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CONSTRUCTION EQUIPMENT®

June 2006
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Sky High

Demand for tool-carrier functionality drives telehandler market

p. 50

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CONSTRUCTION EQUIPMENT

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Cover photo supplied by Genie Industries

FEATURES

HANDS-ON EARTHMOVING

It's probably safe to say that in the past 10 years or so, the mini-excavator has had an uphill battle to fight in terms of being accepted in North America as a legitimate construction machine. But now it seems that contractors here, just as their counterparts in Europe and Asia, can't get their hands on enough of them. The mini-excavator is carving out a solid niche in the equipment market, and it's interesting to note how opinions have changed. In this story, we place a Caterpillar 304C CR in the expert hands of a one-time skeptic who's now a true believer.

FLEET MASTERS

The Association of Equipment Management Professionals (AEMP) and *Construction Equipment* created the annual Fleet Masters Award to recognize top fleet professionals for managing just the right elements to maximize their organizations. We interviewed this year's winners, City of Jacksonville Florida (left) and Traylor Bros., who shared some of their business strategies.

Sam Houston

Thad Pirtle (right) and Roscoe Beall

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ISRI SHOW SPOTLIGHT

40 No Junkyard Dogs Allowed!

New products shown at the recent conference of the Institute of Scrap Recycling Industries (ISRI) reflect innovation and rugged, durable designs. We bring you a sampling of what senior editor Walt Moore found while walking the show floor.

HANDS-ON TRUCKING

43 Unimog Goes Anywhere, Almost Automatically

Maybe you saw it on the History Channel's Modern Marvels program. It's the Mercedes-Benz Unimog, a remarkable multi-functional, all-terrain truck, and the current model has been slowly catching since first coming to America three years ago. Surveys show that many potential buyers have heard of it but most don't know much about it, so slow but steady marketing efforts continue. Truck editor Tom Berg reports on the features and benefits of this truck, including its semi-automatic transmission.

COVER STORY: Buying File

50 Could Telehandlers Be the New Skid-Steer Loader?

A flurry of European and Euro-inspired compact telehandlers introduced to North America seems to be creating two functional classes within the fast-growing telehandler market: lift-and-place machines and tool carriers. The sales pitch for low-boom telehandlers focuses on versatility. Most models carry the same quick-attach couplers as their skid-steer and backhoe-loader-line mates.

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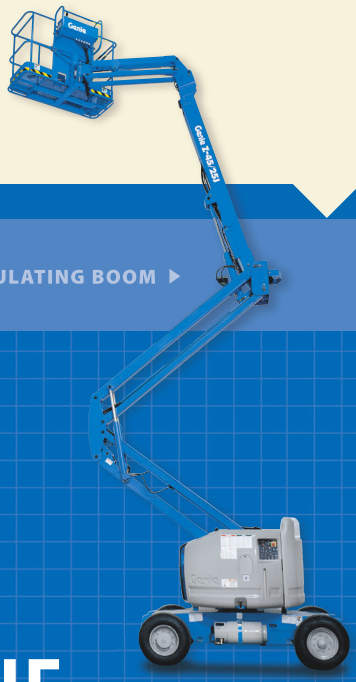

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A Precious Commodity

The roar of Harley Davidsons signals spring in Chicago. This year, Vespas and other motorized scooters hit the street as consumers try to combat rising gasoline prices. Vespas don't move earth, though, so equipment managers have to find other ways to manage increasing fuel costs.

Fuel cost comprises a significant percentage of a machine's operating cost, and that percentage has been increasing rapidly in recent months as oil prices have climbed. The climb has made managing operating cost difficult, and we can presume fuel prices will continue to increase rather than decrease.

But what's disturbing is the lack of knowledge and information among equipment managers on actual fuel usage. Many equipment fleets do not track fuel consumption, a situation one leading equipment executive labels "gross mismanagement." His reasoning: How can you manage a fleet without knowing how much fuel is being consumed by each machine? More important, perhaps, is how can a firm expect to make winning estimates for upcoming projects when it doesn't have an accurate equipment cost to use in the calculation?

Rod Sutton, Editor in Chief

Here's a simple example to illustrate this problem. Assume diesel fuel costs $1 per gallon. Multiply that by 1.7, a factor that includes the cost of dispensing the fuel, and the cost becomes 1.70 per gallon. Take a machine that uses 3.6 gallons per hour to operate, and the fuel portion of your machine rate is $6.12 per hour.

Change the price of fuel to $2 per gallon, and the rate jumps to $12.24 per hour. How will the equipment owner capture that increase in cost? More to the point, if the manager doesn't know how much fuel the machine burns in an hour, he has no way of knowing what that $1 increase in fuel cost really means to machine profitability, not to mention overall fleet performance.

Managers today track machine hours as a matter of course. But, as our executive says, tracking fuel consumption gives a far more accurate look at actual machine costs. In an era of rapidly rising fuel costs, the successful fleets will know exactly how much precious fuel is used by each machine.

ConstructionEquipment.com houses an Excel spreadsheet that allows managers to calculate machine rates using their own numbers for various components of owning and operating costs. Go to "Mike Vorster's Equipment Executive" in our magazine archives, and scroll down to "How Estimates Affect Cost Calculations" from March 2004. In the article is a link to the spreadsheet.

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MARKET WATCH

By KATIE WEILER, Managing Editor

We're making it quicker for you to obtain more information on products by going to ConstructionEquipment.com/info. Once there, you'll be in our Buyer's Guide, where you can find manufacturer information as well as distributor listings. Sign up for our monthly MarketWatch eNewsletter at ConstructionEquipment.com

Stone

Rhino 66X roller expands Stone's line of single-drum vibratory compactors beyond its 54- and 43-inch models. The 10-ton 66X has dual amplitude with a choice of high or low compaction forces up to 22,500 pounds. It has a 110-hp Cummins water-cooled diesel and Sauer-Danfoss hydraulic components.

For more information, visit ConstructionEquipment.com/info

Caterpillar

Seven new M-Series motor graders will replace the previous 10 H-Series machines. New models include the 120M, 12M, 140M, 160M, 14M, 16M and 24M — all of which will be operated with joysticks. The M-Series joystick-operated electro-hydraulic control system simplifies motor-grader functions and is claimed to reduce operator arm and hand movements by up to 78 percent. See the report on page 79 for more details.

For more information, visit ConstructionEquipment.com/info

Liebherr

Two new wheel loaders, the L 566 2plus2 and the L 580 2plus2, which replace the L 564 and L 580 models, respectively, offer more power, greater operator comfort and added safety. They are powered by Tier-3 Liebherr engines and feature an advanced cooling system. Cabs are 28 percent larger than those of their predecessors. These machines consume up to 25 percent less fuel than comparable machines working in similar conditions, says Liebherr, the result of their "2plus2" hydrostatic drive technology.

For more information, visit ConstructionEquipment.com/info

Volvo

G900 motor graders have been redesigned from the ground up, Volvo says. The series of seven graders ranges from 155 to 225 horsepower. Operating weights range from 34,300 to 46,300 pounds. Volvo-manufactured D7 and D9 engines with V-ACT power the series, and the HTE transmission is also Volvo's. An optional 11-speed transmission is available with autoshift.

For more information, visit ConstructionEquipment.com/info

Market Watch

John Deere

The 950J crawler dozer has a new 10.5-liter, inline six-cylinder engine with 247 horsepower and 6 percent more torque than its predecessor, which gives it 28 percent more drawbar pull. The hydrostatic drive train is controlled by a single joystick, and provides infinite speed control up to 6.8 mph. Operating weight was boosted to nearly 4,000 pounds. Cab has improved comfort including a 15-degree angled seat and standard leg cushions.

For more information, visit ConstructionEquipment.com/info

Sandvik

Driltech T1000 is a truck-mounted, top-drive blasthole drill for drilling 4.5- to 6.75-inch-diameter holes to 125 feet. Mounted on a Sterling LT9500 6x4 chassis, the unit has a 900 scfm/350 psi compressor, rotary head speed of 0-89 rpm with 51,400 inch-pounds of torque, and is powered by a Cat C15 450-hp deck engine.

For more information, visit ConstructionEquipment.com/info

Toro

Offering more than 35 attachments, the Toro Dingo 220 compact utility loader delivers increased flow from the high-flow pump, producing 10.8 gpm of flow at 3,250 psi of hydraulic pressure. It is powered by a 20-hp Kohler gasoline engine. The loader has a 40.5-inch operating width and offers skid-steer style, zero-turn capability steering.

For more information, visit ConstructionEquipment.com/info

LBX

LBX has put a Tier 3 diesel into its 330 LX Link-Belt excavator, giving it a 10-percent increase in horsepower and a 7-percent boost in fuel economy, the company says. The Isuzu AH-6HK1XYSS diesel puts out 271 horsepower. Other enhancements include reduced control lever effort, shorter lever travel, and increased responsiveness.

For more information, visit ConstructionEquipment.com/info

Haulotte

The HA 80 JRT diesel articulated boom provides an 83 foot-5 inch working height with 53 feet of horizontal reach. It features continuous optimum movement management, new platform load controller, 5-degree tilt alarm allowable in all positions, and stability management in all positions.

For more information, visit ConstructionEquipment.com/info

Auto Crane

Titan 60-14 from Auto Crane has 14 feet of bed space and has been designed to complement today's chassis designs, the company says. The body can support up to a 60,000-ft.-lb. crane and was designed for use with the company's 10,006H telescoping crane.

For more information, visit ConstructionEquipment.com/info

MEC

MEC introduces the TH60 and TH80, acquired from Volvo. Volvo bought UpRight's telehandlers and reworked them, but never added telehandlers to the Volvo product line. The two machines are rated at 6,000 and 8,000 pounds of lift capacity, respectively, and both stretch to a maximum lift height of 41 feet 6 inches. Power comes from a 100-hp Deutz diesel engine.

For more information, visit ConstructionEquipment.com/info

Market Watch

Peterson

Model 6710B track-mounted horizontal grinder has a 50x66-inch feed opening. Powered by a 1,000-hp Cat 3412E diesel, it features Adaptive Control System II that controls all components of the feed system to optimize output. Rotor options include traditional drum style and a "pinned" style for high-impact applications.

For more information, visit ConstructionEquipment.com/info

Caterpillar

The AP-1000D asphalt paver features a 224-hp, Tier-3 Cat C7 engine with ACERT technology, a high-capacity cooling system with a variable-speed fan, dual operator stations, three propel modes, and a material-supply system using two augers and two feeders that are all controlled independently.

For more information, visit ConstructionEquipment.com/info

Skyjack

Skyjack enters the telescopic-boom-lift market with the SJ 40T and SJ 45 T. Models come with Continuous Drive and Steer Directional Sensing, which adjust the control inputs based on operator orientation relative to the base. Other features include the ability to drive at full height, 360-degree continuous turret rotation, and 180-degree platform rotation.

For more information, visit ConstructionEquipment.com/info

Stone

WolfPac 6100 asphalt roller features dual-drum drive and dual-drum vibration, with an electro-hydraulic control system. With 47-inch-wide drums, it delivers 6,518 pounds of impact and is equipped with a pressurized, 47.5-gallon water-spray system with adjustable sprinklers.

For more information, visit Construction Equipment.com/info

Genie

S-Series boom option is said to deliver the highest capacities in the industry and is available on the S-60 HC. The platform on the unit offers a full range of motion up to 750 pounds, for 50 percent more load capacity. It supports platform loads up to 1,250 pounds. Genie says that's 40 feet 8 inches of outreach, including up to three people and gear.

For more information, visit ConstructionEquipment.com/info

Roadtec

The SP-200 allows the contractor to spray asphalt cement or emulsion directly in front of the screed in preparation for placing a Nova-Chip surface or conventional asphalt mix. Equipped with a heated, 2,100-gallon asphalt-cement/emulsion-tack tank, the machine features three rows of spray nozzles that can be either electronically or manually controlled.

For more information, visit ConstructionEquipment.com/info

Komatsu

The D-65 crawler dozer series is equipped with the Komtrax fleet-monitoring system, which uses wireless technology to send machine operating information to a secure website, including hour-meter reading, cautions and maintenance alerts. The D65 Series includes six models, which use Komatsu's Tier-3 SAA6D114E-5 engine (rated at 205 net horsepower), but differ in blade and track configuration. These models range in operating weight from 44,700 to 47,200 pounds and can be configured as a straight-tilt dozer, semi-U dozer or power-angle-tilt dozer.

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MANUFACTURER NEWS

Big Pull Down Under

Under a hot mid-February sky in the tiny village of Clifton, on Australia's east coast, stood officials from the Guinness Book of Records, who were intensely interested in driver John Atkinson and the Mack Titan truck he had just boarded. As a crowd of 8,000 spectators looked on, Atkinson eased the big 620-hp, 8x6 tractor into gear and moved it 328 feet forward. The crowd cheered.

Of course, what we didn't yet tell you was that the Titan was pulling 113 loaded trailers, which stretched out behind the Titan nearly a mile. Atkinson was attempting to set a

world record for the longest "road train" pulled with a single prime mover, all in the interest of raising funds for a cancer-care charity. And he did set the record, breaking his own 2003 record, also set in a Mack truck.

MANUFACTURER NEWS

Komatsu GPS Tracking Comes Standard

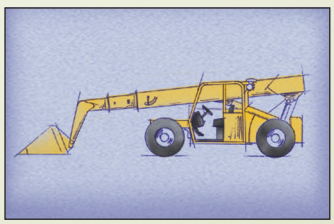
Komatsu has committed to making its wireless machine-information system, KOMTRAX, standard equipment on every one of its construction machines "at either model change or Tier 3 engine change, whichever occurs first," says Komatsu America's Chris Wasik.

KOMTRAX uses the GPS to identify the host-machine's location, and interfaces with the machine's on-board computer to track engine-run hours, error codes and cautions, maintenance items, fuel levels, and more information.

Critical data is transmitted via digital cellular signals to a secure website that dealers and customers can access with a password. Machines with standard KOMTRAX come with five years of free communication.

PRODUCTION TIPS

Telehandlers Are NOT Wheel Loaders



Don't make the mistake of using a telehandler to dig like a wheel loader, warns Mike Popovich, training director at JLG.

"You should never use the boom in opposition to the telehandler's ground drive," he says. "Any time you use the joystick by itself, you're OK — the boom is designed to withstand the force of the crowd cylinder. So it's OK, although not recommended, to boom-in while pushing down on material," Popovich continues. "But when you have the boom retracted to its limit, don't put the machine in reverse and drag the bucket with the ground drive."

There is typically only one hydraulic cylinder in a boom. Cables or chains operate the third and fourth boom sections, and those sections never come to rest against a firm stop. Cables and chains are no match for the telehandler's drive train.

"It's always the third and fourth section that breaks," says Popovich. "The buckets sold for telehandlers don't usually have any teeth, and they're made of relatively light-gauge metal. They're not made for actual digging."

MANUFACTURER NEWS

Cat Expands Facility, Announces New Look

Caterpillar invited a group of trade editors to christen its newly expanded Edwards Demonstration and Learning Center just west of Peoria, Ill. The company added a total of 40,000 square feet of space, which includes increased classroom facilities, multi-purpose room, a dining room/outdoor hospitality area, and Cat Merchandise Center. There are also two indoor areas focusing on marketing Cat products and services.

At that event, which also announced the M-Series motor graders (see p. 79), Caterpillar introduced a new look for its machines. The company is replacing the red beltline stripe with a new logo that sports a red slash setting off model numbers and highlighting the Cat logo. The "Power Edge" logo is designed to complement the changing shape of machines, work tools and engines, while displaying a consistent look on the 700 Caterpillar products.

CONSTRUCTIONEQUIPMENT.COM NEWS

Benchmark Usage Lags, Say Webcast Participants

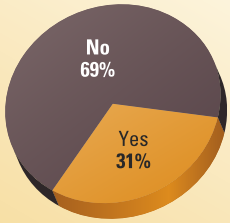
Among registrants for Construction Equipment.com's recent webcast on shop overhead, 69 percent said they do not use benchmarks in their fleet management.

They learned how important the practice is, however, with Mike Vorster and Preston Ingalls leading the way in their presentations on "How to Use Benchmarks to Judge Shop Overhead."

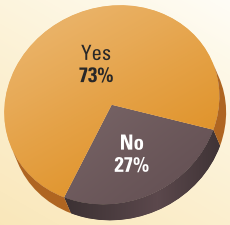
Even though they don't benchmark, registrants are not far from being able to start collecting the data. In fact, many already do, with 73 percent reporting that they use software to track and manage shop costs.

After viewing the webinar, managers should be ready to move from tracking to benchmarking.

The webcast aired April 26, 2006, and it is archived at ConstructionEquipment.com.



Do you use benchmarks in your fleet management?



Do you use software to track and manage shop costs?

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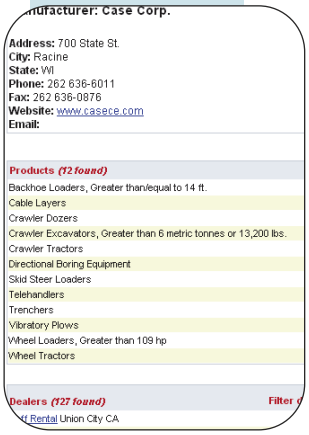
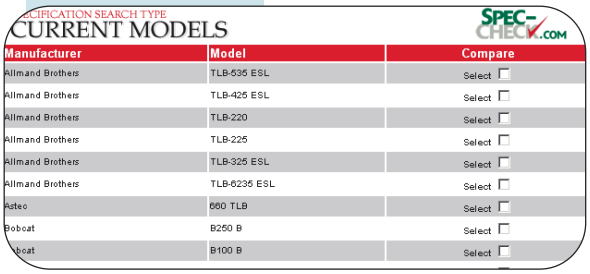
From Find Dealers & Manufacturers in the horizontal navigation bar, drill down to manufacturer contact information, the products made by the company, and dealers as available.



From Specifications in the horizontal navigation bar, compare specs on 63 types of construction and forestry equipment at no charge.



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Read information on maintaining and managing fleets, as well as magazine archives, in the horizontal-navigation bar.

Scan headlines from news around the country. Click on the headline and read more pertaining to construction, equipment and related topics.

