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28 How to run your shops green

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42 We test drive GMC's quiet hybrid light trucks

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Backhoe loaders reign with versatility in tools and tasks p. 46

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DEPARTMENTS

PRODUCTS

FEATURES

RUNNING GREEN

28 Reducing and Reusing Wastes Builds Leaner Shops

Although much of the equipment industry's environmental attention today is devoted to reducing exhaust emissions from diesel machinery, operating heavy equipment also creates some regulated solid waste. Doing the wrong thing with used oil and filters, wash-rack waste, coolant, spent solvent, tires and a host of other wastes can bring penalties of more than $32,000 per day until the mess is cleaned up. The Resource Conservation & Recovery Act defines wastes that are hazardous, and prescribes how generators should handle them.

FIELD REPORT

36 Plowing 101: Traction, Traction, Traction

Vermeer's 110-horsepower RTX1250 with optional rubber track modules replacing the tires on all four corners is a tractor that can plow through most underfoot conditions, but some contractors wanted more. Devising a steel-track alternative for the same hydrostatic tractor, Vermeer created a production machine for the worst terrain. With one tractor offering three traction choices, *Construction Equipment* decided it was time to measure the working range of each option.

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HANDS-ON TRUCKING

42 Two-Mode Hybrid: Smooth and Quiet

Truck Editor Tom Berg drives a Chevy Tahoe with 2-Mode Hybrid System and says it gets up to 50 percent better gas mileage than a regular Tahoe with a straight-gas V8. The 2-Mode Hybrid's 4-speed automatic transmission has two electric motor-generators and two sets of infinitely variable ratios, plus fixed ratios in 1st and 2nd gears under high-load conditions. The motors act as generators during coasting and braking, sending electricity to a bank of nickel-metal-hydride batteries, from where the juice is sent back to the motors to help acceleration.

BUYING FILE

46 Don't Count Out Backhoes Just Yet

The backhoe loader has undoubtedly more challengers in the utility equipment game today, but rumors of its demise? Those are greatly exaggerated, say backhoe-loader manufacturers. More to the point, those OEMs appear focused on product enhancements that will retain, even recapture, product market share. Senior Editor Mike Anderson talks to some major players and reports on the latest advancements.

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On the Brink of 2009

We have a new president, although at this writing we don't know which candidate won the election. We do know, however, that in January this man will preside over a country on the brink of several major, even fundamental, shifts.

First, and most obvious, is the credit and economic situation. Late fall shook us to the core of our financial and historical roots. No one will soon forget the outrage, the grassroots anger, as the federal government was forced to bail out financial institutions dragged down by the subprime mortgage fiasco. We will also remember this fall as the time the term "socialism" inserted itself into a presidential campaign.

Rod Sutton, **Editor in Chief**

We welcome your comments.
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Second, infrastructure continues to deteriorate in visible and invisible ways. Highway and transportation funding requires immediate and perhaps radical attention as the current funding bill runs out next year. Some are calling for the kind of transformational ideas not seen since Ike and the Interstate system. User fees (some would call them taxes), increased gasoline taxes (there's that word again), and a federal acceptance of its role in interstate commerce and public safety will be among the discussions in which the new president must participate and even lead.

Third, the public openly distrusts federal government and national media. The healthy skeptism of a democratic society has morphed into unabashed cynism. Public discourse has succumbed to partisan bickering and stonewalling. Our political leaders are perceived as motivated by personal gain and interest instead of public service, and our citizens perceive their values and voices go unheeded.

The construction industry limps into 2009 closely watching these issues. Credit, transportation funding, and political malfeasance impinge upon our industry's ability to build and rehabilitate infrastructure and structures; to employ and create new jobs. But we must beware of becoming painted by the brush of distrust rightly wielded by the citizens of this country.

Become involved in a new way next year. Communicate with your fellow citizens. They want improved and less-congested highways and safe bridges; they want better homes and public facilities and reasonable development.

Earn and build trust among your neighbors, then work together with trusted Washington officials for the benefit of all, not just for the benefit of a few.

Rod

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CONSTRUCTION EQUIPMENT MARKET WATCH

A summary of the month's primary machine introductions and model changes

By KATIE WEILER, Managing Editor

Bobcat

Four new hydrostatic, four-wheel-drive compact tractors expand the large end of Bobcat's new lineup to nine models. The CT335 has a 38-horsepower diesel and front-loader rated operating capacity (ROC), with counterweight, of 1,650 pounds. Three-point lift capacity is 2,475 pounds. The CT440, CT445 and CT450 all have front-loader ROC of 2,600 pounds and three-point lift capacity of 2,625 pounds, but they come powered by 41-, 45-, and 50-horsepower diesels, respectively. The Bob-Tach quick-attachment mounting system is now available on the optional front loader of all nine models.

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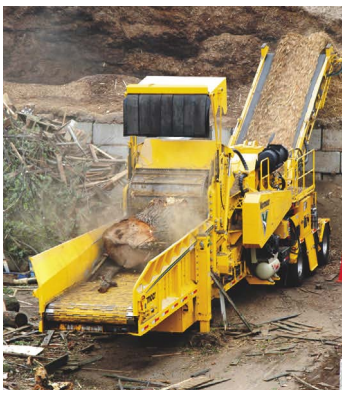

Vermeer

With a mill-box opening measuring 50 inches high by 71.5 inches wide, the HG8000 horizontal grinder can process a higher volume of raw and grind materials usually reserved for tub grinders. To maximize productivity, Vermeer's SmartGrind feature stops and reverses material from feeding into the patented Duplex Drum when engine rpm drops below an efficient operating range. The 1,050-horsepower unit, which can be operated by a wireless remote control, is equipped with two screens that allow for countless screen combinations and end-product sizes.

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Case

Featuring the repowered 3.2-liter Tier III-certified Case engine, the Case 321E compact wheel loader delivers 72 net horsepower and has an operating weight of 12,676 pounds. A high-efficiency cooling package provides improved accessibility and greater air flow across the coolers, thus extending component life. Other features include sight gauges positioned at eye level, flip-up rear hood for ground-line access to the engine, and more than 75 optional attachments.

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Caterpillar

With the change to a higher-displacement Cat 3512C HD engine, the Caterpillar 785D mining truck could gain engine life; it maintains fuel efficiency; and it is compliant with U.S. EPA Tier II emissions standards. The 1,348-net-horsepower truck performs without derate at altitudes up to 14,000 feet, and it can haul payloads up to 155 tons. Cat introduces the X body with the 785D, providing volume of 111 cubic yards compared to the 102-cubic-yard dual slope body. Rear-axle oil filtration is intended to improve component life; and Cat claims its extended-life disc brakes, resistant to glazing, "may achieve up to double the wear life of standard brakes."

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Telsmith

QuarryTrax T16060 track-mounted primary impact crushing plant produces up to 800 tph. It features the heavy-duty PA6060 Primary Impact Crusher, which has a massive, solid-type rotor set on oversized 220 mm, wide-series bearings. With its heavier rotor, the company says the crusher delivers higher inertia to consistently crush 40-inch stone or concrete slabs. It is powered by a 540-horsepower Cat C15, Tier III engine.

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John Deere

John Deere 75D excavator weighs 17,637 pounds and has a 15-foot-1-inch dig depth. Powered by a 54-horsepower Tier 4 diesel, the excavator has a conventional boom and reduced tail swing. Rubber tracks are optional. Isolation-mounted cab has unrestricted visibility, the company says, and machine operations can be monitored via multifunction LCD screen.

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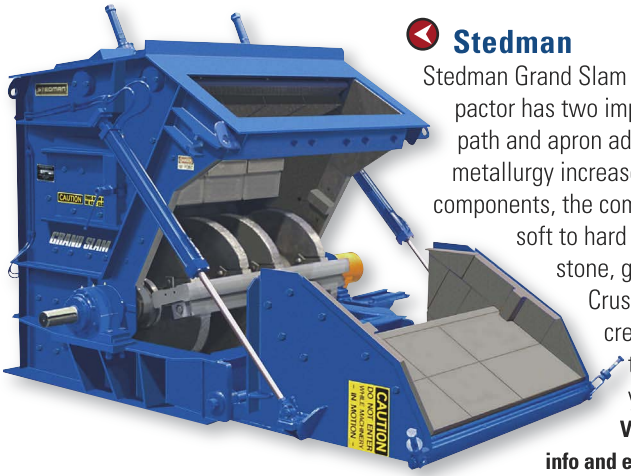

Stedman

Stedman Grand Slam secondary horizontal shaft impactor has two improvements: a new grinding path and apron adjustment system. High-chrome metallurgy increases the wear life of machine components, the company says. It can be used on soft to hard aggregates, including limestone, gravel and asphalt materials. Crush Plus grinding path system creates a third crushing chamber to maximize one-pass product yield and minimize oversize.

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Morbark

Model 40/36 tree chipper aggressively feeds brushy tops and limbs. The 36-inch-diameter by 40-inch-wide drum contains eight knives in a staggered configuration. Yet, at a width of 8 feet 6 inches, the new trailer-mounted whole tree chipper is easily transportable. With Cat or Deere power options up to 700 horsepower, Morbark's IQAN system monitors engine parameters, hydraulic pressures and temperatures. Wireless remote control and four hydraulic stabilizers complete the package.

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Asphalt Drum Mixers

Roadbuilder asphalt plants come in four production sizes: 110, 160, 250 and 350 tons per hour. Parallel-flow plants maximize heat transfer through the mix, the company says. Stationary and portable machines are available. Self-erecting silos on portable plants require one person to set up and take less than 15 minutes.

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Putzmeister

With a rated output of 600 cubic yards per hour, the Telebelt TB 600 truck-mounted telescopic belt conveyor is designed to meet high-volume material placement demands. It has a 24-inch-wide, high-capacity main conveyor and feeder belt. The machine can place all flowable materials, such as pervious concrete, roller-compacted concrete, soil, cement, flowable fill, and large aggregates up to 6 inches in diameter, according to Putzmeister.

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Liebherr

Liebherr LRS 708 concrete reclaimer has new features that allow it to adapt to existing settling ponds and evolve as environmental rules change. LRS 708 requires no ramps or special foundations, the company says. For use on mid-sized ready mix plants, the reclaimer has a 29-cubic-yard capacity and dual mixer truck discharge. For larger operations, the LDP buffer can be added for up to six trucks to discharge.

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Komatsu

Boasting improved visibility and increased loading power and performance, the Tier-3 WA320PZ-6 wheel loader has an operating weight of 32,480 to 33,900 pounds and a net horsepower of 167. It comes equipped with advanced maintenance technology, able to send operating information, such as operating hours, vehicle location and alerts, to a secure web site for easy accessibility by fleet managers and maintenance staff.

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Side Dump

The Contractors Series can haul loads of up to 4 cubic yards. It can be tilted to 45 degrees for dumping, and the nylon pivot blocks mean the trailer pivots smoothly. The standard 2 5/16-inch adjustable ball hitch ensures easy connection to hitches of varying heights. This trailer can be used for water-tight applications, as well, with its sealed tub and 1.5-inch drain plug.

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Caterpillar

Cat says its CB22, CB24, CC24 and CB32 vibratory utility compactors perform well on asphalt, soil, or base materials with a dual-frequency vibratory system with single amplitude. The CB22 has 39-inch-wide drums, and the compact CB24 has one 47-inch drum. The CB32, with a 51-inch drum, offers more coverage in a similar-sized package to the CB24. The CB32 is similar in size making it easier to transport and maneuver than the larger Cat CB34. The CC24 combines a 47-inch-wide vibrating drum and four pneumatic tires for a smooth, tight mat finish. All are powered by the new Cat C1.5 diesel, which provides 33 horsepower at 2,800 rpm.

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Morbark

Model 30 NCL disc chipper is designed for use in tighter workspaces. By eliminating the cab, loader and feed bed from the RXL, what results is a lighter, easy-to-transport wood chipper that retains the power and productivity. With larger feed and throat openings, as well as power choices up to 1,000 horsepower, the compact NCL model still utilizes the established 83-inch disc with three or four knives.

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TopKick's large windshield and sloped hood means the driver's field of forward vision begins as close as 13 feet from the front bumper, 13 feet sooner than the Ford F-450/F-550's.* And large 126 square-inch cowl-mounted mirrors are anchored to the rigid structure of the truck for less vibration and can be folded 90 degrees either way, so tight areas and seeing obstacles is easier.

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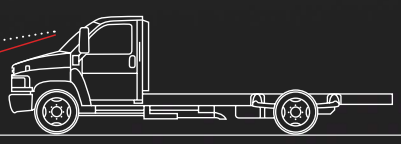

FORD F-450 & F-550 2WD / 26' FROM BUMPER ▲

▲ GMC TOPKICK C4500 & C5500 2WD / 13' FROM BUMPER

*Based on a comparison of a 2008 GMC TopKick C4500/C5500 2WD 60" CA to 2008 Ford F-450/F-550 2WD 60" CA. Vehicle shown with equipment from an independent supplier.

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MANUFACTURER NEWS

Sterling Truck to Disappear In Daimler Restructuring

Sterling Truck, an old-line name that enjoyed a 10-year resurgence as part of the Freightliner family, is being put to death again, a casualty of the slow American economy and rising materials and manufacturing costs. Daimler Trucks North America said it will drop its Sterling product line and close two factories, and consolidate remaining production in the Carolinas and Mexico.

Major cuts will begin in March with the closing of the Sterling plant in St. Thomas, Ont., Canada, and proceed into 2010 with the closure of Daimler's Portland, Ore., plant. The restructuring will end jobs of about 2,300 assembly workers and another 1,200 to 1,500 administrative people, executives said in a phone-in press conference from Daimler AG's headquarters in Stuttgart, Germany, on Oct. 14.

The high costs of meeting increasingly stringent American exhaust emissions limits and rising costs of basic materials like steel also led to the decision, executives said. Surveys of American customers showed that they were not planning many truck purchases any time soon. There'll probably be no pre-buy to beat the more expensive 2010 diesels because their increased fuel economy will offset higher purchasing costs, said Chris Patterson, president and CEO of Daimler Trucks North America.

Daimler Trucks North America says it will drop the Sterling product line and close two factories,

The moves will cost Daimler about $600 million in employee separation and other expenses but save $900 million annually by 2011, the first full year after changes have been accomplished. This, along with a "two-brand strategy" with Freightliner and Western Star, will keep the company financially strong and more competitive, and better able to develop new truck products, said Andreas Renschler, a member of the board of managers for Daimler Trucks in Germany.

The modern-day Sterling Truck was born a decade ago when Freightliner bought Ford Motor Co.'s Heavy Truck business. Executives revived the old Sterling name, which had been dormant since early 1950s, for the trucks. Current Sterling heavies and mediums continue to be based on the old Ford products. But sales performance never got Sterling beyond a 6 percent market share, which came last year, and now it's below 4 percent in heavies and 3 percent in mediums, Patterson said.

The original Sterling began about 1908 in suburban Milwaukee as the Sternberg Truck Co., but its founder went for an Anglo name to avoid anti-German sentiment at the outset of the first World War in 1914. Sterling became known for its use of oak-lined frames and cabs, and chain-drive rear ends, even into the post World War II period.

Sterling was absorbed in 1951 by the old White Motor Co., which built Sterling Whites for a couple of years before killing the name. White itself went bankrupt in 1981. The grim state of truck building here means the Sterling name will probably sleep again for many more years.

