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Information.

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packs extra muscle



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E-Series Evolution

Cat's next-generation
backhoe-loaders
feature hydraulic
upgrades...and more
p. 30

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FEATURES

COVER STORY: Field Report

30 "Thumbs Up" for Cat's New E-Series

Caterpillar's E-Series backhoe-loaders, which replace the D-Series machines launched in late 2000, have a long list of design enhancements and, according to Caterpillar, also are more productive at basic earthmoving tasks. We take a first-hand look at the design and performance of an E-Series model – the 420E IT.



HANDS-ON TRUCKING

39 Volvo's VT 800 Heads Right Down Your Alley

Truck editor Tom Berg travels to Volvo's Greensboro, N.C., headquarters to drive the company's new VT 800. The truck features a big engine, big nose, and a modern rendition of "large-car" styling that should please drivers and image-conscious fleets.

The truck is aimed at heavy hauling and other construction-oriented trucking tasks that require extra muscle.



SPECIAL REPORT

47 Asphalt Products Take Center Stage

The World of Asphalt 2006 Show & Conference will take place March 13-16, 2006, in Orlando, Fla. There will be more than 200 exhibitors showcasing new products on more than 55,000 square feet of exhibit space. Here is just a sampling of what you'll find on the show floor.



BUYING FILE

56 Hot Markets Keep Asphalt Pavers Bubbling

There were nine manufacturers selling commercial asphalt pavers (under 19,000 pounds) in North America in September 2002. Within three and a half years, four of those names have changed. The strong housing market continues to fuel demand for these machines, and big-paver technology is trickling down.



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Foundations for Decisions

Construction fleets vary tremendously, and it is on the edge of impossible to cast broad conclusions about their management. Yet as much as the subscribers to *Construction Equipment* vary, we believe certain core principles benefit an equipment manager whether the fleet operates in a mine, works under public control in a government agency, or labors in the hands of an entrepreneur who uses a few machines.

As we've talked with equipment managers during our Construction Equipment Institute or in presenting any of our research reports, we're struck by the diversity in the levels of sophistication among managers when it comes to tracking machine data.

Recently, a discussion of rental brought this idea of data collection into stark relief. Rental is a viable option, with nearly one-quarter of the machines in the equipment universe on short- or long-term rental. Among the 28 machine categories we've tracked over the years in our Universe Study, this percentage has stayed between 20 and 23 percent.

According to *Construction Equipment's* Rent/Lease/Buy research, almost 90 percent of rentals are executed to meet a short-term need. Rental can provide a cost-effective and efficient method of accomplishing an operation's goals. The equipment manager is charged with deciding which acquisition method suits the situation.

Sophisticated managers recognize the options: outright purchase of new or used machines, leasing arrangements, or rental agreement both short- and long-term. The correct decision directly affects the operation's bottom line, whether it is measured in tons of coal per hour, effective use of tax dollars, or year-end profits.

To make the correct decision, equipment managers need three pieces of information, and each depends on the one upon which it stands. First, the fleet operation must track data over time. Second, this historical data must be configured into owning and operating costs. Finally, management must mold these costs into equipment-acquisition strategies that best serve the organization's financial goals.

Equipment that is not managed in the context of this information could potentially become a liability rather than an asset. Equipment that should be used to contribute to the goals of the organization will instead become an impediment to those goals.

Managers, small fleets and large, private and public, must know these measures. If they don't, they should make 2006 the year they learn them.



Rod Sutton, Editor in Chief

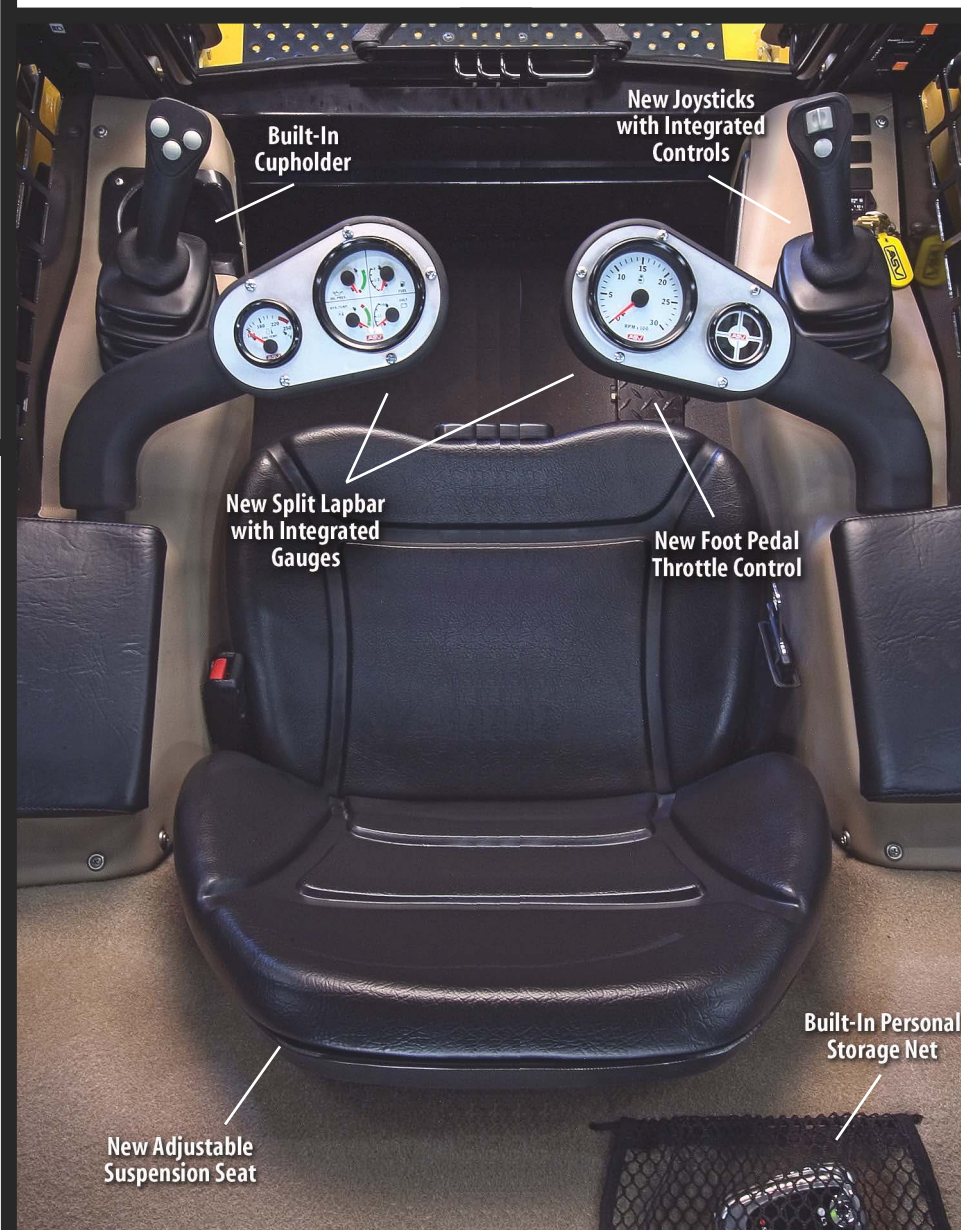
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MARKET WATCH

By KATIE WEILER, Managing Editor

We're making it quicker for you to obtain more information on products by going to ConstructionEquipment.com/info. Sign up for our monthly Market Watch eNewsletter at ConstructionEquipment.com

▶ JLG

A new line of compact telehandlers includes Model G5-19A with a maximum capacity of 5,000 pounds and the G6-23A with 6,000 pounds. G5-19A lifts up to 19 feet with a forward reach of 10 feet 4 inches. A mechanical quick switch enables fast attachment changes. Powered by a 100-hp Deutz diesel, the telehandler has four-wheel drive for 45-percent gradeability.

For more information, visit ConstructionEquipment.com/info



◀ New Holland

Marking a 40-year legacy that began with the Ford dedicated tractor loader backhoe introduced in 1966, New Holland announces five new backhoe-loaders, rated from 95 to 110 gross horsepower. The B95 and B95TC (tool carrier) models are in the 14-foot size class, and the B95LR (Long Reach), B110 and B115 are in the 15-foot size class. The B95LR is the base B95 model with the same stick as the B110, making it a 15-foot machine. Both B95 derivatives offer bucket breakout force improved by 8 percent.

For more information, visit ConstructionEquipment.com/info



▶ Caterpillar

Four compact-radius models have been added to Cat's C-Series mini-excavators: 303C CR; 303.5C CR, 304C CR and 305C CR. The 305.5C is a new model. Higher engine powers have been added across the range, including turbos on the 303.5 C CR and 305C CR. An angle blade option is available, 25 degrees in each direction.

For more information, visit ConstructionEquipment.com/info



▶ Pettibone

Pettibone co-developed a new axle for its PrecisionSteer system on all 6,000-, 8,000-, and 10,000-pound telehandlers to meet the demands of four-wheel steering. The Carraro 26.43 axle is a response to industry concerns over tire wear. Pettibone says manufacturers have sacrificed proper wheel alignment to allow higher turning angles and improve maneuverability using axles originally created for two-wheel steer on backhoe-loaders. PrecisionSteer is said to cut the steering error by half.

For more information, visit ConstructionEquipment.com/info



Market Watch



Caterpillar

E-Series backhoe-loaders replace the D Series with new flow-sharing hydraulic valves to improve multi-function performance. Cat says the 420E, with a backhoe dig depth of 14 feet 4 inches, generates 14 percent more stick breakout force and is about 10 percent more productive. Lifting, breakout and swing forces are increased in the 430E, with 15 feet 5 inches of dig depth. Both have toolcarrier counterparts. The 14 foot-4 inch 416E offers either 74 or 89 horsepower.

For more information, visit ConstructionEquipment.com/info

Allen

Pro 900 edger riding trowel finishes within $\frac{5}{16}$ inch of obstructions. Two rotating guard rings allow finishers to edge at their speed. Powered by a 27-hp Kohler engine, the rider has two 36-inch-diameter, four-bladed rotors.

For more information, visit ConstructionEquipment.com/info



John Deere

The 240D LC excavator has a totally redesigned cab, including fully adjustable suspension seat, extra legroom, 47 percent more right-hand window glass, and larger roof-hatch area. Shorter pilot controls require less effort, and a completely redesigned multi-function monitor has easy-to-read gauges, warning lights and icons. A faster hydraulic system boosts productivity by 8 percent, Deere says, with improved drawbar pull, swing torque and maximum flow.

For more information, visit ConstructionEquipment.com/info

The Perfect





New Holland

W50TC and W80TC compact wheel loaders have increased engine and hydraulic power. W50TC has a 55-hp Deutz diesel, operating weight of 10,173 pounds, and a bucket capacity of 1 cubic yard. The W80TC has a 75-hp Deutz; a 1.44-cubic-yard bucket capacity, and weighs 12,727 pounds. New boom design features one lift cylinder and one bucket cylinder.

For more information, visit ConstructionEquipment.com/info

Putzmeister

New 43Z-Meter concrete boom pump has vertical reach to 138 feet 5 inches



using five boom sections in a Z-folding configuration. A compact outrigger provides a spread of 26 feet 1 inch in front and 29 feet 6 inches in rear. Front outriggers diagonally telescope out; rear one swings out for easy setup regardless of space restrictions, the company says. All sections have 5-inch delivery line.

For more information, visit ConstructionEquipment.com/info



Terex Roadbuilding

Two new mid-range pavers, the two-track SF3502B and four-track SF3504B, rely on massive frame section construction to deliver minimal deflection paving over their entire 12- to 33-foot paving widths and challenge the industry's toughest Profile Index (PI) and International Roughness Index (IRI) standards. Terex | CMI's proven Hydra-Mation grade controls feature only two moving parts. The controls set up quickly and come with a five-year guarantee.

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Hamm

HD 8 and HD 10C tandem rollers mark the company's

entry into the 3,307-pound market. The HD 8 has a drum width of 31 inches. The HD 10C ("C" is for "compact") has a drum width of 39 inches. In both machines, the drums are suspended from one side and offset by approximately 2 inches. This configuration extends the working width to allow the machines to work up close to walls and other obstacles. The machines feature a low center of gravity, a height of 7 feet (with ROPS) and power rating of 22 horsepower.

For more information, visit ConstructionEquipment.com/info

Perkins

Tier 3 400D Series engines offer the same package size and performance and power density of the Tier 2 predecessors. Noise reductions have improved up to 3 dB(A), with the option of lowering noise levels by an additional 2 dB(A) with a non-standard low-noise fan. Ratings range from 40 to 67 horsepower. The company has improved engine cooling, resulting in smaller cooling packages.

For more information, visit ConstructionEquipment.com/info

Case

The latest in the CX range of excavators, the CX700 fills the gap between the CX460 and CX800 and is the first Case excavator to have an electronic-controlled engine to Tier 3 specifications. The electronic engine-management system constantly monitors the temperature in the cooling, oil, air-inlet and fuel systems. Fuel injectors are adjusted to give maximum fuel efficiency and reduce emissions. Cooling-fan speed is also adjusted to maintain optimum engine temperatures. The machine is rated at 463 horsepower and has an operating weight of 152,000 pounds.

For more information, visit ConstructionEquipment.com/info

Liebherr

The two-axle LTM 1040-2.1 features a maximum load capacity of 88,185 pounds and joins the range in addition to the LTM 1030-2.1. The telescopic boom measures 115 feet.

A 31-foot-long folding fly jib is available for attachment and extends lift height to 148 feet and working radii to 128 feet. Up to four working movements can occur simultaneously; load-sensing hydraulics ensure accuracy.

For more information, visit ConstructionEquipment.com/info



Gehl

The SL 4240 features an operating load of 1,400 pounds. The 46-hp machine has low fuel consumption and low noise emission. A larger radiator and hydraulic oil cooler provide increased engine and hydraulic-oil cooling. Like the other 40 Series machines, the SL 4240 is designed with heavy-duty axles and the Power-View boom, which provides an overall view and high breakout forces.

For more information, visit ConstructionEquipment.com/info





▲ Hitachi

The company introduced the first of its Zaxis-3 excavators — the 250-3 and 350-3 — in January 2006 and plans to show the Zaxis 280-3, 520 LCH-3 and 670 LCH-3 at Intermat in March. The excavators feature Isuzu engines and a hydraulic system that allows greater control over the simultaneous operation of arm and boom. Thanks to a redesigned recirculation system, arm and boom operating speed can be increased by as much as 15 percent, and forces for traction, digging and swing torque have also increased, says Hitachi. Rear-view camera comes standard.

For more information, visit
ConstructionEquipment.com/info



▲ Grove

The GMK5275 crane features five axles and has a capacity rating of 275 tons with a 224-foot main boom. Capacity on the fully extended boom is 15.4 tons. The machine features a new, lighter design with hydraulic-electronic steering. This "steer-by-wire" system also reduces tire wear and improves drive quality. The Mercedes engine is rated at 563 horsepower.

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— Joe Schuster, Equipment Manager, Emery Sapp & Sons, Inc.



Emery Sapp & Sons, Inc. is one of Missouri's largest heavy construction companies. With over 250 machines spread out over the entire state, the company faced a couple of big issues: maximizing utilization and keeping the fleet up and running at peak levels.

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With GlobalTRACS installed, Joe and his team could immediately see the "big picture" on their entire fleet — where each piece was located, how much it was being used, and whether it needed service.

Before GlobalTRACS, this data had to be captured manually. But the records were incomplete, and sometimes maintenance crews couldn't even locate equipment they were supposed to service.

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"We've now set up a much more effective preventive maintenance program at 250-hour intervals," Joe says. "We're seeing big improvements in uptime and equipment performance."

There are also improvements on the production side.

"GlobalTRACS helps us make better decisions about where to send equipment, so we're saving money on rentals," he says. "Plus, GlobalTRACS' geo-fencing capability helps keep equipment secure around the clock."

Joe really likes how GlobalTRACS performs on the balance sheet. "The system will pay for itself very quickly in terms of the money we're saving."

"What can I say? GlobalTRACS just makes my job a whole lot easier."



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INDUSTRY NEWS

Comment on Truck-Braking Proposal by April 14

Proposals by the National Highway Traffic Safety Administration to shorten heavy-truck stopping distances could require more expensive brakes

on construction rigs. They would affect only truck-tractors for now.

NHTSA would like to see heavy truck-tractors stop in 20 to 30 percent shorter distances. Most tractor/trailer

combinations could probably meet shorter stopping distances with larger S-cam drum brakes now available as options. But heavy haul tractors like those that transport massive machinery might need more costly air disc brakes.

