

 Reed Business
Information.

22 Potain Igo 50
unfolds on site



43 Breathe
easier with
Peterbilt's 365



71 Check
out Cat's center-
mounted cab



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**Horizontal directional drills
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finishing the final feet
of utilities installations**
p. 54

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Cover photo by George Pfoertner ©

FEATURES

HANDS-ON LIFTING

22 Height and Reach Unfold on Site

Senior editor Walt Moore set out to investigate Manitowoc's claim that its Potain Igo 50 self-erecting tower crane comes close to replacing a go-anywhere telehandler. Manitowoc concedes that the telehandler has definite advantages, but the company also touts the tower crane's superior lift height and reach, its ability to work in small spaces, its relatively fast deployment, and its jobsite friendliness (it doesn't make ruts, it's exceedingly quiet, and it can place material where a telehandler might not be allowed).



SPECIAL REPORT

28 Industry Moves to Stem the Theft Tide

For years the National Insurance Crime Bureau estimated that \$1 billion worth of construction equipment and tools are stolen each year. But it seemed nobody felt the pinch acutely enough to take decisive action against equipment thieves.



Equipment owners had grown accustomed to the cost of theft. Now, insurance providers, theft-prevention companies and manufacturers are addressing this problem. Incentives are being offered to contractors who are taking action to fight crime on their own jobsites.

HANDS-ON TRUCKING

43 Peterbilt 365's Newness Is Mostly Under Its Hood



Although this model looks and drives like a 357, Truck Editor Tom Berg says the new 365 doesn't have any diesel-exhaust odor.

The 2007 emissions controls have so seriously pinched down the NOx, the smell is gone. There was absolutely no smoke coming out of the stack, either. Model 365, pictured here, features a Kimbel mixer body.

SPECIAL REPORT

49 Jobsite Attachments

Construction Equipment editors selected a variety of innovative attachment introductions that were made this year. From hydraulic hammers, to planers, to laser grading systems, we bring you some new ideas to help improve your jobsite productivity. Be sure to visit ConstructionEquipment.com to find all the latest product introductions we've covered.



COVER STORY: Buying File

54 Small HDDs Take It the Final Feet

After several difficult years, times appear to be good again for the horizontal directional drilling (HDD) industry. Although big projects where large drilling units install thousands of feet of large-diameter pipe continue to attract attention, most trenchless installations by directional drilling actually are made by much smaller models. For this report, we focused on HDDs rated at 20,000 pounds of pullback or less. Currently, six manufacturers offer 15 models in that size class.



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Manage the Risks

Business has wrestled with rising health-insurance costs for a decade. And we all have adjusted our behavior in light of rising personal costs as business pushes some of these increases down to us. In most cases, we've become better health-care consumers, and our general attitude toward the professionals who care for our health has shifted from one of automatic consultation to a more measured consideration of our alternatives.

We're not going to debate this issue in *Construction Equipment*; we're an equipment magazine, not a business-management book. But we are going to draw a line from health care to equipment theft.

For too many years, equipment managers have considered equipment theft in the same way we used to consider health care: "Not to worry, insurance will cover it."

Hold on, though, because insurance firms are using the words Howard Beale immortalized in the movie "Network": "We're not going to take this anymore." Insurance firms, as executive editor Larry Stewart discovered in researching his article on page 28, have decided that the payouts on equipment theft are affecting actuarial tables. According to the Insurance Service Office, theft reports to insurance companies have increased 10 to 20 percent *each year* since 1996.

Insurance providers, theft-prevention companies, and manufacturers are addressing this problem, Stewart reports.

But professional equipment managers must change attitudes toward theft, just as we have toward health care. Technology today provides many excellent options for asset tracking and theft prevention. But that's not enough. Managers must move theft into the risk-management portion of their job function.

Risk-management is more than GPS and police databases. Risk management means understanding the costs of theft, and partnering with those who insure fleets to ensure the least exposure in the event of theft. Risk management is a philosophy of anticipation, not reaction.

Be assured, once the actuaries start digging into equipment theft, they will find ways to win the premium and deductible war. Risk management is their profession, and they are there to turn a profit for their company. We must find ways to work with them.

Go to our archives section at ConstructionEquipment.com to read "This Business of Risk Management" from October 2005, and "A Master of Risk Management" in November 2006.



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MARKET WATCH

By KATIE WEILER, Managing Editor

Access our online reader response form at ConstructionEquipment.com/info. Just key in the issue date and make your selections. Subscribe to our monthly eNewsletter at ConstructionEquipment.com/subscribe.asp.

▶ Transcraft

D-Eagle aluminum/steel combo drop-deck trailer is now available with multiple axle configurations. With a GVWR of 100,000 pounds, the D-Eagle can be equipped with a tri-axle rear and/or a center lift axle option to gain more payload. With all lightweight options specified, says Transcraft, a standard 48-x102-inch D-Eagle tri-axle and center-lift combo drop-deck trailer can weigh as little as 13,000 pounds.

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◀ Pettibone

Model 10032 telehandler features a 60-inch-wide baler attachment to make the 10,000-pound machine a pipe handler. Handling pipe up to 20 inches in diameter, the baler attachment has hydraulically ac-

tuated holddowns on the arms to stabilize pipe on 48-inch forks. A single joystick controls all boom and baler functions. The telehandler will take 8,000 pounds up to 32 feet 6 inches and 3,000 pounds to maximum forward reach. Turning radius is 12 feet 6 inches.

Visit ConstructionEquipment.com/info and enter 208

▶ IMT

SiteStar lube truck has been significantly redesigned and now incorporates polyethylene product tanks for oil-based fluids, antifreeze, water and salvage. The new tanks, says the company, allow flexibility in design, reduce weight significantly (the "poly" tanks weigh about 80 percent less than steel counterparts), and also reduce product contamination from welding residue, rust and condensation. Also new is the product-pumping system, which uses a newly designed hydraulic motor/pump system to move oil-based products; air-diaphragm pumps for antifreeze, water and salvage; and an air-piston pump for grease.

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▶ Komatsu

Featuring a Tier 3 engine, the PC308USLC-3 short-tail-swing excavator has a fly-wheel horsepower of 187. It weighs between 70,682 to 73,146 pounds and has a bucket capacity range of 0.76 to 2.13 cubic yards. The machine occupies a width of less than 17 feet 5 inches with a loaded bucket, and its counterweight requires no additional clearance, so it is ideal for working on confined jobsites.

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Market Watch

◀ Club Car

Carryall 295 Series features both a two- and a four-seat model, with bench-type or optional bucket-type seats. Engine choices include a 20-hp Honda gas or a 20-hp Kubota diesel. The new Carryall 295 Series features the IntelliTrak drive system and IntelliTach tool-handling system. The 295 Carryall's bed will haul 850 pounds with standard suspension and 1,050 pounds with a heavy-duty suspension.

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▲ Power Curbers

Model 5700-Super-B can slipform concrete foundations for steel cable with a post-hole digger attachment. The machine can dig holes up to 34 inches deep with the attachment, which mounts on the left rear of the paver and is powered by the auger conveyor circuit. The digger's auger operates inside a cylinder and moves dirt into a hinged chute. The chute transfers spoil out of the way of the slipform application.

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▶ Travis

The Travis Mule horizontal-discharge asphalt trailer features a dual-walled, smooth-sided aluminum design. Reciprocating floor slats unload asphalt at a rate that can be controlled at the back of the trailer or inside the cab of the truck — without using belts or raising the trailer. The 28-foot long, 4-axle trailer hauls 80,000 pounds gross in at least 37 states, says Travis, and weighs 10,998 pounds.

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▼ New Holland

New pilot controls are available for the company's largest skid-steer loaders (L170, L180, L185 and L190) and all compact-track loaders. The controls are said to feature ergonomically designed joysticks — the left joystick controls steering and travel; the right controls lift arm and attachment tilt. Included with the controls are contoured, adjustable armrests for excellent forearm support.

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▲ Challenger

MT300B tractors come in four models ranging from 45 to 75 PTO horsepower. Reverse speeds on standard 12x12 shuttle transmission are 15 percent slower than comparable forward speeds for better control, says the company. Four-wheel braking is standard on all-wheel-drive models. They are powered by 3-cylinder Challenger 3.3-liter turbocharged diesel engines. Category I/II 3-point hitch comes standard with lift capacity of 5,500 pounds at the ball ends.

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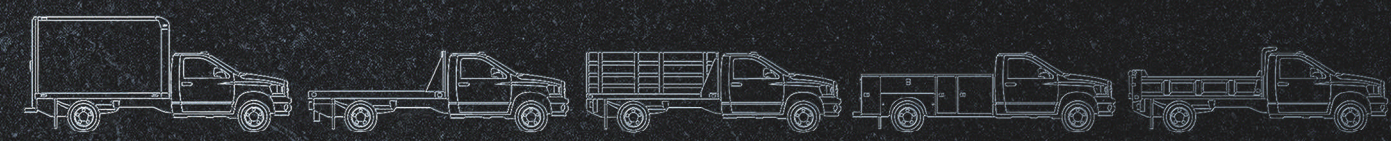
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*2007 Dodge Ram 3500 Heavy Duty Chassis Cab vs. 2006 Ford and GM one-ton, pickup-based Chassis Cab models.



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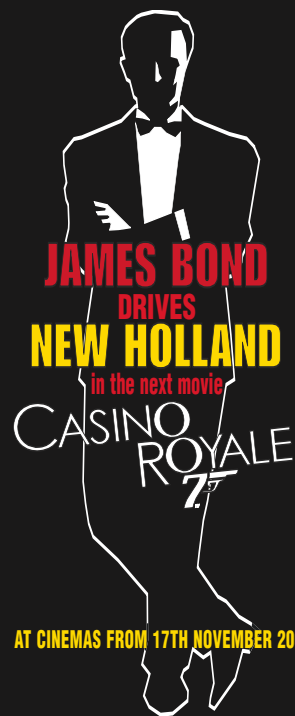
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MANUFACTURER NEWS

Oshkosh Truck to Acquire JLG

Oshkosh Truck, a Wisconsin-based manufacturer of military and heavy-duty commercial vehicles, announced on Oct. 16 that it has signed a definitive agreement to acquire Pennsylvania-based JLG Industries, a leading manufacturer of aerial-work platforms and telehandlers, including the JLG, Gradall, SkyTrak and Lull brands.

The \$3.2 billion cash deal has been approved by each company's Board of Directors and is subject to customary closing conditions, which are expected to require 90 days.

According to Oshkosh chairman, presi-

dent and CEO Robert Bohn, the JLG deal meets the company's major-acquisition strategy, in that JLG is a market leader, has strong management, has double-digit growth potential, and promises earnings in excess of capital costs.

Also, says Bohn, Oshkosh "expects to realize substantial purchasing and logistical synergies, while benefiting from JLG's already outstanding manufacturing operations." JLG operates manufacturing facilities in the United States, France and Belgium.

William Lasky, chairman, president and CEO of JLG, also is optimistic



JLG Industries offers four brands of commercial telehandlers, including the all-wheel-steer JLG models.

about the deal:

"This transaction is a good fit for JLG," says Lasky. "Oshkosh has a similar philosophy of offering premier products, creating strong market positions and delivering after-sales service and support. For the JLG team, this combination offers additional growth opportunities. For our customers, JLG will be-

come an even stronger partner in their future success."

With revenues of \$2.3 billion during fiscal 2006, and with an anticipated 25-percent increase in sales for fiscal 2007, JLG placed 22nd in Fortune Magazine's 2006 list of the 100 Fastest-Growing Companies.

MANUFACTURER NEWS

Ingersoll Rand Buys Geith

Ingersoll Rand has signed an agreement to acquire Geith International, an attachments provider for construction equipment, from management shareholders and two venture capital funds managed by Bank of Scotland (Ireland). The acquisition is said to close in the fourth quarter of 2006, and terms were not disclosed.

"Geith represents a key element in our strategy to grow our global attachments business, and augment our base of recurring revenues," said Herbert L. Henkel, chairman, president and CEO of Ingersoll Rand.

EQUIPMENT NEWS

Ultimate Weight-to-Horsepower Ratio

The Ditch Witch SK650 mini skid-steer weighs 2,630 pounds and rolls off the assembly line with a 31.5-net-hp diesel engine. That gives the machine a thoroughly acceptable weight-to-horsepower ratio of about 84:1.

We're guessing that a Chevy 350 V-8 engine weighs around 550 pounds. Now, if you should install that en-

gine in the SK650 (as did engineers at Ditch Witch), you'd have a machine weight of, say, 3,200 pounds — or perhaps just a bit more for the added reinforcement.

Since the 350 is rated at a modest 410 horsepower in the SK650 (or the Super Witch VI), the weight-to-horsepower ratio drops slightly — to around 8:1. Since each horse is

pushing around only about 8 pounds of Super Witch VI, this little machine may be the fastest on the jobsite.

It's mostly fun, but the project also has been practically instructive for Ditch Witch engineers, who picked up some valuable tips on track retention, track-roller design and high-flow hydraulics.

— Walt Moore



The Super Witch VI is remote controlled and has a shut-down switch on the control panel. At every performance, a second remote, in the hands of an observer with a good view of the area, also has a shutdown switch.



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Managers Digest

CONSTRUCTIONEQUIPMENT.COM NEWS

Dozens of New Models Added to Spec Check

During September, 159 machines were added to or updated in the Spec Check database, including several dozen new machines introduced in recent months. Most of the alterations were updates, ranging from changes in machine parts to new engines put into existing machine models.

Spec Check works diligently to track machine specifications. Each time Spec Check receives a manufacturer's updated specifications sheet, those updates are input into the Spec Check database. Subsequently, database updates are made to Spec-Check.com, making this online resource the most accurate, up-to-date buyer's resource in the industry. Equipment professionals can also access data through ConstructionEquipment.com.

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Wesco	880 TLB	Select <input type="checkbox"/>

SAFETY TIPS

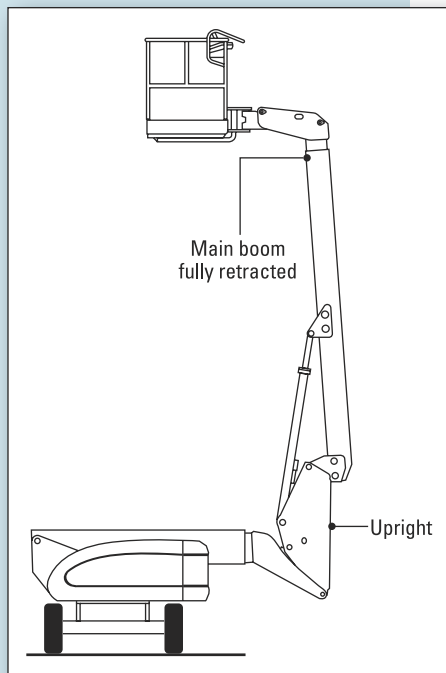
Many Factors Keep Lifts Upright

The combined affect of several stability-related issues — even if no single one of them is severe enough to upset a telehandler or aerial-work platform — can result in tipping the machine. For example, if one tire's pressure is low and it comes to a stop on uncompacted ground on the downhill side of a slightly sloping surface, the machine may well be stable enough that not even the operator notices.

But booming down over that low tire, an overloaded platform or forks, a strong gust of wind, and/or an abrupt control movement could send the machine over.

Don't use the tilt alarm as a level indicator. The tilt alarm, on machines so equipped, typically only sound when the machine is on a severe slope.

- Always inspect the site for hazardous conditions and the machine for maintenance needs before operating.
- Remember that booming down usually reduces stability.
- Know your load, and never overload a boom or telehandler's rating.



This is the position of least backward stability for this boom. The machine could tip if operated on a slope with the counterweight downhill, if the upright is extended, or if a combination of other stability factors shifts the center of gravity back.