— TOM BERG

USED EQUIPMENT NEWS

Ritchie Rings Up Records

With total gross auction revenues of more than $268 million (US), Ritchie Bros. Auctioneers booked its biggest week ever in late June — just one of the company records set during the seven-day stretch by the world's largest used-equipment auctioneer.

During the week of June 23, Ritchie Bros. conducted four agricultural and a week's record 13 industrial unreserved public auctions. Along the way, the 50-year-old company set a new mark for weekly Internet sales of $52 million (US), and recorded its largest-ever auctions in Atlanta with auction proceeds of $60 million (US) and Australia with auction proceeds of $55 million (AUD).

Also during the week of June 23, Ritchie Bros. held an official opening of a new permanent auction facility in Saint Aubin sur Gaillon, west of Paris, France.

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SANY is one of the top 50 global construction machinery manufacturers in the world. SANY America Inc. is a subsidiary of SANY Group China and has acquired 268 acres of land in Peachtree City, Georgia, with plans to invest $60 million in the development of its North American headquarters, manufacturing facilities, marketing and service center, and research and development center.

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ANNUAL SALARY: Salary and benefits are very competitive.

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JOB TITLE: **Motor Grader Senior Product Manager**

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RESPONSIBILITIES:

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3. Make the design/modification package of motor graders deliverable to production line.
4. Assist Sales and Marketing at SANY America and SANY China in evaluating engineering, manufacturing, and marketing information to develop motor grader product plans that are consistent with customer requirements and product line objectives.
5. Assist SANY America Services, SANY China Engineering and Service Departments in resolving current product issues with motor grader imported to the American market.

JOB REQUIREMENTS:

- Bachelor's Degree in Engineering required with emphasis in mechanical, hydraulic, or electrical disciplines.
- Minimum of 8 years of designing and project management experience. Successful candidate must have five (5) years direct experience in motor grader designing, ideally in mechanical and structural design.
- Demonstrated proficiency in completion of major projects from conception to product release.
- Must possess interpersonal skills to be able to work successfully in a strong cross-functional and multi-cultural team environment.
- Ability to work under minimal supervision.
- Ability to travel to other plants and supplier locations worldwide (especially China) as required to meet the demands of assigned programs.
- Ability to use and understand network diagrams and MS project to develop and manage projects through their life cycle is desired.
- Ability to use designing software (Pro/E, PDM, Winchell, etc).

Compensation for this position is very competitive and the benefits are company paid.

AUCTION NEWS

Economic Uncertainty Doesn't Slow Auction Action

Crisis? What crisis?

Well, not exactly. However, fleet owners and managers participating in a major construction-equipment auction held smack in the middle of Congress' on-again, off-again, on-again economic bailout shuffle appeared to retain their interest in doing business regardless of any doom-and-gloom chatter. *Construction Equipment* followed closely specific makes, models and years of equipment up for bids in IronPlanet's Oct. 2 auction, in order to compare the results to machines auctioned elsewhere in previous months. The IronPlanet event was held three days after the House of Representatives rejected the initial federal economic bailout plan and one day before it approved a second crack at the $700 billion plan.

The hand-picked auction results Oct. 2 were mixed — some up, some down — but certainly neither disastrous for sellers nor indicative of an industry gone stone cold. For example:

- A 2005 JCB JS220LC excavator located in Georgia sold for $52,000 after attracting 30 bids. Four sister machines sold during the previous four months at different auctions held by different companies throughout the United States went for an average of $48,500.
- A 2004 Caterpillar 938G Series II wheel loader located in North Carolina drew 57 bids and ultimately sold for $81,000. That was actually higher than each of three comparable machines sold at auctions elsewhere in the nation during March, April and May.
- Two 2005 Caterpillar 420D backhoe loaders, located in Arizona and Texas, respectively, sold for $42,000 and $35,000 after attracting 23 and 16 bids. Thirteen of the same machines sold at auctions throughout the country in the previous months went for an average of $40,154 apiece.
- Four 2004 Bobcat T190 compact track loaders were up for bids. While one in Georgia went for $13,000, the other three in Colorado went for $14,000 apiece, which is above the $13,667 average of comparable machines auctioned elsewhere in the month prior.
- A jewel of the Oct. 2 auction was a 2006 Caterpillar D6R LGP Series III dozer, located in South Carolina. It attracted 67 bidders and ultimately sold for $152,000. A similar machine sold back in the winter at a Florida auction for $200,000.

On the whole, those are not at all horrific results during a period of overall economic uncertainty.

— MIKE ANDERSON

CRANE SAFETY

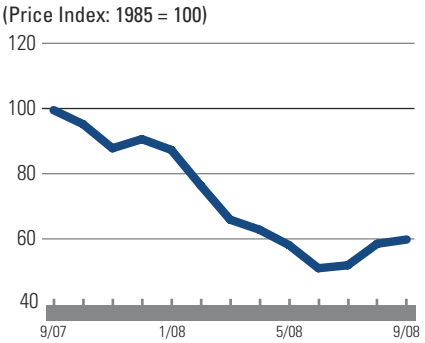
Comment Quick on OSHA Crane Rule

The Occupational Safety & Health Administration published its proposed rule governing use of cranes and derricks in the Federal Register Oct. 9. Comments and hearing requests are due by Dec. 8, 2008. Interested parties can submit comments, referencing Docket ID OSHA-2007-0066 or RIN No. 1218-AC01, via the Federal eRulemaking Portal at www.regulations.gov.

STATUS & FORECAST

CONSUMER CONFIDENCE INDEX

The domestic economy is in a recession, which began late in 2007 and will persist at least through summer 2008. However, the overall economy continues to expand at an erratic 1- to 2-percent pace because of the exceptional improvement in the U.S. foreign-trade balance. GDP grew 3.3 percent in the spring, but will slow and could dip under 1 percent for the rest of the year. Next year, lower fuel costs and a housing rebound will progressively boost GDP growth back to the 2-percent range. For more analysis, visit Economic Outlook at ConstructionEquipment.com.



Source: The Conference Board

RUNNING GREEN

Strategy	Implemented	Considering
Replacing older machines with new	29%	43%
Updating older machines with newer, used machines	22%	42%
Engine retrofits	9%	36%
Repowering machines or using alternative power sources	5%	31%
OEM machine remanufacturing	5%	36%
Rental of emissions-compliant machines	12%	42%

Source: *Construction Equipment* Running Green study

About four in 10 respondents do not know how they will meet emissions requirements. And eight of 10 have no formal plan or strategy. Among those who have begun to meet requirements, these are common strategies.

Joe Montesano of Greeneck Earth Works in Tetonia, Idaho, fuels his Case excavator with biodiesel.

MANUFACTURER NEWS

Case Approves B20 Biodiesel Blends

Case Construction Equipment approved the use of B20 blends (20 percent biodiesel and 80 percent petroleum diesel) for more than 85 percent of its construction-equipment models.

Biodiesel, which is produced from vegetable oils or animal fat derived from renewable resources, is used in various processed mixes with standard petroleum diesel. This alternative fuel is credited with having the ability to lower exhaust emissions and help reduce dependence on imported oil.

"Biodiesel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel," says Ray Good, engine application manager, Case Construction Equipment. "Biodiesel has a higher Cetane number and burns cleaner with less particulates and smoke emissions."

Biodiesel fuels must comply with the North American Standard ASTM D6751. "Biodiesel should be purchased from a trusted supplier who understands the product and maintains good product quality," Good says. "Case recommends that you only use biodiesel from BQ 9000 accredited suppliers to maintain the quality and the consistency of the fuel."

MANUFACTURER NEWS

Bridgestone Firestone Raises Its Prices

Bridgestone Firestone North American Tire and Bridgestone Firestone Canada have raised prices on the companies' Bridgestone and Firestone brand tire lines, as well as all associate brand tires. Prices through the replacement, original-equipment and export channels have increased up to 10 percent on passenger and light truck, truck and bus, motorcycle and agricultural and off-the-road tires as of Sept. 1, 2008.

"We are faced with a shortage of the basic, critical raw materials used to make our tires," says Asahiko "Duke" Nishiyama, vice chairman and president of Bridgestone Americas Holding Inc. "The result is a dramatic rise in prices for commodities such as butadiene, natural rubber and other materials. Continuing high prices for gasoline and diesel fuel affects every aspect of our business."

INDUSTRY EVENTS

World of Asphalt Will Be a Safe 'Work Zone'

In a perfect world, the worlds of asphalt and safety should be one in the same. To that end, the American Road and Transportation Builders Association-Transportation Development Foundation will host its 2009 National Traffic Management and Work Zone Safety Conference in conjunction with the 2009 World of Asphalt Show & Conference.

Scheduled for March 9-12 in Orlando, Fla., World of Asphalt features educational programming and exhibits showcasing the latest technologies and innovations in asphalt-related equipment, products and services for highway and pavement maintenance professionals, contractors and public officials.

"This ARTBA-TDF conference and exhibit pavilion will offer additional learning opportunities to enhance the show experience of attendees, and it is an example of our commitment to provide them with the knowledge they need for maximum productivity and safety," says Sara Truesdale Mooney, World of Asphalt show manager with the Association of Equipment Manufacturers. "ARTBA's involvement illustrates the value of cooperative efforts to benefit industry professionals."

ARTBA organized the first work zone safety conference in 1985 and has subsequently hosted seven additional national and international events. In 2007 the conference was renamed and offered under the auspices of the National Work Zone Safety Information Clearinghouse.

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MANUFACTURER NEWS

Caterpillar Radios Tune in Technologies

New on-board equipment radios from Caterpillar allow users to switch between global positioning system (GPS) and advanced tracking sensor (ATS) grade control without actually changing out the machine radio itself.

Firmware on the CR Series radios upgrades directly through the display, eliminating the need for using a PC and simplifying installation and integration. There are two configurations available: single-band 900 MHz/2400 MHz and dual-band 900/2400 MHz.

The 900-MHz band radios are used to receive GPS satellite data in compact measurement record (CMR) format. Received from a reference receiver, the data is transmitted to one or more roving receivers for precise machine positioning. These radios can also communicate two-way data between an office computer and the machine.

The 2400-MHz radios are used to communicate ATS location information and commands from a base station to a machine for precise positioning. Caterpillar's AccuGrade product uses ATS technology to track a machine and monitor blade positioning.

CR Radios share a common housing and electrical interface, which simplifies machine installation and integration. The new radios replace the TC450, TC900 and TC2400 radio models.

MANUFACTURER NEWS

Komatsu Slant-Nose Wins Design Award

Citation calls the visibility "an improvement in fundamental dozer work parameters."

Komatsu America's D51 EX/PX-22 crawler dozer won a silver award in the International Design Excellence Awards (IDEA). According to the award citation, the super-slant-nose is a "unique feature (that) allows the operator to see objects that are very close to the blade, dramatically increasing safety and efficiency on the jobsite. This new design assures an improvement in fundamental dozer work parameters."

The D51EX-22 and D51PX-22 dozers are 28,000-pound machines rated at 130 horsepower, and there are now two additional models with the slant-nose hood. The IDEA program has been administered since 1980 by the Industrial Designers Society of America and is sponsored by BusinessWeek magazine.

EQUIPMENT SECURITY

31 Stolen Machines Recovered in S.C.

In April of 2008, the South Carolina Law Enforcement Division — with significant resources from sheriff's offices in Georgetown County, Marion County and Dillon County, plus the National Insurance Crime Bureau (NICB) — completed an equipment investigation that recovered 31 stolen machines worth a record $4 million.

Units included four Caterpillar 320 excavators, two Cat D6 dozers, two Cat 930G loaders, two Cat 730 off-road trucks, three Cat 420D backhoes, a Cat motor grader, Volvo L-70 loader, John Deere 310SG backhoe, Kubota KT37 and Komatsu PC27MR mini excavators, Ingersoll Rand roller, Kubota farm tractor, Monaco motor home, a Mack truck and numerous smaller machines and trailers. Most of the equipment was stolen in the Carolinas.

The case initiated because two suspects were in possession of stolen backhoes. To launder the units, each of them decided to swap his machines for the other's, not realizing that the other backhoe was also stolen. One suspect sold his backhoe to an unsuspecting buyer. The innocent purchaser went to the local Caterpillar dealership to buy a fuel cap for his new backhoe and supplied them with the equipment's product identification number (PIN). Using the PIN, the Cat dealer discovered that the backhoe had been reported stolen, and contacted the South Carolina Law Enforcement Division requesting an investigation.

Source: NER

Tracking down product identification numbers is a challenge to returning equipment to rightful owners.

"In most cases, the PINs were altered to some extent, and we had to use various means to determine the correct PINs," says SCLED Senior Special Agents Pete Chrisley. "Another challenge came as most of the equipment was not currently listed in the National Crime Information Center's database as active thefts, while some machines had been listed with inaccurate PINs. Several different methods were used to identify the equipment and its legitimate ownership, including NICB and NER databases, as well as manufacturers' and dealers' records."

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By LARRY STEWART, Executive Editor

Reducing and Reusing Wastes Builds Leaner Shops

Equipment owners large and small cut shop costs as they commit to shrinking service operations' environmental footprints

Although much of the equipment industry's environmental attention today is devoted to reducing exhaust emissions from diesel machinery, operating heavy equipment also creates some regulated solid waste. Doing the wrong thing with used oil and filters, wash-rack waste, coolant, spent solvent, tires and a host of other wastes can bring penalties of more than $32,000 per day until the mess is cleaned up.

The Resource Conservation & Recovery Act (RCRA) defines wastes that are hazardous, and prescribes how generators should handle them. The Act lists many hazardous wastes specifically, and describes characteristics that make other wastes hazardous. RCRA specifies the Toxicity Characteristic Leaching Procedure (TCLIP) test that is used to determine if a waste is hazardous.

Waste generators are lightly regulated, relative to those who treat, store, and dispose of waste. And RCRA assigns progressively easier paperwork and handling requirements to generators based on the volume they generate. There are three generator sizes:

1. Large Quantity Generators generate 1,000 kilograms (about 2,200 pounds) or more of hazardous waste per month, or more than one kilogram (about 2.2 pounds) of acutely hazardous waste per month.

2. Small Quantity Generators produce more than 100 kilograms (about 220 pounds, or about half of a 55-gallon drum full of most liquids) up to 1,000 kilograms of hazardous waste per month.

3. Conditionally-Exempt Small Quantity Generators generate 100 kilograms or less of hazardous waste per month, and one kilogram or less of acutely hazardous waste per month. It's important to remember that state environmental quality agencies can impose more-stringent regulations on wastes in their jurisdictions.

"If you get water or some other contaminant in fuel tanks and have to remove the fuel and dispose of it, your generation rate gets that much higher, even if it's a one-time event," says Ed Buckner, an environmental engineer specializing in RCRA enforcement for EPA's Region 7. "You have to notify the agency and follow the procedures applicable to the larger generator's status. But your status will go right back down the next month."

Large- and small-quantity generators have to archive a copy of each manifest for wastes transported off their site and records of test results, waste analyses, and other hazardous waste determinations for three years. Most equipment organizations will be regulated as small quantity generators and very many can be conditionally exempt, especially if they take advantage of opportunities to reduce waste.