The federal agency will issue a final rule after taking comment from the industry. Anyone wishing to com-

ment on this Notice of Proposed Rule Making, published in the Dec. 15 Federal Register, must do so by April 14. First, download a copy of it at NHTSA's website, www.nhtsa.dot.gov/, and then find the instructions for commenting on page 74279. The

agency requests that any objections to its proposals be accompanied by practical alternatives. In commenting, refer to Docket NHTSA-2005-21462.

For the full story, see ConstructionEquipment.com/brakes.

— Tom Berg



Wide S-cam drum brakes (right), which cost a few hundred dollars more than standard drums for a three-axle tractor, will be enough for most tractors to meet the proposed stopping distances.

RESOURCES

Train Operators with PC-Based Simulator

Vista Training has introduced a PC-based Hydraulic Excavator Personal Simulator. It puts an operator at the controls of an excavator at a virtual construction site and is available in English and French (Spanish coming soon). Twelve simulation lessons progress with increasing difficulty. There is a menu to switch between SAE and backhoe-loader joystick patterns. Data is tracked to allow comparison to benchmarks. For more information, call 1-800-942-2886, ext.305.



MANUFACTURER NEWS



Blaw-Knox Celebrates 75 Years

Ingersoll Rand announced that this year marks the 75th anniversary of Blaw-Knox products in the asphalt industry. In 1931, Blaw-Knox introduced the Ord Finisher, which was the first asphalt paver constructed with ends resting on forms that could be raised or lowered. The company said that technology made it possible for the use of multi-lifts without resetting the forms. Ingersoll Rand is looking for customers to share information about the oldest Blaw-Knox paver in operation and/or in existence and the most unique application or jobsite in which a Blaw-Knox paver was used. Submissions should be sent to the anniversary website at ir-bk75.com.

MANUFACTURER NEWS

Gehl Sponsors Rahal Letterman Racing



Gehl hopes to see young Graham Rahal on the podium in this year's Champ Car series as he was last year driving his Andersen Walko Star Mazda car at the SCCA National event held at Road Atlanta.

Gehl will sponsor 17-year-old Graham Rahal's effort to win the Mi-Jack Conquest Racing Champ Car Atlantic Series. Gehl will be an associate sponsor on Rahal Letterman Racing's cars at the Grand Prix of St. Petersburg, the Indianapolis 500 and the Indy-

Car Series race at the Milwaukee Mile.

"We pride ourselves ...on partnering with like-minded companies that are leaders in their respective fields," said Bobby Rahal, three-time CART champion and 1986 Indy 500 winner. "The Gehl Co. motor-sports program has

been in existence nearly 20 years. They were looking at opportunities to expand their program, and the opportunity to partner with a young driver like Graham and to be involved as an RLR partner at Indianapolis, St. Petersburg and Milwaukee proved to be the right mix."

Managers Digest

Choose from the list of categories and subcategories to find all information the site has to offer on a specific type of equipment.

Backhoe Loaders >=14 feet

Introductions
Komatsu



The Utility Division of Komatsu America has refined models in its backhoe-loader line with addition of available joystick controllers for

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feet Specification
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Website: www.casace.com
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Products (22 found)

Backhoe Loaders, Greater than/equal to 14 ft.
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Crawler Tractors
Directional Boring Equipment
Skid Steer Loaders
Telehandlers
Trenchers
Vibratory Plows
Wheel Loaders, Greater than 100 hp
Wheel Tractors

Dealers (22 found)

Neff Rental Union City CA
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Read information on maintaining and managing fleets, as well as magazine archives, in the horizontal-naviga-tion bar.

From Find Dealers & Manufacturers in the horizontal-naviga-tion bar, drill down to manufacturer contact information, the products made by the company, and dealers as available.

Manufacturer	Power Trac, inc.	YANMAR DIESEL AMERICA Corp	Power Trac, inc.	Caterpillar	John Deere
Product Link	PT-2460-T3349	CBL40	PT-2425-T1278	420D IT	M68 M47
Product Model Number	PT-2460-T3349	CBL40	PT-2425-T1278	420D IT	M68 M47
Product Name	Loader Backhoe	Loader Backhoe	Loader Backhoe	Loader Backhoe	Load
Backhoe Bucket Width Min	12 in		9 in	12 in	12 in
Backhoe Bucket Width Max	18 in		12 in	36 in	36 in
Dig Depth	9 foot	10 foot	6 foot	14.42 foot	9.5

Shop-Overhead Webinar at Redesigned CE.com

ConstructionEquipment.com will host a free webcast on how to use benchmarks to judge shop overhead. Exclusive research gives insight into the numbers, perspective on their meaning, and specific ways to use benchmarks in your shop.

Rod Sutton, *Construction Equipment's* editor in chief, will lead the discussion. Joining him will be Mike Vorster of Virginia Tech, who teaches the Construction Equipment Institute and writes "Equipment Executive"; and Preston Ingalls of

TBR Strategies, a consultant specializing in improving maintenance reliability.

The webcast will include:

- Presentation of the *Construction Equipment* benchmarks
- Strategies/best-practices from firms in construction and other industry sectors
- Ideas on how to track costs
- Strategies on how to use benchmarking to reduce maintenance costs and boost overall company profitability

The webcast will take place April 26,

2006, from 11 a.m. until noon CST. To register, visit ConstructionEquipment.com.

CE's website redesign

ConstructionEquipment.com — the online resource for equipment professionals — relaunched in January with a new design. Above are screen captures that illustrate how to find the information you need for equipment purchases, maintenance and management, as well as the latest on product introductions.



THINKING OUTSIDE THE LINES



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MANUFACTURER NEWS

JLG Sells Gradall Excavator Line to Alamo Group

JLG Industries has sold the entire Gradall excavator line to Alamo Group for \$39.4 million. According to a press release, the sale includes the 430,000-square-foot manufacturing facility in New

Philadelphia, Ohio, and related equipment, machinery, tooling and intellectual property. The companies have a supply agreement covering the components for JLG's telehandlers that are currently manufactured at the New Philadelphia facility.

"Divesting this product line is consistent with our strategy of focusing our efforts on

our core access business and the proceeds from the sale will be used to continue implementing our growth strategy," said Bill Lasky, JLG's chairman of the board, president and CEO. "The Gradall excavator is a well-known and highly respected niche product line, but it is not a core business for JLG." Management of the

Gradall operation will be from Gradall veterans who are already on site. Michael Haberman, who has been with Gradall for more



Michael Haberman

than 18 years, has been named president.

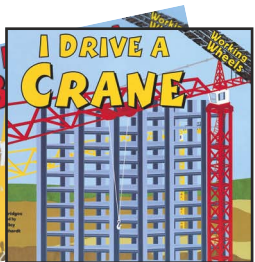
"I am very excited about the future of Gradall with the Alamo Group," Haberman said. "Gradall has been an important corporate citizen in this community for over 55 years...and it's great that the positive Gradall impact will continue and grow even stronger again."

RESOURCES

Children's Books Spark Equipment Interest

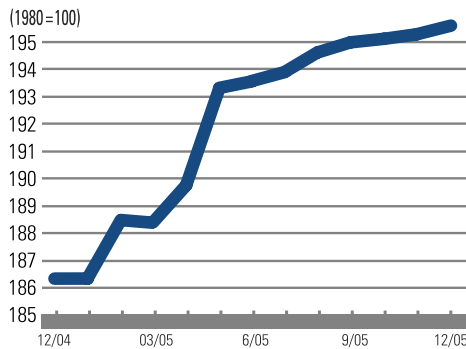
Construction Equipment worked with publisher Picture Window Books to consult on two new equipment books for children entitled, "I Drive a Backhoe" and "I Drive a Crane." They accompany several new books in the publisher's "Working Wheels" Series of books.

Each book has a retail price of \$16.95 or they can be purchased as a set of six or 12 titles. For more information, visit the website www.PictureWindowBooks.com.



STATUS & FORECAST

Construction Equipment Price Index



Source: U.S. Department of Labor

Construction equipment price inflation slipped to a 1.5-percent annual pace at the end of last year after increasing more than 9 percent in the previous year. The recent slowdowns were due to a world surplus of steel capacity and thus weak pricing, slower cement-price increases with the return of China to the export market, and lower capacity shortage premiums collected by equipment manufacturers and their distributors as order backlogs stabilized last summer.

Have you signed up for *Construction Equipment's* monthly economic update? All the economic indicators affecting the equipment market can be e-mailed to you each month. Visit ConstructionEquipment.com to sign up.

SAFETY

Ditch Witch Offers Safety-Training Program

A new training program called Groundbreaking Safety promotes the safe operation of trenchers, plows, horizontal directional drills, mini skid-steers and mini-excavators.

The program features two products. The first is a free DVD with three safety videos on trenchers, HDD equipment and compact utility machines. The second is a complete safety-training program that includes an interactive presentation, leader's guide to help facilitate training sessions, and a test to record what participants have learned. For more details, visit www.ditchwitch.com.

Delivering More

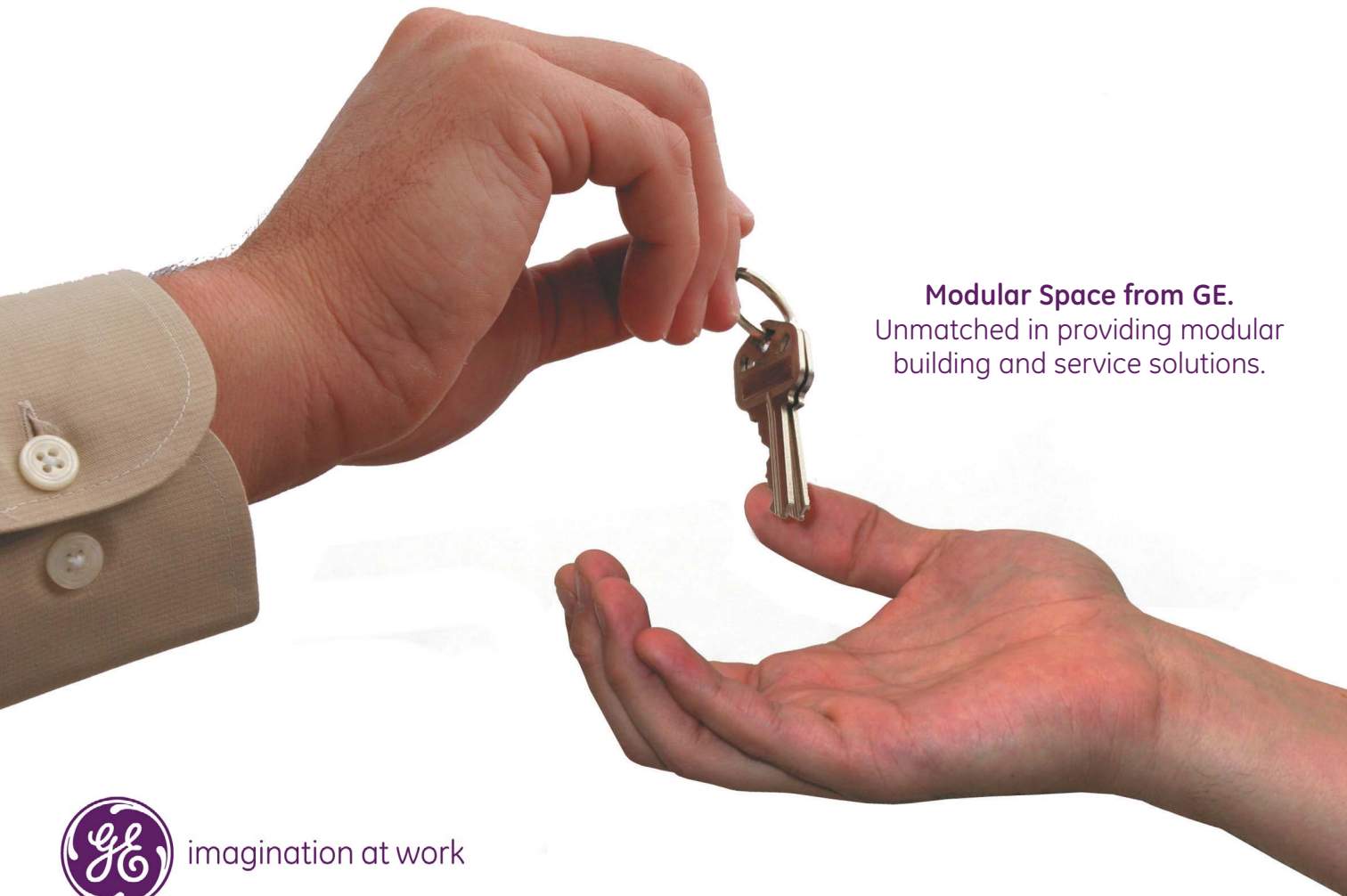


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www.JohnDeere.com/brown-noser

“Thumbs Up” *for Cat's*

The hydraulic-thumb mounting structure on every new E-Series backhoe-loader is just one item on a long list of significant design changes

By WALT MOORE, Senior Editor



The new Caterpillar 420E, with a Tier-II-compliant 3054C DIT diesel engine rated at 89 net horsepower, uses modified transmission and rear-axle ratios to increase travel speed to 25 mph (up from 20.4 mph for its D-Series predecessor).

Basic 420E IT Specifications

Net horsepower	89
Operating weight, nominal (lb.)	15,474
Backhoe dig depth, standard (ft.)	14.3
Loader capacity (cu. yd.)	1.25
Hydraulic pressure, main (psi)	3,611
Hydraulic flow (gpm)	43

E-Series Example List Prices:

416E fully functional w/HD bkt.	\$62,000
420E w/cab, A/C, e-stick, 4WD, HD bkt., cwt.	\$93,200
430E IT w/all options, including hyd. thumb, fork carriage/tines, MP bkt., coupler w/36-inch bkt.	\$137,000

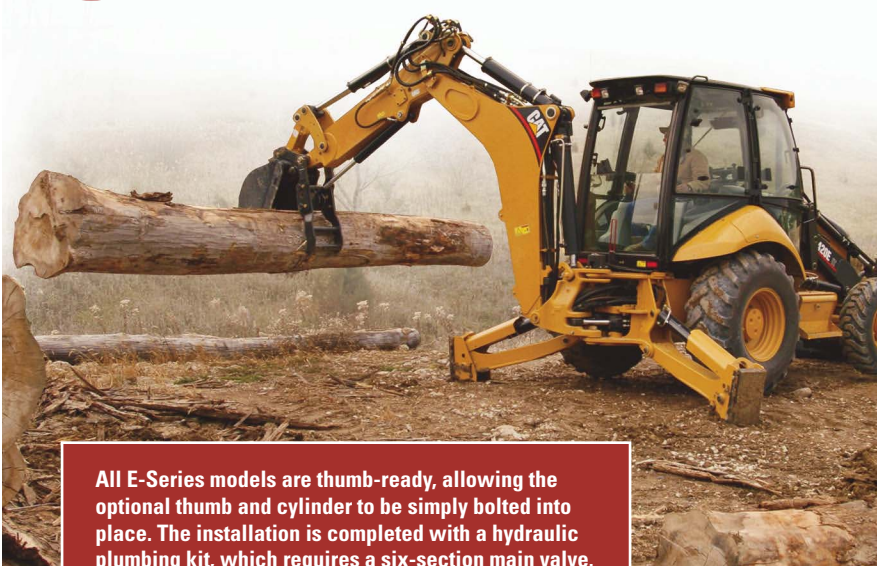
REPORT FIELD REPORT

New E-Series

When Curt Maas clamped an immense log — about 18 feet long and 20 inches in diameter — between the backhoe bucket and the hydraulic thumb of a new Cat 420E IT, we had just the fleeting thought that maybe he was kidding. The log seemed to us an impossible load for the machine. But the new Caterpillar made the lift, swung side-to-side with the log in an iron grip, and all the while, as far as we could tell, remained completely stable.

Maas, a test operator at Caterpillar's Peoria (Ill.) Proving Ground (PPG), spent a couple of days with *Construction Equipment* this past November, along with fellow operator Norm Miller, demonstrating the capabilities and features of the new 420E IT as representative of the company's new E-Series backhoe-loader range. The lineup includes the 416E, 420E and 430E — with the latter two models also available with an integrated-tool-carrier (IT) front end. Standard digging depths are, respectively, 14.3, 14.3 and 15.4 feet.

