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Cover photo: George Pfoertner ©

FEATURES

FIELD TEST

30 More Machine Runs on Less Fuel
Could the "E" in the new Case 821E's model designation stand for efficient? The word does seem apt for summing up this new wheel loader's overall design and performance — a conclusion *CE* editors reached when working with Case to run the 821E and its 821C predecessor in head-to-head production and fuel studies.



SPECIAL REPORT: FLEET MASTERS

38 CJ Miller Saves Millions Measuring What Should Be Managed
In 26 years directing the operations of large equipment fleets, Dale Warner has developed systems and disciplines necessary to measure machine usage and operating severity by tracking individual units' fuel consumption. Warner joined CJ Miller a few years ago, and he has saved the company millions of dollars. CJ Miller was recognized with the Fleet Masters award from AEMP.



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HANDS-ON TRUCKING

44 Trio of Ts Show Basic Strengths

Truck Editor Tom Berg drives a pair of construction-type Kenworth T800s as well as a T660, specifically a Day Cab version of KW's highway tractor. The Day Cab features a setback axle, allowing a tight wheel cut that makes for good maneuverability. Berg also reports on the '07-spec diesels that power the trucks.



BUYING FILE

48 Taking Notice of a Sleeping Giant

A 75,000-pound excavator would not best be described as a sleeping giant. But, considering their clear significance to the industry, 30- to 40-metric-ton excavators collectively may just fly under the radar screen more than any other machine size class. This is big iron, well represented in the field, but without the hoopla of smaller machines and the sheer dominating presence of the largest machines.



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Technician Scholarships

A few weeks ago, trustees of the AEMP Foundation met to choose its first scholarship winners. Full disclosure: This editor has served as a trustee since 2004, when Bob Decker took over as chairman of the group. Decker has revitalized the Foundation, and these scholarships are among the first fruits of his leadership.

Decker's passion for preparing the next generation of technicians is matched by the others on the Board, and the combined efforts of this group brought us to Scottsdale, Ariz., where we were reviewing the first class of applicants. The scholarship winners will use the money to pay for classes that will move them along the path toward becoming equipment technicians.



Rod Sutton, **Editor in Chief**

The Foundation also funds AEMP's Technician of the Year program, which includes money for continuing education as one of the prizes awarded each year. These awards are given to technicians currently employed by equipment-owning fleets.

These two Foundation expenditures address the technician shortage in a tangible, far-reaching manner. Both young people training for the career and those currently serving benefit from the resources provided. The Foundation comes by these resources through donations, and the board disburses these resources with a great sense of responsibility: to the industry that contributes and to the recipients who advance their abilities.

We all want technicians to succeed; we all want more young people to choose this career. We all can put individual efforts toward those goals; but it is when united that the industry can make its greatest impact on the technician shortage.

Investigate the AEMP Foundation (aemp.org); read about its mission and purpose; review the scholarship application. Contact any member of the board of trustees to find out what impact this group is having on the technician shortage.

So here's the plug. If you like what you see, consider becoming involved. You can make personal donations, or you can talk to your company's management about some sort of broader involvement. If the Foundation's vision matches yours, support it with a financial contribution.

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MARKET WATCH

By KATIE WEILER, Managing Editor

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Caterpillar

The D6N has been updated with a new 150-hp Cat C6.6 ACERT engine that meets Tier 3 emissions standards. It also features SystemOne undercarriage with oscillating track roller frame, decreased ground shock, and a smoother ride. Cat says its redesigned operator station provides excellent visibility to the work area and reduces sound and vibration levels. An AccuGrade Attachment Ready option includes all of the changes needed to machine systems — electrical, hydraulic, blade and cab.

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JCB

JCB says the Vibromax 160 double-drum vibratory rollers, with a new 11.7-gallon fuel tank, will provide a full day's more use out of the machines than competitive models without stopping to refuel. A 32.6-gallon water tank will also keep the roller on the move. Five versions of the 1.76-ton VMT160 models replace the 1.32-ton VMT120. There are drum widths of 32, 36 and 40 inches, with 32- and 36-inch variants available with clear side operation. The drum is only supported on one side enabling clear-side machines to compact right up against obstacles such as walls and curbs.

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Gehl

The 1448 Plus and 1648 Plus Power Box asphalt pavers use a full-floating, adjustable, vibratory, 8-foot screed that is suited to applications such as driveways, recreational courts, walking paths and parking lots. The screed on the 1648 Plus is propane-heated, while that of the 1448 Plus is heated via engine exhaust, but a propane burner is available. Both models are powered by Yanmar diesel engines.

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Sterling Truck

Sterling has announced Set Forward versions of its Class 7 and 8 conventional-cab models with short and medium-length hoods and 101- and 111-inch BBCs, respectively. Compared to Sterling's current axle-back models, the forward placement of the steer axle stretches a truck's wheelbase by 20 to 23 inches in the same overall length, which adds 1,500 or more pounds of legal payload in bridge-formula states. More slope to the hoods allows better forward vision.

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Ingersoll Rand



The DD-22 and DD-24 double-drum asphalt compactors are designed to allow the drums to protrude beyond the frame. As well as improving the operator's view to the drum edges, this makes it easier to compact around obstructions without the chassis getting in the way. The DD-22 has a drum width of 39 inches and an operating weight of 5,400 pounds; DD-24 has a drum width of 47 inches and weighs 5,725 pounds.

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Toro

Dingo TX 525 compact utility loader is available in both Narrow Track and Wide Track models, each powered by a 25-hp Kubota diesel engine. The Narrow Track model has an overall width of 33.7 inches and weighs 1,904 pounds, while the Wide Track model has a width of 40.5 inches and weighs 2,127 pounds. Both configurations of the tracked walk-behind loaders have a rated operating capacity of 553 pounds, and they are able to accommodate a number of attachments.

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Caterpillar

The D6T features a new two-pump hydraulic system that powers the steering system with one pump and the implement circuit with another pump, resulting in quick steering performance and blade response. The new Multi Velocity Program (MVP) allows operators to choose from five different speed ranges. The machine retains its C9 ACERT engine, planetary powershift transmission, differential steering system, System-One undercarriage, and AccuGrade.

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Komatsu

With an operating weight of about 14,500 pounds, the WB 142-5 backhoe-loader is billed as an "entry-level" model. This 76-horsepower machine "has many of the same design features as its big brother, the WB146-5." Four-wheel drive is standard, as is the 1.0-cubic-yard front bucket with bolt-on cutting edge. The WB142-5's hydraulic system supplies a flow of 37 gpm from a tandem gear pump, and the system allows the operator to select a performance mode or a fuel-economy mode.

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New Holland

W170B and W190B wheel loaders are powered by the latest generation, CNH Tier III engines. The W190B's power has increased 13 percent to 195 horsepower, and torque increased 16 percent. Power is unchanged for the W170B, but torque increased 6 percent. The W270B is fitted with a Cummins Tier III engine delivering its 320 horsepower peak at 1,000 rpm, compared to 1,200 rpm in the previous model. All models now feature a ZF Powershift transmission.

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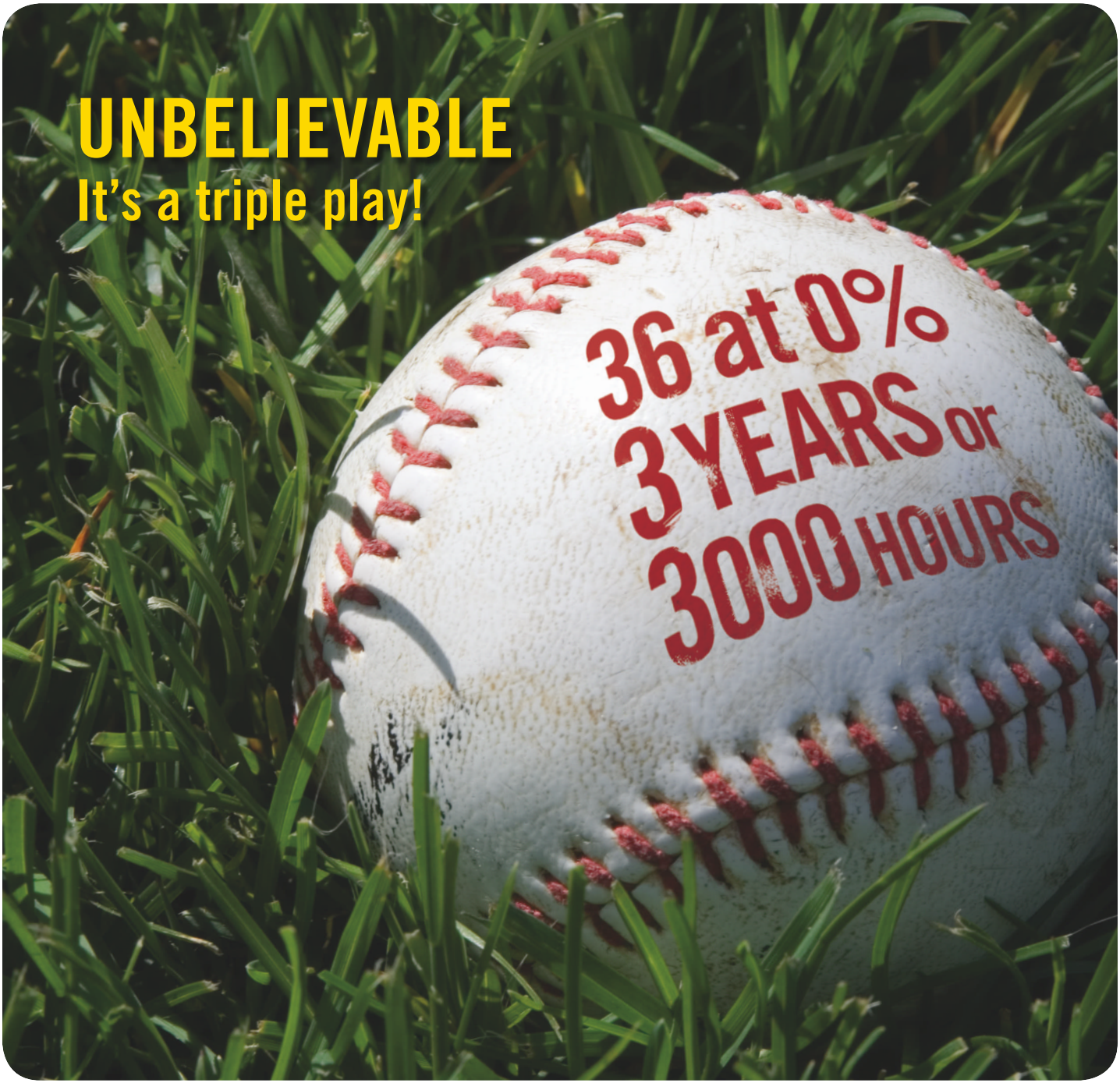

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Case

The 921E is the latest in the company's E Series line of wheel loaders, with an improved payload of 5.75 cubic yards. Tier III engine, serviceability improvements, and quieter cab highlight the upgrade. Three power curves and four work modes are available. At max performance, the engine provides 297 net horsepower. The unit also has a new cooling package that facilitates cleaning with a swing-out condenser.



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Genie

Genie has redesigned its GTH-1048 and GTH-1056 telehandlers for maneuverability without compromising reach and lift, the company says. GTH-1048 lifts up to 6,000 pounds to 48 feet with 31 feet of outreach; GTH-1056 has outreach of 40 feet and lifts 4,000 pounds to 56 feet. Outside turning radius is about 14 feet, and the machines have three steering modes: crab, coordinated and front-wheel. Engine choices are Perkins or John Deere.



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John Deere

The largest crawler loader model offered by John Deere, the 755, has been updated to the D-Series. It features a Tier 3 Deere 6068H turbocharged, charge-air-cooled, wet-sleeve diesel engine producing 181 horsepower at 1,800 rpm. Controlled by a single lever, the loader's hydrostatic transmission provides infinite speed control, power turns, counter-rotation and dynamic braking. A transmission-only decelerator provides full power to the hydraulics while slowing the tracks.



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Caterpillar

Cat introduced four telehandlers to replace its previous B Series. Two smaller B-Series machines, the TH220B and TH330B, will continue to be offered in North America. Models TL642, TL943, TL1055 and TL1255 feature JLG designs and include Caterpillar components. A pilot-operated joystick allows three boom functions to operate simultaneously; a separate control lever operates the auxiliary hydraulic functions. The machines have a capacity range of 6,500 to 12,000 pounds and lift heights from 42 to 55 feet.

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Vermeer



The RTX1250 ride-on trencher, equipped with four track modules, is designed for use in applications requiring enhanced traction, stability and flotation. The "quad track" system replaces the standard RT1250's rubber tires, but retains its counterpart's ground-drive features, such as axle oscillation and four-corner steering and crab steering. Using a 120-horsepower Cummins diesel engine, the unit can trench to depths of 72 inches and to widths of 18 inches. The unit also can pull vibratory-plow blades to 36 inches.

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Volvo Trucks

The VHD vocational truck and tractor, formerly available only as a daycab, is now offered with a 42-inch-long sleeper compartment for operations where legal sleep must be accommodated. The sleeper has 118 cubic feet of space and comes with a full-length bunk and a privacy curtain, plus another curtain for the windshield. Like all VHDs, the new VHD 430 is standard with Volvo's D13 diesel with up to 485 horsepower and 1,650 lbs.-ft. of torque.

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310SJ TMC	92 hp	14 ft. 11 in.
410J TMC	96 hp	16 ft. 1 in.











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Putzmeister



The new soil-placing hopper is designed for use with its truck-mounted Telebelt conveyors and allows materials to be placed into the hopper via a wheel loader. The 3-cubic-yard hopper has a top opening measuring 72x120 inches, and its adjustable legs allow heights from 83 to 98 inches. A steel grate prevents oversized material from entering the hopper.

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Genie



The GS-3232 self-propelled scissor lift has been added to the company's line, and it lifts up to 500 pounds to a maximum working height of 38 feet. With a footprint of 7 feet 11 inches long and 2 feet 8 inches wide, it fits through standard doorways. It has dual front-wheel drive and zero inside turning radius, and it travels up to 2.2 mph.

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Hitachi

Hitachi rolls out Dash-3 excavator upgrades with the ZX160LC-3, ZX200LC-3 and ZX225USLC-3 models. In addition to increasing operating weight by more than 2,400 pounds, the ZX160LC-3 offers 39 percent more hydraulic flow thanks to the HIOS III hydraulic system. This leads to 20-percent faster arm roll-in and 15-percent faster boom lowering. The ZX200LC-3 and ZX225USLC-3 also benefit from the new hydraulics, and boast an additional swing torque increase of 13 percent.

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Bobcat



With a rated operating capacity of 3,300 pounds, the vertical-lift-path Bobcat S330 skid-steer loader provides a lift height of 10 feet 10 inches. It provides an auxiliary-hydraulic flow (high-flow) of 37 gpm, which, says Bobcat, will enhance performance of high-flow attachments. A deluxe panel option provides information on the function of a specific attachment by showing the operator the fingertip controls to be used.

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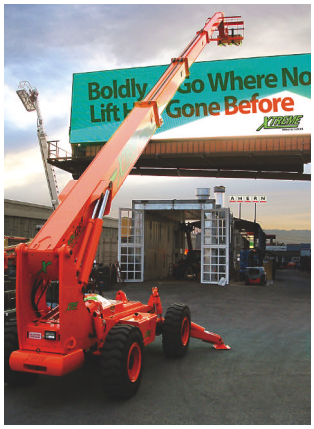
Xtreme



Xtreme pioneers a new size class with the 12,000-pound XRM1267 telehandler imported from the company's Italian supplier, Dieci. Only a couple of crane-like telehandlers with rotating upper structures will reach higher than its 67 feet, and nothing else is even close to the XRM1267's 6,800-pound capacity at maximum height. Horizontal reach is 53 feet 8 inches (nearly nine feet longer than any other traditional telehandler), and the unit will lift 3,000 pounds at full reach. Operating weight is 46,300 pounds.

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Gehl



The 383Z zero-tail-swing excavator weighs 7,826 pounds with a canopy and 8,002 pounds with a cab. The machine uses a 29-hp Yanmar diesel engine, mounted on the side of the unit to allow a larger operator's station, and employs two variable-displacement pumps and two gear pumps in its hydraulic system, which develops a 3,481-psi working pressure. The 383Z is equipped with a blade and provides offset digging.

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Joe Kilzer

Joe Kilzer
Job superintendent - Garrett Excavating
Hot Springs, AR

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The secret to Joe's success is he wasn't afraid of the technology. He found out it's not that hard and by learning it and applying in on the job, he could advance quickly. I'm so proud of him and what he has accomplished.

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MANUFACTURER NEWS

Datsun? Daewoo? Doosan!

Except for among you Z-car enthusiasts, the name Datsun isn't well remembered today. But we all know the brand name that replaced it: Nissan. Likewise, the name Daewoo, which we had come to associate with a strong brand of earthmoving equipment, has been changed to a new brand designation: Doosan. And like the Nissan brand, the new Doosan brand on machines with the familiar orange paint will likely soon build market equity.

As you might remember, in April 2005, Doosan Corp., a 111-year-old South Korean company, acquired Daewoo Heavy Industries and Machinery, which had established itself as a significant supplier of hydraulic excavators, wheel loaders and compact equipment in the North American market.

To capitalize on Daewoo's market momentum, Doosan established Doosan Infracore America, Construction Equipment Division, and has actively advanced the development of its products, for example, by already introducing 15 Tier-III-compliant models — 10 DX-Series excavators and five DL-Series wheel loaders. According to the company, it ranks fourth in the global market for medium and large crawler excavators.

John Vandy, president and COO of Doosan Infracore America, Construction Equipment Division, has assured the industry that ongoing development will further enhance the new brand name and the machines that bear it. Among the company's plans for North America are more new models; a parts-guarantee program; a product-engineering department to guide machine-development/product-support efforts; a "remarketing" department to build market awareness for used machines; and continued development of the dealer network, which presently includes 70 distributorships and 130 locations.

— *WALT MOORE,* Senior Editor



The brand name has changed from Daewoo to Doosan, but the distinctive orange paint remains on the company's expanding range of equipment.

INDUSTRY SAFETY

OEM Backs "Call Before You Dig" Program

John Deere is digging in for the safety of America's contractors, homeowners, and public at large.

The Moline, Ill.-based equipment giant has been named the national equipment partner for the new nationwide 811 "Call Before You Dig" program. The new FCC-designated telephone number has been created to eliminate the confusion caused by the multiple numbers currently used across the country. As of May 1, 2007, homeowners and contractors can simply call 811 anywhere in the United States to have crews mark a requested site for underground lines prior to any excavation.

"Ultimately, we anticipate that the new national number will become top-of-mind to contractors and consumers, and help reduce or eliminate the more than 680,000 utility interruptions each year," says Bob Brock, John Deere Construction & Forestry Division's senior vice president, sales and marketing.

In addition to a financial commitment, Deere will promote the new number through its existing industry communications channels. The company's logo is also included on the new www.Call811.com website, which features information for homeowners and contractors about the importance of calling before digging.

LETTER TO THE EDITOR

"Not Coming Home," February Editorial

"Not Coming Home" erroneously presumes the construction fatality "was an accident, pure and simple." The backhoe-loader fall was not an "accident." Why? Equipment falls are the consequence of physical factors (gravity, elevation, etc.) and human factors (operator alertness, judgment, etc.). Ask any mechanical, industrial, or civil engineer. Avoidable fatality? Yes, definitely, for both the truck driver and the needlessly killed victim.

— *Chief Donald E. White,* Northern Virginia Mental Institute

HEAVY EQUIPMENT FORUM

GPS Grades a Little Disappointing

User #1: GPS grades we've been getting from the engineer aren't very accurate, + or - 0.20. Building corners, etc., are on, just the elevations are inconsistent.

User #2: GPS I have used has been right on. The most important factor is the model that you run off of. The guy on the computer end can make you or break you. In other words, the finished product is only as good as the data installed into your machine from the model.

User #1: The engineer's grades are off at the stakes. We have a series of 10 pads, 50' x 480', all supposed to be the same finish elevation. Hub elevations don't match.

User #3: I have run into that problem many times, and until an incident last year, my boss thought that I was just being difficult and having trouble with grades.

The surveyors came back to replace some grades around a building for a sidewalk. Only a few stakes were missing so you could compare it to the rest and see things were off. The new grades were out by 8 inches on one stake and then went down to 3 on the last ones. The surveyors said they didn't do the first layout and that that guy made the mistake. The building Super set up his old-fashioned level, and after going off the floor grades told them THEY were wrong and that they had better learn to use the tools they had.

The problem is some of these guys put too much trust in their machines, and even when you can see the error, can't or don't know how to correct it. The machines are only as good as the person that entered the information.