Used oil

Used oil is a special waste that doesn't count toward generator status if it is recycled or its energy value is reclaimed. Used oil can only be stored in containers and tanks that are in good condition; and those containers, above-ground tanks, and fill pipes need to be clearly marked with the words "Used Oil" to prevent mixing other waste with the oil.

RSC East Chicago mechanics use absorbent oil pads to catch spills, toss them in a marked can in each work bay, and dispose of them with waste oil.

RSC East Chicago mechanics use absorbent oil pads to catch spills, toss them in a marked can in each work bay, and dispose of them with waste oil.

Used oil isn't subject to storage time or quantity limits. Generators can burn their own used oil and used oil generated by "do it yourselfers" in on-site used-oil-fired space heaters. They won't have to comply with regulations for used-oil burners.

Generators are also allowed to transport their own used oil as long as: 1) they're bringing it to either an approved collection center or their own collection point; 2) shipments are 55 gallons or less; and 3) the used oil is transported in a vehicle owned by the generator or an employee.

So even though a quart of used oil can contaminate 250,000 gallons of drinking water, it is regulated in a way that's not an overwhelming challenge. The rules are designed to encourage generators to reclaim the oil. A gallon of used motor oil can be re-refined, for example, and will provide the same 2.5 quarts of lubricating oil as 42 gallons of crude oil.

RSC Equipment Rental in East Chicago, Ind., for example, gets credit for used oil collected by its waste-handling vendor, Crystal Clean. Every gallon of used oil the vendor hauls away helps defray the cost of managing the rental branch's parts-washer solvents, spill-cleanup materials, wash-rack sludge and other wastes.

In areas where it is difficult to find reputable waste haulers who will pay for used oil, equipment owners can cash in the energy value of waste oil by burning the oil to heat facilities. It eliminates the hauling and energy costs associated with re-refining. You can burn your own used oil unregulated in a furnace designed to burn used oil that develops no more than 500,000 Btu per hour.

To minimize the volume of used oil generated, consider changing oil less frequently. Equipment professionals with thorough preventive maintenance programs are extending oil-change intervals to 350 hours today, cutting used oil generation by 40 percent with no detrimental affects on engines. Labor-cost reductions deliver net cost savings even after recouping the cost of a premium oil.

Wash water

Heavy equipment wash water can contain thousands of parts per million of oil and grease, which are potential carcinogens. It can also carry benzene, chromium, lead, and eight other toxic priority pollutants. But the actual content of wash waste varies with the condition of equipment being cleaned. The thing to remember is that there are nearly no populated areas of the country where equipment-washing water can be left to run into a storm drain or surface water without some form of treatment and a permit.

Volume is a serious challenge to handling this wash waste. The wash rack at a large shop will produce as much as 50,000 gallons of waste water per year. If it meets the publicly owned treatment works' (POTW) standards,

the waste can be discharged to the sewer. That waste will not count toward your generation rate. If the POTW won't allow the discharge, however, having a certified carrier haul that much material away makes the cost of washing equipment extravagant. Options include recycling the water for continued washing or treating it to remove the hazardous components so it can be safely discharged.

Discharging water to the storm sewer was an option, but RSC East Chicago modified a wash-rack separator to recycle water because, "recycling is the right thing to do for the environment and the community."

Recycling slashes both the hazardous waste flow and water use.

"We could get a permit to discharge to the local industrial storm sewer," says Kristen Marlow-Kellemen, general manager for RSC branch No. 219. The East Chicago RSC branch pays Crystal Clean to dispose of sludge from the separator of a wash recycling system. "But a fresh-water system would be a giant waste of water, in our opinion. It's a little more expensive, but we feel that recycling the wash water is the right thing to do for the environment and the community."

You can spread solids from a wash-rack separator on your own real estate if it passes the TCLP, but that's not the wisest choice. One hazardous batch of dirt, with a high concentration of benzene (gasoline) or lead (radiators) for example, can put you in as much hot water as if every shovel full of dirt lifted from the separator were hazardous. Settled-out dirt may be disposed of as municipal trash in an approved landfill, but separator oil and sludge must be removed by an EPA-certified hauler.

"Four years ago we put in a new wash-water recycling system from Oil Trap," says Myron Brubacher, fleet manager and part owner of Brubacher Excavating, in Bowmansville, Penn. "All of our equipment and trucks are washed here, and every four months or so we have somebody come out and remove the mud from the wash pit."

Sludge from Brubacher's oil/water separator is disposed of with used oil. The closed-loop system replaced a sand filtration system.

"It was better than nothing, but we weren't reusing the water," Brubacher says. "Recycling costs a little more with the upkeep, but we upgraded more because it's the right thing to do than anything else."

Coolant

"You don't know for sure if antifreeze is hazardous — it's dependent on the vehicles — but there's a possibility that it is, usually because of metals content, such as lead, selenium, and some others," says Buckner. "Many vehicle-servicing companies just assume that it is or they test it with the TCLP test often enough to be statistically valid."

Coolant can be recycled, but even if it is, it will count toward a firm's generation rate. The benefit of finding a recycler to handle the waste is that their services are typically cheaper than a company that will simply dispose of the coolant.

Propylene glycol-based coolant is often considered safer for the environment because it has been approved as an additive by the Food and Drug Administration. Of course, FDA approves the material before it picks up heavy metals from inside a diesel engine's radiator. With its first spin through the water pump, all coolants can react with other chemicals and metals in the radiator and become hazardous.

Even acute filtering won't clean coolant up enough for Caterpillar to warrant its use. There are some commercially available stills that can distill coolant to reusable purity, but their cost compared to the price to have coolant hauled off by a permitted disposal firm typically requires that a generator produce more than 100 gallons of coolant every month to warrant the investment.

The best option for most equipment owners is to minimize this waste stream by managing cooling systems impeccably and changing coolant only when laboratory analysis says it is necessary. When change is inevitable, test the waste coolant with an oil analysis vendor to find out if it contains any heavy metals. That testing is a lot cheaper than the

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If you drain used oil and fuel filters thoroughly (pierce the cannister on those with a anti-drainback valve) and reclaim the oil that comes from them along with the rest of your used oil stream, you can recycle the filters with other waste metals.

TCLP, and if any of RCRA's listed metals or compounds are present in the coolant, have a permitted disposal company haul the waste.

Parts washing

Traditional parts-cleaning solvents are hazardous, but solvent service companies such as Safety-Kleen and Crystal Clean reduce the equipment owners' risk in using them. RSC in East Chicago relies on Crystal Clean, for example, to remove solvent when it is no longer effective (about every eight weeks) and supply fresh solvent to its parts-cleaning stations.

There are alternatives to hazardous chemicals that can reduce the cost of cleaning parts. Biodegradable soaps can effectively clean parts when used in hot-water washing cabinets that are much like automatic dishwashers. Brubacher was inspired by the environmental simplicity of such a system.

"Rich (Equipment Manager Rich Deeds) looked at some of the systems out there and we thought we could make one like it," says Brubacher. "Now we have a hot-water and soap solution parts washer that we fabricated here in our weld shop."

The system eliminates release of organic compounds to the air as the solvent evaporates, and removes the environmental liability from the waste stream. Of course, turning over management of traditional parts washers to a permitted transporter and treatment facility limits the equipment operation's environmental risk, but cleaning parts with non-hazardous methods reduces the operation's environmental footprint, and as Brubacher found it can save money.

Firms that continue to use traditional parts cleaners should use self-contained recirculating solvent sinks, and contract with a solvent service company to take used solvent and maintain the sink. Precleaning can minimize the waste stream. Rinse with old solvent, for example, and then clean with a minimal amount of fresh. Steam cleaners, heat baths, or high-pressure washing units can preclean parts without solvent use. And parts can be precleaned with dry rags or brushes to reduce solvent contamination.

Install a drip rack over cleaning tanks to confine drips. Keep solvent containers sealed when possible to prevent emissions.

"If you leave a drum of used solvent open and it evaporates, that's considered illegal treatment and an EPA inspector that discovers it will cite you," warns Buckner.

Tires

Tires are neither listed nor characteristic hazardous waste, yet most states have tire-dumping regulations. Suppliers usually pick up a used tire for every new one they sell, although you may have to request the service.

One of the best ways to reduce tire waste is to get more life out of tires. Maintain inflation pressure meticulously, and clear jobsites of debris to preserve tire carcasses for retreading. An estimated seven gallons of oil go into the material to retread a truck tire, compared to 22 gallons required to manufacture a new tire. And retreading requires about 70 percent less energy than manufacturing new tires.

Off-road tires can be retreaded. Bandag's new Continuum precure retreading materials save energy in the process, and are being applied by a growing number of off-road-tire retread specialists.

You are ultimately responsible for making sure your hazardous materials are disposed of properly. When you hire a hauler, you're trusting the firm to handle the waste according to the law. Make sure the company has an EPA identification number and procedures in place not only to properly recycle or dispose of the waste, but also to manage the necessary record keeping.

"We've pretty much partnered with Crystal Clean, a waste-handling company on the RSC preferred supplier list," says Dave Jillson, manager of shop services for RSC East

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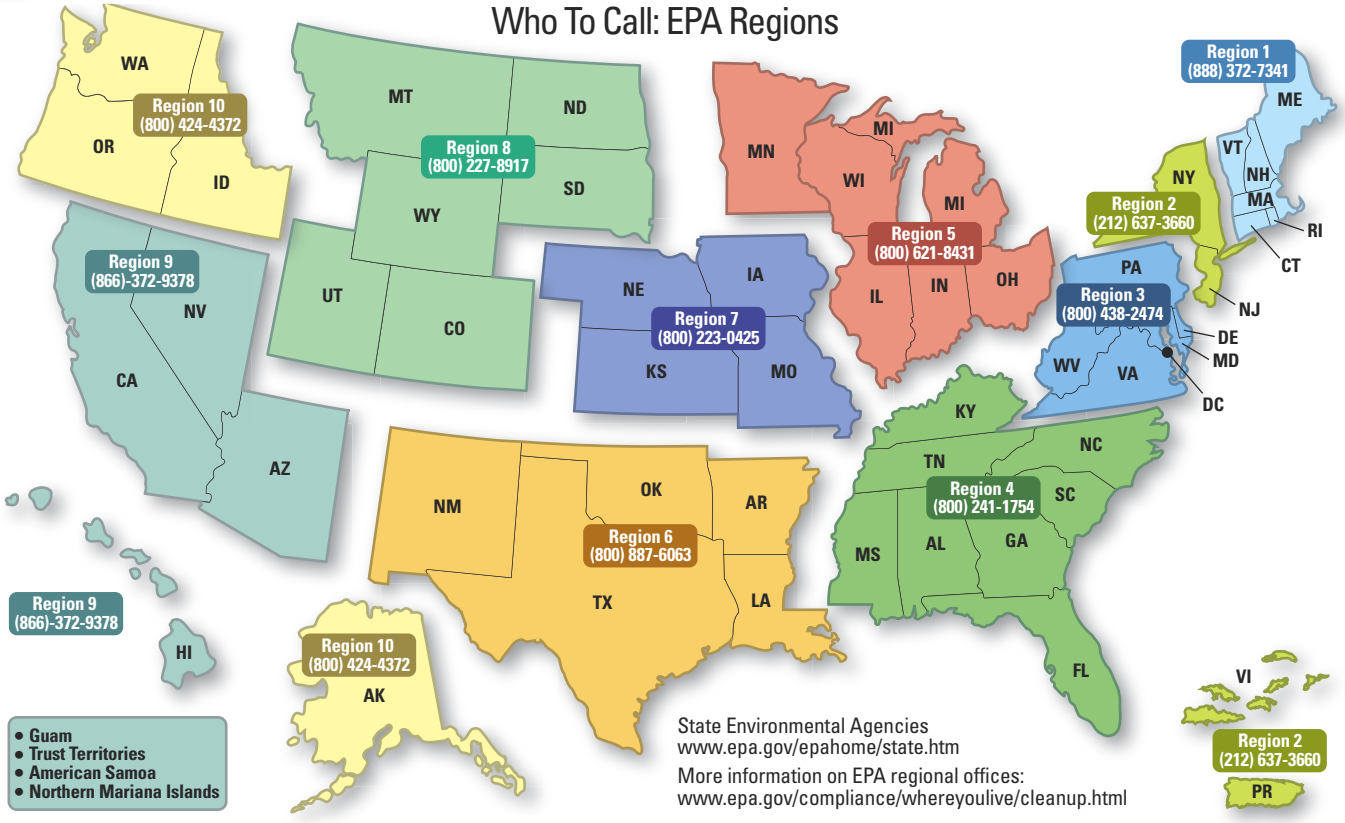

Most shop wastes are regulated under the Resource Conservation & Recovery Act (RCRA) and enforced by EPA regions. State and local agencies can apply more stringent regulations, though, and typically do for things such as used oil, wash-rack waste and tires.

Chicago. "They test every barrel of waste that leaves here."

Any reduction in waste generated works to reduce an equipment operation's risk and costs. RSC East Chicago reduced its environmental impact as part of a larger operations makeover that dramatically reduced costs and increased efficiency. The process started with a sorting of all the services the branch offered.

"In the sorting process, we go through the entire facility systematically looking at everything that's there to decide if it's actually something we need; and if we do need it, we find a place for it, organize it, store it properly, and integrate it into our work processes," says Chuck Hersey, general manager at large for RSC's Region 8. He is describing the start of a management process called 5S, which is being implemented at all RSC branches. "If it's not something we need then it goes in the dumpster. A clean and organized facility is an end result, but it's not the main reason for doing it."

Sorting this way digs into and refines an organization's business.

"We're in an industry where you can find yourself doing things because, 'we've always done it this way,' and we challenged every step in our process — opened it up for each of the mechanics and other employees to suggest ways to improve our work flows," says Marlow-Kellemen. "We eliminated a lot of soft-waste and hard-cost waste. It really opened our eyes to not just the bottom-line efficiency defining how much this group of people can get done, but we also had dumpsters full of stuff that was truly unnecessary. It gave us a tangible picture of how much opportunity we have not just to improve our processes, but also to reduce raw-material waste."

In the end, reduced environmental impact pays off in terms much larger than financial.

"We want to be known as a company that cares about the environment," says Myron Brubacher. "The Brubacher Excavating leadership — my brother and I are the shareholders — know that God created this Earth and we need to be good stewards of the resources He has entrusted us with."

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By WALT MOORE, Senior Editor, and LARRY STEWART, Executive Editor

Plowing 101:

Traction, Traction, Traction

Our vibratory-plow obstacle course compares three traction options on Vermeer's RTX1250

Vermeer's 110-horsepower RTX1250 with optional rubber track modules replacing the tires on all four corners is a tractor that can plow through most underfoot conditions, but some contractors wanted more. Devising a steel-track alternative for the same hydrostatic tractor, Vermeer created a production machine for the worst terrain. With one tractor offering three traction choices, *Construction Equipment* decided it was time to measure the working range of each option.

When the RTX1250 was introduced in 2003, it rolled on tires. But Vermeer engineers decided to push the hydrostatically driven machine's design envelope to keep it moving in ground conditions that jeopardize traction and flotation, especially when pulling a plow. An obvious way to accomplish this end was to use tracks instead of wheels, a design concept that Vermeer, working with ASV (now a Terex company), developed in 2006 for the RTX450.