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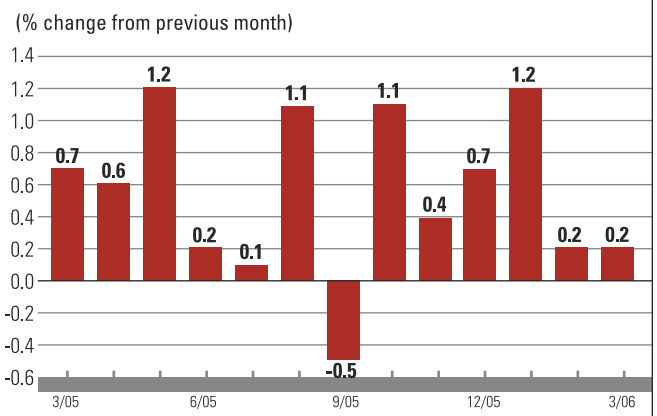
Status & Forecast

By JIM HAUGHEY, Director of Economics

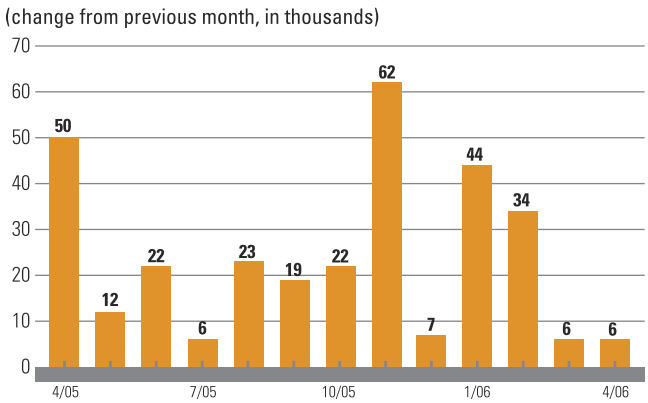
⟷ PUBLIC CONSTRUCTION SPENDING

Spending grew less than inflation in February and March after a brief surge in December and January. The slowdown is temporary, as projects are being reassessed because costs are exceeding budget. This also occurred in a similar cost situation in 2004. State and local government budget balances are back above average and improving. Highway spending accounted for the entire gain from January to March.



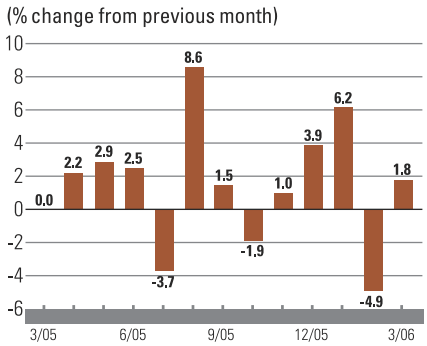
⟷ CONSTRUCTION EMPLOYMENT

Contractors hired only 6,000 people in April and only 12,000 in the last two months. Almost all of the new jobs are on nonresidential building projects. Employment at heavy contractors has been steady for the last three months. A longer work week pushed total construction work hours up 0.7% in April, which is a reliable signal that construction activity continues to expand. Average hourly earnings in construction are essentially unchanged so far this year.



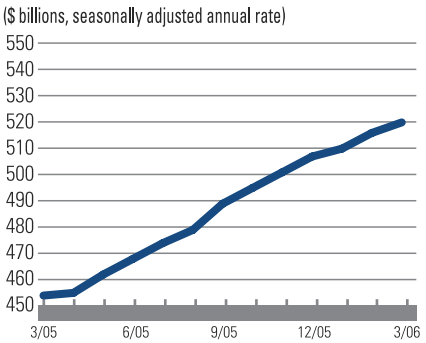
⟷ CONSTRUCTION EQUIPMENT SHIPMENTS

Shipments by U.S. manufacturers increased 6.3 percent in the first quarter and are 20.8-percent higher than 2005. The winter sales surge was enough for manufacturers to trim unfilled orders by 2 percent and boost their slim inventories by 1.3 percent. New orders declined 1.8 percent in the first quarter, but the small decline may have been due to slightly shorter delivery lead times. Smaller gains in shipments are expected during the spring and summer.



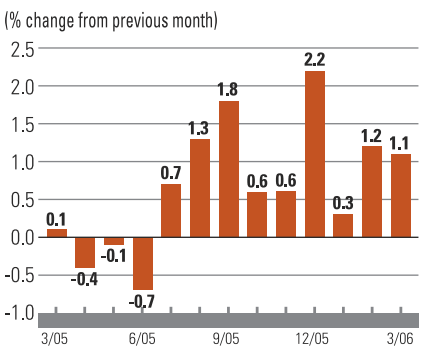
⟷ NEW RESIDENTIAL CONSTRUCTION SPENDING

Construction increased 0.7 percent in March, a sharp slowdown from the nearly 15-percent rise over the past year. The small month-to-month gain was mostly due to inflation for single-family homes, although spending on multifamily projects increased at a 24 percent annual pace following a surge in starts that began late last year. Spending is at or near its peak for this building cycle and is expected to decline 5 percent by late next year.



⟷ PRIVATE CONSTRUCTION SPENDING

Spending increased at a 13.5 percent annual pace for the last six months, but that will be halved through the end of 2007 as the small decline in residential spending more than offsets the large increase in spending for nonresidential and heavy construction projects. Cutbacks and delays of private nonresidential projects whose costs are exceeding plans will also contribute to slow expansion.



For the full text of this month's economic analysis, check Magazine Archives/Economics at **ConstructionEquipment.com**

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By WALT MOORE, Senior Editor

Mini-Excavator Gains

Caterpillar's new 304C CR received good reviews from an excellent operator who admits he's "from the old school"

Photos: George Pfoertner©

Operator Gene Held, at the controls of a new Caterpillar 304C CR, demonstrates the essential nature of the mini-excavator — the ability to maneuver into confined spaces, then to work precisely and competently once there. In this exercise, Held combines the 304C's house swing and boom swing to dig parallel to a new footing. Caterpillar's new C-Series mini-excavators were introduced early this year.

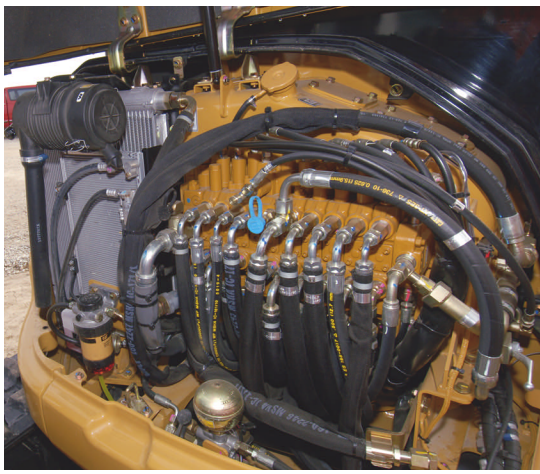
Our friend Gene Held has been moving dirt for 30-plus years — many years with contractors, and more recently as an instructor in Local 150's (International Union of Operating Engineers) Apprenticeship and Skill Improvement Program. Held's primary job is to help young apprentices become competent, safety-conscious operators of hydraulic excavators and backhoe-loaders, so it's to him we turn when we have a new machine of this type to evaluate.

We worked with Held most recently in late April, when Caterpillar's Matt Mumford arranged with nearby dealer Patten Equipment to deliver a brand new 304C CR (Compact Radius) mini-excavator to Local 150's new training facility (presently under construction) near Wilmington, Ill. Although Mumford wanted to supply a 304C with its optional coupler and optional hydraulic thumb, the machine arrived with a standard pin-on bucket. The mini-excavator market is so hot these days, explained Mumford, that choices for our evaluation machine were limited.

Equipped with a cab (optional), air-conditioning (optional), rubber tracks, blade and counterweight (as was our test machine), the 304C CR weighs in at about 10,800 pounds. The machine, which is manufactured by Caterpillar in Japan, is powered by a 42-hp (net), Tier-2-compliant Mitsubishi diesel. The standard digging arm (stick) yields a maximum digging depth of 10 feet 10 inches, and the "long arm" (which our machine used) delivers 12 feet 1 inch. Both sticks are available from the facto-

"Real-Machine" Status

Details in the 304C's roomy cab include a handy sliding door, joystick switches that eliminate foot pedals, a "pattern changer" (at the forward left corner of the seat base) for switching boom and stick functions side-for-side, dial-type throttle, retractable seat belt, utility power outlet and multiple vents for heating, cooling and defrosting.



The 304C's engine bay compactly and neatly accommodates not only the engine, but also a split cooler for the radiator and hydraulic-oil, the air-conditioner condenser, hydraulic valve and lines, as well as the hydraulic tank. The 304C's hydraulic hoses are enclosed in nylon sheaths for burst protection and abrasion resistance, and they have a metal tag with the part number for easy identification.

ry with integral mounting bosses that facilitate installation of the optional hydraulic thumb.

The 304C has a "CR" designation, because the standard rear counterweight can overhang the tracks by up to 4 inches. The counterweight is installed to improve lifting performance, which, says Caterpillar, may be compromised to a degree in some zero-tail-swing designs. If need be, the counterweight can be removed to provide zero tail swing.

First look

Probably like many professional equipment operators with years of experience, Held admits that he didn't take the mini-excavator too seriously when it first appeared on the North American construction scene. But he's changed his tune, he says, based mainly on the performance of a couple of mini models added to Local 150's fleet in the recent past.

"It's amazing how much power these little things have," says Held. "When they first came out on the market, I thought: 'Those little toys, what the heck would you want one of those for?' But they really are strong, versatile machines, and now you see them everywhere."

So, now that we knew Gene wasn't going to be a hard sell on the mini-excavator concept, Mumford gave us a quick tour of the 304C's cabin. Held's observations as he climbed into the cab were, first, the sliding door, which he considered an excellent feature, and then, as he settled into the seat, the machine's excellent all-around visibility. Mumford asked Held to unlatch the front window and slide it upward into the roof, an operation easily done with the assistance of gas struts, and then to remove the lower front glass, which lifts easily out of its frame for storage against the left rear window.

"When it's warm, I like the bottom glass out," says Held, "because it's usually dirty and you can't see as well into the trench. This is an easy-to-use system. Some front windows you really have to tug at."

When trenching with the 304C, Held noted that the machine had the stick force to pull strongly through the cut without having to pump the bucket.

Held was impressed with the 304C's pushing power when backfilling a trench. The blade and mounting structure exhibit a beefy construction, and the system is designed to allow rocks and dirt that spill over the blade to drop through, instead of collecting on the top of the push beams and cylinder.

Mumford explained that a significant design change for the 304C (compared to its predecessor) was the replacement of foot pedals — for boom swing and auxiliary hydraulics — with thumb controllers in the pilot-operated joysticks. The net result, he said, is easier control of these functions and more foot room.

"Foot room is important," said Held. "I don't like operating with my knees under my chin."

Our test machine was equipped with a push blade (it's standard), and the pilot-operated blade controller has a forward detent to place the blade in a float condition. Soon to be available, Mumford said, is a hydraulic angle blade that can be rotated 25 degrees right or left to minimize repositioning when backfilling. The new blade's controller will be single-lever and pilot-operated.

When Held noted the two-speed travel switch on the 304C's panel, Mumford pointed out that the travel system now has automatic-shift capability. You can place the switch in the "rabbit" position, he said, and the system will automatically downshift when it encounters a load — or when the machine turns. He noted, too, that the 304C now has an auto-idle feature, which is aimed, he says, at enhancing fuel economy and lowering sound levels.

When Mumford told Held that the 304C was radio-ready, we asked Held if he liked a radio when he was working.

"No, I seldom use it. The kids [his apprentices] do — they like jammin' when they're operating. But I don't. I'm from the old school, so I like to concentrate on what I'm doing. A radio's nice sometimes if you're out by yourself, but I want to hear how the machine's running, so if something goes wrong, I'm aware of it. But that's just one guy's opinion."

The 304C is fitted with auxiliary hydraulics as standard equipment, and our test machine, Mumford told us, also was fitted with an optional auxiliary package that allows, for example, use of a rotating shear. The secondary auxiliary functions, he explained, work off the boom-swing circuit, and an in-cab switch diverts oil from one function to the other. A changeover valve in the engine compartment allows the main auxiliary hydraulics to function as either a one-way or two-way system.

In the dirt

When we put the 304C to work, we first asked Held to position the machine's tracks parallel with the wall of the new facility, then to position the cab and boom so as to dig closely parallel to the wall. The intent was to get his thoughts on this compact machine's basic maneuverability and controllability. After 10 minutes or so, we asked what he thought.

"The offset boom gives the machine a lot of flexibility; it's great for working in tight quar-

ters like this. Hydraulic functions are very smooth and easy to feather — not jerky at all — and that's important when you're working against a structure that you dare not damage."

The next exercise was trenching in a moist, heavy-clay stockpile. As we watched Held work, our overall observations were that 304C seemed quite a flat-footed digger (it has more track-on-ground than its predecessor) and that its digging motion was consistently smooth. Mumford told us that Cat excavators, mini-models included, are known for high stick forces, and now, he said, bucket-breakout force also has been significantly increased in the new C-Series. But what did Held think about 304C's trenching performance?

"It's got a lot of breakout power in the stick, and that's what I like. When you're coming in with the stick, you don't want to have to pump the bucket to get through the cut. It's also very smooth; you could finish grade with it."

How about stability when you were pulling through some of the tough spots?

"It was very stable — as long as you have the blade down in front. I noticed, too, that even with the longer stick, when you come up out of the hole, you don't get into the blade with the bucket. On some machines, especially those with an extendible stick, you can hit the blade if you're not careful."

Next, Held used the 304C's blade to backfill the trench.

"It's got plenty of pushing power," he said, "and blade control is smooth. And when you put the blade into the dirt, it doesn't dive into the cut. Some machines will do that, and you're always having to pull the blade up."

As a final exercise, Held placed a chain through the 304C's lifting eye (which is integral with the bucket link) and picked the top ring of a concrete manhole.

"It has good lifting power," he said. "I don't know what that ring weighs, but I'll bet that I could have lifted the bottom section, too, if we had the rigging to hook it up. I could raise the blade and travel with the load, and it didn't feel unstable at any point."

We then found a shorter chain that allowed making the same pick and keeping the load tucked in sufficiently to swing over the side. Again, according to Held, the machine was strong and stable, "as long as you keep the load in close and keep the blade down."

What impressed us, also, is the precision with which Held could replace the massive ring over the neck of the manhole — likely the result of his skill and the machine's controllability.

The manhole cap was the handiest heavy object on site to lift, even though it presented no real challenge to the 304C. Held was of the opinion that the machine is a capable lifter, over the end as well as over the side, and that it traveled competently with the load over the end.

Final thoughts

Mumford told us that Caterpillar's primary focus when developing the C-Series mini-excavators was to continue to enhance operator comfort (hence the larger cab with its new amenities) and to increase digging performance (which seemed to impress Held).

So, Gene, do you have any parting thoughts about this mini?

"I'll come back to the stick power it has. I like to dig only to about the height of the teeth, and to move the stick though an arc from about the 8-o'clock position to the 5-o'clock position.

"Because I'm not digging deep, I can feel the bottom of the trench. Some guys will just roll the bucket into the ground to load it, but you'll never dig around utilities doing that. You always want to shelf the material down. This machine has the power to dig the way I want. I think Cat has done well on this particular machine." CE

Basic Specifications

Net horsepower	42
Operating weight w/cab (lb.)	10,844
Overall width (ft.)	6.5
Max. dig depth, long stick (ft.)	12.1
Max. reach, ground level, long stick (ft.)	19.2
Digging force, std. stick (lb.)	5,550
Digging force, long stick (lb.)	4,788
Digging force, bucket (lb.)	10,050
Max. travel speed (mph)	2.8

Think of productivity and the 5700-B Super comes right to mind

"Our customers are amazed at the speed of the 5700-Super-B. We put down more concrete quicker, and the machine doesn't slow down on higher grades. There's more power in the trimmer.

"The biggest difference is the speed. The operator is always asking for four or five trucks. That's telling me that production is going way up.

"The machine runs cooler and is easier on ther operator and doesn't wear him down by the end of the day."

Sam Craghead, Craghead Building Co., Riverton, UT

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By LARRY STEWART, Executive Editor

Congratulations To Top Fleets

Fleet Masters awards honor the expertise needed to excel with mixed equipment fleets

There's no formula for running a mixed fleet of on- and off-road equipment cost effectively. Strategies used by the best fleet managers include everything from managing tire pressures to total quality initiatives that empower technicians to make repair decisions based on smart business principles.

The Association of Equipment Management Professionals (AEMP) and *Construction Equipment* created the annual Fleet Masters Award to recognize top-notch fleet professionals for managing just the right elements to maximize their organizations, and encourage discussion that might help others deliver more efficient equipment.

The following pages offer a sample of the strategies that carried this year's winners to the top of the Fleet Masters competition. The awards were presented March 6, 2006, during AEMP's 24th Annual Meeting in Jacksonville, Fla.

Fleet Masters

Private Fleets

Traylor Bros. Inc.
Zachry Construction Co.

Government Fleets

City of Jacksonville Florida
Manatee County Florida
City of Lee's Summit Missouri

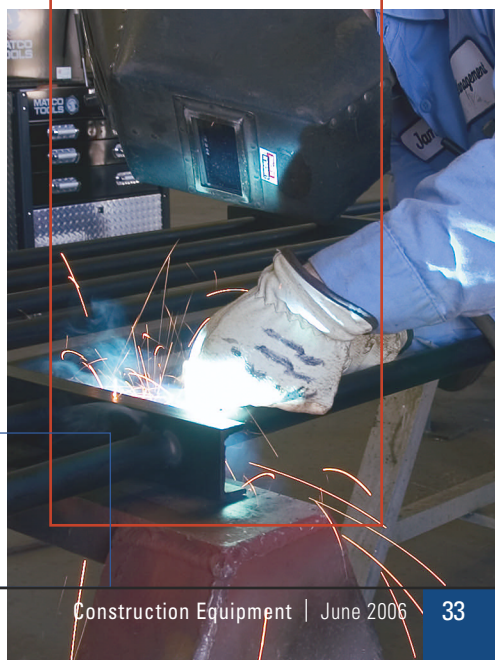

Photo: Kelly LaDuke®

If you know of an organization that should be considered for the next Fleet Masters competition, please go to www.aemp.org/Masters to find out how to submit a nomination. All equipment-managing organizations are welcome to enter.

