obstacles to telematics disappear."
Harmonious Partnerships

John Meese has Waste Management working closely with its OEM dealers for direction, expertise and cost savings.

BY G. C. SKIPPER

Waste Management, Fleet Masters Award winner for the private sector, is a big player on a big team.

The company operates one of the largest fleets in North America and has dealer relationships that reach far beyond "professional" and deep into the realm of true "partnership."

The scope of Waste Management’s business, of course, is a factor that encourages harmony, but those who want a share of that business must meet strict, written standards established by the company.

John Meese, senior director of heavy equipment, best expresses the importance of the end-user/dealer bond.

"I am always frustrated when one of my managers tells me he doesn’t have a good working relationship with an OEM dealer," Meese says. "The first things I ask are when was the last time he went in and checked parts or when was the last time he called a service dispatcher or supervisor and said, ‘Hey, I’m nearby and I have the donuts if you have the coffee.’ That face-to-face meeting can go a long way in resolving problems. Just sit down in a room, say what needs to be said, and then fix the problem. It’s really very simple."

Nurturing that relationship is equally important. In areas where Waste Management has a big presence (a number of transfer stations, a couple of recycling stations and landfills), local employees must schedule—at minimum—a quarterly meeting. "Once you get the ball rolling," Meese says, "it’s just a matter of getting along with people."

Among the benefits derived from good relationships is response time, for one, and, also, obtaining dealer technical assistance and information.

"If one of our technicians is unsure about something, he can contact the dealer’s go-to guy," Meese says. "If a dealer technician has to come out, he knows what parts we use in that particular application and can bring them with him. You don’t want some guy driving 60 miles out to the facility and say, ‘Yep, that’s what’s wrong with it. I’ll be out tomorrow with the parts.’"

The relationships sculpted by Waste Management have been key factors in creating master agreements with OEM manufacturers, including Caterpillar, Volvo and John Deere. These agreements provide "a certain level of discounting on a market basket of parts," says Meese.

"With equipment, we typically negotiate a base price on machines equipped with a certain set of specifications. The agreements have escalators built in on an annual basis," he says. "We don’t have labor agreements with manufacturers because that service is handled by the local dealer."

Waste Management also has longer-term, more-inclusive warranties that differ from others. For instance, Waste Management labor is used for nonintrusive repairs that typically would be covered under warranty.

"We file a warranty claim that reimburses us for the cost of the parts and the labor at a pre-agreed upon rate," Meese says. Such warranties are possible, he says, "because our volume differentiates us from the typical small fleet owner who has one or two dozen pieces of equipment."

Another differentiating factor is the rebuild program the company has with Caterpillar and Volvo. Among
With the number of locations that we have and the shortage of technicians, plus the complexity of the technology being built into equipment today, there is always going to be the need for us to turn to OEM-trained, certified, dealer technicians.” — JOHN MEESE

Caterpillar’s various levels of rebuild programs is one called Caterpillar Certified Powertrain Plus Rebuilds. “When the rebuild is completed, the machine is given a near-new machine extended warranty,” Meese says.

The “plus” provides a separate package of equipment repairs that the customer wants done beyond those outlined in the Cat program.

“The OEM program does not entail hoses, harnesses or hydraulic work,” Meese says, “but, in our case, we are very specific about the ‘plus’ portion that we want included in every rebuild done for us and we include those items.”

He gave this example. Caterpillar Certified Rebuild program would rebuild the engine, driveline, differentials, transmission drop box and the electrical harness that is part of the powertrain. “We take the leniency out of the program,” Meese says. “We spell out how certain components are rebuilt. For instance, we go into detail on friction disk thickness on transmissions. We don’t want to have that kind of interpretation left up to the dealer.”

Such precise requirements also serve another purpose. If competing dealers submit bids for Waste Management rebuilds, the company wants to make certain that each dealer bids to the exact Waste Management interpretation of the Cat Rebuild Program.

To submit a bid, dealers must send a technician out to perform an in-depth inspection of the machine. “We supply all the maintenance history so they can see what’s been done up to that point,” Meese says. “Then, the dealer presents his interpretation of that inspection with a set of recommendations and a quotation based on what it will take to bring that machine from its current state to Waste Management’s finished product state.”

So far, nearly 350 rebuilds have been done with Caterpillar and “a much smaller amount with Volvo,” he says.