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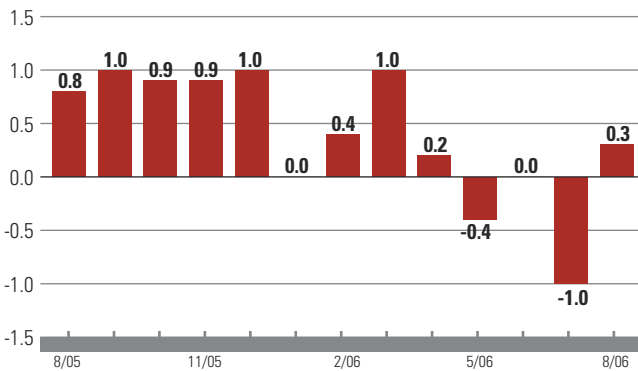
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↔ TOTAL CONSTRUCTION SPENDING

Spending peaked early this year, then declined into the fall as the housing market collapsed faster than the rest of the construction market expanded. After inflation, total jobsite activity fell as much as 4 percent. Total hours worked in the construction industry dropped an outside 1.7 percent in September even though more than 10,000 new construction jobs were added. Total spending will be rising again by the end of 2006 and will rise 7-8 percent during 2007.

(% change from previous month)

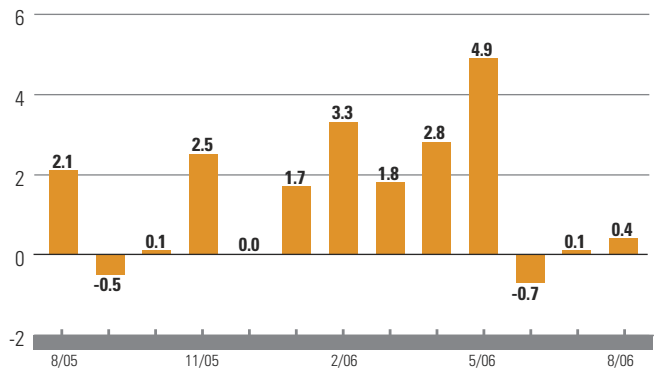


Source: U.S. Department of Commerce

↔ HIGHWAY CONSTRUCTION SPENDING

Highway construction spending was 18 percent higher late in the summer than a year ago although it was unchanged during the summer when soaring pavement and structural-steel costs forced some projects to be slowed or postponed. Bridge work continued to expand, and pavement work stalled partly because of concrete worker strikes and material delivery problems. Spending is expected to grow at a 7-percent pace through 2007, slightly ahead of project cost inflation.

(% change from previous month)

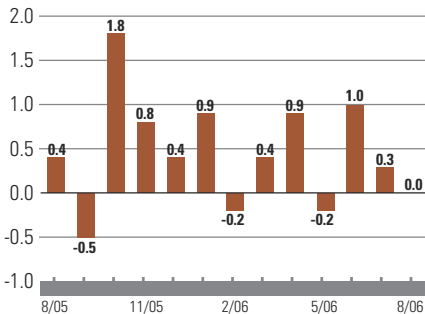


Source: U.S. Department of Commerce

↔ CONSTRUCTION EQUIPMENT PRICE INDEX

Inflation stalled during the summer after increasing more than 3 percent in the prior year. The stall reflects a 16-percent downturn in orders for equipment after a late spring surge that capped a three-year boom. Prices are expected to increase at a less than 3-percent pace through 2007 as manufacturers are forced to reduce the "shortage" premium in their pricing as their order backlogs ease. Demand, and hence pricing pressures, will remain strong for road-specific equipment.

(% change from previous month)

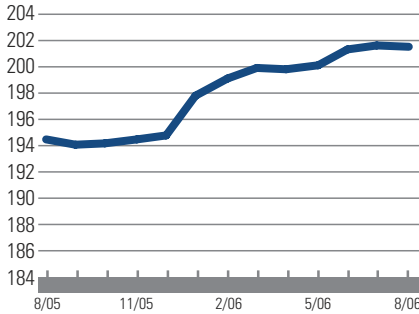


Source: Federal Reserve Board

↔ INDUSTRIAL PRODUCTION INDEX

Factory production stalled during the summer but is expected to resume expanding through 2007 at about the same pace as GDP. Ahead, chemical and other process industries will grow faster than equipment and consumer durables industries. Production gains were larger than GDP gains for several years until spring 2006. Nonetheless, factory capacity utilization will remain near the current 82 percent.

(1980=100)

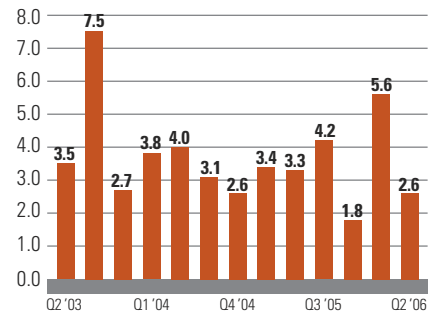


Source: U.S. Department of Labor

↑ GROSS DOMESTIC PRODUCT

GDP growth is forecast in the 2.5-3.0 percent range for the next two years. The housing boom is reversing, and the equipment-investment boom will slow soon. This growth pace will be slightly below the economy's growth potential so there will be a modest easing of pressure on available supply, materials and labor cost. Credit rates will average slightly above the current depressed level. But, supply condition will remain tight in the rapidly expanding civil and nonresidential building construction markets.

(% change from previous quarter)



Source: U.S. Department of Commerce

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Height and Reach *Unfold on Site*

The Potain Igo 50 is portable, assembles itself quickly, and provides considerable lifting coverage

Could a machine that stands in one small spot on the jobsite ever come close to replacing a go-anywhere telehandler?

It could, says the Manitowoc Crane Group, if the machine were a self-erecting tower crane. Manitowoc concedes that the telehandler does have certain advantages: It can place material inside structures; it's ready to work the instant it reaches the jobsite; and it's available vir-

tually everywhere. But the other side of that coin, says Manitowoc, is the self-erecting tower's superior lift height and reach, its ability to work in small spaces, its relatively fast deployment, and its jobsite friendliness (it doesn't



make ruts, it's exceedingly quiet, and it can place material where a telehandler might not be allowed — such as across fresh concrete.

According to Eric Black, regional business manager for Manitowoc's range of Potain self-erecting tower cranes, the self-erecting tower has long been popular on European jobsites, but it has been slow to catch on in North America. We at *Construction Equipment* realized that these machines might now be getting a second look from domestic contractors, however, when Jim Yasko, assistant administrator of Local 150's Apprenticeship and Skill Improvement Program (ASIP), told us that the Local had added a Potain Igo 50 to its crane fleet for training International Union of Operating Engineers members.

We asked if we could take a close look at the new addition, and in mid-August visited with Local 150 instructor Glenn Minyard at the ASIP training facility in Plainfield, Ill. Minyard, a long-time crane operator who now specializes in crane training and operator certification for Local 150, spent the morning demonstrating the features and capabilities of the Igo 50. Accompanying us were Manitowoc's Black, Pat Runnion, principal of Runnion Equipment in Lyon, Ill. (the company that supplied the Local's Igo 50) and Leslie Shalabi,



The auxiliary derrick (pointing rearward from the back of the mast at the top center of the photo), is used to install the concrete counterweight slabs. The derrick line is controlled by the main hoist line, and the derrick can be swung in a 90-degree arc via an enclosed hydraulic cylinder.

vice president of SE10 Creative, a public relations firm representing Manitowoc.

Capabilities and transport

The Igo 50 is the largest and among the newest of the 16 Potain self-erecting tower-crane models. This electrically powered, bottom-slewing crane has a hook height of 76 feet when the jib is horizontal (86 feet with the jib offset 20 degrees) and has a maximum lift radius of 131.17 feet. Maximum lift capacity is 8,818 pounds at a radius of 42.58 feet (or 45.75 feet if the second and third jib sections



The assembly process begins (far left) when the large hydraulic cylinder extends. (It's anchored on the back side of the lower mast section.) As the cylinder continues to push (center), the mast sections are brought into vertical alignment and the first jib section is deployed. (Although the concrete counterweights are shown installed, they are not actually required until after the mast and first jib section are deployed.) Assembly is completed (right) with the deployment of the remaining jib sections via hydraulic cylinders.

Photos: George Pfoertner

Hands-On-Lifting

are folded back). Lift capacity at maximum radius is 2,514 pounds. The Igo 50 has a fully counterweighted working weight of around 103,000 pounds.

The crane requires 480-volt, 60-hertz, 31-amp service, which can be supplied either from temporary power on the job, or from a portable generator. The unit at Local 150 used the latter. The crane utilizes Potain's LVF Optima technology which, says the company, is a variable-frequency system that lowers electrical requirements and "delivers full winch power and ensures the fastest speed possible."

The Igo 50's transport weight is about 52,000 pounds, and its overall transport dimensions are approximately 46 feet in length and 11.8 feet in height. The crane can be towed to the site as either a trailer or a semi-trailer, or it can be transported on a drop-deck trailer.

If the Igo 50 is towed, a transport axle (or two, if weight regulations require) is pinned to a mounting structure on the lower portion of the mast. Then, either a dolly axle or a fifth-wheel attachment is pinned to a mounting structure at the base of the counterweight tray. If the Igo 50 is transported, then an assist crane is required for unloading, unless it is transported with its transport axle in place and conditions allow it to be rolled off the trailer. The approximate 51,000 pounds of concrete counterweight arrive on an assist truck — or two, depending on truck size.

The Igo 50's trolley-control line and hoist line are contained within the mast. Note the two-piece construction of the hook block that facilitates switching between two and four parts of line.

The unfolding story

Once on site, the crane's swing-away outriggers can be deployed on suitable mats and the erecting process can begin. As Minyard explained and demonstrated the assembly process, we were impressed by its seeming simplicity and speed. Inside the crane's right cabinet is a control panel with three rotary switches that program the assembly sequence, and then set working parameters — for example, jib offset, number of jib sections used and parts of line used. Before assembly begins, however, the jib's working attitude — whether horizontal or offset at 8 or 20 degrees — must be selected by adjusting the pendant.

Minyard first turned the left rotary switch to the assembly position, which allows deployment of the mast and first jib section. He initiated this process by clicking the toggle switch on the crane's wireless remote to the right, and then moving the right joystick to its assemble position. This action activates the crane's hydraulic system, and a large hydraulic cylinder, anchored to the mast's bottom section, works through a system of linkage, wire rope and the jib mast to bring these components into position. (The hydraulic pump that powers the assembly process is, in turn, powered by one of the Igo 50's four electric motors, all of which are accessible from ground level.)

As this sequence of the assembly takes place, the crane's base counterweight (made of steel) is sufficient to stabilize the unit, but additional counterweight now must be added before deploying the second and third jib sections. Although Local 150's Igo already was equipped with its full counterweight when we arrived, Minyard demonstrated how the crane's optional derrick, which stows along the mast's upper section, can be used to take on 12 concrete counterweight slabs, each weighing 4,250 pounds.

He first lowered the hoist line and clipped it to another line near the mast base. This line passes through a sheave (which has a brake) near the base of the mast, then is directed upwards, through a second sheave mounted near the base of the upper mast section, and finally across a sheave in the tip of the derrick. Releasing the brake on the lower sheave allows the



The electric motors for the Igo 50's hoist, trolley, swing and hydraulic pump are accessible from ground level — as are the winches for hoist and trolley. The drum for the trolley line, shown here, is positioned in the base of the mast.





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Hands-On-Lifting

derrick to lower to its working position, and clicking the rotary switch to its derrick position allows a small hydraulic cylinder to be used for swinging the derrick through an arc of 90 degrees. With this arrangement, the main-hoist line now controls the derrick's hoist line, which can be hooked to the counterweights that arrive on a separate truck.

Actually, the Igo 50 is ready to work in this configuration, with only the first jib section in place. Typically, however, the remaining

says Minyard, is probably used only when the operator allows the remote to run low on battery power.

The crane's line speeds range from around 6 feet per minute with four parts of line, to 216 feet per minute with two parts of line. Minyard demonstrated the procedure for switching between two and four parts of line. The switch is relatively simple, because the hook block is made in two sections. He lowered the block (running with four parts of line) to the ground,



The remote controller (left) provides a visual display of the crane's operating parameters. The switch panel in the machine's right-side cabinet (right) is used to select set-up modes and to set operating conditions.

two sections are deployed for added reach. Hydraulic cylinders (one between the first and second jib sections, another between the second and third sections) deploy the remainder of the jib. Before lifting, though, the operator must use the switches in the cabinet to set the jib sections in use (one, two or three), the jib offset (0, 8 or 20 degrees), and the parts of line used (two or four). A screen below the switches asks the operator to confirm the choices.

The Igo at work


The Igo 50 in action is a quiet machine — just sort of a low purr from its motors. Even with the portable generator running within a few feet of the crane, we could carry on conversation in a normal voice.

Minyard told us that he prefers to use the crane's wireless remote when operating, because it gives him the latitude of staying close to the load when placement is critical. The machine does have a tethered controller which,

unpinned the two halves, and then, by using the hoist control, raised the lighter of the two halves (the one without the hook) to dead-end at the trolley.

According to Minyard, the hook and trolley automatically slow when reaching limits of travel, and the crane is equipped with an anti-two-block device. Also, according to Potain, the Igo 50 has a new slewing system that allows "reinforced braking by an opposite movement of the controls (counter-slewing)." A load-moment system allows only hoist-down and trolley-in functions if the system senses an unsafe condition approaching. Also available as operating assists are a wind-sensing system and system that automatically restricts trolley and jib travel into a designated area.

If you're wondering how quickly the crane can be ready to work, we've heard various estimates, but we offer Minyard's opinion:

"If the mats are waiting, I've seen the crane go together in as little as 45 minutes." 



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Industry Moves to Stem the *Theft Tide*

Insurance companies and machine-tracking vendors offer contractors incentives to stop thieves

For years the National Insurance Crime Bureau (a non-profit group dedicated to combating insurance fraud and vehicle theft — www.nicb.org) estimated that \$1 billion worth of construction equipment and tools are stolen each year. But it seemed nobody felt the pinch acutely enough to take decisive action against equipment thieves.

Equipment owners had grown accustomed to the cost of theft. Indeed, *Construction Equipment* readers were so inured that they valued theft losses not much greater than the deductible costs on insurance claims, according to research conducted by the magazine.

It's really no surprise that equipment theft is a problem.

Construction equipment is valuable. Skid-steer loaders — the most mobile construction machines and probably the most commonly stolen — can sell for more than \$50,000.

There's low risk of being caught. The recovery rate for stolen cars is better than 60 percent, but less than 10 percent of stolen construction equipment is recovered.

Equipment is easy to steal. There is very poor security on work sites and machines. Sites are often large spaces in remote areas, or private property (few witnesses). Machine ignition switches don't require unique keys to start.

Equipment is easy to sell. Ownership records of precious few used machines are

checked before sales. With the risk of being caught so low, many people who would normally not be prospects for buying hot iron are enticed, eager to gain bidding advantages.

■ Fifth Time Stolen Yields Arrest

Monday morning a construction crew arrived at a work site on I-10 in West Chambers County, Texas, to find that numerous construction tools, generators, and equipment had been stolen, including a 2001 Miller Bobcat welder. The foreman, knowing the welder is LoJack equipped, immediately called the Chambers County Sheriff Department and filed a theft report. The Deputy completed the theft report and entered the welder's product identification number (PIN) in the state and national crime computer. This activated the LoJack device hidden on the welder and it began to transmit a radio signal. Fifteen minutes later, a Texas State Trooper picked up the signal on his LoJack police tracking computer.