User #4: On the smaller jobs when I'm on the tripod I can tell a slight difference on my final grade from day to day; on the big jobs with a permanent base set it doesn't seem to be as bad. Also, how many points did you calibrate the site with? More [calibration points on site] seems to be better, especially if there is a difference in elevations.

User #5: If grades are involved, I insist on a solid benchmark with an elevation they will sign off on being 100-percent right. If I have one benchmark I know is right, I can check elevations before if it seems off, during if it starts looking wrong, before I do the work to finish it, and afterward if it does not match their stakes.

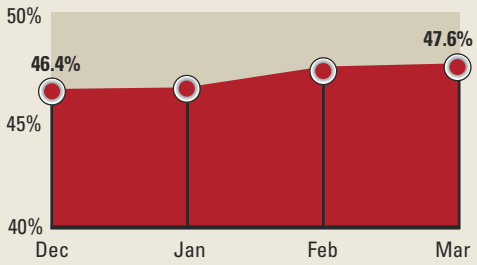
User #7: The first law of computing has always been GIGO: garbage in, garbage out. If surveyors, engineers, and/or programmers make stuff up, the poor bloke on the bottom of the food chain out on the job has no chance of getting it right.

HeavyEquipmentForums.com is a user forum where professionals in the heavy-equipment industry can exchange ideas and post questions/comments. Users include owner/operators, operators, company owners, technicians, and others. Posts have been edited for clarity/content.

MANAGEMENT

Used-Equipment Values Inch up 0.4 Percent

The Rouse Value Index
(Avg. orderly liquidation value as % of cost)

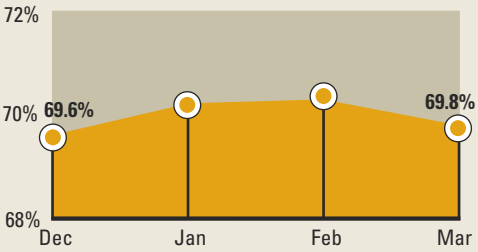


Note: Orderly liquidation value is expressed as a percentage of replacement cost (average cost paid for a new unit by large rental companies and dealers) for the average age of equipment within that category. Includes 10 categories of equipment common to rental fleets.

Source: Rouse Asset Services

Average sales values for used equipment typically operated in rental fleets have risen 3.2 percent since September. Values are up just slightly in March compared with February.

Backhoe Loader Values Hold
(Avg. orderly liquidation value as % of cost)



Of the 10 equipment categories typically owned by rental firms, backhoe-loaders are keeping the most value, registering a liquidation value right around 70 percent of replacement cost. For more information, visit www.rouseservices.com.

INDUSTRY EVENTS

SAF-T Conference Coming in July

Lift and Access magazine will be hosting the inaugural Safe Access, Fall Protection & Training Conference (SAF-T) on July 20, 2007. It will be held at the Hyatt Regency Long Beach in Long Beach, Calif. The one-day event will follow the Scaffold Industry Association's 35th Annual Convention at the same location.

For more information about feature presentations, panel discussions, and registration, visit SAF-Tconference.com.

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MANUFACTURER NEWS

Ingersoll Rand to Sell Bobcat and Related Businesses?

In mid-May, Ingersoll-Rand began to explore the choice of selling or spinning off to shareholders its Bobcat and construction-related businesses, including Utility Equipment and Attachments businesses. These businesses generated approximately $2.6 billion in revenues in 2006. The company expects to conclude its investigation in the second half of 2007.

"Our Bobcat, Utility Equipment and Attachments businesses represent world-class operations with exceptional people, products and brands; however, these businesses no longer fit Ingersoll Rand's long-term strategy," said Herbert L. Henkel, chairman, president and chief executive officer. "The eventual outcome of our process to explore strategic alternatives for these businesses will be the strategic repositioning of Ingersoll Rand away from the capital-intense, heavy-machinery profile of the company's past and toward a true diversified industrial company with powerful growth platforms consisting of climate control, industrial and security businesses. These businesses are well positioned to deliver consistent growth throughout the business cycle."

INDUSTRY NEWS

Goodyear Pioneered Interstate Trucking

On April 9, 1917, a five-ton Packard with 10-foot-high body rolled the first interstate trucking route with regular nonstop runs from Goodyear's Akron tire factory to its tire fabric mill in Connecticut. The one truck eventually blossomed into Goodyear's Wingfoot Express fleet, complete with the first sleeper cab.

A 1917 Packard Model E 3-ton truck — similar to the trucks of the first Wingfoot fleet — symbolizes the original interstate truck fleet. Housed in Fort Smith, Ark., at the headquarters of Wingfoot Commercial Tire Systems, the Wingfoot Express truck will celebrate the 90th anniversary this year with stops at Wingfoot Tire Center grand-openings nationwide.

Wingfoot Commercial, a Goodyear subsidiary, operates more than 173 commercial tire centers in North America. For more information on Wingfoot, visit www.wingfootct.com.



MANUFACTURER NEWS

Cerberus to Buy Chrysler

DaimlerChrysler is prepared to pay $680 million (the projected net cash outflow from the deal) in order to unload Chrysler. Private equity firm Cerberus will buy an 80.1 percent stake in the Chrysler Group from DaimlerChrysler for $7.4 billion — just over 20 percent of the price that Daimler paid for the U.S. automaker nine years ago. The deal is expected to close in the third quarter of this year.

It's the first time a major U.S. automaker will be owned by a private equity group. The company courts undervalued companies in aerospace, defense, automotive, manufacturing and other business sectors.

Chrysler will retain about $18 billion in retirement and healthcare costs for current/retired employees guaranteed by existing union contracts. United Auto Workers President Ron Gettelfinger and Chrysler President Tom LaSorda have both hailed the deal as the right move to return the No. 3 automaker to profitability in 2008.

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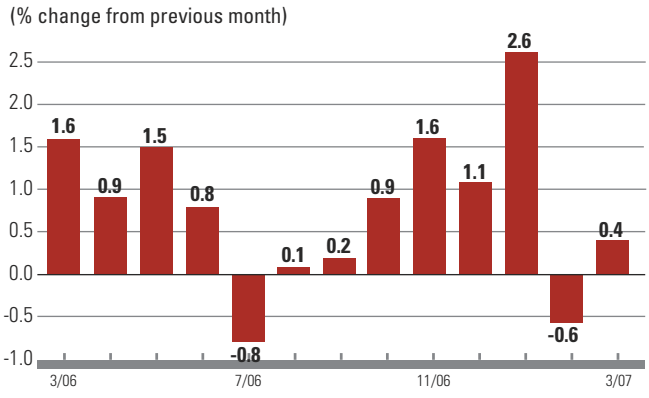
Status & Forecast

By JIM HAUGHEY, Director of Economics

PUBLIC CONSTRUCTION

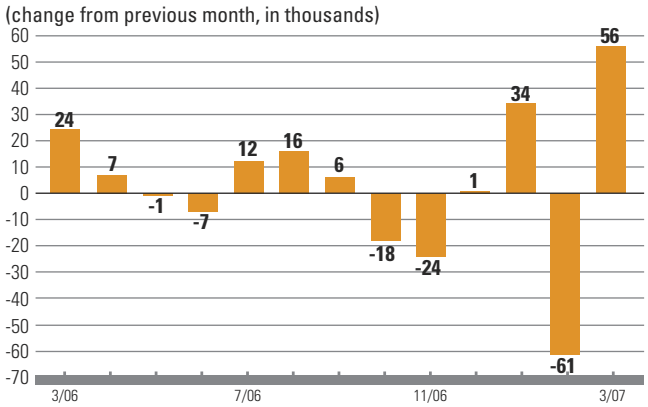
Spending for civil projects and institutional buildings is 9 percent higher than a year ago. The growth pace is expected to slip to around 8 percent by year end and about 5 percent by the end of 2008, which is a little short of projected project cost increases. This follows a similar decline in the new project starts trend. Water, sewer, bridges and colleges are the strongest markets. Pavement is weak due to the precarious state of the highway trust fund.



Source: U.S. Department of Commerce

CONSTRUCTION EMPLOYMENT

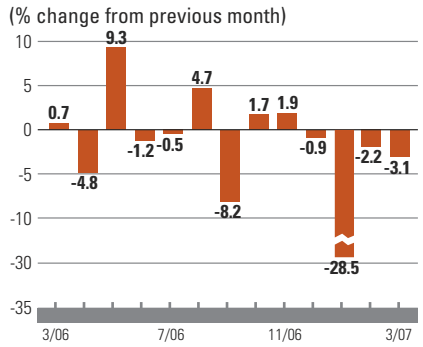
Construction employment is unchanged over the last nine months with layoffs in new home construction offset by hiring in other construction sectors. Total jobs will average near the current level through 2008. Homebuilder layoffs will accelerate this spring for a decline of between 30,000 and 50,000 jobs, but it will return late next year when homebuilders are again building their inventory. Nonetheless, construction wage rates will keep rising as workers catch up with the recent spurt of inflation.



Source: U.S. Department of Labor

CONSTRUCTION EQUIPMENT SHIPMENTS

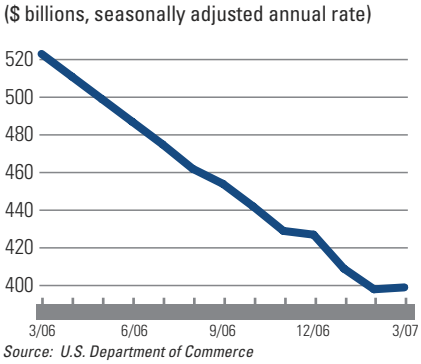
In the first quarter, equipment shipments from U.S. factories dropped a third below the sales pace that persisted throughout 2006. Equipment imports also fell substantially. Many fleets have now upgraded and expanded to the desired level. Overall construction spending is essentially unchanged over the last nine months, partly due to concern about economic growth prospects. Those concerns have now past, so shipments are projected to average from 6 to 10 percent higher than recent months through 2008.



Source: U.S. Department of Commerce

NEW RESIDENTIAL CONSTRUCTION SPENDING

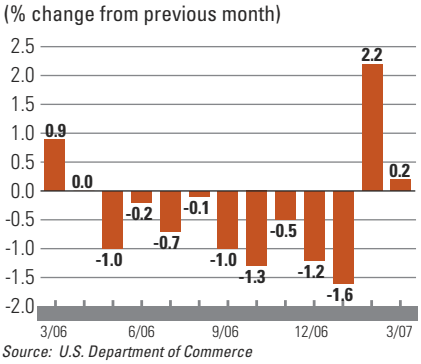
New residential construction spending fell 24 percent since March 2006, is forecast to dip slightly further this spring, and set to increase about 7 percent by the end of next year. Multifamily is unchanged from a year ago. The entire decline is in single-family, mostly for resort and retirement properties at the top of the market and entry-level homes at the bottom. Large homebuilders initially slowed building in existing developments, but are now postponing and canceling new developments.



Source: U.S. Department of Commerce

PRIVATE CONSTRUCTION

Spending is down 5.2 percent since the peak level reached a year earlier. The decline is near 10 percent after accounting for project-cost inflation. The entire drop is due to single-family housing, concentrated in the southeast and southwest. Spending for residential remodeling is 19 percent higher; spending for commercial buildings is 22 percent higher. Private construction spending is expected to resume expanding this spring with a turnabout in housing starts and increase about 15 percent by the end of 2008.



Source: U.S. Department of Commerce

For the full text of this month's economic analysis, check Economic Outlook at **ConstructionEquipment.com**

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The Case 821E is essentially a different machine than its 821C predecessor, incorporating a new engine, new hydraulics, new cooling system and new cab.

More Machine Runs on Less Fuel

By WALT MOORE, Senior Editor

In-the-dirt testing illustrates the merit of the new Case 821E's design — which leaves little unchanged from that of its predecessor

While we don't think that the "E" in the new Case 821E's model designation stands for "efficient," the word nonetheless seems appropriate for summing up this new wheel loader's overall design and performance, both of which *CE* editors had the chance to investigate first hand when spending a day in the dirt with this new machine. That day was in mid-April, when we worked with Case to run the 821E head-to-head with its predecessor, the 821C, in a comparative study of production capacity and fuel efficiency.

As we quickly discovered, the 821E is a significantly different machine than its predecessor. Checking off just the major items, we noted a new Tier-3-compliant Case Family IV diesel engine, new hydraulic system, innovative new cooling package, redesigned loader linkage, redesigned bucket, and all-new cab. But also not to be overlooked are such items as the new model's auto-idle system, temperature-controlled fan, cushioned steering cylinders and enhanced serviceability (lubed-for-life drive shafts, for example).

Case's expansive Arizona proving ground





Fuel measurements included weighing replacement volume, as well as checking temperatures.

The 821C has little in common with its successor, except a similar ZF transmission and similar ZF axles.

Photos: George Pfoertner©

(near Phoenix) was the site for the 821C/821E evaluation. Our 821E test unit was virtually brand new, supplied by Sandpiper Rentals, a division of Falcon Power, a Case dealer in Phoenix. Sandpiper's rental account manager, James Bagshaw, also supplied a low-hour 821C for the evaluation.

The 821C was fitted with a 4.0-cubic-yard (heaped) general-purpose bucket, the largest bucket available for this model. The 821E used a 4.25-cubic-yard general-purpose bucket, which Case considers the standard bucket for the new model. Both buckets were fitted with teeth and segments.

Talking with Case prior to the evaluation about bucket sizes for testing, we concurred that the 821E's ability to handle larger buckets than its predecessor (up to 4.5 cubic yards) is an integral aspect of its enhanced design, and that using the larger bucket on the new model was justified. Both machines used 23.5-25 L2 tires — bias-ply for the 821C and radial for the 821E.

David Boone, project superintendent for Mountainside Materials in Tempe, Ariz., and Michael Tennant, Case's western-region product specialist — both proficient wheel-loader operators — ran the machines during the evaluation. Also on site for the evaluation were Case's Dave Wolf, marketing manager for heavy-range products; Dave Natzke, program manager and platform engineer for wheel loaders; and Trever Bayer, test engineer. Proving-ground supervisor, Carl Fowler, loaned us Quincy Walker, 2nd-shift leadman, and Mike Stacy, test operator, to maintain the stockpiles during the production studies.

The machines worked from stockpiles of heavy desert soil (estimated at 3,000 pounds per cubic yard). The material contained a high percentage of fines mixed with rock that ranged from 2 inches to more than 12 inches in diameter. The production testing simulated a short-cycle truck-loading application and a hopper-charging application — "simulated," because the machines dumped over barriers that represented the truck and hopper.

Both machines were fitted with an auxiliary fuel tank, which was refilled after each test run with fuel weighed across an electronic scale. But tanks were not refilled until temperatures were determined for fuel remaining in the tank (after a test run) and for replacement fuel. Temperature measurements provided the data to adjust replacement-fuel volume (if required) to compensate for hot-fuel expansion.

You'll find the results for the evaluation summarized in an accompanying sidebar. The thumbnail version here, however, is that the new 821E demonstrated an impressive fuel-ef-

ficiency advantage (material produced on a gallon of fuel) over its predecessor. Reducing fuel consumption was among the crucial design goals for the new E-Series loaders, and meeting that objective, say Wolf and Natzke, required careful engineering analysis to lessen parasitic loads and to build efficiency into the 821E's overall design.

Power choices, efficient cooling

Among the most innovative aspects of the 821E's design is its fully electronic, multi-horsepower engine, which, with a 6.7-liter displacement, is nearly 25 percent smaller than the 8.3-liter engine used in the 821C. The new six-cylinder diesel, which employs a common-rail fuel system and charge-air cooling, is a product of the CNH Engine Group, involving Case and Cummins (the original joint-venture partners in the Consolidated Diesel Co.), and now Iveco. The 821C's engine had a single net horsepower rating (186) and a single net peak-torque rating (671 pounds-feet). The engine in the 821E, however, has three net-horsepower ratings (181, 198 and 213) and three corresponding net-peak-torque ratings (693, 701 and 712 pounds-feet).

Using the monitor in the cab, the operator can select one of the engine's three horsepower curves — maximum, standard or economy — to suit the application. For instance, handling pipe might be done in the economy mode, loading loose material might best be done in standard, and digging in a dense stockpile might be a job for the max mode. Or, if the application involves a mix of chores, then the operator might opt for the automatic mode, which allows the engine to switch between the max and standard modes as sensors in the control system report turbine torque from the transmission and load on the implement hydraulics.

The logic behind the three horsepower curves, says Natzke, is to promote fuel economy. The electronic control for each mode, he says, uses a programmed matrix that determines the fuel-delivery rate (grams per stroke) for any given throttle position. The three curves are initially identical to ensure sufficient low-end power, says Natzke, but diverge at about 1,200 rpm to provide their own specific power and fuel-usage characteristics. All three curves, however, have the same rpm operating range, he says, which means that hydraulic capability is not compromised in any of the modes.

Adding to the overall design for fuel efficiency in the 821E is the new auto-idle system, which drops the engine's normal low idle of 900 to 600 rpm if the throttle or hydraulic controls are not used for 30 seconds. Also, to assist with fuel-system efficiency, the 821E uses a fuel cooler to maintain consistent fuel density in the common-rail system. (Fuel absorbs heat and expands as the machine works.) Cooler fuel also helps extend fuel-pump life.

The 821E's fuel cooler is but one component in a completely new cooling package (compared to that of the 821C). The 821E employs Case's mid-mount cooling module, first used on its D-Series loaders and consisting of a specially contoured hydraulic tank that is surrounded in cube fashion by the engine radiator on the left, separate transmission and hydraulic coolers on the right, charge-air cooler and air-conditioning condenser on top, and the fuel cooler at one end.

At the other end of the cube is the hydraulically driven fan that pulls ambient air through the coolers and across the tank. Unlike the hydraulically driven fan in the 821C, however, the new model's fan is temperature controlled and can run at speeds proportional to cooling demands, thus conserving considerable fuel and reducing sound levels. (The 821E, by comparison with the 821C, is an extremely quiet machine.) And, while the operator of either machine can reverse the fan to purge the coolers, the 821E also has an "auto-reversing" feature, which allows the fan to automatically send a cleaning blast of reverse air through the coolers at 30-minute intervals.

Because the new cooling module resides just behind the cab in the rear frame, the space at the rear of the machine (usually consumed by a conventional cooling package) can now be used to move the engine rearward, behind the axle, where it serves as a natu-

Operating Specifications

	821C	821E
Wheelbase (in.)	125.8	**131.5**
Overall length (in.)*	308.7	**314.7**
Width, centerline of tread (in.)	82.0	**87.5**
Height to top of cab (in.)	131.1	**135.8**
Bucket hinge-pin height (in.)	155.6	**162.3**
Lift capacity, full height (in.)*	16,221	**20,615**
Approximate operating weight (lb.)	37,900	**37,900**

*821C w/4.0-cu.-yd. bucket w/teeth; 821E w/4.25-cu.-yd. bucket w/teeth

As the accompanying table illustrates, the 821E is a larger machine than its predecessor, including a longer wheelbase and wider track. Note, too, that the new model lifts higher (by nearly 7 inches) and lifts stronger to full height (nearly 4,500 pounds more).

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ral counterweight. Plus, the hood can now be sloped more steeply for enhanced rearward visibility.

More efficient loading

Also among the fundamental changes between the 821E and 821C is the design of the new model's hydraulic system. The 821C's open-center system used a tandem, fixed-displacement vane pump to produce a 79-gpm oil flow for the implement and steering systems. The two pump sections (which displaced a constant volume of fluid on every revolution) continually pumped oil, the rate of flow dependent upon engine speed. The excess flow that was inevitably produced (that is, oil pumped, but not needed) was directed back to the hydraulic reservoir through the open center of the main valve.

By contrast, the 821E's system is a closed-center, pressure-compensated, load-sensing type that uses two variable-displacement pumps. While main-relief pressure is 3,600 psi in the 821E's system (up considerably from the 821C's 2,810 psi), maximum oil flow is reduced by approximately 20 percent. Unlike the vane pump in the 821C, the 821E's variable-displacement piston pumps adjust flow to match hydraulic demands. As a result, the pumps produce no excess flow, thus saving engine horsepower and fuel, while generating less heat.

821E Shows Fuel-Efficiency Advantage

The 821E/821C evaluation consisted of two production studies — hopper charging and short-cycle truck loading. Each study involved six, separate, 20-minute tests, because each of the two operators ran the 821C, the 821E in its economy mode, and then the 821E in its maximum mode.

In the hopper-charging study, the machines loaded from a stockpile, reversed, then traveled forward up a 30-foot ramp, at the top of which was a bar set at about 10 feet to represent a rock-crusher's grizzly. In the truck-loading study, the machines again loaded from a stockpile, reversed, then traveled forward a short distance and dumped over the top of a barrier representing a large dump truck.

