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Information®

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with small excavators



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tough undercar-
riage to loaders



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The Future Of Fuels

Alternatives abound
for trucks, but how
well do they work?
p. 28

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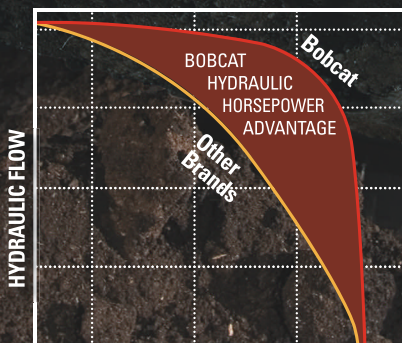


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FEATURES



COVER STORY: HEAVY TRUCKS

28 Alternative Fuels Displace "Pure" Diesel

Truck Editor Tom Berg reports on the benefits of using natural gas and biodiesel. America has an abundance of natural gas, which is touted as an extremely clean fuel, emitting fewer greenhouse gases than diesel. Production and distribution of biodiesel is steadily expanding, and on-road tests are showing the fuel has several benefits. In addition, Berg provides a summary of the Class 8 truck market.

BUYING FILE

36 Mini vs. Compact What's the Difference?

It can be rather difficult for equipment buyers to definitively peg what they want, given how different manufacturers define what is and what is not a compact or mini-excavator, or whether or not those two terms are even one in the same. The classification of mini-excavators is defined as those up to 6 metric tons, or about 13,200 pounds. Although some OEMs hold true to that designation in the marketing of their smallest excavators, increasingly some do not. Senior Editor Mike Anderson breaks down manufacturers' classifications.



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The Common Good

It happened, more quickly than anticipated. Several major heavy-equipment manufacturers have agreed to pursue an initiative to make key telematics data available directly to their customers, the end-users.

The Association of Equipment Management Professionals (AEMP) recently met with key associate members to discuss the issue of a common communications protocol, or lack thereof. The technology summit resulted in a landmark agreement to figure out a way to standardize and deliver key nonproprietary data.

The next step is to bring other manufacturers into the process and try to develop a standard file format, according to AEMP executive director Stan Orr.

AEMP is collaborating with the Association of Equipment Manufacturers (AEM) in this effort. Al Cervero, AEM senior vice president, attended the summit and said AEM is willing to support members. "If our members want to move forward, we will help our members," he says.

Orr expressed gratitude for AEM's cooperative involvement. He says manufacturers at the summit showed a desire to "do what's best for end-users" by enabling them to better use available telematics data. "Telematics is the future of the industry," he says. "We need to do what we can to help our members understand that and to encourage them to start using this data."

Although immediate beneficiaries will be large, heterogeneous fleets with multiple telematics systems, all equipment managers will gain with a standard file format. Data will be more readily and easily available for use in management software.

AEMP is to be commended for tackling this issue. It's not an association issue, though. This is an industry issue. All equipment managers should take advantage of the momentum coming out of the summit, along with the cooperative environment developed between end-user and manufacturer, to encourage further progress.

Contact your distributor and OEM sources to stay abreast of developments. Let them know how your fleet would benefit from the development of a standard file format. It's all about effective and efficient fleet management. "What we're talking about is providing an easier method for the end-users to get the data that is rightfully theirs," Cervero says.

Visit ConstructionEquipment.com to hear more on what Cervero and Orr had to say.



Rod Sutton, Editor in Chief

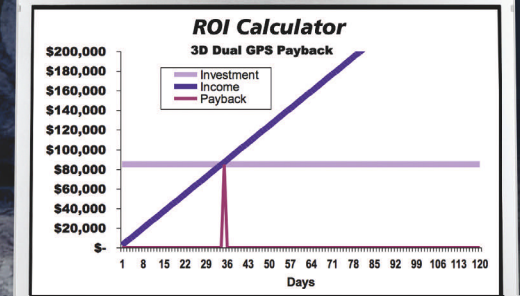
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MARKET WATCH

By KATIE WEILER, Managing Editor

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ASV

A special forestry version of ASV's largest compact track loader features an all-new sealed and pressurized cab, full guarding, large dual pressurization filters, and a high-performance air conditioner and heater. On the 99.9-horsepower PT-100 Forestry Loader, ASV's Posi-Track undercarriage includes rugged tapered bearings with metal face seals on all wheels. Independent torsion axle suspension and 18-inch-wide rubber tracks maximize traction and flotation in soft underfoot conditions.