The E-Series models, which replace the D-



All E-Series models are thumb-ready, allowing the optional thumb and cylinder to be simply bolted into place. The installation is completed with a hydraulic plumbing kit, which requires a six-section main valve.



Contributing to the greater productivity of the E-Series backhoe are new flow-sharing valves, refined torque-limiter system, a boost in main-relief pressure, and linkage geometry that has been tweaked to yield greater mechanical advantage.

Photos: George Pfoertner®

Backhoe Productivity

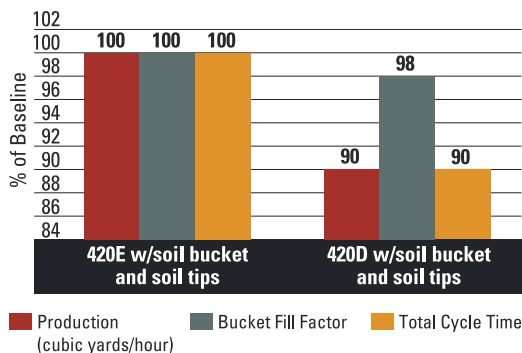
The results of a comparative study conducted by Caterpillar to determine the relative trenching performance of the 420D IT and 420E IT showed the new model to be approximately 11 percent more productive. The greater productivity of the 420E IT resulted from an approximate 9-percent advantage in cycle time and about a 2-percent advantage in its bucket-fill factor, which is the ratio of the bucket's capacity actually used, versus its rated capacity. Much of the 420E IT's production advantage likely results from its new flow-sharing valves, which apportion hydraulic flow more efficiently between backhoe functions.



Both operators agreed that the 420E IT backhoe is a more efficient trencher than that of its D-Series predecessor, with more stick power and the ability to work effectively close to the machine.

Backhoe Productivity Summary

(% Baseline)



Note: A faster cycle time in this plot is indicated by a value of larger magnitude. Thus, the faster cycle time of the 420E IT (7.8 seconds) is shown as 100 percent, while the slower cycle time of the 420D IT (8.5 seconds) is shown as a lesser value. The graphic plot of the numbers noted above have been rounded in material furnished by Caterpillar.

Series machines launched in late 2000, have quite a long list of design changes, compared with their predecessors and, according to Caterpillar, are also more productive at basic earthmoving tasks. The company put numbers to these stated productivity increases by sharing with CE the results of a recent PPG comparison between the 420E IT and its 420D IT predecessor.

During our visit to PPG, operators Maas and Miller, along with the PPG backhoe-loader evaluation staff — Brad Holsapple, Gerry Stewart, Nick Krueger and Elizabeth Baldwin — demonstrated the methodology Caterpillar employs in its comparative testing. They arranged for us to observe the machines running side-by-side in

trenching and truck-loading operations, while Krueger and Baldwin electronically recorded machine performance.

The electronic test-data-collection system the company uses is a computer-based process that allows every cycle of a test machine to be divided into its primary segments for later analysis. During the trenching comparison, for example, times are recorded for digging, swinging/dumping and returning, as well as for time spent repositioning.

To complement this look at the comparative performance of the new model and its predecessor, senior project engineer Jim Joy, from Caterpillar's Building Construction Products Division in Clayton, N.C., met us at the

Peoria Proving Ground to explain the details of the new E-Series design.

Structures, sticks and thumbs

Structurally, the design enhancements of the E-Series, compared with the D-Series, go right to the very backbone of the new machines — the mainframe, which has been modified significantly in four key areas: loader tower, front and rear axle mounts and swing post. According to Caterpillar, these mainframe changes further complement the already-high-strength design of D-Series models. Structural changes at the loader end of the machine include boom arms with a beefier box-section and a heavier torque tube that provides added rigidity to the assembly.

At the backhoe end, the boom has been modified, says Caterpillar, to reduce stress points in heavy-duty applications. Specific changes include one-piece side plates, versus fabricated side plates, larger mounting pins, and the addition of a replaceable wear pad to protect the boom underside from contact with work tools. Another significant change involves the boom nose, which has been reconfigured and strengthened to accommodate a new extendible stick. The boom lock has been redesigned, too, not only to keep the backhoe tighter during transport, but also to more effectively handle the stress of lifting with the stick when the boom is in its locked position.

The new extendible stick is a significant development for the E-Series, says Joy, and has been designed with an "outside slider" configuration. This means, he says, that the outer structure of the stick extends by sliding over a stationary inner structure. By comparison, the D-Series extendible stick pushed out an inner structure from within a stationary outer structure. And to maintain proper fit between the two sections, the new extendible stick incorporates a

Loader Productivity

The results of a comparative study conducted by Caterpillar to determine the relative truck-loading performance of the 420D IT and 420E IT showed the predecessor model to have an approximate 2-percent advantage in cycle time (15.1 seconds, versus the 420E's 15.4 seconds). The new model, however, had a significant (5.5-percent) advantage in its bucket-fill factor, which is the ratio of the bucket's capacity actually used, versus its rated capacity. Thus, the net result in this comparison was an approximate 3.5-percent advantage in production for the 420E IT, compared to the 420D IT.

We asked Nick Krueger, a member of Caterpillar's backhoe-loader evaluation team, about the longer cycle time difference. In his opinion, changes in the torque-limiter system, which yield a more precise split of tractive effort and hydraulic power for the 420E, might trade a small amount of ground speed for overall better performance.

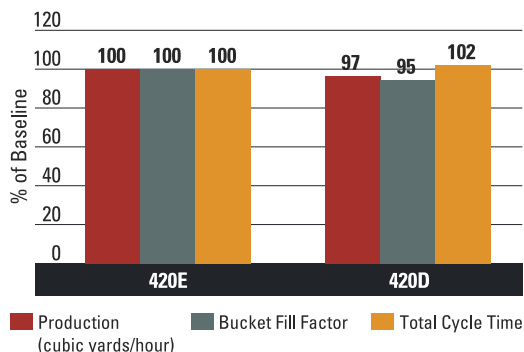
But a more likely reason, he says, were the perfect loading conditions at the site. When the operators were on the 420D, he says, ground conditions allowed them to start raising the boom



An E-Series loader feature that both operators mentioned is the machine's ability to quickly raise the boom without having to neutralize the transmission in short-cycle operations.

Loader Productivity Summary

(% Baseline)



Note: A faster cycle time in this plot is indicated by a value of larger magnitude. Thus, the faster cycle time of the 420D IT (15.1 seconds) is shown as 102 percent, while the slower cycle time of the 420E IT (15.4 seconds) is shown as 100 percent. The graphic plot of the numbers noted above have been rounded in material furnished by Caterpillar.

while still backing away from the pile — in order to have the bucket at dumping height when reaching the truck. But if the ground had been soft underfoot or rough, he says, chances are that the boom could not have been comfortably raised while backing from the pile. This would have meant that the operators probably would have had to disconnect (neutralize) the transmission, somewhere in the cycle, to gain time for boom raise — thus adding to cycle time. But the 420E IT, with faster boom raise, did require use of the neutralizer function.

redesigned system of greaseless wear pads that can be adjusted in about 30 minutes, according to Caterpillar, compared with two hours on D-Series models.

Two rows of serrated gripping teeth on the bottom surface of the new extendible stick's sliding section allow the operator to clamp material securely between the bucket and the stick without risking damage to the stick. But as handy as the gripping teeth might be, they can't match the heavy-duty clamping power and dexterity of an E-Series extendible stick equipped with a hydraulic thumb.

Although the thumb is optional, all

E-Series backhoe sticks, whether extendible or standard, are fitted with thumb and thumb-cylinder mounts to allow bolting on the attachment. (The D-Series could use a thumb only with a standard stick.) A thumb-plumbing kit allows quick installation of the attachment, a process facilitated if the machine is equipped with a six-function main valve from the factory.

Stronger hydraulics

In concept, the design of the closed-center, load-sensing, 43-gpm hydraulic system used in the E-Series is essentially the same as that for the D-Series. But, that said, the E-Series incor-

porates a number of refinements, among them an increase in main-relief pressure to 3,600 psi, up from 3,300 psi in the D-Series.

While the pressure increase results in more available hydraulic horsepower at both the backhoe and loader ends, the new hydraulic system also incorporates features that contribute to easier operation. New thumb wheels near the top of the backhoe joysticks, for example, allow easy control of auxiliary functions — such as the extendible stick and thumb. These controllers replace floor-mounted pedals in D-Series machines and are designed to provide low-effort, precise, proportional control of auxil-



Although the operator's environment on Caterpillar's D-Series backhoe-loaders is difficult to fault, the new E-Series cab is roomier and has a number of added operator amenities, including thumb wheels in the joysticks for proportional control of rear auxiliary functions, a foot pedal for quickly retracting the tilt steering wheel when spinning to the backhoe position, and an in-cab pattern-changer switch.

ary functions — while also providing more foot room for the operator.

Also contributing to ease of operation are the new flow-sharing valves, which automatically proportion hydraulic flow between the boom and stick or between the boom and swing functions to more exactly match the operator's intentions. In essence, says Joy, the flow-sharing valves make multiple-function operation easier to control, which helps less-experienced operators maintain acceptable production rates, and offers experienced operators more precise control and the prospect of higher production.

Caterpillar backhoe-loaders have long used the company's "torque-limiter control," which is basically a system that manages the distribution of engine power between the hydraulic system and the drive train. According to Joy, refinements in this system result not only in enhanced loader performance through a more precise split of engine power between the hydraulic system and drive wheels, but also in a more aggressive backhoe by assuring that maximum engine power is used to develop hydraulic flow.

The operator's station for E-Series models has been completely rede-


signed, featuring a new four-post ROPS configuration that provides more interior space than the ROPS configuration for the D-Series. Overall, improvements to fit and finish in the new cab further contribute an automotive-type environment, which was already apparent on D-Series models.

For E-Series models, the front console has been made narrower to provide enhanced visibility to the loader bucket, and a hood that is lower by 3.5 inches at the cowl further improves visibility. The right-side console has been made more compact, further enlarging interior space, and a foot pedal controller for the tilt steering wheel makes the spin from loader to backhoe positions that much easier.

A significant change for E-Series models is the in-cab switch for easily changing the digging pattern between hydraulic-excavator and backhoe-loader configurations. A two-position electrical switch on the left console

allows the selection. By contrast, D-series models had a pattern-changer control on the left side of the machine's frame, behind the rear tire — obviously not as handy as the E-Series design.

Another cab enhancement of note is the increased performance of the optional air-conditioning system. A larger compressor, 20-percent increase in airflow, and repositioned vents go a long way toward increased operator comfort, says Caterpillar. In addition, the air-conditioning system incorporates easier-accessed filter locations, one in the right inner fender and one in the right console. Both can be cleaned with compressed air.

Combine the amenities of the new E-Series cab with Caterpillar's fresh design for basic structures, hydraulics, power train and utility-enhancing features (like the new extendible stick and hydraulic thumb), and the result is a solid new E-Series platform that should serve the company long and well. 

What the Pros Like About the New 420E IT

Norm Miller: "The E-Series makes very easy directional shifts; the shift takes a little longer, but it's much smoother, more comfortable, and you spill less material. The D-Series had a tendency to shift abruptly."



Curt Maas: "You have a much better view to the loader bucket with the E, because the dash is narrower and the hood is lower. I also like the way the steering column itself pulls back and gives more adjustability."

Miller: "The quickness of the loader-boom lift lets you run a tighter cycle. With the D-Series, you'd have to neutralize somewhere in the cycle to allow time for boom lift, so cycles couldn't be as tight."

Maas: "The flow-sharing valves give the stick a lot more power and speed. Stick performance is far superior on the E-Series, compared to the D, and it makes trenching much more efficient overall."

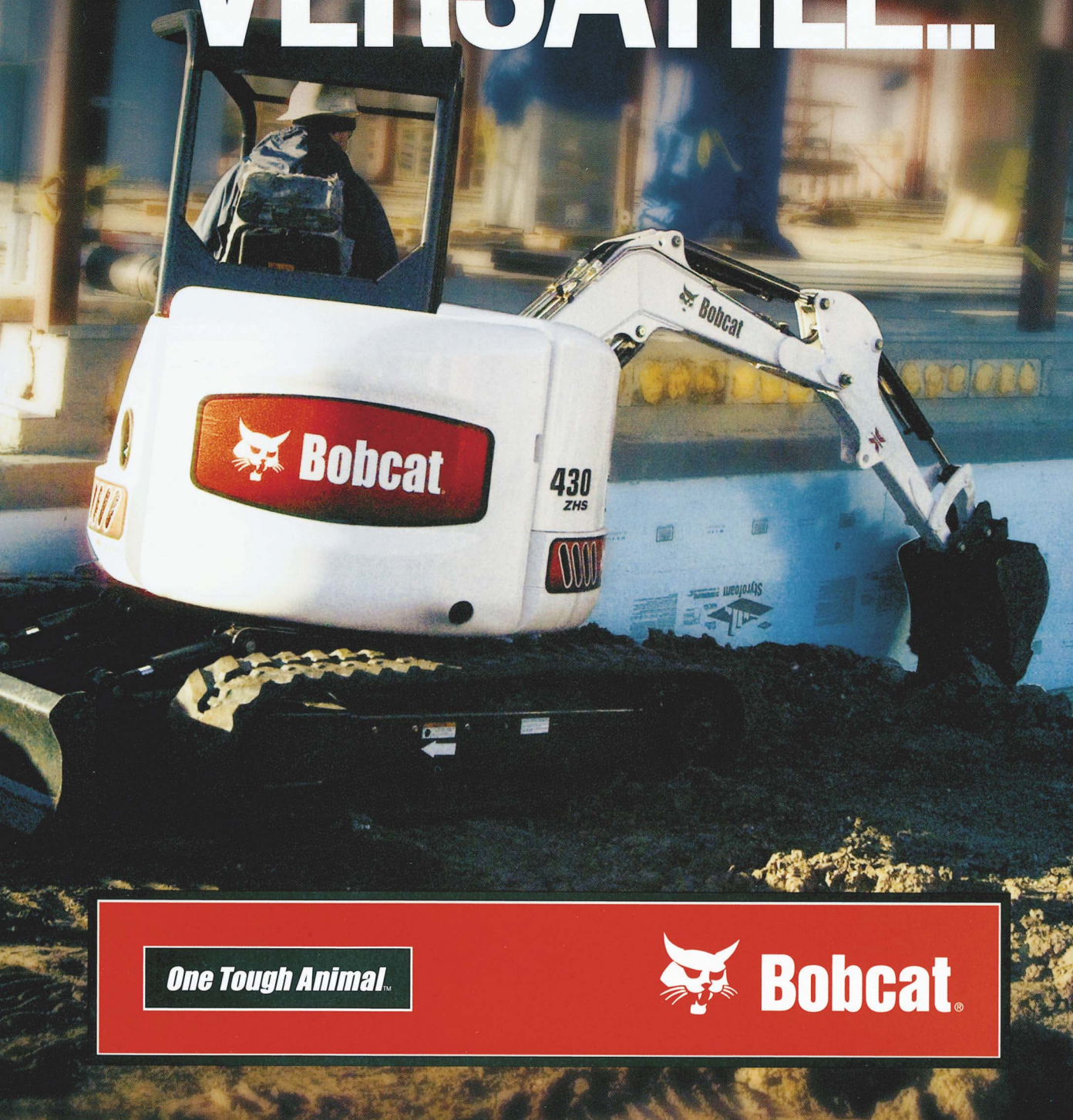
Miller: "The E-Series backhoe has more power closer to the tractor. You can work closer to the machine, and this is an advantage in tight-quarter digging."

Maas: "The E-Series has a dual torque-limiter setting that makes truck-loading superior over the D. It starts in low torque, then shifts to high. There's less tendency to stall, and the system gets the bucket up more efficiently."

Miller: "I like the flatter floor of the new multi-purpose bucket. It's easier to load."

Maas: "The boom is usually the weak link in lifting, but the new lock is built to take the lifting stress."