The summary numbers presented here are based on averages calculated from the 12 test runs, which involved a total of 539 loading cycles and four hours working time. The percentages represent the 821E's performance, relative to that of the 821C.

Test Summary

Measurement	821E advantage
Hourly production: maximum mode	10%
Hourly production: economy mode	-3%
Fuel conserved: maximum mode*	4%
Fuel conserved: economy mode	16%
Fuel efficiency: maximum mode**	14%
Fuel efficiency: economy mode	12%

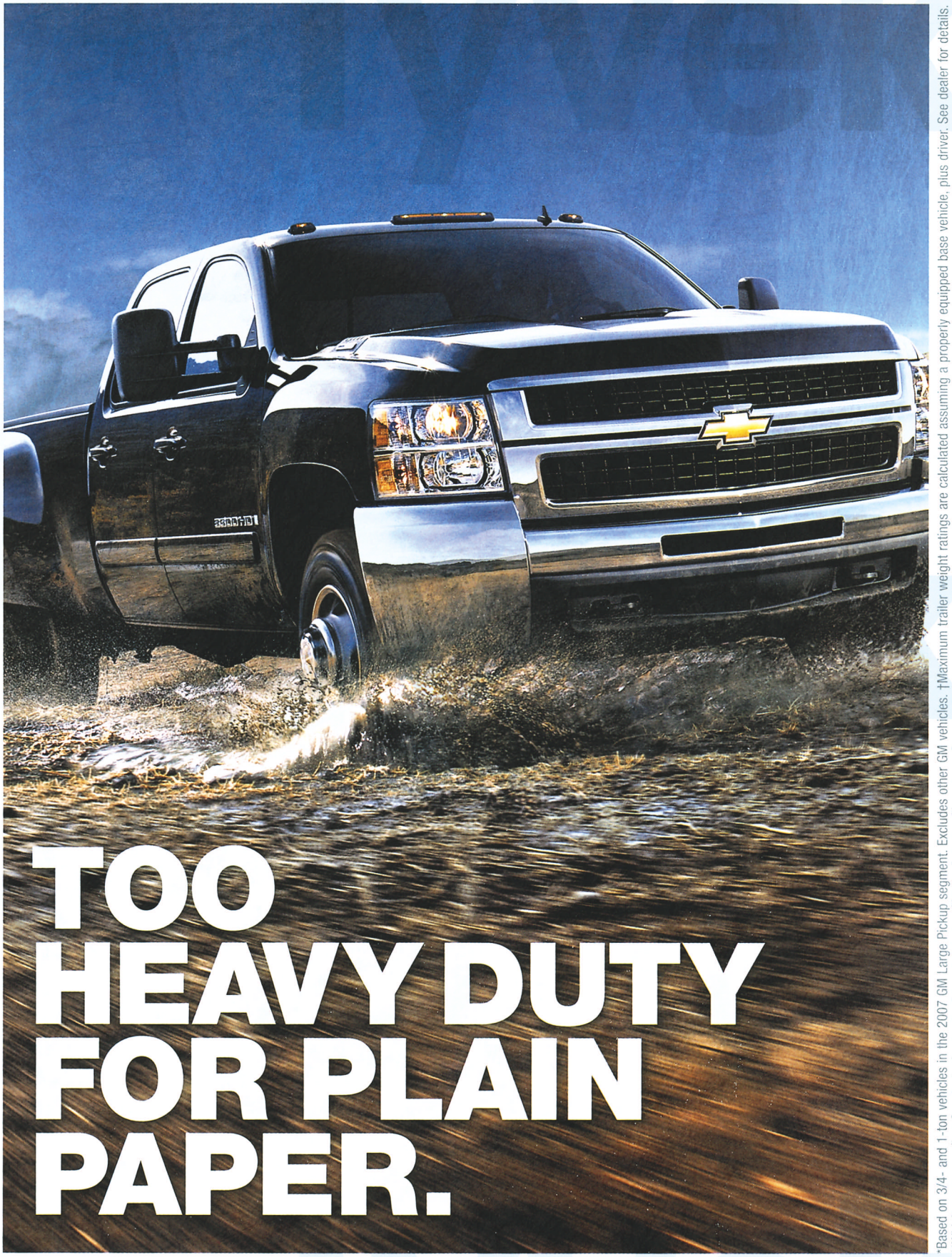
* "Fuel conserved" — In two hours of running time, working at the same tasks, the 821E consumed 4 percent less fuel in its maximum mode, and 16 percent less fuel in its economy mode, than did the 821C.
** "Fuel efficiency" — Material moved per gallon of fuel



The 821E nears the top of the ramp used in the hopper-charging productivity study. The auxiliary fuel tank is at the right rear corner of the machine.



The 821E prepares to dump over the "truck" in the short-cycle loading test.



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Also, the 821E's system can direct full flow to either the steering or implement systems as needed. And with the new model's 28-percent gain in implement-system pressure, cylinder size can be reduced with no compromise in optimum breakout force.

Complementing the increased power and efficiency of the 821E's hydraulic system is its redesigned loader linkage. Basically, the linkage has been reconfigured to accommodate changes in hydraulic forces, says Natzke, resulting in a geometry that provides added breakout force. But the new linkage also reflects practical refinement. For example, the boom-to-bucket pins are mounted higher on the back of the bucket to keep them cleaner, and split O-rings at all bucket-pivot points help retain lubricant and reduce contaminant infiltration.

Redesigned, too, is the bucket, which incorporates a cutting edge that is longer and less blunt than that of the 821C, allowing it to slice more effectively into the pile. Plus, the floor is now inclined upward at a 5-degree angle toward the back of the bucket, allowing a smoother flow of material. In addition, the new bucket is more stout overall, using heavier reinforcement under the floor, a thicker shell at the top, added gussets and heavier bolt-on heel plates that afford more protection in abrasive materials.

Refined cab, easier service

The 821E's all-new cab has a 15-percent larger floor plate, and floor-to-ceiling front glass enhances the view to the bucket and front tires. The standard loader control is a single joystick with an integral directional-shift switch and a downshift button. Multiple control packages are available, however, and the conventional shift lever on the left of the steering column is still there. A single brake pedal (with adjustable transmission disconnect) is standard, but dual pedals are available for operators who prefer this arrangement.

The front panel includes new analog gauges (a request from customer focus groups) and a new digital display that provides real-time operating information (including fuel-consumption rates), allows access to diagnostic data (with user-friendly text messages) and facilitates programming operational modes. A new switch panel in the right console is positioned within easy reach of the operator's fingertips, and a total of 18 diffusers in the cab direct airflow in just about any fashion. A 12-volt outlet and prewiring for a radio add to overall convenience, as does a thermal storage compartment.



During the evaluation, material weights were recorded by an RDS LOADLOG 8000 on-board weighing system, which provided a cycle-by-cycle printout of results.



The 821E's tilt-up hood (electrically raised) provides wide-open access to routine maintenance points. Removable inner fenders below the hood further increase service access, as do pull-up side sheets (forward of the hood) and a tilt-up panel above the cooling module.

Enhanced serviceability, another primary objective of the E-Series design, gets a boost from a powered hood, which, when raised, provides easy, ground-level access to all routine service points, including sight gauges for all fluid checks except engine oil. Easily removed inner fenders (just one thumbscrew) allow further access to the engine and cooling module, as do pull-up side sheets forward of the hood.

At the articulation joint, steering cylinders have been moved up to keep them cleaner, and fewer hydraulic hoses pass between the frames. Moving the 821E's engine rearward and extending its wheelbase also open up this area for easy transmission access.

Remote drains for engine oil, coolant and hydraulic fluid make changes tidier, and a sealed glass cover over the fuse panel provides ready access to the electrical system, while protecting against pressure washers. Only the carrier bearing in the driveshaft system needs lubricating (and that's done via a remote zerk), and right-hand steps facilitate window cleaning. A new cab air filter has been relocated, uses a radial seal, and provides longer service life.

"If I can get a technician involved in a machine walk-around," says Wolf, "I have this machine sold."

Case's suggested list price for the standard version of a ready-to-work 821E is $225,335, which compares to the last suggested list for a comparable 821C at $221,017.



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By LARRY STEWART, Executive Editor

FLEET MASTERS

Focus on fuel consumption, PM, parts management and more trims waste from all corners of equipment operations

CJ Miller Saves Millions

Measuring What Should Be Managed

In 26 years directing the operations of large equipment fleets, Dale Warner has developed systems and disciplines necessary to measure machine usage and operating severity by tracking individual units' fuel consumption. Why? Part of what he learned in 22 years as a field technician for a Caterpillar dealer was that Cat finds fuel consumption to be more effective than hours or miles of use for managing service, predicting repairs, and replacing machines.

Photos: Bill Geiger©



Serviceman John Dickenson (left) and Jeff Gist, vehicle foreman, reconcile work recorded on a PDA with the schedule. Data collected in the field has improved the timeliness and accuracy of information such as fuel consumption critical to scheduling maintenance.

Just a few years ago, C.J. (Buck) Miller and his sons decided they needed a fleet professional to take the precise measure of equipment costs in the Hampstead, Md., construction company's $73 million fleet. It was a benevolent coincidence that Warner had recently been turned loose by an employer of 26 years whose principals had decided to exit the construction business and was between jobs.

Warner and Buck Miller, CJ Miller's founder, are contemporaries. Warner worked on Miller's equipment in the late 1950s and early '60s when he was a field mechanic in the Baltimore area. Now Buck is turning his business over to his sons, C.J. III, and Billy, and he couldn't ask for a more authoritative voice to

CJ Miller LLC Fleet Master Profile

Headquarters: Hampstead, Md.

Specialty: Excavating, grading, utilities, and asphalt paving

Market Range: Maryland, Delaware, Pennsylvania, Washington, D.C., and Virginia

CJ Miller Equipment Division

Fleet Value: $73 million

Fleet Makeup: 342 off-road units from scrapers to skid-steer loaders to pumps; 622 licensed vehicles from Class 8 trucks to pickups to tag trailers

Facilities: Headquarters includes the primary shop, and each of the three asphalt plants has a smaller service facility

Staff: Managers Dale Warner, Fred Boog, Jeff Gist, and Tim Myerholtz; six field technicians; five truck and shop technicians; two welders; four fuel/lube techs and two PM servicemen; four parts people; two administrators

2006 achievements:

Equipment hours	**235,900 (+10%)**
Vehicle miles	**4,674,800 (+2%)**
Parts reduction	**$1,213,300 (-38%)**
Labor reduction	**$295,900 (-19%)**
Warranty recovery	**$112,000**
Tire cost reduction	**$37,400 (-10%)**
PM cost reduction	**$30,200 (-25%)**
Fleet cost/hour reduction	**$3.16 (-9%)**



Leadership at CJ Miller has invested not only in Warner's expertise, but the technology to carry out his fleet-management strategies. From left: Dale Warner, Lisa Utz, C.J. Miller III, Buck Miller, and Billy Miller.



Dale Warner

advise the young men in the often-controversial area of fleet management.

"First thing I told them was, 'if you can't measure it you can't manage it,'" Warner remembers. "If we don't know exactly what our costs are, we don't know how to manage the fleet.

"First thing we did was install an equipment-maintenance management system."

Warner was a regular user of World Information Systems' ShopFax software with his previous employer's fleet, and knows a work-order-based system is the best way to gather detailed information necessary to schedule service and record cost history.

ShopFax is available as an Internet application, so the Millers could pay as they used the system. They weren't sure how equipment-management data might affect other systems such as job costing or estimating, so renting the software online was a good way to test the waters. They did not, however, limit their commitment to the technology.

"We implemented PDAs (personal digital assistants) with the technicians so they could initiate work orders and input most of their own data by scanning bar codes — started getting actual hours and costs," Warner says. "Once the techs were doing their own work orders, things kind of tightened up in shop. They were just doing a lot of 'stubby pencil' before."

That's Warner's euphemism for the rough estimates of work hours often submitted on hand-written work orders — mostly the result of undisciplined paperwork. Warner has found that the accountability imposed on technicians by creating their own electronic work orders at the time they're doing the job more than pays for the cost of the data-gathering technology.

CJ Miller technicians completed 12 percent more work orders through the first three quarters of 2006 than the same period in 2005, even while technician labor cost dropped by nearly $296,000.

Perhaps the most remarkable aspect of this labor savings is that it was accompanied by an improvement in service quality. Warner was able to hire a Cat dealer's technician late in 2005 who had been working full time in the CJ Miller shop. Bringing the additional capacity in-house and improving shop productivity with the work-order system reduced outsourcing costs by more than $423,000. At the same time, Warner's insistence on high-quality maintenance had stretched the time required to do a basic PM by two hours.



Kevin Snyder welds hammer holders to a milling drum. Technicians using computers were 12 percent more productive.

The Millers bought a high-efficiency filter cart, and are now using it to clean up the hydraulic oil in most machines during each service.

"We're definitely seeing wear go down on hydraulic systems and transmissions, according to the particle counts," Warner says of the oil-analysis results.

"Our average PM cost in 2006 was $368. In 2005, it was $253, but we did 356 less PMs in 2006 for a savings of $30,173."

Scheduling machine service based on the gallons of fuel burned, rather than hours or miles run, reduced the frequency of regular maintenance in most cases.



Lloyd Richards, with the local Michelin dealer, checks tire tread depth. Vendor servicing of radial tires has cut CJ Miller's overall tire costs by 10 percent.

Fuel consumption is a more precise measure of a machine's need for service or component replacement because total gallons of fuel burned reflects much more accurately than hours or mileage just how hard the machine has worked.

CJ Miller serviced off-road machines every 200 hours and licensed vehicles at similarly conservative mileage intervals before Warner started scheduling by fuel use.

"Doing the heavy trucks by fuel burn, it's working out to about every 17,000 or 18,000 miles (it had been every 8,000 miles)," Warner says. "'Course we bring them in every 5,000 miles to grease the chassis, check brakes, and do a walk-around inspection."

Tracking the fuel consumption of pickup trucks is more difficult because their operators tend to fuel them at retail pumps, so their service intervals remain mileage based. Pickups get regular oil changes at 5,000 miles (CJ Miller had been servicing them at 3,000 miles).

Warner initiated a disciplined oil-analysis program to confirm the condition of lubricants and the components they serve. He considers oil analysis critical to support fuel-based service, and to inform decisions on replacing components before failure. Long experience with the lab at Castrol Heavy Duty, and Dryden before them, ensures that Castrol got the nod to supply lubes and do the oil analysis.

"I had them do a summary for us because I wanted to know if, through fuel scheduling, we were getting better at maintenance or not," Warner says. "The first thing we learned is that we are turning samples and getting results in about a day — it was taking 18 days to turn a sample around before. Our oil-change intervals increased more than 50 percent across the board, and at the same time component wear went down."

Of course, fuel consumption is only effective in measuring machine use if you can accurately record how much fuel each machine burns. CJ Miller overcomes this often formidable obstacle because the company operates several fuel trucks that service each machine. Fuelers record how much fuel they pump into each unit's tank, and their records keep the CJ Miller service clock running.

There's plenty of opportunity to improve the system, though, because the fuel drivers are simply recording fuel deliveries with pencil and paper. Warner is currently implementing a data-collection system called Orpak USA on all machines, vehicles and fuel trucks to nail down fuel consumption precisely.

It's an RF (radio frequency) system that requires mounting a small computer on each machine and an antenna that rings the fuel filler neck. Service trucks also get a computer and a chip in the fuel-filler nozzle. When the fueler inserts the nozzle into the filler neck, the sys-

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Tim Myerholtz, parts manager, and Fred Boog, equipment superintendent, make sure CJ Miller only pays to stock high-volume parts. Inventory investment has fallen $1.2 million as uptime climbs.

tem automatically records the time, date, gallons of fuel dispensed, the machine's run time (distinguishing between working and idling hours), and job number. The service truck's computer downloads the information via RF to the company's software where a work order is generated.

The fuel-truck computer will also gauge grease delivery, so managers will be able to confirm that an appropriate quantity of grease is delivered to each machine to properly maintain its bearings and bushings.

"It will take me six to nine months to get that system implemented on about 1,000 machines," Warner says, "But I estimate the ROI (return on investment) will be less than a year.

"Every user they've ever sold the product to has had a 6 to 8 percent improvement in fuel consumption just in reducing shrinkage," Warner says. "The system won't allow you to pump fuel unless it's in the fuel filler neck of a vehicle that has the ring in it."

"Plus, it will give us the actual time the machine ran on the job, too, which will be a huge advantage in the job-cost and estimating systems," he adds. "We'll be working with actual, true job-cost charges."

Work on administrative systems continues as CJ Miller implements Viewpoint's construction-enterprise software. Viewpoint's equipment module must be adapted to take the place of ShopFax.

"Once they got the equipment on a computer system, then they wanted to tie the information all into one system," Warner says. "While it was the groundwork for what we're doing with the fleet, in January we stopped using ShopFax. I think ShopFax is a better program for what we're doing with equipment because it's a true equipment-management program, whereas Viewpoint is more accounting-based. So I'm sure there will be trade offs.

"This new system is starting to convert the equipment department into a cost center, which is something we never had before," Warner adds. "It allows us to better track costs and budget — it puts costs in place so you can measure results of your management decisions.

"The equipment-management system really focused less on cost than the new system. It would give you the cost, but you almost had to write special reports to get the information in a way that would help make decisions."

"For instance we can see whether a machine is supporting itself or not. We see that a machine is generating $10,000 per month, and whether or not the company made anything from that $10,000. The equipment program just looked at what it cost to run for the month. Normally equipment people don't get involved in that part of the business, but if you're running a cost center, you have to know that."

Warner convinced the Millers to come to AEMP's Annual Meeting in Corpus Christi to see he and his right-hand men — Fred Boog, Jeff Gist, and Tim Myerholtz — receive the Fleet Masters award. His clear objective was to share the award with the family whose confidence in him allowed the company to achieve so much in such a short time. In the heat of the moment, however, the consummate negotiator slipped into gear.

As Warner tells it, he needed to "set some terms" with his employers. The 67-year-old asked to limit his work week to four days, 5 a.m. to 4 p.m., with Fridays off.

"Since I've been here, I've been working 5 to 5 or 6 p.m., five or six days a week," Warner says. "I'm getting too old for that stuff."

Dividing the $3.5 million that Warner's policies have saved the Millers by less than three years gives you something in the neighborhood of $1.5 million in savings per year. There are still proven strategies to put in place — the fuel-management system, adapting Viewpoint to deliver work orders — so CJ Miller's rate of savings continues to accelerate.

"It is really gratifying that the owners put their trust and confidence in me to charter the course of the fleet for the coming years," Warner said.