People and Practice

Make a Winning Fleet

Traylor Bros. invests in the expertise necessary to not only manage maintenance and repair, but also to ensure uptime

The Traylor Bros. Equipment Division has several clear goals. The first is to equal or outperform national averages in all safety-industry measurements. Goals two and three — develop superior talent, and employ the industry's best equipment-management practices — work hand-in-hand to deliver goal one and goals four and five — be in the upper 25 percent of heavy-civil-industry profitability, and beat the budget on every project. The company's progress in developing people and managing equipment earned Thad Pirtle and the Traylor Equipment Division the 2006 Fleet Masters Award.

Thad Pirtle (right) and Roscoe Beall, manager of Traylor's Evansville shop, check a manlift's fall-protection tieoffs. The Traylor Equipment Division's first priority is the safety of people using and servicing company equipment.
Photos: Jack Grossman©

Equipment superintendents and field mechanics are certified in forklift operation, manlift inspection, crane inspection, welding, equipment electrical systems, and mobile hydraulics. They are also required to take two weeks of factory training annually. All will get formal communication and customer-service training.

The division has promoted four field mechanics that travel to all Traylor projects and equipped them with service trucks. They are factory-trained on the brands the company operates, and certified for annual crane and manlift OSHA inspections. One of the mechanics is certified for crane-boom welding.

These four field mechanics assist projects at startup and shutdown, and provide an alternative to distributor support. They also supplement the projects' maintenance workforce during peak periods.

Traylor's commitment to improving peoples' equipment skills exceeds the boundaries of the equipment-division payroll. The company wants all of its project managers, engineers, superintendents, and division estimators to attend the weeklong training from the National Commission for the Certification of Crane Operators (NCCO) and take the written test. The practical test is optional. So far, 75 percent of them have been through the program.

The equipment division sponsored 26 Traylor senior managers to the 2005 Conexpo show for three days. The division also engages in corporate training throughout the organization, educating engineers, superintendents, project managers, and foremen.

Parts costs are tracked for each piece of equipment and monitored at the project level. They're expressed as a percentage of the project's equipment rental cost per month, which has helped focus attention on both parts and equipment usage. Better preventive maintenance, mostly completed by project personnel, and improved application of equipment has cut parts costs in half over the past 10 years.

Traylor also tracks machine availability by unit number and by equipment type. Equipment operators fill out equipment performance forms every day to track downtime. The company is halfway through a two-year pilot program with Qualcomm that has seen the instal-

lation of more than 100 Global-Tracs wireless tracking devices for monitoring the utilization and location of cranes, loaders, dozers, rollers, tug boats, trucks, forklifts and other equipment.

Utilization goals are set for each equipment class and actual use is tracked for each piece of equipment. Being able to compare an individual machine's usage to that of a whole group of like machines helps identify problem machines and improve overall equipment quality.

"We are currently operating at 97 percent machine availability on the machines we are tracking," says Pirtle. The company continues to add machine types to the reporting.

Pirtle measures quality of the Traylor equipment division's work and satisfaction of project superintendents with a single program called Traylor Equipment Quality. The program requires shop managers or equipment superintendents who ship a machine to sign their name on an Equipment Quality sticker fixed to it, and phone the project superintendent two weeks after delivery to be sure he's satisfied. Any deficiencies in the machine that might keep it from being 100-percent productive are recorded. The primary responsibility of the company's six field equipment superintendents is to visit each job in their territories monthly to make sure equipment is working as it should and that project people are satisfied.

Traylor Equipment Quality has been steadily improving fleet reliability and recording fewer deficiencies since early in 2004. Pirtle meets with his people quarterly to discuss progress, adapt the program, and administer the company's safety-incentive program.

"The goal is zero deficiencies," declares Pirtle. "The equipment business is becoming increasingly competitive. The success of our division rests upon our reputation to provide quality equipment that is on schedule and reliable in an environment where the safety and well-being of our people is paramount."

PROFILE

Traylor Bros. Inc.

Headquarters: Evansville, Ind.

Specialty: Highway/heavy and marine constructor with expertise in boring tunnels, building bridges, dams and ports

Market Range: North America primarily, with some overseas work

Geographic Range: All U.S. coastlines, North America's inland waterways, Hawaii, Alaska, Mexico and Canada

Traylor Equipment Division

Fleet Value: $165 million

Fleet Makeup: 2,900 total units, including 92 cranes, 10 tug boats, 10 tunnel-boring machines, 45 underground locomotives, 40 loaders, 20 dozers, 34 forklifts, 28 pile hammers, 40 Class 7 and 8 trucks, 200 light trucks and cars

Facilities: One shop in Evansville, a riverfront maintenance facility in Wickliffe, Ky., and storage yard in Rialto, Calif.; four mechanics' trucks

Equipment-Support Staff: 45 total, including four field mechanics, four master mechanics, six field equipment superintendents, 14 project mechanics, three lube techs, 10 shop mechanics, and two corporate equipment superintendents

Tasks: Heavy/marine equipment rentals, heavy fabrication, equipment maintenance and rebuild including crane remanufacture, specialty-equipment fabrication including building tunnel-boring machines, equipment storage and staging, field support

Division Advantages:

- 80+ years management experience
- Extensive fleet at below-market rates
- Three well-located storage yards
- Deep-water port on Mississippi River
- Expertise in Traylor specialties
- Craning expertise
- Equipment-insurance expertise
- Heavy-fabrication capabilities
- Low-cost maintenance and repair
- Quality reputation

Beall inspects a deck winch prior to shipping it to a project. His signature confirming that a machine will be productive from the day it arrives on site is the cornerstone of Traylor Equipment Quality — a program that is turning project supervisors into equipment-division allies.

Shop Production Is Key To Fleet Performance

Scheduling maintenance and paying incentives to technicians turns a city fleet into a service vendor

The primary goals and objectives of the City of Jacksonville's Fleet Management Division are to improve the availability of equipment, get maximum use from city resources, and provide fuel to city and state agencies and utility customers.

Because the fleet-management division is supporting the Jacksonville Sheriff's Office, Fire & Rescue, and Public Works Departments, plus general government, independent authorities, and the Florida Department of Transportation, equipment and fuel availability are critical, especially during hurricane season and other emergency situations. Equipment is essential to these agencies' missions.

Sam Houston

Photos: Kelly LaDuke©

Sam Houston, chief of the city fleet management division, has focused on delivering preventive maintenance and safety inspections to maintain availability, and on scheduling and production incentives to maximize shops productivity and make the most of city resources.

Automated scheduling software produces reports for vehicles that are due for maintenance two months in advance so shop managers can be sure to have labor, parts and materials on hand when equipment arrives for service. An accompanying system monitors the progress of every work order from open to close. The status of each work order is updated every 15 minutes, and the system allows managers to check the reason why the work required more time than was originally estimated. A Quality Assurance effort has reduced returns to the shop to 1 percent.

Preventive maintenance on light vehicles is administered with the same scheduling system, but the actual oil and filter changes are done by a low-cost vendor with locations all around Duval County. In 2005, 20,000 PMs were scheduled, and 95 percent of them were completed on time. The fleet-management division continues to conduct maintenance on medium and heavy-duty vehicles and off-road equipment.

Getting preventive maintenance done on time and with expertise has had the desired effect. When combined with an initiative to conduct all of the off-site fueling and tire service at night, when equipment is idle, equipment availability increased from around 90 percent before 2003 to 99 percent in 2005. The number of overdue PM and safety inspections was reduced from 56 in 2004 to 33 in 2005.

Seeing the number of repairs that were going next door to the fire-apparatus dealer's shop and other area vendors, Jacksonville's own technicians called the city to complete more warranty repairs. They saw the unused capacity in the shop and, frankly, were also hoping to earn some overtime hours. Houston agreed that there was more productivity to be gained from the existing workforce and facility, so he set about getting the fleet-management division certified for warranty work on Ford, General Motors, and International vehicles as well as American LaFrance and Pierce fire apparatus.

Houston turned his attention to technician productivity in order to make sure repairs and

Jacksonville technician, Derrick Anders, repairs an engine in the city's fire-truck fleet. Completing much of its own warranty work has saved the city more than $1.5 million over three years with virtually no payroll increase.

PROFILE

City of Jacksonville Fleet Management Division

Specialty: Municipal fleet management

Fleet Value: $172 million

Fleet Makeup: 5,400 units including 154 pieces of fire and rescue apparatus, 100 off-road construction machines (including 22 backhoe-loaders, 31 excavators, 33 loaders); 410 Class 7 and 8 trucks, and 2,250 light trucks and cars

Vehicle Replacement Budget: About $18 million per year

Facilities: One shop; eight mechanics trucks and three wreckers; three lube service trucks, three fuel service trucks and one fuel transport; eight 24-hour fuel sites, one bio-diesel mixing and dispensing facility, and one E85 fuel site

Equipment-Support Staff: 163 total including 81 mechanics, nine welders/fabricators, 22 supervisors/lead workers, 15 parts workers, five maintenance technicians, and 25 support people

Operating Budget: $31.6 million (in 2005), including $12 million for fueling operations

Customers: Jacksonville police, fire, refuse-collection, and other city agencies; Jacksonville Electric Authority, Florida Dept. of Transportation, and State Attorneys Office

Services: Equipment specification writing, purchasing, and salvage; aerial device repair/rebuilding, hydraulic repair/rebuilding, welding/fabrication, car and light truck repair and maintenance, minor body repair, accessory installation, heavy truck and off-road equipment repair and maintenance, fire and rescue equipment repair and maintenance, tire service, off-site PM service

Geographic Range: Duval County — 840 square miles with 800,000 population

maintenance are done at competitive costs. Each year, managers, supervisors, and technicians meet to agree upon production goals. Performance is measured monthly, and technicians or supervisors that lag their goals are provided with training to help them hit their targets.

All employees who meet their production goal are paid an incentive equal to 1 percent of their base salary. Last fiscal year, only two employees didn't reach their target.

As an added incentive, the organization also pays technicians $25/month for each ASE and Emergency Vehicle Technician certification they maintain, up to nine certifications per person. Jacksonville technicians currently hold a total of 356 individual certifications. Jacksonville Fleet Management Division also pays technicians a monthly tool allowance of $450.

Productivity has increased tremendously. So much that Houston has chosen not to fill 21 staff positions that opened due to attrition. Replacing those people hasn't proven to be necessary. Actual payroll cost has stayed about the same — actually increased about two percent (or $123,800) between 2002 and 2005, as overtime and use of temporary labor has increased. But over the same period, the cost of outsourced repairs has dropped nearly 50 percent, or $1.5 million.

Efficiency gains ultimately led the division to hire itself out as a service vendor to the Florida DOT, integrating about 275 pieces of Florida DOT equipment into the Jacksonville fleet. That, coupled with fueling services for local utilities generates about $450,000 in annual revenue to offset the cost of replacing City of Jacksonville equipment.

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By WALT MOORE, Senior Editor

No Junkyard Dogs Allowed!

New products shown at the Institute of Scrap Recycling Industries Show reflect innovation and durable designs

A 954 C Becomes Bigger Brute

Liebherr's new A 954 C wheeled excavator, which replaces its B-Series counterpart, uses a new Tier-3-compliant engine, carries more weight and has increased lifting power. It has, basically, become even more of a brute than before, with a massive undercarriage that is wider, longer and heavier — resulting, says Liebherr, in greater stability when handling long attachments. Equipped with a 34.5-foot straight boom, 25.6-foot stick and 1.8-cubic-yard grapple, this new scrap handler weighs in at about 166,000 pounds. Liebherr's VarioLift-Plus system allows variable cylinder mounting positions to provide added depth, reach or lift capacity as the operating situation demands.

For more information, visit ConstructionEquipment.com/info

Expanded Material-Handler Line

The new Sennebogen 821 Series is available as a wheeled model (821M) or as a crawler model (821R). With operating weights of 54,000 and 51,600 pounds, respectively, the new models both use a John Deere diesel engine rated at 142 horsepower. According to Sennebogen, the new models are "equipped with one large hydraulic axial-piston pump and a 'computer-free,' load-sensing hydraulic system." The cab-riser system employs two hydraulic cylinders, and the machines feature a 13-kw generator driven from the front of the engine.

For more information, visit Construction Equipment.com/info

More Power for Cat Scrap Handlers

Caterpillar's new M325D MH and M325D LMH Wheel Material Handlers are designed for the scrap, demolition and bulk-materials-handling industries. The new models, which replace C-Series counterparts, feature Tier-3-compliant, Cat C7 diesel engines with ACERT technology. The C7 is a six-cylinder, 7.2-liter, turbocharged model rated at 190 horsepower in the M325D MH and 204 in the M325D LMH. The M325D MH, with four sets of dual 12.00-20 solid rubber tires, has an operating weight of 68,059 pounds. The M325D LMH weighs in at 77,737 pounds and is equipped with four single 16.00-25 solid rubber tires. Optional pneumatic tires are available.

For more information, visit ConstructionEquipment.com/info

Redesign for Terex/ Fuchs MHL 350

The increased weight and lift capability of the Terex/Fuchs 350 MHL material handler, compared to its predecessor model, enables it to use larger grapples and magnets, as well as to employ longer-reach packages. A new boom design enables greater lifting capability across the full operating range, and a wider undercarriage features larger outrigger cylinders and wider stabilizer-support beams. Swing torque is up nearly 20 percent, and a dual-circuit hydraulic system, with a rated flow of 169 gpm, uses two pumps — one dedicated to the digging arm and the other to all other hydraulic functions. The machine is fitted with a Tier-3, 198-hp Deutz diesel.

For more information, visit Construction Equipment.com/info

Sennebogen Multihandler Claims a Couple of Firsts

According to Sennebogen, the new 305 Multihandler Series-C is the first telehandler with a hydraulically actuated high-rise cab (with an eye-level height of 13.3 feet) and the capability to attain a lifting height of 24 feet. With the optional two-part XL telescopic boom, lift height increases to 30 feet. The load-bearing capacity of the new diesel-powered, 100-hp machine is slightly more than 11,000 pounds. The material handler is fitted with a hydrostatic drive system (all-wheel drive) and features three steering modes (front-wheel, all-wheel and crab).

For more information, visit Construction Equipment.com/info

Greasing Advantages

Stanley LaBounty makes bold claims for its new MSD Saber-Lube Series, which includes 12 shears ranging in weight from 8,700 to 42,000 pounds. At the heart of the design is a patent-pending lubrication system that automatically delivers grease to several areas of the upper jaw and blades, as well as to both slide pucks and the upper-jaw/ cylinder connection. Extensive field-testing, says the company, proves that this strategic application of lubricant can double blade life, reduce by half the time required for build-up welding in the jaw areas and reduce downtime by two weeks or more per year. Also, says the company, reduced friction results in up to 10 percent more cutting efficiency.

For more information, visit ConstructionEquipment.com/info

Generation-6 Loaders Arrive

Liebherr's newest wheel loaders, the L 566 2plus2 and the L 580 2plus2, which replace the L 564 and L 580, respectively, can be fitted with solid tires, added guarding (for the cab and hydraulic components) and an enclosed drive train to equip them to work competently in scrap applications. New Tier-3-compliant engines, manufactured in Liebherr's Bulle, Switzerland, factory, use an "advanced" cooling system that combines larger capacity with a hydraulically driven fan. These new loaders consume up to 25 percent less fuel than comparable competitive machines working in similar conditions, says Liebherr, the result of their "2plus2" hydrostatic-drive technology, which employs two hydraulic drive motors that are used singly or in tandem as operating conditions dictate.

For more information, visit ConstructionEquipment.com/info

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By TOM BERG, Truck Editor

Unimog Goes Anywhere, Almost Automatically

An automated mechanical transmission is Mercedes-Benz's clever answer to the Allison question, and it might well be sufficient

Maybe you saw it on the History Channel's Modern Marvels program. It's the Mercedes-Benz Unimog, a remarkable multi-functional, all-terrain truck, and the current model has been slowly catching since first coming to America three years ago, according to the sales and service team that's part of the Freightliner Group.

Surveys show that many potential buyers have heard of it but most don't know much about it, so slow but steady marketing efforts continue. That Modern Marvels episode first aired in August 2004, and "our phones start ringing every time it runs again," says Bob McTernan, director of Unimog of North America.

However, one question that comes up from municipal fleet people — prime potential customers, along with agencies and companies that can use the Unimog's versatility and off-road ability — is its transmission. It's semi-automatic or, as some see it, a semi-manual gearbox, because it requires constant use of the clutch and shift lever. It's easy to learn and easy to drive, but it's not an automatic.

To avoid driver training and drive-train problems, municipalities in the United States and Canada embraced Allison automatic transmissions many years ago. More

A crane body is one of many that can be quickly mounted to a Unimog 500, which can then traverse rough terrain to the jobsite. It can carry and power scores of implements using "universal" attachments and a mechanical PTO and/or hydraulic circuits and connections.

Jeff Berls, equipment maintenance manager at DuPage County (Ill.) Airport, says his '78 and '89 Unimogs are "unstoppable machines." They're posed with a current U500.

recently, so did many private operators. And they wonder why they can't get something like the Allison in a Unimog. Now they can, almost.

Automated gearbox

It's called Electro Automatic Shift, or EAS, and it's what's generically known here as an automated mechanical transmission. It does the clutching and shifting while the driver merely punches the accelerator and steers. EAS has no torque converter or power-shift functions, so is not a full automatic, but McTernan and his colleagues feel it's close enough, while still retaining the preciseness inherent in a manual.

A small rocker switch below the paddle-like gear selector lets the driver pick Auto or Manual mode for the transmission's Electro Automatic Shift.

Modern 'Mog has power steering and brakes, air conditioning and other amenities, plus a roomy cab — a far cry from original models of the 1950s.

EAS makes the Unimog even easier to drive and complements its do-anything, go-anywhere character. (Well, almost anywhere. But if you can't get there in a Unimog, you probably don't need to go.) During a demonstration at the DuPage County Airport outside Chicago, I drove a couple of Unimog 500s with EAS on streets and access roads. Alas, rough terrain wasn't part of the program.

First, a review of the U500, which we first covered in our September '03 issue. The original Unimog — the name is an acronym for Universal Motor Garact, or Tool — was born in post-World War II Germany as an agricultural tractor that could also take a farmer's goods to market. It since has grown in size and evolved into the multi-purpose military and civilian machine seen here; more than 360,000 units have been sold in 180 countries since production began in 1951, officials say.