The smaller RTX450 is successful riding on a pair of long, oval tracks with roller-cage sprockets engaging proprietary rubber belts. But twin tracks have some drawbacks that would be magnified on the larger tractor. Twin tracks would diminish the exceptional steering ability of the wheeled RTX1250, and its ability (via oscillating axles) to closely follow ground contours. The long, single track on each side of the machine would exhibit "break-over," that is, the tractor would nose rapidly downward as the mid-point of its tracks crossed the apex of a hill or berm — disrupting the position of the towed attachment.

Tracks like wheels

Vermeer worked with Loegering Mfg. (an ASV company) to develop a "quad-track" system, which can be used to replace each of the RTX1250's wheels with a tri-

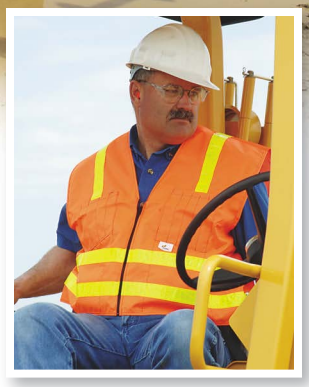
The steel-track (left) modules are taller than the rubber tracks (center) or wheels (right). The change in profile, plus the steel-tracked XTS1250's greater pulling power, call for specialized attachments.

TEST SET

- New Model.....RTX1250
- Weight (wheels)..... 9,040 lb.
  (rubber track) 13,620 lb.
  (steel track) 17,950 lb.

Photos: George Pfoertner©

The rubber-track modules give the RTX1250 the flotation and traction to work through probably the worst conditions for a plow — pulling the blade through dense, wet clay from a soft, slippery surface.



Operator Chris Anderson explains that maintaining good production with a vibratory plow involves the right combination of plow-blade attitude, vibratory frequency and ground speed.

angular track module. Each of the four modules uses a short track frame, a central sprocket, and a series of rubber-rimmed steel rollers that spread the weight of the tractor over the module's rubber track. Of course, if the user considers the RTX1250's wheels to be better for certain applications, then the track modules can be removed and the conventional undercarriage reinstalled by two competent technicians in an estimated 2.5 hours.

Compared with that of a wheeled RTX1250 equipped with a trencher and a backhoe, the ground pressure of a similarly equipped tractor on the quad-track system drops from 20.1 to 6.8 psi, even though substituting the track modules for the wheels increases the machine's weight by nearly 4,600 pounds. The quad-track system lays down a larger, aggressive footprint at each corner, resulting in increased flotation and traction in soft or wet soils. But the rubber tracks are less damaging to finished landscaping, won't damage pavement, and maintain most of the wheels' transport speed.

Plus, says Vermeer, the rubber-track modules' turning radius is virtually the same for both configurations. Steering modes are identical (although the current RTX1250 has a new fuel tank and other modifications to accommodate the rear-steering tracks). Front and rear axles still oscillate and use differential locks. And each track module can rotate on its hub, oscillating fore and aft, to help keep the track in contact with changing terrain. (A patented feature bolted to the end of the axle prevents the module from rotating beyond practical limits.)

The wheeled RTX1250, however, does

accommodate more rear attachments than its tracked counterpart. Both can handle a standard trencher, plow and rockwheel, but the wheeled machine also can use a "combo" (a combination trencher/plow), a sliding offset trencher, sliding offset conveyor trencher and a sliding offset rockwheel.

The quad-track system has made a significant number of converts in its year or so of availability. Some customers pointed out, however, that severe applications, such as running in fractured limestone, would soon destroy rubber tracks. Cross-country plowing in these tough conditions require a more durable track.

In response, Vermeer and Loegering again went to work, developing a steel quad-track system that uses modules that reflect crawler-dozer undercarriage design. The steel-track modules use a heavy track frame, conventional track rollers, conventional chain (with links, pins and bushings) and steel shoes (19.5 inches wide) with aggressive grousers. The XTS1250, as Vermeer calls the tractor sold with its steel-track modules, weighs about 8,600 pounds more than the RTX1250 on wheels.

Like the rubber tracks, the steel-track modules behave like wheels beneath the XTS1250. But because the steel undercarriage sits higher than the wheeled and rubber-track versions, special rear attachments must be used. They accommodate the tractor's higher profile and greater pulling power, which is some 30 percent more than the rubber-tracked machine.

Practical benefits

Early in the year, when the temperature in Pella, Iowa, (Vermeer's hometown) was around zero and the ground solidly frozen, we visited with Jon Kuyers, manager of ride-on trenchers and compact equipment, about the design of the RTX1250 and its undercarriage options.

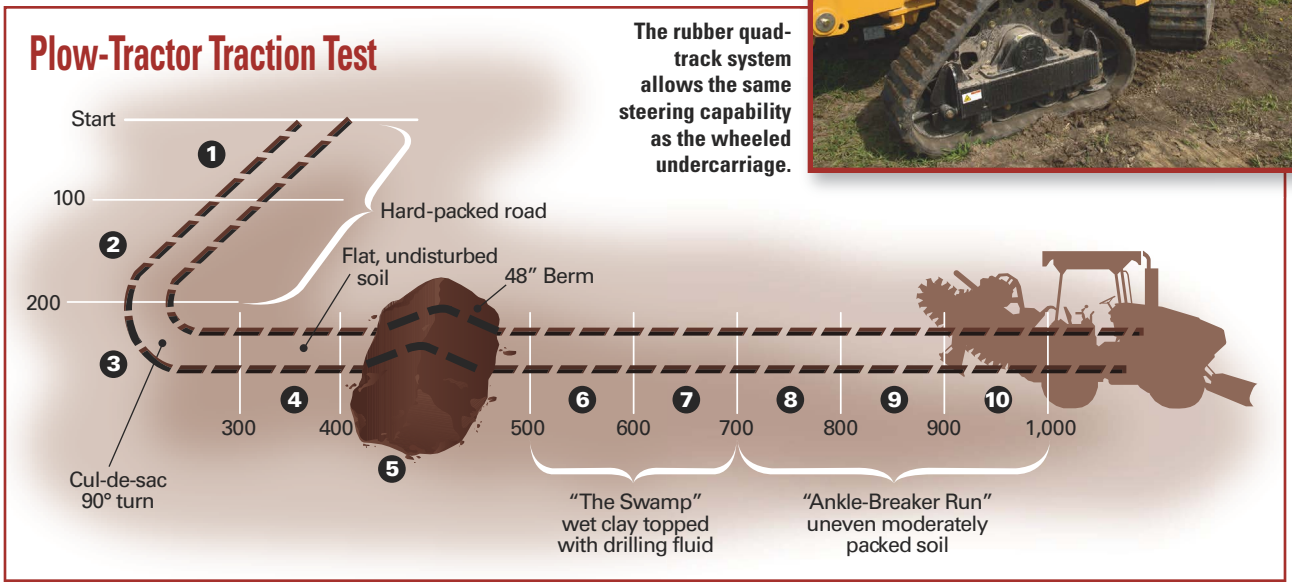
Machines like the RTX1250 are used in trenching, plowing and rock sawing, said Kuyers, and each may have different traction requirements depending on ground conditions.

"In trenching, it's really a mixed bag, because of the various terrain the machine encounters," says Kuyers. "Often a machine like the RTX1250 on tires has more tractive effort than required when pulling a trencher, because the trencher can work only so fast. But with a plow, too much tractive effort is never a problem. The vibratory action of the plow is an assist, of course, but it's the actual pulling force of the tractor that moves the plow through the ground."

During development and testing of optional undercarriage systems for the RTX1250, Vermeer learned that rubber-track modules are effective in both trenching and plowing. When trenching, the modules help maintain production in applications where poor ground conditions and steep terrain are detriments; and when plowing, the rubber-track modules generally boost production, especially when surface conditions turn slippery.

According to Kuyers, an unexpected benefit derived from the rubber-track modules is their positive affect in rock sawing. Because pneumatic tires can flex, the rockwheel may

The rubber quad-track system allows the same steering capability as the wheeled undercarriage.



For the steel-tracked machine, crossing the 48-inch-high berm was absolutely no problem. The berm slowed down the rubber-tracked machine a bit, and the wheeled machine worked hardest to get over it. See an interactive illustration of how this works at ConstructionEquipment.com.

bounce, momentarily losing contact with the face. The rubber tracks' firm, flat-footed stance pulls the saw consistently into the cut. Production benefits, as does the smoothness of the cut and life of the saw and cutting teeth.

Overall, says Kuyers, equipping the RTX1250 with tracks will allow contractors to extend their working season and to maintain or increase production in a broader range of conditions. Tracks, he says, have allowed some contractors to take on jobs that had been beyond their capabilities.

Comparing pulling power

CE editors returned to Pella in early May to observe first-hand the performance and potential production differences among the RTX1250's undercarriages. Kuyers had arranged to have plow-equipped units available with the three different undercarriages, and had created a 1,000-foot test course for the machines to traverse.

The course represented varied operating conditions, including plowing a hard-packed road, working through a cul-de-sac, climbing rough terrain and slogging through slippery, soft conditions that challenged flotation and traction. Each of the undercarriages tried the course, and we recorded the time each required to traverse each section. This simple demonstration allowed us to calculate a production rate for each undercarriage in the various operating conditions, and overall, to asses their relative performance as conditions changed. The accompanying sidebar, "The Plowing Tractor's World," gives the details.

Steel tracks (left) are designed like crawler-dozer undercarriages. Once installed, the steel-track modules become a permanent undercarriage. The rubber-track modules (right) spread the tractor's weight across the belt via a system of wheels.

To make the comparisons an "apples-to-apples" event, professional operator Chris Anderson ran all the machines. Anderson is a long-time employee of Mid American Energy, based in Des Moines, and typically runs either a vibratory plow or a horizontal directional drill to install utilities. We've included some of Anderson's observations and comments in the sidebar, but it's fair to say here that he's a fan of the tracked machines.

Having operated plows with a single, long track on each side of the machine, Anderson sees the four tracks' ability to plow around a radius like a wheeled machine and climb obstacles without break-over as clear advantages.

"Also, since you can crab steer with the quad-track system, you can sometimes tip the tracks just a bit into a hill and maintain a straight line across the slope."

According to Vermeer, switching between the rubber quad-track undercarriage and the wheeled undercarriage takes two technicians about 2.5 hours.

"Another consideration for our company is restoration. The rubber track doesn't tear up the ground as much as tires. After we've plowed, we come right back over it with the tracks and level it out. Sometimes you can hardly see that we've been there."

Without giving too much away here, we can say that the overall production of rubber tracks is superior to wheels, and steel tracks out-work rubber tracks.

Of course, enhanced capability carries a price tag. Compared to an RTX1250 equipped with rubber tires, expect the list price of the same machine with rubber tracks to be around 30 percent more. If you want steel tracks, expect to pay about 20 percent more for the XTS1250 than the price of the rubber-tracked machine. As always, price is relative to performance. Undercarriage options now allow RTX1250 customers to decide how much traction they need — then to pay accordingly.

Watch Video

See video of the Vermeer RTX1250 — on tires, rubber tracks and steel tracks — taking on extreme terrain at ConstructionEquipment.com. Click "VIEW ALL VIDEOS" and browse the latest videos for "Vermeer Plow Tractor Traction Test."

The Plowing Tractor's World

To simulate the ever-changing environment of the plowing tractor, the test course included 200 feet of hard packed soil (an access road); a 100-foot, 90-degree radius in moderately packed soil to simulate a cul-de-sac; another 200 feet of moderately packed soil with a steep, 48-inch-high berm at near the mid-point; 200 feet of wet clay (the "Swamp") with a slick surface of drilling fluid from a horizontal drill being tested nearby; and 300 feet of rough terrain ranging from moderate to hard-packed soil.

Professional operator Chris Anderson pulled a 42-inch vibratory plow through this 1,000-foot course as quickly as good operating practices allowed. The plow was set in its float positions for both depth and steering. Anderson repeated this process three times — using a machine equipped with rubber-track modules, a machine with steel-track modules and a machine with tires. We timed the machines through each 100-foot segment of the course, then calculated approximate production rates for each. Our objective was simply to get a look at the relative performance of the RTX1250 with each of its three undercarriages.

The accompanying table presents the data. When plowing in hard-packed material (segments 1 and 2), rubber tracks produced 53 percent more than the wheeled machine, and steel tracks produced 22 percent more than the rubber-tracked machine.

In the really tough going of the "Swamp" (segments 6 and 7), the wheeled machine soon dug itself in and could not move the plow. Rubber tracks worked through the slop, but at a slow pace, averaging about 9 feet per minute. The steel-tracked machine, however, averaged 56 feet per minute through the Swamp.

"The advantage I see with the rubber-tracked machine," says Anderson, "is that it runs anywhere. With a rubber-tired machine, you have to pick your spots [to plow], because you know that if you run into mud or a soft ground, you'll lose production. With rubber tracks, you don't have to be as selective about where and when you plow, and you get more days in the field."

And what about the steel tracks?

"Your mobility with a steel track is limited, of course," says Anderson, "because you can't drive the machine to the next job. But the steel undercarriage makes for a cross-country machine, and if you're in the mud, it's the one to have."

Plowing Production (ft./min.)

Segment	Tires	Rubber	Steel
1	14	52	65
2	16	54	64
3	30	77	86
4	29	44	53
5	14	78	95
6	–	11	73
7	–	7	38
8	–	61	74
9	–	56	68
10	–	53	65
Total time for 1,000-foot course (min.)		37	16

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By TOM BERG, Truck Editor

Two-Mode Hybrid:
Smooth and Quiet

Advanced gasoline-electric system from GM and Chrysler saves fuel and is intriguing to operate; next year it'll be available in pickups

It's quiet! That's the first thing I thought as I began driving this Chevrolet Tahoe with its 2-Mode Hybrid system. It's so quiet that safety experts worry it'll sneak up on pedestrians, and in California they're suggesting minimum noise standards for hybrids, if you can believe it. And it's smooth, so smooth that I hardly knew what the engine and transmission were doing except by watching the tachometer.

More importantly, it was saving fuel, or was supposed to be. This Tahoe was being hammered by enthusiastic automotive press reporters at a GM event last May in Las Vegas, and a readout under the tach showed only 14 mpg. However, a two-wheel-drive Tahoe or GMC Yukon Hybrid should get 21 miles per gallon in the city and 22 on the highway (or 20/21 as a 4x4) versus 15/17 or so for one with a straight gasoline-and-automatic transmission power train, according to General Motors Corp., citing the federal EPA's test numbers.

This gasoline-electric hybrid could well revive the idea of driving a full-size sport-utility vehicle as a personal conveyance, something that folks are turning away from since the run-up in fuel prices. It could also cut operating expenses for anyone who uses a pickup truck for work, because this is the same system that'll be available on Silverado and Sierra 1500-series pickups early next year. A GM Hybrid SUV is rated to pull 6,000 pounds, and that'll probably be higher in the half-ton pickups. Chrysler LLC also offers the 2-Mode system in two SUVs and is readying it for certain pickups.

The 2-Mode Hybrid is so named because its 4-speed automatic transmission has two electric motor-generators and two sets of infinitely variable ratios, plus fixed ratios in 1st and 2nd gears under high-load conditions. The motors act as generators during coasting and braking, sending electricity to a bank of nickel-metal-hydride batteries, from where the juice is sent back to the motors to help acceleration. They whine faintly while operating, making for an eerie experience at first, but one quickly becomes accustomed to it.