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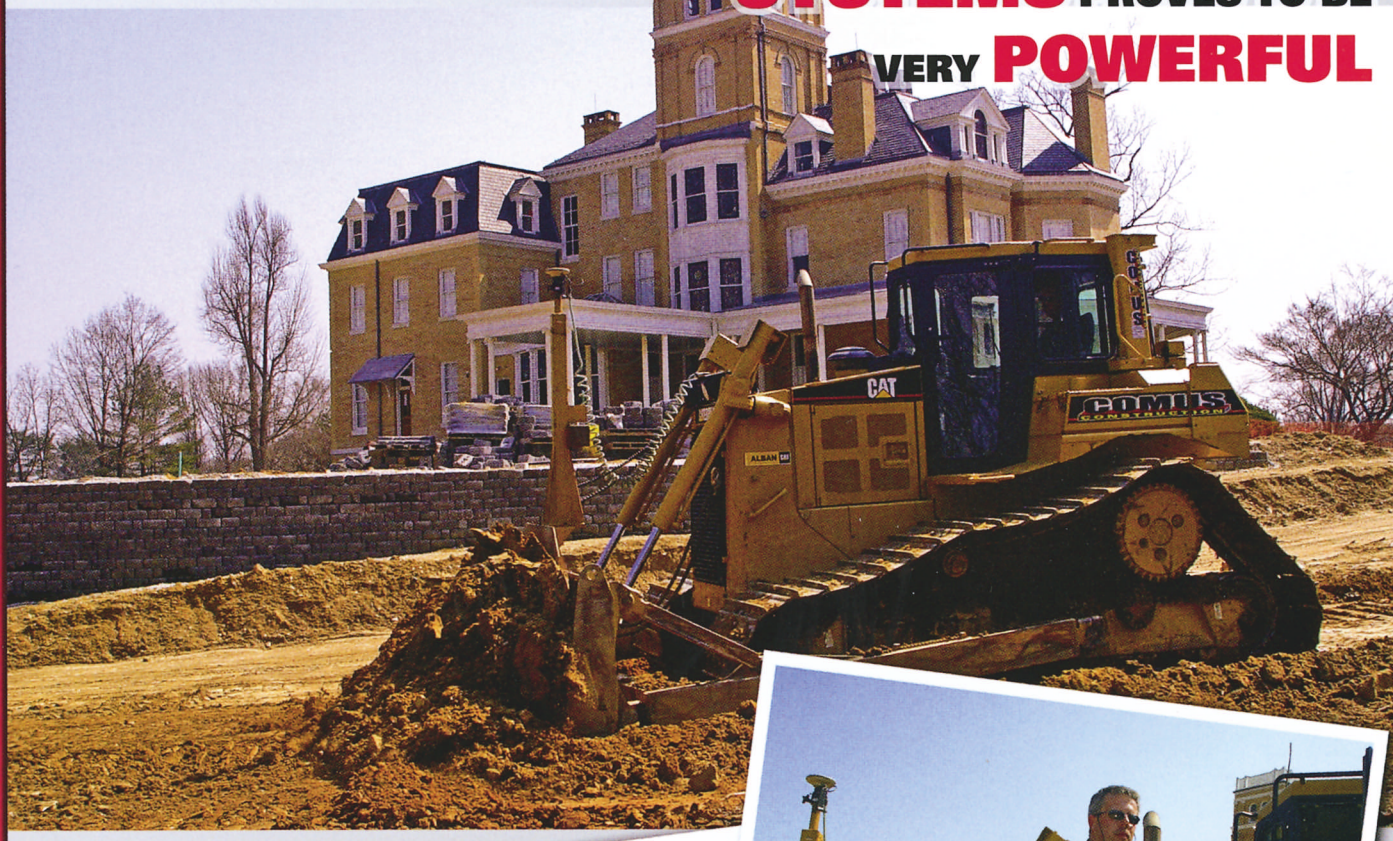
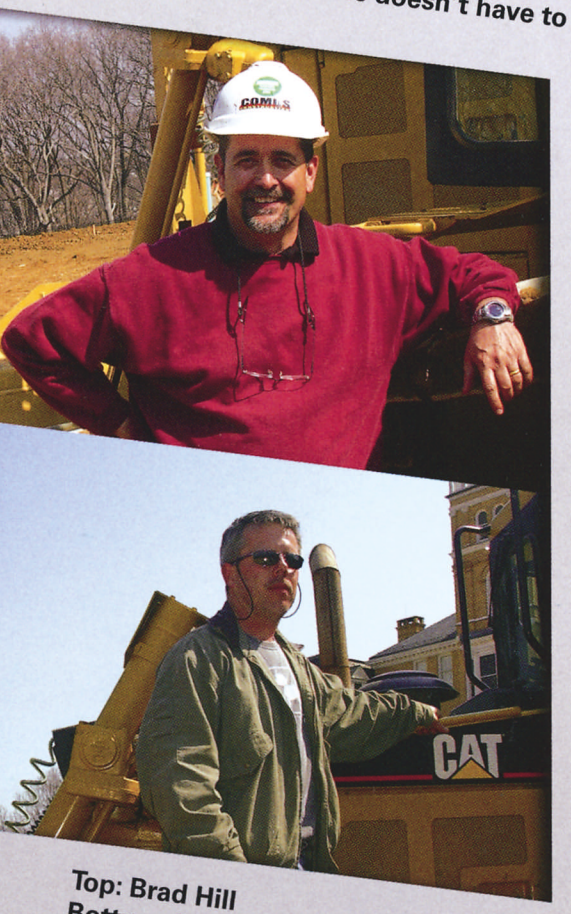




Leica Geosystems

Grade foreman and experienced operator Mark Pritchard is known as the "Jedi knight" at Baltimore-based Comus Construction because he is so good at what he does, and the GradeSmart 3D GPS system from Leica Geosystems gives him one more level of confidence that he's exactly right.

"It's operator friendly," says Pritchard. "It's just a matter of hitting two or three buttons and it's on and it's operating. If the operator goes fully automatic with the blades, he doesn't have to control them anymore; he's just driving the machine. So you can take an operator who doesn't have a lot of experience, and he can get on a dozer and do a good job. But you can take an operator who is really experienced and he can run the job himself. He doesn't have to worry about being at anybody else's mercy to get the job finished."



Top: Brad Hill
Bottom: Mark Pritchard

Getting the job finished quickly, efficiently and correctly demands equipment that can increase productivity and accuracy on the job, and "the GradeSmart GPS is the perfect tool because I can prove that I'm on grade or subgrade, and I can prove volume before I even leave the site," says Brad Hill, president of Comus Construction.

"We do a lot of industrial work, a lot of storm water ponds, so we have these very precise needs to assure quantities or volumes. We decided to put the GradeSmart equipment on our larger dozer machines because we do a simultaneous operation. We're moving the mass out of the way, and then this larger dozer is leaving us on actual grade so we don't have to come back and do it a second time."

Comus Construction is also using 3D GPS and grade control technology for residential site development work. On a recent project, Comus Construction used 3D GPS technology to place the fill behind a 27-foot retaining wall. "It's useful when we're doing cut-to-fill operations," says Hill. "We can assure our geotechs that we're only putting on a lift of a certain size. We can then put the final shape to the grade. It's a precise shape that needs to hold precise grades. We've done this with very large machinery, and we got it done faster because of (the technology).

"Our levels of productivity have increased dramatically. We feel we recouped our investment on the first two large industrial ponds we did. We've been using the GPS system for a year and a half, and we're very pleased. To go from grade stakes to this kind of information is...well I'm speechless about how much work that machine has produced. In fact, we're so pleased with what's happening with our dozer corps that we're going to put it on our excavators now and lay pipe with the GPS equipment."

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By TOM BERG, Truck Editor

Trio of Ts Show Basic Strengths

Kenworth's versatile T800 can be fitted for many on/off-road duties. But wait — what model is that mixer?

How good is your knowledge of trucks? If you run Kenworths, you might already have noted that one of the three supposed T800s pictured here is not a T model, but a W. The hoods look the same, so what's the difference? Placement of the steer axle. KW's T800, and all T models, have a set-back steer axle while the W900's is forward-set.

Many "W9" trucks built for vocational use have an S suffix, as does the mixer chassis shown here. Highway models (usually they're long-haul tractors) are suffixed with a B (signifying the second major redesign of the series) or L (meaning long, for its extra-length hood). So no matter what the hood looks like, it's the position of the steer axle that identifies the basic model, and it's a detail that's peculiar to Kenworth.

So why the "trio" in the headline? Because for this article I drove not only a pair of construction-type T800s, but also a T660, specifically a Day Cab version of KW's popular highway tractor, which began life as the aerodynamic T600 "anteater" of 26 years ago. Its latest iteration includes smoother aero lines and interior upgrades, which merits the model 660 moniker. The new Day Cab is something that can ably pull flatbed trailers laden with building materials or bottom dumps with sand or aggregate for a concrete batch plant, and its setback axle allows a tight wheel cut that makes for good maneuverability.

Install a higher-capacity axle and big "duplex" tires, as was done with the "T8" trucks, and turning ability is not as good. But, of



A setback steer axle identifies a T series truck, like this T800 dumper. It's got a Cummins ISM with an Allison automatic.



This mixer has a forward-set steer axle, so it's not a T800 (in spite of its sloping hood) but a W900S. It's got a lightweight Caterpillar C9 and an Eaton 8LL manual.

course, more weight can be carried up front, which is another advantage of the setback placement that's usable in "axle-weight" states. In "bridge-formula" states, which encourage spreading out the load over longer distances, the set-forward steer axle stretches a wheelbase and allows heavier payloads. That's one reason why KW makes the W series, and the mixer also has the heavy front-end parts.

However, the point of this driving exercise in late February was not the T versus W distinction, but the workability of the EPA '07-spec diesels that powered the trucks. All had Caterpillar or Cummins engines with advanced electronics and combustion designs, and exhaust aftertreatment that you've heard so much about. KW titles trucks with these engines as 2008 models. Builders want customers to know that the diesels have been extensively tested and run well, and figure we press guys can help get out the word.

KW's public relations manager, Jeff Parietti, staged a multi-truck event out of the tech center run by Paccar, parent to KW and Peterbilt, near Mount Vernon, Wash., north of Seattle. He and his colleagues gathered 16 trucks and tractors and about a dozen reporters, then girded their nerves as those of us with commercial driver's licenses went off on short trips through the area. In spite of chilly and threatening weather (it rained intermittently and snowed heavily that night), we all enjoyed the jaunts, as much for the scenery (the rolling terrain is punctuated with rivers, estuaries and bays) as for the driving experiences.

Gutsy new engines

I can't say how long these complex new engines will run without trouble, but they certainly run well when relatively fresh from the factory. Previous drives with a variety of '07-spec diesel makes and models show that they are gutsy and burn cleanly, to the point where you cannot see any exhaust smoke or smell any odor. The diesel particulate filters that most diesels are now getting include ceramic honeycombs that cause back pressure, but that's taken into account in their tuning and the new engines feel just as powerful as before.

Caterpillar diesels include Clean Air Induction, which is Cat's version of exhaust-gas recirculation (EGR) that Cummins and others have used since October '02 to lower combustion temperatures and reduce formation of oxides of nitrogen. People at some truck manufacturers have complained about installing the CGI's return pipe, that takes filtered exhaust gas from the rear of the particulate filter to the engine. But Kenworth engineers didn't find this too difficult, according to Ben Vander Griend, an assistant chief engineer in charge of powertrain and chassis development.

The T660 Day Cab had a 470-hp 13-liter Cat C13 mated to an Eaton 13-speed UltraShift, and they worked





The T800H heavy haul tractor looks impressive just sitting there, even without a loaded trailer. Its wide hood houses a big, high-capacity radiator and (inset) 600-hp Cummins ISX.



Third T model in our trio is this T660 Extended Day Cab tractor, which would give cargo on the flatbed trailer, not to mention its driver, a smooth ride. It's got a Cat C13 with an Eaton UltraShift.



Stack on the Cat-powered W900S includes the big diesel particulate filter, which looks like and doubles as a muffler, with a Clean Air Induction pipe that leads from the DPF back to the engine.



T800H's driver can check the temperature or pressure of almost any moving thing on the truck. Want more gauges? Go fly a Boeing 747F.

very well, though the engine tended to rev higher in each gear than necessary. Vander Griend, who rode with me in this tractor, pointed out that the automated tranny's electronic controls can be programmed to shift sooner, which many owners would do to get better economy. The W900S mixer truck had a lightweight 9-liter C9-350 with an 11-speed Eaton 8LL, which like most manuals that KW expertly installs, was easy to shift and a joy to operate.

The two T800s had Cummins power. The dumper had an 11-liter ISM-425 and a six-speed Allison 4500RDS automatic, which your grade-school principal could drive with only a little coaching. This one was lively right off the line and throughout the rev range, without the lower-rpm dogginess that I've experienced with other engines saddled to heavy-duty Allisons. Are the new diesels better tuned for automatics? I don't know, but this ISM seemed so.

The stout-looking tractor was a T800H, built for heavy hauling. It had an extra-wide hood to house an extra-large radiator (1,780 square inches) needed to cool high-horsepower engines at low road speeds. This engine was a 600-hp ISX, which Cummins has reintroduced after withdrawing the much-advertised Signature 600 in October '02. Engineers weren't sure it would live with the then-new EGR, which causes the engine to run even hotter, but now they are. It was hard to judge its power on this day because I drove the tractor without a trailer.

It had been hitched to a heavily ballasted tri-axle dropdeck semi, but another writer (who shall remain unnamed, but it wasn't me!) dragged some of its wheels over an obstacle, blowing a tire and bending a rim. Technicians detached the trailer, but the tractor looked so impressive that I drove it anyway. Even bobtail the hulking T8 was satisfying to operate, with that big hood out front, dual stacks out back, and all those big-tired axles following along. And it had more gauges and switches in its dash than any other truck I can remember.

On the road again

The tranny was an Eaton 18-speed, and with 600 horses, 2,050 pounds-feet of torque, and no load except the tractor's own mass, it could be shifted like a six-speed. That's what I did (4th and 5th in Low range and 6th through 9th in High), but I did split some of the gears as I rolled up and down hills and followed speeding and slowing traffic. The Cummins Intebrake was strong enough to stop the tractor on its own except as I drew to a stop, and the engine throbbed as it pulled down road speed.

The cabs on the T800 and W900 series are KW's stout aluminum design, and are so air-tight that I had to crack open a window when I wanted to close a door. This got a little annoying, but it does imply durability and longevity. Meanwhile, drivers enjoy soothing quietness and a reassuring feeling of quality. Interior trim packages provide comfortable surroundings, even in base levels, along with professional-looking instrument and control panels. Big windows that are close to a driver's eyes due to the cabs' narrowness provide a fine view of the outside world. The T800 dumper and the T660 tractor had the Extended Day Cab option, with an extra 5 inches of length and more belly and leg room. So a T- and W-type cab can be quite roomy, even if it is a little narrow compared to some others, including that on KW's own T2000 highway tractor.

If you run Kenworths you probably know all this. Eventually you'll be buying some with the new diesels, and aside from coughing up an extra $6,000 to $10,000 or so per truck, you'll have to get accustomed to the engines' extra complexity and the added maintenance they will require. The engine makers say it won't be much, but users report that EGR valves and turbochargers on some '02/'04 diesels have proven troublesome, and we can only hope that the '07s are better. In the meantime, your drivers will truly enjoy themselves if they're in KWs like these. CE



"Our overall costs in maintenance are lower in part due to the effort and expertise provided by Shell."

Barbara Smith
Albian Sands Energy, Inc.



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By MIKE ANDERSON, Senior Editor

Taking Notice of a Sleeping Giant

The largest of the maneuverable excavators can do just about anything

A 75,000-pound excavator would not best be described as a sleeping giant.

But, considering their clear significance to the industry, 30- to 40-metric-ton excavators collectively may just fly under the radar screen more than any other machine size class. This is big iron, well represented in the field, but without the hoopla of smaller machines and the sheer dominating presence of the largest machines.

Make no bones about it, says John Deere's Mark Wall, excavators in the 30- to 40-ton class are staples of earthmoving.

"Outside of the 200-size market, which is the largest market," says Wall, "the 350 is a great, popular tractor in North America."

Since 2002, Hitachi Construction and Mining Products has operated under an integrated excavator marketing, sales and distribution agreement with John Deere Construction



The 30- to 40-metric-ton class is the "core" of the excavator range, says Komatsu's Doug Morris. The PC300HD-7 is able to "stretch out" that digging muscle even more.



As the largest excavators still easily transported, members of the 30- to 40-metric-ton size class are an ideal mix of grunt force and maneuverability.

and Forestry Equipment. As a product marketing manager for excavators, Wall speaks of both the John Deere 350D LC and Hitachi ZX350LC-3 models when he describes "the maximum performance you can get out of a machine that's still easily maneuverable."

From Wall's perspective, it's the ability to offer the best of both worlds that is making this excavator size increasingly popular.

"Contractors realize it's a pretty versatile machine," he says. "They don't have to break it down to haul it, and they can haul it in one load with the right permits, so it's a lot more maneuverable than the next size up. And, yet, it gives them a lot more depth, reach and lift capacity than the next size down would."

If customers are interested, then manufacturers generally are, too.

Of 14 full-size excavator brands serving North America that were surveyed by *Construction Equipment*, 12 responded with current product information specifically for the 30- to 40-metric-ton class (see Buying File Gallery on Page 56). Another respondent, Volvo, will "imminently" roll out to North America a new C-Series model in this size class.

As a product marketing manager with



The Cost of Ownership

Excavator Size	List Price 2007 / 2004	*Hourly Rate 2007 / 2004
28.1 - 33.0 metric tons	$285,305 / $256,831	$102.64 / $78
33.1 - 40.0 metric tons	$338,783 / $303,011	$123.51 / $90

* Hourly rate is the monthly ownership costs divided by 176, plus operating cost. Unit rates used for 2007 are diesel at $2.69 per gallon, mechanic's wage at $42.50 per hour, and money costs at 5.25 percent.

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

Komatsu America, Doug Morris represents excavators from the standard 75,000-pound PC300 size right up to the PC1250 mass excavator. He, too, credits the demand for the 30- to 40-metric-ton machines on their versatility.

"You can see them anywhere from a quarry-type application, all the way to a sewer-pipe application, to a development application. With this size class, you really get into a wide variety of applications," says Morris.

"Whereas you look at a lot of larger-size machines you'll generally see in a quarry, or smaller-size machines you'll see more in an urban setting," he says, "these machines are virtually everywhere."

For standard use, Komatsu offers the Tier 3 PC300LC-7 — a 246-horsepower, 75,376-pound excavator rolled out in 2006. For customers wanting to "stretch out" the excavating capabilities offered, there is the PC300HD-7.

"It's basically a 300 upperstructure that uses a 400 undercarriage," says Morris. "What you basically get is excellent stability and lift capacity, improved basically for those customers who are in long-arm applications and require the additional over-the-side stability. That market's really taken off, as well."

If not the most glamorous or the largest class, the 30- to 40-metric-ton group is the "core" of the excavator range, says Morris.

If the PC300HD-7 stretches that core, then the Komatsu PC308USLC-3 condenses it, welcoming to this size class the reduced tail swing benefits now firmly established in compact and utility classes.

Product marketing manager Trenton Gore recalls the reaction he heard at recent Komatsu field days upon the appearance of a tight-tail-swing machine at 70,000-plus pounds: "You're telling me that machine weighs that much?"

Indeed, the PC308USLC-3 does.

If the market for the 30- to 40-metric-ton excavator size class is wishing to pull up from below while at the same time reaching up above, more model variations may just be the future path for more manufacturers. The standard models offered may become, it seems, "the core of the core."

With Deere and Hitachi, the 350D LC and ZX350LC-3 models offer 26 feet 10 inches of dig depth and 38 feet 5 inches of reach at ground level.

"It's a big machine," says Wall, "but yet it can get into places where you need to dig water and sewer trenches. It just seems to fit a lot of niches for a lot of contractors."

Much like with other excavator size classes, many of the technological advances in the 30- to 40-metric-ton class are aimed at operator comfort and productivity.

At Komatsu, Gore's area of marketing covers the PC308USLC-3 and down, which includes the new PC270LC-8, a machine that creeps up into the 30-ton-and-up class.

"What's key about it is that we have the attachment flow control. I'm excited that everybody I talk to has been finding that useful," he says. "You get a total of four flow settings, two for breaker and two for attachment."

The "wow factor" for the operator is the 7-

Give Them the Tools and They'll Work Even More

Excavators are no longer for digging alone.

And the wide variety of attachments available to carriers in the 30- to 40-metric-ton size class makes the largest of the easily-transported excavators even more versatile.



Take the RDM rotary disc mulching technology developed and marketed by Hayden, Idaho-based Advanced Forest Equipment, which of late has seen a surge is orders to accommodate this very size class. The mulching attachment (shown) handles thick undergrowth and trees up to 20 inches in diameter.

"Much more than a spinning disk with cutting teeth," the RDM proprietary technology transfers maximum power to the attachment using only the existing hydraulics of the carrier. Since the carrier is built to handle the power requirements of this attachment, there is no complex or expensive auxiliary power unit to install or maintain.

"Our customers are experiencing significant increases in productivity, without increasing costs," says company president Jonathan Moffet. "Because no power boosters are needed, machines are lighter, use less fuel and are more economical to transport – all without sacrificing any performance."

For a gallery of attachments available for this excavator class, see page xx.