After obtaining a complete description of the welder and calling for backup, the signal led officers to a private residence where it appeared to come from



the garage. Officers approached the owner of the residence and questioned him. The suspect stated: "Come on in, I'm sure what I purchased this weekend is stolen." The suspect then opened the garage and showed officers the welder and several other items he had purchased. Officers called the district attorney's office and were advised to file any and all charges related to the theft. Recovered property was identified as that stolen in the burglary of the I-10 site. It is the fifth time this welder has been stolen and recovered with LoJack. (www.lojack.com)

Security-device vendors started to show interest in construction equipment markets during the boom of the late 1990s. Presented with working solutions to the easy theft of construction equipment, insurers supported some of them in an effort to reduce payouts from theft losses.

For example, when stolen-vehicle-recovery firm, LoJack, made its first forays into the construction-equipment industry early in the decade, St. Paul Travelers insurance bought 5,000 LoJack devices. They seeded the fleets of high-risk policy holders with the tracking devices. (LoJack's radio network is currently operating in 26 states and the District of Columbia, as well as in 27 countries throughout Europe, Africa, Latin America and Asia.)

"They're not doing that any more, but they're seeing their original investment returned four to five times because those 5,000 LoJack units keep recovering pieces they're mounted on," says Kathy Kelleher, national manager of LoJack's Commercial division. "And those St. Paul customers are continuing to buy LoJack, adding them to more of their fleets."

Still, the insurance industry seemed to lack the collective will to mount widespread efforts to resist thieves. It seems the pain of paying for equipment theft was diffused too broadly, and

Special Report: Equipment Theft

its severity was too poorly measured for anyone to take on such an intractable problem.

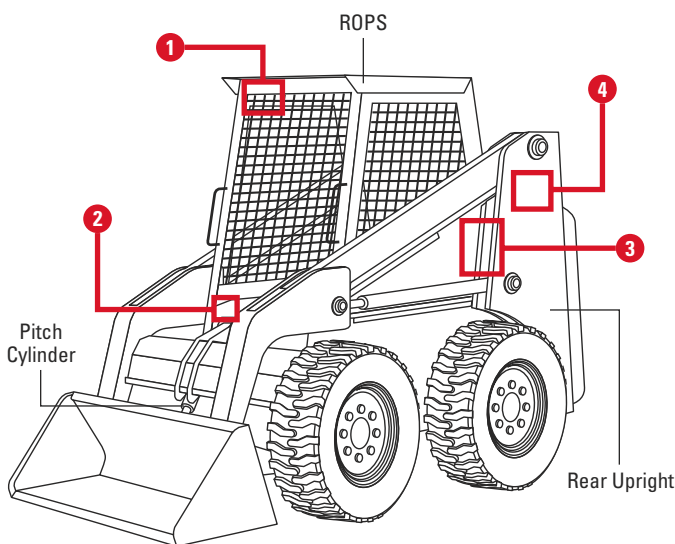
A comparison with car theft illustrates the severity of the challenge in fighting construction-equipment theft. Because current-model cars are so universally insured and/or owned and driven by individuals, most car thefts are reported to the police immediately. Self-insured contractors may not report some machine thefts, particularly those that are not discovered until after the thieves' trails have grown cold. Chances of recovering the machine are too slim to invest man hours filing a report and assisting the investigation.

Auto registration is regulated, and all auto makers supply a standard 17-character vehicle identification number (VIN). The VIN is placed on all cars in a standard location on the dashboard where police officers can easily find it. Ownership of construction equipment is not regulated. Manufacturers can assign machines any product identification number (PIN) they want and place it anywhere on the machine that they want.

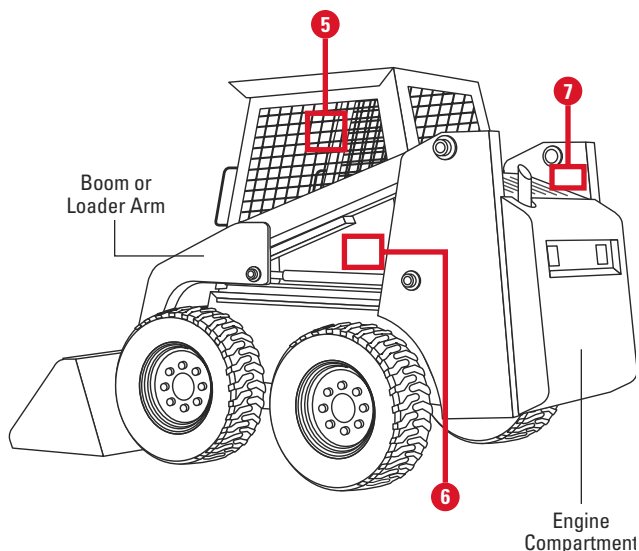
The primary advantage of the auto industry's consistent VIN format is that computerized reporting systems for law enforcement and insurance companies can be built to instantly notify the person reporting a theft that they've entered an improper number. Equipment manufacturers agreed to a standard prescribing a 17-character PIN, but compliance is voluntary and not very consistent. As a result, the construction industry lacks accurate reporting of its theft problem.

As construction accelerated into the new millennium, the insurance industry's imperfect statistics took such a turn that insurers started to squirm. Construction theft reports to insurance companies have increased 10 to 20 percent each year since 1996, according to the Insurance Service Office (ISO). And this leading source of all kinds of information about risk (www.iso.com) says theft is the most frequent type of construction-equipment loss by a huge margin over risks such as vandalism, fire and collision. It is the most expensive loss by a smaller margin.

A Skid-Steer's Seven PIN Spots



Source: NER



Precious few police officers are construction-equipment specialists, and multiple locations on machines for product identification number (PIN) plates makes investigating machines in suspicious situations particularly challenging. PINs can be found in at least seven different positions on skid-steers, for example. Inviting police officers to your equipment yard or project site to learn about PIN plates can pay off handsomely if your machines are ever stolen.

Source: NER

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- Operations Managers in the construction, mining and quarrying industries who seek a better understand of techniques to reduce equipment ownership and operating costs and improve productivity.
- Fleet Owners who are seeking to maximize their return on assets as well as improve the productivity of their fleet.

Learn to:

- Improve the value of the equipment management function to the company as a whole
- Improve team building between operations, equipment dealers, and manufacturers
- Evaluate some of the leading equipment and fleet management software systems
- Develop and use information systems to support critical repair, rebuild and replace decisions
- Evaluate financial alternatives and complete financial impact and equipment-operating costs
- Use historical data to calculate operating cost
- Balance cost and reliability throughout an optimum economic life
- Establish benchmarks for managing maintenance operations
- Implement Total Process Reliability
- Set internal rental rates for individual machines and fleets

Program Topics

Managing the fleet within the organization.

The fact that the fleet must be managed within the organization as a whole will be stressed and a number of issues associated with organization design, responsibility and authority will be discussed. Fleet management functions will be discussed in detail.

OWNING COSTS - The factors that impact owning costs will be reviewed. The need to determine and include residual market value and return on invested capital will be stressed as will the impact of utilization on the hourly cost of ownership.

OPERATING COSTS - This session will show how hourly operating costs can be estimated by using field data and a knowledge of component replacement cost to determine the relationship between repair cost and machine age.

ECONOMIC LIFE - Previously developed knowledge of owning and operating cost will be combined to develop a methodology for determining economic life and answering the interdependent questions "How much does it cost?" and, "How long do I keep it?"

MAINTAIN, REPAIR, REBUILD REPLACE - Maintain, repair, rebuild, replace will be defined and presented as a spectrum of decisions made in the normal course of fleet management. The importance of preventive maintenance as the first line of defense will be stressed and it will be shown how the cumulative cost model can be used to evaluate repair rebuild decisions.

MAINTENANCE BENCHMARKS (NEW) - This session will focus on comparing maintenance performance and costs metrics against Industry Averages, Best in Class and World Class. Participants will also have an opportunity to evaluate their own practices as an exercise.

EQUIPMENT ACCOUNTING AND FINANCE -

The session will emphasize the accounting, finance and cash flow aspects of equipment ownership and develop the language needed to improve understanding between equipment operations, finance and accounting.

WORLD CLASS MAINTENANCE PRACTICES (NEW) -

During this session, participants will learn the key elements to successful maintenance practices. We will share the results of five extensive studies and several case studies that illustrate the essentials to improve fleet and equipment asset management.

DATA, INFORMATION AND PERFORMANCE MEASURES -

This session will draw a distinction between data and information and propose quantitative measures that can be used for equipment and fleet management

IT SUPER USER ROUND TABLE (NEW) -

This session will have actual "super users" sharing how to maximize the use of the equipment management module of an enterprise system. Participants will learn the various features and capabilities of an information system, how bolt-on programs can enhance functionality, essential reports, required structure for equipment management, cost tracking, and key characteristics of a good computerized maintenance management program.

TOTAL PROCESS RELIABILITY STRUCTURE (NEW) -

This session focuses on the use of TPR to create operator ownership, organizational buy-in to maintenance improvement and the infrastructure necessary to support the process.

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Mike Vorster is the David H. Burrows Professor of Construction Engineering at Virginia Tech, where he has taught since 1986.



Preston Ingalls is the President and CEO of TBR-Strategies, and is an experienced maintenance and reliability consultant.



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Special Report: Equipment Theft

■ **Stolen Backhoe Stopped at Border**

An inspector with United States Customs & Border Protection in Laredo, Texas, was suspicious of the export documentation being submitted for a Case 580 Super L being taken into Mexico. The machine's product-identification number yielded no matches on police computers so the inspector contacted NER for additional information before letting the backhoe cross the border.

NER searched internal databases and found an ownership record for the backhoe. The owner was contacted and confirmed that the backhoe was his, but he said there was no reason it would be headed into Mexico. The owner then checked his yard and confirmed that the backhoe was missing. The unit was seized and returned to the owner. (www.nerusa.com)

David Shillingford and a cadre of experts in law enforcement recognized that lack of proper information is one of the key reasons for proliferating equipment theft. They founded the National Equipment Register (NER), a business dedicated to improving theft data and using it to catch heavy-equipment thieves. Insurers recognized the need for somebody to focus on the issue, and more than 350 of them

now support NER's national databases of equipment ownership records and theft reports. NER specialists coordinate the efforts of equipment owners, insurers and law officers.

NER sells equipment owners what they call the HELPtech service (Heavy Equipment Loss Prevention Technology), which provides secure online equipment registration using correct PINs and complete identification. As a deterrent, NER provides HELPtech decals to post on registered machines that warn

thieves of the increased likelihood of their being stopped and arrested.

Insurance-company members fill another NER database with their records of equipment thefts based on policyholders' reports. Law-enforcement officers can search both NER databases 24 hours a day to find out if equipment discovered in suspicious circumstances has been reported stolen.

More than 175 fleets have registered their fleet inventories with NER, including six of the 10 largest rental firms in the United States. They've supplied more than 13,420,000 ownership records. Member insurers have supplied 77,500 theft reports.

Law officers can contact NER to get help when they encounter a suspicious piece of equipment. If they can find the PIN, NER will help them run it against their databases to see if it has been reported stolen. If they can't identify the machine, NER specialists can guide them to PIN plates and other locations where product numbers might be stamped on the machine.

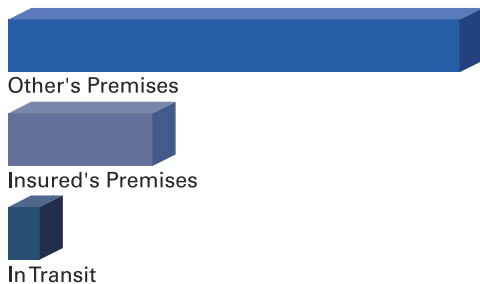
More than 4,000 officers are registered to use NER databases. They've called on NER assistance with more than 5,000 investigations. NER has been involved in 464 equipment recoveries with a total value of \$7,462,507.

The number of investigations NER touches has been increasing by 50 percent per year, and Shillingford expects that growth rate to continue.

The insurance industry is also paying NER to educate law officers about equipment identification and recovery. Last year NER distributed 95,855 equipment-identification guides. The pocket guides describe various PIN formats and point out where PIN plates can be located on the most-stolen pieces of equipment. NER held 27 classes that trained 1,400 officers on identifying equipment and investigating theft.

"As a result, there are now more officers looking at equipment who either didn't have the time before (we've made it easier to do it in real time), or who aren't specialists but who will now look at suspicious equipment because they can get all the information they need to identify it over the phone from us," says Shillingford.

Theft by Location: 2004



Source: Insurance Services Office, Inland Marine Circular, Contractors Equipment

The percentage of contractors' equipment stolen from others' premises grew 10 points from 2000 to 2004. But work sites are so transitory that it may not be feasible to adequately secure them.



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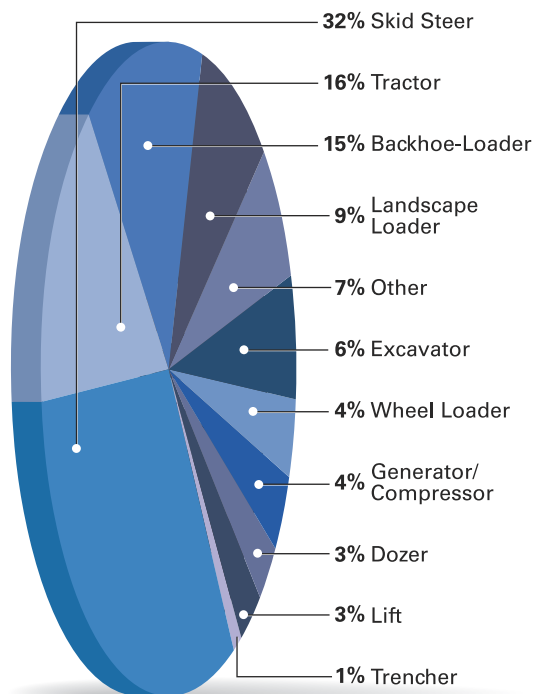
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Special Report: Equipment Theft

Theft by Type of Equipment



Source: NER 2005 Heavy Equipment Theft Report

The two keys to determining the type of equipment most likely to be stolen are value and mobility. The higher the value of an item and the easier it is to transport, the greater the chance of theft. Dozers and wheel loaders are the most valuable equipment among the 10 most-stolen machines, but skid-steers and backhoe-loaders are easier to transport.

As NER accumulated equipment-theft records from most of the underwriters of inland marine insurance (the type of policy that covers construction equipment), insurers gained a more complete picture of the size of the industry's losses. At the same time, the marketing efforts of telematics providers such as Qualcomm, DPL America, and Longview have been gaining traction among off-road customers.

This coincidence has produced a steady stream of new incentive programs offered by insurance companies over the past year.

Terms can be fairly simple. ARA Insurance Services (the American Rental Association's insurance arm) will pay NER's fees for policy holders to register up to 1,000 pieces of equipment (a \$3,500 value).

Policy holders with the Chubb Group and Fireman's Fund can register 10 pieces of equipment with NER at no cost, and will receive a 20 percent reduction of NER's standard fees on additional machines. Fireman's Fund policy holders get an insurance rate credit of 2 percent. Also, Chubb and Fireman's will waive deductibles up to \$10,000 if registered equipment is stolen and not recovered within 30 days of being reported.

The Hanover is fighting thieves on two fronts. The underwriter will waive \$10,000 of its deductible for NER-registered machines that are stolen if they're not recovered within 60 days. They're also cutting \$100 off insurance costs for each of a policy holder's first 15 vehicles fitted with a LoJack stolen vehicle recovery system, and offering discounted rates for protected machines. The insurer will waive up to \$25,000 in deductibles for LoJack-equipped

machines that are stolen but not recovered.

St. Paul Travelers transitioned from its LoJack giveaway to offering insurance-premium discounts to LoJack customers. They also waive \$10,000 to \$25,000 in deductibles for any LoJack-equipped machine that is stolen and not recovered.