Waste Management also consulted with its dealers when it decided to revamp its oil analysis procedure. At one time, Meese says, the company had an oil sampling program, “but [despite] following a protocol base, it was a little broken.” Samples weren’t being labeled properly; others, after being pulled, were left on shelves too long and sometimes the type of oil wasn’t labeled properly.

Meese turned to Caterpillar and its Cat SOS (Scheduled Oil Sampling) program.

“Caterpillar is our primary, most expensive workplace tool and that tool must have the highest availability there is,” Meese says. “Who knows better what type of oil wear particles should be in a sample given our grade of oil and our grade of servicing than the manufacturer?”

A true test of relationships is the teamwork necessary to resolve serious problems. That situation occurred in 2008 when a rash of fires broke out throughout one of the company’s regions. After “a little investigation,” says Meese, they learned the region didn’t have an aggressive cleaning program and it also had a fire-suppression system prone to electrical shortages.

The electrical shorts, Meese says, happened to be underneath the fuel filter, which had a plastic bowl on the bottom. If a machine was operating and caught fire, the plastic bowl would melt. “That meant raw diesel was being pumped onto a fire,” Meese says.

To stop the problem, Waste Management worked with the fire-suppression system manufacturer and came up with a solid steel frame that encased the fuel filter. At the same time, Meese says, it worked on a thermal wrap material to encase the manifold turbocharger and exhaust.

As a result, fires declined from 16 major incidents in that region in 2008 to “not even 16 thermal events company-wide in 2011,” Meese says.

Another fundamental part of its dealer relationship is outsourcing. Major component repair, such as engines and transmissions, as well as standard PMs, are outsourced.

“With the number of locations that we have and the shortage of technicians, plus the complexity of the technology being built into equipment today, there is always going to be the need for us to turn to OEM-trained, certified, dealer technicians to support us,” Meese says.

John Meese says technology holds great promise for maintenance programs going forward.

“My vision is that, through telematics and properly trained people, we can create Waste Management PM Central, a system that would permit a single, well-qualified individual to monitor all fault codes, oil sample results and the health indicators of hundreds of machines in the company’s 700 remote locations.”

PM Central would be able to go into the company business system, create a work order and send it to a specific site, alerting a technician to respond to a signal coming from the system.

No exact date has been set for implementing the system, but there is a time frame, Meese says.

“I’d like to see it all happen before I retire.”
When asked, “Does your company/fleet use an oil analysis management program?” the answer is normally, “Yes, we take oil samples.” This does not answer the question. Many companies and maintenance personnel believe that taking an oil sample, sending it to the laboratory, and receiving a report is the end of the process.

This is just the beginning of utilizing all the benefits and cost savings that can be realized from having an oil analysis management program. The ultimate goal of oil analysis is to reduce owning/operating costs and save money. The main benefits of an oil analysis program are that it:

- Detects abnormal wear
- Detects oil degradation
- Detects oil/component contamination
- Detects impending failures
- Verifies the oil in use
- Optimizes service intervals
- Avoids unnecessary overhauls
- Avoids loss of production
- And, ultimately, saves money

To realize the above benefits, the program must be established from the top managerial position to the technician on the floor taking the sample. The responsibilities of all personnel involved should be defined and explained to help ensure a financially successful program. On average, 80 to 90 percent of samples submitted will be “normal.” It is the other 10 to 20 percent of samples that can affect the bottom line of a company’s financial statement. These samples may be rated as “abnormal,” which usually indicates a slight problem that can be corrected during the next service interval. Those samples that require immediate attention—the “Critical/Severe” samples—are the ones that could cause a major failure.

Taking an oil sample is not just the start of the process but one of the most important steps to a successful program. Oil sampling is typically carried out by maintenance technicians. Ensuring that personnel who take oil samples are properly trained and have the correct sampling hardware is important to ensure the integrity of oil samples. An improperly taken oil sample could result in warnings/alerts being sent erroneously to the end user, causing

**REPORTS**

Most oil analysis reports include both raw laboratory data and recommendations or comments. Fleet managers or shop foremen are typically responsible for reviewing the oil sample reports. It is important that the personnel responsible for reviewing the sample reports can interpret the oil analysis data and lab recommendations, and translate these into appropriate maintenance tasks. When reviewing reports, managers should view previous samples and use trend analysis, allowing them to spot changes that could indicate a developing problem as seen below.

**RECOMMENDATION**

We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

**WEAR**

The iron level is severe.