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Morbark

Adding to its lineup of wood-waste processing equipment, Morbark combines heavy-duty construction and new technology in the 1300B tracked tub grinder. With the undercarriage of a Caterpillar 330L excavator as a base, the 1300B uses Morbark's Iqan feed system that automatically adjusts feed rates, pressures and feed-wheel positions to optimize production and engine efficiency.

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Terex

TC550 now features an on-demand hydraulic steering and blade-control system with an improved blade lift and steering cylinders. The upgrades reduce heat buildup and extend the life of the 110,000-pound compactor. The TC550 also boasts an asset-management system, which relays critical faults and utilizes GPS and satellite technology to collect operational information.

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Auto Crane

A line of articulating cranes has lift capacities ranging from 31,800 to 332,700 pounds. Controls on both sides of the crane are identical, so that what the right hand controls on the driver's side is the same on the passenger's side. Cranes are built of high-tensile-strength steel, which enables the unit to be lighter and more compact, and enables the truck to carry more payload capacity.

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Komatsu

Komatsu D37EX-22 and D37PX-22 crawler dozers have features introduced in the D51-22 model: super-slant nose coupled with a new cab forward design. Dozers have Hydrostatic Transmission (HST) and a 3.26-liter, Tier 3 Komatsu SAA-D95LE-5 engine with net horsepower of 89 at 2,200 rpm. Operating weight ranges from 17,394 to 19,070 pounds. Power angle tilt blade has a capacity of 2.32 to 2.55 cubic yards.

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Market Watch



◀ Side Dump

Adaptable to all Side Dump trailers, the new High Side Revolution Series side-dump trailers can increase hauling capacity up to 60 cubic yards. After initial installation, the

High Side can be easily removed and put back on in minutes. The 45-cubic-yard High Side can also be ordered with weight-saving parts, with trailer weights in the 11,000-pound range and up, depending on product hauling needs.

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▶ Case

The 586G Series 3 and 588G Series 3 rough-terrain forklifts sport a 4.5-liter turbocharged engine that delivers 80 net horsepower — a 10 percent increase over previous models. Equipped with Tier III Case engines, the 586G Series 3 has a lift capacity of 6,000 pounds and an operating weight of 14,337 pounds. The 588G Series 3 can lift up to 8,000 pounds and has an operating weight of 16,684 pounds. Both have zero tail swing, a maximum width of 88 inches, and a 55-degree axle turn angle.

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◀ Powerscreen

An upgrade from the Chieftain 2100, the new 2100X screening plant from Powerscreen has a 14-percent greater bottom deck screen area for better processing capability. Setting up ready to run in less than 30 minutes, the Caterpillar-powered plant features an adjustable, high-amplitude, two-bearing screen action, which can expose material to varying amplitudes and G-force. This helps separate processed material into various required specifications.

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◀ Sakai

Featuring a new traction-control system that can effectively put these 84-inch-wide single-drum compactors to work on slopes up to 62 percent, new Sakai SV510-III Series rollers feature patented shock isolation systems that are completely independent of the drum drive system. Four vari-

ations are available: the smooth-drum SV510D-III for rock and granular materials; padfoot-drum SV510T-III for cohesive materials, silts and clays; padfoot-drum TB version with a strike-off blade; and TF version featuring a padfoot drum encased within a bolt-on smooth drum shell that can be removed when working on cohesive soils.

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▶ Ditch Witch

The FX20 vacuum excavation system is powered by a 27-horsepower Kohler engine, developing vacuum power of 540 cubic feet per minute. With a 150-gallon spoil tank, the system is suited for cleaning out municipal valve boxes, commercial and residential debris cleanup and landscaping, exposing utility lines, posthole digging, and other short-run projects. It can be transported in the back of a pickup truck, on a flatbed or a small trailer, with no CDL required.