■ GPS Busts New Mexico Theft Ring

Under the protection of night, three thieves crept into a quiet jobsite off US Highway 550. When their target — a John Deere 310SG — didn't start, they suspected a master disconnect switch was the obstacle. They left the jobsite for cables to wire around the disconnect switch, returned and wired across the battery, got the backhoe running and began driving it down the street, with their white GMC truck close behind. Less than a mile from the site, several police cruisers performed a felony stop on the backhoe and truck, catching the thieves red handed. When owner Bill Joiner arrived, the three thieves were handcuffed and lying on the ground.

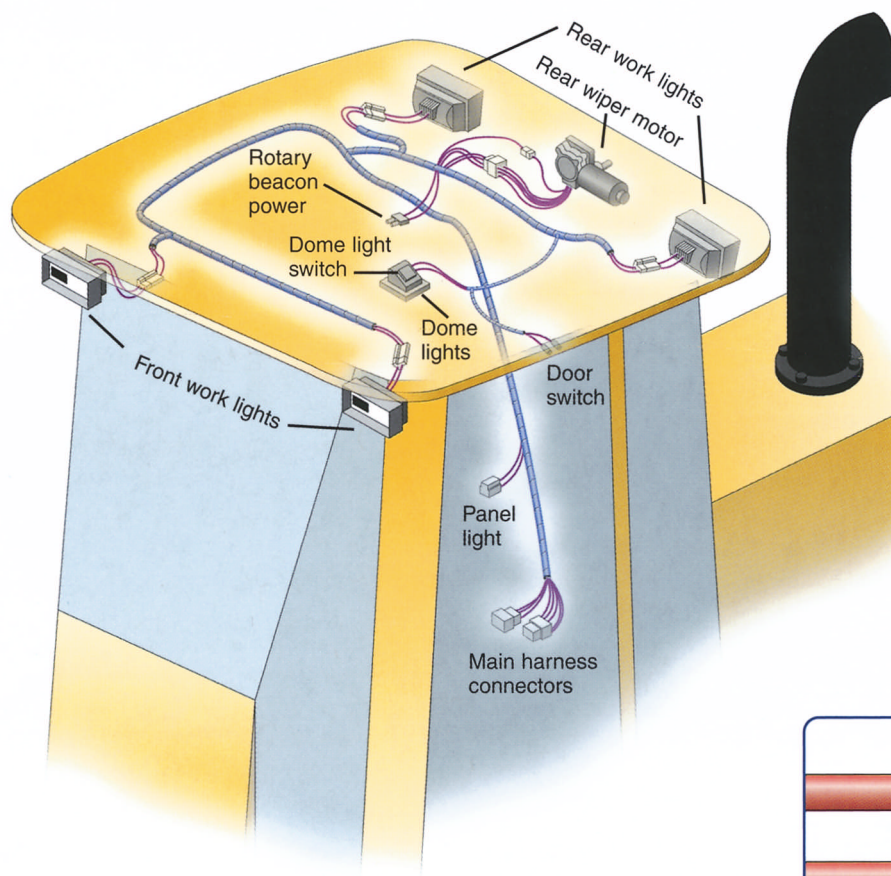
Joiner has DPL America's Titan system installed on the backhoe-loader. Titan's disabling feature stalled a routine 20-minute theft into an hour and a half effort. During that extended process, a number of silent alarms alerted Joiner employees and the police. Titan's GPS located the machine on a street-level map, making it easy for authorities to intercept the criminals.

Police found a cluster of universal keys for nearly every make of machine as well as burglary tools in the GMC truck. The truck itself was stolen. A scan of the backhoe revealed that the thieves had already painted over all Joiner Construction identifying marks and decals. Fortunately, the leader of this organized crime ring was one of the suspects apprehended. (www.dplamerica.com)

How to Keep a Wiring Harness Working

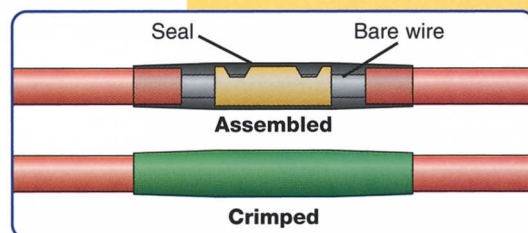
Seal Reliability In

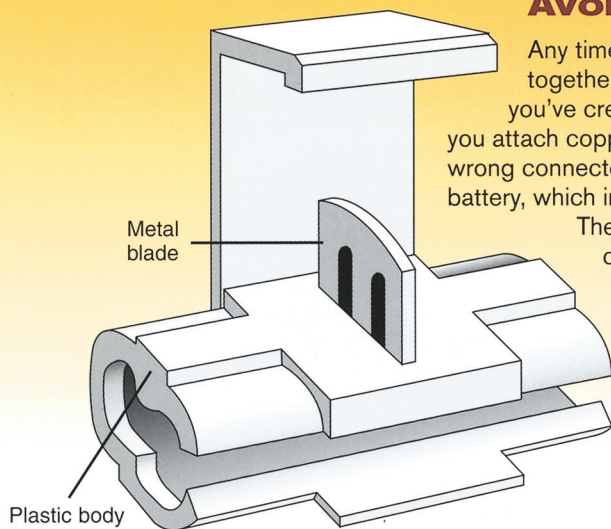
Most electrical-system problems originate in the wiring because wires are under the most stress. Pressure washers overpower sealed connectors, test lights poke holes in wire covers and water gets under the insulation. The resulting corrosion boosts resistance in circuits and current flow drops. Sensitive electronic systems don't operate as they should. Heat begins to build up and can burn wires or connectors.



Safe Splicing

Most broken wires should be repaired with a 2-foot section of replacement wire and two butt splices. Replacing a length of wire keeps vulnerable splices away from the stress point in the harness. The butt splice should be of high quality and be compatible with the metal in the circuit, or the dissimilar metals create a corrosive chemical reaction like that in a battery. Use a crimper designed by the splice manufacturer to get a proper connection. If the splice isn't sealed, shrink wrap should be used to keep out moisture.





Avoid Quick Fixes

Any time you put dissimilar metals together with a little moisture, you've created a battery. It happens if you attach copper wire to steel or use the wrong connector. It will corrode like a battery, which increases resistance.

The blades in crimp-on quick connectors like this one are often not made of the same metal as the wire, and because they can cut strands, this shortcut slows current flow two ways.

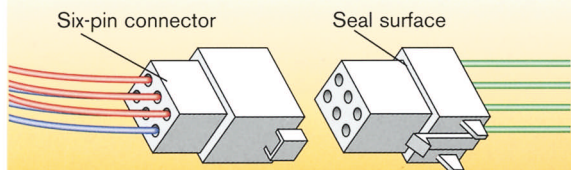
QUICK TIP

Careful With Cleaners

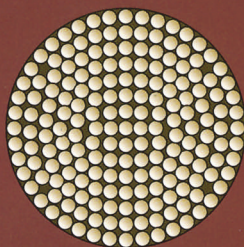
Some parts cleaners, and even some products sold as electrical-connector cleaners, will destroy the plastics OEMs used to make electrical connectors. If you're having trouble with connectors coming apart, softening, or dissolving, after being exposed to chemical cleaners, buy a few extra connectors and test all the cleaners your technicians use.

Keep Connectors Clean

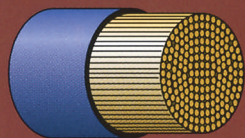
Always replace cut or missing rubber seals in connectors. Use dielectric grease only with great care. If the connection gets dropped in the dirt, debris tends to stick to grease, and the connector could be damaged when it is closed again. Make sure any cleaners used in the connector are compatible with the materials. Some parts cleaners dissolve plastic.



Original Resistance



Original diameter



Original length

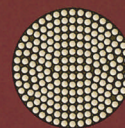
Match the Wire

When splicing a broken or damaged wire, always match the type and size of wire being replaced. Splices should be the same size as the wire, too. Smaller-diameter wire or a longer stretch of the same size wire will resist the flow of current more than the wire it replaces, and that heats the wire.

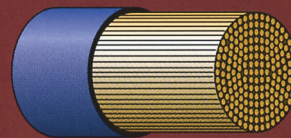
Stranded wire is more flexible and resilient than solid, so splicing a break with a solid wire almost guarantees recurrence of the wire failure.

New wire should be labeled like the wire it replaces so it can be identified in future troubleshooting. Strip a section of insulation from the old wire that shows the manufacturer's identification number and wrap it around the spliced replacement wire. Then use a tie to secure it.

Four-Times the Resistance



1/2 Diameter



Double length

The Leavitt Group of independent insurance agents offers customers premium reductions of 20 to 50 percent if they use DPL America's Titan system to immobilize equipment and track equipment location.

Qualcomm initiated a unique incentive offer that does not include insurance companies in a move to raise its profile among theft-sensitive customers. The telematics provider will pay NER's fees to register equipment on which it installs GlobalTRACS systems. Qualcomm will actually submit registration information to NER for its customers. (See the accompanying sidebar for more theft-preventing incentives.)

Shillingford predicts a continued flow of insurance companies offering incentives to improve the chances of recovering stolen equipment. He expects three insurers will announce incentives to use NER before year's end. LoJack's Kelleher says her company is working with four insurers to arrange new incentives to use its products.

"There is a driving force affecting real change in how the industry deals with equipment theft," says Shillingford. "And that driving force is the insurance industry."

NER and the wireless-tracking systems apply after the fact — they're aimed at recovering machines after they have been stolen. It's important for raising a thief's risk, but doesn't address construction equipment's virtually nonexistent physical security.

"Equipment manufacturers are going to make the equipment that is going to sell at the best profit margin," Shillingford says. "If security becomes a concern for buyers, they will make equipment that will be harder to steal."

"Critical mass is attained when the first manufacturer says, 'if I can make my machines less likely to be stolen than other machines like it, equipment buyers will prefer my machines,'" he adds. "Then they can put the theft deterrent on the machine at the factory, at little or no cost to the customer."

"We'll probably see this kind of change from a manufacturer sometime toward the end of 2007," Shillingford predicts.

As always, the challenge is to add what some customers want — security, in this case —

without cutting into productivity. Equipment has used universal keys for a long time. For example, one Caterpillar key starts most Cat equipment. Many operators carry sets of universal keys so they can run anything. When a foreman needs work done, there's no time wasted looking for a machine's specific key. The key can protect the machine from use by casual passers by, but a deliberate thief can buy a ring of universal keys on eBay for about \$70 that will start most off-road machines.

Caterpillar's Machine Security System (MSS) disables the starter when somebody attempts to start it using a universal key. Keys embedded with an electronic chip, each with a unique digital identification, fit all existing Cat machines and will start them. But on MSS-equipped machines, the electronic controller checks the key being inserted against its pre-

Companies Paying to Prevent Theft

Insurance companies are beginning to offer incentives in the form of waived deductibles and premium discounts to policy holders if they will take steps to improve law enforcement's chances of recovering stolen equipment. Here are some that can save you money on insurance and theft prevention.

American Resources – www.aric.cc

- 20 percent discount of NER fees
- Waiving \$5,000 of its deductible

AIS – www.ararental.org

- Paying NER fees to register policy holders' equipment
- Registers machines for customers

Chubb Group – www.chubb.com

- Policy holders register 10 machines with NER at no cost, additional units at a 20 percent discount
- Waiving \$10,000 of its deductible

Fireman's Fund – www.the-fund.com

- 20 percent discount of NER fees
- Offering 2 percent rate credit
- Waiving \$10,000 of its deductible

The Hanover – www.hanover.com

- Waiving \$10,000 of its deductible

Leavitt Group – www.leavitt.com

- Policy holders that use DPL America's Titan telematic system get premium reductions of 20 to 50 percent

Rue Insurance – www.rueinsurance.com

- Paying NER fees to register policy holders' equipment
- Registers machines for customers

United States Liability Insurance Group – www.usli.com

- Paying NER fees to register policy holders' equipment
- Registers machines for customers

Qualcomm – www.qualcomm.com

- Paying NER fees to register GlobalTRACS customers' equipment
- Registers machines for customers

Each of the insurers below is discounting premiums for policy holders using LoJack systems (www.lojack.com) on construction equipment, and waiving deductibles if a LoJack-equipped machine is stolen and not recovered:

The Hanover – www.hanover.com

Progressive – www.progressive.com

St. Paul Travelers – www.stpaul.com

Special Report: Equipment Theft

Buying Used: Is It Hot?

Less than 10 percent of stolen equipment is recovered — encouraging thieves with a 90 percent chance of success. Low recovery is due in part to a lack of ownership checks during used-equipment purchases. Here are some places you can go, in addition to local equipment dealers, with a machine's product identification number (PIN) to find out if it has been reported stolen.

National Equipment Register (NER)
(866) NER-TIPS

CatUsed.com
<http://catused.cat.com/en/Equipment/Missing.aspx?ViewAll=all>

Bobcat
(701) 678-6165

Ontario Sewer and Water-main Construction Assoc.
<http://www.stolen-heavyequipment.com/>

approved list of authorized keys. If the key is on the list, the machine will start. MSS is available as a factory-installed option or retrofit for most small and medium Cat equipment with 12- or 24-volt electrical systems.

Bobcat offers a system that requires operators to enter a password using the keypad on the machine monitor. Similar systems from other excavator manufacturers lock out the ignition circuit until the operator is able to punch a registered password into the monitor's keypad. The Bobcat option allows managers to store up to 10 passwords, any of which will allow the user to start the machine.

■ GPS Sees Where People Can't

Two days after a Chicago-area contractor took delivery of a \$42,000 skid-steer loader, it was stolen from his jobsite. The skid-steer carried a Qualcomm GlobalTRACS unit that tracked it using global positioning system (GPS) satellites to a local forest preserve. The police officer on the case walked through the heavily wooded park but couldn't find the loader. He went into a nearby sporting goods store and bought a GPS receiver like the one hikers use. The officer called Qualcomm to get the GlobalTRACS unit's exact latitude and longitude, then walked to those coordinates. There he discovered that the thieves had used the skid-steer loader to dig a large hole, drove the machine into it and camouflaged it with tree branches. (www.qualcomm.com)

Only Komatsu and Pettibone have stepped up to install security devices as standard equipment. Both rely on telematics. Most OEMs feel the need to offer a telematic solution for tracking mobile assets using GPS and wireless communication, not only for its ability to help recover stolen equipment, but also for its fleet management benefits. Caterpillar has its Product Link, and Deere recently signed a deal with Qualcomm to brand a derivative of GlobalTRACS as JD Link. Bobcat is greasing the skids for putting Qualcomm boxes in its equipment

by offering factory wiring and installation.


Komatsu announced early this year that it would equip all new construction machines that get Tier 3 engines with its proprietary Komtrax system. The units will come with five years of free communication services. Pettibone has designated Qualcomm's GlobalTRACS as standard equipment on its telehandlers.

As various efforts to resist construction-equipment theft coalesce, more equipment owners will inevitably be called upon to contribute. An underestimated, free theft deterrent is checking the ownership of used machines before buying. It is seldom done today, largely because there is no universal database where a PIN number can be checked against theft records. Many manufacturers post lists of stolen machines on their secure dealer intranets, though. NER databases are more broad-based, but they're not currently available to the public.

"It's our intent to keep this information out of the hands of thieves," says Shillingford. "We don't want to make it any easier on them to get top dollar for stolen equipment.

"But NER is testing a service that will allow an equipment owner to check ownership of a machine through one of our analysts."

You can threaten thieves' remaining defenses by making equipment harder to steal. Controlling access to machines with systems such as Cat's MSS, or aftermarket products from companies such as Keytroller (www.keytroller.com) keep universal keys from holding the door open for thieves. Unique locks from companies such as The Equipment Lock Co. (www.equipmentlock.com) can disable machines and prevent them even from being winched onto a trailer.