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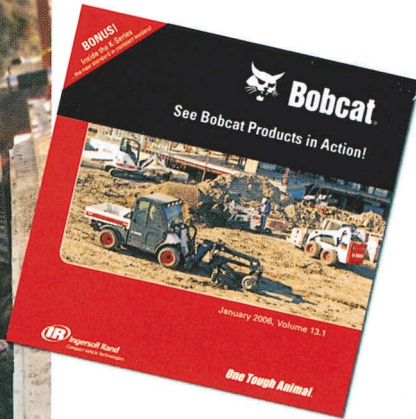
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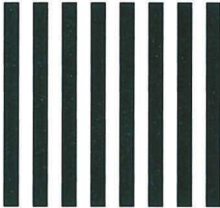
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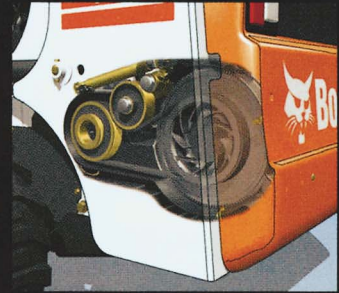
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Volvo's VT 800

Heads Right Down Your Alley

This gleaming heavy hauler is big on style, power and comfort

After years of paring down its model lineup to the freight-carrying VN and the low-volume VHD vocational truck, Volvo Trucks seems intent on slowly expanding its range of offerings. Early last year it brought out the big-nosed VT 880 sleeper-cab highway tractor, which was built around the then-new D16 diesel, and executives hinted the VT series itself would be expanded.

Late last summer they showed what they were talking about: a non-sleeper version of the 880, called the VT 800, also featuring a big engine, big nose, and a modern rendition of "large-car" styling that should please drivers and image-conscious fleets. The VT 800 is aimed directly at heavy hauling and other con-

struction-oriented trucking tasks that require extra muscle.

The first VT 800 was displayed at a truck show in Dallas, but wasn't available for driving until last fall. I traveled to Volvo's Greensboro, N.C., headquarters to get my hands on it. This was the display truck, complete with gleaming "golden amber" paint and bunches of chrome, and it was hooked to a loaded trailer and ready to go.

VT 800's big, shiny nose is appropriate for the big trailer and load that follows. Much of the chrome and bright-metal trim is standard with the VT series.



Hands-On Trucking

TEST SET

Truck: Volvo VT 800 daycab heavy-haul tractor, BBC 133.7 inches

Engine: Volvo D16, displacement 16 liters (994 cu. in.), 550 hp @ 1,900 rpm, 1,850 lbs.-ft. @ 1,000 to 1,600 rpm (1,650 lbs.-ft. in first four gears), with integral engine brake

Transmission: Eaton Fuller RTL018913A 13-speed

Front axle: 13,200-lb. Meritor FF967, on parabolic leaf springs

Rear axles: 40,000-lb. Meritor RT40-160P, w/3.58 ratio, on Volvo Non-Torque Reactive suspension

Wheelbase: 188 inches

Brakes: Meritor Q Plus S-cam w/Meritor Wabco ABS

Tires and wheels: 11R22.5 Goodyear G149 front, G372 rear, on Accuride polished aluminum discs

Fifth wheel: Holland FW35 air-slide

Fuel tanks: Dual 100-gal. polished aluminum

Trailer: Ferree 50-ft. by 102-in. Tri-axle lowboy



The D16 is Volvo's, and North America's, biggest truck diesel. This one is rated at 550 horsepower and up to 1,850 lbs.-ft. of torque, and comes with a quiet and strong integral engine brake.

A long, tall hood is a VT's most obvious feature, and it's needed to house the D16 and accommodate a 1,700-square-inch radiator to cool it. The D16's ratings range from 500 to 625 horsepower, while the optional Cummins ISX goes from 475 to 565 horsepower. A big radiator is important when a Big Power engine is pulling a heavy load up a long, steep grade at low speeds where there's little ram-air flow to help, and is even more important since the advent of exhaust-gas recirculation that shrugs off additional heat into the engine's coolant. Come 2007, when higher doses of EGR will be used, that "rad" will get a still bigger job.

The big hood is about 8 inches longer than one on a VN, from which the

VT series takes its styling cues, from the Cadillac-like projector-beam headlamps to the smoothly rounded contours in the fiberglass and sheet-metal panels. The VT 800's bumper-to-back-of-cab measurement is 133.7 inches, so this is a long machine, even without a sleeper.

The VN's high-strength steel cab is also used on the VT, which means it's very stout and crashworthy. More important to everyday use, it's got more than ample dimensions in all directions. Some people prefer a narrow cab for a vocational truck, but it's hard to argue with the gracious feeling that spaciousness brings. It's a very quiet cab, which means you can converse

with a partner in normal voice tones, and are shielded from most road noise. Yet you can hear enough engine sounds to appreciate what lurks under that hood.

The D16 is Volvo's largest engine and indeed is the strongest truck diesel now avail-

able. The 994-cubic-inch inline Six was introduced in 2003 as the European D16C (the latest in a series that goes back 20 years). With an exhaust-gas recirculation system to make it emissions legal in the United States and Canada, it became the D16D, though the D suffix is dropped from the designation here. Its features include an overhead camshaft operating four valves per cylinder, high-pressure fuel injection, a sliding-nozzle turbo, and rear-mounted gear train.

Interior amenities

This tractor's deluxe interior trim package, called "supreme limited," includes leather-covered seats and about a half-acre of nicely molded, well fitting plastic panels on all wall surfaces, plus a panel across the top of the windshield. There are pockets for paperwork and holders for beverage containers, and ample storage space for tools and all kinds of other stuff behind the seats. The wide doors close with a solid thunk! And there are no rattles to mar the traveling experience.

You might think that big hood would block a lot of forward and front-quarter vision from the driver, but it doesn't. The hood slopes downward, making visibility to the front actually very good. Smaller cars and cycles can disappear directly along the right side, but good mirrors kept me informed of where they were. And I quickly learned to sense where the VT's corners were as I maneuvered on interstate highways and secondary roads.

My drive was literally out of Volvo's headquarters. Spokesman Jim McNamara had tapped contractor Kevin Thomas to set up an appropriate trailer and cargo: a Ferree 50-foot by 102-inch tri-axle lowboy toting a Volvo L110E wheel loader. Thomas had obtained this same trailer for other Volvo excursions here and in Arizona, where the company unveiled the VT 880 last spring. There was an L110E aboard that time, too, and it provided enough weight — 42,000 pounds — to solidly ballast the already heavy steel trailer.

The tractor alone scaled at just over 19,000 pounds with about 100 gallons of fuel — not exactly a lightweight, but that can be explained by the 16-liter engine and the fact



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Hands-On Trucking

Right: Tall steps lead up to the wide cab. Interior-mounted handles are well placed and stay clean in bad weather.



Posh "supreme limited" interior is nice looking and comfortable, and its tan hue nicely complements the "golden amber" exterior paint.

that this is a prototype. Production models might be lighter, though heavy-haul specs usually result in considerable heft that operators don't seem to worry about, especially if they run on over-size/overweight permits to legally carry massive loads. On this day the rig weighed almost exactly 80,000 pounds, so this was not exactly a heavy-haul run, but was hefty enough to simulate one.

As on a previous trip with a VHD tractor, Thomas guided me out of Greensboro on Interstate 40, then north on U.S. 52 through Winston-Salem and beyond, then onto a set of state and county roads that took us back toward the interstate.

He's a smooth driver, and tutored me on the best way to manipulate the balky gearshift on this VT. I've enjoyed float-shifting transmissions on other truck makes and models, but I can't shift most Volvos worth a shoot. In this one, I had a devil of a time making decent upshifts in Low range, so Thomas advised me to upshift sooner than I was, at 900 or 1,000 rpm rather than 1,200 to 1,500. I tried it and it worked.

This D16 was rated at 550 horsepower, and at these low revs it makes a lot of torque. In the first four gears of the transmission's Low range (that is, Low through 3rd in the Eaton


Fuller 13-speed) the D16's Intelligent Torque feature limits output to 1,650 lbs.-ft.; beginning in 4th gear, an extra 200 lbs.-ft. is made available. The idea is that maximum output isn't needed to pull a load at low road speeds, so why not avoid stressing gears, shafts and bearings until really necessary?

At higher speeds, the engine needs to rev a bit more, especially to maintain momentum on upgrades. Its most efficient range is 1,400 to 1,600 rpm, and that's where I tried to keep it. I was able to shift well in 5th through 8th gear, each of which, of course, can be split. However, the transmission regularly hung up in 7th gear (11th or 12th ratio) as I slowed for stop signs, but I learned to engage the clutch slightly during deceleration to break the torque lock that the gearshift seemed to be imposing on the tranny.

Driving impressions

Our meandering route through the scenic back country outside of Winston-Salem tested my ability to keep this wide rig between stripes, as some lanes were only 10 feet in width and the rig was close to nine. The lower edges of the loader's bucket hung over by 2 to 3 inches on each side of the trailer, blocking my mirror-view of the tridem's wheels except while going around corners. Then I could see that the wheels were following along just-so and the entire rig was responding as though I knew what I was doing.

Let the credit go to the VT's excellent maneuvering ability. The steer axle had enough wheel cut to allow sharp turns, swinging that big nose around almost as though it wasn't there. Helping, too, was the short 188-inch wheelbase — a foot or two shorter than such a tractor would normally have. On the narrow straightaways, the TRW Ross power steering was stable and precise, and the ride smooth and shock-free. If not for the gearshift problems, this would've been the best truck I'd driven in many months.

You see more and more freight-hauling Volvos on the road, and now with the VT 800, you could well see some heavy haulers. If so, you can admire and envy the driver, because he'll have one of the finest rides going. 



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IMPROVEMENT: HYDRAULICS ■

Hitachi's Dash-3 hydraulics are smarter and more responsive to bucket resistance. Multiple sensors instantly feed automatic micro-adjustments for increased hydraulic power to maintain steady, sure movements. Boom, stick, and bucket cylinders feature regenerative flow for faster down movements, extremely fine control, and multitasking.



IMPROVEMENT: CAB ■

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World of Asphalt will feature more than 200 exhibitors.

Here is a sampling of what you'll find on the show floor



Ingersoll Rand

High-frequency, high-amplitude compactors — available in three models — feature SMART drum technology. Eight amplitude settings automatically adjust to the highest frequency for that amplitude selection, enabling use of lower amplitudes with higher frequency on thinner lifts and higher amplitude with lower frequency on thicker lifts and stiffer materials. This flexibility serves the function of two compactors in one. The vibration system automatically adjusts vibration frequency for both drums to the design frequency for the given amplitude.

See Booth **811**



Caterpillar

The new model AP-1000D high-production, 10-foot wheel-type asphalt paver features a Cat C7 engine incorporating ACERT technology; dual swing-out operator stations that can be rotated into four different positions; a hydrostatic propel system that provides three propel modes; and a high-capacity cooling package. The material-handling system uses independent feeder and auger controls. The hopper has a 12.2-metric-ton capacity and includes power dumping controlled from the operator stations.

See Booth **401**



Cimline

Magma melter/applicator compressors in 110-, 230- and 410-gal-lon capacities are designed for high-volume, high-production jobs. Crack cleaning and crack sealing are performed in a one-pass operation with heavy-duty compressors that output 100 psi. Oil in the inner wall of a jacketed tank is heated with a burner and an agitator keeps the melted sealant flowable. A recirculation feature ensures uniform sealant temperature, and a convection system draws asphalt fumes back into the burner exhaust.

See Booth **1023**



Dynapac

Offering high-vibration frequency combined with low amplitude, the CC432 tandem roller is suitable for thin asphalt layers with high stone

content. It features 66-inch split

drums, two 158-gallon corrosion-free water tanks, 61-gallon fuel tank, sprinkler timer and sprinkler backup system, standard asphalt temperature meter, three-step filtering system for sprinkler water, and rear drum offset up to 10 inches in either direction. Dynapac says there is excellent operator visibility of drums, spray bars and scraper system.

See Booth **211**



Hamm/Wirtgen

Asphalt compactors to be displayed range from the 13-ton, 78-inch-wide, double-drum HD 0120V oscillation roller to the company's smallest unit, the HD 10, with an operating weight of 5,690 pounds and drum width of 39 inches. The HD 0120V reportedly is the largest compactor in North America to use exclusive oscillation technology that works hot-mix asphalt from side to side. At the other end of the scale, the double-drum vibrating HD 10 is intended for small projects such as driveways.

See Booth **201**



Trail King

Advantage Series Live Bottom asphalt trailer increases payload by more than 2,000 pounds in a lightweight, modular design without compromising strength, says the manufacturer. Sixty-degree sloped walls reduce load segregation during transport and eliminate bridging problems. A heat- and oil-resistant two-ply rubber continuous belt moves the entire load to the rear for discharge. The 36-inch belt, attached to patented steel slats, moves via a self-lubricating double-pitch roller chain on steel tracks.

See Booth **328**



Bomag

The BW24RH pneumatic-tired roller offers a hydrostatic-drive system that provides infinitely variable speed control from 0 to 12 mph and smooth transitions between forward and reverse. Two-point steering pivot on the front four tires allows for sequenced steering. With a fully ballasted operating weight of 52,911 pounds, the machine delivers a maximum per-wheel load of 6,614 pounds and provides 80 inches of coverage with a 2-inch tire track overlap.

See Booth **429**

Terex Roadbuilding

The 50,800-pound CR662RM RoadMix material transfer vehicle (MTV) features rubber tracks that spread the vehicle load over a broad surface, reducing ground pressure so it can work on base and top courses. Terex says the CR662RM, with augers in the receiving hopper, is the first and only MTV to reblend 100 percent of the asphalt. When the unit is not needed as an MTV, the rear conveyor assembly can be removed and replaced with any Terex | Cedarapids screed, allowing it to be used as a paver.

See Booth **2002**





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↑ Roadtec

New SP-200 asphalt spray paver lets contractors spray asphalt cement or emulsion (tack) directly in front of the asphalt mix before it is laid for NovaChip applications or traditional paving. Spraying the tack seconds before asphalt is laid provides a strong bond between existing surface and new pavement. The gravity-fed paver has a heated 2,100-gallon asphalt cement/emulsion tank and three rows of spray nozzles. Flow rate can be controlled by an onboard micro-processor. The SP-200 eliminates the need for separate tack trucks.

See Booth **611**

← Stone



The new WolfPac 4100 is a 40-inch-wide, double-drum-drive asphalt roller facilitates compaction of base, binder and finish coats in confined areas. An electro-hydraulic circuit combined with a custom-designed manifold allows the operator to direct vibration to front, rear or both drums. With 4,000 pounds of impact per drum, the roller is ideal for driveways, parking lots and more. Other features include centerpoint articulation, short wheelbase, high curb and minimum wall clearance, and pressurized water system with gravity-feed back-up. Ergonomic advantages include vibration isolation, adjustable safety seat and tilted steering wheel.

See Booth **121**



↑ Sakai

New Model CR270, a 35.4-inch-wide compact vibratory asphalt roller, delivers high-frequency 4,000 vpm and achieves 10 impacts per foot at 4.55 mph ground speed. Features include hydrostatic transmission, dual-drive drums, adjustable spring-loaded scraper bars, articulated center-pivot steering, short wheelbase for maneuverability and a high-capacity reservoir with rustproof tanks. It is designed for small asphalt applications such as bicycle paths, parking lots, driveways, road widening and patchwork.

See Booth **101**



↑ BLS

Suitable for milling machines of all makes, new TUFPADS Blues polyurethane track pads are said to provide as much as 20 percent extra wear compared with standard black bonded polyurethane track pads. The manufacturer also introduces Poly Bolt-On track pads, which can be changed out in a few minutes on-site, eliminating the need to return to the yard for this kind of maintenance.

See Booth **655**

← Astec

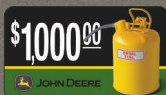
On display will be an authentic replica of a complete hot-mix-asphalt facility, hand-built by fabricators on the equipment manufacturer's team. Designed on a one-eighth scale with silos more than 11 feet tall, the award-winning model is constructed from the same materials and painted the same colors as the equipment it represents.

See Booth **623**

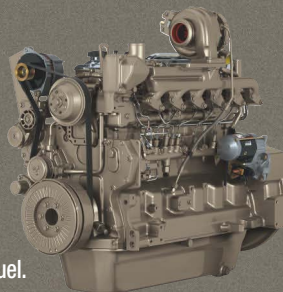


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Sneak Peek



Mountain Valley

Stehr SKF 950 manhole cutter enables one worker to cut approximately 15 shafts per hour. A wide range of cutter head sizes accommodates various applications, including new road construction, surface repair, raising manholes and detail mill around manholes. Grinder chisels offer an average service life of 40 cuts and can be easily replaced. The dry-cut process uses no water.

See Booth **765**

TransTech



Shoulder Wedge Maker (SWM) mounts on the screed extension face against the end gate of any asphalt paver brand to form a compacted tapered edge fillet at an angle less than 45 degrees. The SWM leaves a smooth, beveled surface for safe re-entry of a vehicle to the travel lane. An integral self-adjusting spring allows the device to follow the roadside surface independently. SWM kit includes wedges and mounting hardware for left and right sides of the paver.