A joint venture involving GM, Chrysler and BMW shared the work and expense of developing the complex device, which GM calls an Electronically Variable Transmission, and the three companies have begun selling vehicles that use it. In North America it's available in the Chrysler Aspen and Dodge Durango SUVs, and in the 2010 model year it will be an option in Dodge Ram 1500 pickups. Chrysler employs its own 5.7-liter Hemi V-8 engine, along with its own electrical parts and electronic controls. To a driver, Chrysler's 2-Mode

Chevrolet Tahoe Hybrid looks pretty much stock except for special badges. Lightweight body parts, including an aluminum hood, contribute a bit to 21-mpg city fuel economy, about 50 percent better than a Tahoe with a 5.3-liter straight-gasoline V-8.

The 2-Mode Hybrid system will be available in GMC Sierra and Chevy Silverado pickups in early 2009.

Hybrid operates like GM's.

GM mates the 2-Mode's transmission to a 6-liter Vortec V-8, which has plenty of horsepower (332) and torque (364 pounds-feet), yet it's well muffled, as is the cabin in this limo-like truck.

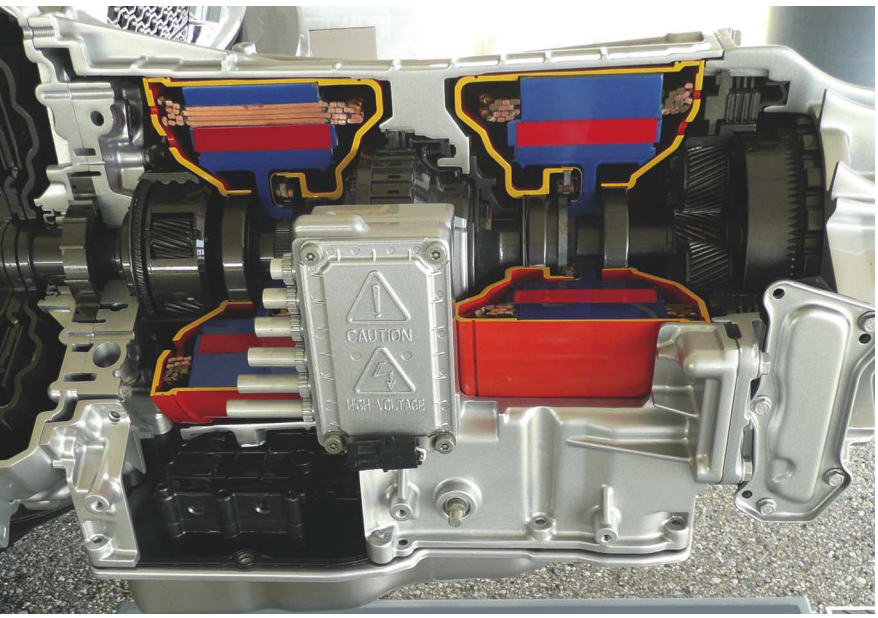
Full torque from both the motors and the engine is available when needed, so it's a proverbial stump puller. Under light loads the V-8 engine becomes a V-4 whenever it can, closing exhaust valves on those unused cylinders and employing variable valve timing in many situations. And it shuts down frequently in stop-and-go driving.

From a dead stop, the vehicle moves out under electric propulsion — that's where most of the gasoline is saved — and the engine fires up when speed begins to build and/or the driver puts his foot into it. If the driver uses a light foot, the motors can accelerate the Tahoe to 30 mph, GM says. With this one I couldn't get above 13 mph before the engine restarted.

The transmission is ultra smooth. I couldn't feel it shifting, and judging by the tach, it seemed to go to the highest ratio possible in any situation. The engine seldom got above 2,000 rpm and often loafed along at 1,200 to 1,400.

The tach needle drops as vehicle speed slows and soon the needle rests on Auto Stop, indicating the engine has shut down because it's not needed. That label on the tach is useful to someone not familiar with the truck's hybrid operation because the engine simply stopping might otherwise be disconcerting. ("Hey! It's not running! What'd I do?!") The engine shuts off when the truck is coming to a stop or coasting slowly; when it does you can faintly feel it, but you can't always hear it, and probably never would if you're playing the radio or yakking on a cell phone.

Electric-only operation is even quieter, but you can hear a descending whine as the vehicle slows and the system regenerates while you brake, capturing energy, converting it to volts and amps that it sends to the bat-



Two-motor, multi-ratio transmission, developed by a GM-Chrysler-BMW joint venture, is also offered in Chrysler Aspen and Dodge Durango SUVs.

A hefty 6-liter 332-horsepower Vortec V-8 acts as a V-4 whenever possible and shuts down frequently in stop-and-go driving. The hybrid's electric system, partly housed in the far corner of the engine compartment, operates at 300 volts.

Tach needle rests on Auto Stop as the engine naps at a red light; it restarts instantly when needed. Readout shows unimpressive economy during heavy-footed demonstrations, but the hybrid's supposed to get 20 to 21 mpg in town.

teries. And there's an ascending whine from the electric motors as you move away from a stop. Pedestrians, especially the blind who protect themselves by listening for engines, might not hear this, so toot the horn if they make a move toward the truck's nose.

And don't poke around blindly under the hood or you might penetrate an orange-clad cable that's carrying 300 volts. That's what the motors run on and so does the air conditioning compressor, so you stay comfy at red lights while the engine naps. Rescuers and tow-truck drivers are being trained to watch for bright-orange cables and connectors in hybrids so they don't fry themselves.

Electric propulsion is what sets the 2-Mode Hybrid apart from GM's "mild" hybrid system used in several cars and in the now-discontinued Silverado-Sierra Hybrid pickups. The mild system's generator does not help to move those vehicles; it only captures braking energy that's then used to run accessories while the engine shuts off during stops and at low speeds. Otherwise the engines in those vehicles do all the work, and the mild hybrid system at best saves only about 10 percent in fuel.

The 2-Mode Hybrid operates like other "parallel" hybrids in that it'll go on electric or gasoline power or both. Incorporating the motors inside the transmission sets it apart from the Eaton electric hybrid systems now available in several medium-duty trucks and vans (but not from GM or Dodge), where a single motor-generator is placed outside the transmission.

Like them, the 2-Mode Hybrid is expensive to buy, even though federal tax credits might mitigate the financial sting. Sticker prices on fancy Tahoe and Yukon Hybrid SUVs are above $50,000 per, and the recently announced Cadillac Escalade is even higher. But a Chevy or GMC Hybrid pickup truck should cost somewhat less, as the system will be available as a stand-alone option on base-trim pickups as well as better-trimmed versions.

One has to wonder how much it will cost to repair or rebuild the complex Electronically Variable Transmission, and who'll be able to do it; buying an extended warranty might be a good idea. But for now the 2-Mode Hybrid is a technological marvel that saves some serious gasoline money. That's hard to ignore, even if the hybrid's hard to hear.

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SAVE OUR FUEL

By MIKE ANDERSON, Senior Editor

Don't Count Out Backhoes Just Yet

Backhoe loaders offer enhanced versatility, say manufacturers determined to develop new product technologies and offerings

The backhoe loader has undoubtedly more challengers in the utility equipment game today, but rumors of its demise? Those are greatly exaggerated, say backhoe loader manufacturers. More to the point, those OEMs appear focused on product enhancements that will retain, even recapture, product market share.

"Manufacturers are starting to look at why a mini-excavator is so much better at digging a trench than a backhoe; why it's so much more efficient; and down the road what's going to happen with that in mind is that they will be using some of the characteristics of the mini-excavators in the backhoes . . . and taking from loaders and skid steers on the front end as well," says Jim Blower, mid-range product marketing manager with JCB. "To try to claw back some of that business, as it were," look for the multi-tasking characteristics of a machine that already carries two product names to be accentuated even more.

For precise backhoe operation, Caterpillar now offers the AccuGrade machine control and guidance system as a factory-installed option on the 416E, 420E and 430E backhoe-loader models.

"Over the years, the backhoe's always been the machine you'd bring onto a site and do every job with it," says Blower, adding that over the past 10 to 15 years, skid steers, compact wheel loaders and excavators have dug their way into that market. "If a guy just typically wants to dig a pipeline trench, he's going to put an excavator in there, because it does it a little bit more efficiently.

"Nowadays, in the last five years or so, the backhoe is still being seen as this multi-tasking tool that you put on the jobsite at the beginning and it's the last thing to leave, because it can do so many odd jobs around the site. You're not typically seeing it in the true production situation, but you are seeing it doing lots and lots of different odd jobs around the jobsite."

John Deere's Bob Tyler agrees, and sees an opportunity for full-sized backhoe loaders — those competing in the 14-foot dig-depth class and above.

"You'll hear every so often folks talk

about substitution of backhoes; in other words, mini-excavators and skid steers taking over from backhoes," says Tyler, John Deere product marketing manager for backhoe loaders. "One of the reasons skid steers have become popular is because of the versatility. They have all these attachments that they can put on the front, and you can use the one machine for multiple tasks. And now we're just doing exactly the same thing with the backhoe, so that you can use that one machine for multiple tasks. Of course, with the backhoe the advantage is you've not only got the front; you've got a back end that you can do the same thing with."

In North America, the front end of the backhoe loader has been a bit of a mystery to equipment users, judging by its historical use — or lack of.

"We've recently done a study on exactly that," says JCB's Blower. "Everyone had the typical thought of 60/40, with 60 percent being the back and 40 percent being the front, but in actual fact it's more like 85 percent in back-end use. In Europe, it's more of a 60/40 split, but also thrown in there is that Europeans road these machines a lot more than typically people in America do. These things will easily spend three or four hours on the road getting to the next job in Europe. It's just a lot cheaper to drive it there than it is to put a truck under it and get it to the next jobsite."

Cost of Ownership

Size	List Price	*Hourly Rate
14′ to < 15′	$75,044	$37.26
15′ to < 16′	$79,559	$41.75
16′ to < 17′	$81,241	$43.36

** Hourly rate represents the monthly ownership costs divided by 176, plus operating cost. Adjusted operating unit prices used in the calculation are diesel fuel at $4.15 per gallon, mechanic's wage at $45.39 per hour, and money costs at 5.125 percent.*

Source: EquipmentWatch.com, phone 800/669-3282

In Tyler's view, John Deere has tackled the front-end challenge with the introduction of the TMC Tool Carrier option on top of the Total Machine Control (TMC) option now available on the 14-foot-class 310SJ and 15-foot-class 410J backhoe loader models.

"For years with backhoes, you could put a hydraulic quick coupler on the front, so you could drop your bucket off and put the forks on. Well, that doesn't make it a tool carrier; that makes it a backhoe with a coupler on the front of it," he says. "The part that truly makes it a tool carrier is that it has parallel lift."

Deere's TMC Tool Carrier allows the addition of a couple of features established on four-wheel-drive loaders — return to carry and boom height kick-out — further utilizing the loader end of the backhoe loader product, says Tyler.

Particularly useful whenever a loading cycle is involved, Case Construction Equipment now offers Comfort Steer on all five of its backhoe loader models, including the all-new, wider 580 Super M Plus Series 3 and 590 Super M Plus Series 3 machines featuring variable-volume, closed-center hydraulics.

"Normally on a backhoe when you're turning the steering wheel, it takes you about three to three-and-a-half times around in a full circle to get from full lock left to full lock right," says Jim Hughes, brand marketing manager with Case Construction Equipment. "When you have the Comfort Steer engaged, it only takes one-and-a-half, so it cuts the

Utilization of both ends of a backhoe loader is key to the full "multi-tasking" development of the product type," says JCB's Jim Blower.

Backhoe-Loader Specifications

Model	Standard Dig Depth	Extended Stick Option	Loader Breakout Force (lbf)	Engine Model	Net Engine Output (hp)	Operating Weight (lb.)
Komatsu WB142-5	14'2"	n/a	10,116	Komatsu 4D102LE-2	76	14,513
Case 580M Series 3	14'3"	18'3"	9,480	Case 445T/M3	79	13,359
John Deere 310J	14'3"	17'11"	9,350	Deere 4045HT054	84	13,880
New Holland B90B	14'3"	18'2"	15,212	FPT 445TA/M3	90	15,677
New Holland B95B	14'3"	18'2"	15,212	FPT 445TA/E3	91	16,008
New Holland B95B TC	14'3"	18'2"	14,109	FPT 445TA/E3	91	18,135
Caterpillar 416E	14'4"	17'11"	9,185	Cat 3054C DINA	74	14,960
Caterpillar 420E	14'4"	17'11"	10,242	Cat 3054C DIT	89	15,474
Caterpillar 420E IT	14'4"	17'11"	10,593	Cat 3054C DIT	89	16,219
JCB 3C 14FT	14'4"	18'0"	11,730	JCB Dieselmax 444 TC	90.1	13,486
Case 580 Super M Series 3	14'5"	18'3"	9,480	Case 445TA/E3	91	14,285
Volvo BL60	14'5"	17'10"	9,866	Volvo D4D	83	15,653
Volvo BL70	14'5"	17'10"	12,445	Volvo D4D CBE2	90	18,910
John Deere 310SJ	14'6"	18'5"	11,160	Deere 4045HT054	93	14,510
John Deere 315SJ	14'6"	18'0"	10,300	Deere 4045HT054	92	16,865
Komatsu WB146-5	14'6"	18'2"	13,224	Komatsu S4D102LE-2	88	16,090
Komatsu WB146PS-5	14'6"	18'2"	13,224	Komatsu S4D102LE-2	88	16,090
JCB 3CX 14FT	14'7"	18'6"	12,638	JCB Dieselmax 444 TC	90.1	15,053
JCB 4CX 14FT	14'7"	18'6"	12,638	JCB Dieselmax 444 TC	97.6	16,986
Terex TX760B	14'8"	19'3"	10,485	Perkins 1104D-44T	87	14,975
Terex TX860B	14'8"	19'3"	12,291	Perkins 1104D-44T	94	15,964
Case 580 Super M Plus Series 3	14'10"	18'3"	9,480	Case 445TA/E3	91	14,905
John Deere 310SJ TMC	14'11"	18'5"	11,051	Deere 4045HT054	94	17,532
New Holland B115B	15'0"	18'4"	12,169	FPT 445TA/E3	108	18,289
New Holland B110B	15'3"	18'8"	14,109	FPT 445TA/E3	108	16,316
New Holland B95B LR	15'3"	18'8"	15,212	FPT 445TA/E3	91	16,028
Caterpillar 430E	15'5"	19'6"	10,401	Cat 3054C DIT	97	16,066
Caterpillar 430E IT	15'5"	19'6"	10,672	Cat 3054C DIT	97	16,811
Komatsu WB156-5	15'6"	19'7"	13,224	Komatsu S4D102LE-2	95	16,530
Komatsu WB156PS-5	15'6"	19'7"	13,223	Komatsu S4D102LE-2	95	16,530
John Deere 410J	15'10"	20'0"	10,210	Deere 4045HT054	98	15,080
Case 590 Super M Series 3	15'11"	19'11"	10,980	Case 445TA/E3	108	15,268
Case 590 Super M Plus Series 3	15'11"	19'11"	10,980	Case 445TA/E3	108	15,268
Terex TX870B	15'11"	20'4"	12,291	Perkins 1104D-44T	94	16,986
Terex TX970B	15'11"	20'4"	12,291	Perkins 1104D-44T	94	17,663
John Deere 410J TMC	16'1"	20'0"	10,300	Deere 4045HT054	98	19,022
JCB 3C 15FT	16'3"	20'1"	12,638	JCB Dieselmax 444 TC	90.1	18,177
JCB 3CX 15FT	16'3"	20'1"	12,638	JCB Dieselmax 444 TC	97.6	17,037
JCB 4CX 15FT	16'3"	20'1"	12,638	JCB Dieselmax 444 TC	97.6	18,765
Caterpillar 450E	17'3"	21'4"	11,375	Cat C4.4	124	24,141
JCB 3CX 17FT	17'7"	21'6"	14,560	JCB Dieselmax 444 TC	97.6	17,515
JCB 4CX 17FT	17'7"	21'6"	12,638	JCB Dieselmax 444 TC	97.6	18,968
John Deere 710J	17'10"	22'4"	15,540	Deere 6068T	123	23,000

Source: Spec-Check.com Xpanded Specs (as of September / 08)

work in half. Imagine you're doing trench work: You've dug your trench, and you laid your pipe or done whatever you had to do in there, and now you have to go in and backfill the trench using the loader bucket. If you can cut the number of times you have to turn that steering wheel in half, what do you think that's going to do for operators?