Most contractors in the highest-risk areas are already working to secure their equipment on work sites, but the strategies need to be repeated in more locations. Simply bringing machines together in a highly visible location at the end of each day, and parking larger pieces in a circle, blocking in generators, compressors, skid-steers and other high-theft items can be effective. All elements of the construction industry working together — insurers, OEMs and equipment owners — can make equipment theft a less-attractive career choice. 

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Peterbilt 365's Newness Is Mostly Under Its Hood

One of the builder's renamed models looks and drives like a 357, but without the diesel exhaust odor

Diesels are a big deal, and getting bigger. A diesel has always been a truck's single most complex and expensive component, and that's even truer of cleaner-burning engines due out in January. Developing the diesels and preparing trucks for them has been time-consuming and costly for manufacturers, so much so that Peterbilt Motors renamed most

of its vocational and highway models to mark the changeover.

One is this Model 365, which is replacing the 357 that's long been a popular dump and mixer chassis in many markets. The 365, complete with a Kimbel mixer body, was available for a drive in Denton, Texas, home of Peterbilt's headquarters and one of its two plants,

A wide, sloping hood houses a 1,438-square-inch radiator to help cool a hotter-running Cummins ISM. "Viper red" paint marks this as one of Peterbilt's 2006 show trucks, though some fleets use that color, too.



Hands-On Trucking

TEST SET

Truck: 2007 Peterbilt 365, conventional-cab, BBC 115 in., w/high-efficiency cooling system, legal bridge-formula GVW 75,500 lb. on six axles

Engine: EPA '07 Cummins 11-liter ISM, 350 hp @ 1,400 to 2,100 rpm, 1,450 lbs.-ft. @ 1,200 rpm

Clutch: Eaton Fuller 15.5-in., Solo 7-spring w/ceramic facings

Transmission: Eaton Fuller RTO-14909ALL 11-speed

Front axle: 20,000-lb. Dana Spicer EFA20F4 w/TRW TAS65 dual power steering, on 20,000-lb. taperleaves

Rear tandem: 46,000-lb. Dana Spicer D46-170HP w/differential locks, on 46,000-lb. Hendrickson Haulmaxx rubber suspension

Wheelbase: 258 inches

Pusher axles: Two 8,000-lb. Watson-Chalin SLO851TT self-steering air-sprung

Brakes: Bendix Spicer S-cam w/Haldex Dana automatic slack adjusters

Tires: Bridgestone 425/65R22.5 M844 front, 11R22.5 M843 rear; 217/75R17.5 R184 pushers

Wheels: Alcoa polished aluminum disc

Fuel tank: 60-gallon polished aluminum

Body: Kimbel 2000 w/booster axle

EPA 2007-spec Cummins ISM uses increased amounts of exhaust-gas recirculation. It'll throw off more heat, but the enhanced cooling system should handle it.

and I journeyed there on a hot day in August to check it out.

What I found was that the 365 looks and drives like a 357 because, except for the 2007 engine and changes related to it, it's pretty much the same truck. It's got the same 370-series aluminum cab, steeply sloped hood, flat fenders and headlight pods mounted to the hood. The 365 can be ordered with either a forward-set or setback steer axle to maximize loading in bridge-formula or axle-weight states.

The 365 has a medium-length nose to house 9- to 13-liter engines from Cummins and Caterpillar. This particular truck had an 11-liter Cummins ISM, which many ready mix companies choose for its combination of low weight and good performance. A companion truck in Peterbilt's new vocational lineup is the 367, with a long nose to take 15-liter engines.

Also under the 365's hood was a larger cooling system that includes a 1,438-square-inch core, about 30 percent bigger than before, which will handle the extra heat that the engine will shrug off under some circum-

stances. In the 365's exhaust stack was an after-treatment device consisting of an oxygen catalyst and diesel particulate filter. It looks like a big muffler with wires running to it.

It does act as a muffler, but its primary job is to scrub out any oxides of nitrogen (NOx) and soot that the new engine can't deal with.

Periodically the device's sensors will tell the engine's electronic controls that the filter is loaded with ash (from motor oil, not combustion) and they will trigger a regeneration. A small amount of fuel will burn off the ash, causing a high heat (up to 1,200 degrees F), that will largely be contained in the double-walled device. It's mounted high and shielded, so shouldn't burn anybody.

Did I mention heat? The temperature readout on the instrument panel said "104 F" as I was leaving the plant premises. I cranked up the air conditioning and left it on when I ventured out to shoot pictures. This violated my own anti-idling rule, and I'm sorry, but I wanted the cab cool for when I jumped back in.

While scurrying about with the camera I realized that I wasn't smelling any exhaust odor. I mean, there was absolutely no diesel aroma, or stink, depending on your point of view, or smell. The new '07 emissions controls had so seriously pinched down NOx — the source of the characteristic smell of diesel exhaust — that the smell is gone. There was absolutely no smoke coming out the stack, either. That should please a lot of people, including drivers and crews at pour sites.

The 365's big, wide hood took a good yank to tilt forward, and it locks in place so wind can't blow it back down until a sliding lever is released. On most trucks the lock is on the curb side, where I unsuccessfully sought it until Derek Smith, Peterbilt's public relations manager, pointed out that the lock's on the left side of this truck.

The 350-hp Cummins sounded nice and behaved well. It didn't have a lot of guts, but it was brand new and far from broken in: The odometer showed only 29 miles when I left the



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The Group

Hands-On Trucking



In the exhaust stack are an oxygen catalyst and particulate filter that are combined in a can that looks like a big muffler, and doubles as one.



Model 357 drivers will feel at home in the 365's cab, as it's the same stout aluminum structure with similar interior amenities. This one has the base ProBilt interior with Vinyl seat covers.



Outward view is good overall, and excellent through the big rear window and to the sides, which include curved-glass corner windows.

Denton plant. The mixer drum was empty so I skip-shifted through the 11-speed Fuller "LL" and never used its low-low ratios. The tranny shifted smoothly if I remembered to move the stick quickly, which you must do with most modern engines.

The drum was empty because this is one of Peterbilt's 2006 show trucks, Smith explained. No one wanted to risk scratching the funnel with crushed rock or some other ballast material, as they had last year with a 357 mixer that I drove.

From the plant, I headed to Interstate 35 and swung north, going as far as Sanger, a dusty small town with no vacation villas but enough streets with bruised concrete and asphalt to give a good workout to mechanical suspensions over the axles and air bags under the cab and beneath the seat. The ride was pretty good, considering the axle suspensions' high ratings (20,000 and 46,000 pounds) and that empty drum.

Big "duplex" tires on the steer axle limited wheel cut and made for a wide turning circle, but it wasn't bad if I cranked the wheel early in a turn, especially while backing up. TRW dual power assist removes the work in hard turns, but also introduces some vagueness at highway speeds — normal for an extra heavy-duty front axle.

Peterbilt's stout cab sits high off the pavement on the 365 chassis, as it does on a 357. It's narrow by some comparisons, but is roomy enough for construction duty, or is if the driver doesn't pack in a lot of gear. There's enough space in the cab for two seats, including a low-back passenger seat that squeaked annoyingly while underway.

Between the seats was a


big console with switches and other controls for the mixer. There were two holes where the pusher-axle switches will go, and the rear booster axle was disabled. So I couldn't drop the auxiliary axles if I had wanted to, and the truck was a 10-wheeler for this trip.

Interiors were redesigned last year for the 357 and are carried through to the 365. This truck had the base ProBilt interior, which looked nice in grey and is practical, though its Vinyl seat covers are sticky.

From the high-backed driver's seat there was a good view through the windshield and over the sloping hood. The hood is wide and there was a blind spot alongside the right-front wheel, but I never ran over anything I didn't want to. The view in other directions is excellent. There's a big window on the rear wall, neat curved corner windows and a peep window in the passenger door. This truck had motorized Moto Mirrors, but they were set just-so, and I never needed to remotely adjust them.

On the tall, wide instrument panel were two rocker switches for the cruise control, which I used while zipping along I-35. I usually cruised at 60 mph, which in top gear was a little over 1,700 rpm on the tachometer — just where the engine should be in a vocational truck, according to Cummins. For me, 60 would be fast enough with nine or 10 yards of concrete aboard and all axles down, but the truck's overall gearing would let a guy in a hurry make even better headway.

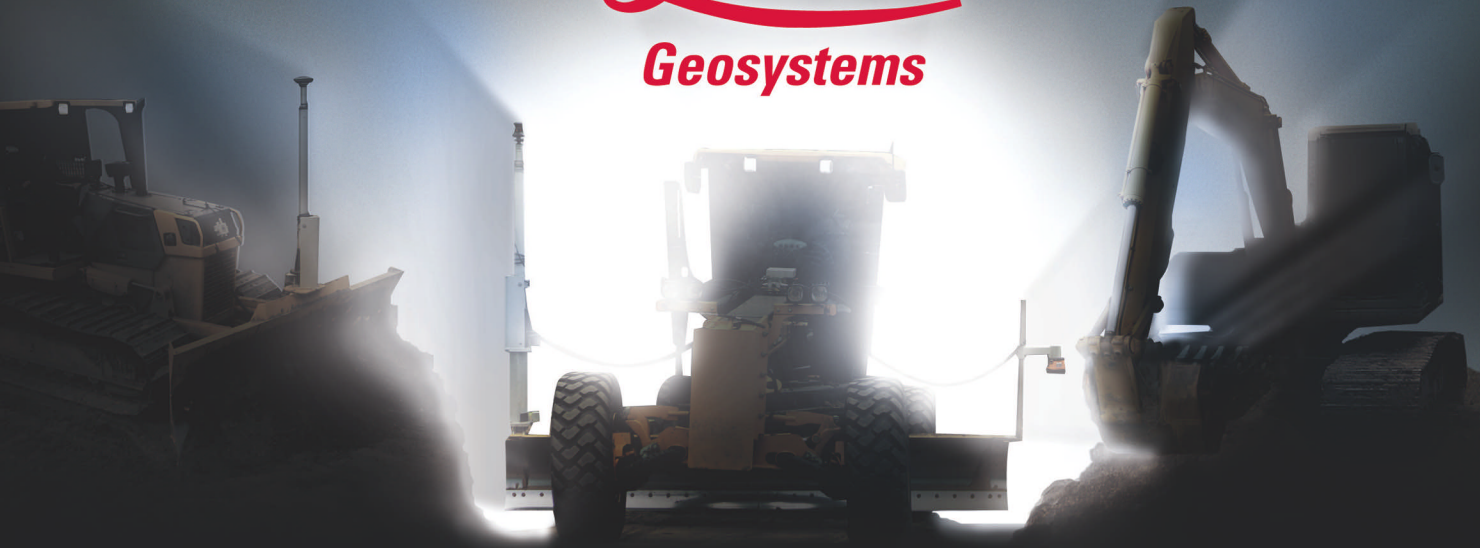
So, this is how Peterbilt's mixer customers will zip into the future, in a truck that has a lot of familiar features along with the necessary advances to meet the new emissions standards. Do the changes add up enough to justify the new model number? If I had been among the Peterbilt people who worked so hard to get this truck to market with those January '07 diesels, I'd say yes.

If I were a buyer who will be asked to spend thousands of extra dollars over a predecessor model to acquire one, I might feel my investment more than paid for a higher model number. If I were the driver of this 365, I think I'd enjoy going to work in it. And with the cleaner burning engine, I'd definitely appreciate breathing easier. 

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Orthman Industrial

The Grade Mate Laser Grading System allows one operator to finish a fine grade to 50,000 square feet with accuracy to 1/4 inch, all in one day, says the company. The unit is ideal for final preparation of a large site for concrete. The maneuverable machine provides even grading, thanks to the distance of the cutting blade from the tractor. Features include a machine-mounted console to monitor functions and a full-width roller that compacts sub-base materials and eliminates tire tracks and scraper bounce.

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Handy Hitch

Grader-mounted packer/rollers come in 90- and 120-inch models. Billed as the most compact and lightweight packer/rollers available, they require no separate lift assembly. The contour feature allows the units to follow the shape of the road. List price is under \$20,000.

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Atlas Copco

The 5,512-pound HB 2500 hydraulic-breaker attachment is designed for carriers weighing 29 to 43 metric tons and accepts hydraulic flows to 58 gpm at a pressure of 2,610 psi. AutoControl adapts the breaker's frequency and power output to match operating conditions and fires the first blow at half power to establish a pilot notch that centers the tool and helps prevent slippage. The StartSelect system allows the HB 2500 to be operated in AutoStop mode (to prevent firing until the tool senses down pressure on the material) or in an AutoStart mode (to allow firing as soon as the tool contacts material).

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Attachments

Allied-Gator

Equipped with the Shear Jaw Set, MTR 90 Multi Tool has a 35-inch jaw opening, a 35-inch throat depth, and delivers 1,500 tons of force for processing structural steel and scrap metal. "Replaceable Tip"

prevents excessive wear or damage to the tip from affecting the shear knife. Cracker/Crusher Jaw Set processes reinforced concrete and heavy cast material.

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Zanetis Power Attachments

With a reduction in overall height and planer length, the company's second generation skid-steer cold planers offer increased visibility and downforce to the cutting drum. To help prevent damage and increase side clearance, the driveline is submerged within the chassis. The piston motor is rated at 42 gpm at 5,000 psi. All models feature manual hydraulic or electro-hydraulic control of tilt, depth and sideshift from the operator's seat. The cutting drum's tooth-locator system helps simplify tooth and holder replacement and allows 5 inches of clearance between the tip of the cutting tool and the surface of the drum. The units are available in cutting widths from 16 to 40 inches, can cut down to 8 inches, and come with an 18-month warranty.

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Caterpillar

The H55Ds hydraulic hammer has a simplified design that reduces the number of parts by almost half compared to its predecessor, the H50s. It has a higher blow rate and 25 percent more power. Carrier weight is 5,500 to 9,900 pounds, and the hammer is compatible with the Caterpillar pin grabber quick-coupler system. Cat also introduced the H65Ds hammer on page 73.

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Pro-Tech

Switchblade reversible pusher has a rubber cutting edge and a steel cutting edge. The tool has no moving parts.

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Fecon

Ideal for clearing brush and removing debris and logs, the HD60 Root Grapple for skid-steer loaders is designed with a ridged frame and serrated front tines for ripping and grabbing. The 41-inch depth, 60-inch length, and 37-inch open-clamp height allow the unit to grab oddly shaped materials.

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Leading Edge Attachments

DigNRip excavator bucket works like a trencher for severe rock and frost removal. Ripper-tooth tips are located at positions associated with the rolling movement of the bucket cylinder and the sweep action of the stick. Tooth angle provides maximum ripping ability.

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Stanley LaBounty

Stanley LaBounty's MSD Series shears now have an automated blade-lubrication system, the Saber-Lube. The company asserts that the system doubles blade life, and cuts build-up welding time on the affected jaw areas in half. Lubrication allows the system to convert blade friction to usable cutting power, increasing it by 8 percent.

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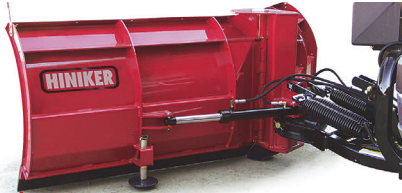


Attachments

Amulet

StickGrip is a weld-on attachment designed to provide a low-cost grip for an excavator bucket, the company says. It provides a grip profile on the machine's lower dipper stick.

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Hiniker

Hiniker's 1852 and 1952 DA-Series V-Plows use double-acting angling cylinders for full moldboard control in all positions. Users will need no optional locking cylinders or end enclosures when backdragging snow, says Hiniker. The plow provides variable cutting widths and mounts on full-size, heavy-duty pick-up trucks. A compact joystick controller is either hand-held or velcro-mounted in the cab.