See Booth **739**

Coneqtec

DCS6000 compaction plate extends to 36 inches below the surface into trenches. The trench compactor was designed to eliminate delayed, uneven settling left from conventional compacting methods following trench work. Dual counterweight design delivers 6,000 pounds of vertical compaction force directly into the trench. It is available in 16-, 18- or 24-inch widths and attaches to any skid-steer loader equipped with a quick attach.

See Booth **346**





↑ Eagle Crusher

New to the UltraMax Series is the 1600-69 high-volume primary/secondary impact crushing and recycling plant. The self-contained, portable crusher processes a variety of feed material at a capacity of 800 tons per hour. Three-stage crushing action achieves reduction ratios exceeding 24:1. The UM 1600-69 features a 68-inch by 20-foot feeder and a 13-ton, three-bar, sculptured solid-steel rotor. See Booth **458**



↑ Power Curbers

Model 150 extruder is a flexible unit that extrudes curb up to 12 inches high by 12 inches wide at speeds up to 18 feet per minute on either the right or left side. A continuous, one-pass operation can turn a smooth radius as tight as 2 feet. Offset mounted mold and extrusion auger enable curb to be placed within 1 inch of obstructions. Wheels adjust vertically and horizontally. The extruder features front carriage steering assembly and a steering "T" handle. See Booth **234**

Calder

Two new Mauldin SuperPaver models offer single-stage extension (45 inches per side), Power-Glide guides, ultrasonic material feed, high-rise spring-loaded endgates and power extending feed tunnels. The 12,500-pound 1550-C features an 8- to 13-foot vibratory screed with four-auger material feed system, 60-hp Deere diesel engine for paving speeds to 140 fpm, and hopper capacity of 6.5 tons. Weighing 15,700 pounds, the 1750-C is available with optional Silver 16 screed that provides a uniform mat from 8 to 16 feet wide and 6 inches deep. See Booth **471**

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Buying File: Commercial Asphalt Pavers

By LARRY STEWART, Executive Editor

Bomag's investments in the acquired Gilcrest Propaver plant yielded the 814-2 and 815-2, 15,400-pound pavers with Cummins power that pushes paving speeds to 180 feet per minute.



Hot Markets Keep Asphalt

Manufacturers are merging and highway-class technology is trickling down to tracked and wheeled pavers under 19,000 pounds

The consistently strong housing market continues to fuel demand for paving streets, parking lots, driveways and recreational paths, and the generally favorable U.S. economy keeps encouraging contractors to buy new commercial-class asphalt pavers (those weighing less than 19,000 pounds). The hot market keeps commercial-paver innovation bubbling with large manufacturers buying up smaller companies and big-paver technology trickling down.

"Acquisition of small paver manufacturers by larger companies has really changed commercial paver sales in the past three years," says Paul Puckett, president of Puckett Mfg.

There were nine manufacturers selling commercial asphalt pavers in North America in September 2002. Within three and a half years,

four of those names have changed. Caterpillar is transitioning the Italian-designed Bitelli machines, which include some of the most aggressively spec'd commercial pavers in the class, into its own product line, and will likely retire the acquired Bitelli name before long.

In addition to Caterpillar's Bitelli purchase, Ingersoll Rand bought ABG and Blaw-Knox. Bomag bought Gilcrest, and Fayat's January 2005 purchase of Bomag ended Marini's short-lived North American marketing campaign. Fayat also owns Marini and, deciding to bank on the Bomag name here, moved Marini's milling machines into Bomag's lineup and shuttered Marini America last summer.

"This past year, we made significant investments in engineering and production at the former Gilcrest facility in Warrensburg, Mo.," says

Doug Zoerb, administrator of marketing communications with Bomag. “The initial result is the two pavers we recently introduced, the 814-2 and 815-2.”

In replacing its 813 RT ProPaver with the 814-2 and the 815-2 (one tractor with either a 14- or 15-foot screed), Bomag gained half a ton of hopper capacity, the ability to use electronic grade controls, and an additional 58 feet per minute of paving speed (an increase of 48 percent) while creating the only commercial-class paver with Cummins power. Bomag also put a machine — the 815-2 at 15,700 pounds — in direct competition with LeeBoy’s popular 8500 models. Calder competes in this hotly contested size range as well with its Mauldin 1750-C powered by a John Deere diesel.

Caterpillar’s absorption of Bitelli will create only the second manufacturing company that offers both commercial pavers and a full line of highway-class pavers. Aside from Ingersoll Rand, the only other manufacturer in the commercial class that currently markets machines weighing more than 19,000 pounds



electronic grade controls.

Electronic-control systems prevalent on highway pavers are making the jump even to the light end of commercial class.

“The use of tactile and sonic sensors to automate feed augers has had the greatest impact on commercial-paver sales in the last 36 months,” says John Koepf, Gehl product manager for asphalt pavers. Gehl builds two machines that weigh less than 10,000 pounds. “Sensor manufacturers have increased sensor

Ingersoll Rand suggests its smaller pavers reflect the construction of their highway-class counterparts. The 3120 is the heaviest and most powerful commercial-class paver, and a hydraulic tow point, like that on many highway pavers, on the 3020 and 3120 allows plug-and-play of electronic grade controls.

Pavers *Bubbling*

is LeeBoy. And the highway-class LeeBoy offering is limited to the 25,000-pound 8816 introduced two years ago.

Ingersoll Rand suggests that its commercial pavers mimic the heavy-duty construction and high horsepower common to IR Blaw-Knox highway pavers. Indeed the 3020 and 3120, at about 16,900 pounds, are the heaviest commercial-class asphalt pavers, and the 3120’s 87-hp Kubota makes it the most powerful paver in the class. IR has also moved the undercarriage maintenance points for these commercial-class heavyweights to the outside, so you don’t have to raise the hopper to service them as on most other commercial pavers. A standard hydraulic tow point on the 3000 Series duo, like that found more commonly on highway pavers, facilitates plug-and-play of

reliability in the harsh asphalt environment. Sonic sensors are noncontacting which dramatically increases their durability.”

Sonic sensors can be used to monitor the head of material in front of the screed. The pavers’ onboard computers automatically adjust the flow of material from the hopper according to those sensor inputs.

“Automating the auger feed system allows the operator to concentrate on steering the machine, matching the existing asphalt surfaces, and controlling the depth of the asphalt,” says Koepf. “Paving companies are having a hard time finding hired help. Auger automation allows for smaller paving crews.”

Two-thirds of all new commercial paver models offer the option of electronic grade control. Bomag’s 814-2 and 815-2, for example, are

Buying File: Commercial Asphalt Pavers

available with Topcon's System Four Screed Automation as an option. Using a "non-contacting" sonic sensor, the system controls paving grade without skis or string lines and matches joints without requiring the sensors to touch any surfaces.


Electrically heated screeds have been making inroads on highway-class paver sales, and LeeBoy brought electric screed heat to the commercial class last spring. The Legend Electric Screed System is available as an alternative to

propane on LeeBoy models 8500, 8515 and the 8816 for paving 8- to 15-foot widths.

"We've been watching paving trends and environmental air-quality requirements, safety issues and cost effectiveness for several years and felt that now was the time to give the commercial-contractor customers their first option for an electrically heated screed system," says Mike Lee, vice president of product development for LeeBoy.

Electric screed heat powered by an on-board electric generator eliminates the flame, fuel and fumes used in propane screed heating. Many buyers favor electric heat because it warms the screed plate consistently across its surface for better results and virtual elimination of plate warping. Thermostats control the heaters so the system only uses energy when necessary. Changes in ambient temperature won't cause a sudden cooling of the screed.

So many significant highway-class features appearing on commercial-class asphalt pavers begs the question, "where are the rubber tracks?" Steel tracks continue to dominate commercial pavers. LeeBoy's 1000D and 8515, and Mauldin's 1550-C are the only pavers in class with rubber tracks. A significant portion of steel-tracked pavers is shod with bolt-on polyurethane track pads.

There's enough demand for commercial pavers to stimulate innovation. That's why those pavers are emulating highway-class machines. It's also a significant impetus behind LeeBoy's decision to break the traditional 19,000-pound boundary for the commercial class to introduce the 25,000-pound 8816. The challenge now is for buyers to keep up with new features and figure out which they can use for maximum competitive advantage. 

Web Resources

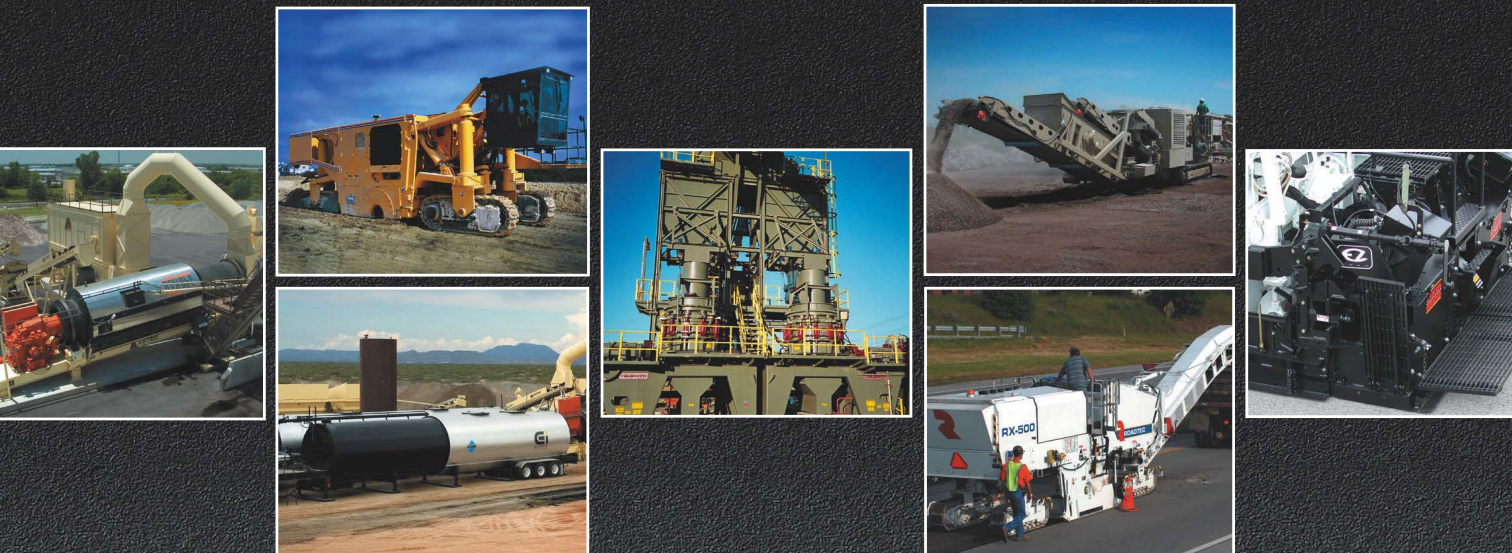
Specifications	ConstructionEquipment.com
Bitelli	www.bitelli.it
Bomag	www.bomag.com/americas
Gehl	www.gehl.com
Ingersoll Rand	www.road-development.irco.com
LeeBoy	www.leeboy.com
Mauldin	www.4amauldin.com
Puckett Mfg.	www.puckettmfg.com
Salsco	www.salsco.com

Asphalt Pavers (by weight)

Model	Operating Weight (lb.)*	Paving Width Range	Engine / Gross Horsepower	Max. Paving Speed (fpm)
Salsco 5004 (tire)	1,040	3' 0" - 6' 0"	Honda / 13	50
Eagle ES 4896 (tire)	4,180	4' 0" - 8' 0"	Deere / 29	264
Puckett 540	7,000	8' 0" - 12' 0"	Kubota / 28	80
Mauldin 550E (tire)	7,800	8' 0" - 13' 0"	Kubota / 28	140
Gehl 1448	7,800	4' 0" - 12' 0"	Isuzu / 25	160
Puckett 560	8,250	9' 0" - 13' 0"	Kubota / 37	80
Mauldin 550E	8,300	8' 0" - 13' 0"	Kubota / 28	140
Bitelli BB 621 C	8,818	4' 7" - 9' 10"	Hatz / 35.4	108
Mauldin 690F (tire)	9,300	8' 0" - 13' 0"	Kubota / 38	140
Mauldin 690F	9,700	8' 0" - 13' 0"	Kubota / 38	140
Gehl 1648	9,815	4' 0" - 13' 0"	Isuzu / 41	130
LeeBoy 1000D (tire)	10,000	8' 0" - 13' 0"	Hatz / 37	90
LeeBoy 1000D	10,000	8' 0" - 13' 0"	Hatz / 37	220
LeeBoy 700B (tire)	10,000	8' 0" - 12' 0"	Hatz / 37	70
LeeBoy 700B	10,000	8' 0" - 12' 0"	Hatz / 37	70
Bomag 3310/3320	10,000	8' 0" - 13' 0"	Isuzu / 47	150
Mauldin 1500 (tire)	11,800	8' 0" - 13' 0"	Kubota / 50	170
Bomag 4410/4420	12,000	4' 0" - 13' 0"	Isuzu / 56	160
LeeBoy 5000	12,000	5' 0" - 9' 0"	Hatz / 37	200
LeeBoy 7000	12,000	8' 0" - 13' 0"	Hatz / 56	220
Mauldin 1500	12,300	8' 0" - 13' 0"	Kubota / 50	170
Mauldin 1550-C	12,500	8' 0" - 13' 0"	Deere / 60	140
Bitelli BB 632 (tire)	13,890	5' 7" - 13' 0"	Deutz / 53.6	167
Bomag 814-2/815-2	15,400	8' 0" - 15' 0"	Cummins / 85	180
LeeBoy 8500	15,700	8' 0" - 15' 0"	Hatz / 74	140
Mauldin 1750-C	15,700	8' 0" - 16' 0"	Deere / 80	140
LeeBoy 8515	15,900	1' 0" - 15' 0"	Hatz / 74	160
Ingersoll Rand 3020	16,934	8' 0" - 15' 0"	Kubota / 73	120
Ingersoll Rand 3120	16,958	8' 0" - 15' 0"	Kubota / 87	120

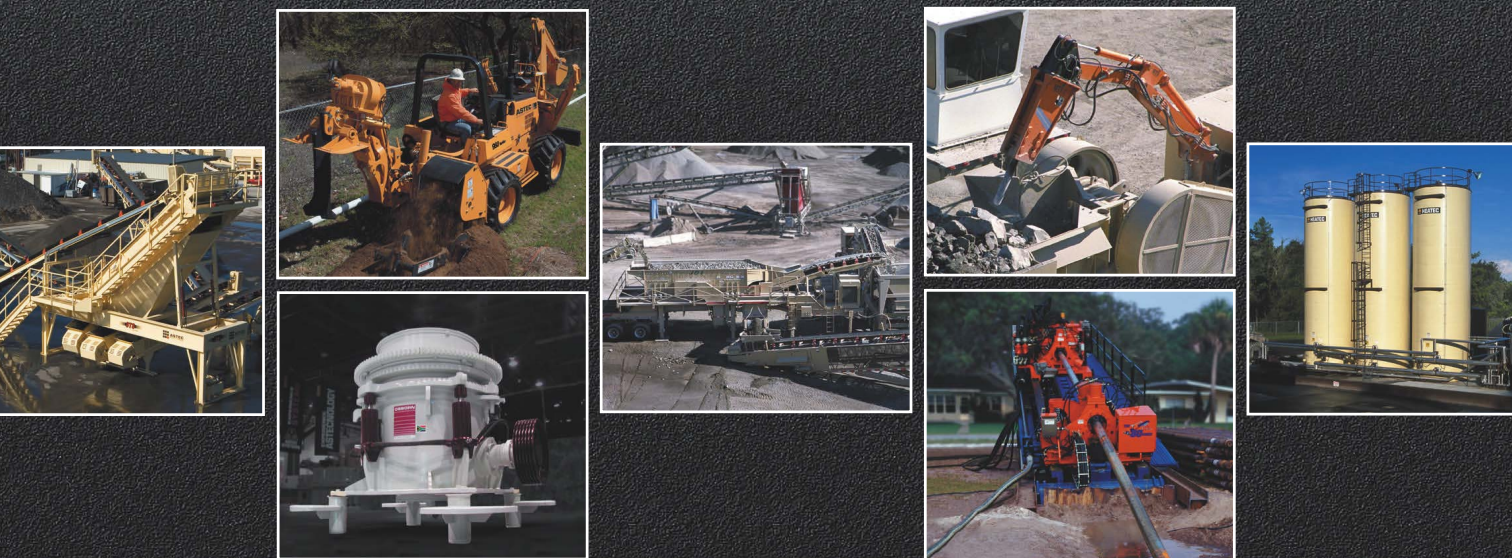
*With smallest screed

Steel tracks continue to dominate commercial pavers, although many can be shod with bolt-on polyurethane track pads. LeeBoy's 1000D and 8515, and Mauldin's 1550-C are the only pavers in class with rubber tracks. To compare specifications on the full range of asphalt pavers, click on "Specifications" at ConstructionEquipment.com.