Toolbox Tips

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June 2007

No. 26 in a Series

Read the complete story at **www.ConstructionEquipment.com/TBT26**

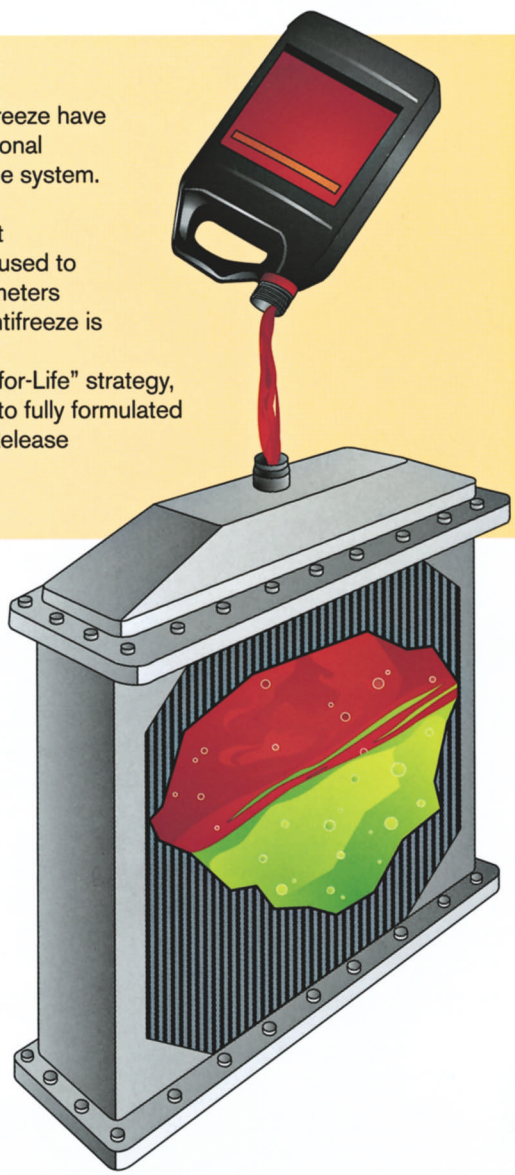
The Basics of Diesel-Engine Coolant

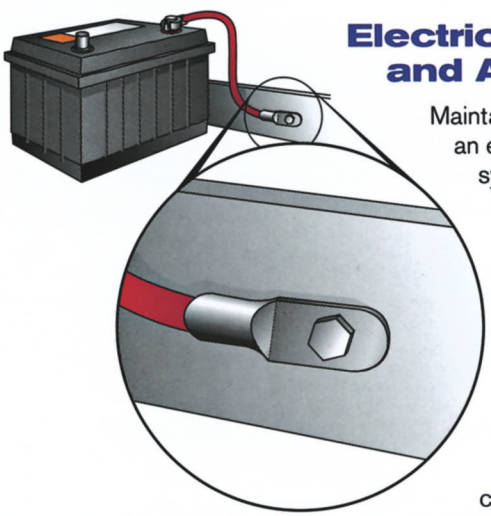
Conversion Possibilities

Manufacturers of at least three brands of organic-acid-technology antifreeze have programs for converting cooling systems from fully formulated conventional coolant to an organic-acid-type coolant, without draining and refilling the system. Reduced maintenance is cited as the primary benefit of conversion.

ChevronTexaco's Fleet Fix Conversion, Shell's Extended-Life Coolant Conversion, and Old World Industries' Final Charge Converter can be used to make the conversion, but the existing coolant must meet specific parameters before conversion can proceed. (Old World Industries' Final Charge antifreeze is a non-carboxylate organic-acid-based product that contains no nitrite.)

By contrast, Penray, a maker of antifreeze additives, promotes a "Fill-for-Life" strategy, which is aimed at converting nitrited-organic-acid-technology coolants to fully formulated conventional coolant. Penray's conversion strategy employs its Need-Release Filter, which uses corrosion-sensitive barriers for the timed release of SCA charges.





Electrical Grounds and Aeration

Maintaining electrical grounds is an essential aspect of cooling-system maintenance, because stray electrical currents can cause problems in cooling systems. Regularly check ground connections for the batteries and starter, and be careful to properly ground any add-on accessories.

On the other hand, aeration in a cooling system can cause problems that are sometimes blamed on stray currents. Periodically inspect the cooling system for air leaks from loose clamps, bad hoses and bad pressure cap.

Tool Box Tips are not to be used in lieu of the manufacturer's manuals.

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Toolbox Tips

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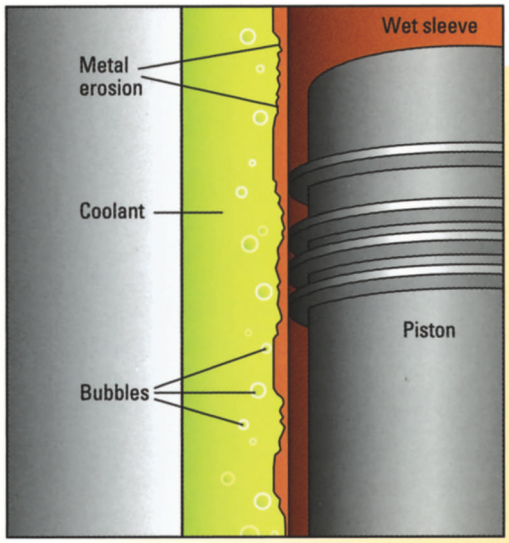

Wet-Sleeve Cavitation

In a wet-sleeve cooling system, antifreeze additives create a barrier between the engine's sleeves and the small bubbles that form in the coolant next to the sleeves, the result of pressure differentials. When the normal vibration of the sleeves causes the bubbles to implode, they do so with great violence and can create tiny cavities in the surface of unprotected sleeves. Left unchecked, this "cavitation" process (a leading cause of engine failure) can create holes in the sleeves and allow coolant to leak into the cylinder. Fully formulated conventional antifreeze uses nitrite, which coats the sleeves, to protect against cavitation. Organic-acid-technology antifreeze uses chemicals that plate sleeves with a thin protective layer, but these formulations also may contain nitrite.

Illustration adapted from Baldwin Filter graphic.

QUICK TIP

Pure Water

Using tap water in your vehicle's cooling system can undermine your best efforts at good maintenance if it creates rust, scale and corrosion.

Premixed coolant, with 50 percent demineralized water, avoids these problems. So does deionized water. Talk to your local water-conditioner expert about a deionization unit. We found a local supplier who would install a "mixed bed" unit for around $200, then switch tanks as needed for $80 or $90. Typical tank life is 1,500 to 2,500 gallons of treated water.





Coolant Analysis

Given the changing chemistry of coolants and the increased demand placed on cooling systems by today's engines, Bryan Debshaw, CEO of Polaris Laboratories, believes that coolant analysis will become an increasingly important tool in preventive-maintenance programs. Coolant analysis not only determines coolant condition, he says, but also identifies other vehicle problems that can show up in the cooling system. Coolant-analysis programs typically are available in various levels (and costs), depending on the number of parameters checked.

A primary cause of wet-sleeve damage is cavitation, but other causes are prevalent: These sleeves have been attacked by 1) stray electrical current going to ground through the coolant; 2) calcium and magnesium scale that impedes heat transfer and is caused by water with minerals (the sleeve "blues" at 600F); and 3) chloride (in the water), which "decarbonizes" iron until it is like sand, says Elizabeth Nelson of Polaris Laboratories.



Photos: Polaris Laboratories



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inch color monitor, which supports five different application modes or operations and displays data in 10 different languages, says Gore. Views from an optional counterweight-mounted camera also display on the monitor.

Standard on Komatsu models is the Komtrax equipment monitoring system.

"It's a web-based application that provides critical machine information virtually anytime, anywhere," says Morris. "To put it simply, Komtrax will tell you where your machine is, what it's doing, how it's doing it, and the condition that it's in. That's really what it's designed for, and it's all wireless."

Upon further review, perhaps it is unfair to suggest these machines are flying under any radar screen.

Web Resources

Find hydraulic-excavator manufacturers' websites in the online version of this story at ConstructionEquipment.com. Just click on Archives, Buying File, and you'll find a link to this story.

Excavator Specifications (30 to 40 metric tons)

Models	Operating Weight (lb.)	Net Engine Horsepower	Maximum Dig Depth	Reach at Ground Level	Dump Height
Kobelco SK290LC-DA	66,350	190	23'9"	34'8"	23'6"
Caterpillar 325D L Mass Boom	67,100	204	20'1"	31'0"	19'7"
Terex TXC 300LC-2	67,579	197	24'2"	34'7"	23'10"
Volvo EC290B LR	69,900	192	48'6"	60'8"	n/a
JCB JS330NL	70,330	239	22'4"	34'0"	22'8"
Caterpillar 325D L Super Long Reach	70,833	204	48'0"	61'0"	41'9"
Hyundai R320LC-7	71,000	232	24'2"	35'11"	23'9"
JCB JS330L	71,100	239	24'3"	35'11"	23'7"
Komatsu PC308USLC-3	71,938	187	21'2"	33'0"	23'1"
Hyundai R290LC-7 Long Reach	72,440	197	48'7"	60'4"	40'0"
Kobelco SK290LC Long Reach	74,733	190	49'4"	62'6"	41'2"
John Deere 350D LC Super Long Front	74,957	271	46'5"	59'7"	38'11"
Doosan DX340LC	75,177	247	24'8"	36'0"	23'7"
Terex TXC 340LC-2	75,178	247	24'7"	36'0"	23'7"
Komatsu PC300LC-7	75,376	246	24'3"	35'10"	23'4"
Caterpillar 328D LCR	76,500	204	22'8"	34'8"	26'5"
Liebherr R944B	77,160	241	22'2"	34'1"	23'9"
Hitachi Zaxis 350LC-3	77,269	271	26'10"	39'1"	25'0"
John Deere 350D LC	77,269	271	26'10"	39'1"	25'0"
Komatsu PC300LC-7 Power Plus	77,558	242	26'10"	38'6"	24'7"
Kobelco SK300LC-DA	77,800	247	24'7"	36'2"	23'11"
Case CS330	78,043	271	24'1"	36'0"	23'9"
Link-Belt 330LX	78,500	271	24'1"	36'0"	23'9"
Hyundai R360LC-7	79,590	261	24'7"	36'1"	23'11"
Kobelco SK350LC Acera Mark 8	79,600	264	24'10"	36'3"	24'2"
Caterpillar 330D L	79,700	268	26'10"	38'5"	24'9"
Volvo EC300B LC	79,800	247	24'2"	35'7"	24'2"
Kobelco SK300LC Mass Excavator	80,000	247	20'9"	31'9"	23'2"
Volvo EC330B LC ME	80,520	247	22'1"	33'8"	22'5"
Caterpillar 330D L Mass Boom	81,511	268	21'9"	33'7"	21'9"
Komatsu PC300HD-7	83,555	246	23'10"	35'8"	23'6"
Volvo EC360B LC	85,470	247	24'7"	36'0"	23'9"
Volvo EC360B LC ME	85,600	247	22'1"	33'8"	22'5"

Source: Spec-Check Xpanded Specs (as of April / 07)

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JCB CONSTRUCTION EQUIPMENT

CASE

B Series Machine Makes Debut

Introduced in January 2007, the 32.8-ton CX290B is among the first models in Case's new CX B Series line of full-sized excavators. In addition to a 20-percent increase in fuel efficiency, the CX290B features faster cycle times due to increased hydraulic flow, up to 17 percent more horsepower, and an improved operator environment. Maintainability and serviceability have improved 39 percent over the previous model, as measured by the SAE maintenance score of 14,917 points.

Number of models: 2

New model: CX290B

Product-line features: While Case's 290-size machine has jumped to the B Series, the larger CX330 model has itself undergone a significant upgrade. The 39-ton CX330's new Tier III engine uses a common high-pressure rail system, resulting in a 5-percent increase in horsepower, and 8- to 10-percent better fuel economy.

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CATERPILLAR

Electronic Control Module Manages Machine



Generating 268 horsepower to drive the new 79,700-pound Caterpillar 330D L excavator, the new Cat C9 engine employs ACERT technology. Cat's ADEM A4 electronic control module manages fuel delivery to get the best performance per unit of fuel used. The engine management system provides flexible fuel mapping, allowing the engine to respond quickly to varying application needs. For reduced power consumption and reduced noise, the 330D L has a hydraulically driven fan controlled by the electronic control module.

Number of models: 1

New model: 330D L

Product-line features: As part of the upgrades from the C-Series machines they replaced, each of the 324D L, 325D L and 330D L models rolled out in 2006 employs a new spacious, quiet cab featuring fully automatic climate control adjustments for temperature and air flow. The system even determines which air outlet is best in each situation. All glass is affixed directly to the cab, which eliminates the need for window frames. Pillar-mounted wipers also increase the operator's viewing area.

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HYUNDAI

Cummins Power Drives New Models

As part of Hyundai's new Robex 7A Series, the R360LC-7A excavator is powered by the Tier 3 four-cylinder Cummins QSL turbocharged engine that is SAE-rated at 271 horsepower. Improved fuel economy, better cold-starting capabilities, and 50-percent quieter operation are combined with heavy-duty engine design and surrounding infrastructure for reliability in the toughest working conditions. Underneath, the machine's reinforced box-section lower frame is engineered of all-welded, low-stress, high-strength steel.

Number of models: 2

New models: R320LC-7A, R360LC-7A

Product-line features: With the Robex 7A Series, Hyundai focused excavator improvements beyond improvements in engine and hydraulic performance to operator comfort. The new 79,590-pound R360LC-7A model provides operators with a wide, quiet cab featuring a full-view front window and large rear and side windows for visibility to all surroundings. Controls are located for minimum operator movement.

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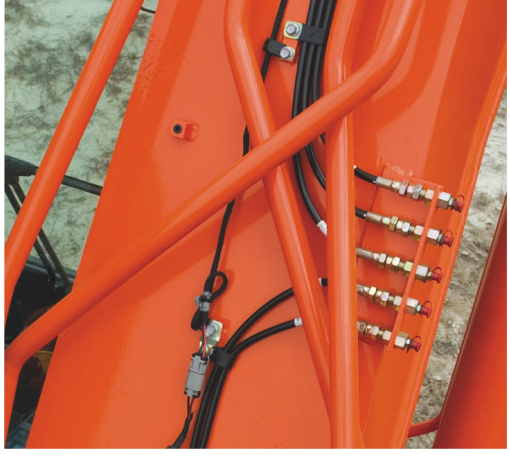

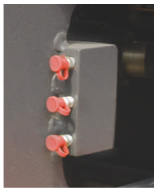

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DOOSAN

New Brand Brings Smarter Machines

With Doosan updating the former Daewoo product line, each of the new models in the DX Series of crawler excavators features an electronic package that allows communication between the engine and hydraulics for optimum performance and fuel economy. At the same time, a dual-walled exhaust silencer reduces noise levels with the DX models, which includes the DX300LC and DX340LC models at 66,580 and 76,621 pounds, respectively.

Number of models: 2

New models: DX300LC, DX340LC

Product-line features: The ergonomic DX Series cab is designed to pamper the operator with fully automatic heating and air conditioning, a six-way adjustable seat with lumbar support, and a telescopic control stand. The glass surface and a transparent roof section increases visibility. Operating costs are kept low through the ease of routine maintenance, extended service intervals and increased fuel efficiency.

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HITACHI

Popular Model Moves Up

In 2006, Hitachi introduced the ZX350LC-3 excavator as an upgrade to the Zaxis 300LC. The new model keeps a number of the features introduced with the smaller predecessor machine, but also incorporates a beefier undercarriage and faster hydraulics, as well as a new Tier 3, six-cylinder Isuzu engine. A common-rail fuel-injection system and the cooled Exhaust Gas Recirculation system improve the 271-horsepower engine's output and fuel efficiency.

Number of models: 1

New model: ZX350LC-3

Product-line features: A redesigned cab features a 47-percent increase in right-side visibility. Short-throw levers combined with armrests mounted independently from the seat result in fingertip control with less effort. Adding to the simple operation of the machine is a single work mode. The complete redesign extends to the multi-function monitor, which features large, easy-to-read gauges.

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JCB

Model Available in Different Configurations

Introduced in mid-2006, the JS330 excavator from JCB is available in a choice of standard, long-reach or demolition configurations. This Tier 3-compliant model boasts 25 percent more power, faster cycle times, and service access improvements. The cab has been updated in line with the other JCB "New Generation" models to provide greater visibility and comfort for the operator.

Number of models: 1

New model: JS330

Product-line features: The electronic management system of the Tier 3 engine allows the on-board computer system to control the power and fuel usage of the excavator with precision. This not only makes the JS330 a very efficient machine, but also increases output by obtaining the most out of the engine and hydraulics. True ground-level servicing is possible because the engine oil level is checked electronically and displayed in the cab.

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JOHN DEERE

System Takes Away Operator



The Powerwize III engine/hydraulic management system on the John Deere 350D LC excavator simplifies the operator's choice to either work or attachment mode. The computer automatically adjusts swing, boom and stick priority based on operator inputs through the pilot levers, and will deliver a temporary power boost when the hydraulic system is taxed. According to product marketing manager Mark Wall, customers most often remark that these excavators perform predictably in changing conditions, that operators know the machine is going to react to expectations.

Number of models: 1

New model: 350D LC

Product-line features: John Deere's on-board data-logger records operating parameters such as engine speed, coolant temperature, hydraulic pressure and temperature, travel time, swing time, idle time and fault codes. Downloaded to a computer via a mobile device, Deere's Machine Information Center can provide data in user-friendly formats to help contractors predict maintenance and be more productive.

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KOBELCO

Hydraulic Flow Controlled from Cab

As with all new Kobelco excavators, the SK350LC model boasts increased hydraulic performance, along with increased bucket breakout force, swing torque and drawbar pull force for digging trenches, setting pipe and loading trucks. Introduced last fall, the SK350LC is powered by an electronic fuel-injected Hino turbocharged engine generating 264 horsepower. At 79,600 pounds, the SK350LC digs to 24 feet 10 inches, and reaches to 36 feet 3 inches at ground line.

Number of models: 1

New model: SK350LC

Product-line features: Kobelco has focused on operator comfort, providing seven-way adjustable seats and near 360-degree visibility. Operating features include four working modes to match the application, improved grading and leveling capability via the Intelligent Total Control System, and one- and two-way hydraulic flow controlled from inside the cab.

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LBX

New Model Packs More Punch



Introduced by LBX in January, the Link-Belt 290 X2 excavator incorporates a horsepower boost from 177 to 207 without an increase in fuel consumption, thanks to a re-engineered Tier 3 Isuzu engine. Providing optimum power are new work modes, including speed priority mode for fast cycle times, attachment mode to match output with auxiliary attachment needs, applied power mode for heavy lifting and precise placement, and heavy mode for general purposes. The 9-percent power boost automatically engages in heavy mode and stays on in applied power mode.

Number of models: 2

New model: 290 X2

Product-line features: On both the new 290 X2 and the established 330 LX excavator models, the two-speed boom lifting and arm open/close functions work in conjunction with the hydraulic system to enhance digging, lifting and swing. The load-sensing, automatic power boost allows the machines to power through tough digging conditions. Daily maintenance is made easy via remote ground-level service access to the engine oil filter, fuel filter and engine oil.

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LIEBHERR

New Machines Boost Operating Efficiency



Over the B Series models, Liebherr's R934C and R944C excavators integrate a bypass valve into the main control block to allow simultaneous travel and lifting duties without the loss of flow or pressure to any function. Hoist cylinders with integrated load-holding valves combine with "regeneration plus" pressureless boom lowering to allow gravity to lower the boom with no oil flowing through the control valve, resulting in more efficient operations. Both Liebherr models covering the 30- to 40-ton excavator market feature more powerful, purpose-built, Tier 3 Liebherr D936L diesel engines.

Number of models: 2

New models: R934C, R944C

Product-line features: The R934C and R944C feature a dedicated third pump exclusively for swing, reducing cycle times in production applications. The rotating deck features two different boom-mounting positions, so that the machine's digging envelope and lifting capacities can be maximized. Cast components in high-stress areas of the attachment ensure durability and long life. Standard semi-automatic centralized lubrication allows the operator to grease all lube points without leaving the seat.

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TEREX

Product Line Undergoes Overhaul



Updated as part of Terex's ongoing program to update the excavator line, the new TXC 300LC-2 and TXC 340LC-2 models feature a new pattern change control that allows operators to change the control pattern to best suit their particular operation style and background. This is ideal for rental yards that need to accommodate as many operators as possible. The LC-2 models feature a wider, roomier cab with automatic climate control that has 20-percent more cooling capacity and 8-percent more airflow, yet less noise generated by the new Tier 3 engines.

Number of models: 4

New models: TXC 300LC-2, TXC 340LC-2

Product-line features: Now offering an excavator lineup ranging in operating weight from 3,395 to 104,900 pounds, Terex incorporates the e-EPOS electronic power optimizing system that communicates with the engine and hydraulics to help maximize work efficiency and minimize fuel consumption. For operators, a multi-functional color monitor provides quick viewing of performance and maintenance data from within the cab.

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KOMATSU AMERICA

Product Offering Covers All Bases

Over the past 18 months, Komatsu has introduced updated editions of each of its excavator models in the 30- to 40-ton range. And, even with the tight scope of that particular size range, the variety of excavator solutions offered by Komatsu is clearly exhibited. Aside from the standard PC270LC-8 and PC300LC-7 models, the company introduced an updated PC308USLC-3 model, bringing the benefits of a short tail swing excavator to applications requiring larger machines. At the same time, the PC300HD-7 incorporates the 300-size upperstructure with a 400-size undercarriage for extra stability and lift capacity.

Number of models: 4

New models: PC270LC-8, PC300LC-7, PC300HD-7, PC308USLC-3

Product-line features: An improved pump flow merge divide valve combines with high-efficiency components to enhance Komatsu's hydraulic system, as evidenced in the new PC270PC-8. The 300-size machines are equipped with two boom mode settings; four working modes; and Power Max to match engine speed, pump flow and system pressure to specific job needs. The PC308USLC-3 offers two working modes, one with four level settings. All of the machines come equipped with the Komtrax wireless monitoring system as standard.