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Market Watch

► Morbark

Claiming low maintenance and high affordability in a mobile wood-waste processing solution, Morbark offers the 3800 Track Wood Hog horizontal grinder. A factory-balanced hammermill with forged hammers is supported by an interplanetary drive; the tracks of a Caterpillar 320L excavator; and the Morbark Iqan feed system that automatically adjusts feed rates, pressures and feed-wheel positions.

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◀ Caterpillar

Caterpillar replaced the 307C and 308C CR mini excavators with the new D-Series 307D and 308D CR (compact radius), and added a swing boom to the 308 to create the 308D CR SB. The mini excavators outperform their predecessors with 22 percent greater bucket forces and 10 percent greater stick forces, and lift capacity has been increased with added counterweight. A 15 percent increase in traction forces improves dozing and turning performance. They're powered by a new Tier-4 Mitsubishi 4M40 TL engine, rated at 54 net horsepower.

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▼ Bri-Mar

DT610-DP and DT712-DP Deck-over Dump Trailers solve flat-bed and dumping needs. Users can transport mulch, lumber and pallets of paving stone, all with one piece of equipment. Loads are supported by a 6-inch tubular mainframe, 3-inch channel cross-members, and a 12-gauge steel bed. The DT610-DP (6x10-foot bed) is available in either 7,000- or 10,000-pounds GVW, and the DT712-DP (7x12-foot bed) is available in either 10,000- or 12,000-pounds GVW.

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► Blastrac

Blastrac 2-45DT mounted shot blaster has a 45-inch blast pattern. The on-highway truck has all required equipment on board. Closed-circuit, dust-free shot blasting process is attached to the front and controlled by the operator in the cab. Dust collection, abrasive storage, hydraulic controls and spare parts are on board, too. It ret textures asphalt, concrete roads, highways, and airport runways/taxiways.

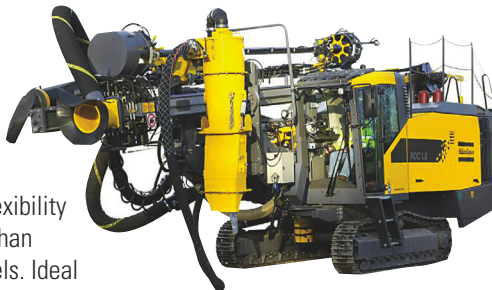
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► Atlas Copco

The re-designed ROC L8RC drill rig offers more flexibility and capacity than previous models. Ideal for surface mining and quarrying, the rig stores 118 feet of RC drill pipe, including 98 feet in its revolving magazine, with the option of drilling up to 328 feet using additional RC pipes. Both DTH and RC drilling are possible, and converting between the two is a speedy process.

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▼ Moxy

The AB510 51-ton haul truck, based on the acquired Aveling Barford RD range, is the smallest entry in what will be a Moxy-built range



up to 120 tons. The truck weighs 68,800 pounds and is powered by a Cummins QSX15 diesel rated at 600 gross horsepower. An Allison M5610AR transmission offers six forward speeds capable of up to 38 miles per hour.

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Market Watch



◀ Kioti

A choice of transmissions differentiates the two versions of the newest Kioti compact tractor. Powered by a three-cylinder, in-line vertical, water-cooled Daedong diesel generating 28 horsepower at 2,600 rpm, the CK27 has a manual-synchro shuttle transmission with eight forward and eight reverse speeds, while the CK27

HST is managed by a hydrostatic transmission. The CK27 Series tractors have a lifting capacity of 1,764 pounds and come standard with a telescopic three-point hitch, joystick loader control, foldable ROPS, tilt steering, wet disc brakes and rear PTO.

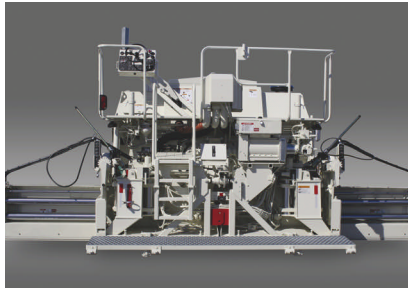
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▲ GOMACO

The GT-3200 curb-and-gutter machine is now capable of a right- or left-side pour. The machine's front track can either be mounted to a flange on the front of the machine or mounted to a flange on the back, the company says. The conveyor can accommodate both directions, or an auger can be used for slip-forming the specific direction. A newly designed piston-style front leg acts like a hydraulic cylinder and features more steering torque. Two-speed track motors provide jobsite mobility up to 125 feet per minute. Paving speed was increased up to 50 feet per minute.