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Gallery of Commercial Asphalt Pavers

BOMAG

Bomag Pursues Big-Production Buyers

Bomag replaced its 813 RT ProPaver with the 814-2 and 815-2, upgrading to an 85-hp Cummins 4B 3.3T engine and adding half a ton of hopper capacity. Maximum paving speed increased to 180 feet per minute — a 48-percent jump. Heavy-duty crawler undercarriages and thicker steel in many fabrications increased operating weight by more than 1,000 pounds. The new Unimat 2 screed on the two pavers delivers standard paving ranges of 8 to 14 feet and 8 to 15 feet, respectively.

Number of models: 4

New models: 814-2 and 815-2

Product-line features: Material augers mounted directly to the hydraulic screed extensions provide a consistent supply of material at all paving widths.

For more information, visit ConstructionEquipment.com/info



PUCKETT MANUFACTURING

Two Choices to 13-Foot-Wide Paving

Puckett has designed and intends to begin production in 2006 of its Model 580 with a paving-width range of 8 to 13 feet and Kubota diesel power. A new screed extension on Model 560 extends the 8,250-pound tracked paver's maximum paving width to 13 feet.

Number of models: 3

New model: 580

Product-line features: Each Puckett paver comes with an exhaust-heated screed or optional propane heat. Sprocket drive and automatic track tensioning are standard features, and all models are powered by Kubota diesels. Folding wings on the 540 simplify loading for trailer transport.

For more information, visit ConstructionEquipment.com/info

GEHL

Largest of Very Small Pavers

The Powerbox line straddles the smallest commercial work — driveways, cart paths, sidewalks, jogging trails and parking lots — offering two track-mounted pavers with paving-width ranges from 4 to 13 feet and 4 to 12 feet. The 1648, at 9,815 pounds, has 9-inch-diameter material feed augers that can be mounted on the screed extensions or gates. The steering valve allows the operator to pave ripple-free curves by turning a single lever into the turn. The 1448, with 4-ton hopper, is equipped with an exhaust-heated screed, and offers propane heat as an option.

Number of models: 2

Product-line features: Both the 1648 and 1448 are powered by Isuzu diesel engines through a direct-drive track system that is self-cleaning and self-adjusting. Steel tracks are shod with bolt-on polyurethane track pads.

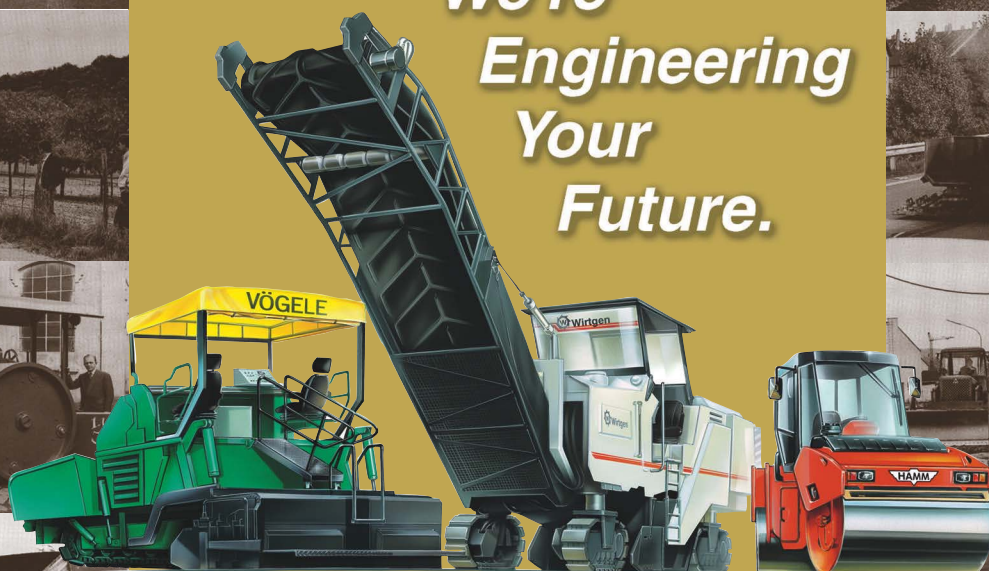
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Gallery of Commercial Asphalt Pavers



SALSCO

Path Paver on Tracks

Salsco swapped the tires on its Mini Paver for rubber tracks to create a tracked paver capable of a width range from 3 to 6 feet. The dump hopper is upgraded with hydraulic dumping action and an added cut-off plate. Tracks are hydraulically adjustable, and screw jacks have been added on the end gates.

Number of models: 2

New models: 05012 Mini Track Paver

Product-line features: Salsco builds two units available for under \$25,000 that are able to pave sidewalks, cart paths and trenches.

For more information, visit ConstructionEquipment.com/info

LEEBOY

No Fuel, Flames or Fumes

LeeBoy's electric screed-heat option provides commercial-class paving contractors an alternative to propane-fired heating systems. The Legend Electric Screed is exclusively available on LeeBoy Models 8500 and 8515 (as well as the 25,000-pound 8816). The Legend Electric Screed System retains the features of the propane-heated version, which allows for seamless paving from 8- to 15-foot widths.

Number of models: 4

Product-line features: The Legend Screed has a bull-nose wear plate and a bolt-on main-screed wear plate of $\frac{3}{8}$ -inch-thick AR400 steel. Extendable wallboards were added recently. LeeBoy uses Hatz diesels in all of its less-than-19,000-pound pavers.

For more information, visit ConstructionEquipment.com/info



CALDER BROS.

Widest Paving Width in Class

Calder's Mauldin 1750-C is a 15,700-pound track-mounted paver challenging the competition at the top of the commercial class with 16 feet of paving width — a foot more than any others — and the only John Deere diesel in the size range.

Number of models: 8

Product-line features: Extension augers on the four-auger material feeding system extend with the screed. O-ring face seals in the hydraulic system carry a three-year, leak-proof warranty from Parker Hose.

For more information, visit ConstructionEquipment.com/info

INGERSOLL RAND

Screed Improves Material Control

A new version of Ingersoll Rand's Liberty Screed has extensions with angled inner walls to control material when retracting the screed. A crown/invert indicator shows the operator the screed's setting. Depth screws are repositioned for better clearance when the screed is raised.

Number of models: 2

New models: 3120 and 3020

Product-line features: The 3020 and 3120, at about 16,900 pounds, are the heaviest commercial-class asphalt pavers, and the 3120's 87-hp Kubota makes it the most powerful machine in the class. Outboard tracks move maintenance points out from under the hopper.

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VOLVO

Drum-Type Compactors

JCB-VIBROMAX

The JCB-Vibromax W 355 K combination roller weighs about 8,500 pounds, and the machine's 51.2-inch front drum has a standard frequency of 3,300 vpm and amplitude of 0.020 for a centrifugal force of 10,878 pounds. An optional dual-frequency/dual-amplitude system provides forces of 6,967 or 11,911 pounds. The machine uses four pneumatic tires at the rear to knead the top-most portion of the asphalt mat.

Tire spread measures 50.4 inches. The machine is powered by a four-cylinder, water-cooled Kubota diesel rated at 46.6 horsepower. For more information, visit ConstructionEquipment.com/info



BOMAG

The Bomag BW190AD-4 is a tandem vibratory roller fitted with 79-inch-wide drums. Slanted drum-support legs and the open design of the front and rear frames enhance visibility to both drums and the sprinkler system. Powered by a 131-hp Deutz diesel engine, the unit delivers 28,800 pounds of centrifugal force in its low-amplitude/high-frequency (3,600 vpm) setting, and 40,950 pounds in its high-amplitude/low-frequency (2,880) setting.

For more information, visit ConstructionEquipment.com/info

SAKAI

The Sakai SV505 Series vibratory soil compactor is available in either a smooth-drum (SV505D) or padfoot-drum (SV505T) configuration. These two models, each with an 84-inch drum, have operating weights of 23,525 and 24,320 pounds, respectively. Both models feature dual frequencies (2,200 and 1,650 vpm) and dual amplitudes (.04 and .08 inches). Centrifugal-force ratings on the smooth-drum model are 38,580 and 50,710 pounds; and for the padfoot, 41,890 and 55,120 pounds.

For more information, visit ConstructionEquipment.com/info



AMMANN

Ammann's ASC Series of single-drum compactors includes six basic models, plus heavy-duty variants of each, all available in smooth-drum or padfoot configurations. The ASC models feature two amplitudes and two frequencies, and heavy-duty models incorporate a high-performance hydraulic system, anti-slip control and tire ballast. Transverse-mounted, centrally positioned engines in these machines, says Ammann, lower the center of gravity and enhance stability.

For more information, visit ConstructionEquipment.com/info

Spotlight

HYPAC

The Hypac C810C Series single-drum rollers feature two amplitudes and an “optimized frequency,” providing “maximum compaction results on the widest range of soil types,” says the manufacturer. The smooth-drum model (C815C) is designed for work on granular and mixed-soil applications. The padfoot model, C812C, available with a leveling blade, is designed for work in cohesive and semi-cohesive soils. Both configurations use a 47.2-inch-wide drum. Operating weights range from 7,275 to 8,047 pounds.

For more information, visit ConstructionEquipment.com/info



CATERPILLAR

Caterpillar's CB-335E is a combination roller, weighing in at 8,092 pounds, that uses a drum 31 inches in diameter and 51 inches wide. Vibration frequency is 4,140 vpm, and the CB-335E generates 7,267 pounds of centrifugal force. This 50-hp machine's four rear tires assist in the compaction process by bringing aggregate fines in the mix to the top of the mat to create a tight, smooth surface that resists water intrusion.

For more information, visit ConstructionEquipment.com/info



HAMM

Hamm models that incorporate the company's oscillating technology include the HD 070V, HD 090V, HD 0120V and 3412 VIO asphalt rollers. These machines have a conventional vibratory system on the front drum, but use Hamm's oscillating drum at the rear. According to Hamm, the compaction effort of the rear drum is “non-aggressive” because it compacts with a gentle rocking motion. The rear drum develops its compaction effort via generating shear forces, as opposed to vertical forces (amplitude) and, says the company, machines using this technology may achieve compaction up to 62 percent faster than conventional vibratory machines.

For more information, visit ConstructionEquipment.com/info

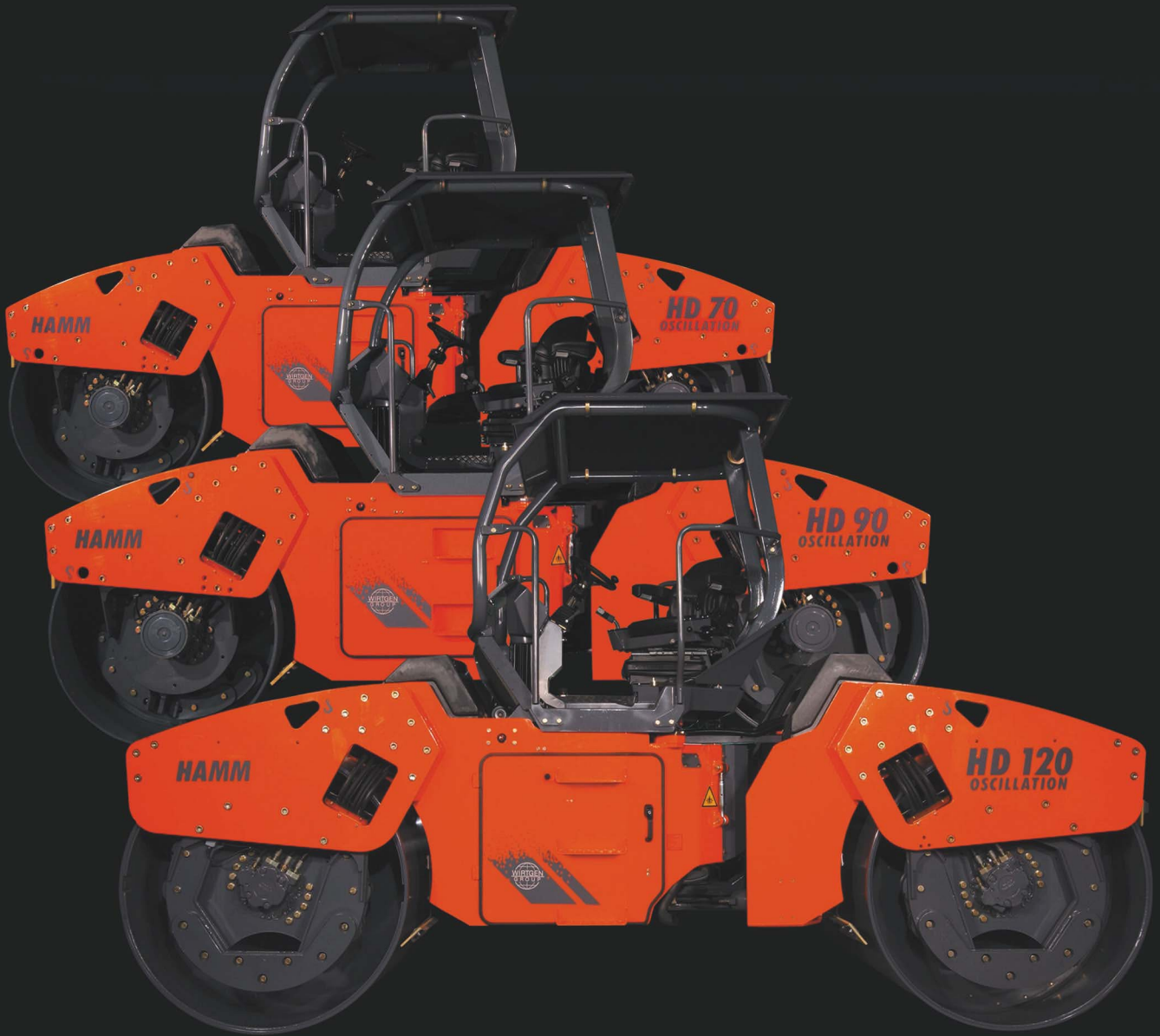


MULTIQUIP

The patented blade on the Rammax P33 HHMR-BD trench roller is designed to level material in front of the machine for more effective compaction. According to Multiquip, the machine can be used with infrared remote control for work in shored trenches and in granular soil. Available with either 24- or 33-inch-wide drums, the machine features dual compaction settings (18,500 or 12,150 pounds of impact force) to match varying applications. Powering the unit is an 18.5-hp Hatz 2G40 diesel engine.

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Spotlight

CASE

The Case 200-Series compaction line includes four single-drum soil models and three double-drum asphalt models. Double-drum, vibratory asphalt models — the DV201, DV202 and DV204 — range in operating weight from 5,510 to 7,720 pounds, and in horsepower ratings from 27 to 38. Drum-width ranges are from 39.4 to 51.2 inches. Equipped with a dual-frequency vibration system (3,180 and 3,720 vpm), the double-drum models generate centrifugal force from 4,580 to 8,877 pounds.

For more information, visit ConstructionEquipment.com/info



STONE

Model 4100, one of five asphalt rollers in Stone Construction Equipment's WolfPac line, uses 40-inch-wide drums and generates 4,000 pounds

of impact per drum. The

roller is ideal for driveway and parking-lot applications, as well as for a variety of other confined-space

applications. This

articulated-frame machine features double-drum drive, an isolated and dedicated hydraulic circuit for eccentrics and steering, plus a pressurized water system with a gravity-feed backup system.