"When the operator doesn't have to work as hard and can be more productive, what's that doing? It's putting money in his pocket. The longer it takes him to do the job, the less money he's getting paid."

Backhoes with brains?

The backhoe loader may be a run-around, do-it-all type of machine, but that doesn't mean it can't work smartly, too, according to Cat.

The AccuGrade machine control and guidance system is now available direct from the factory for the Caterpillar 416E, 420E and 430E backhoe loader models. "The machine has everything on it, programmed, ready to run, when it shows up," says Paul Grohsmeyer, Caterpillar backhoe loader sales and marketing. "All of the sensors on the machine are basically built into the cylinders, so that they are protected. They are not an add-on to the system. By having them inside the cylinders, they're pretty well bomb-proof."

Two AccuGrade options are available. The site reference system is an entry-level grade and depth check system allowing the operator to excavate to pre-determined coordinates. The laser reference system uses an off-board laser transmitter to set a grade reference over an entire work area.

"By doing it the way we have done it, it's ingrained into the machine, so we know exactly what the machine is doing. You don't have to worry about the operator having to go back and re-measure things," says Grohsmeyer. "When the machine leaves the factory with the basic system on it, every Caterpillar backhoe bucket for that model line is already programmed in. So if the operator wants to change from a small-capacity bucket, to a soil-excavation bucket, to a high-capacity bucket, all he has to do is go to a screen and select the bucket. All the measurements are already taken for him; it's already saved onboard the machine, and he doesn't have to worry about doing any measuring himself.

"The aftermarket systems if you will, as good as they may be, still rely on the operator making those measurements and making the changes onboard the machine."

As the newest additions to the Case backhoe loader line, the 580 Super M Plus Series 3 and 590 Super M Plus Series 3 have variable-volume hydraulics, "which gives you fuel efficiency and a hydraulics-on-demand type of system," says Jim Hughes, brand marketing manager, "and we've coupled that with our pilot controls."

Along with the operator comfort of having the joystick controls mounted in the armrests, Deere's TMC option on the 310SJ and 410J models features three hydraulic speed modes — high, normal and precision. The high production mode is 20 percent faster than normal, whereas precision works at 60 percent of normal speed, which actually leads to "subtle" production gains, says Tyler. "That's really useful for working around underground buried utilities, and you can imagine production can actually go up if you do that, because if you actually hit that underground utility because you were digging too fast, your production stops." Similarly, he adds, when craning a load, a backhoe arm moving too fast leads to excessive load swing . . . and excessive waiting for the ground crew.

While the North American market continues to evaluate how it uses backhoe loaders, one manufacturer has moved away from a continental-unique designation to the adoption here of its worldwide nomenclature. Gone are the 200 Series of JCB models in exchange for the 3C, 3CX and four-wheel-steer 4CX product families of J.C. Bamford.

"It's history," says Blower. "Mr. JCB started off with the JCB 1, and then he went to the JCB 2, then up to a JCB 3. For the next step, he didn't actually change the whole machine; he just did little changes, so it became a 3B, then it became a 3C, and then he invented extra dig, and hence the name 3CX.

"We decided that we needed to call the same machine the same thing all over the world."

How various parts of the world view the same piece of equipment may, indeed, be coming together.

Gallery of Backhoe Loaders

CASE

New Series Offers Upgrades 'Plus'

M Series 3 is the latest upgrade to the Case backhoe-loader legacy, offering five models ranging from 79 to 109 in net horsepower and from 14 feet 3 inches to the Extendahoe's 20 feet 4 inches in dig depth. All models are powered by Tier 3, turbocharged Case Family IV engines, of which electronic versions with high-pressure common rail injection are found on the two Super M and two Super M+ models to improve cold starting and fuel efficiency. The new "Plus" models also have pressure-compensated, load-sensing hydraulics for additional fuel efficiency.

Number of models: 5

New models: 580M Series 3, 580 Super M Series 3, 580 Super M+ Series 3, 590 Super M Series 3, 590 Super M+ Series 3

Visit ConstructionEquipment.com/info and enter 150

JOHN DEERE

Machines Make for a Smooth Operator

With the J-Series, John Deere provides all five of its backhoe loader models with a powershift transmission as standard, providing smooth clutch-free gear shifts for higher transport speed, greater hill climbing and faster acceleration. Cruise control improves operator comfort during roading applications, and a multi-plate clutch engagement allows for on-the-fly engagement of the mechanical front-wheel drive. A dial throttle, as found in excavators, further facilitates low-effort operation. At the backhoe end, a new top-hook, single-pin coupler provides faster attachment changes.

Number of models: 5

New models: 310J, 310SJ, 315SJ, 410J, 710J

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KOMATSU

'Entry-Level' Model Joins Family

The newest Komatsu backhoe loader, WB142-5 comes with flip-over outrigger pads and a suspension seat. According to Komatsu's Jeff Aubrey, those are often upgrade options on other brands. While the footprint of the machine is smaller than the Komatsu WB146-5 and WB156-5 models, both of which are available in standard and PS (powershift) versions, the WB142-5's operator platform is the same size.

Number of models: 5

New model: WB142-5

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JCB

Control Systems Speed Up Cycle Times

The addition of new precession and servo control systems to full-sized backhoe loaders has reduced overall cycle time by 9 percent, says JCB. At the same time, increased bucket breakout force improves digging power. All models offer new Tier 3 engines featuring an intercooler, combining increased torque and intake air pre-cleaner to extend air filter life. Now with automatic hydraulic speed control, the JCB machines sense when full hydraulic flow or just low flow is required, conserving fuel.

Number of models: 8

New models: All upgraded

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Gallery of Backhoe Loaders

NEW HOLLAND

Boom Design Boosts Production 'Curve'

Among the design enhancements, New Holland's six new B Series backhoe loaders feature curved booms and flip-up hoods. The curved boom lowers a machine's transport height by 6 inches, and allows for greater digging forces and digging depths. With all daily maintenance check points accessible at ground level, the one-touch flip-up hood eases machine serviceability. Each model in the B Series is equipped with New Holland engines by FPT, entirely Tier-3 certified with claimed increased fuel economy and lower emissions.

Number of models: 6

New models: B90B, B95B, B95B TC, B95B LR, B110B, B115B

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CATERPILLAR

AccuGrade Available on Backhoe Line

The newest addition to the Caterpillar backhoe-loader lineup, which grew to four models with the January 2007 introduction of the largest 450E model, is the availability of the AccuGrade Ready option on the 416E, 420E and 430E models. Caterpillar backhoe-loader owners can actually select from two options of the AccuGrade machine control and guidance system. The AccuGrade site reference system is an entry-level grade and depth check product allowing the operator to excavate to predetermined coordinates.

Number of models: 4

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TEREX

Increased Bucket Rotation Pays Off

With a bucket linkage design that allows operators to drive into a pile and roll back 45 degrees, then to dump at 57 degrees, Terex backhoe loaders capitalize on increased bucket rotation for added productivity, says product manager Tom Reith. All four models come standard with front counterweight for greater fore and aft stability. Stabilizer legs feature lock-out valves in the circuit, so they can remain down for added stability when the operator is working at 90 degrees. A flip-over stabilizer foot with rubber pads on one side is for street applications; two cleats on the other side suit soil work.

Number of models: 4

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VOLVO

Machines Load Trucks Efficiently, Too

Powered by new Tier 3 Volvo engines, the BL60 and BL70 backhoe loaders burn only 1.5 to 2.75 gallons of fuel per hour, depending on model, application and operating technique, according to the company. The patented, self-adjusting Volvo Hydraulic Safeguard System combats machine overheating. A new front end with a lowered hood line provides improved visibility and styling. Options include bi-directional hydraulics for the backhoe, a stabilizer cylinder guard and Cyclonic engine pre-cleaner.

Number of models: 2

New models: Tier-3-certified BL60, BL70

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Quixote Transportation Safety

Kenco

For work in trench boxes and other confined spaces, the Kenco self-leveling pipe hook handles all shapes of pipe, including elliptical, up to 9,000 pounds. Simply attached to the backhoe's stick with a lifting strap or hook, the pipe hook has a self-leveling mechanism housed inside that gives the operator the capability to hook, lift, move and set pipe from the comfort of his seat. A urethane pad prevents damage to pipe walls.

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Atlas Copco

The Atlas Copco SB 552 hydraulic breaker's solid-body concept features a one-piece design that contains all integral parts in the same iron alloy casting. In addition to product reliability, the slimline design allows better operator visibility and easy positioning. At 1,149 pounds and suited for carriers in the 9- to 15-metric-ton range, the SB 552 has a high power-to-weight ratio, delivering up to 1,080 blows per minute. It requires oil flow of 17.2 to 30.4 gallons per minute at 1,450 to 2,180 pounds per square inch.

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Amulet

Amulet Manufacturing now offers a HoeClamp for Komatsu WB146/156 backhoe loaders. Action of the unique HoeClamp is similar to that of a conventional hydraulic clamp, but without any extra cylinder, valve or hoses. A "kidney link" makes geometry work to provide live action, using only the power of the bucket cylinder. The HoeClamp, first developed in 1983, fits most backhoe loaders with extendable sticks.

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Stanley

With models in both the "6 Series" and "EXS Stealth" mounted breaker line, Stanley Hydraulic Tools offers a variety of breaking attachments suited to the backhoe loader market. Ranging from 1,500 to 2,000 foot-pounds, the MB15EXS, MB20EXS and MB30EXS models are matched to full-sized backhoe loaders up to 28,000 pounds in operating weight.

Visit ConstructionEquipment.com/info and enter 166

Allied

A new addition to the AR Series hydraulic impact hammer product line from Allied Construction Products, Model AR 85B mounts to backhoe loaders ranging up to 25,000 pounds. Requiring 13 to 27 gallons per minute of flow at 1,400 to 1,750 pounds per square inch, the Model 85B breaks at a rate of 500 to 750 blows per minute. The demolition of concrete structures, building foundations, pavement and trench rock are among the applications for this hammer suited to both rental and contractor markets.

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Kent

Increased back head pressure and a larger-diameter piston results in 25-percent greater impact energy from the KF6 and KF9 medium-range hydraulic breakers, says manufacturer Kent Demolition Tools. A longer thrust bushing improves piston alignment during impact and incorporates grease holes to evenly distribute grease in the front head, which itself has added wall thickness. CD-designed side bolt threads provide even load distribution and greater surface contact between the nut and bolt, reducing the chances of thru-bolt failure.

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By ANDREW BALTAZAR, Associate Editor

Scissor Lifts

HAULOTTE

Able to carry up to 595 pounds and measuring in at a width of 30 inches and length of 6 feet 2 inches, the Optimum 1930E scissor lift is robust and also compact enough for easy stowing and transporting through standard doorways. The lift has a maximum platform height of 18 feet 11 inches, and its 3-inch ground clearance means it can be used both inside and outside. Standard features include a 3-foot extension platform, tilt alarm, and two drive speeds.

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MEC

The 3072ES and 3772ES electric scissor lifts are powered by eight 6-volt 350-amp hour batteries. With the optional Quad Trax 4wd, gradeability reaches 45 percent, and full height can be achieved in just over 30 seconds. Other features include drivability at full height, fully proportional drive and lift controls, and fast cycle speeds for lift and drive.

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JLG

At a height of 25 feet 6 inches with a 30 inch width, the JLG Model 2630ES boasts front-wheel drive and steering for a zero-degree inside turning radius. It has a 3.5-inch ground clearance with 25 percent gradeability to clear doorways and for loading onto trailers and rollback trucks. Powered by an electric drive system that uses two independent motors for the drive wheels, the 2630ES provide up to twice the duty cycles compared with other models while lowering noise levels.

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GENIE

The GS-3232 is Genie's latest self-propelled scissor lift, capable of lifting up to 500 pounds to a maximum working height of 38 feet. Thanks to its compact storage size at 7 feet 11 inches long and 2 feet 8 inches wide, the GS-3232 fits through standard doorways, and the dual front-wheel drive allows for zero turning radius and maneuvering in tight spaces. The automatic-leveling, hydraulic-outrigger system levels the machine on up to 5 degrees slope, and the unit comes standard with Genie's four-wheel braking system.

Visit ConstructionEquipment.com/info and enter 163

LIFT-A-LOFT

Best suited for use in manufacturing facilities performing large scale machining and welding operations, this custom-designed 16-foot scissor lift has a durable build that provides up to 7 feet of reach off the front end. To improve ergonomics, Lift-A-Loft includes the Extenda-Deck for safely reaching hard-to-reach structures. Also featured is an operator-friendly egress ladder located at the rear.

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SNORKEL

The latest in Snorkel's line of scissor lifts, the S2633 provides a working height of up to 32 feet while offering a tight turning radius. Like Snorkel's other scissor lift models, the S2633 was designed for convenient serviceability, with a heavy-duty, steel swing-out battery, as well as component trays that facilitate inspection of components and fluid levels. It also features steel-shrouded drive motors to protect against damage from jobsite hazards.

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THE WORLD'S #1 BUILT IN THE U.S.A.

JCB is the world's best-selling brand of backhoe loaders. With almost 50,000 backhoes sold last year, the world's operators have made their choice. These world-class machines are built at JCB's North American Headquarters in Savanah, Georgia along with the compact skid steer loader and 60 m.p.h. military HMEE (high mobility Engineer Excavator).

JCB is the 3rd largest construction equipment company in the world and also one of the world's most succesful privatley-owned family businesses. JCB produces over 270 models of equipment on 4 continents. From the North American Headquarters in Savannah, JCB manufactures and supports equipment for over 170 dealers across the United States, Canada, Mexico and Central and South America.

JCB's North American Headquarters
Savanah, Georgia

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By ANDREW BALTAZAR, Associate Editor

GPS Guides Grace Pacific

Hawaiian contractor sees surge in efficiency thanks to location-based technology

Not long ago, the bed of one of Grace Pacific's fully loaded super dump trucks took a tumble on the road after a tire came loose. As a result, material spilled across the street. Officials and nearby residents claimed that the driver was reckless, swerving from lane to lane and accelerating above the posted speed limit.