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▶ Terex

VersaScreen 210 is a 10-foot electric asphalt screed with variable paving widths up to 18 feet 6 inches. Left- and right-hand bolt-on screed extensions allow for full-width paving up to 21 feet 6 inches. Front-mounted screed extension design allows for fast width changes. Electric heat delivers uniform heat distribution, the company says, and is powered by a 34-kW, three-phase generator.

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◀ Caterpillar

The 279C, 289C and 299C are the latest additions to Caterpillar's line of compact track loaders, which sport durable, steel embedded track and steel undercarriage components for extended life in aggressive applications. A new fully suspended undercarriage employs four independent torsion axles for a smoother ride and improved bucket load retention. Rated operating capacity ranges from 3,200 to 4,150 pounds. See a full report on page 59.

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▶ Hitachi

The Zaxis 350LC-3 replaces both the Zaxis 330 and Zaxis 370 excavators. Beefed-up in several critical areas and powered by Isuzu's 271-horsepower Tier-3-certified diesel with EGR, the 77,269-pound 350LC-3 performs more like its larger production-sized siblings. Swing torque, traction force and digging force have all been increased. The P Mode increases production; the E mode can reduce fuel consumption. It comes standard with a 13 foot-1 inch arm, a 16,314-pound counterweight, and 32-inch triple semi-grouser shoes.

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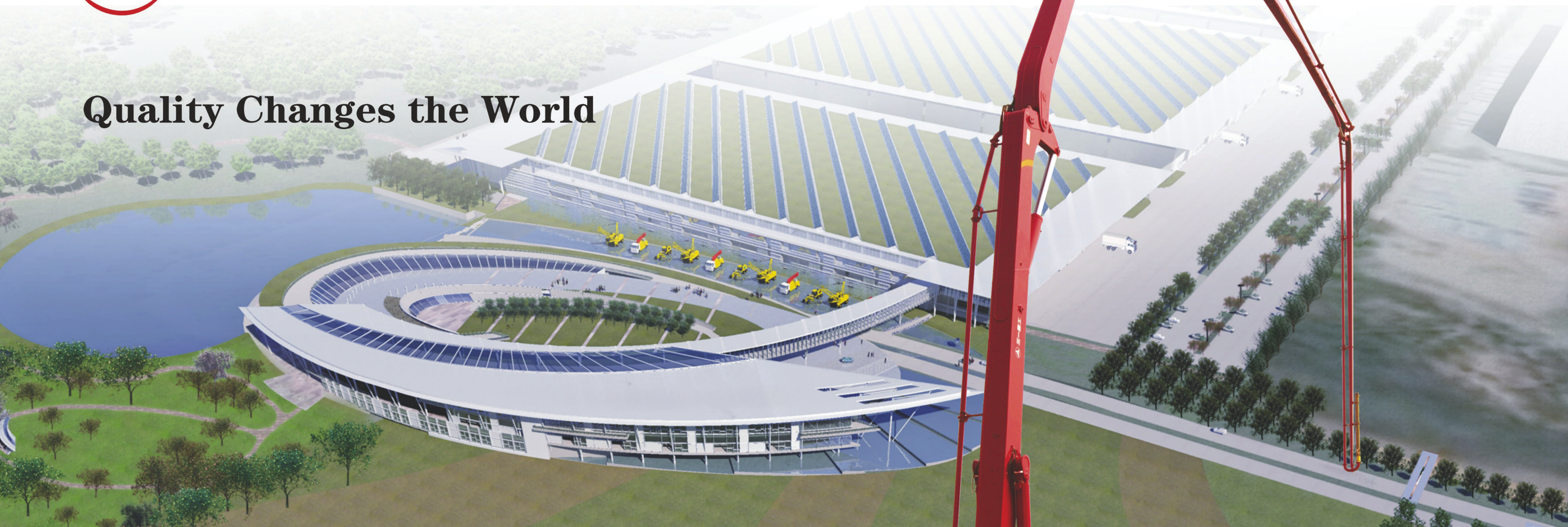