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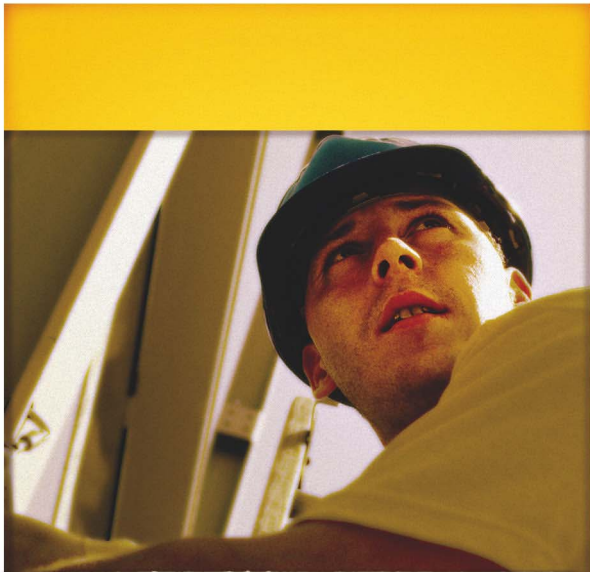
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Spotlight

WACKER

Wacker's RD 27 Series ride-on roller is available in two configurations, the RD 27-100 with 39.4-inch-wide drums, and the RD 27-120 with 47.2-inch-wide drums; drums for both are 27.6 inches in diameter. Operating weights for these dual-frequency models are 5,622 and 6,063 pounds, respectively, and both use a three-cylinder Perkins diesel engine rated at 33.7 horsepower.

For more information, visit ConstructionEquipment.com/info



INGERSOLL RAND

The Ingersoll Rand DD-158HFA is a 33,810-pound, tandem, vibratory asphalt machine using 84-inch-wide drums. This eight-amplitude roller is capable of generating centrifugal force in the range of 38,280 to 44,910 pounds, and its SMART technology automatically adjusts frequency, based on the selected amplitude, "to the optimum performance setting." Other aspects of this 185-hp-machine's SMART system include automatic control of working speed to maintain selected impact spacing, automatic regulation of water flow and automatic sequencing of the lead and trailing drums.

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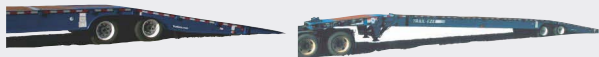
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Spotlight

TEREX

Terex's TV1200-1 is representative of the company's latest tandem-roller range, which has models from 1.5 to 5.0 tons. The TV1200-1, with 45-inch-wide drums, has an operating weight of 6,382 pounds and develops 6,519 pounds of centrifugal force. All controls are mounted on a unique, ergonomically designed steering arm designed to enhance operator comfort and the driving position. A tilting hood provides access to service points, and the tanks are removable for cleaning.

For more information, visit
ConstructionEquipment.com/info



DYNAPAC

The Dynapac CC 522C combination roller has an operating weight of 25,800 pounds. The machine's front drum is 77 inches wide and 55 inches in diameter. The four-tire module at the rear is 75 inches wide. Powered by a 125-hp Cummins diesel engine, this "combi" roller has dual amplitudes and operates at a frequency of 3,060 vpm. Centrifugal force is 31,050 pounds in high amplitude, and 15,750 pounds in low amplitude. Both the drum and wheel module propel the roller, which has a maximum speed of 7 mph.

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Ryan Pioneers Fleet-Management Software

Custom software gathers real-time data automatically so management decisions maximize return on investment in equipment assets

Ryan Inc. Central is the kind of company that defines its core business and outsources as much of everything else as possible — fueling equipment, some preventive maintenance, and most major-component repair. But when Greg Kittle, the “Giant” earthmover’s equipment manager, called for better, more current information to support important fleet decisions, the company decided to write its own equipment-management software.

“Information flow and the interpretation of that information provides a quantitative competitive advantage,” says Kittle. “We need high-quality information in real time that can be acted upon.”

Off-the-shelf equipment software didn’t supply what Kittle considered essential information to properly manage a fleet.

“I believe there are several key elements to effective fleet management,” says Kittle. “Develop durable partnerships with equipment vendors. Recommend machines that are highly productive. Develop acquisition and disposal strategies that support the company’s equity-management goals. And ensure that the customer receives the value that was intended — this is an operating and production cost metric.”

“We’re always building equity in a machine as we move forward, even with rentals and leases,” says Kittle. “And because our equipment needs can change at any time due to weather or job schedules, we want to know our equity position in each of those machines all the time — every day — in case we should have to buy or sell a machine.”

Kittle oversaw development of Ryan’s fleet-management software, called Iron IQ. The system would eventually digitize most of the equipment-operation’s paperwork — things like tracking fuel use and hour-meter readings, work-order processing, and ordering and paying for parts. Equipment-department field data is gathered using Nextel phones with bar-code readers attached.

“Iron IQ tracks all of the costs and credits [revenue and residual value] to each machine every day of its life,” says Kittle. “It gives us an accurate idea of actual fleet values so we know where to invest, and when.”

The Web-based software accumulates cost inputs such as fuel, oil, maintenance and repair by machine ID number thanks to bar codes on each machine. It correlates productivity based on Kittle’s production studies with work hours recorded by hour-meter readings from fuel and lowboy drivers, and from Qualcomm units.

The system regularly imports current market pricing (auction results) for machines like the ones in the Ryan fleet. Iron IQ uses all of this data to calculate

Kittle discusses field data with Larry Hill, manager of Ryan’s Chicago operations. When Kittle’s equipment department started gathering information from machines automatically, it improved the quality of equipment cost accounting so that estimates more closely matched Hill’s operating reality.

PROFILE



Greg Kittle,
Equipment Manager

Ryan Inc. Central

Headquarters:
Janesville, Wisc.

Specialty:
Earthmoving for commercial development

Fleet Value:
\$130 million

Fleet Makeup:
2,000 total pieces — about 800 heavy earthmovers and 1,200 pieces of light equipment

Facilities:
1 shop, 30 service trucks

Employees:
50 total, 8 administrative

Market Range:
Eastern half of the contiguous 48 states



Photos: George Pfoertner®

Great Managers

John Moll, a Patten Tractor field mechanic under contract to Ryan, swipes the bar code on a machine using a cell phone with reader accessory before filling the fuel tank. Moll keys in the hour-meter reading and a Bluetooth device will record gallons of fuel pumped. The information, along with machine location gathered from the phone's GPS chip, is sent via cell-phone signal to Iron IQ.

an actual return on investment, including residual value, for each Ryan machine. It compares this number to the estimated ROI used to justify acquiring the machine to see how each equipment asset is actually performing in terms of dollars and cents. Kittle believes this comparison is the key to practical decisions — repair or replace, rent or buy, convert a lease or return the machine to the dealer.

“These are decisions equipment managers make every day,” says Kittle. “The software just organizes and presents all the information we need to make each one of those decisions quickly and with a very high degree of accuracy.”

The software touches all of the day-to-day equipment operations such as preventive maintenance and oil analysis because each expense affects the machine's ROI. In typical Iron IQ fashion, it does so automatically.

When the time comes to pull an oil sample from a machine, Iron IQ sends an electronic alert via Nextel to the maintenance manager in the region where that machine is working. The technician swipes the bar code on the machine before starting to work, draws fluid samples, and swipes the bar code on sample bottles to attach the machine ID to the samples.

Laboratory technicians at Ryan's oil-analysis vendor swipe the bar code on the sample bottles, attaching the machine ID to the analysis information. When the analysis is complete, the laboratory's

computer communicates the results to Ryan's computer.

“Wear-element information and particle data goes to our software digitally, gets fed into our algorithms (based on Caterpillar's classic combinations of wear indicators), and is interpreted by the software,” says Kittle. “If necessary, the system generates an action. If a sample shows high coolant, for example, the software generates a work order to change the oil and a repair order to find the source of coolant.”

Ryan's fuel vendors use Nextel and bar-code readers to tag each gallon of fuel they pump to a machine ID. The data generates their invoices, and the hour-meter reading the fueler punches into his keypad with each fuel stop is correlated with the gallons pumped to compute fuel consumption for every unit. Nextel's GPS chip identifies where the machine is located.

The process complements information gathered by Qualcomm's GlobalTracs asset-tracking systems. Ryan has 500 units with Qualcomm boxes installed. The investment significantly enhanced accuracy in Ryan's cost accounting.


“We saw utilization increase exponentially with the introduction of Qualcomm,” says Kittle. “We paid for the Qualcomm boxes in six months just with the increased utilization on small equipment.”

Iron IQ's automated data gathering eliminated several thousand hours of data processing at Ryan in 2005. It eliminated 3,000 hours of vendor data processing. One result, Kittle points out, is that Ryan pays significantly less than the street price for fuel service.

“Saving our vendors money is important to Ryan,” says Kittle. “That's how you build partnerships. It also allows us to negotiate service charges — we expect

to get some of the benefit of saving them money.”

The company extends that courtesy to its own customers. Ryan works exclusively for private developers and firms, and most contracts are negotiated rather than awarded based on bids.

“Ryan's company objective is to continue to improve productivity for the benefit of our customers,” says Kittle. “Their continued prosperity ensures our own.” 



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Taxable Income and Equipment Acquisition II

Lease transactions provide positive cash flow, but other “nonquantifiables” must also be considered in the acquisition discussion

Last month, we looked at cash flow before tax, taxable income, and cash flow after tax and saw how the tax codes affect decisions to use either cash or loan financing. This month, we’ll look at the implications of using lease finance to acquire equipment. We will again focus on language and concepts rather than technical details.

In a lease transaction, the machine will not become a company asset. You will not buy it, own it, or sell it, and, except in the case of a capital lease, it will not go onto the balance sheet. Lease agreements do not give the company ownership of the machine: they give you the right to use it and the obligation to meet payment and other agreed-upon terms.

A lease-finance decision is simplified because the machine isn’t owned; issues such as purchase price, depreciation and residual market value do not enter the calculation.

We’ll use the same machine example that we used last month. The machine costs

\$380,000 and has a residual market value of \$50,000 after it has worked 10,800 hours in six years at a rental rate of \$115 per hour. We now assume that the machine is acquired on a six-year lease with payments of \$69,000 per year.

The calculation is shown in the accompanying table. Row 3 is the expected rental income based on the annual utilization and an hourly rate, row 4 the lease payments, and row 5 the annual direct costs of operating the machine including repairs, fuel, wear parts, preventive maintenance licenses, insurance and other direct costs.

The bottom row of the table clearly shows the principal advantage of leasing. We acquire the right to use a \$380,000 machine without experiencing large negative impacts to our cash flow. Indeed, we only go \$44,850 cash negative in our first year and become cash



Mike Vorster

David H. Burrows Professor of Construction Engineering and Management at Virginia Tech.

Cash-Flow Calculation

1	Expected life	0	1	2	3	4	5	6
2	Expected annual utilization		1,900	1,900	1,900	1,800	1,700	1,600
3	Annual income		\$218,500	\$218,500	\$218,500	\$207,000	\$195,500	\$184,000
4	Lease payments	\$69,000	\$69,000	\$69,000	\$69,000	\$69,000	\$69,000	
5	Annual direct costs		\$108,262	\$118,978	\$131,518	\$137,714	\$143,043	\$146,148
6	Total annual costs	\$69,000	\$177,262	\$187,978	\$200,518	\$206,714	\$212,043	\$146,148
7	Cash flow before tax	-\$69,000	\$41,238	\$30,522	\$17,982	\$286	-\$16,543	\$37,852
8	Tax due	-\$24,150	\$14,433	\$10,683	\$6,294	\$100	-\$5,790	\$13,248
9	Cash flow after tax	-\$44,850	\$26,804	\$19,839	\$11,688	\$186	-\$10,753	\$24,604

The lease payments (row 4) replace all the transactions associated with buying the machine such as purchase price, depreciation and residual market value. Cash flow before tax (row 7) is therefore simply what comes in from the annual income minus what goes out to lease payments and direct operating costs. The full lease payments are allowed in the after-tax calculation and thus cash flow before tax and taxable income are the same. Tax due (assumed to be 35 percent of taxable income) is calculated in row 8 and deducted from cash flow before tax to give row 9.

positive by the end of our second year ($-\$44,850 + \$26,804 + \$19,839 = \$1,793$). This is a great advantage and could easily cause us to decide on the lease option despite the fact that the sum of the lease payments ($6 \times 469,000$, or $\$414,000$) exceeds the sum of the purchase price plus interest minus residual market value that we saw last month ($\$380,000 + \$80,000 - \$50,000 = \$410,000$).

It is important to “do the numbers” and determine how various financing options are likely to affect the company’s tax and cash-flow situation. There are also non-quantifiable aspects of each option to be evaluated in order to properly assess the risks involved before making a final decision. Here are five important areas:

Fixed-cost risk. Monthly loan and lease payments must be met regardless of whether or not the machine has worked. Utilization thus becomes extremely important, and managers must do all they can to ensure that machines acquired using loans or leases work the hours needed to recover their fixed ownership costs. High fixed costs arising from commitments to the loans and leases used to acquire equipment can cause a company to focus on cash flow instead of earnings and create a climate where acquiring work is more important than building work at a reasonable margin. Charges for depreciation and return on equity affect internal measures but do not have the same sense of urgency and impact on business results.

Working-capital risk. Working capital (cash plus current assets minus current liabilities) is invariably a scarce resource. Using cash to purchase equipment has a negative impact on working capital and could give rise to the use of debt to cover short-term operating needs. Loans for working capital needs are both risky and expensive; it is wiser and cheaper to save working capital for working capital needs and use loans or leases to acquire equipment. The Construction Financial Management Association says that working capital should be approximately 3.3 percent of annual revenue and that values below this “may indicate a need for increased working capital to sup-


port future revenue growth.”

Debt-to-equity risk. There is a limit to the amount of debt that a company can use to acquire equipment and other fixed assets regardless of its ability to generate the cash flow needed to service the debt. The ratio of the debt to equity (total liabilities to total net worth) is commonly used by lending agencies to measure risk and set limits. The Construction Financial Management Association says that “a ratio of three to one or lower is considered acceptable.”

A need to conserve cash and maintain acceptable levels of working capital while maintaining an acceptable debt-to-equity ratio means that leasing is frequently the only alternative available to companies that are leveraged and growing rapidly. Complex calculations on the relative merits of buy, borrow or lease become moot when neither cash nor debt capacity is available.

Residual-market-value risk.

The fact that the leasing company owns the machine and bases the lease payment calculation on an assumed market value at the end of the lease means that they carry the risk for variations in the residual market value. This can be a great advantage and is frequently a plus when companies enter into lease agreements with manufacturers of new, innovative and perhaps experimental equipment where the manufacturer sees less risk of failure than the buyer is prepared to accept.

The small-print risk. Loan agreements and leases often contain small print aimed at protecting the lending or lease organization. This pertains particularly to clauses which describe what happens if payments are missed, if the agreement is terminated early, or if the loan or lease is converted to an equity purchase. Lease agreements also frequently contain clauses that pass some of the residual market value risk on to the user by stipulating that the agreed payment covers only “normal wear and tear” and by limiting the total hours or miles of use during the lease period. Needless to say, the small-print risk needs to be well studied and understood before entering into the agreement. 

A need to conserve cash and maintain acceptable levels of working capital while maintaining an acceptable debt-to-equity ratio means that leasing is frequently the only alternative available to companies that are leveraged and growing rapidly

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“Bowlful” of New Features for Bobcat’s K-Series

Like adding vitamins and minerals to breakfast cereal, these new loaders are fortified with chain-case, undercarriage, hydraulic and cooling-system enhancements

Marketing types can be pretty clever when trying to capture the attention of buyers—or in this instance, the trade press. Several weeks ago, an overnight package arrived containing what appeared to be an empty Kellogg’s Special K cereal box, complete with calories-per-serving and fat-content information. Turning the box to the left side panel, however, revealed pictures of the new Bobcat K-Series loader lineup. Okay, we got the connection, so we weren’t surprised to see that the back and right side panel of the box promoted new K-Series design features.

Dare we say, then, that these new K-Series machines have a bowlful of new features, or that Bobcat believes that settling into the cab of a new K-Series loader is a great way to start your day at the site? Maybe we should just look at the box again to see what’s new with these K-Series models, including the S130 through S300 skid-steer loaders, T140 through T300 compact track loaders and the A300 all-wheel-steer loader.

A significant enhancement for these machines is the new SmartFAN cooling system, which uses a variable-speed, hydraulically driven fan that senses machine-operating temperature, then automatically adjusts its speed accordingly. The company says the new fan can be up to 30 percent quieter in certain operating conditions, a benefit that may allow longer workdays in noise-sensitive areas, reduce noise-fatigue for the operator (less Snap, Crackle and Pop) and contribute to better communication on worksites. Of course, Bobcat did not LEggo of its innovative dual-path cooling system on K-Series models, which can accommodate an optional sound-reduction package.