The pictures make it look like a cute little cabover, but it's a full Class 7 truck meant to carry heavy power tools and mount a variety of work bodies. Its chassis sits high, so there's a brisk, three-step climb into its cab. Once there, the view is commanding and, once underway, there's a reassuring feeling of stability. Under the tilting composite-fiber cab is a Mercedes-Benz inline 6-cylinder diesel set for 260 horsepower. This is the same engine used in Freightliner and Sterling mid-range trucks, where it's called the MBE 906.

The U500's stout chassis includes four-wheel independent suspension with a long coil spring at each wheel. The all-wheel-drive system uses a single-speed transfer case, differential locks front and rear, and hub reduction gears. Low- and low-low gear sets for the transmission are optional, as are a mechanical power take-off and various hydraulic circuits that can run scores of implements.

A basic U500 starts at more than $100,000, but it can replace several trucks and pieces of equipment, from snow plows to lawn mowers. That's because implements can be quickly attached and detached and the truck and its operator kept busy all year round. Fewer vehicles in the fleet mean less total maintenance, insurance premiums and all the other costs of ownership, Unimog people say.

Specialty bodies can also be mounted and dismounted, and at the demo Unimog announced several new units, including a street sweeper, fire-fighting apparatus and a hooklift, which itself can handle several types of platform-based bodies. Also new is a VarioPower high-pressure hydraulic system that can run implements that now need auxiliary engines.

The DuPage County Airport owns two Unimogs, and the equipment maintenance manager, Jeff Berls, said they are rugged, reliable and long lived — "unstoppable machines,"

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TEST SET

Truck: Mercedes-Benz Unimog 500, cab-over-engine all-wheel-drive on/off-road truck and implement carrier, GVW 26,000 to 33,000 lb.

Engine: MBE900, turbocharged, intercooled, inline-6, 260 hp @ 2,200 rpm, 700 lbs.-ft. @ 1,200 rpm, w/compression and exhaust brakes

Transmission: M-B Telligent w/Electro Automatic Shift, 8 speeds forward, 6 reverse, w/Low and Low-Low ranges and lockable single-speed 1 to 1 transfer case

Axles & suspensions: M-B hub-reduction solid portal-type, axle-link w/locking diffs, on coil springs w/15-inch vertical articulation

Wheelbase: 154 inches

Tires & wheels: Michelin XZY 395/85R20 on Accuride two-piece steel discs

Fuel capacity: 60 gallons

Body: Various

as he put it. The first one, a '78 U900, was bought to replace three trucks, but now is dedicated to snow removal; so is an '89 U1250. In 28 years, the U900 has required only fluid changes, a new clutch and some rebuilding of its hydraulic brake system. He'd gladly buy another 'Mog if the budget allowed it.

The old U900 has a three-lever manual transmission, so the new Electro Automatic Shift is a modern marvel. Like other such products, it uses electronically controlled clutching and shifting that the driver needn't be concerned with, except that he/she should know that a clutch is there to avoid abusing it.

It's almost out of its element on a paved parking lot, but here and on streets is where this U500 with sweeper body and brushes would work. Different tools with other purposes might take it far off road.

Indeed, with EAS the clutch can still be used manually, and should be while in the transmission's optional low-range modes. Otherwise, the clutch pedal folds up and out of the way, and the tranny becomes a two-pedal type.

Driving impressions

The gearbox is the same Telligent eight-speed used in all U500s, and its standard "highway" ratios take the truck up to 70 mph. You choose Auto or Manual with a rocker switch near the paddle-like shift selector, both on a small console next to the driver's seat. In full manual mode, you move the selector to Drive, engage the clutch with the pedal, apply power, then upshift by tapping the paddle up and quickly punching the clutch. Downshifting is similar; you preselect the next lower gear by tapping the paddle backward and punch the clutch.

In Auto mode with the clutch pedal folded up, you simply switch to Drive and depress the accelerator. Usually it'll start out in 2nd or 3rd and upshift as the engine revs up. It will downshift as road speed falls, eventually going to one of the lower gears and declutching as the truck comes to a stop. There was some clunking as the transmission descended into its lower gears, but it never missed any. To move out, you take your foot off the brake pedal, which signals the controls that they can engage the clutch as soon as you again get on the accelerator.

If you use a very light foot, EAS will "short shift" — upshift at low rpm — but pressing the pedal to get moderate to snappy acceleration causes the engine to rev almost to its 2,600-rpm limit in each gear. I found this a little disconcerting because I was taught years ago that high revs waste fuel. Shift "progressively," keeping engine speed low until you really need the horsepower that comes at higher rpm, the old pros told me. And you really don't need a lot of horsepower until you're on the highway.

So I used EAS's semi-manual feature: I tapped the paddle selector to initiate an upshift, usually for each gear change. The clutch still works automatically, and I could watch the tachometer or just listen to the engine and command a shift whenever I thought it necessary, which was almost always below 2,000 rpm. I could floor the accelerator and still short shift, and could downshift while braking to get more engine drag. Or I could leave it alone and the automated shifting would proceed as the transmission's controls thought best.

As capable as the EAS is, it's not fully automatic and therefore might not fully answer the Allison question posed by some potential customers. But engineering an Allison RDS into a low-volume vehicle might not make much economic sense. So the automated variant of the manual 8-speed is the answer, and it's a clever one.

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By LARRY STEWART, Executive Editor

Could Telehandlers Be the New Skid-Steer Loader?

Double-digit sales growth fueled by versatility that is attracting new owners has drawn a rush of marketers and compact machines

If you're in the market for a telehandler that can handle bucket work, find a boom that extends on hydraulic cylinders only, such as the two-section boom on Bobcat's V723. Chain- or cable-actuated booms don't withstand digging and backdragging forces like wheel loaders.

A flurry of European and Euro-inspired compact telehandlers introduced to North America seems to be creating two functional classes within the fast-growing telehandler market: lift-and-place machines and tool carriers. Low-boom, compact machines were virtually unheard of here until a few years ago when manufacturers began bringing them to our shores and convincing contractors, agri-business, landscapers, building-supply stores, and others to buy machines with width and height like a skid-steer loader but considerably more reach.

The sales pitch for these low-boom telehandlers focuses on versatility. Most models carry the same quick-attach couplers as their skid-steer and backhoe-loader-line mates.

Not every telehandler is built to compete with skid-steer loaders for bucket work, though. Digging and back-dragging stresses are hard on the chains or cables used in traditional pick-and-place telehandler booms, but tool-carrier booms are designed to handle that work.

A hydraulic cylinder extends the first boom section of telehandlers that are built as forklifts, and chains or cables fixed to that section simultaneously extend the third and fourth boom sections. Boom sections don't come to rest against a firm stop.

"Any time you use the joystick by itself,

Average Telehandler Costs

Capacity	List Price	Hourly Rate*
5,000 to 6,999 lb.	$75,435	$32.37
7,000 to 9,999 lb.	$96,549	$40.64
10,000 to 10,999 lb.	$126,205	$49.09
11,000 to 20,999 lb.	$130,618	$63.81

* Monthly ownership cost (based on list price and 5.125 percent interest) plus operating expenses (including fuel at $2.49 per gallon and $40.18 per hour for mechanic's wages) divided by 176 hours.

Source: www.EquipmentWatch.com, 800-669-3282

Average list prices for the biggest machines aren't substantially higher than 10,000-pounders, but hourly ownership and operating cost increases disproportionately. Maintenance and repair cost must be significantly higher for these large machines.

you're OK — the boom is designed to withstand the force of the crowd cylinder," explains Mike Popovich, training director at JLG. "So it's OK, although not recommended, to boom in while pushing down on material. But when you have the boom retracted to its limit, don't put the machine in reverse and drag the bucket with the ground drive."

That kind of force will break the boom's chains or cables. If you're tearing up the bucket you bought with your telehandler, you're over-applying the machine and the boom will likely be the next casualty.

Machines manufacturers often refer to as "tool carriers" are usually low-boom-mount machines, and they are typically limited to two boom sections (although JCB makes three-section tool carrier booms). All boom sections extend under the direct pressure of a hydraulic cylinder, and there are no chains or cables.

The versatility sales pitch notwithstanding, most telehandlers here in North America are still primarily forklifts. Eleven pick-and-place telehandler models are available with sliding boom carriages — four from Pettibone (two 6,000-pound machines and two 8,000 pounders), three that carry JLG's Lull brand (one 6,000-pound unit, one 9,000-pounder, and one at 10,000 pounds), and Liftking's 12,000-, 15,000-, 20,000- and 30,000-pound models.

Smooth horizontal movement of the entire boom discourages operators from trying to back the forks out from under pallets. Driving the machine with the boom raised is dangerous, particularly on a construction site where any change in grade or underfoot conditions will wave the boom around and could cause the machine to tip.

There are four models available — two French Manitous and two Italian Xtremes — with boom-mounts that rotate, slewing like a crane. Manitou fields a 6,300-pound model with 45 foot-7 inch lift height and a 10,000-pound model with nearly 68 feet of lift height. Xtreme's 8,000-pound machine has a maximum height of 43 feet 2 inches and the 10,000-pounder reaches 67 feet 7 inches high. The 10,000-pound machines are the highest-reaching telehandlers in the market.

"Previously, the best year for telehandlers in North America saw about 14,000 machines shipped," says David Baxter, JLG director of marketing. "Although final numbers are not yet available, the total number of machines

Many contractors swear by the sliding carriage of some Lull, Pettibone and Liftking machines. Boom mounts smoothly slide 70 or 80 inches forward and back to place loads easily. Driving raised forks out from under a load is dangerous on a rough construction site because any change in grade will wave the boom around and could tip the machine.

shipped for 2005 will be on the order of 20,000. That's a significant increase and we attribute it to the realization by new end-users of the versatility and productivity a telehandler provides."

Manufacturers that are serious about North American market share can't afford to ignore that kind of sales growth. In a very practical sense, those that want to be taken seriously by equipment dealers need a telehandler line. And it's typically most economical for the dealer to get the telehandler from the same manufacturer from which they buy skid-steers and backhoe-loaders, or boom and scissor lifts.

Lifting-equipment manufacturers and dealers can trade on their expertise, using the telehandler's aerial-equipment nature as a way to reach customers who may not buy work platforms or cranes.

As a result, we see Terex painting its telehandlers blue and marketing them through Genie dealers. Work-platform specialist, MEC, has launched its own telehandler line, and Haulotte is building a new plant in Spain to make, among other things, its own telehandlers.

Case and New Holland expect to re-enter the North American telehandler market with new product by the end of this year. Thomas purchased Tovel to add a telehandler to its compact-equipment line, and Gehl is investing $6.5 million to expand its Yankton, S.D., facility and increase telehandler production by 50 percent.

In an uncharacteristic outsourcing, Caterpillar signed a supply agreement with JLG for its telehandlers. Clearly telehandlers are an important part of the Cat product line, but it appears they're unique enough that the Peoria giant, traditionally a do-it-yourselfer, wants JLG to supply the Cat-spec'd machines.

Perhaps even more unusual is the decision by the owner of the country's largest privately held equipment-rental company, Don Ahern, to enter the telehandler business. Ahern founded Xtreme manufacturing, despite the number of brands already in the marketplace, because of the perceived lack of competition for sales of a rugged, highly durable machine.

"In our opinion, the single most dynamic market factor affecting the telescopic-handler industry is manufacturing consolidation that has reduced competition," says Elesha Rasmuson, vice president of administration and sales for Xtreme. "It has reduced technological development."

Nevertheless, marketers are speaking of telehandlers with the kind of fervor for versatility reserved for backhoe-loaders or skid-steer loaders. And given double-digit growth in sales of telehandlers, tool-carrier models may just turn out to be the skid-steer-loader alternative that some claim them to be. If you're in the market for a machine to do some bucket work with, though, pay close attention to boom construction. Make sure you're getting a machine that will withstand the versatility promise. CE

Web Resources

Find telehandler-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.

Telehandler Specs: 6,000-Pound Models

Model	Max. Lift Height	Capacity (lb.) At Max. Height	Engine / Gross HP
JCB 527-55	18′ 0″	6,000	JCB / 83
Gehl CT6-18	18′ 3″	6,000	Perkins / 101
Manitou MLT 630T	20′ 0″	6,000	Perkins / 101
Manitou MVT 628T	20′ 8″	5,000	Perkins / 101
Xtreme XRM621	20′ 10″	4,400	Iveco / 99.5
JCB 530 Turbo	22′ 11″	5,000**	JCB / 100
Liftking LK 630R	30′ 0″	6,000**	Perkins / 110
Gehl RS5-34	34′ 3″	4,000	Deere / 99
Mustang 634	34′ 3″	4,000	Deere / 99
Manitou MT 6034XT	34′ 3″	4,000	Deere / 115
JCB 506C	36′ 0″	6,000	JCB / 82.5
Genie GTH-636	36′ 0″	6,000	Deere / 99
Pettibone T6036 Traverse*	36′ 0″	5,000	Cummins / 110
Pettibone 6036 Extendo	36′ 0″	5,000	Cummins / 110
Sky Trak (JLG) 6036	36′ 1″	6,000	Cummins / 99
Liftking LK 60R	37′ 0″	6,000**	Cummins / 100
Thomas Laser TL 6-44-36	37′ 2″	6,000	Perkins / 108
Liftking LK 641R	41′ 0″	6,000**	Perkins / 110
MEC TH60	41′ 6″	6,000**	Deutz / 100
Sky Trak (JLG) 6042	41′ 11″	6,000	Cummins / 99
Carelift ZoomBoom ZB6042	42′ 0″	6,000	Cummins / 110
Lull (JLG) 644E-42*	42′ 0″	6,000	Cummins / 99
Thomas Lazer TL 6-44-42	43′ 0″	4,000	Perkins / 108
Genie GTH-644	44′ 0″	6,000	Deere / 99
Pettibone T6044 Traverse*	44′ 0″	5,000	Cummins / 110
Pettibone 6044 Extendo	44′ 0″	5,000	Cummins / 110

* Sliding boom-mount carriage
** Stabilizers used in measuring capacities

Source: www.Spec-Check.com

For specifications on the full range of telehandlers, and more than 60 other types of equipment, visit ConstructionEquipment.com.

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CATERPILLAR

Cat-Built Machines Briefly Available

Caterpillar's B-Series telehandler product line introduced in 2003 continues to be available for the time being, but an alliance struck last fall will supply Caterpillar-specified and branded machines manufactured by JLG.

Number of models: 9

New models: TH220B, TH330B, TH350B, TH360B, TH460B, TH560B, TH580B and the compact TH210 and TH215

Product-line features: Since the line's introduction, the company has added the THP10 and THP24s Access Platforms. Both have controls for boom up and down, boom in and out functions in the basket.

For more information, visit ConstructionEquipment.com/info

GENIE

Genie Unites Terex Telehandler Sources

Genie announced at the American Rental Association tradeshow this winter that an extensive collection of blue Terex-sourced telehandlers will be marketed through the Genie distribution network. The GTH-644, 842 and 844 are manufactured in Redmond, Wash.; the GTH-636, 1048 and 1056 are made in Baraga, Mich.; and the tool-carrier-type GTH-5519 and GTH-6622 come from the Terex plant in Perucia, Italy.

Number of models: 8

New models: GTH-5519, GTH-6622, GTH-636, GTH-644, GTH-842, GTH-844, GTH-1048 and GTH-1056

Product-line features: Genie telehandler booms use pilot hydraulic controls (hydraulic over hydraulic). A variable displacement hydraulic pump minimizes hydraulic-system operating temperature and fuel consumption. Boom components can be accessed without taking the boom sections completely apart, reducing time and space required for repair.

For more information, visit ConstructionEquipment.com/info

JLG

Compacts Dig Attachment Work

Compact telehandler models G5-19A and G6-23A come with a low-pivot design that improves their ability to work with buckets and other attachments. Remaining JLG models are high-pivot machines with Deere power. Lift heights range from 42 to 55 feet. The TF6-42 Transformer allows transitions between forks and an ANSI-certified work platform in minutes.

Number of models: 6

New models: G12-55A, G5-19A and G6-23A

Product-line features: JLG focuses on fast lift speeds of the telehandler brand that carries its name. Lift speed on the new G12-55A, with the boom retracted, is 15.8 seconds. The boom can be extended in 17.3 seconds.

For more information, visit ConstructionEquipment.com/info

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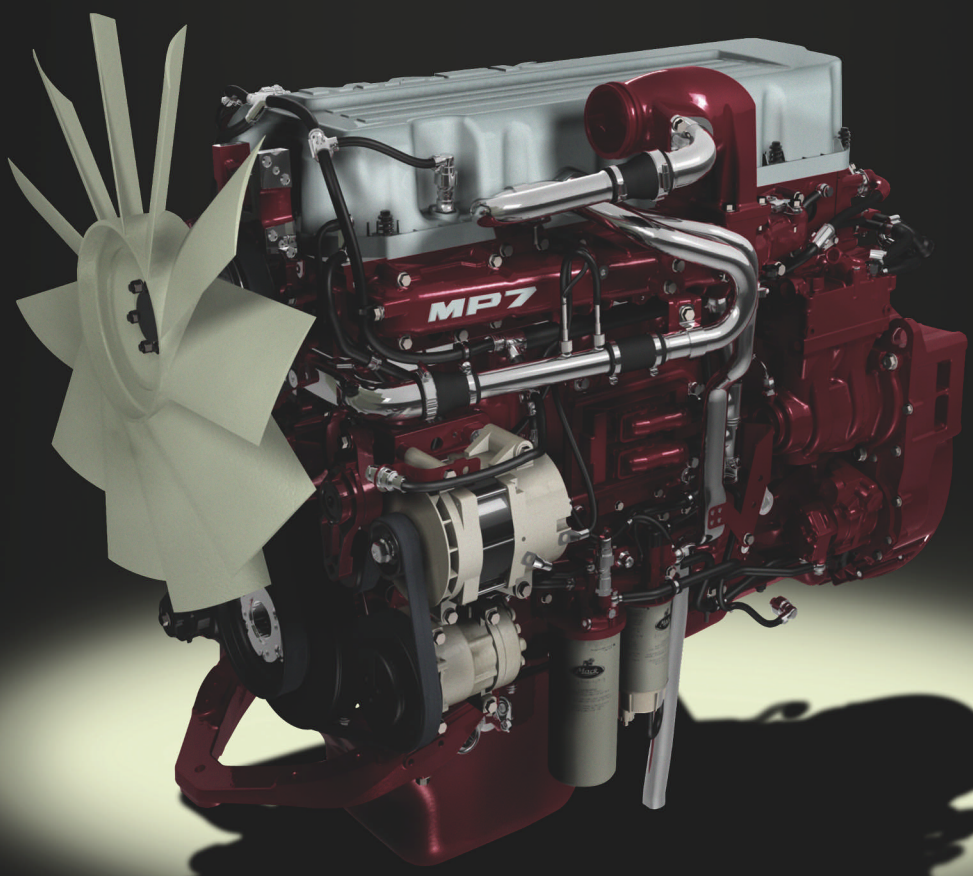

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PETTIBONE

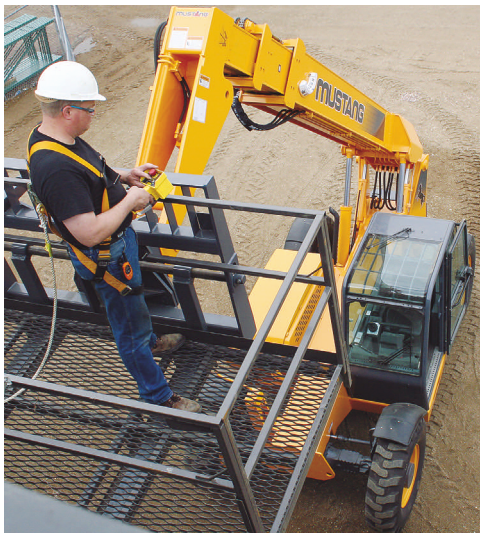
Standard GPS Tracking

Pettibone's Equipment Management System includes a contract with Qualcomm that makes the GlobalTRACS GPS-based service standard equipment. GlobalTRACS transmits vital machine information to a data center accessible via the Internet. The system locates machines in the field, tracks utilization, monitors unauthorized use, reports theft and records maintenance history.