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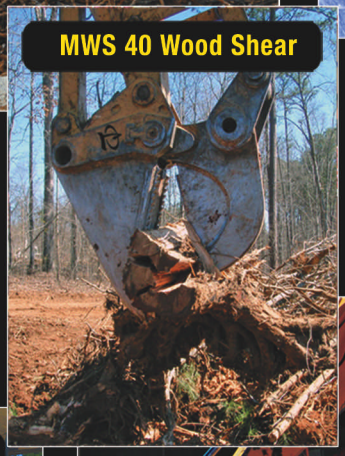





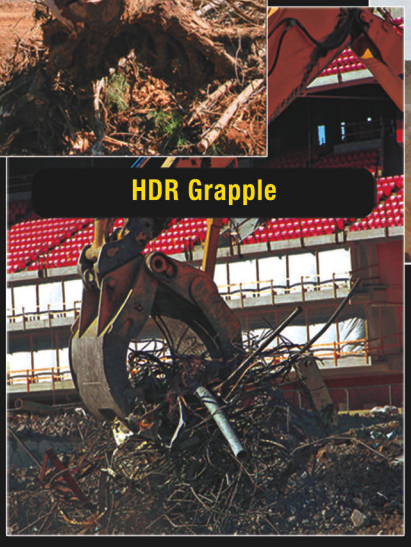

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By MIKE ANDERSON, Senior Editor

Have Tools, Will Work

Attachment suppliers support hydraulic-excavator market

Fecon



For reaching up and down slopes and other areas not easily reached by traditional stump-grinding equipment, Fecon offers the SH340 "Stump Hog" attachment. It has 90 cutting tools with large, thick carbide tips patterned for maximum cutting action while protecting the wheel and each other from wear and foreign materials. Measuring 33x4.5 inches, the Stump Hog's cutting wheel utilizes the Sandvik Dura Disk II stump-cutting system. The SH340 can accommodate up to 100 gallons per minute of hydraulic flow when powered by Fecon's self-contained power pack.

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Craig Manufacturing



Direct-link hydraulic thumbs connect to a variety of excavator buckets and accommodate various tooth configurations. Boasting the ability to tuck tight to the stick when retracted, the thumbs will work with either pin-on or quick hitch-type buckets. Progressive link designs are also available.

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BTI



Along with a suspended, boxed-section, lightweight housing, Breaker Technology's BT Series hydraulic breakers have upper and lower shock-absorbing dampers to reduce noise and vibration. Other features include large-diameter, high-strength tie rods constructed from high-tensile steel; sealing system suited for long life in harsh environments; smooth piston finish and piston chamber; tight piston and valve tolerance for high efficiency; and a well-protected and easy-to-refill accumulator gas valve. Models are available in 10 sizes, ranging from the 550 to the 10,000 ft.-lb. class.

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Nye Manufacturing



Evolved from a long line of mechanical pulverizers, Nye's new XCP2 Series heavy-duty concrete pulverizer attachments are designed to outperform conventional hydraulic units in both primary and secondary crushing operations. Hardened alloy pins and bushings combine with thicker steel for increased strength and durability. Replaceable AR500 crushing jaws are welded in, not pinned, so they cannot fall out and jam the crusher. Nye pulverizers require no extra hydraulics. Quick coupler and pin grabber models are also offered by the company.

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Kinshofer North America



Described as an "all-rounder" three-in-one demolition tool, the Multi-Quick Processor is available in three sizes, for carriers ranging from 22 to 65 metric tons. Versatility of the MQP-30, 45 and 60 models comes through the use of three different jaws — a shear, pulverizer and combination — all built with exchangeable wear parts. All teeth and cutting blades are easily replaced on site. The Kinshofer processors come with the DSXpower cylinder, consisting of two pressure chambers providing up to 20-percent more power.

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Stanley LaBounty



MWS wood shears from Stanley LaBounty were recently upgraded with stronger, more durable components to better withstand the rigors of land-clearing operations. The new design features a heavy-duty pivot group, as well as upgrades to the mounting pad and arm, and associated pins. The weld-in replaceable blade is made from abrasion-resistant, high-strength steel for long life and edge durability. Using the existing bucket cylinder and linkage, the shears have no need for additional hydraulic circuits. A key benefit is the ability to not only reduce the size of stumps/logs, but also to remove much of the dirt and rocks. The shears come in two sizes.

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Allied-Gator



The MTR 40, 50 and 70 can expand the processing capabilities of any 30- to 40-ton excavator model. Ranging in weight from 7,000 to 12,500 pounds, these Multi-Tools, respectively, generate 685, 860 and 1,043 tons of force for shearing, cracking and crushing. Transition from structural steel processing to concrete reduction is simple with Quick-Change jaw sets, switched in the field in as few as 15 minutes. The MT Shear Jaw Set is designed for the processing of heavy structural steel and scrap metal, offering weld-on, interchangeable, solid and disposable shear tips. The MT Cracker/Crusher Jaw Set processes reinforced concrete and heavy cast materials.

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Kenco



Available for use either as a direct pin-on attachment or in conjunction with the Kenco Wedgebolt coupler system, the Slab Crab bucket turns the removal of concrete slabs and bridge decks into a one-person job. The contractor simply saw cuts the concrete into manageable slabs, and then uses the excavator to pick the pieces up and load them directly onto the truck bed. Kenco makes the Slab Crab for carriers ranging up to 150,000 pounds to accommodate slabs ranging in thickness up to 29 inches. Other products for excavators in the 30- to 40-ton range include pulverizers.

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Ingersoll Rand



Tramac heavy range hydraulic breakers utilize patented variable-speed technology that senses changes in material hardness and automatically adjusts to the optimum combination of impact energy and striking rate. This maximizes productivity while reducing potentially damaging energy transferred back to the excavator. A progressive start system creates a small niche in the material, preventing the Ingersoll Rand Tramac breaker from sliding by applying the first few blows with low energy before full power is applied. An automatic lubrication system ensures the breaker is constantly lubricated for optimal functionality.

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MBW

The boom-mounted Universal Vibratory Platform utilizes a patent-pending advance in compression isolation design. Heavy-duty compression mounts isolate higher-amplitude vibration between the boom and compactor under relatively low down pressure. As up or down pressure increases, independent secondary isolation systems are engaged. These systems distribute increasing static load over comparatively huge surface areas, effectively isolating the boom yet minimizing additional deflection in the combined isolation system. The platform can be fitted with an assortment of vibratory wheels or vibratory plates, depending on the soil type and work area constraints.

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Helac

PowerTilt swing attachments from Helac allow excavator operators to simply tilt the tool instead of repositioning the entire unit. To improve a machine's versatility, PowerTilt can be used with a variety of attachments, including wide or narrow buckets, hydraulic hammers, rippers and brush cutters. PowerTilt provides up to 90-degree left and right bucket swing for a full 180-degree total side-to-side swing capability. Available for excavators up to 35 metric tons, PowerTilt comes standard with a pin-on coupler, and is compatible with OEM-specification buckets and other attachments.

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ESCO

With universal mounting allowing installation on excavators up to 40 tons, ESCO's new rigid-style thumb is an economical option to hydraulic thumb models. And, in comparison to the previous ESCO thumb design, the new rigid model provides superior strength in key areas such as the strut and tines, but with only a minimal increase in weight. T1 plate is used in all critical component areas, including times and mounting base arms. The thumb's four-tine design allows it to mesh with standard bucket widths in each weight class. The independent thumb does not interfere with the bucket lugs or coupler, so attachment changes are quick and easy. Staggered, serrated teeth provide a continuous bite across the width of the thumb, and curved tines provide grip when working with varying-sized items. Three working positions allow for maximum movement.



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Buying File: Attachments



AIM Attachments

AIM's new HDT34 universal excavator thumb incorporates an AR400 steel structure built for a tight fit on any bucket. For excavators in the 60,000- to 80,000-pound market, the thumb measures 34 inches in width and 63 inches in length. Standard features of the HDT34 (shown) include three working positions, oversized steel pins, and AR400 steel tines with serrated edges. AIM also offers excavator grapples for excavators ranging 25,000 to 100,000 pounds, available in standard widths of 36, 42 and 48 inches. Excavator grapples feature five solid AR 400 steel tines and three working positions for durability and versatility in demolition, recycling, excavation and salvage operations. High-capacity models are also available, coming in 54- and 60-inch widths.

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Danuser



Danuser leveraged 60-plus years of auger design and manufacturing experience with the launch this decade of a hydraulic earth auger product line. Designing drive units and auger systems for today's heavy-duty carriers, Danuser's high-pressure drive units start out at 1,500 psi and can handle up to 5,000 psi. With hydraulic flow rate also a concern for excavator operators, the high-pressure drive units accommodate anywhere from 25 to 60 gallons per minute. Danuser uses Auburn gearboxes, which utilize a bearing nut for greater output and retention compared to a snap ring. Additionally, a variety of mounting methods are available for the Danuser attachments.

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Atlas Copco



With an operating pressure of 5,100 psi and a design that combines high breaking force and short cycle times, the CC 3300 demolition attachment meets the requirements of carriers in the 30- to 50-metric-ton range. Both universal jaws and steel-cutting jaws are available. The universal configuration opens 40 inches wide and delivers 441 tons of cutting force. The steel-cutting jaw opens 17 inches wide, also providing 441 tons of cutting force for steel structure demolition, secondary reduction and material separation. The jaws are mounted on one central bearing pin for improved stability and faster replacement.

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Ajusta-Buckets

The Ajusta-Buckets brand lives up to its name with quick-coupler products that allow most buckets to be attached in the reverse position, thus facilitating a front shovel position. Compatible with standard OEM buckets, the quick-couplers also feature lifting hooks for most applications to increase on-the-job versatility. A brand of Seaway Industrial Products, Ajusta-Buckets will make standard and custom couplers, and the company's original manual "snap-lock" latching mechanism is available in all sizes. Hydraulic-powered latches are available, and they can be used manually when hydraulic systems are down.

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Lo-Dril

To meet the needs of powerline contractors and other crews requiring a high-torque drilling attachment, Bay Shore Systems offers the LoDril DH Series. Consisting of the DH-60, DH-84 and DH-100 models with 62,000, 84,000 and 110,000 ft.-lbs. of torque, respectively, these LoDril models are suited for customers who require a low-clearance rig with the power to both turn a large-diameter auger in tough soil conditions and drill it down deep into the ground. Since 1978, Bay Shore Systems has specialized in the manufacture of drilling equipment for challenging site conditions.

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L & G Products

Hydraulic excavators can gain an additional 8 to 26 feet of reach with the installation of the Add-A-Stick. For use on machines weighing 30,000 pounds and up in applications ranging from EPA cleanup work to dredging, the Add-A-Stick has been successfully installed on all major excavator brands, according to manufacturer L & G Products. For smaller arm extensions, L & G also offers the Add-A-Boot in lengths ranging from 4 to 8 feet.

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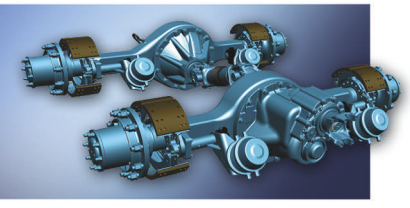

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Trailers

TRANSCRAFT

Transcraft is increasing the legal payload capacity of its standard-duty flatbed trailer models by approximately 8,000 pounds, or 12 percent, moving forward. Formerly designated as "normal" duty with gross vehicle weight ratings of 65,000 pounds, the company's standard-duty flatbed trailers will in the future carry 73,000 pounds. The added capacity is being achieved through focused engineering efforts and the use of higher-strength materials, and is effective on 2008-model-year flatbeds. Transcraft's flatbed models include the Eagle, Eagle II and TL-2000, available in standard-, heavy- and extreme-duty capacities.

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JLG

Allowing operators to lower and raise the deck of JLG's TRIPLE-L trailers in less than 15 seconds, the Power Deck hydraulic system eliminates the need for cumbersome ramps, ascending grades, or using additional personnel. The trailers range from 2,000 to 10,000 pounds in capacity, and are up to 6x16 feet in dimension. Along with nine models of flatbed trailers, there are eight models of utility trailers with sidewalls surrounding the deck and a rear gate. There are also three fully enclosed trailers to keep equipment secure and out of the weather.

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REDI-HAUL

"Ready to haul equipment where it's needed," Redi-Haul builds a full line of flatbed trailers with main frames engineered to carry loads up to 25 tons. Every part of a Redi-Haul trailer is designed to both meet DOT safety standards and exceed the quality standards of customers. The full flatbed line includes skid loader trailers ranging from 12 to 16 feet in length, while the industrial flatbeds range from 20 to 29 feet in overall deck length, including the beavertail models. Gross vehicle weight rating ranges from 10,000 to 60,000 pounds.

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TEREX

Specifically designed to meet transportation demands of the rental industry, the new Terex HFT 70RS trailer comes standard with an automatic hydraulic tail lock system. At a width of 102 inches, the main deck is 29 feet 5 inches in length, and is joined by the additional 9 and 10 feet, respectively, of the gooseneck deck and extended hydraulic ramp. The tail section provides ample ramp length for an easy loading slope with a total length of 14 feet 6 inches. Specifically, the folding tail flips out and lowers to the ground and creates a 6-degree break-over angle, which allows equipment to drive onto the main deck without using a winch. The trailer's starburst decking provides excellent traction.

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TRAIL KING

Trail King's TK70HST hydraulic sliding tail trailer combines the movable wheel area of a sliding axle trailer with the tail of a hydraulic tail trailer to deliver a low load angle. With the wheels moved forward, the HST's hydraulic tail's load angle can be lowered to 10 degrees. The resulting transition from the tail to the deck at the hinge point is so small that even equipment with very low ground clearance can be loaded with ease. Other Trail King trailers available include the Advantage Series sliding axle and hydraulic detachable gooseneck models.

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FONTAINE

Recently, Fontaine rolled out an aluminum trailer so "revolutionary" that it weighs less than 7,800 pounds and yet handles 60,000 pounds in just 4 feet. The sleek, aerodynamic shape of Fontaine's Revolution trailer is designed to cut through the air with a drag coefficient not associated with a flatbed trailer. Friction-stir welding, proven technology borrowed from the aerospace industry, adds to the strength of the floor while reducing weight to allow bigger payloads. A patent-pending, one-piece extruded aluminum siderail is designed to withstand impact damage better than conventional designs. A patent-pending main beam is made from extruded aluminum to eliminate welding between the web and the flange.

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REINKE MANUFACTURING

Enhancements to Reinke's drop-deck trailers include refined wheel wells that no longer extend up into the floor of the drop deck. This change beefs up the floor's strength and increases the structural integrity over the wheel wells. Additionally, bolting the lower deck side rail to the drop section adds trailer strength and flexibility. Drop-deck trailers are available in lengths of 45 to 53 feet and widths of 96 or 102 inches. Beam capacity is 50,000 pounds in a 4-foot working load rating when the load is astride main beams. The trailers come standard with Reinke's "Super Floor" and unique S-shape neck design.

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CENTREVILLE

To make it easier for contractors to load scissor lifts, asphalt rollers, and other equipment difficult to get onto a traditional ramp trailer or standard tilt trailer, Centreville developed a 14-foot low-angle tilt trailer. When tilted, the Centreville LAT614 model has a 5-degree slope, compared to the traditional 11 to 12 degrees of a tilt trailer bed. The special ramps are tapered to further enhance the ease of loading the low-angle tilt trailer, which also comes in bed lengths of 16, 18 and 20 feet. Options include oak decking and winches.

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TITAN TRAILERS

With a focus on developing custom hauling solutions, Titan delivered for K&D Transport in Stoney Creek, Ontario. At first glance, the flatbed trailers in K&D's yard wouldn't garner a second look. But whenever fellow truckers see steel coil getting hoisted onto one of the trailers at a mill, suddenly there are a lot of questions. The object of the attention is the trailer's coil bunk. With the bunk's timbers fastened to the deck with removable pins, the loading process takes less time, and thanks to pins going right through the subframe, there's an extra sense of security once the coil is tied down. Fabricated steel Ts drop into square-cut holes in the deck.

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ROGERS BROTHERS

On the Ultima Series of lowboy trailers, Rogers Brothers' use of cambered main beams fabricated with 100,000- and 130,000-psi material is able to reduce the trailers' tare weight while maintaining strength and durability. These trailers are now available in production models of 35-, 50-, 55- and 60-ton capacities. Specialized Ultima models offer a wider selection of payload capacities, deck styles, gooseneck lengths, and other options and accessories to simplify any hauling need. Standard is the award-winning No Foot self-lifting gooseneck, which quickly raises or lowers the front of the deck under full load without a ram foot contacting the ground.

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LIFT-A-LOAD

A product of The Advance Metalworking Co., the hydraulically elevating Lift-A-Load trailer simplifies loading with its ability to hydraulically lower to ground height and to lift to dock height or any level in between while remaining level throughout. Essentially a portable loading dock, the trailer eliminates the need for slanted ramp boards and allows equipment delivery without double handling. At the transport position, the trailer provides a low center of gravity for safe towing. When lowered, it allows a minimum loading angle ideal for low-ground-clearance or reduced-gradeability vehicles. With capacities ranging 4,400 to 15,000 pounds, the custom-built Lift-A-Load elevating platform trailers are available in different styles, from straight tongue to gooseneck hitch, and with single or dual axles.

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BIL-JAX

One person can easily load equipment onto the Bil-Jax ET7000, even while the Escalate Trailer remains attached to a towing vehicle. With the ET7000's ramp grade at only 6 degrees, equipment with low ground clearance can be driven on and off the trailer, which is designed to handle payloads of up to 7,000 pounds. With a bed size of 75x144 inches, the trailer is ideal for hauling scissors lifts, skid-steer loaders, trenchers, personnel lifts and all types of powered walk-behind equipment. The ET 7000 is equipped with hydraulic surge brakes or electric brakes. As options, a battery charger and spare tire kit are available.

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LANDOLL

Equipment transport trailer manufacturer Landoll has selected Kar-Tech to supply wireless remote controls for the 2008-model-year Traveling Axle, Traveling Tail and Container trailers. Kar-Tech, of Delafield, Wis., will supply its "Mini Series" controls for three hydraulic valve spools or six complete functions on the trailers. In most cases, the wireless remote controls hydraulic movement of the traveling undercarriage, winch and trailer tilting deck. Landoll also announces the availability of a new ramp option for the Model 835 detachable lowboy trailer line. Manufactured in-house, the ramp allows asphalt pavers to be loaded and unloaded from the lower deck. The 4-degree load angle allows for proper clearance under the paver and a safe transition from the ground to the trailer deck.

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COMPACT POWER

Offering not only construction equipment, but the systems to specifically transport that equipment, Compact Power recently increased its product line to include five different trailer packages for the Kanga Kid, Boxer Brute and Boxer mini-skids. Compact Power's system trailer is "a tool kit on wheels" that carries up to 10 attachments plus the machine in the same package. The trailer is equipped with receptacle areas for each attachment, comes standard with chains and binders to keep the attachments in place while en route, and includes a 2-inch coupler for towing. Ranging in size from 4x7 feet to 5x10 feet, the single- or dual-axle trailers weigh less than 6,500 pounds fully loaded.

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TRAIL-EZE

Thanks to the newest hydraulic tail trailers from Trail-Eze, small tired equipment can now be loaded as easy as larger equipment. The TE70XT model meets the lowest of load angles, alleviating the concern of operators about axle alignment or parts wearing out and not being able to push back under the load. The Trail-Eze TE70TXT has the same low load angle, as well as the capability to lift the entire bed to help dump the load without the use of a hydraulic upper deck ramp. Also, by simply lifting the front of the bed and winching the load off slowly, the unloading of small air compressors is no longer a problem.

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DITCH WITCH

The Ditch Witch single-axle S6B trailer is built with structural steel frames for strength and torsion axles for reliability and ease of maintenance. As standard, this equipment trailer features steel-mesh, skid-resistant ramps; steel, skid-resistant bar grating decks; tie-down points; and complete lighting, including shock-mounted clearance lights for highway driving. The Ditch Witch trailer is built with a no-tilt feature, and a sturdy storage space is provided in front for the transport of equipment attachments such as buckets, pallet forks, trenchers and augers.