<table>
<thead>
<tr>
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<th>12/02/10</th>
<th>03/25/11</th>
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</thead>
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<td>1405</td>
<td>3358</td>
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<td>hrs</td>
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<td>259</td>
<td>268</td>
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<td>hrs</td>
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<tr>
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<td>not chg</td>
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<tr>
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<td>changed</td>
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<td>not chg</td>
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<td>PO</td>
<td>22.0</td>
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<td>0.0</td>
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</table>
unnecessary maintenance and cost.

Another issue of importance is the information provided about the sample and equipment itself. For accurate diagnosis, information on the make/model of the equipment and component, oil type, sump capacity, hours/miles on the equipment and oil/filters should be completed and submitted along with the sample. Most OEMs have established sample intervals for each component of their equipment. These intervals should be followed at a minimum to assist with possible warranty claims and monitor the equipment. Depending on the harshness of the operating environment, samples may need to be taken more frequently.

Remember, this is a process to ensure that your oil analysis program is effective within your company. Reviewing and analyzing fleet data can allow fleet managers to maximize the return on investment of the oil analysis program.

Oil analysis is a useful predictive maintenance tool that can provide a high ROI. Laying the ground work for a successful program will help you maximize the ROI from oil analysis. Working with your oil analysis vendor and ensuring everyone understands the goals and responsibilities will lead to a world-class oil analysis management program that will increase a fleet’s return on investment.

HOW TO SET UP A PROGRAM

Whether you are starting a program or improving on your current one, when working with your oil analysis vendor, follow the steps below to help ensure the program is correct for your company.

1. SET GOALS AND TARGETS

Setting program goals is paramount to a successful oil analysis program. All oil analysis programs are not created equal.

Discussions with your oil analysis vendor will allow the laboratory to select the appropriate oil analysis tests for each type of equipment within your fleet. Doing so will ensure that you are collecting the appropriate oil analysis data to measure your progress toward your lubrication and maintenance goals. Establish benchmarks to monitor progress toward your goals and targets. Ensure management reports as previously discussed are in place to access progress.

2. DETERMINE RESPONSIBILITIES

Like any successful program, it is necessary to designate personnel to tasks and provide training to ensure that tasks are performed properly. In many cases, the same people taking the samples will be carrying out the maintenance tasks that are recommended by the oil analysis reports. As a result, ensure that there are lines of communication between those personnel that take oil samples, review the oil analysis results, and those that affect the corrective actions. Feedback both up and down the chain of responsibility will ensure that the oil analysis program becomes well entrenched in the culture. A lack of communication can quickly erode confidence in the program at any level. The “program manager” has ultimate responsibility for the program success.
REVIEW AND ANALYZE

Reviewing and analyzing data can also alert managers to developing trends and problem areas. This allows them to review maintenance practices and make adjustments as required. This company submitted 743 samples, and 225 (30 percent) were flagged as "abnormal." Of those, 70 are attributed to "dirt." As a result, dirt could be causing wear, and maintenance practices should be reviewed.

<table>
<thead>
<tr>
<th>Company</th>
<th>Normal</th>
<th>Abnormal</th>
<th>Severe</th>
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<tr>
<td>All Sites</td>
<td>470 (63%)</td>
<td>225 (30%)</td>
<td>48 (6%)</td>
<td>743 (100%)</td>
</tr>
<tr>
<td>Grand Total</td>
<td>470 (63%)</td>
<td>225 (30%)</td>
<td>48 (6%)</td>
<td>743 (100%)</td>
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Abnormal Samples Problem Category Break-down

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<thead>
<tr>
<th>Problem</th>
<th>Count</th>
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<tbody>
<tr>
<td>Dirt</td>
<td>70</td>
<td>31%</td>
</tr>
<tr>
<td>Wear</td>
<td>69</td>
<td>31%</td>
</tr>
<tr>
<td>Viscosity</td>
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<td>10%</td>
</tr>
<tr>
<td>ISO</td>
<td>14</td>
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<tr>
<td>Water</td>
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<td>6%</td>
</tr>
<tr>
<td>Additives</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>Sludges</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>Visual Metal</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>Glycol</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>Scoot</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>

3. DETERMINE THE SCOPE OF THE PROGRAM

The best approach is to evolve the oil analysis program. Start by ensuring OEM recommendations oil analysis are followed to assist with warranty claims. Add other equipment to the program to assist in reducing downtime and maintenance cost. You may want to use maintenance records to determine equipment that presents higher maintenance and repair cost of the fleet.