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Kenco

The barrier lift attachment has an automatic actuator for hands-free movement of the barrier. Elastomer pads aid lifting. Capacity ranges from 1,500 to 40,000 pounds. Model KL1500 is priced at \$1,950; the KL40000 is \$12,500.

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Paladin

The Bradco mulcher for skid-steer loaders comes in 60-, 72- and 84-inch cutting widths. Hydraulic flow ranges from 30 to 60 gallons. The mulchers shred material to 8 inches in diameter. The hydraulic deflector door allows control of particle size and discharge. Single and reversible rock teeth are optional.

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Buying File: HDDs

By JEFF GRIFFIN, Contributing Editor

Small HDDs Take It The Final Feet

These small units perform in the installation of utilities to the home, school or commercial buildings

Many fiber-to-the-premises (FTTP) projects are in established neighborhoods where excavation is impractical, impossible or sometimes prohibited.

After several difficult years, times appear to be good again for the horizontal directional drilling (HDD) industry. Contractors have work, and equipment manufacturers are selling drilling equipment and support products. Although few go so far as labeling HDD's resurgence from the depression of the early 2000s a new "boom," the market is closing 2006 on a strong note and prospects for 2007 are encouraging.

Although big projects where large drilling units install thousands of feet of large-diameter pipe continue to attract attention, most trench-

less installations by directional drilling actually are made by much smaller models.

The most recent Universe of Construction Equipment study conducted by *Construction Equipment* magazine found that 62 percent of the active HDD population is comprised of equipment rated at 20,000 pounds of pullback or less, and drilling units in that category are the subject of this report.

Currently, six manufacturers offer 15 HDD models in this class, ranging in pullback ratings from 5,000 to 20,000 pounds. Thirteen are track machines, two are skid-mounted, pit-



launch models. All of these products pack a surprising amount of power in small packages.

The rebounding telecommunications market, and especially accelerated projects to deploy fiber optic networks to bring broadband services to new customers, is given much of the credit for increasing demand for directional drilling. Many fiber-to-the-premises (FTTP) projects are in established neighborhoods where excavation is impractical, impossible or sometimes prohibited.

Horizontal directional drilling is the perfect solution in such situations, and contractors are talking full advantage of the technology to bring services from curb to home or building. Most of these installations are less than 100 feet in length to bury small-diameter conduit in which fiber optic cable is placed.

“Limiting excavation is the key,” says Ed Savage, underground segment manager for Vermeer. “That translates into less restoration costs, less closed driveways, less closed streets, less closed sidewalks, less disturbed landscaping, and happier homeowners.”

There even are instances where property owners demand trenchless construction — once a compact drill unit has worked in a neighborhood, trenchers and even vibratory plows are not welcome there, and residents may pressure project owners and contractors to install services trenchlessly.

Although much attention is focused on the benefits of compact machines for FTTP construction, their value is not limited to only those projects. Compact HDD equipment is active on a variety of projects, including extending electrical-distribution and natural-gas-distribution systems, replacing old power cable and gas pipe, and installing water service lines and sewer laterals.

Several new model designations in the machines in the 20,000-pound-and-less class have been introduced. But basic designs and key components of compact drill units have not changed in the past several years, and some of the features considered standard on mid-range equipment — on-board pipe racks, automatic pipe make up and removal — are not



Compact HDD equipment is active on a variety of projects, including extending electrical-gas and natural-gas distribution systems.

Estimated Operating Costs Of Compact HDD Equipment

Size	Average List Price	Hourly Rate
Units to 7,000 lb.	\$75,000	\$33.98
7,001-10,000 lb.	\$81,855	\$38.08
10,001-15,000 lb.	\$128,250	\$52.64
15,001-20,000 lb.	\$154,500	\$63.67

Based on diesel cost of \$2.90 per gallon; mechanic's wage of \$40.18 per hour, and cost of money at 5.750 percent. Not included are costs of downhole tools, drilling fluids, and stand-alone fluid-mixing system.

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

available on some smaller models. However, manufacturers continue to refine those designs, enhancing already-proven products that have the capabilities needed by the marketplace.

Exceptions of note: Digital Control Inc. (DCI) and Vermeer recently unveiled a new electronic tracking system developed specifically for Vermeer's compact 5,500-pound pull-back drilling unit. And while pit-launch HDD units have been available for several years (CE covered the product category in 1998), they have not been widely used. They now appear to have found a new niche on FTTP jobsites with extremely limited space.

Manufacturers offer the following comments about compact-drill units and how they are being used:

Astec Underground (two models under 20,000 pounds pullback), Gaylord Richey, territory manager: “These small, compact packages allow quick set up in tight working conditions, but have plenty of power to get the job finished in a timely manner. They also require smaller support packages, vehicles, trailers and crews, which makes them more marketable for the residential neighborhoods. When comparing brands and models, buyers should consider

Buying File: HDDs



Pit-launch HDD units are now being used on FFTP jobsites with extremely limited space.

size-to-power ratios; thrust, pullback and torque; size of footprint; ease of operation; safety features; and weight for transporting.”

Ditch Witch (four models with pullback of 20,000 pounds or less), Richard Levings, senior product manager: “Which compact model is used depends on job requirements and space available for setup. Smaller models are used in tight spaces and installations from house to curb, larger units are better in difficult soil conditions and for longer runs two blocks or more. Some features are left off small models because they add weight and size and really aren’t needed. It also keeps costs down.”

McLaughlin Group (one pit-launch model), Dave Gasmovic, president: “Small, mini-directional rigs are ideally suited to residential fiber installations, but pit-launched models, although more labor intensive in terms of setup and restoration, are an extremely viable alternative when right-of-way restrictions prohibit the use of a surface-launched unit.


Some pit-launched systems allow for the use of multiple drilling methods, not possible with a surface-launched unit, while affording the operator comparable power. Pit-launch versions use the same fluid assist method and

also are capable of using an auger and a rotary percussion bit for rock conditions. The system can operate dry or with drilling fluids.”

StraightLine (one 20,000-pound pullback model), Don Cary, president: “The 20,000-pound machine is a good size for many projects. It provides a lot of horsepower that translates into more work with a machine that weighs less and fits in smaller spaces than medium-size models. There is a significant amount of FFTP construction, but there also are new levels of work for gas, power, force sewer systems, and small pipeline construction. We believe this is the foundation for the future of HDD.”

TT Technologies (one track-mount and one pit-launch model with pullback of 20,000 pounds or less), Chris Brahler, president: “Keeping the environmental impact to a minimum is always a benefit of using compact drills, and the demand for the smaller rigs of 20,000 pounds or less has been really strong and growing — they are very powerful and versatile. Pit-launch units are used when going building to building. They are great for inner city jobs.”

Vermeer (five models with pullback of 20,000 pounds or less), Ed Savage, underground segment manager: “Compact HDD

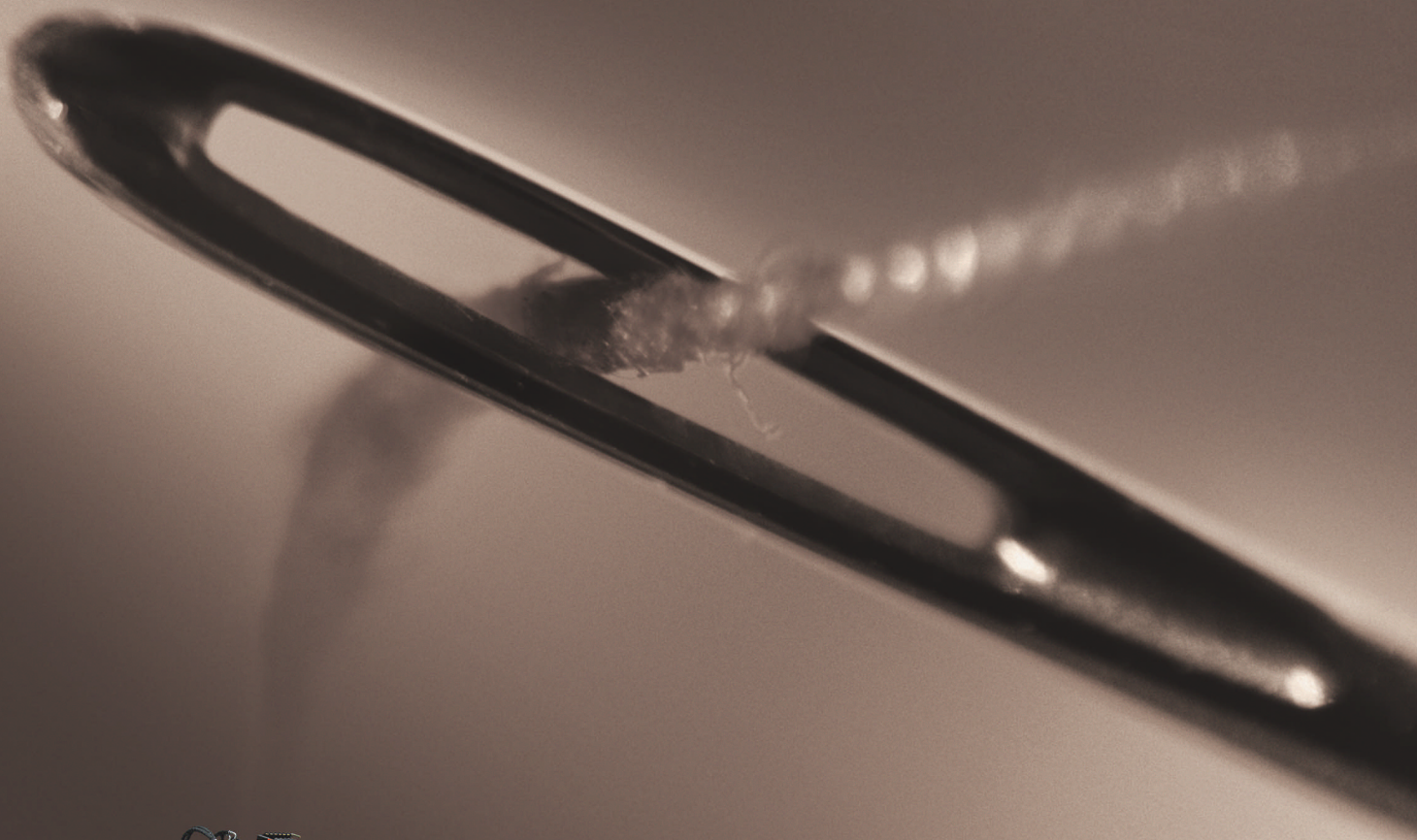
equipment is suited for any job requiring short (typically 500 feet or less) installation of small-diameter product (4 inches or less). Such jobs include not only fiber deployment, but water, electric, cable television, and sewer laterals. The new DCI DigiTrak LT is a cost-effective HDD tracking system for use with our 5,500-pound pullback drill unit for making the short, relatively shallow installations associated with deployment of fiber systems to end-users.” 

HDD Specifications (less than 20,000-lb. pullback)

Make	Model	Max Pullback (lb.)	Max Rotational Torque (lb-ft)	Gross Engine Power (hp)	Operating Weight (lb.)	Max Drill Pipe Dia. (in.)
Astec	DD-65 MiniMax	6,000	500	26	2,600	1.75
Astec	DD-1215	12,000	1,500	65	8,500	1.67
Ditch Witch	JT520	5,000	500	26	3,150	1.10
Ditch Witch	JT921	9,000	1,100	50	6,670	1.58
Ditch Witch	JT1220 Mach 1	12,000	1,400	60	9,700	1.82
Ditch Witch	JT2020 Mach 1	20,000	2,200	83	10,800	2.06
McLaughlin	McL-10-H	13,250	1,030	36	1,200	1.50
Straightline	SL2020	20,000	2,000	99	11,000	2.50
TT Technologies	Grundopit 40/60	8,800	442	13	440	1.80
TT Technologies	Grundodrill 4X	9,800	1,100	38	4,100	1.75
Vermeer	D6x6 Six Shooter	5,500	550	25	2,815	1.32
Vermeer	D7x11 Series II	9,000	1,300	47	5,660	1.66
Vermeer	D10x14	9,600	1,400	47	6,270	1.66
Vermeer	D16x20A	16,000	2,000	63	8,800	1.90
Vermeer	D20x22	20,000	2,200	85	11,160	2.06

Source: www.Spec-Check.com

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Gallery of HDDs



DITCH WITCH

Power for the Job

The JT2020 packs 20,000 pounds of pulling power and the highest ratio of power to size in its class. Maximum torque is 2,200 foot-pounds and maximum spindle speed is 2,200 rpm. Key features include: a double-sided rack-and-pinion thrust system that provides outstanding power transfer and performance for a wide range of HDD jobs; cruise control that simplifies drilling and back reaming by reducing operator effort; and two-speed carriage decreases cycle time, significantly increasing productivity. Tethered ground drive controller allows the operator to maneuver the unit from a position which provides outstanding power transfer and performance for a wide range of directional-drill jobs.

Number of HDD models with 20,000 pounds pullback or less: 2
Visit ConstructionEquipment.com/info and enter 168

TT TECHNOLOGIES

Compact for the "Last Mile"

The compact Grundodrill 4X, designed for residential service and "last-mile" operations, offers 9,800 pounds of thrust and pullback. The drill features a dual hydrostatic pump system and four-auger stake down system that provides greater stability. The Grundodrill 4X also comes with the smart-vice system that performs vice cycling operations automatically. The track-mounted machine develops spindle torque of 1,100 foot-pounds and spindle speeds to 200 rpm.

Number of HDD models with 20,000 pounds pullback or less: 2

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STRAIGHTLINE

Hydraulic-over-Hydraulic Controls



Central to the design of the SL2020 is the elimination of complex electrical systems in favor of hydraulic-over-hydraulic controls. Additionally the SL2020 has many other class-leading features: 99-hp diesel engine; 30-gpm triplex mud pump; mud-ready swivel; rugged motor/planetary combinations; stake down matched to the size of the machine; machine fit rack and pinion; efficient rotary drive and simple hydraulic and electrical circuits that are intentionally designed to be contractor serviced. At 52 inches wide, the SL2020 fits easily in congested residential areas. Yet, with 20,000 pounds of thrust and pullback and 2,000 foot-pounds of rotary torque, it delivers the performance of a much bigger rig.

Number of HDD models with 20,000 pounds pullback or less: 1
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Gallery of HDDs



VERMEER

Two-Speed Rotation

The Vermeer D20x22 produces 20,000 pounds of pullback and has a two-speed rotational system allowing the operator to choose a high rpm to do the pilot bore, and then select a high torque for the pullback. Matched with 2,200 foot-pounds of torque, the D20x22 has enough power to turn cutting tools in demanding soil conditions and longer-distance bores, and sufficient torque to accommodate larger back reamers than other machines in this HDD class. The D20x22 is the only drill in its class that offers an integrated rock-boring system. A state-of-the-art operator's station is designed for ease and efficiency and provides a forward view of the drilling operation. Controls for thrust/pullback, rotation, and water-pressure gauges are conveniently located.

Number of HDD models with 20,000 pounds pullback or less: 5

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ASTEC UNDERGROUND

Works Around Obstacles

The Astec EarthPro DD-65 MiniMax horizontal directional drill offers power and versatility in a compact package. This unit is small enough to work among obstacles in existing landscapes or tight work areas such as against walls or buildings. This unit offers 6,000 pounds of thrust and pullback force and is capable of up to 500 foot-pounds of rotary torque, with a maximum rotary speed of 180 rpm. An onboard duplex mud pump can pump 5 gallons per minute at 650 psi. This unit features the field-proven dual rack-and-pinion carriage drive. It uses 5-foot drill stem with an outside diameter of 1.75 inches and can carry up to 150 feet of pipe. The patented Es!Lok system is integrated into the drill controls.