"Obviously those people were lying," says Lorne Fleming. As the equipment division director for Grace Pacific, a Hawaii-based paving contractor, Fleming is the man who would have been responsible for that mess, so of course he hoped that the accident was not the driver's fault.

It turns out that Fleming was right — they were lying. But save for the account from the driver himself, how did Fleming know?

Grace Pacific's equipment fleet uses Global Positioning System technology, which collects location-based information and combines it with data about engine performance, vehicle up or downtimes, and a myriad of other operating characteristics.

So, when supposed eyewitnesses told Fleming that the driver was at fault, Fleming simply pulled information from the truck's electronic control module, and voila: The data showed that the driver was well within the speed limit; he did not change lanes; and the rpm and throttle position were steady.

"Risk management is one of the big benefactors of a GPS system," Fleming says. "It doesn't lie, and it doesn't get fooled by misperceptions. It doesn't get misled by the particular emotions of people."

In the past few years, Grace Pacific's equipment fleet, under the direction of Fleming, has been able to trim costs and maximize efficiency of both its vehicles and operators by as much as 15 percent. Currently, 60 of the company's machines are GPS-equipped, most of them service trucks and backhoe loaders. That figure will grow to 250 in mid-2009 — more than a third of Grace Pacific's total pieces of equipment.

This technology has in part enabled Grace Pacific to remain a vital player in Hawaii's infrastructure development, even in the face of highway funding cuts and the increasing cost of materials.

GPS offers three key functionalities for equipment managers: It provides raw data that show the precise location of the machines, where they have been and where they are going, and whether they are working properly.

"We can tell how many hours a day a truck actually worked, we can look at productivity, and we can make decisions on choice of equipment based on how the equipment that we have now is working," he says. "The list goes on and on and on.

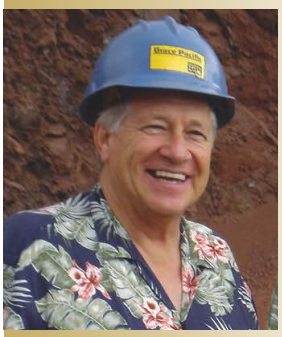
"But it's only a tool. You as a manager have to start making intelligent decisions based on the information that you're getting."

So, once a month, Fleming and his team download the parameters and history from the ECM on every truck. By studying this data, he can take action if he finds that a piece of equipment needs immediate repair, which could save the company thousands of dollars. He could also confront an operator if he learns that the operator drives recklessly or is not productive enough.

As part of Grace Pacific's driver management procedures, each truck is set to trigger a notification if an operator speeds above 61 mph. This makes it easy for Fleming, who says several of his mechanics are "lead-foots," to maintain control over his staff and reprimand them when appropriate. It also helps to keep traffic violation-related costs to a minimum.

On numerous occasions, Fleming found — thanks to GPS and the ECM — that the

PROFILE



Lorne Fleming, Director – Equipment Division

Grace Pacific

Headquarters:
Honolulu, Hawaii

Specialty:
Asphalt paving

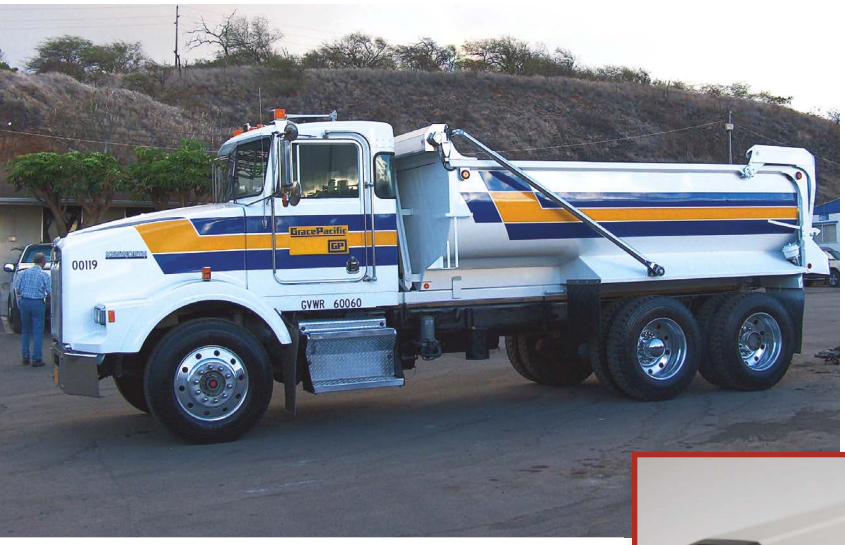
Equipment Value:
$200 million

Fleet Makeup:
600

Support Staff:
650 total employees; 40 maintenance, repair and monitoring staff

Facilities:
Seven asphalt plants on five Hawaiian islands, two rock quarries, and projects on each island

Web site:
www.GracePacific.com



When one of Grace Pacific's dump trucks tumbled on a Hawaii street, GPS helped determine the cause.

The NetworkFleet 3500, used in Grace Pacific's vehicles, transmits GPS location and engine diagnostics from the vehicle.

trucks were burning much less fuel than planned. After looking at the GPS data, he discovered that drivers sat and idled most of the day, which not only violated company policy, but it also went against emissions-regulation efforts to cut idling time to three minutes.

Drivers loaded the trucks at 7 a.m. and then departed for the jobsite. However, the trucks idled there until 1:30 p.m., at which time they were finally unloaded.

"If the truck idles for six of the eight hours in the work day, that means the driver didn't do anything, the truck didn't do anything, and the job didn't get done," Fleming says. "You can address the inefficiencies of the operation at so many levels.

"The widest point of Hawaii is 70 miles. So it's inconceivable that a truck that's working eight hours is only getting one load a day."

Fleming says he discussed the issue with his operators and told them: "We've got a truck that we've paid $200,000 for and you're using one load a day, which is 20,000 tons of asphalt. Our revenue on 20,000 tons of asphalt is about $200 per ton. So do the math: We can't afford that truck if you're only going to use it for one load a day."

As a result of the data provided by the GPS system and the ECMs, Fleming was able to make the decision to sit down with his operations people and get them to understand that they needed to do a better job of scheduling.

Fleming still employs people to physically check each machine regularly. And while fueling the trucks each day, service department staff inspects the tires, bed mirror, lights, bumpers and anything else that contributes to the maintenance and well-being of the truck.

Several departments of the company benefit greatly from this technology, he says, such as asset management, maintenance management, operations management, and the asphalt plants.

"If you've got jobs out there which you've made asphalt for that didn't get done, and the asphalt that they made didn't get delivered, now you've got a bunch of asphalt sitting around that you can't use."

In addition, Fleming works closely with the company's accounting department and uses management system software called Street Smarts to keep track of operating expenses. Operators are asked to record various data on a daily basis, such as equipment hours, fuel usage, and vehicle deficiencies, which are then input to the management system.

"We think our accounting department provides a great service to us by making sure that we're aware of cost increases that we otherwise might not be aware of," Fleming says.

"There is nothing that will ever replace the physical element," Fleming says. "This is, after all, a people business, and our people provide as much input as the expensive GPS system."

Still, these technologies can help managers keep an eye on their operations from a distance and avoid unanticipated expenses, such as fuel costs from worker procrastination or traffic-violation fees.

Although GPS technology is still expensive, firms cannot afford not to use it, Fleming says. "We are looking at the single greatest advancement of a tool in our industry, probably in our lifetime. It's going to revolutionize our business."

Visit ConstructionEquipment.com for more on this story, and listen to Lorne Fleming discuss his work at Grace Pacific.

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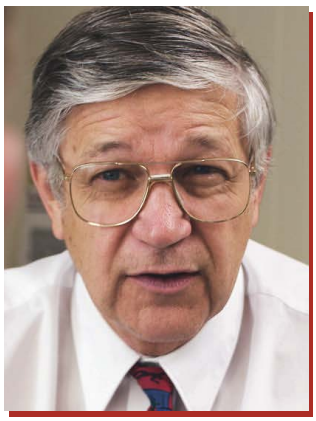
By MIKE VORSTER, Contributing Editor

The Cost of Work Completed

Machines must function as expected if the cost of work completed is to be as well-managed as machine costs



Mike Vorster
David H. Burrows Professor of Construction Engineering and Management at Virginia Tech. See ConstructionEquipment.com for full archives of "Equipment Executive."

We have written many articles in this space on fleet-management strategies, including dozens that focus on how best to lower the owning and operating cost per hour. Coupled with cost management, however, is the realization that equipment-using entities survive, grow and flourish by using that equipment efficiently.

Machines exist to do work, so managers must keep an eye on cost per unit of work in addition to owning and operating cost. The cost per unit of work can be calculated using the following principal production equation:

$$\text{Cost per unit of work completed} = \frac{\text{Cost per hour for the resources used}}{\text{Production achieved per hour}}$$

Minimizing the numerator — cost per hour — will reduce the cost per unit of work completed. But it is just as effective, and just as important, to maximize the denominator — production per hour.

Production is an interplay between the machine that is used to perform the work and the work itself. Our illustration shows how machine and work fit together, and we can identify and understand the many factors that influence production.

The characteristics of the machine are defined by the engine that provides the power, the transmission that converts this power into available force, the traction system that moves the machine and generates the usable forces, and the implement that actually does the work.

The characteristics of the work can be divided into three broad categories. First, the grade, rolling and working resistance that the machine experiences as it loosens, lifts or moves its load; second, the distance traveled in a cycle; and third, the properties of the material that define the machine's ability to break, move, lift or load the material in question.

The available force, the usable force, and the skill of the operator determine how much force can be applied to overcome the resistance experienced by the machine and hence the speed with which the machine is able to perform its work. Speed coupled with distance determines the cycle time and the number of cycles the machine can complete in each working hour.

The size and shape of the truck body, excavator bucket, or dozer blade (the implements doing the work) join with the properties of the material to determine the volume that can be moved per cycle. Cycles per hour and volume per cycle determine the following second main production equation:

$$\text{Production achieved per hour} = \text{Cycles per hour} \times \text{Volume per cycle}$$

Our knowledge of equipment costs and a relentless focus on fuel, repair cost, purchase price, and utilization put us in a position to lower the cost per hour of the equipment used. Our illustration and equations help us to understand the factors that determine production and affect the unit cost of producing work.

From this exercise, we can hone in on six important concepts:

1. As fleet manager, you should provide equipment that performs to specification. Make sure that each machine delivers the power, force and capacity intended and that it has the ability to perform the required work.

2. Operators must have the skills and capabilities necessary to apply to the machine and use its capabilities at maximum safe speeds.

3. The job must be planned to ensure that

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operations, workflow and the jobsite function in such a way where the speed and capability of the equipment can be used to minimize cycle times.

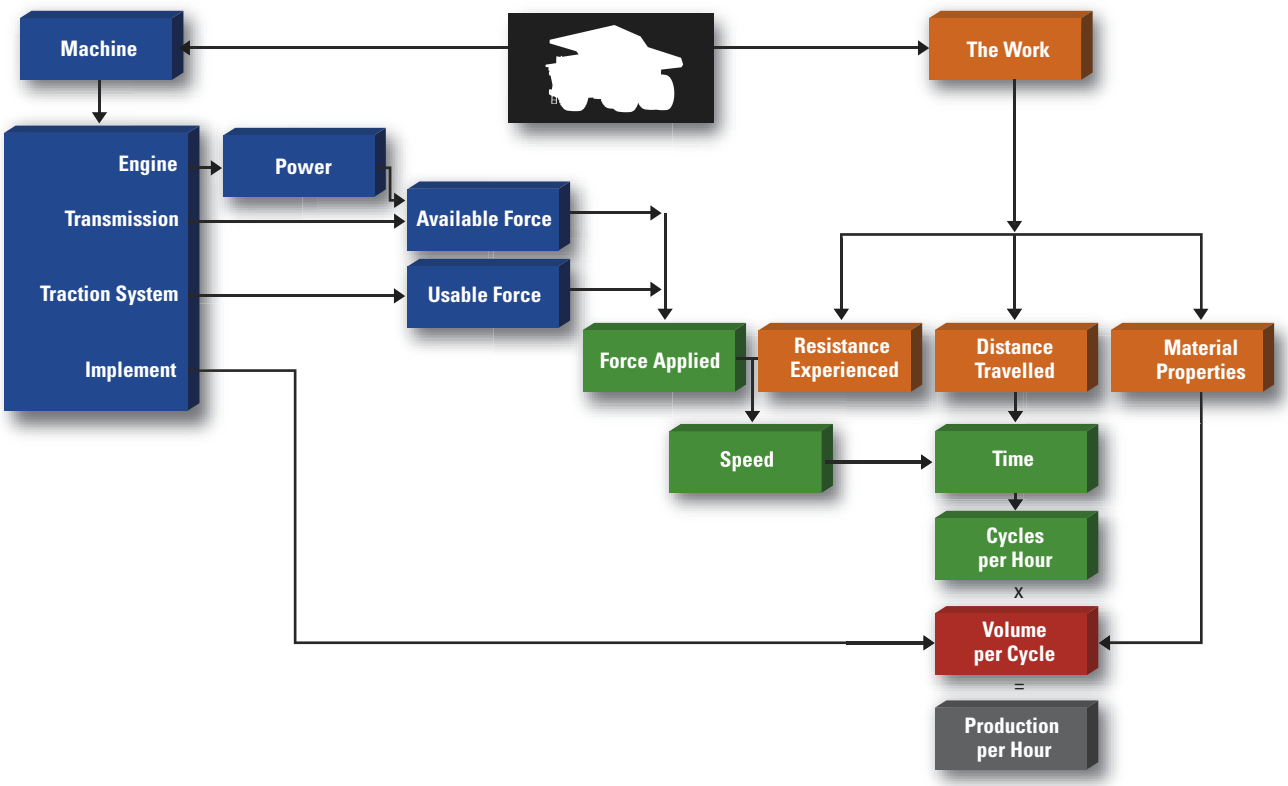
4. The organization must manage the work, plan operations, and provide the infrastructure needed to make every minute of every hour count. Maximize cycles per hour as well as cycles per day.

5. Ensure that there is a match between the bodies, buckets and blades that push, lift, load and transport the material. Ensure that every load is at capacity and that volume per cycle is maximized.

Machines exist to do work, so fleet managers must keep an eye on cost per unit of work in addition to owning and operating cost.

6. Machines usually work in groups or spreads, so managers must balance production spreads to maximize the capacity of the constraining resource, reduce waiting time, and achieve the best unit cost for the spread overall.

How Work and Machine Interact



Production is an interplay between the machine that is used to perform the work and the work itself. This illustration shows how machine and work fit together. By understanding these dynamics, managers can identify the factors that influence production.

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By MIKE ANDERSON, Senior Editor

Doubling Up with Sakai

New 58-inch-wide, double-drum compactor doubles as oscillating, vibrating roller

Two rollers in one . . . and all while on the run.

Among the Sakai compaction equipment introductions this year is a 58-inch-wide double-drum oscillating roller that doubles as a double-drum vibratory roller. As compared to other oscillating compactors, the Sakai SW652ND asphalt roller oscillates or vibrates on both drums simultaneously.

"The 652ND is unique in that it is the only such roller on the market that enables the operator to switch back and forth from conventional vibration to oscillation on both drums," says Shane Sirmons, Sakai marketing manager. "This is a great multi-tasking tool for contractors rolling streets and highways where bridge decks are involved."