4. COLLECT MACHINE INFORMATION

Take the time to collect all the required equipment information in electronic format, and forward to your oil analysis vendor. Providing this information goes a long way to ensure accurate diagnosis and meaningful recommendations. Most laboratories can provide you with a spreadsheet template that you can complete with your machine information. Once the laboratory has imported your equipment into its database, most labs can either provide pre-printed labels or software that allows you to print your own labels that can subsequently be used in place of the standard Sample Information Forms (SIFs). Not having to complete SIFs with your oil samples will save you a lot of time, and pre-printed labels ensure accurate machine information when the laboratory receives your samples.

5. SELECT APPROPRIATE SAMPLING PROTOCOLS

Having determined goals for the oil analysis program, it is necessary to select the appropriate testing protocols to ensure that progress toward these goals can be tracked. Typically, the information provided by you on the equipment spreadsheet will enable the oil analysis vendor to establish the appropriate oil analysis...
CORRECTING PROBLEMS

Developing a procedure or tracking method such as the Trouble Log can allow the fleet manager to identify equipment that may need additional attention to correct recurring problems that may lead to premature equipment failure. This should alert the manager that a specific piece of equipment continues to require attention and sample reports should be reviewed for any trends to determine possible solutions. Left unattended, it could result in a catastrophic failure that could add additional repair cost from secondary failures in the system.

**Equipment Id** | FF720DX70318B
---|---
**Sample** | P128931 Taken on 7/17/2012
**Component** | JOHN DEERE 7200D Hydraulic System
**Fluid** | HITACHI HYDRAULIC SUPER EX 46HN
**Latest** | Recommend drain oil if not already done. Reduce drain interval to 2000 hours or drain and flush and use recommended zinc-free oil.
**Diagnosis** | Oil and filter change at the time of sampling has been noted. We advise that you inspect for the source(s) of wear. The iron level is severe. There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable. Zinc level above manufacturer’s recommendations.

<table>
<thead>
<tr>
<th>Wear</th>
<th>The iron level is severe.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Date</td>
<td></td>
</tr>
<tr>
<td>PQ</td>
<td>50.0</td>
</tr>
<tr>
<td>Iron</td>
<td>38.0</td>
</tr>
<tr>
<td>Nickel</td>
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</tr>
<tr>
<td>Chromium</td>
<td>0.2</td>
</tr>
<tr>
<td>Titanium</td>
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<tr>
<td>Copper</td>
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<tr>
<td>Aluminum</td>
<td>1.6</td>
</tr>
<tr>
<td>Tin</td>
<td>0.0</td>
</tr>
<tr>
<td>Lead</td>
<td>2.1</td>
</tr>
</tbody>
</table>

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6. INTEGRATE OIL ANALYSIS RESULTS

Oil analysis vendor’s software should work in conjunction with your existing maintenance software platform. Most oil analysis vendors provide data export capabilities for common reliability software packages or standard CSV or XML data files at a minimum. Integrating the oil analysis data into your existing maintenance software platform ensures that the fleet manager has ready access to the oil analysis data. With tools to track machine condition, track maintenance actions, sort and find units, this puts your entire oil analysis program at your fingertips.

7. TAKE CORRECTIVE ACTION AND PROVIDE FEEDBACK

The largest return on investment from your oil analysis program comes from avoiding equipment failure in the critical 5 to 10 percent of instances. To realize these returns, it is incumbent on the program manager and maintenance departments to ensure that appropriate maintenance activities are carried out based on the oil analysis recommendations. In cases where component inspections are recommended, it is essential to take immediate action, consult with the operators, utilize additional CBM techniques and collect all the necessary information to make a decision on when to take a machine out of service for inspection and possible repairs. At these times you should inquire with your laboratory about additional advanced level testing (e.g. analytical ferrography) that may assist in making the decision more clear. After inspection and repairs have been completed, provide the laboratory with the results of the inspection and what corrective action was taken. This will allow the laboratory to become more knowledgeable about your fleet and problems they should look for. This is a step in the process most fleet fails to complete. **EM**

Ken Hill, CESP, is VP-sales and marketing for WearCheck USA, which specializes in lubrication/fluid analysis and management. He is an 18-year member of AEMP and a Certified Equipment Support Professional.