Bobcat might well borrow the sentiments of a fellow feline



Large-frame, vertical-lift-path loaders in the new K-Series (S250, S300, T300 and A300) have an additional 2 inches of lift height. This added capability assists in loading over high-sided containers and trucks.

by saying that the heavier drive chains now used for large-frame K-Series loaders are G-R-R-REAT. The new 120 HSOC drive chains, says Bobcat, are 38 percent stronger than the previously used 100 HSOC chains (HSOC means “high-strength oval chain”). This added chain strength, says the company, has life-extending potential in tough applications, such as those requiring over-the-tire steel tracks or special tires. And on T180 through T300 K-Series compact track loaders, a triple-flange, permanently lubricated track roller added to the undercarriage (making a total of five per side) enhances ride quality and track life.

All Bran new for medium-frame K-Series loaders (S130 through S205 and T140 through T190) is the use of Bobcat’s K-Force hydraulic system, which, says the company, provides the same and technology and performance as the systems already used on large-frame models. Among the new system’s benefits are an 8-percent increase in breakout force and more available hydraulic horsepower for powered attachments.

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Fleetguard Invents Plastic-Canister Filter

Molded polymer product is easier to handle than the metal types it will replace

Anyone who's ever changed an oil or fuel filter will appreciate Fleetguard's new "user-friendly" design the first time he or she picks it up. Unlike the metal-canister filters it will replace, the new polymer plastic product almost nestles in one's hand because of slip-resistant surfaces near its base. It feels secure and should be easy to grasp while spinning it on the engine's spud.

We haven't done that yet because Fleetguard has just put its plastic-canister filter into production. The company says it's the first such filter on the market, but it may well start a trend away from ubiquitous metal-canister filters of all kinds.

The plastic canister design has no snappy marketing name, and will be known only by new part numbers when it begins showing up in the supply pipeline. Only the canister will change — the same filter media as in current Fleetguard filters, based on application, are inside the new canisters.

The first ones made will be oil and fuel filters for Cummins 5.9-, 8.3- and 8.8-liter diesels, which are the biggest-volume automotive and industrial models built by Fleetguard's parent company. Soon there'll be versions for other Cummins and many competitor diesels, as well as for private-label distributors.

Current filters in the FF, FS, LF and MK series will be replaced by new numbers with the same letter prefixes. These will be for applications on Case, Ford, GMC, International, Komatsu, KHD, Volvo and other engines. Fleetguard might eventually make the filters for hydraulic systems, but that has not been determined yet, a spokesperson said.

As the new filters enter the market, and especially after they have been in service long enough to be pulled off, mechanics accustomed to dealing with metal-canisters will immediately notice the new filter's other attributes:

- Polymer threads at the filter's top screw easily onto the engine's metal spud, but cannot hurt the spud if the mechanic cross-threads it. Cross threading ruins only the filter, not the spud, which is troublesome and time-consuming to replace.
- A one-way socket indentation molded into the bottom allows the filter to be removed with a bare 1/2-inch-drive ratchet wrench or a 1/2-inch-drive extension. But that wrench can't tighten the filter; it can only be hand-tightened, which avoids overtorquing.
- A flat bottom lets the filter stand on any level surface top-



A molded-in pocket accepts the square 1/2-inch-drive of a ratchet wrench or drive extension to loosen the filter. But the polymer filter can only be hand-tightened. Many versions of oil and fuel filters are planned.

side up, keeping it clean until it's ready to be installed and, after removal, keeping dirty oil inside until the mechanic is ready to dump it. The flat-bottom feature is easily molded into plastic, but cannot be stamped onto the bottom of a metal-canister filter because it needs curved edges to withstand high oil pressures.

- Plastic is lighter than metal, so a new plastic filter will weigh about 50 percent less than a metal-canister filter.
- The polymer nylon material is crushable and recyclable. Many recycling operations now accept the material, but it can also be incinerated in states and locales that allow it, the company said.

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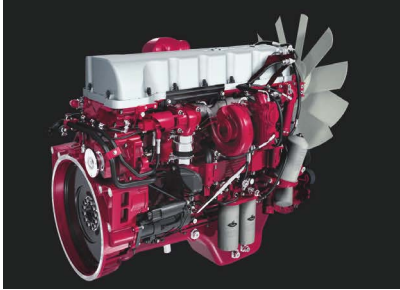
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Market Watch Lite

By HEATHER BURLINGAME, Senior Production Editor

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▶ Mack

A more economical series of diesels called Mack Power, or MP, will go into production beginning in early 2006 to replace current ASET engines by January '07. First is an 11-liter MP7, which will be offered as an '04-compliant engine in certain truck models. For '07 the MP7 will be fitted with a diesel particulate filter to

meet stricter exhaust emissions limits. Also in '07, a 13-liter MP8 will debut. They'll deliver better fuel economy than ASET engines, and have unique mechanical parts and electronic controls.

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▶ Michigan Pneumatic Tool

The NPK NRE-1000 Hoist features the Automatic Load Limiter that prevents lifting of weight that exceeds the hoist's load rating. The load limiter constantly monitors the air pressure supplied to the air motor during lifting and will automatically stop the hoist when attempting to lift in excess of the rated load. The unit is available in a one-ton capacity.

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▶ Caterpillar

The H55Ds hydraulic hammer has a simplified design that reduces the number of parts by almost half compared to the previous model, the H50s, according to the company. It has a higher blow rate and 25 percent more power. Carrier weight is 5,500 to 9,900 pounds, and the hammer is compatible with the Caterpillar pin grabber quick-coupler system.

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▶ Ingersoll Rand

The PowerSource mobile generator line includes six models (G10-G125), ranging from 10kVA to 125kVA. PowerSource is smaller and lighter than predecessors. All controls and connection points are at the rear in a power pedestal for operator convenience and safety.

For more information, visit ConstructionEquipment.com/info

▶ Stone

Stone Champion line of heavy-duty mortar mixers includes two models. SM1200 has a capacity of 12 cubic feet; SM2000's capacity is 20 cubic feet. Powered by 13-hp Honda engines, mixers feature Parker Parts hoses and fittings, Eaton hydraulic pumps and White motors. Adjustable legs allow the mixers to fit under any silo, and intuitive dumping and paddle drive controls are located on both sides of the cowl making the mixers easy to operate.

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Market Watch Lite



▶ **Multiquip**

The PS Series walk-behind pavement saw has adjustable handles that remain level regardless of the saw's position. Maximum blade capacity is 36 inches. The 34-inch wide, 1,700-pound machine has a clutchless bladeshaft disengaging system that enables bladeshaft rotation to be stopped or started while the engine is running.

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▶ **Topcon**

GPS+ GLONASS features G3 technology. The G3 chip's Universal Signal Tracking capability can receive signals from up to 36 satellites simultaneously. The Paradigm G3 chip tracks all signals from all available satellite positioning systems to provide seamless positioning information. Its patented new-generation firmware is designed to dynamically adjust to satellites with the best signal strength. The chip is 75 percent smaller than current chips, enabling smaller, lighter receiver design.

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▶ **Wacker**

The BS 50-4s and BS 60-4s are the first four-cycle rammers to offer a low-oil shut-off. Wacker's 4-cycle WM 90 engine generates 2.8 horsepower. The BS 50-4s weighs 137 pounds and hits with 2,645 pounds per blow at a rate of 680 blows per minute. The BS 60-4s weighs 154 pounds, hits with 2,975 pounds per blow at a rate of 680 blows per minute.

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Atlas Copco

LS 14 and LS 16 hydraulic-powered cut-off saws cut through concrete, asphalt, cement, brick and steel. The 14-inch blade on the LS 14 cuts to 5.3 inches deep. The 16-inch blade on the LS 16 cuts to 6.3 inches. Both have a direct-drive design for consistent speed and torque and reduced maintenance requirements. A power-on-demand system automatically decreases engine speed when the tool is disengaged, reducing fuel consumption.

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Leica

Sixth-generation Disto instruments are available in two models: A5 for advanced applications and A3 for basic distance measuring. The A5 features an integrated telescopic optical viewfinder with crosshairs for aiming and a flip-out end piece for measurement from edges or corners. The A3 can be carried in a pocket. It can produce to 5,000 measurements on one set of AAA batteries.

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MSA

An optional network interface for the MSA Galaxy Automated Test System for portable gas-detection instruments is available. Instrument-inventory data includes instrument type, serial number, test-stand location and last-calibration date. Most settings can be modified via the network interface. The system notifies two recipients via email when an instrument is due for calibration or has failed.

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Atlas Copco

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Leica

Leica Builder comes as Builder T, Builder R and Builder RM. Builder T reduces many steps and manipulations in tasks such as fast horizontal angle measurements or plumbing. Builder R has all the features as Builder T, plus a red visible-laser electronic distance-measuring device. Also added are built-in software functions for layout and the capability to produce graphic sketches. Builder RM has all the abilities of Builder R and allows the user to call up construction data, save measurements and transfer data to a PC for editing.

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Construction Technology

Models CLT-10 and CLT-20 Clamp-On Forks fit compact tractors from 20 to 40 horsepower. CLT-10 forks feature 1,000 pounds of lift capacity and 34-inch tines. The forks weigh 45 pounds per tine. CLT-20 forks have 2,000 pounds of lift capacity and 36-inch tines. Total weight is 110 pounds. Padded clamp screws hold the forks in place. The forks are covered by a three-year warranty.

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Honda

For handheld applications, the GX35 mini four-stroke engine replaces the GX31. Engine design is based on the same 360-degree-inclinable technology as the GX31, but is smaller, lighter and more powerful. Improvements include more power output, reduction in overall size, weight reduction, power-to-weight ratio, and power per cc of displacement. With ample low-speed torque, the unit does not need to be operated at wide-open throttle, which reduces noise and operator fatigue, increases fuel economy and decreases emissions.

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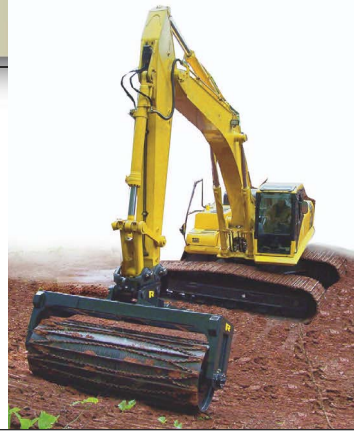


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▶ Subaru Robin

For handling water with small solids and light debris, semi-trash pumps offer a heavy-duty overhead-valve gasoline engine and a large volute-discharge opening. The 2-inch PKX201ST features a 4.5-hp engine and provides a delivery volume of 153 gpm. The 3-inch PKX301ST offers a delivery volume of 246 gpm with a 6-hp engine. A low-tone muffler and sound-suppressing air cleaner provide quiet operation. Routine maintenance can be done in the field with hand tools.

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▶ Smith Equipment

Oxy-fuel Gas Axe is for use with oxygen and any fuel gas, and cuts steel up to 24 inches thick, says the manufacturer. Available in 3-, 4-, 5- and 6-foot lengths, the torch comes with various head angles. Resilient Graf-Tite seat material protects the cutting tip from nicks, provides consistent gas tight seating, and requires less cutting tip replacements compared to competitive metal-to-metal seat tip designs, according to the company.

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Kaeser

M43 and M70 portable compressors are new from Kaeser Compressors. M43 delivers 150 cfm at 100 psi, and is powered by a 4-cylinder Kubota diesel. M70 produces 250 cfm at 100 psi and 190 cfm at 150 psi. Both have a Sigma Profile rotary-screw air end. Both the compressor and engine are warrantied for two years or 2,000 hours, whichever comes first.

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Kenco

The Hardrock Coupler is said to be able to withstand use in hammering applications with the efficiency of a pin-grabbing coupler. The universal coupler works with any excavator within the weight class, and the hydraulic cylinder operates at full system pressure.



"Safecam" system prevents release of the attachment in the event of hydraulic failure, according to the company, and a standard lifting eye provides storage for the safety pin. Price (100 class machines) is \$3,728, with a one-year warranty.

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Landa

The company has upgraded its SUV line of hot-water pressure washers and extended the warranty to seven years. The Landa pump has three ceramic plungers, which increases average expectant life to 2,500 hours. The two models (SUV3-20124 and SUV3-24124) feature 6- and 7-hp Subaru engines coupled with Landa's proprietary super-duty regulator to

produce a constant supply of 12-volt power for the diesel-fired burner.

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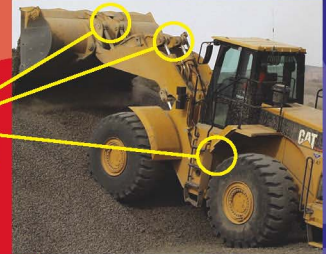
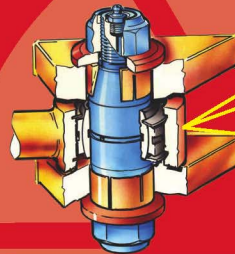


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Iron Works

By KEITH HADDOCK, Contributing Editor

A 50-Year Niche

Born to fill a specific need, the Cary-Lift is still one of Pettibone's main products

Entrepreneur Phil LaTendresse ran a small manufacturing facility at L'Anse, Mich., called LaTendresse Manufacturing Co. He wanted a regular wheel loader to do more than merely load material. After several experimental machines, he invented the world's first forward-reaching, rough-terrain material handler in 1949, naming it the Cary-Lift. What sets the Cary-Lift apart from a regular wheel loader is its ability to extend its bucket arms forward and back when the machine is in a standing position. This is accomplished by attaching the pivoting loader arms to a movable frame that is actuated in turn by an extra pair of hydraulic rams.

When equipped with forks or pipe-handling grapple, this forward-reaching feature allows the operator to delicately pick and place a load or position the forks accurately under stacked material without having to depend on perfectly level ground. It also gives him superior forward reach capability beyond that of a similar-sized wheel loader. An additional bonus is full frontal visibility with overhead lifting arms pivoting at the rear.

In 1951, LaTendresse sold the Cary-Lift manufacturing rights to Pettibone Corp., and the first Pettibone Cary-Lift appeared soon afterward as the Model 54 with 10,000-pound lift capacity. In 1957, the company moved manufacture of the Cary-Lift from L'Anse to Baraga, Mich., where it is still manufactured by Pettibone Traverse Lift.

Over the years the Cary-Lift received many upgrades, and its design concept expanded into a wide range with lifting capacities from 4,000 to 70,000 pounds. The massive Super 70 Carry-Shovel of 1962 was powered by a Cummins 350-hp engine, carried a loader bucket of 26 cubic yards heaped capacity, and boasted a 6-foot forward hydraulic reach.

Pettibone Traverse Lift today operates as the Heavy Equip-



Pettibone's Model 54 Cary-Lift has a lift capacity of 10,000 pounds. Cary-Lifts have been in production since the early 1950s.

ment Group of Pettibone LLC headquartered in Downers Grove, Ill. It is a direct descendent of the Pettibone company formed in 1881, which at that time was involved in manganese refining. Over the years, the company expanded into manufacturing and acquired a long list of companies. They operated at different locations but all under the umbrella of the main Pettibone corporation.

During the 1960s, the construction-equipment division (known as Pettibone Mulliken) operated eight integrated manufacturing plants. Products included wheel loaders, elevator loaders, bucket loaders, motor graders, mix-in-place concrete equipment, pumps, conveyors, rock crushers and screening and washing plants. Later, the company made a name for itself with rough-terrain mobile and hydraulic truck cranes.

Since its invention more than 50 years ago, the Cary-Lift has remained in continuous production and still forms the backbone of Pettibone's Heavy Equipment Division at Baraga, Mich.

You can read more about the evolution of construction equipment in Keith Haddock's illustrated book "The Earthmover Encyclopedia" available in most bookstores. Also, consider a membership in the Historical Construction Equipment Association, www.hcea.net. Be sure to visit ConstructionEquipment.com for past Iron Works features.



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Bucket Digging Force (lbs.)	8,157	12,125	17,416	22,707	27,337	31,526
Bucket Digging Power Up (lbs.)	N/A	N/A	18,298	24,912	28,880	33,510
	S300LCV*	S340LCV	S420LCV	S470LCV	S5500LCV	
Operating Weight (lbs.)	65,257	74,736	103,397	103,397	110,000	
Net Engine HP (SAE 1349)	197	247	281	312	312	
Bucket Digging Force (lbs.)	37,699	45,415	48,722	55,556	60,186	
Bucket Digging Power Up (lbs.)	39,903	48,061	53,131	59,965	60,200	

*For model as shown. Other models available.
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