Number of models: 10

Product-line features: Pettibone partnered with Carraro to develop the Carraro 26.43 Ackerman-corrected axle to reduce tire wear and improve fuel efficiency. Pettibone also developed Constant Pressure Compensated Hydraulics — a pilot-operated system that the company says eliminates hesitation inherent in load-sensing systems.

For more information, visit ConstructionEquipment.com/info



MUSTANG

Two Joysticks Replace Three

Mustang replaced the 638 with model 642, increasing its lift height from 38 to 42 feet, and added the 844 to its line with a rated capacity of 8,000 pounds and 44-foot lift height. The 642 and 844 share boom designs with the larger Mustang Deluxe Series of telehandlers. Two pilot-hydraulic joysticks put boom control in one hand and frame leveling and attachment control in the other.

Number of models: 6

New models: 642 and 844

Product-line features: Mustang's Radio Remote Boom Control raises and lowers, extends and retracts the boom from a remote-control pendant. The remote can also start and shut down the engine. This feature is available from the Mustang line's origin, Gehl, and from Manitou (by virtue of its alliance with Gehl).

For more information, visit ConstructionEquipment.com/info

MANITOU

Turns in 88 Inches

Manitou's SLT415B Twisco is rated to carry 3,000 pounds and has a maximum lift height of 13 feet, but the castering rear wheel gives the machine a turning radius of only 88 inches. Width over tires is less than 5 feet 6 inches. At an operating weight of 5,200 pounds, Twisco can be trailered behind a light commercial vehicle.

Number of models: 18

New models: SLT 415 B, MT 6034, MT 6642, MT 8044, MT 1745, MLA 628, MLT 627, MLT 634, MRT 1432 and MRT 2150

Product-line features: Tier II engines and hydraulic-system modifications have improved Manitou's performance specifications.

For more information, visit ConstructionEquipment.com/info

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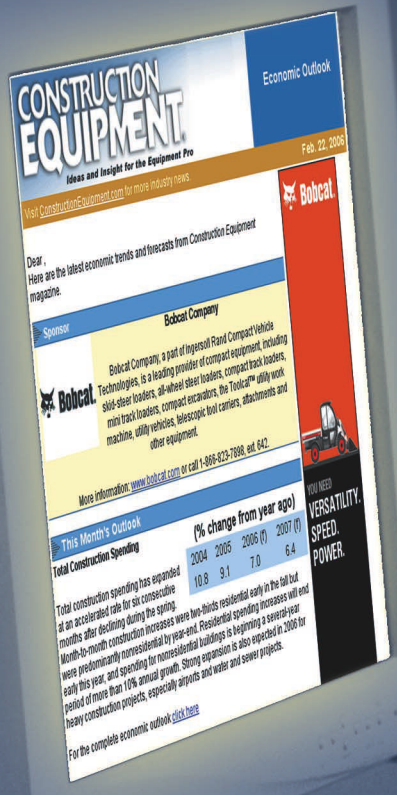

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Gallery of Telehandlers

JCB

Reach Replaces Some Skid-Steers

JCB's 520-40 measures just 61 inches wide and 78 inches high, which puts a machine with the ability to raise 4,000 pounds over 13 feet high in areas that only some skid-steer loaders can access. Capacity at maximum forward reach (8 feet 4 inches) is 2,000 pounds. JCB has emphasized tool-carrier versatility in its line, building only three models — the 506C, 506CHL and 508C — in the traditional pick-and-place configuration with high boom mounts and chains to extend the third boom section. The 550-170 is a three-section tool-carrier that extends to nearly 55 feet without use of chains or cables.

Number of models: 10

New models: TLT 35D

Product-line features: The new TLT 35D Teletruk — not actually a telehandler, but a counterbalanced industrial forklift on traction tires with a telescopic boom in place of the mast — will lift 7,000 pounds 14 feet in the air and extend 3,750 pounds 6 feet 6 inches out in front. Width over tires is just 4 feet 2 inches.

For more information, visit ConstructionEquipment.com/info

GRADALL

Hydrostat Improves Rear Steering

Gradall telehandlers feature rear-pivot steering, with rear wheels turning up to 90 degrees for great maneuverability. Hydrostatic transmissions precisely control machine speed with no interruptions in power delivery, and allow the machine to be inched into tight locations for critical load placement.

Number of models: 4

Product-line features: Gradall telehandlers use Deere diesel power. A single joystick controls boom lift and crowd.

For more information, visit ConstructionEquipment.com/info

TEREX

Consistent Improvements

Over the past few years, Terex has consistently improved the TH644, TH842 and TH844 manufactured in Redmond, Wash. In 2003, the turning radius was improved; then 2004 brought new frame welding and cab updates for improved visibility and serviceability. Terex introduced new boom assemblies and a Deutz engine option last year.

Number of models: 8

New models: TX-5519, TX-6622, TH-636C, TH-644C, TH-842C, TH-844C, TH-1048C and TH-1056C

Product-line features: Last year Terex released the TX-6622 configured for the North American rental market with 6,600-pound capacity and 22 feet of lift height. Its two-speed drive can take the machine to a maximum speed of 22 mph.

For more information, visit ConstructionEquipment.com/info

Gallery of Telehandlers

MEC

Camera Shows Load from Forks

Work-platform specialist, MEC, entered the telehandler market with two low-boom models, TH60 with a rated capacity of 6,000 pounds and TH80 rated at 8,000 pounds. Both models reach 41 feet 6 inches high. The TH80 is a rare 8,000-pound low-boom machine. Outriggers are an option that more than doubles the lift capacity with forks fully extended. The MEC Viewer is an optional industrial camera system that shows the operator the position of his load at the forks. And when the transmission is shifted to reverse, the monitor displays a view from the rear camera that shows what's directly behind the telehandler.

Number of models: 2

New models: TH60 and TH80

Product-line features: The MEC telehandlers were initially designed by Upright and owned for a time by Volvo (which never put them into production). The first of MEC's telehandler models are powered by the 100-hp Deutz diesel.

For more information, visit Construction Equipment.com/info

SKYTRAK

Automatically Stabilizes The Rear Axle

The three-mode Stabil-Trak system stabilizes the rear axle, transferring automatically from a three-point to a four-point stance as necessary. The system transitions automatically between free-pivot, final positioning and locked modes depending on the boom angle and other operating parameters. Five models range from 6,000 to 10,000 pounds of capacity, with lift heights from 36 to 54 feet.

Number of models: 5

Product-line features: JLG markets basic workhorse telehandlers with unitized box frames, four-wheel steering, and turbocharged Cummins power through its SkyTrak brand.

For more information, visit ConstructionEquipment.com/info

CARELIFT

Industry's Biggest Telehandler

The frame design of Carelift's Zoom Booms lowers the cab-mounting position for easy entry and exit and 360-degree visibility from the operator's seat. In 2005, Carelift introduced the largest of the telehandlers — the 32,000-pound ZB32032 — which is rated to lift 15,000 pounds to its maximum height of 32 feet.

Number of models: 7

New models: ZB10044, ZB10056 and ZB32032

Product-line features: Carelift takes care to point out that its units are designed and built in North America with heavy-duty frames and booms to meet the demands of North American telehandler users. All of the models are powered by Cummins diesels.

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Gallery of Telehandlers

GEHL

Compacts Have Joystick Options

Gehl's CT Series adds five compact telehandler models with maximum capacities from 5,000 to 7,000 pounds and lift heights from 16 to 23 feet. The new units expand the product line by nearly 50 percent courtesy of Gehl's alliance with Manitou. The CT5-16, CT5-16 Turbo and CT6-18 Low Profile have two joystick options: "loader configuration" or "pick-and-place."

Number of models: 7

New models: CT5-16, CT5-16 Turbo, CT6-18 Low Profile, CT6-18 Turbo and CT7-23 Turbo

Product-line features: The CT6-18 Low Profile is less than 7 feet tall at the top of the cab, putting a machine capable of raising 6,000 pounds nearly 18 feet high into garages or other low-access spaces.

For more information, visit ConstructionEquipment.com/info

JOHN DEERE

Ag Machines Get Hard-Hat Tough

Wearing John Deere's farm-line green, two telehandlers introduced in 2004 stepped up to construction-like quality. The 3220 (6,200 pounds rated capacity with 18 foot-6 inch lift height) and 3420 (6,600 pounds rated capacity with 23-foot lift height) replaced the 3200 and 3400 with Tier 2 engines rated at 114 horsepower — up 14 percent — and 360 foot-pounds of torque — up 17 percent. Variable-displacement pumps and closed-center hydraulic systems replacing the open-center system increased oil flow 20 percent. Deere says cycle times improved by an average of 35 percent.

Number of models: 3

New models: 3220 and 3420

Product-line features: All Deere telehandlers are equipped with enclosed, heated and air-conditioned cabs. Each has automatic self-leveling and a quick-attach carrier.

For more information, visit ConstructionEquipment.com/info

BOBCAT

Compact Bridges to Pick-and-Place Work

With a rated lift capacity of 6,700 pounds, the new V638 is a more traditional pick-and-place telehandler than Bobcat's two compact machines. The V638's three-section boom reaches nearly 39 feet high — significantly greater than Bobcat's two-section-boom machines. For rough jobsites, the V723FL has a frame-leveling feature the operator can use to make safer lifts on uneven ground.

Number of models: 3

New models: V638

Product-line features: Booms on Bobcat's compact V518 and V723 are mounted low to maximize digging ability and reach. Like their Ingersoll Rand counterparts, all three machines have three steering modes, hydrostatic transmissions and Perkins power.

For more information, visit ConstructionEquipment.com/info

XTREME

Improved Fork Leveling

Last summer Xtreme improved its fork-leveling system with separate master cylinders and fork hydraulic isolation block for the four models the company designed and manufactures — the XRM842, XRM1045, XRM1245 and XRM1254. The line's first redesign raised lift capacities for most models. Structural strength and wheel bearing loads were increased and steering geometry was improved. Xtreme protects its boom-extend cylinder inside the roller boom.

Number of models: 9

New models: XRM842, XRM1045, XRM1245 and XRM1254; XRM519, XRM621, XRM732, XRM844 and XRM1068

Product-line features: Xtreme partnered with Dieci of Italy to complete its telehandler line, bringing five models — XRM519, XRM621, XRM732, XRM844 and XRM1068 — to the United States. These include compact, tool-carrier-type machines and two machines whose upper frame rotates like that of a crane.

For more information, visit ConstructionEquipment.com/info

INGERSOLL RAND

C Series Focuses on Ergonomics

Ingersoll Rand's C Series, introduced in 2003, was designed to boost operator productivity with cab ergonomics, an EPA Tier II engine, and greater hydraulic functionality. Single joystick control is standard. The VR-725, VR638 and VR-530 have subsequently been updated to C-Series status.

Number of models: 8

New models: VR-642C, VR-843C, VR-1044C, VR-1056C, VR-723, VR-638 and VR-530C

Product-line features: C-Series handlers are powered by Cummins electronically controlled QSB4.5-30T turbocharged diesel engines.

For more information, visit ConstructionEquipment.com/info

LIFTKING

Biggest Traversing Boom

With the Tier 2 engine, Liftking also added a roller frame on which to mount the booms of its LK120R, LK150R, LK200R and LK300R, allowing the boom to traverse forward 80 inches and back to easily engage a load. At 12,000, 15,000, 20,000 and 30,000 pounds, they are all bigger than any other sliding-carriage telehandler available.

Number of models: 11

New models: LK120R, LK150R, LK200R and LK300R

Product-line features: Load-sensing hydraulics are now controlled by a multi-function joystick.

For more information, visit ConstructionEquipment.com/info

LULL

Sliding Carriage Lands Loads Easier

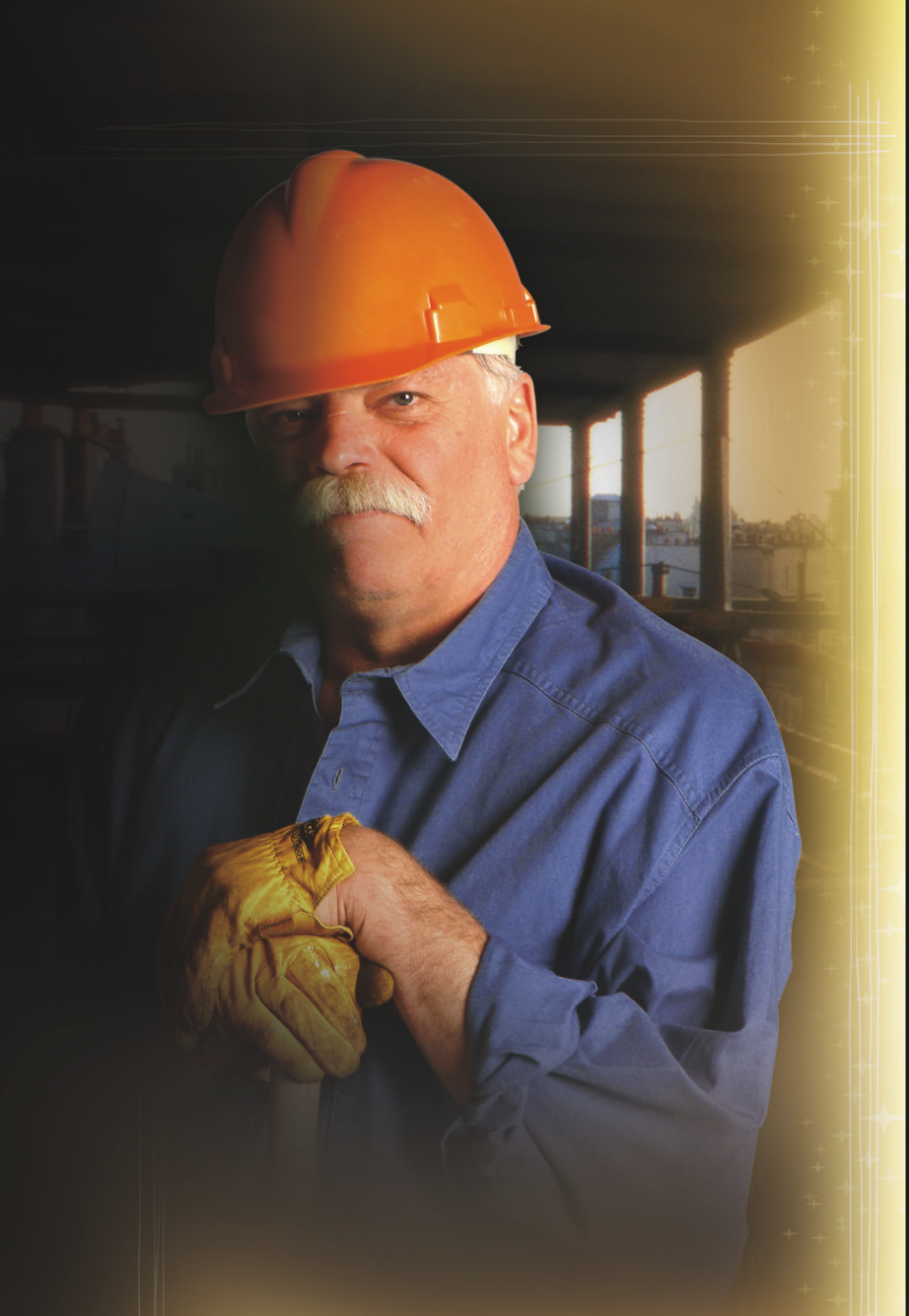
Lull's load-placement system allows the entire boom, raised to any angle, to shift forward 80 inches and back again, minimizing the need to coordinate multiple functions to place a load at height. The Series II version of the 1044C-54 brings a Deere diesel, like those used in JLG's Gradall and JLG brands, to the Cummins-dominated Lull and SkyTrak lines.

Number of models: 3

New models: 1044C-54 Series II

Product-line features: Like JLG's SkyTrak line, Lull offers the StabiliTrak system with three rear-axle modes: free-pivot, final positioning, and locked modes. StabiliTrak automatically switches from a three-point stance to four-point stance as necessary.

For more information, visit ConstructionEquipment.com/info



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SUBARU
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By G.C. SKIPPER, Contributing Editor

Welding Equipment

LINCOLN ELECTRIC

The Vantage 400 from Lincoln Electric is said to be one of the most compact 400-amp welder/generators in the construction market. The unit is housed in a corrosion-resistant, stainless-steel case. It has an 1,800-rpm water-cooled, 4-cylinder Perkins diesel engine powerful enough to do stick welding up to 1/4-inch-diameter electrodes and CV wire welding with up to 3/32-inch wire diameter as well as gouging with up to 5/16-inch-diameter carbons.