Number of HDD models with 20,000 pounds pullback or less: 2

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MCLAUGHLIN

Pit-Launched Boring

The powerful McLaughlin McL-10H, pit-launched HDD model can be set up in confined areas where use of a surface-launched drill is prohibited. It produces 13,250 pounds of pullback and 17,000 pounds of thrust, develops 1,030 foot-pounds of torque, and has a maximum spindle speed of 125 rpm. The McL-10H offers different installation methods to accommodate both the soil and job conditions. The system can operate dry or with drilling fluids. Pullback diameters from 2 to 12 inches are possible.

Number of HDD models with 20,000 pounds pullback or less: 1

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Utility Vehicles

JOHN DEERE

Deere's Gator utility vehicles include a range of models in three series: Compact, Traditional and High Performance. Shown here is the Gator TH 6x4, which is powered by an air-cooled, two-cylinder Kawasaki engine and uses a continuously variable transmission that provides a forward top speed of 19.4 mph. The rear wheels provide full-time four-wheel drive, and a traction-assist feature locks the drive wheels together for extra push through tough spots. The cargo box handles loads up to 1,000 pounds.

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TORO

Included in Toro's Workman Series is the model 4300 (pictured), which features four-wheel drive and a liquid-cooled, 26.5-hp diesel engine. The 4300's total weight capacity is 2,600 pounds. New from Toro are the Twister 1400 and 1600, which incorporate active, in-frame suspension for the rear cargo bed, allowing the bed suspension to twist independently of the cab and resulting, says Toro, in better traction.

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BOBCAT

The new four-wheel-drive, diesel-powered, 20-hp Bobcat 2300 can be equipped with the company's RapidLink attachment system, which is hydraulically actuated and can accommodate a bucket, mower, pallet forks, snow blade and push broom. The RapidLink attachment arm can lift loads of up to 500 pounds as high as 2 feet, and when not required, the system can be removed. The 2300 also features the IntelliTrak drive system, which automatically sends



power to all four wheels and protects against traction loss. Also new from Bobcat are two restyled 2200-Series models.

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KUBOTA

At the heart of the Kubota RTV900 is a three-cylinder Kubota diesel engine rated at 21.6 horsepower. This four-wheel-drive vehicle has a differential lock, front and rear wet-disc brakes and the company's Variable Hydro Transmission. The Worksite Utility configuration has a payload capacity of 1,576 pounds, and its cargo box has a rated capacity of 16 cubic feet and features hydraulic lift. Available for the Worksite Utility and Turf Utility versions of the RTV900 is a Hydraulic Utility Valve.

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Spotlight

POLARIS

The Ranger 6x6 from Polaris has a 1,750-pound payload capacity and an equal towing capacity. On-Demand six-wheel-drive automatically senses when the rear wheels slip, and then engages both front wheels with full torque to increase traction. Complementing the drive system is a swing-arm rear-suspension system designed to keep driving wheels on the ground and to smooth the ride. The Lock & Ride Cargo system features multiple tie-down points and more than a dozen mounting holes to accept attachments. Two keys allow speeds to 41 mph (black) or to 25 mph (yellow). Bench seating accommodates three people.

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CLUB CAR

Club Car's new Carryall 295 Series features both a two-seat and a four-seat model, with bench-type or optional bucket-type seats. Engine choices include a 20-hp Honda gas or a 20-hp Kubota diesel. The Carryall 295 features the IntelliTrak drive system, which automatically provides four-wheel drive when conditions demand. Also available is the IntelliTach tool-handle system, which allows the use of attachments. The unit's bed will haul 850 pounds with standard suspension and 1,050 pounds with a heavy-duty configuration.

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YAMAHA

Among Yamaha's Rhino Series utility vehicles is the 660 Auto 4x4, which is powered by a 660-cc (40-cubic inch) liquid-cooled engine and features the company's Ultramatic V-belt transmission that provides dual-range drive to match torque/speed requirements to the application. The On-Command drive system allows switching among two-wheel drive, limited-slip four-wheel drive, and fully locked differential four-wheel drive.

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KAWASAKI

The Mule 3010 Trans-4x4 Diesel from Kawasaki is designed as a four-passenger, off-road, four-wheel-drive utility vehicle with a "transformable" cargo bed. Two rows of seats accommodate four passengers, but the rear seat can be folded down and the bed expanded to carry more cargo (800 pounds with two occupants). The vehicle features a three-cylinder, liquid-cooled diesel engine and uses Kawasaki's Automatic Power Drive System, a fully automatic continuously variable transmission. It also features dual-mode rear differential and limited-slip front differential.

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E-Z-GO

Included in E-Z-GO's ST Series is the 4x4, which is powered by an air-cooled, 18-hp Honda V-Twin engine. The transmission is a continuously variable type and uses a forward/reverse transfer case with helical gearing. Brakes are hydraulic discs in the front and hydraulic drum in the rear. Front suspension includes coil springs and hydraulic struts, and suspension at the rear features leaf springs and hydraulic shock absorbers. Total load capacity is 1,500 pounds.

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LAND PRIDE

The two newest additions to the Land Pride Treker range are the 4419 (4x4) and the 4210 ST (4x2). Both new models use an "Auto-



lock" differential in the rear axle, which engages when wheel slippage is sensed, but incorporates over-running clutches that allow that faster wheel to run ahead during turns. Both models feature a fully enclosed and sealed torque-converter shield, plus the engine air-take to facilitate water crossings. A brush guard is available and incorporates a receiver-type hitch mechanism that can be removed to install a powered winch.

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Equipment Executive

By MIKE VORSTER, Contributing Editor

Keep Capacity in Stock

Focus on work hours rather than units to evaluate how decisions affect fleet productivity



Mike Vorster

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

Vorster will lead the Construction Equipment Institute on Jan. 16-19, 2007, in San Antonio. For more information, contact Susan Beck at sbeck@reedbusiness.com or call 630-288-8494.

Equipment has a finite life. At some stage either cost, reliability, productivity, or some combination of these factors leads to a situation where the machine is no longer as good as it used to be and needs to be replaced. Understanding the replacement process, planning and managing the various options available, and taking the necessary action is much easier if you imagine a machine to be a package of available hours that is worked down to zero as it ages. Buying a new dozer with an expected life of 12,000 hours adds a machine to your fleet, but more importantly, it adds 12,000 hours to your stock of available dozer hours.

Let's see how we can use this concept to plan replace, rebuild and renovate decisions for a fleet of similar machines.

The table shows a fleet of 12 dozers, each of which is expected to work 12,000 hours. At the end of 2006, units 1 and 2 will have no more hours in stock. In fact, unit 1 has overdelivered and is a can-

didate for some sort of action. The other dozers have varying numbers of hours remaining in stock, for a total of 59,500 hours. The average number of hours in stock is 4,958 hours per machine.

Things look good at this point in time. We have 12 dozers in our group, only two units are in the red zone, and the rest are fairly well spread out.

Let's assume that we do nothing and that each machine works 2,000 hours per year. This means that we will take 24,000 hours out of stock to reduce total hours in stock to 35,500 and average hours to 2,958. Six units (1, 2, 3, 4, 6 and 8) will be in the red zone, and although we will still have 12 units, we will not have the same capability as we had a year ago. Taking no action for a second year will decimate our fleet. Hours in stock will go down to 11,500, and average hours in stock will go down to less than 1,000.

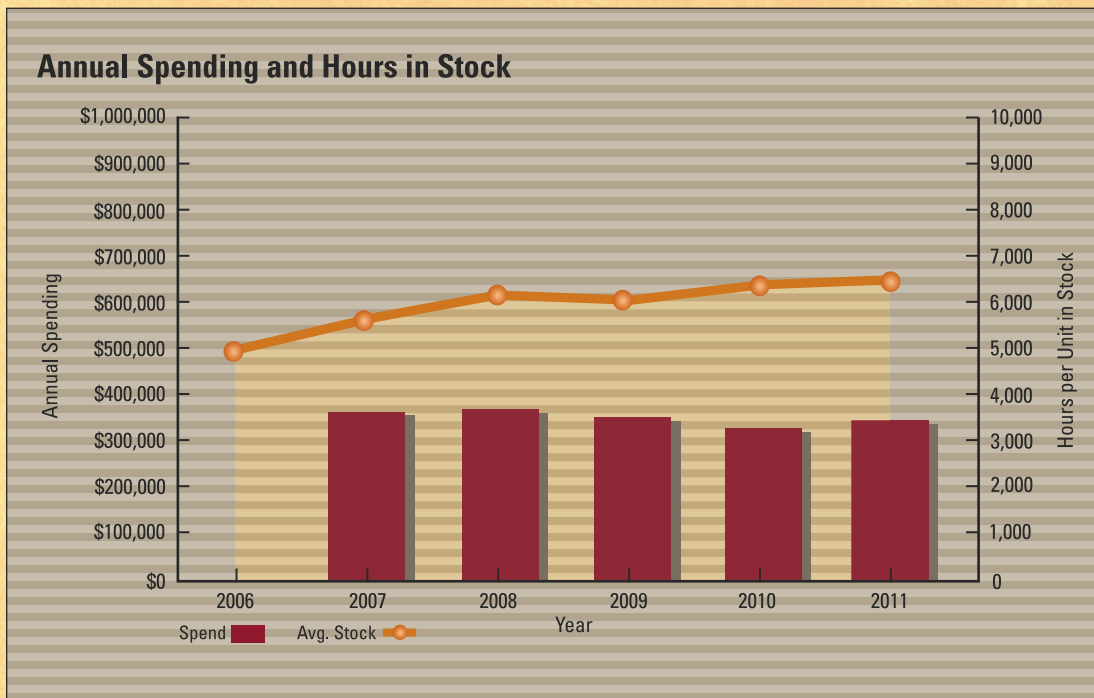
Doing nothing is clearly not an option if we are going to stay in business for the long term (see "Buy What You Burn," October 2004, or at [Construction Equipment.com](http://ConstructionEquipment.com)). The challenge is to decide on what to do and when to do it so that we can maintain the productive capacity of our fleet and spend a relatively constant amount each year. Focusing on remaining work hours rather than on units enables us to define possible actions in terms of cost as well as the number of hours added to available stock. Assume we can i) replace a unit for a capital cost of \$150,000 and add 12,000 hours (a new unit) to stock; or ii) rebuild a unit for a capitalized cost of \$90,000 and extend its life (add to stock) by 8,000 hours; or iii) renovate a unit for \$45,000 and add 3,000 hours to stock.

The combinations of what to do and when to do it are endless.

Dozer Hours in Stock

Unit #	End 2006 Hours		2007 Action	End 2007 "Hours"	
	Worked	In stock		"Worked"	In stock
1	13,000	0	R	1,000	11,000
2	12,000	0	B	6,000	6,000
3	9,000	3,000	B	3,000	9,000
4	8,000	4,000		10,000	2,000
5	6,000	6,000		8,000	4,000
6	9,000	3,000	V	8,000	4,000
7	7,500	4,500		9,500	2,500
8	8,000	4,000		10,000	2,000
9	7,000	5,000		9,000	3,000
10	3,000	9,000		5,000	7,000
11	2,000	10,000		4,000	8,000
12	1,000	11,000		3,000	9,000
Total hrs in stock		59,500			67,500
Ave hrs in stock		4,958			5,625

Good decision-making will produce a relatively uniform spending level over time.



In 2007, replacements, rebuilds and renovations will cost \$375,000 and increase total hours in stock to 67,500.

A simple spreadsheet tool will help you do the calculations and test alternatives. (Go to www.ConstructionEquipment.com/WorkHours) to do the calculations and help test alternatives.


Refer again to the table, which shows one set of actions for 2007. Replace (R) unit 1 at a capital cost of \$150,000. This adds 12,000 hours to stock and provides an “in stock” value of 11,000 hours at the end of the year, assuming that the new machine will work 1,000 hours during the year. Rebuild (B) unit 2 at a capitalized cost of \$90,000. This adds 8,000 to its “stock,” which ends the year at 6,000 hours (zero at the end of 2006 plus 8,000 added minus 2,000 worked). We also rebuild unit 3 to give it an end-of-year stock of 9,000 hours. We renovate (V) unit 6 at a cost of \$45,000, adding 3,000 hours to stock. Our proposed actions will cost \$375,000 (\$150,000 for the replacement; \$180,000 for the two rebuilds; and \$45,000 for the expensed renovation), and total hours in stock increases from 59,500 to 67,500. It

looks good as we have 12 units in the group, none more than 10,000 hours old. But there could be some challenges ahead as six units are either red or orange. We will have to look at what action needs to be taken in 2008.

If we continue the process to develop plans and budgets for the years ahead, we can produce a graph of annual spending and average hours in stock similar to that shown above. Our chosen strategy produces a fairly uniform spending profile with a maximum of \$375,000 per year while improving our capacity in stock from a present low of 4,958 hours per unit to 6,500 hours per unit at the end of 2011.

This is the outcome of one set of decisions. Feel free to go to www.ConstructionEquipment.com/WorkHours and try your hand at producing a better solution. Remember the conflicting demands:

The challenge is to decide on what to do and when to do it so that we can maintain the productive capacity of our fleet and spend a relatively constant amount each year.

Maintain or improve capacity in stock, keep annual spending as uniform and as low as possible, and make sure that no single unit becomes too old. 

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Takeuchi Takes on Compact Wheel Loaders

An exclusive distribution agreement with Atlas Weyhausen complements excavator, track-loader lines

Four compact wheel loaders comprise the new line introduced by Takeuchi as it celebrated the opening of its new facility outside Atlanta last month. Even in the rainy conditions, however, the manufacturer impressed its dealers with the roll out, which is billed as a move to strengthen the company's position with U.S. distributors.

"We've always been interested in adding additional lines," says Mike Ross, national product & training manager. "[This] is a rapid-growth market and complements our excavators and track loaders." The compact wheel loaders will allow the company to go after "another portion of the skid-steer market," he says.

The line is manufactured by Germany-based Atlas Weyhausen. Takeuchi has an exclusive agreement with Atlas Weyhausen to distribute these four loaders in North America. This current generation of machines has been available in Europe for three years, Ross says.

Ranging from the 51-hp TW 50 to the 73-hp TW80, the line features frame oscillation and articulation; forward, reverse and neutral functions that can be controlled on the fly with a thumb switch on the right-hand control; and bucket float and automatic bucket positioning. Operating weights range from 8,708 to 12,677 pounds.

Breakout force measures up well against key competitors, the company says, which are Caterpillar, Case, Deere, Komatsu, Kubota and Volvo Construction Equipment, depending



Hydraulic quick-attach gives the loaders tool-handling capabilities, enabling Takeuchi to market to a variety of vocations from excavating contractors to landscaping to rental yards.

on model. This is accomplished, says Ross, through a combination of design and machine balance, as well as by high-performance hydraulics and pumps.

"Engine placement and counterweighting equates to better lifting capacity in the front," Ross says. "It's well balanced." The engine is to the rear of the operator station. Rexroth pumps are used in the TW50 and TW60, with Daikin Sundstrand pumps in the larger two models. Pumps are variable-displacement, pressure-compensating, which puts the flow and pressure to the functions that are needed, Ross says.

Heavy-duty Dana Spicer axles handle the weight and enable the company to tout a feature Ross says is exclusive: 100-percent differential lock front and rear. The function is controlled with a push button on the right-hand control. "It's more expensive," he says, "but it gives positive traction on

both axles. It's very noticeable when you push into a pile." Auxiliary hydraulics are plumbed into the bottom of the loader arms.

Hydrostatic drive with outboard planetary final drives provide low and high ranges of travel speeds up to 12.4 mph. The company also touts the loaders' 100-percent inching pedal.