With the new Sakai SW652ND asphalt compactor, the operator can switch back and forth from oscillation to vibration mode while on the run.

The new model can be used both as a breakdown roller in the high-frequency vibration mode and as a finish roller using oscillation. This could, theoretically, allow paving contractors to reduce the number of rollers needed on a jobsite.

The vibration mode of the SW652ND is typical of that on other Sakai compactors, offering a high frequency of 4,020 vibrations per minute. The more gentle oscillation mode offers a new drum motion designed to neither over-compact the mat nor fracture the aggregate, which is especially useful while compacting thin lifts and in gaining density at the joints and during finish passes.

With each drum controlled independently, the SW652ND achieves the required compaction faster on both thin and thick lift asphalt applications.

"Rather than trucking another roller out to the site or rolling static," says Todd Mansell, Sakai technical marketing manager, "the operator can simply switch to oscillation and still maintain vibration without damage to the structure underneath. This double-drum is also excellent for thin lift work, where a vibratory might fracture the aggregate and a static or pneumatic would just be too slow. The ability to vibrate both drums in either mode gives the operator great flexibility and compaction options on the run."

As on other Sakai double-drum rollers, the SW652ND's independent double-drum drive system is driven hydrostatically at speeds up to 7.5 miles per hour in either direction. Speed is controlled by the forward-reverse directional lever accessible from the operator's seat, and the new roller model uses the three-way braking system featured on other Sakai models. The drums are cross-mounted — the drive motors are on opposite sides of the machine — to facilitate straight rolling even at slow speeds.

A 78-horsepower Hino diesel engine powers the SW652ND's traction, steering and compaction systems independently, and a vibration-isolation system reduces the amount of drum vibration reaching both the operator and key machine components. The use of dual, rust-proof spray bars at each drum — enhanced by a triple filtration system — helps keep the drum surfaces wet and thus prevent asphalt pick-up.

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Basic Specs: Sakai SW652ND

Operating Weight	16,725 lb.
Engine Model	Hino W04D-H
Engine Output	78 hp @ 2,050 rpm
Drum Width	58"
Drum Diameter	42"
Vibration/Oscillation Frequency	2,940 vpm
Centrifugal Force Per Drum	12,250 / 27,780 lb.
Nominal Amplitude	0.2" / 0.3"

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By ROD SUTTON, Editor in Chief

Geometry Improves Functionality

Genie redesigned its S-80 and S-85 telescoping boom lifts for speedier, smoother operation and eliminated a bothersome service point

Five years ago, Genie introduced its virtual pivot boom assembly on its 60- and 65-foot telescoping boom aerial lift platforms. They've now adapted the design to its 80- and 85-foot cousins, the S-80 and S-85.

With the new features, Genie was able to eliminate extendable axles, says Alan Lofurno, global general manager for the Genie boom product line. Axles extend to provide stability on the ground and withdraw to allow for easy transport. These axles stay put, he says, giving the machine an easily transportable 8-foot-2-inch width.

Stability is maintained by the virtual pivot boom assembly. As the boom is extended, the geometry configures itself to keep the weight of the boom over the chassis' center of gravity. As a result, the boom will extend to full height more quickly, with the 80-foot boom reaching maximum height in 68 seconds.

Operation of the lift was improved through the implementation of a Genie-designed software package that controls boom angle, monitors hydraulic flow for multiple functions, and adjusts lift speed to eliminate hard stops at the top of the boom's reach.

During an onsite demonstration, we moved quickly to maximum height, slowing near the top without experiencing a jarring stop. Multiple boom functions were handled smoothly with no discernable slowing.

Other design improvements include active oscillating axle, redesigned control box labels on top and bottom panels, and hard hydraulic lines where possible. In another move to eliminate service trouble spots, the former shotgun-cylinder boom assembly was redesigned as a single-cylinder boom assembly with sequencing cable system. This, according to Genie, not only reduces boom weight, but also is less costly to inspect and repair.

Virtual pivot assembly (above) keeps boom weight over the chassis' center of gravity. Single-cylinder boom design (inset) reduces boom weight and lowers service and repair costs.

Genie has specific weight goals as the axle and boom configuration were designed, says product manager Phil Harvey, so Genie reduced horizontal reach by 11 inches. "Our customer surveys indicated that less machine weight was more important than losing inches in reach," Harvey says. The new models weigh about 2,200 pounds more than previous versions.

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Basic Specifications

	S-80	S-85
Platform Height	80′	85′
Horizontal Reach	71′6″	76′6″
Lift Capacity	500 lb.	500 lb.
Platform Rotation	160 degrees	160 degrees
Weight (4WD)	35,500 lb.	38,000 lb.

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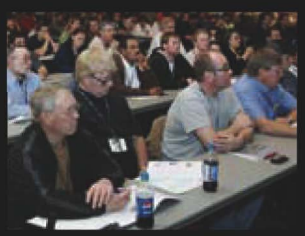


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By KATIE WEILER, Managing Editor

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TrynEx

A new product division of TrynEx, TurfEx introduces its line of commercial-duty spreader attachments designed to mount on compact service vehicles such as utility tractors, riding mowers and all-terrain vehicles for the consistent distribution of materials. Consisting of six models, the TurfEx mountable spreader line offers capacities of 3, 7 or 12 cubic feet, in either electric or PTO drive. Weather-resistant, variable-speed controllers are standard for all models, except the TS300, on which it is optional.

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Construction Lifters

The adjustable Load Lifter is a crane attachment. Lifting bail adjusts to the correct center of gravity for handling different sized loads. The throat opening adjusts for different load heights. Tri-adjustable model features adjustable fork spread. Auto-return bail hangs level when empty. It is available in 1- and 2-ton capacities.

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Hilti

Cutting and grinding with an all-purpose tool isn't the best choice for every application, says Hilti, in introducing the DCH 230 and DCH 300 electric diamond cutters. With a 2.6-kilowatt motor, the DCH 230 and DCH 300 reach depths of 3.4 and 4.7 inches, beating their competitors — conventional angle grinders — that both cut and grind, but only reach depths of about 2.25 inches, says the company. The Hilti electric diamond cutters feature overheating and overloading protection, while also providing the added safety advantage of counter-blade rotation, guiding the tool away from operator's body during use.

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TrynEx

With 60- and 72-inch mainframes, respectively, two new Groom 'N' Sweep broom attachment models have been introduced by the TurfEx division of TrynEx. Each featuring eight brush rows for aggressive cleaning and grooming action, the Groom 'N' Sweep models are designed with no moving parts, eliminating the cleaning and lubrication of sprockets and bearings associated with rotary-style brooms. The push-broom action reduces dust and flying debris, protecting the operator, equipment and environment while at work in wet and dry material in both forward and reverse.

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Thomas Grinding

The Stump Eater stump-grinding attachment comes in models SG110-32 and SG110-44. Self-powered units attach to excavators and use a Sandvic Dura Disk II cutting system. On the larger SG250-44, disc speed is 420 rpm with engine speed at 2,200 rpm. On the smaller unit, disc speed is 487 rpm at 2,200 rpm.

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Hilti

With the 36 V 3.3 Ah CPC Li-Ion battery, Hilti says the WSR 36-A is the highest-capacity cordless reciprocating saw on the market. It is designed for cutting pipe, strut, threaded rod, steel studs and more. Built-in Hilti Active Vibration Reduction is said to reduce vibration by up to two thirds. It also offers six variable speed settings.

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Lincoln Electric

Lincoln Electric upgraded its Power MIG 215XT and 255XT welders. Model 215XT is now spool-gun ready and is compatible with the company's Magnum 100SG spool gun. Model 255XT has been given timer functions, which add a four-step interlock, spot mode, adjustable run-in speed, and adjustable burnback time.

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OPW Fuel Management Systems

The Petro Vend K800 Hybrid fuel-control system is now available with the FSC3000 fuel-site controller built in. Thanks to the integrated FSC3000, the K800 Hybrid can connect via Bluetooth to a host computer, allowing operators to wirelessly update card files, change their site configuration, and transfer other data at distances of up to 320 feet. It also stores transaction data and vehicle records, including fueling restriction information. The K800 Hybrid can control up to four mechanical dispensers.

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Firestone Industrial Products

Heavy-duty Level-Rite air spring suspension helps level the front end of 2003 to 2008 Dodge Ram 2500/3500 4x4s that carry a winch, snow plow, Texas Style bumper or any other configuration that puts extra weight on the front of the vehicle. Level-Rite pairs a reversible-sleeve air spring with a high-performance Bilstein monotube shock absorber. It is designed to reduce suspension fatigue by preventing factory torsion bars from sagging under heavy loads.

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Motorola

The Motorola Adventure V750 "push-to-talk" phone now leverages the speed of an evolution-data-optimized network developed by Verizon Wireless in conjunction with such business-friendly, location-based Verizon services as VZ Navigator and Field Force Manager. With VZ Navigator, customers can get audible maps, turn-by-turn directions and location information to more than 14 million points of interest that customers can share with others. Field Force Manager gives Verizon Wireless customers a resource management tool that provides the ability to locate, monitor and communicate with mobile field workers – right on their mobile devices.

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Thomas Grinding

The SS-200 rumble-strip grinding machine is a skid-steer attachment for asphalt pavements. Shoulders, centerlines and transverse rumble strips can be ground, as well road planing to depths of 1-1/4 inches. Attached via universal quick disconnect, the tool requires a minimum flow of 35 gpm. Warranty is one year.

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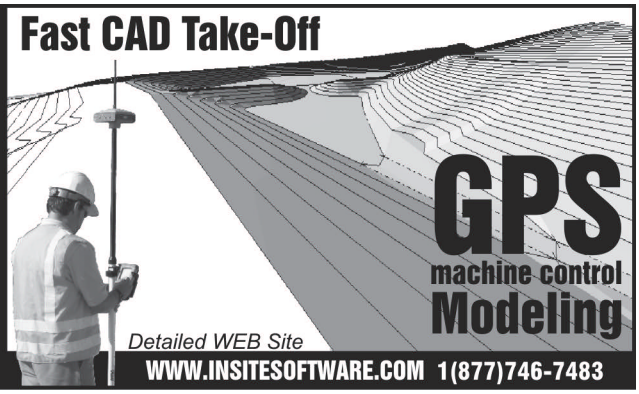

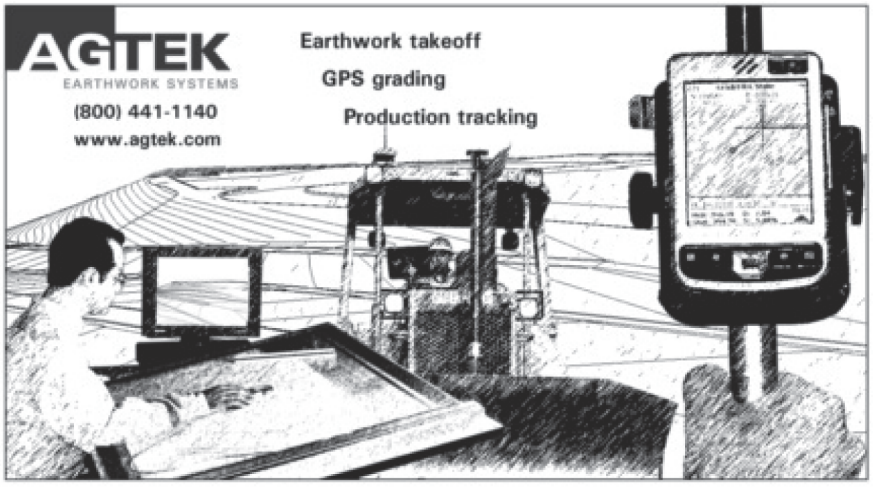

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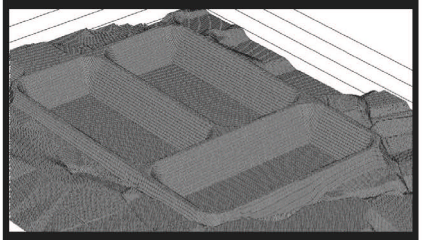

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By KEITH HADDOCK, Contributing Editor

Dynahoe Loader Backhoe

The Hy-Dynamic Co. took the loader-backhoe concept to the extreme with some of the largest ever built, but their niche market was overtaken by the hydraulic excavator

Today's loader-backhoes originated in the early 1950s when farmers and small contractors wanted a low-cost, multi-purpose excavating and loading machine. Light-duty loader buckets had been mounted on agricultural tractors since the 1920s, but following hydraulic technology advancement in the 1940s, manufacturers began supplying tractors with a loader in front and also a backhoe at the rear. The idea was a phenomenal success and it wasn't long before manufacturers began to offer integrated units built from the ground up as digging machines, and not farm tractors carrying digging attachments.

Model A Dynahoe was one of the first backhoe loaders produced by the Hy-Dynamic Co. in 1959.

As a newcomer to the market in 1959, the Hy-Dynamic Co. of Lake Bluff, Ill., introduced the first model of its legendary Dynahoe line of loader-backhoes. The Dynahoe Model A was equipped with a Continental F-244 gasoline engine developing 65 horsepower, and the Model AD was offered with a 65-horsepower Continental HD-277 diesel engine. Maximum digging depth was 13 feet and backhoe loading height was 12 feet. Operating weight for either model was 13,000 pounds. Even this early design sported a neat, efficient backhoe linkage, integrated design and massive frame.

Hy-Dynamic upgraded its Dynahoes in 1966 and launched a new range of machines with 3-digit model designations with the first two digits indicating digging depth in feet. The new lineup covered popular sizes from the model 140, at 90 horsepower and 14-foot digging depth, to the four-wheel-drive model 190-4, at 126 horsepower and 19-foot digging depth. Even larger machines were to follow.

Most loader-backhoes of the 1960s and 1970s, although capable of performing a multitude of tasks, were lightly built and unsuitable for heavy excavation. But the unique Dynahoe was heavily built from the ground up as an excavating machine, the largest of its type on the market. The average loader-backhoe in the early 1970s was two-wheel-drive, could dig from 14 to 17 feet deep, carried an 80-horsepower engine, and weighed approximately 10 tons. In contrast the largest Dynahoe, the four-wheel-drive 200-4 introduced in 1968, boasted a digging depth of 20 feet, carried a 160-horsepower engine, and weighed 16 tons.

Although not selling in such huge quantities as the smaller competitors' machines, the Dynahoe served a niche market and garnered sufficient sales to maintain production. In 1971 the Hy-Dynamic Co. became a division of Bucyrus-Erie, but the products continued. The acquisition took place when Bucyrus-Erie's Construction Equipment Division was at the height of its activity and demonstrated the company's desire to capture all segments of that market. Under new ownership the products were updated and the Dynahoe name continued to identify the heaviest loader backhoes on the market.

As Dynahoe sales dwindled in the 1980s, largely as a result of the upsurge of 360-degree hydraulic excavators, Bucyrus-Erie decided to concentrate on its large surface mining equipment and sell its entire Construction Equipment Division. Consequently, in 1985, manufacturing rights and designs of the Dynahoe were sold to Northwest Engineering, which established a new company Bucyrus Construction Products (BCP) based at Erie, Pa. The following year BCP became a division of Terex Corp., and under this ownership, Dynahoe production survived until the early 1990s.

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