For more information, visit Construction Equipment.com/info

BROCO

GOWELD MIG welder is a go-anywhere welding unit from Broco that uses two 12V batteries to weld steel or aluminum up to 1/2 inch thick. It can be used as a spool gun with MIG comparable (CV) welding power sources. The unit can handle large or small welding jobs away from traditional welding sources.

For more information, visit Construction Equipment.com/info

MULTIQUIP

New GAW-135H and GAW-180HE welder/generators from Multiquip are said to provide arc-welding characteristics and more consistent performance than other units in their class. GAW-135H combines 135 amps or DC welding power and 1.5W AC output, and is 45 percent lighter than other similar welders. It is easily transported around jobsites and into confined areas. The GAW-180HE is a 180-amp welder, 3KW generator combination. It has a permanent magnet alternator that reduces its weight to 242 pounds.

For more information, visit ConstructionEquipment.com/info

HOBART

Champion 4500 portable AC generator/welder provides industrial contractors and construction crews with a lightweight, reliable and affordable machine for power generation and occasional welding tasks, the company says. The unit provides surge watts/4,000 continuous watts of 120/240 volt AC power for emergency power situations and to run hand tools, grinders, lights and battery chargers.

For more information, visit ConstructionEquipment.com/info

Spotlight

ESAB

Recently introduced 653cvcc-SE Power Source is a multiprocess, three-phase power source designed for heavy-duty industrial DC welding applications in harsh coastal environments. It is said to be ideal for mig, flux cored wire, submerged arc and stick electrode welding or carbon arc gouging. The power source offers a rated DC output of 650 amps at 100-percent duty cycle or 750 amps at 60-percent duty cycle at 44Vdc.

For more information, visit ConstructionEquipment.com/info

MILLER ELECTRIC

A new Trailblazer 302 diesel-engine-driven welding generator from Miller Electric features a Kubota liquid-cooled diesel engine that produces 19 horsepower at 3,600 rpm. It is said to offer unparalleled arc performance durability and peak generating power. Other new features include a 12-gallon fuel tank that allows 24 hours of operation on a typical job using 1/8-inch electrodes at 125 amps with a 20 percent duty cycle.

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Net Flywheel Power (hp)	18.1	18.1	24.9	29.5	38.9	41.6	46.9
Std. Max. Dig Depth (ft. in.)	6′ 10″	6′ 10″	8′ 8″	9′ 7″	10′ 4″	10′ 10″	11′ 5″
Bucket Digging Force (lbs)	3,462	3,462	5,620	7,419	8,498	10,049	11,443

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CATERPILLAR®

By G.C. SKIPPER, Contributing Editor

In-House Training Boosts Uptime

Two in-house trainers keep shop staff up to speed, and first-year results show 99-percent uptime and reduced employee turnover

Red Mountain Machinery has watched the pool of qualified technicians steadily dry up, leaving behind a severe shortage that is quickly becoming a major problem.

With a fleet of more than 350 units valued in excess of $50 million, the Chandler, Ariz.-based rental firm provides heavy earthmoving equipment such as articulated dump trucks, hydraulic excavators, scrapers, graders and other machines to end-users throughout Southern California, Arizona and Nevada. In addition to Chandler, Red Mountain operates out of facilities in Escondido, Calif., and Las Vegas.

Red Mountain cannot afford to risk the health of its machines by using unskilled wrench-turners. And that was the underlying reason why company executives decided to invest $250,000 a year to create and operate a technical training department and throw the doors open to customers, vendors and even competitors, in addition to its own employees.

That was four years ago, says Jay Dee Sale, the company's director of parts and service. "I think the primary factor was the lack of trained technicians. We can hire a technician who hasn't had all the training in our specific lines of equipment, or hire even an apprentice, and give them both on-the-job and classroom training," says Sale.

Another reason the company entered the technician-training business, he says, is to attract the type of employee who wants to learn. "If you're the type of mechanic who thinks he already knows everything, then there's no incentive to come to work here," Sale says. "But if you're the type of mechanic who sees there are machines coming out and wants to stay on the cutting edge of knowledge, then this is a good place to work."

Although training was initially available to more than just Red Mountain employees, that no longer is the case, says owner Owen Cowling. "We had little success with it," he says. "We had a problem with people not showing up. Technicians were always out in the field repairing things and couldn't attend the classes."

Photos: Jerry Portelli©

Trainer Will Young keeps technicians up to date on such work as air conditioning, engine repairs, transmissions and electronics.

PROFILE

Jay Dee Sale,
Director of parts and service

Red Mountain Machinery

Headquarters:
Chandler, Ariz.

Specialty:
Heavy-equipment rentals

Fleet Value:
More than $50 million

Fleet Makeup:
More than 350 units; heavy earthmoving equipment such as scrapers, motor graders, articulated dump trucks and hydraulic excavators

Facilities:
Chandler, Ariz.; Escondido, Calif.; and Las Vegas

Equipment Support Staff:
50 technicians and supervisors

Market Range:
Southern California, Arizona and Nevada

Red Mountain's training regimen includes both classroom and hands-on training with employees spending part of the time in class and part of the time in the shop. Student technicians include Todd Mast (in the cab), Tim Greely (on the ladder) and Mike Wiles.

Now Red Mountain has hired two new instructors and is focusing on its own employees only, says Cowling. Between the two trainers — Will Young and Kent Kraayenbrink — they are able to keep technicians up to date on such work as engine repairs, transmissions and electronics. "Basically, every part of the machine is covered in one class or another," says Sale.

No one ever graduates, Sale points out, since it is not a course that you go through. "It is continual training," he says. "All our employees go through training for eight hours once a month. That's done at all three facilities."

The sessions include both classroom and hands-on training with employees spending part of the time in class and part of the eight hours in the shop. Class sizes are no more than eight or nine persons, says Sale.

"We have to break up the technicians, so we actually do the same class two days in a row with half the mechanics attending one day and the other half attending the next. That's because we can't shut down the whole operation to do a class," Sale says.

Much of the curriculum is created by Red Mountain, Sale points out, with some material coming from various OEMs. "The OEMs have different training literature for their specific type machine," says Sale. "In addition to troubleshooting, we also teach failure analysis working with the software of various OEMs."

The training has made a difference at Red Mountain. With improved technician knowledge and efficiency, downtime has decreased, although it's hard to put a percentage number on it, says Sale. Technicians are also completing work faster and better, he says.

"There are two things we track. We call them 'first-day fall downs' and 'first-week fall downs,'" Sale says. "Before we started the training we weren't doing that, so it's hard to compare, but I can give you one example, and that is 'first-day' statistics. Last year, we had 3 percent first-day fall downs. That means that out of 1,000 days, we were down three days. That's 99 percent equipment availability."

Another area of improvement that's directly linked to training is the retention of technicians. "Although we don't track it by percentages, we know that our turnover rates have been greatly reduced at all three facilities," Sale says. Red Mountain has 40 technicians, a service manager and an assistant service manager at each location, plus parts-department people.

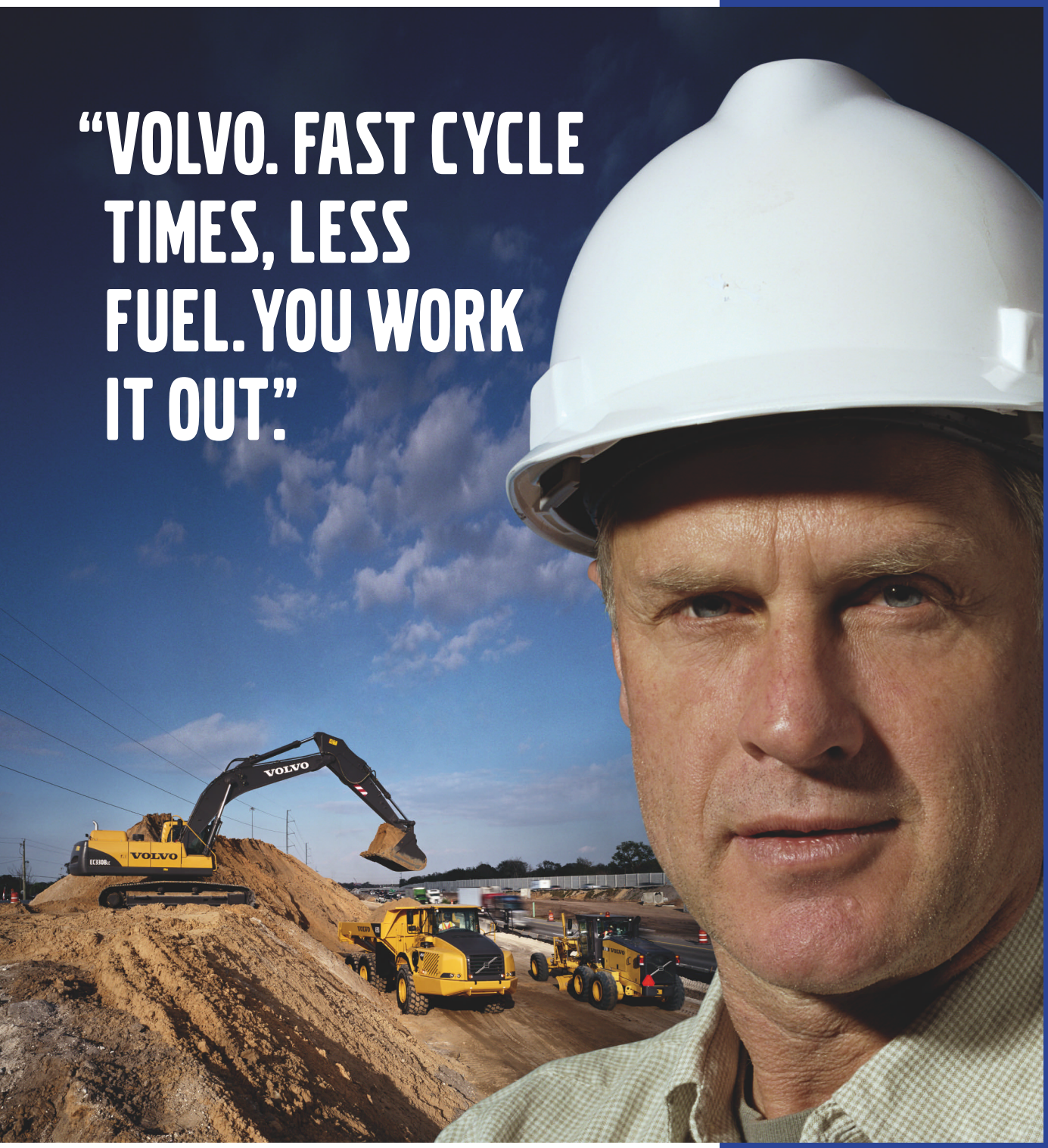
Realizing that a single company and its training department cannot solve the industry's technician shortage alone, Cowling has already taken steps to confront the issue on a much broader scale.

"We have our trainers working with local community colleges, such as Palomar Community College in San Marcus, Calif., to develop a program for construction-equipment technicians. There are quite a few diesel-technology schools out there, but emphasis has always been on things like engine rebuilding," he says. What's also needed, he points out, is training for field and shop technicians whose work isn't always rebuilding engines.

Cowling is convinced that establishing such technician training in conjunction with community colleges is an objective the private sector — OEMs, companies, contractors and other segments — can achieve. "The funding won't come from federal agencies," he says. "The construction industry itself has to help these colleges raise the necessary funds."

As for Red Mountain, says Cowling, "we have locations in three states and we want to establish programs in each state to get funding for training construction technicians." Because the demand for technicians is growing and technicians are becoming fewer, a career as a technician can lead to a profitable, bright future for anyone willing to learn, he says.

"When someone asks me what we pay mechanics, I always answer, 'more than we did last month,'" Cowling says.



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NEW HOLLAND

By MIKE VORSTER, Contributing Editor

Component Replacement Cost

Machine management must consider component-replacement strategies as maintenance moves away from field repair

Design developments aimed at improving reliability and reducing field repair labor have caused machines to be more component-oriented. Gone are the days when mechanics repair engines, transmissions or hydraulic pumps in the field. It is easier, quicker and more cost-effective to remove and replace the component, return the machine to work, and then rebuild the failed unit for use in another machine at another time. The focus has shifted from repair parts to components and from field repairs to planned component replacement.

This shift makes it possible to use estimated component life and replacement cost as a basis for forecasting lifetime repair costs. The approach differs from the cumulative cost and trend line method ("How to Benchmark Repair Costs, April 2004, or at ConstructionEquipment.com) and emphasizes the need to plan and manage components rather than record and analyze data.

The table below details a format that can be used to plan and calculate the hourly cost of a component-replacement strategy for an imaginary machine. Columns B through H detail the cost and replacement strategy for the eight major components. Engine replacement, column B, is estimated to cost $35,000 and is planned to be done at 12,000 and 24,000 hours. Hydraulic pumps and motors, column E, will cost $13,000 to replace and will be done every 8,000 hours. Column I provides for the cost of other necessary repair actions estimated at $2,000 per 1,000 hours. Column J gives the total for the period, column K the cumulative total, and column L the hourly cost.

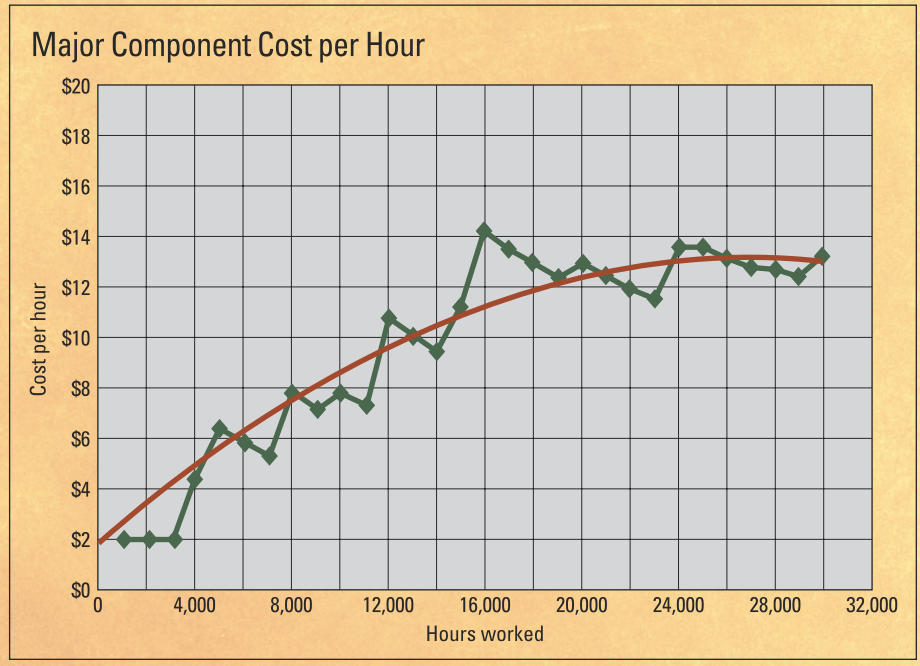
Mike Vorster

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

Component Cost Data

A	B	C	D	E	F	G	H	I	J	K	L
	Major Components										
Hours Worked	Engine $35,000	Turbo $1,500	Transmission $21,000	Hydraulic P&M $13,000	Axle & Brakes $35,000	Bucket $10,000	Cylinders $12,000	Misc. $2,000	Total	Cumulative Total	Cum. $ per Cum Hr
1,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$2,000	$2.00
2,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$4,000	$2.00
3,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$6,000	$2.00
4,000	$0	$0	$0	$0	$0	x $10,000	$0	x $2,000	$12,000	$18,000	$4.50
5,000	$0	$0	$0	$0	$0	$0	x $12,000	x $2,000	$14,000	$32,000	$6.40
6,000	$0	x $1,500	$0	$0	$0	$0	$0	x $2,000	$3,500	$35,500	$5.92
7,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$37,500	$5.36
8,000	$0	$0	$0	x $13,000	$0	x $10,000	$0	x $2,000	$25,000	$62,500	$7.81
9,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$64,500	$7.17
10,000	$0	$0	$0	$0	$0	$0	x $12,000	x $2,000	$14,000	$78,500	$7.85
11,000	$0	$0	$0	$0	$0	$0	$0	x $2,000	$2,000	$80,500	$7.32
12,000	x $35,000	x $1,500	$0	$0	$0	x $10,000	$0	x $2,000	$48,500	$129,000	$10.75
30,000	$0	x $1,500	x $21,000	$0	$0	$0	x $12,000	x $2,000	$36,500	$395,500	$13.18

Engine and turbocharger lives are well matched, but the component lives for the transmission, hydraulic system, axles and brakes could be better synchronized. (For purposes of illustration, this spreadsheet has been condensed. For a full version, go to ConstructionEquipment.com)



Hourly cost of the major components builds up over the life of the machine to reach a state of ongoing component replacement at about $13.20 per hour from 30,000 hours onward.

The strategy works out to an estimated total lifecycle cost of $13.18 per hour after 30,000 hours of machine life. Engine and turbocharger lives are well matched but one wonders what could be done if the component lives for the transmission, hydraulic system, axles and brakes were better synchronized. Similarly, one could develop and implement a better strategy for replacing or rebuilding the bucket and hydraulic cylinders.

When we plot component costs over time (line graph), we see how the hourly cost of the major components builds up over the life of the machine to reach a fairly steady state of ongoing component replacement at about $13.20 per hour from 30,000 hours onward.

It also shows a clear decision point at 14,000 hours, which is just before we redo the axles and brakes for the first time. The residual market value of the machine, its reliability and availability, future work loads, and the advantages of trading up to the latest technology will all influence the decision, but it is clear that the decision to redo the axles and brakes at 16,000 hours carries with it the decision to keep the machine for at least another 12,000 hours.

An analysis of this kind can be of great assistance in estimating costs and setting lifecycle strategies for different types of equipment. It can also be used for unit-level decisions by developing a data table such as this for each machine, updating it with actual hours worked and costs, and adjusting future component-replacement strategy as necessary. This will enable us to analyze the impact that actual component-replacement decisions will have on future lifecycle costs and ensure that investments made today are recovered during the remaining life of the machine.