Visit ConstructionEquipment.com/info and enter 167

Compact-Wheel-Loader Specifications

Model	Engine	HP	Operating Weight (lb.)	Bucket Breakout Force (lb.)	Tip load, Straight (lb.)	Suggested Retail Price*
TW50	Perkins 404C-22	51	8,708	8,992	6,790	\$52,900
TW60	Perkins 404C-22T	61	10,251	11,600	7,992	\$57,900
TW65	Deutz F4L 2011	59	10,362	11,600	8,073	\$62,600
TW80	Deutz BF4L 2011	73	12,677	15,287	9,420	\$74,700

*with bucket and tires and one-year unlimited-hour warranty

Source: Takeuchi

To compare specifications of these machines with their competitors, visit www.Spec-Check.com.

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Sit Front and Center in Cat's New Trucks

Forty- and 50-tonners offer many improvements and features to lower cost per ton

At first glance, the new 770 and 772 construction/quarry trucks look remarkably different from the models they replace. Notice the all-new center-mounted cab and body style. The 770's predecessors were the 769D, a 35- to 40-ton truck; and the 771D, which was on the same chassis but designed specifically for quarry work. Model 772 enters a new size class for Caterpillar at 50 tons and is aimed at both construction and quarry markets.

The big question at a recent press event was why Caterpillar would change the traditional cab design. The answer was simple: to meet "voice-of-the-customer" needs. After Cat conducted research on what its customers wanted, the company concluded that a center-mounted cab provided many benefits. First, the larger cab offers walk-in convenience, excellent visibility, improved ingress/egress, and a more comfortable ride. It also features a new ergonomic design and controls layout to reduce operator fatigue. Because the driver's seat has been moved to the center, a training seat is now at the operator's left. In addition, an optional camera system provides rear view through a 7-inch LCD color monitor in the cab.

While in the cab, operators can use Cat Messenger, which provides real-time and stored machine performance and diagnostic data. Also, the Truck Payload Management System allows Messenger to show payload state and weight, loaded travel time, loaded travel distance, and accumulated weight.

The new trucks are powered by Tier III ACERT engines. Model 770 features a 476-net-hp C15, and the 772 uses a 535-net-hp C18. Engines have the MEUI Fuel system, which Cat says combines the technical advancement of electronic control with the simplicity of direct, mechanically controlled fuel injection. Engine service intervals have doubled to 500



Caterpillar's Model 770 and 772 trucks feature an exclusive center-mounted cab.

Rigid-Frame Truck Specs (44.1 to <55.1 U.S. tons payload)

Manufacturer/ Model	Payload Rating (tons)	Heaped Capacity (cu.yd.)	Gross HP	Net Machine Weight
Hitachi EH750-2	44.1	36.3	525	78,100
Terex TR45	45.0	34.0	525	81,870
Komatsu HD325-6	47.8	31.4	518	69,700
Caterpillar 772	50.0	41.0	598	81,000

hours, mostly due to efficient combustion technology, according to the company. The QuickEvac system, an on-board engine oil evacuation and pre-lube system is now standard. Another standard feature is automatic retarder control, which controls braking on grade and maintains engine speed.

A choice of dual slope and flat floor body systems are available with three different steel liner packages and two rubber liner packages. With five different body-liner systems, the 770 and 772 can be configured for specific applications to achieve maximum capacity.

Trucks are slated to be in production the first quarter of '07. Suggested retail price, including a medium-impact body, is about \$690,000 for the 770 and \$780,000 for the 772.

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Market Watch Lite

By HEATHER BURLINGAME, Senior Production Editor

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Loegering

Z-Track over-the-tire steel track for skid-steer loaders has all the features of the company's F-Series steel track, but with more aggressive traction and side-hill stability. Traction cleats are self-cleaning and provide control for the skid-steer loader.

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Landa

EHW hot-water pressure washer creates instant hot water spray without an open flame or hazardous fumes. The unit runs quietly. Two models range in cleaning power from 3.5 to 4.2 gpm and from 2,000 to 3,000 psi of pressure. Both models operate on 460-volt, three-phase electrical power. The company backs the washers with a seven-year warranty.

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Caterpillar

In the 700-ft.-lb. energy class, the H65Ds is Caterpillar's largest hydraulic hammer for compact equipment. It features 2,000 bpm impact frequency, and a simplified design aims to provide low owning-and-operating cost and high productivity and reliability. Recoil isolation protects the carrier from reflective forces. The hammer can be equipped with a chisel,moil, spade or compacting plate.

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Topcon

Topcon introduced an RTK GPS spread spectrum radio board with an extended range of up to 2.5 miles. The board is integrated into the HiPer Lite+ receiver and provides extended range for improved jobsite performance, the company says. The unit is said to increase radio range by 65 percent, from 1.5 miles to up to 2.5 miles.

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Graco

The Hurricane electric oil-dispense system for bulk oil pumps synthetic or petroleum oils, ATF and antifreeze (to 50/50 mix). The system is ready to use out of the box and requires no wiring or plumbing. It plugs into a 110 VAC outlet. Flow rate is 1.5 gpm. The Hurricane weighs less than 20 pounds and fits any container to 44 inches tall with a 2-inch opening.

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Ditch Witch

Three new Ditch Witch pipe-bursting systems are designed to fracture or cut most types of existing pipe and pull in new pipe. Models PR 50, PR75 and PR95 have pullback forces of 50, 75 and 95 tons, respectively. Systems can replace pipe with outside diameters ranging from 4 to 16 inches.

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Market Watch Lite



Leica

PaveSmart 3D automated steering-and-elevation-control system for curb and gutter is based on Leica's modular 3D software platform that uses its X-Function dataflow concept. Pave Smart 3D is ideal for offset slipform paving, such as curb-and-gutter, barrier, v-channel and sidewalk. The system uses Leica's 1200 total station and for certain applications, GNSS (GPS/GLONASS) technologies.

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Vermeer

Powered by a 125-hp engine, the BC1500 brush chipper delivers 341 ft.-lbs. of torque. It processes material to 15 inches in diameter and comes standard with the SmartFeed system. Equipped with a 45-gallon fuel tank, the chipper provides to 17 hours of continuous operation. It features Vermeer's bottom-feed stop bar, which offers two sensitivity settings to assist the operator with difficult feeding conditions.

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DeWalt

DeWalt D55154 portable air compressor is a heavy-duty, 1.1-hp, continuous electric, wheeled dolly-style four-gallon unit. The compressor produces 4 cfm at 90 psi. Reinforced frame includes a full-protection roll cage to protect pump and motor. Couplers and gauges are guarded by the tank assembly. Unit measures 18.5 inches wide and 29 inches high; and has 10-inch solid-axle, fully pneumatic tires.

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Superior

The Pinnacle portable radial conveyor from Superior Industries features a 21.5-degree incline and a set-back axle for more stockpile capacity. It is available in lengths of 80, 100, 110 and 125 feet with belt widths from 30 to 42 inches. A swing axle or FD axle is available, as is an expanded receiving hopper.

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Goodyear

Previously available on the Unisteel G287 MSA and G288 MSA mixed-service tires, Goodyear's DuraSeal technology now extends to Unisteel G177 severe-service drive tires. Gel-like, solvent-free compound is built into the tire's inner liner and instantly seals punctures to ¼ inch in the tread area.

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Miller Electric

Bobcat and Trailblazer welder/generators feature more horsepower. More horsepower provides more welding output for larger-diameter wires, faster travel speed and more generator power under heavier loads. Engine options are a 23-hp Kohler and 22-hp Robin gas engine. Engine manufacturers warrant engines separately. Other components are covered by Miller's True Blue three-year factory warranty.

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Market Watch Lite



Knaack

Jobmaster Chests from Knaack are available in seven sizes from 5 to 25 cubic feet. The tool chests feature Watchman IV, a high-strength, dead-bolt style, two-point latching system that eliminates the potential for robbery by bolt cutters. Caster-ready skids allow forklifts to move the units.

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Arsenault

Arsenault's Dossier Maintenance Software Version 4.3 features Repair Order and Invoice Data Import, which allows invoice data to be imported directly into Dossier's database from a vendor's electronic file, thus eliminating manual entry of invoices and repair orders. Repair Order templates can be predefined or created as the user goes for future use. Other functionalities include forecasting preventive maintenance and inspection services; broadcasting of work pending, recalls, etc.; automated budget vs. actual expense reporting; and equipment downtime tracking.

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Statement of Ownership, Management and Circulation

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I. Percent Paid/Requested Circulation (15c/15f x 100)	98.31%	98.63%

16. This Statement of Ownership will be printed in the NOVEMBER 2006 issue of this publication.

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John Scheunemann (signed), Distribution Director.



Genesis

The Genesis Demolition Bucket is designed to turn wheel and track loaders into long-distance material handlers. Genesis says the bucket allows a machine designed to load 3.5 cubic yards per pass to handle 7.0 cubic yards of material. Bucket design resists twisting when handling oversized, uneven loads, says Genesis. The attachment is available in two models: GDMB 250 (2- to 2.5-cubic-yard capacity) and GDMB 350 (3- to 3.5-cubic-yard capacity).

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Kaeser

Kaeser's M57 portable compressor is available as a stainless-steel package, with gull-wing doors for corrosion resistance. Mounted on galvanized steel skids, the compressor sits on a galvanized steel crash frame with solid-steel floor pan. The 45-hp unit delivers 210 cfm at 100 psi.

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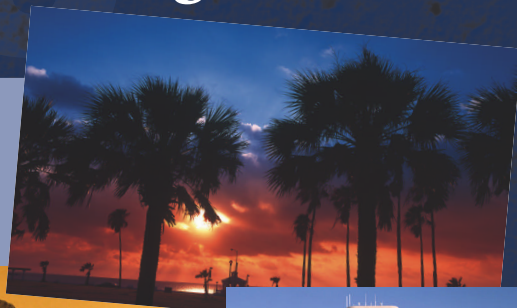
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TECHNICIAN OF THE YEAR award spotlights the increasingly complex skill sets required of today's professional technician, and raises awareness of the critical shortage of technicians that now exists. This year there will be both a public and private sector honoree. *Nominations are due December 1, 2006.*

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Lite



Leica

GPS900 RTK from Leica offers a complete base and rover system in a single case. Leica designed the lightweight, all-on-the-pole, dual-frequency system for one-person operation. The unit has no cables. SmartCheck GPS RTK technology provides centimeter-level accuracy, fast acquisition times, and a range of 1.5 miles from the base station.

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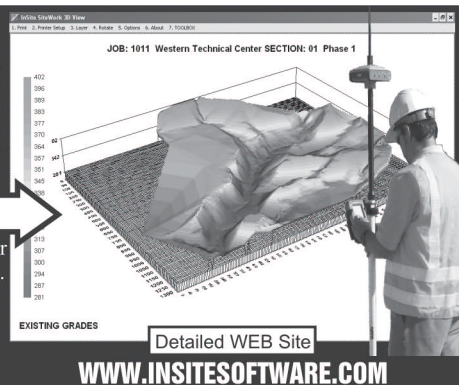
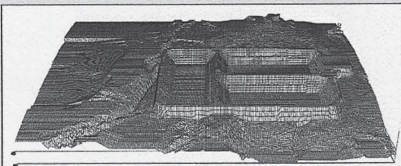
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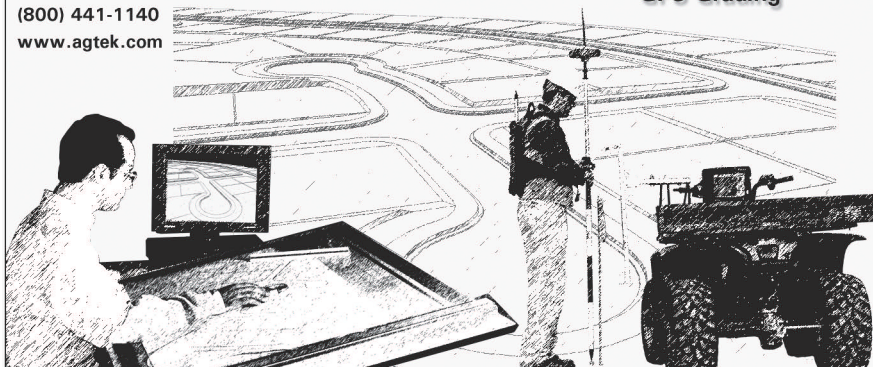
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Backhoe Loaders >=14 feet

Introductions Komatsu



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

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Market Watch: Volvo

Volvo B-Series skid-steer loader line includes five models: MC60B, MC70B, MC80B, MC90B and MC110B. Operating capacities range from 1,350 to 2,250 pounds. Engine power ranges from 45 to 81 horsepower. The company says it has redesigned/upgraded 33 areas in the new series. Operators can choose between foot-and-hand mechanical controls or hand-operated hydraulic

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Trojan Wheel Loader

Yale's biggest-ever wheel loader was also the company's first articulated model — and it pivoted in two places

Wheel loaders started out in the 1920s as small-capacity farm tractors with bucket attachments on the front. Next came larger four-wheel-drive models designed from the ground up as productive loaders, but they were hampered by inflexible non-pivoting rigid frames that resulted in large turning circles restricting their movement in tight places. These shortcomings were remedied by the advent of articulated or center-pivot steer loaders that began to appear in the late 1950s with obvious advantages. By the mid-1960s, all the leading wheel-loader manufacturers offered articulated models in their lines and this type became standard in the industry.

One of the last to change to articulation was Yale & Towne Manufacturing Co. of Batavia, New York, who had been building the well-respected Trojan brand since 1950. When Yale decided to produce an articulated loader, it did so in style: The first machine boasted dual-articulation with two pivots instead of one! Launched in 1966, the huge Trojan 8000 carried a standard bucket of 8 cubic yards and boasted an operating weight of 52 tons. The company said, “dual pivot design provides the speed and maneuverability of a conventional articulated machine, yet possesses all the stability of a rigid-frame construction. This is achieved by the six-ton center section acting as a laterally-sliding counterweight, shifting its weight to the outside on every turn as it balanced the raised bucket.” And further, “the three-sectioned machine configuration provides maintenance personnel with unprecedented access to the machine for servicing and inspection through the two large “walk-in” openings available when the machine is parked in its fully articulated position.”

The loader was offered with GM or Cummins 12-cylinder diesels in the 480-flywheel-hp class. The four wheels were



Trojan 8000 measured 32 feet 7 inches from rear to bucket tip, 12 feet 2 inches from ground to top of cab, and just under 12 feet in overall width.

driven by a full-reversing, four-speed power shift transmission with torque converter. Variable-rate steering provided 40-degrees articulation in each direction. Other features included servo controls for the bucket and boom, and a “demand hydraulic” system that automatically switched hydraulic power to the steering or to the bucket as needed. Although achieving a production life of only three years, it was Yale's biggest wheel loader.

Yale earned an excellent reputation for a long line of successful loaders. From its first — the LM-75 in 1950 — Yale enjoyed success with an extensive line of rigid-frame models and, after the big 8000, more articulated models were introduced and upgraded through the 1970s. In 1982, Faun AG from Germany took over Yale & Towne Manufacturing and merged the machines into the Faun line of wheel loaders. In 1986, O&K (Orenstein & Koppel) of Germany took over the Faun company along with the wheel loaders and continued their production at Batavia, New York. The Trojan loaders were discontinued in 1992 when the Batavia plant closed.

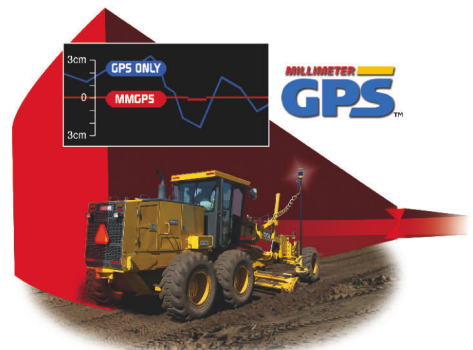
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