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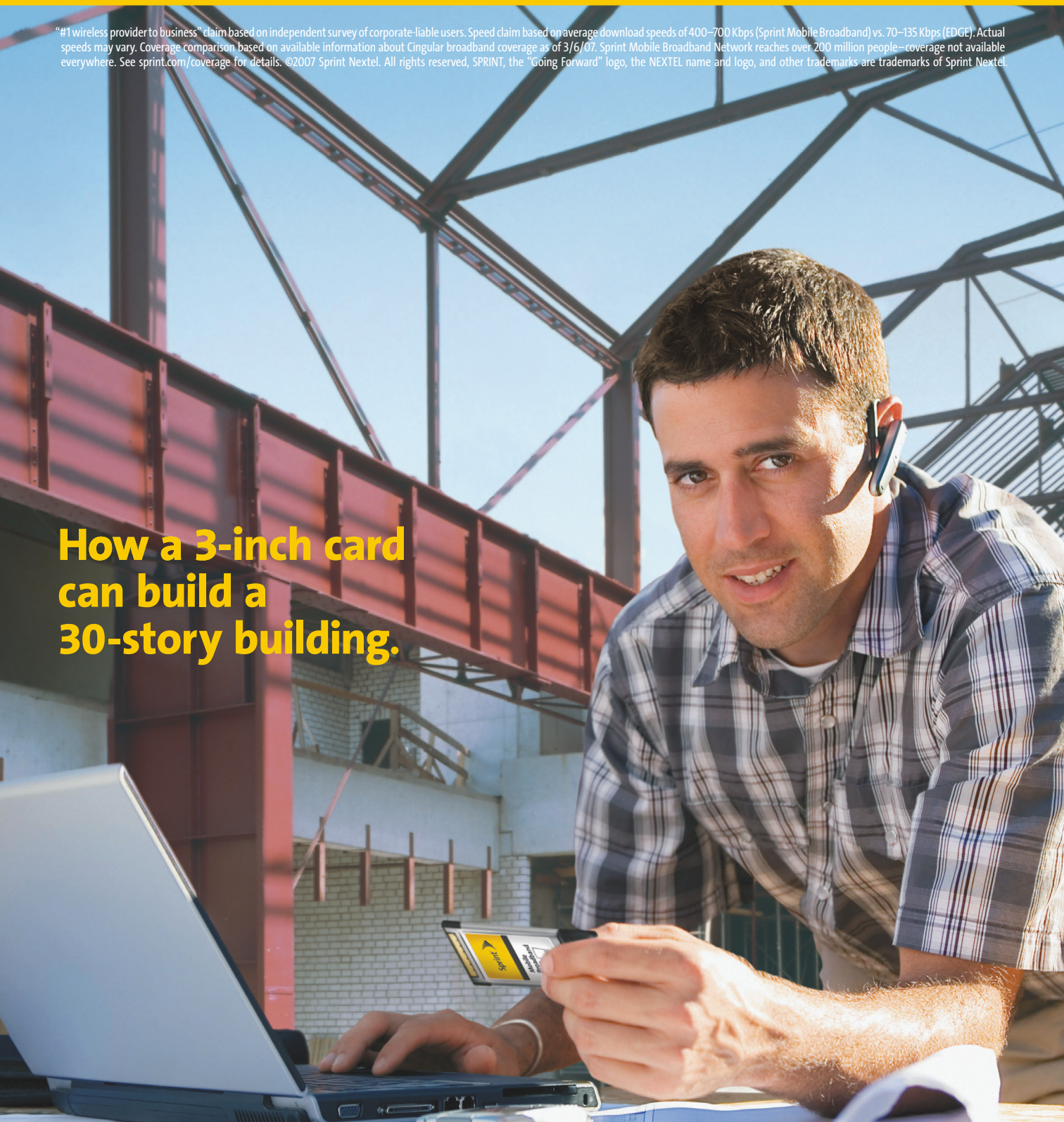

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By MIKE ANDERSON, Senior Editor

Guesswork No Equivalent for Hard Facts

Florida public fleet manager puts real numbers to maintenance staffing requirements

PROFILE



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Specialty:
Government/public fleet maintenance and management

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Support Staff:
31 professionals, including 20 maintenance technicians, two superintendents, four materials management staff and five administrative staff

Facilities:
Three geographically separated maintenance locations

Market Range:
16 departments serving 313,000 residents in a 741-square-mile county

When it comes to determining shop and staffing needs, fleet managers across America have often had to rely on guesswork. Their colleague Ron Schulhofer thought that was the case.

His own guesswork has proven prophetic.

A fleet services division manager with Manatee County in Florida, Schulhofer made a presentation on Utilizing Vehicle Equivalents at the recent conference of the Association of Equipment Management Professionals (AEMP).

"It's a short presentation, it's only 16 slides, and to me it's all kind of self-explanatory," he says. "I fielded quite a few questions from the audience, but at the end of it I said, 'If anyone would like to have a copy of this, give me your card and I'll e-mail it to you.'

"Well, I got a stack that's two inches deep of business cards. Everybody came up and was flipping cards at me ... and I'm like 'Wow, there is obviously a big interest in this.' I don't think there was one individual there who didn't want a copy of it."

The previous year, Schulhofer was also a speaker at AEMP, addressing the challenges of new fleet managers. During that presentation, he brought up his own use of vehicle equivalencies, and this sparked later queries from some audience members. When he was asked if he had a topic for this year's conference, he didn't have to think twice.

"For most folks, unfortunately their staffing level is their budget level," he says, "instead of saying, 'Here's the level of service I can provide if I had this staffing, and I can show you through numbers how that works.'

"That's what equivalencies will do to you. You can drive your budgets, instead of your budgets driving you. It's a good defense tool ... or an offensive tool, whichever way you want to go with it."

Using historical data, fleet managers start off by determining the average hours of "wrench turning" per fleet class, then per unit. A base line is then set from a fleet class



Photos: Bob Thompson©

Ensuring Manatee County's equipment is kept properly serviced is not guesswork. According to the county's Ron Schulhofer, no fleet's shop and staffing requirements need be.

that is representative of the fleet as a whole. In Schulhofer's own case, Manatee's 68-unit half-ton truck fleet was chosen, because its model-year range best matched the remainder of the 1,421-unit county-wide fleet, and that particular class is maintained at all three shops operated by Manatee.

The base unit for all further calculations is the average number of maintenance hours per year for a unit in that representative class. In the case of Manatee, the number was 12.87, and that figure is then divided into the average of all other classes to obtain the maintenance repair factor — or MRF.

The MRF then enables the fleet manager to place all units throughout the fleet on a level playing field by ranking each class by maintenance intensity. Those half-ton trucks with their collective base MRP of 1 can now be fairly related to, for instance, a 24-unit ambulance class with an MRP of 11.

The last step is to determine the vehicle equivalent — or VE — by multiplying the class density by the MRF. In the case of the 24-unit ambulance class, the resulting number is 256. For the base 68-unit half-ton class, it remains 68. So, while the ambulance fleet in this comparison has barely over one-third of the number of units as the half-ton fleet, its VE is almost four times more.

For determining staffing needs, the fleet manager can multiply the base maintenance hours of 12.87 by the total number of VEs, in this case 2,238, for a total of 28,803 hours. A 40-hour work week equals 2,080 hours per year, but since no worker is totally productive every hour of the year, a man-hour availability factor — or MAF — is determined. Taking into consideration such factors as vacations, training, sickness, operational downtime and holidays, Manatee County's MAF was 1,334 hours. So, to cover the 28,803 hours of fleet maintenance time required, 22 technicians are needed.

Such information is key come budget time.

"Different parts of the country seem to be struggling more with first obtaining technicians, much less trying to defend keeping the technicians. There is a nationwide shortage of technicians," says Schulhofer. "But if you can convince your bosses with numbers, and show them: 'Here's the work we do; and here's the level of service we provide with that work; and here's the technicians required to do that; and if we can't find the staff to do that, then I can still show you the cost of the labor through outsourcing ... you can put that in your budget."

Following a 25-year career in the Air Force, where he first was exposed to the use of vehicle equivalencies, Schulhofer has seen the positive effect of his numbers during his six years with Manatee County, particularly come budget time.

"You prioritize your vehicles based on intensity of labor. Obviously, a 40-passenger transit bus requires a lot more maintenance than a Ford Taurus, and the people here started to see that," he says. "If you have 100 pickup trucks, you might need one technician, and if you have 23 buses, you might need four technicians. They started to understand that this makes sense, because you put it on a level playing field."



Senior technician Ed Wells is one of the county employees who collectively keeps Manatee County's fleet primed for work.

The size of the fleet really doesn't matter on the effectiveness of a vehicle equivalencies program, or the degree to which it can be taken, says Schulhofer.



Manatee County senior technician/supervisor Bruce Paxton reports to fleet services division manager Ron Schulhofer.

"You can develop your own, concoction, if you will," he says. "If you want to group all of your pickups together, that's fine. But if you want to do some comparisons between Ford, Chevy and Dodge, you can break them out that far and do comparisons: 'Are we spending more for labor on this brand versus this brand? Or is it just this class of vehicles that is causing me a great deal of labor?' You can break this up any way you need to present it.

"With 1,421 units in this fleet, I have everything from D9 dozers, to transit buses, to air boats. There are folks out there in the smaller municipalities that may have 220 vehicles, or 100 vehicles, but the spatial of vehicles that they have might mirror exactly what I have. They can use this same formula and come up with how many techs they really need, or how much money they need for outsourcing for those classes of vehicles."

And it doesn't have to be guesswork.



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By MIKE VORSTER, Contributing Editor

Discounted Cash Flow, Explained

Asset managers need to understand how this concept, and others like it, affect equipment decisions

Discounted cash flow, net present value, internal rate of return. Chances are you've heard of these terms and wondered what they mean, how they work, and how they affect the decisions you take. The terms are not all that important in your day-to-day life, but you must understand the concepts, know the impact they have, and be in a position to communicate effectively with specialists in the area.

We're going to cover the subject in the next two articles. This month, we'll deal with discounting future transactions and calculating net present value; in July we will handle internal rate of return.

Discounted cash flow analysis stems from the idea that a bird in the hand is worth two in the bush. Or, in financial terms, $100 in hand is worth more than $100 arising from a transaction scheduled for some future date. There are two reasons for this. First, money in hand has value and can be used to accrue interest or reduce the cost of debt. Second, future transactions contain an element of risk. The fact that we do not value a future transaction as highly as a transaction that occurs in the present gives rise to the term "Discounted Cash Flow." You are discounting, or reducing, the value of the future transaction. The term "discounting" in this context has exactly the same meaning as it does when a car dealer "discounts," or reduces, the price on a car or when you "discount," or reduce, the value of something you are uncertain about.

The concept of discounting the value of a future transaction rests on the idea that money has a time value: The sooner it comes to hand the better. The mechanics of how we recognize the time value of money involves the use of a compound-interest formula and some algebra. Two scenarios illustrate how these mechanics work.

First, assume we sold a machine and the purchaser comes to us with the following story: "I know I still owe you $10,000 on the purchase, but things are tight and I would like to delay payment for two years." The $10,000 owed is "P," the present value of the transaction now due. You believe "i" (interest) should be 10 percent per year (you could get 6 percent invested at the bank, and there are at least 4 points of risk in the deal). "N" is 2. Therefore "F," the equivalent future value of the commitment owed now but which will be paid in two years, equals $10,000 x (1 + 0.1)2, or $12,100. "F" is greater than "P" because you have compounded up the interest.

Second, assume you will owe a final balloon installment of $10,000 in two years, but you would like to pay it now, take title, and be done with the deal. Your finance house tells you it expects a return of 10 percent on its funds. You know that "F," the value of the future transaction, is $10,000; "i" is 10 percent; and "N" is 2. Therefore "P," the present value of the payment due in two years, equals $10,000 ÷ (1 + 0.1)2, or $8,264. "P" is smaller than "F" because you have discounted

Mechanics of Money

Future value of a transaction that occurred in the present:
$F = P \times (1+i)^N$

Present value of a transaction that will occur in the future:
$P = F \div (1+i)^N$

F = the value of the future transaction
P = the present value of the transaction
i = the compound interest rate per period
N = the number of periods between the present and future dates



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

A bird in the hand is worth two in the bush. Or, in financial terms, $100 in hand is worth more than $100 arising from a transaction scheduled for some future date.

Two Cash-Flow Scenarios

Direct purchase

1	End of Year	0	1	2	3	4	5	**Total**
2	Buy	($180,000)						
3	Operating gain		$40,000	$40,000	$35,000	$35,000	$25,000	
4	Sell						$50,000	
5	Annual cash flows	($180,000)	$40,000	$40,000	$35,000	$35,000	$75,000	$45,000
6	Discount rate at 7%	1	0.93	0.87	0.82	0.76	0.71	
7	Present value of cash flows	($180,000)	$37,383	$34,938	$28,570	$26,701	$53,474	$1,066

Lease

1	End of Year	0	1	2	3	4	5	**Total**
2	Lease	($50,000)	($20,000)	($20,000)	($20,000)	$20,000		
3	Operating gain		$40,000	$40,000	$35,000	$35,000	$25,000	
4	Sell							
5	Annual cash flow	($50,000)	$20,000	$20,000	$15,000	$15,000	$25,000	$45,000
6	Discount factor at 7%	1	0.93	0.87	0.82	0.76	0.71	
7	Present value of cash flows	($50,000)	$18,692	$17,469	$12,244	$11,443	$17,825	$27,673

These tables provide a simple example of how to calculate net present value of cash flows.

back the value of the future transaction.

In essence, that is all there is to discounted cash flow. If a transaction is to be "moved" from now into the future, we compound it up to arrive at an equivalent future value. If a transaction is to be "moved" from the future to the present , we discount it back to arrive at its equivalent present value. The term "discounted cash flow" is used because, in the vast majority of cases, we deal with future transactions and discount future cash flows back to the present.

If you can discount back the present value of one transaction, then you can repeat the process for a given set of cash flows, add them together, and determine the total of the discounted cash flows also known as the "net present value of the cash flows."

The tables above provide an example of how this works. The top table shows a plan to buy a machine for $180,000 at the beginning of the first year (end of year 0) and sell it at the end of the fifth year for $50,000. In the years we keep it, we expect to generate an operating gain (row 3) that provides annual cash flow (row 5). Total cash flow is $45,000, an apparently tidy sum on the $180,000 investment.

Now assume that the time value of money and the risk inherent in this investment justifies a 7 percent discount rate. This gives the discount factors in row 6 and the present value of each future cash flow (row 7). These total to $1,066, the net present value for the purchase decision under the stated assumptions.

Note that the net present value ($1,066) is different from the arithmetic total of the cash flows ($45,000). This is because the venture is "cash negative" throughout its life. It goes cash positive only when we sell it and bring in the final $50,000. If you use a lot of money for a long time, then the time value of that money impacts the situation to a substantial extent.

The bottom table illustrates a lease, where we have an initial advance payment of $50,000 and four subsequent advance payments of $20,000 per year. The annual cash flows still total $45,000, but the net present value of the cash flows is now $27,673. The change in the way the machine is acquired means that the cash flows become "cash positive" close to the end of year 3, and the venture is not sensitive to or severely impacted by the time value of money.

Investing in equipment results in a number of transactions spread throughout the life of the machine. Simply adding the annual cash flows without appropriately discounting future transactions neglects the time value of money and can easily result in less-than-optimum decisions. CE



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By WALT MOORE, Senior Editor

New Telehandler Trio High on Versatility

These recent models from New Holland feature low-boom design and universal coupler

According to New Holland, its three new "high-performance" telehandlers feature long reach, plenty of power, operator comfort, and simplified routine serviceability. The new models — M427, M428 and M459 — are designed to meet a variety of lift-and-place and lift-and-carry applications. Their low-profile, low-boom design, says the company, affords not only enhanced visibility both at boom-height and pick-and-carry levels, but also adds to machine stability. Visibility also gets a boost from the rounded front profile of the cab and expansive glass area.



Although the new telehanders from New Holland will no doubt work primarily with forks, this M428 with a loose-material bucket might eliminate the need for a small wheel loader on site for clean-up chores.

Lift and Reach Specs

	M427	M428	M459
Maximum lift capacity (lb.)	6,600	8,000	9,000
Lift capacity at maximum height (lb.)	3,500	5,000	5,000
Maximum lift height (ft.)	41.8	41.8	44.6
Reach, fully raised (ft.)	5.0	5.0	3.5
Maximum reach (ft.)	29	29	30.8

Operating weights for the new trio are 21,781, 24,118 and 25,353 pounds, respectively. When foam-filled tires are used, operating weights increase by an average of 9 percent. Maximum rated lift capacities (at 24 inches from the fork heel) are 6,600, 8,000 and 9,000 pounds; lift capacities at maximum height are 3,500, 5,000 and 5,000 pounds, respectively. Maximum lift height for the M427 and M428 is 41.8 feet, and for the M459, 44.6 feet.

All three new models use Iveco diesel engines, with respective gross-horsepower ratings of 95, 120 and 120. Also common is a 4F/3R powershift transmission that provides a forward top speed of 22 mph. A 153-inch turning radius and the choice of three steering modes — standard, crab and four-wheel — add to the new machines' on-site performance.

For the operator's convenience, a single joystick in the cab controls the boom and attachment. Also making the operator's life a bit easier are features such as ground-level fueling and a flip-up hood over the side-mounted engine that provides easy access to routine maintenance points. Performance capabilities are expanded, too, via the universal coupler that is designed to allow use of a selection of attachments, including pallet forks, block forks, lumber forks, truss boom and loose-material bucket.

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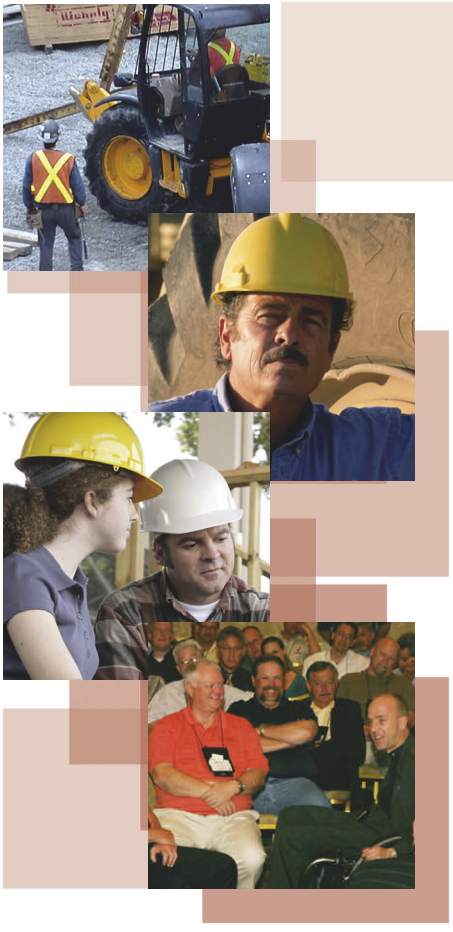

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By LARRY STEWART, Executive Editor

Smart Suspension Keeps Volvo Artics Upright

Shock absorbers at each wheel are smart enough to control machine stability

If you own or operate articulated dump trucks, you probably know their greatest drawback is workers-comp claims and maintenance costs resulting from driving fast on rough roads. Volvo's new E-Series trucks, introduced at Bauma, offer a full-suspension option designed to take some of the shock out of operators who rock and roll.

The new A35E FS and A40E FS (for "full suspension"), when introduced late this year, will be the world's first articulated trucks to offer active, intelligent suspension on all six wheels. Many ADTs use isolated hydro-pneumatic struts on the front suspension. Komatsu's artic trucks add struts on the trailing rear axle as well, but the Volvo E Series 35- and 40-ton FS trucks employ shock absorbers at each wheel position linked to microprocessors that automatically control the truck's stability.

The tractor and wagon are two separate systems, each controlled by its own ECU. The computer works to keep the truck upright by managing pressure in the accumulator packs to which the struts are plumbed. The wagon system has both low- and high-pressure accumulators and the ECU selects which to use for refined performance when operating with the box loaded and empty.

"An ADT's tires are inflated to handle the gross vehicle weight to avoid overheating when loaded. So when the truck is not loaded, the tires are basically overinflated. If you're not careful, the wagon can bounce all over a rough road," says Buddy Goodman, manager of project and marketing support for ADTs at Volvo Construction Equipment. "With the low-pressure accumulator, the suspension just swallows up the ground structure even when running empty."

Introduction of the technology was precipitated by new European body-vibration legislation. The European Union's ergonomic standard is limiting the amount of shock and vibration to which workers, including ADT operators, can be exposed. That's probably why full suspension is an option. To accommodate those outside the EU, there are A35E and A40E models lacking the FS designation that employ traditional front struts and rear-axle rubber block, or elephant's foot, as some in the industry have started to call the traditional shock absorber.

But it's possible that FS may deliver enough productivity advantage to warrant its cost even outside of the EU's regulated environment.