It is time to seriously consider partnering with manufacturers to synchronize component lives and establish reasonable benchmarks for the cost and life of each major component

Repair cost, downtime and reliability need not "be what it is." We can and should take the initiative to analyze and manage at a component level and realize that machines are often a little more than a convenient assembly of components bolted to a sturdy long-life frame.

It is also time to seriously consider partnering with manufacturers to synchronize component lives and establish reasonable benchmarks for the cost and life of each major component. Operating conditions, the operators themselves, and the quality of preventive maintenance will influence actual results. But without standards, norms and expectations, we can neither forecast future costs nor set goals for performance improvement. CE

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By KATIE WEILER, Managing Editor

Gutsy Graders Go with Joysticks

Caterpillar says good-bye to motor-grader levers and hello to operator comfort, ease of operation and better blade visibility

Notice the brand new Power Edge logo with the red slash on the new M-Series grader. The company is replacing the red beltline stripe with this new logo on all of its products going forward.

Ask any contractor what the most complicated piece of earthmoving equipment is to operate and the answer would most likely be a motor grader. After hearing that comment for decades, and after doing plenty of research, Caterpillar decided to address the issue by replacing all of the motor grader's conventional controls — including steering — with a pair of joysticks. At the same time, the company updated its grader engines to meet Tier III emissions requirements. Like the addition of hydraulics and articulation back in the '70s and electronics in the '90s, Cat's new M-Series joystick controls are a serious technological advancement in the motor-grader world. In fact, the company has applied for more than 100 new patents while developing these machines.

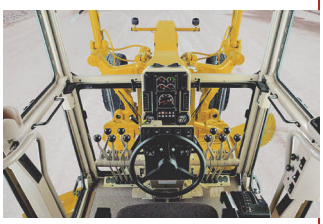
The seven new M-Series motor graders will replace the previous 10 H-Series machines. New models include the 120M, 12M, 140M, 160M, 14M, 16M and 24M — all of which will be operated with joysticks. Operating weights range from 29,000 pounds on the 120M to 145,000 pounds on the 24M. Blade lengths vary from 12 to 24 feet. The 120M, 140M and 160M will offer an all-wheel-drive option for improved traction in poor underfoot conditions. Production will start with the 14M in October 2006 and finish with the last model mid-year 2007.

Caterpillar unveiled these machines at its newly expanded Edwards Demonstration and Learning Center near Peoria, Ill. After a product overview, construction editors were encouraged to try the new motor-grader simulator, where we were tutored on the use of joysticks and practiced what hand/wrist motion accomplished what movements. After sitting down for just a few minutes, all of us in attendance were truly amazed at how intuitive the joysticks were to use and how quickly we learned which hand controlled which function.

Although Caterpillar says the M Series changes were spawned by the latest emissions requirements, it knew the time had come for more grader advancements. In 2000 through 2004, Caterpillar designed prototypes of the M Series and asked customers for feedback — and listened. They also surveyed 500 customers worldwide by phone, mail and in person to ask what keeps them up at night and what they could do to make their jobs easier. Caterpillar went back to their engineers with customers' suggestions and made some improvements. Then in 2005 and 2006 the company sent out field-follow machines to various customers and asked them to use them on jobsites for a period of time. Originally, Cat was going to offer a steering-wheel option for operators who weren't comfortable with the joysticks, but the seasoned veterans using the M Series units said they didn't want or need it.

All in all, Caterpillar says there is 35 percent new content

Joysticks Simplify Grader Operation



By tapering the cab floor and angling the doors of the M-Series motor graders (left), visibility to critical areas has been significantly increased from the H-Series (right). Listed below are functions of the new joysticks.

Left Joystick:

- Side-to-side = steering
- Twist = articulation
- Right yellow button = auto articulation return to center
- Top black buttons = wheel lean
- Trigger switch = transmission direction
- Top yellow buttons = gear selection
- Fore/Aft = left blade lift
- Detent = left blade float

Right Joystick:

- Fore/aft = right blade lift
- Detent = right blade float
- Side-to-side = blade shift
- Twist = circle turn
- Hat switch fore/aft = blade tip
- Hat switch left/right = drawbar shift
- Differential Lock/Unlock
- Electronic Throttle Resume/Decrement

in the M Series graders, including a few industry-exclusives. First, let's start with the cab, which is 5 inches deeper than predecessor models and 69 inches high. Because the cab is not defined by the width of the old console with levers, Cat had the flexibility to open up the interior and provide excellent sight lines to the drawbar, circle and moldboard (DCM) and snow-wing area. The cab features a tapered floor and angled doors, which dramatically increase visibility to the front tires and the heel and toe of the blade (see side-by-side photos). In addition, the sloping, tapered engine enclosure opens lines of sight to the ripper. Outside the cab, notice the black glare-resistant paint used on top of the frame, blade lift cylinders and engine enclosure. This helps the grader operator and also the surrounding equipment operators who won't see any glare.

The M-Series joystick-operated, electro-hydraulic control system simplifies motor-grader functions and is claimed to reduce operator arm and hand movements by up to 78 percent, according to a study done at the University of Wisconsin. According to Caterpillar, "the system helps operators sustain high levels of efficiency throughout the workday, and the intuitive control design makes training fast and simple — for both new and experienced operators." For an explanation of joystick functions, see the sidebar above and notice the exclusive "automatic return-to-center button for articulation."

For the M-Series introduction, Caterpillar brought in three motor-grader customers who were part of the "field-follow" group of M-Series machines to comment on the joysticks and overall operation. Wayne Wood of Wayne Wood Grading (Phoenix) has been in business for 45 years and has operated motor graders for 36 years, Gary Longhe of Flagstaff County (Daysland, Alberta, Canada) has been using graders for 30 years, and John McAllister of Peterson Contractors (Reinbeck, Iowa) has operated a motor grader for more than 35 years. Comments made by these three men included, "you really can teach an old dog new tricks"; "this machine is awesome and easy to learn"; and "the M-Series is not a machine, she's a lady!"

In addition to all the joystick excitement, M-Series motor graders will be powered by new C-Series engines with ACERT technology and meet Tier 3 emissions regulations. Horsepower ranges from 125 in the 120M to 500 in the 24M machine.

Variable Horsepower (VHP) comes standard on all models, and Variable Horsepower Plus is an option. VHP and VHP Plus deliver additional gross horsepower in each gear, both forward and reverse. The horsepower is delivered in 5-hp increments in each gear. VHP as a standard feature delivers horsepower in gears 1, 2, 3 and 4; the horsepower level in 4th is held throughout gears 5 thru 8. If the customer has VHP Plus, the machine will deliver 5 more horsepower in gears 5, 6, 7 and 8. Higher horsepower in higher gears is necessary to carry blade loads at higher ground speeds, especially removing snow in 7th gear.

With more rim pull available in all gears, Caterpillar says the M-Series is much more productive than its predecessor models — more than 30 percent depending on the model.

An all-wheel-drive option is also available on the 120M, 140M and 160M, and is said to deliver 52 percent more torque than the H-Series. It uses dedicated left/right pumps, which allow independent control of hydraulic flow to each front wheel hydrostatic motor. Through an electronic control module, front-wheel speeds can be controlled automatically. Steering Compensation varies the outside and inside wheel speeds by 21 percent, so full torque is available through an entire turn, which allows a shorter turning radius. The system also has a front-wheel-only hydrostatic mode for precise, low-speed performance, providing infinite speed control from 0 to 5 mph.

In addition to power enhancements, Caterpillar has simplified maintenance. All service checkpoints are at ground level, including fuel fill. Top-accessible drawbar wear inserts and bi-directional, moldboard-slide-rail wear strips make DCM adjustments faster by 77 percent, Cat says, and they are now a one-person job. Slide rail shoes allow adjustment up and down as well as fore and aft, which eliminates moldboard chatter.

Attachments made standard are supplemental steering, AccuGrade-ready wiring, and tandem walkways with non-skid surface. A variety of optional attachments is also available.

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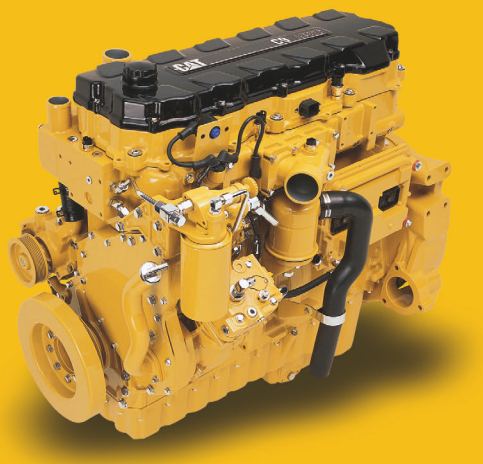

ACERT reduces emissions through precise control of the combustion process. It starts with taking in cool, clean air and then integrates a number of processes:

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By LARRY STEWART, Executive Editor

New Dozer 30 Percent More Productive?

Komatsu makes big claims for the D155AX-6's Sigmadozer blade design, engine-optimizing transmission, and longer track

At Komatsu Field Days, where the manufacturer hosts customers who come to see its latest machines, the demonstration spokesman estimated "conservatively, the new D155AX-6 crawler dozer will deliver a 30-percent improvement in productivity compared to the D155AX-5."

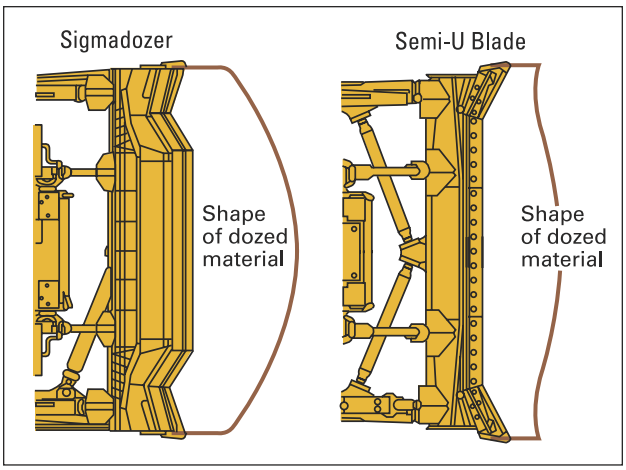
Innovation supporting the claim starts with a redesign of the dozer blade. Komatsu's new Sigmadozer is like a semi-U blade, but with pockets near the outside edges. The design is said to reduce cutting resistance, roll material more effectively, and redirect flow toward the center of the blade. This produces noticeably less windrowing off the outside edges of the blade, and larger blade loads.

Exhaust-gas recirculation allows the Tier-3 diesel to generate more power and low-end torque more economically than previous engines. Komatsu's automatic-lockup torque converter and auto shift transmission make the tractor 10 percent more fuel efficient while moving 15 percent more dirt.

A new blade linkage with dual-tilt control is standard equipment with the Sigmadozer. It holds the blade closer to the tractor, improving the operator's view of the work, and enhancing digging force with reduced blade sway. And because the blade retains material better, it can be tilted back to carry a load like a U-blade with little spillage.

The Komatsu SAA6D140E-5 engine delivers 320 horsepower at 1,900 rpm. To meet the Environmental Protection Agency's Tier 3 exhaust limits, Komatsu applied cooled exhaust-gas recirculation (EGR), direct fuel injection, and air-to-air aftercooling to the turbo diesel. Komatsu claims a 10-percent improvement in fuel economy and more torque output at lower engine speeds.

Torque-converter lockup comes on automatically in the usual dozing speed range. Locking up the torque converter eliminates a 10-percent loss of horsepower between the engine and transmission.



Notches in the Sigmadozer bring cutting force to a sharper point for more efficient digging, and direct material flow back toward the center so the blade carries more and windrows less.

Competitive Dozers
(By horsepower)

	Net HP	Blade Capacity (cu. yd.)	Operating Weight* (lb.)
Caterpillar D8T	310	11.4	75,845
Dressta TD-25M	320	12.5	79,829
Komatsu D155AX-6	**320**	**12.3**	**87,100**
John Deere 1050C	324	12.5	73,985
Liebherr PR 752	330	12.5	75,852
Caterpillar D9T	410	17.7	94,900

* With blade, without ripper
Source: Xpanded Specs at www.Spec-Check.com

Komatsu's D155AX-6, with 320 net horsepower and operating weight above 87,000 pounds, is larger than the competitive models clustered around the Cat D8 at 310 horsepower. The Komatsu product manager says the SAE method for estimating semi-U blade load underestimates the Sigmadozer's capacity at 12.3 cubic yards. For more dozer specifications, and more than 60 other types of machines, visit ConstructionEquipment.com.

The patent-pending, auto-shift transmission has a manual mode that offers operators control over upshifts. But the auto shift controller is constantly communicating with controllers in the engine, steering system and hydraulic system, so when it's in control, it can keep the engine operating at peak torque all the time.

Komatsu brought the K-Bogie undercarriage proven on its largest mining dozers to the D155AX-6. The K-Bogie oscillates more effectively so the roller follows the track link better on rough terrain to maintain alignment between rollers and links. An additional roller in the undercarriage puts more track on the ground.

The D155AX-6, like all of Komatsu's new construction-machine introductions, comes with the KOMTRAX wireless data system as standard equipment. KOMTRAX relies on the global positioning system (GPS) location and cellular data transfer to send location, hours, and error codes, cautions, maintenance items, fuel levels, and more information to a secure website that dealers and customers can access. Machines with standard KOMTRAX come with five years of free communication (service starts when the machine is delivered to dealer inventory).

Komatsu's suggested retail price for the D155AX-6, with dozer blade and ripper, is $537,000.

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Toolbox Tips

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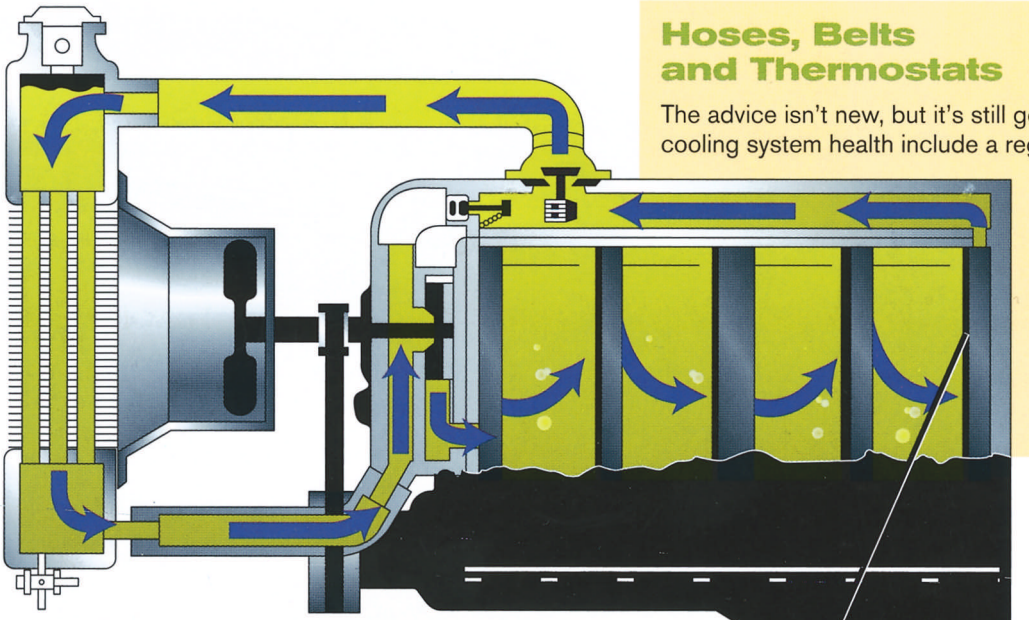
June 2006

No. 20 in a Series

How to Avoid the Heat of Cooling Problems



Hoses, Belts and Thermostats

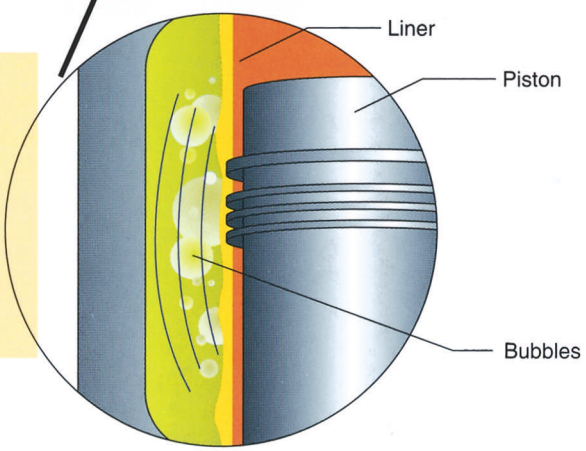
The advice isn't new, but it's still good: The basics of cooling system health include a regular check on hose condition and belt adjustment. And, of course, if the engine begins to abruptly run too hot or too cool, check the thermostat.

Illustration courtesy of Analysts Inc.

Liner Pitting

Pitting (or erosion) of a cylinder liner's outer surface is caused by cavitation, the implosion of tiny air bubbles against the liner. The piston's side-to-side movement causes the liner to vibrate, alternately pulling away from the coolant (which forms the bubbles), then pushing back into the coolant (which cause the bubbles to implode).

Illustration courtesy of Baldwin Filters.



Toolbox Tips

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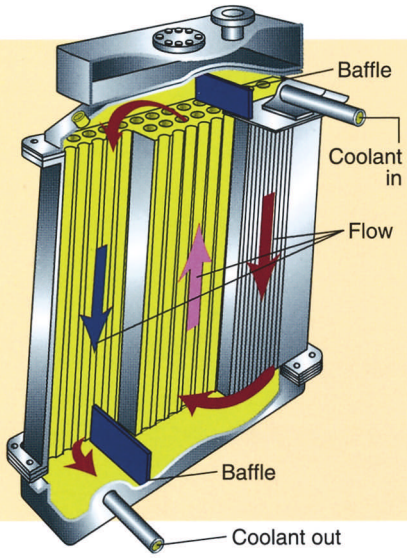
Radiator Care

Heavy-duty radiators employ a variety of designs and coolant-flow patterns. This unit, for example, uses a three-pass, side-to-side flow. Basic maintenance of any radiator type, however, involves cleaning the fins, checking cap pressure and looking for leaks and signs of internal corrosion.