E Series vs. D Series ADTs

	Engine	Net HP	Max. Speed (mph)	Capacity (lbs.)	Heaped Cap. (cu. yd.)	Gross Weight (lbs.)	Service Brakes
A35D	Volvo D12	382	34	71,650	26.2	134,041	Dry disc
A35E	Volvo D12	414	35.3	73,700	22.5	135,600	Wet disc
A40D	Volvo D16	414	34	81,571	29.4	150,509	Wet disc
A40E	Volvo D16	465	35.3	85,800	26.4	152,200	Wet disc

Source: Volvo Construction Equipment

Specs are largely the same for the FS models of the E Series, except for about a 1,500-pound GVW increase on the A35E FS and 2,000 pounds on the A40E FS.



Computer-controlled accumulators allow the shock absorbers in the A40E FS and A35E FS to automatically level and stabilize the trucks on the road or in the dump site.

"It really is amazing," says Goodman. "You can run full-throttle over any kind of ground structure and it's like floating on air."

Volvo claims that haulers can travel at up to 34 mph over rough haul roads with minimal bounce, roll or shake.

"In a slow-speed application, slogging through the mud or where rimpull is a limiting factor, you're not going to see any production increase from the suspension, but you will get stability enhancements," Goodman says. "High-speed applications, where ground structure slows you down, that's where these suspensions really start to shine."

He adds that the suspension also reduces damage to the truck and to the road.

You do not have to wait for FS models to distinguish the new E-Series trucks from the D. The cab and the hood are about the only things retained in the series change. The A40E's capacity increased to 43 tons, and the A 35E is up to 37 tons. These models also have new frames, axles and a new drop box with longitudinal differential and 100 percent lock up.

Power and torque have been increased in the new Volvo D16 engine fitted to the A40E (power up 12 percent and torque up 19 percent). The A35E is powered by a new rating of Volvo's D12 diesel, upgrading it to equal the power and torque that moved the A40D.

Volvo swapped its high/low drop box for a new nine-speed automatic transmission reinforced to handle increased torque. Not only does the new drop box raise the truck's ground clearance, but moving all of the gear sets into the transmission reduced rotational drag and overall driveline weight for a more fuel-efficient gear train.

The 35- and 40-ton models are fitted with more-powerful exhaust brakes and retarders. And the cooling system has been improved so that there is no need to adapt it for hot climates.

The A35E now comes with wet disc brakes, for improved stopping power and longer service life, and the A40E has a larger dump body designed for easier loading. Its high dumping joint and long overhang allows for dumping into hoppers or over an edge.

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By KATIE WEILER, Managing Editor

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Construction Lifters

When the 2.5-ton-capacity Rig-Release remote-control releasing hook is part of the load's rigging, a worker positioned on the ground or in the cab of a crane can release the device from the rigging once the load has been set. According to the manufacturer, Rig-Release can be hooked "to your crane or other lifting device," then the lifting sling attached and the load rigged. Once the load has been landed and the lift line is slack, the operator can press the remote button to release the sling from the Rig-Release.

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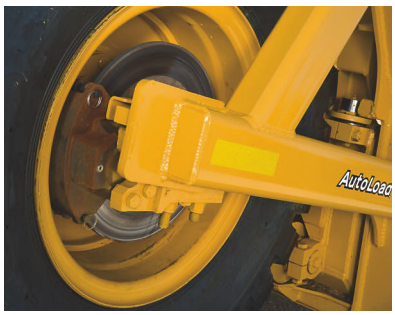
John Deere



To reduce dependency on tractor brakes and allow for shorter stopping distances, a new scraper brake option is available for John Deere's 18- and 21-cubic-yard pull scraper models. Equipped with fixed-mount, dual-opposition, self-retracting pistons and heavy-duty seals for long life, the scraper brakes are activated by the tractor's brake pedal, which results in seamless operation. Steel hydraulic lines are routed along the mainframe of the scraper, delivering improved responsiveness and reliability versus rubber hoses. The brakes are effective in both single and tandem scraper jobs.

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Ingersoll Rand



The self-inflating BL2000 balloon light diffuses glare-free illumination over a 360-degree area. When placed on an optional mounting system, the light stands 7.5 to 15 feet in height, covering a radius up to 15,000 square feet. The 2,000 watts of power are supplied by either a 10-amp, 230-volt source for one lamp or a 20-amp, 110-volt source for two lamps. Weighing less than 40 pounds with a diameter of 43.3 inches, the balloon light can also be fixed directly onto a paver to move along with the night crew. It inflates in less than one minute and can resist wind speeds up to 63 mph.

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Ditch Witch



Pierce Airrow II Series includes seven models of pneumatic piercing tools, ranging in outside diameter from 2.25 to 4.25 inches (with or without threaded heads) and designed for short- to medium-range compaction boring projects, pipe ramming/pushing and pipe pulling. These tools are constructed of single piece, aircraft-quality steel and are designed to flex when encountering an obstacle. Pierce Airrow II models also feature tapered-buttress thread joints (akin to drill pipe) to promote positive locking, and a Nord-Lock securing system reinforces joints that are subject to high vibration and dynamic loads.

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Volvo Penta

A new 7-liter diesel engine, model TAD734GE, is designed for power-generation applications. The engine features an electronically controlled common-rail fuel system, a waste-gated turbocharger, air-to-air charge-air cooling, and four valves per cylinder. Power output for the engine is 250kVA prime 50 Hz and 227kWe standby 60Hz. Dual-speed switching between 50 and 60 Hz is standard on the new engine.

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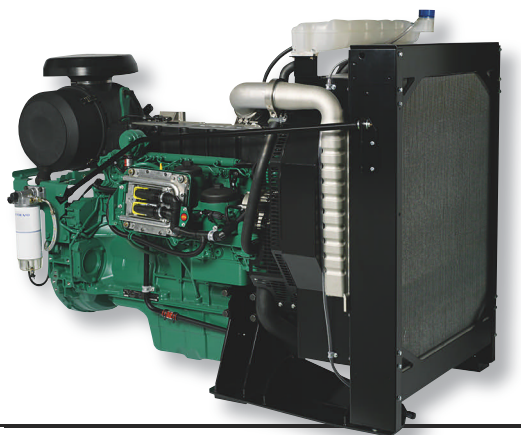

Market Watch Lite

Shell Lubricants

Shell says its Rotella T heavy-duty motor oil meets Caterpillar's ECF-1-a and ECF-2 specifications for 2006 and earlier on/off-highway diesels, as well as the ECF-3 spec for the latest 2007-compliant engines fitted with diesel particulate filters that use ultra-low-sulfur diesel fuel. The formulation also meets the latest API CJ-4 specs, Shell says. Lab tests show that it provides 27 to 88 percent less wear than the previous formulation and it's shown to significantly lower iron wear.

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Bosch

The JACK 11335 breaker hammer delivers 34 foot-pounds of impact force and weighs just slightly more than 35 pounds. An Active Vibration Reduction System is designed to ease the use of the tool, which can be applied in both vertical and horizontal applications.

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Atlas Copco

The XAS 187 JD7 HardHat Portable air compressor, weighing about 2,000 pounds, uses a four-cylinder, 49-horsepower John Deere diesel engine, and its rotary-screw air end produces 185 cfm.

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Trimble

Spectra Precision Laser GL412 single-grade and GL422 double-grade lasers can perform three types of jobs, says Trimble: level, grade, and vertical alignment with plumb with no manual leveling. A continuous, self-leveled 360-degree laser reference is sent over the work area. The beam can be turned off electronically on up to three optional sides to prevent interference with other work areas.

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Allied-Gator

MTR 160 Multi-Tool, weighing 44,000 pounds, is designed for the second member of carriers with operating weights of 215,000 pounds or more, and for the third member of carriers with operating weights of 300,000 pounds or more. The MTR 160's Shear Jaw Set delivers 2,100 tons of force, has a jaw opening of 42 inches, and a throat depth of the same dimension. The Cracker/Crusher Jaw Set opens to 73 inches and provides a throat depth of 50.5 inches.

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Donaldson

Donaldson is promoting its fuel filter water separators (FFWS), including Donaldson Twist &Drain, as part of a system paired with a wide variety of head assemblies. To support its FFWS line, the company is offering a large variety of head options featuring port sizes from 0.25 to 0.875 inch and flow ranges from 45 to 180 gallons per hour.

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Vermeer

Rock-Adaptable Terrain Tool (R.A.T.T.) is designed to drill and steer through most soil conditions. The drill head was designed for Navigator HDD models from the D18x22 to D36x50 Series II. A single-rod setup for pilot bores means no need to change tools as conditions change. R.A.T.T. is 70 inches long, can be used with various Vermeer HDD connections and conventional walk-over navigation systems, and steers via an oscillating motion of the drill string.

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QUALCOMM

GlobalTRACS system now has a multiple maintenance profile feature that provides notifications when maintenance is due on equipment. Users can identify multiple service points scheduled at different intervals rather than receive a generic maintenance notification. Users could be notified for an oil change at 500 hours and a brake inspection at 1,000 hours. Also, a new engine-start curfew function provides theft detection by allowing users to define a range of time that an engine can run.

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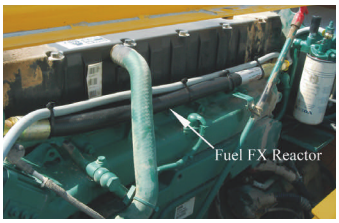
Fuel FX



The reactor is a self-contained, on-board fuel treatment system designed to keep fuel systems clean and increase the mileage of diesel-powered equipment. When fuel passes through the reactor, it is refined at the molecular level to burn cleaner and more completely. Impurities such as water, surfactants, and other particulate matter are broken out of the fuel. The reactor is installed on the fuel supply line between the fuel tank and engine.

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Magnum

Portable light towers have a two-section, tubular steel frame and mast, which adjusts to 11 feet. Features include quick disconnect cords, weatherproof control box, and GFCI protection. Fixtures adjust with 360-degree horizontal and vertical rotation. MPL 1000 holds a 1,000-watt metal halide fixture; MPL 2000 holds two.

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QUALCOMM

QUALCOMM Equipment Management Center combines GlobalTRACS with advanced reporting and can be tailored for each customer. Users can visually manage equipment location and condition, view business information in a comprehensive overhead map, export data into Excel format, subscribe equipment to groups and manage by type. A Web-based version will be available later this year.

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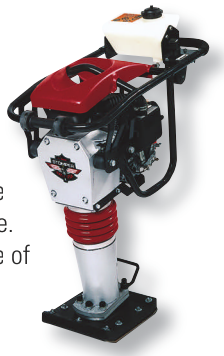
Stone



Two new models have been added to the Stone Stomper line of rammers: XH670D and XH730D. Each has a 4-cycle, 3-horsepower Honda engine. XH670D weighs 134 pounds, has an impact force of 2,650 pounds, and has a 10-x13-inch poly shoe. XH730D weighs 144 pounds, has an impact force of 3,100 pounds, and has a 11-x13-inch poly shoe.

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Lite



Leica Geosystems

Built with cast-aluminum housings, Piper 100 and 200 pipe lasers are designed for use in storm sewer, sanitary sewer, and gravity-flow pipe installations. A large display provides grade, line position, battery status and level indication. Its bright, visible beam is focused to maintain a clear spot and large size over long distances. According to Leica, the pipe lasers have an automatic grade-compensation feature that identifies and corrects grade errors, and it automatically self-levels over a full grade range.

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Caterpillar

Models H35Ds and H45Ds hydraulic hammers are designed for compact equipment and mini-excavators. The H45Ds replaces the H45/H45s, and it is in the 300-ft.-lb. class (up from 200 ft.-lbs. of its predecessor), providing 2,300 bpm. The H35Ds is a new product in the 150-ft.-lb. class and delivers 2,900 bpm. They are said to contain about 50 percent fewer parts than the predecessor, which means less maintenance and reduced costs.

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Chevron

Delo Synthetic Gear Lubricant SAE 75W-90 is designed for use in rear axles and differentials of vehicles in commercial fleets and in construction markets. The lubricant, says Chevron, provides thermal and oxidation stability, plus meets OEM warranty requirements. It also offers extended drain capabilities and exceptional performance over a wide range of operating temperatures, according to the company.

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Dynapac

Models LG160 and LG300 reversible plates are powered by a Hatz diesel or Honda gas engine. Bottom plates measure 18 and 24 inches wide, respectively. Both units provide stepless control of forward and reverse movement. Dynapac says each engine achieves 2,700 rpm in output with compaction vpm frequency of 4,200 and centrifugal force of 9,000 pounds with amplitude of .07 inches.

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EnviroBoot

The EB-1 dust-suppression accessory creates a vacuum chamber surrounding the demolition-hammer chisel to draw away dust and other airborne contaminants released during demolition of concrete/masonry surfaces. According to the manufacturer's testing, when used with a HEPA-filtered vacuum unit, the EnviroBoot reduces particulate matter, such as crystalline silica dust, in excess of 80 percent. This capability allows contractors to meet the standard for permissible exposure to crystalline silica set by federal OSHA.

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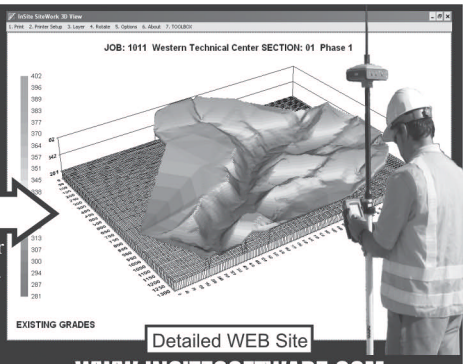

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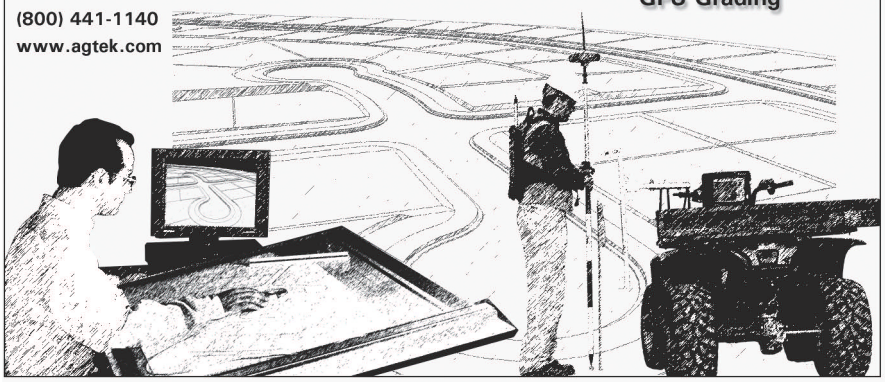

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By KEITH HADDOCK, Contributing Editor

Linn Manufacturing's Tractor Truck

Half-track hauler moved loads up steep grades and over impossibly rough terrain



A nicely restored Linn half-track owned by Gary Mahan of New Jersey.

In the early days of truck haulage following World War I, the Linn tractor truck was able to keep loads moving in impassible conditions where roads barely existed.

Beginning in 1916, Linn Manufacturing of Morris, N.Y., built a series of heavy-duty haul trucks up to 12 tons capacity designed to overcome the problems of hauling large loads over non-existent roads. The secret of the Linn's success lay in its patented rear-end, crawler-type traction unit. Unlike regular trucks of the day prone to mire with their narrow solid rubber tires, and unlike most rigid crawler designs of the day, the Linn crawler assembly featured a flexible track-roller design. The gear-driven assembly incorporated trunion-mounted track rollers able to follow irregular ground surfaces ensuring positive traction. And with the added advantage of lower ground pressure imposed by the tracks, the Linn was able to pull through adverse conditions which sidelined other vehicles.

The Linn was available in several guises and offered with a variety of power units. A "Contractor's Special" was equipped with an 8-yard rear-dumping body with "Linn automatic down-fold tailgate" and available with six-cylinder Cummins or Waukesha diesel power in the 150-horsepower class. It was equipped with a shuttle-shift transmission providing four speeds in each direction. Four reverse speeds made sense given that in the open-cab version, the driver could make use of an auxiliary seat facing to the rear when moving in reverse. It was a valuable feature for accurately spotting under shovels or for safely moving to the edge of high dumps.

The "County and Township Special" included a spreader-type tailgate and was specially designed for towing road machines such as pull-type graders. Northern loggers favored the "Logging Special" which included an enclosed cab as standard and optional sled runners to replace the front steering axle. Loggers used them to drag logs out of the woods, often making up trains of three or four sleds loaded with logs. The train sometimes included a caboose for crew living quarters when working in remote areas. Other models were customized for levee work with side-dumping body, or came equipped with a special 14-yard body for hauling coal or culm in the coalfields. The Linn also made a rugged and stable carrier for mounting mobile cranes and excavators.

The Linn boasted a top speed of 7.5 mph. This may not seem fast by today's standards, but when you consider the Linn hauled much more per load, and traveled twice as fast as the competitive tractor-drawn dump trailers of the 1920s, the economics made sense. After building a few more unusual vehicles in the 1940s, including one model equipped with rear wheels that could be lowered for use on paved surfaces, the short-lived Linn Manufacturing went out of business in 1950.

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You can read more about the evolution of construction equipment in Keith Haddock's latest book release, an updated version of his fully illustrated Earthmover Encyclopedia. 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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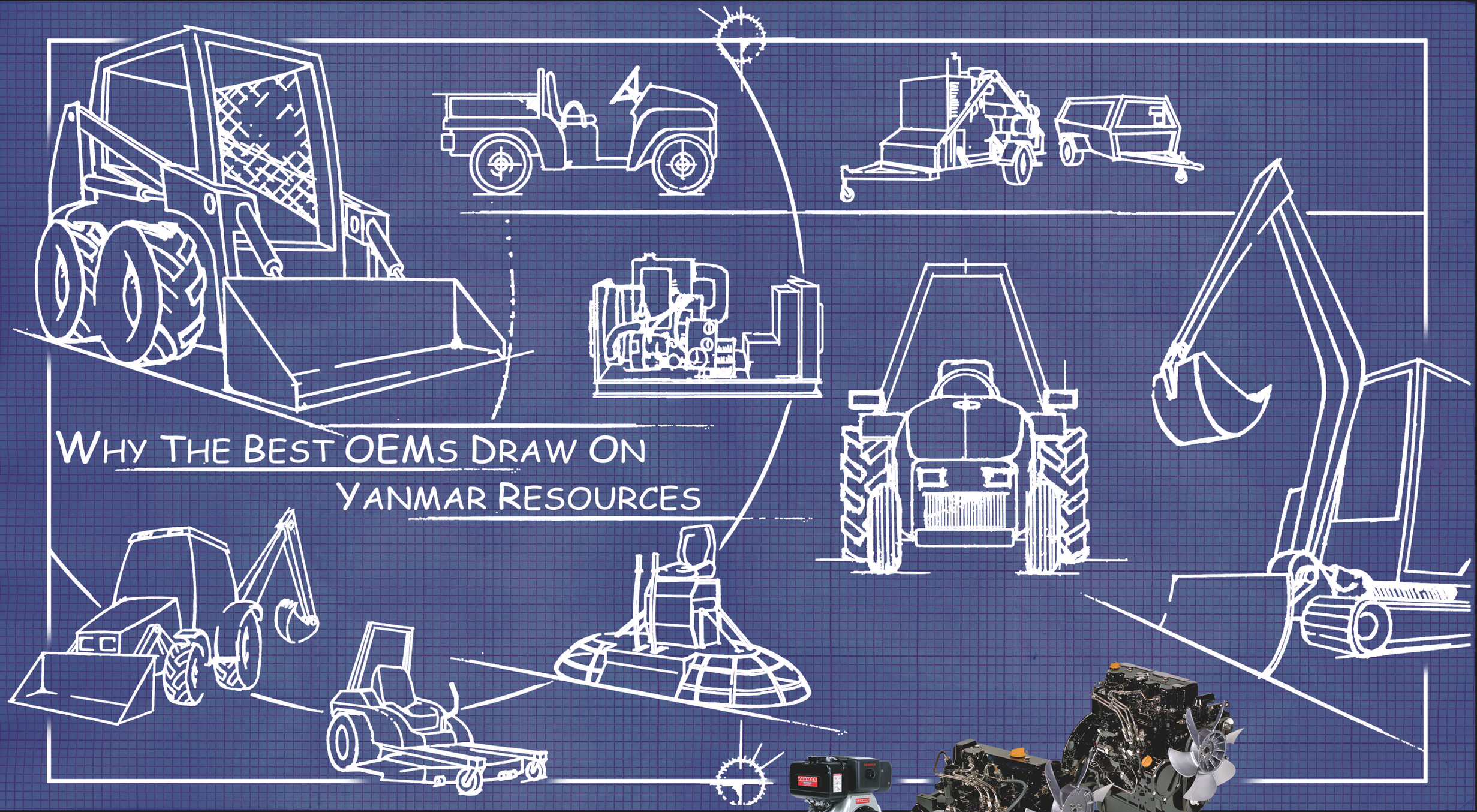

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