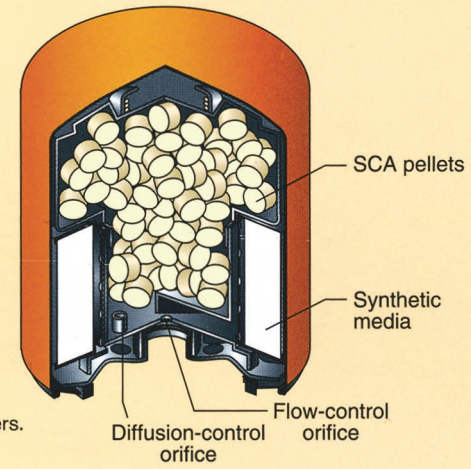
Illustration courtesy of Cummins Engine.



Coolant Filters and Additives

Coolant filters trap rust and scale, bits of hose and residual core sand. Filters that contain supplemental coolant additives gradually release these substances to maintain the coolant's anti-corrosion properties. Don't pour additives into the radiator of a vehicle with an additive-containing filter. An over-concentration of additives can cause problems.

Illustration courtesy Baldwin Filters.



Maintain Proper pH

On the pH scale, measured from 0 to 14, a liquid becomes more acidic as it approaches 0 and more alkaline as it approaches 14. According to Nalco Chemical Co., coolant pH should be maintained between 7.5 and 11. Below 7.5 pH, says Nalco, the coolant will become aggressive to ferrous metals, namely cast iron and steel, as well as to copper and brass. Above a pH level of 11, the coolant becomes aggressive to aluminum and solder.

QUICK TIP

Has the bright green color of standard antifreeze or the bright orange of long-life coolant turned a dull brown in your diesel's radiator? If so, the system may have severely overheated and damaged the coolant by oxidizing its glycol. This process can form harmful acidic by-products. Check that the coolant has enough alkaline reserve. A flush and refill may be in order.

Coolant Analysis

Coolant analysis comes in several flavors. You can, for example, use your own test strips to make reasonably accurate assessments of glycol content and the concentration of certain key additives. Or, if you prefer, you can have coolant checked by professionals, a service usually available through oil-analysis labs. Professional analysis frequently is offered on a couple of levels. The basic analysis, for instance, may include checks on the freeze point, percent antifreeze, nitrite concentration, reserve alkalinity, pH and a visual inspection of the coolant. An expanded analysis may complement these basic checks with an assessment of wear metal concentrations and additive levels, the latter also monitoring additive drop-out and silica hydrogel formation. Knowing wear metal concentrations could be valuable, since excess copper or aluminum could indicate degeneration of radiator tubes, excess lead the corrosion of high-lead solders and excess iron the erosion of cylinder liners.

By HEATHER BURLINGAME, Senior Production Editor

Caterpillar Responds to Demand with Upgraded Trucks

Improvements to major components and the operator cab haul these off-highway trucks to F-Series status

The demand for Caterpillar off-highway trucks has been on the rise since 2003, says the company. With F-Series trucks, Caterpillar Global Mining enhances its offering accordingly.

Fuel prices are on the rise again, and Cat claims its ACERT engines provide increased fuel efficiency, as well as emissions compliance. The C27 powers both the 773F and 775F. On the 773F, the engine meets Tier 3 requirements and is rated at 703 horsepower (net). At 740 horsepower (net) on the 775F, the C27 meets Tier 2 regulations. The C32 engine, rated at 938 (net), powers the 777F and is Tier 2 compliant.

ACERT engines extend service intervals for each truck to 500 hours — twice that of previous truck models, says Caterpillar.

The 777F sports Cat's new Power Edge logo. Caterpillar added 100-percent more glass to the cab for better visibility and redesigned the stairway to make it easier for operators to come and go.

For easier cleaning and servicing, F Series trucks feature a modular radiator design that provides more space than previous models. The new design features a single-pass flow system, which is said to cool more efficiently than the dual-pass system previously offered.

Caterpillar has also improved the transmission and brakes. Electronic Clutch Pressure Control (ECPC) grants these rugged machines smoother speed and directional shifts. ECPC individually adjusts each clutch in the 7-speed transmission and extends the life of drive-train components, says the company. Caterpillar chose all-hydraulic brakes, versus air-over-hydraulic, for its F-Series trucks, citing improvements to reliability, response, control, serviceability and modulation.

Moving into the cab, operators will notice more glass. Caterpillar says the trucks have 100-percent more glass area for improved visibility. For operator comfort, the seat is now located in the center of the cab (with the trainer seat to the left). The new position provides more space for the operator.

F-Series 773 and 775 Off-Highway Trucks replace the E-Series versions. The 777F replaces the 777D.

For more information, visit ConstructionEquipment.com/info

Specifications: Cat F-Series Trucks

	773F	775F	777F
Payload class	60 tons	70 tons	100 tons
Body capacity*	46.5 cu. yd.	55.3 cu. yd.	78.5 cu. yd.
Gross machine weight	222,000 lb.	242,000 lb.	360,000 lb.
Engine model	Cat C27 ACERT	Cat C27 ACERT	Cat C32 ACERT
Net engine power	703 hp	740 hp	938 hp
Gross engine power	740 hp	787 hp	1,016 hp

*Standard body, heaped SAE 2:1

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Market Watch Lite

By HEATHER BURLINGAME, Senior Production Editor

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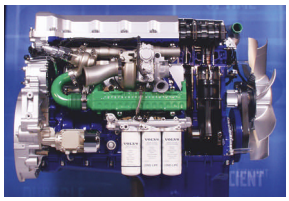
Volvo

Volvo Trucks' 2007-model diesels include three displacements and 22 ratings from 325 to 600 horsepower. Included are a D11 and D13, which will replace the D12 by year's end, and the D16. The D13, at 335 to 485 horsepower and 1,350 to 1,650 lbs.-ft., will be the only engine offered in the vocational VHD series.

For more information, visit ConstructionEquipment.com/info



Vermeer

Vermeer has reintroduced the SC352 stump cutter with new features. The unit now offers a four-wheel-drive option, 35-hp Briggs and Stratton gas engine option, chip-blade option and standard oscillating front-steering axle. The machine measures 35 inches in width, which allows it to fit through most standard gates.

For more information, visit ConstructionEquipment.com

Topcon

LS-B10 laser receivers can be used for a variety of machine- and elevation-control tasks. The integrated laser receiver is battery operated and provides grade control on small machines such as compact backhoe-loaders, mini-excavators and skid-steer loaders. A magnet mount provides quick installment. An optional holder is available for use on a grade rod. LS-B10W offers built-in wireless technology and CANopen (Controller Area Network) connectivity. The RD-10W in-cab remote display gives the operator grade information via wireless link.

For more information, visit ConstructionEquipment.com

Knaack

Weather Guard low-profile aluminum truck boxes (Models #121 and 131) provide more visibility through the rear window, especially for pickup designs with high bed rails. Additional corner support channels and a radius design on the side panels provide more support. The boxes have the same features as the redesigned Weather Guard line, including the Extreme Protection Lock.

For more information, visit ConstructionEquipment.com/info

Leica

The DigSmart 3D Excavator Guidance System uses a color monitor to graphically display project-design information and 3D GPS position. The system has a high level of integration with survey data via technology such as the DBX format for data, Roadrunner software, System 1200 data for coordinate transformations and GPS 1200 sensor modules.

For more information, visit ConstructionEquipment.com

DTN/Meteorlogix

MxVision WeatherSentry provides localized weather information. An upgrade to the system includes layered viewing, which shows customized combinations of weather and map data. View radar, satellite, winds, observed weather and more from national to metro views. Weather forecasts are updated every hour. IcePath animates when and where ice storms are predicted to occur for the next three days and joins the existing SnowPath/StormPath graphics.

For more information, visit ConstructionEquipment.com/info

Market Watch Lite

Pro-Tech

HATS series aluminum trench shields use hydraulically adjustable spreaders to accommodate varying trench widths. Double-wall aluminum panels are foam-filled, and the light-duty shields can be handled with a backhoe-loader. They are available in 15 sizes with sidewalls ranging from 4x6 to 8x16 feet.

For more information, visit ConstructionEquipment.com/info

Godwin Power

From 20 kW to 350 kW, the diesel-powered Godwin Power generators include a programmable control panel that monitors, protects, and controls engine and generator operations. The units are designed with a larger alternator for high motor-starting capabilities. The line includes an "R" Series designed for the rental industry.

For more information, visit ConstructionEquipment.com/info

Laser Reference

Pro Shot AS2 and AS2 Magnum grade lasers replace the L1-AS and L1AS Magnum models. Upgraded electronics give the units improved battery life and greater ease of service. Designed for grading and excavating contractors, lasers provide slope capability from 0 to 25 degrees; working range of 2,000 and 3,000 feet, respectively; and accuracy of within 3/32 inch at 100 feet for the AS2 and 1/16 inch at 100 feet for the Magnum.

For more information, visit ConstructionEquipment.com/info

Atlas Copco

A line of hydraulic power packs powers a variety of hydraulic hand-held tools. They range in weight from the LP 9-20 P at 163 pounds to the LP 13-20 DE at 256 pounds. The largest measures 28x28x29 inches. A twin-pack model can supply power to two tools at the same time. All come with foldable handles and large wheels.

For more information, visit ConstructionEquipment.com/info

Wacker

A new line of seven portable generators features ground fault circuit interrupter system for all receptacles, including 120v and 240v twistlocks. Sensors monitor all outlets for current leakage and trip the main circuit breaker in the event of leakage, the company says. It triggers the main circuit breaker. Models range from 2,500 to 6,600 watts. A rotating field alternator has automatic voltage regulation and separate excitation winding. List prices range from $1,515 to $3,906, and the units carry a two-year complete warranty.

For more information, visit ConstructionEquipment.com/info

Thermal Dynamics

A-Series Firepower plasma-cutting systems include the FP-20A, FP-35A and FP-70A. Respective outputs on the machines are: 20 Amps at 115VAC and 25 Amps at 230VAC; 15 to 35 Amps at 230V; and 25 to 75 Amps at 230V. The units come equipped with 1Torch, the top-of-the-line Thermal Dynamics' cutting torch that features a SureLok head design; ergonomic handle; and lightweight, flexible lead.

For more information, visit ConstructionEquipment.com/info

Axle Tech International

PRLC 124/144 series of planetary rigid axles is available for light/medium-duty lift trucks, backhoe-loaders, compactors and small loaders. The mechanical parking brake combines service, parking and emergency braking into one unit. For severe brake-duty cycles, optional forced-cooling ports are available for an auxiliary brake-cooling system. PRLC 124 axles offer lift capacity from 7,700 to 11,000 pounds. PRLC 144 has an axle capacity of 35,000 pounds and provides lift capacities from 11,000 to 17,600 pounds.

For more information, visit ConstructionEquipment.com/info

Market Watch Lite

Leading Edge Attachments

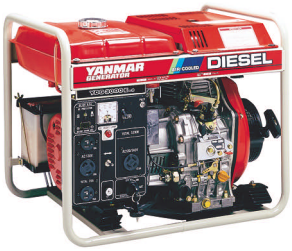
The Attachments Hi-Cap Multi-Ripper bucket takes the company's technology to excavators and shovels used in quarry and mining operations. SHARC technology, which places the shanks on the arc, features staggered ripper teeth that allows for sequential application of breakout force.

For more information, visit ConstructionEquipment.com/info

Donaldson

The TopSpin self-cleaning air intake system precleaners come in 13 models, with outlets ranging from 2 to 7 inches and air-flow ranges from 100 cfm to 1,600. Donaldson says its precleaners grab 99 percent of large debris and 85 percent of coarse air contaminants. Prices range from $58 to $292, depending on model.

For more information, visit ConstructionEquipment.com/info



Yanmar

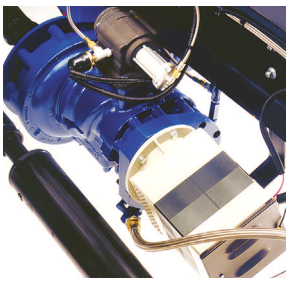
Portable Tier II diesel YDG-model generators have 2,700-, 3,700- or 5,500-watt ratings. The company says a single tank of diesel will keep the direct-injected, air-cooled gensets going for 6 to 15 hours, depending on load factors. Power is provided by Yanmar's LV Tier II air-cooled diesel engines.

For more information, visit ConstructionEquipment.com/info

Stow

The flex-shaft BP25H back-pack vibrator allows contractors to carry the unit around a jobsite without dragging electrical cords. Powered by a 2.5-hp Honda gas engine, the unit weighs only 24 pounds. It is offered with 11 heads — seven steel and four rubber — that range in diameter from 7/8 to 2 3/4 inches with a maximum length of 17 3/4 inches. Flexible shafts are from 2 to 21 feet long.

For more information, visit ConstructionEquipment.com/info



Vanair

Vanair's Genair underdeck unit combines a 125- to 185-cfm air compressor with an integral 7.2 to 10.5 kW AC generator. The system is said to maximize the power of a truck's engine by enabling a person to access both pneumatic and electric power via the PTO drive.

For more information, visit ConstructionEquipment.com/info

Bosch

Powered by a Bosch 10.8-volt Litheon (lithium-ion) battery, the company's new ultra-compact Pocket Driver is designed to drive 100 3-inch screws on a single charge and to drill holes up to 1/2 inch in diameter. The new tool measures 6x6.5 inches and weighs less than 2 pounds (battery included).

For more information, visit ConstructionEquipment.com

Multiquip

Portable Jimmy hydraulic rebar benders allow operators to shape #4 and 11 rebar on the worksite. The series has seven models and bends rebar to 180 degrees. The benders are ideal for offset bends or doglegs, 90-degree hook, 180-degree cane hook, straightening and stirrup-and-tie hook. Minimum bend is from 5 to 14 inches. The units weigh from 22 to 110 pounds. A compact design allows bending in tight spaces.

For more information, visit ConstructionEquipment.com

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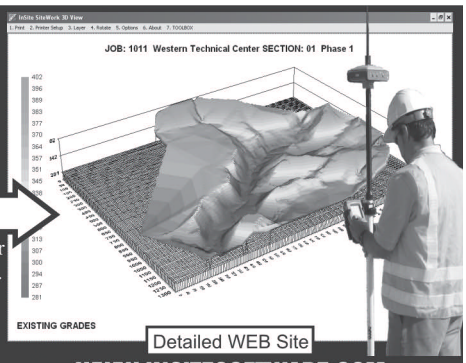

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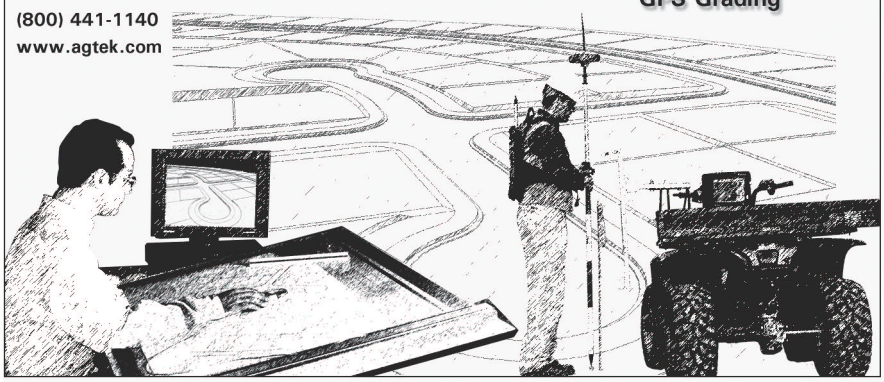

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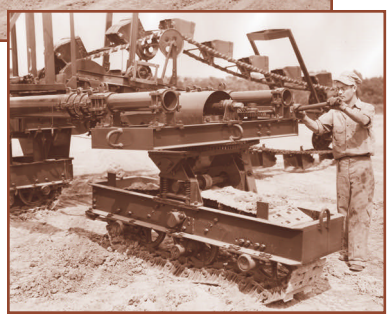
By KEITH HADDOCK, Contributing Editor

Ruth Dredger Served a Niche Market

A mechanical trencher was adaptable to all kinds of trench work until outmoded by modern hydraulic excavators



The flexible Bucyrus-Ruth model HU Dredger is shown in travel position. Inset: An operator hand cranks the steering adjustment of the remote crawler on the Ruth Dredger.

The Ruth Dredger was a unique trench-digging machine that served a niche market for many decades. It was invented in 1906 by Charles H. Ruth, a blacksmith in the Imperial Valley of California. At that time, huge amounts of silt brought down by the Colorado River were being deposited in the Valley and repeatedly clogging the many irrigation ditches fed by the river. After experimenting with several types of primitive machines, irrigation companies declared the Ruth Dredger the most economic of all because of its continuous action and high-volume capability. Following its success in California, the Ruth Dredger Manufacturing Corp. was established in Los Angeles, and it wasn't long before Ruth Dredgers were at work in many states constructing and cleaning irrigation ditches, cleaning canal banks, and building berms and levees to control flooding.

The extraordinary flexibility of the Ruth ditching machine was due to its swinging boom that carried the digging buckets. The boom could swing 90 degrees, left or right, positioning the buckets to trim ditches or canal banks on either side of the machine as it moved ahead. The upper picture shows the machine in travel position with buckets raised above ground and pointing to the rear. The main machine was supported on a single crawler track while a second stabilizing track, not visible in the picture, could be positioned at the far side of the ditch. This remote stabilizing crawler was connected to the main machine by a telescoping frame, adjustable to 25 feet in length, and powered through a telescoping drive shaft connected to the main machinery. This enabled a ditch to be cleaned as the machine straddled it with the buckets positioned between the two tracks.

The lower picture shows the outer end of the telescoping frame in the retracted position and an operator adjusting the steering angle of the crawler assembly with a hand crank arrangement operated through a worm drive.

The early Ruth Dredgers were mounted on three wheels, two under the main machine while the third supported the remote propelling assembly on the far side of the ditch. In the early 1920s, the wheels were changed to a crawler track under the main machine but a wheel was still utilized for the remote position. A few years later, the wheel was abandoned altogether and a two-track configuration was adopted.

In 1939, Bucyrus-Erie acquired the rights to its manufacture and commenced building the machines under the Bucyrus-Ruth trade name. Model HU was powered by a 32-flywheel-hp Cat D4400. Variable digging speeds were available from about 3 to 80 fpm, and the entire machine tipped the scales at 18 tons. Very few of the Bucyrus-Ruth machines were sold so, with the onset of World War II, the company officially discontinued the product at the end of 1942.

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

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