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1. As the project manager, recruit new engineers as team members to build design team to achieve design goals
2. As the lead designer, generate super structural scheme of motor grader with incorporating inputs from mechanical, hydraulic, electrical engineers and peer products to meet requirements and preference of customers in North America, gain both quality and cost advantage over peer products; get the scheme approved by director of R&D Department SANY America and proceed with detail design.
3. Make the design/modification package of motor graders deliverable to production line.
4. Assist Sales and Marketing at SANY America and SANY China in evaluating engineering, manufacturing, and marketing information to develop motor grader product plans that are consistent with customer requirements and product line objectives.

5. Assist SANY America Services, SANY China Engineering and Service Departments in resolving current product issues with motor grader imported to the American market.

JOB REQUIREMENTS:

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

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

RUNNING GREEN

Propane Delivers Cleanest Medium-Duty Fleets

CleanFuel USA's 8.1L GM conversion meets U.S. EPA and California Air Resources Board (CARB) 2010 standards as the cleanest engine available in its class. CleanFuel's propane system is considered an OEM re-



CleanFuel creates a dedicated propane-fueled GM 8.1L engine by replacing only the gasoline tank, fuel pump and injector rails with an OEM-compatible propane fuel system.

placement technology for both new and aftermarket gasoline-fueled engines.

The liquid-propane-injection (LPI) system is designed to convert medium-duty fleets, such as buses and 4500 to 8500 Series GM trucks, to propane. Propane is a cost-competitive alternative that is plentiful in the United States, with most global propane produced and stored domestically.

The moderate cost of switching a vehicle's engine to propane (80 percent of an MSRP just over \$11,000 is recaptured with a federal tax credit) is quickly offset by fuel cost savings. National price average for diesel is about \$4.65 per gallon, and regular gasoline is about \$4.10 per gallon. In comparison, propane motor fuel has been ranging between \$2.39 and \$2.59 per gallon. Qualifying fleets can take advantage of an additional \$.50 federal tax credit per gallon of propane used. Find out more at www.cleanfuelusa.com.

— LARRY STEWART

MANUFACTURER NEWS

Manitou to Buy Gehl

France-based equipment manufacturer Manitou has agreed to purchase compact-equipment maker Gehl for \$30 per share, with a total value of approximately \$450 million.

The deal would allow Manitou to target construction and agricultural equipment markets in the United States, where the company can take advantage of Gehl's distribution channels as well as the distribution channels of Gehl subsidiary Mustang.

"Manitou's interest in Gehl is to increase the presence of Manitou and Gehl worldwide," says Kirk Zander, Manitou director of sales and marketing. "Both companies would see an increase in market share worldwide."

Gehl's mini skid loader product line would also play an important role in Manitou's compact equipment offerings.

According to a Gehl press release, Gehl's "management team will be retained following the transaction." Currently, Manitou owns 14.4 percent of Gehl's outstanding stock.

— ANDREW BALTAZAR

AUCTION NEWS

Bidding on Cat Means Bidding with Cat

The world's largest construction-equipment manufacturer is no longer only represented in the auction business by its products. The Caterpillar brand is now in the auction business itself.

A partnership of Caterpillar dealers, Cat Auction Services is focused on "creating value and reducing risk for both buyers and sellers," through detailed inspections, a range of warranty protection and parts discounts for qualified Caterpillar equipment, and Cat dealer parts and service support, says the new Minneapolis-based company.

"We've created a customer-focused approach that leverages our heavy-equipment expertise, world-class product sup-

port capabilities and industry experience," says Rick Albin, president and chief executive officer of Cat Auction Services. "This allows us to create a win-win situation for both buyer and seller, because they have more information to make better decisions. By reducing the risk that's inherent in many auctions, we'll create more value. And, because we're Cat dealers also offering both new and used equipment to the industry, we have a greater stake in taking care of our customers."

Cat Auction Services allows buyers to purchase equipment online or in person. Real-time online bidding powered by Proxi-bid will provide a global audience for the auctions, the first of which is scheduled for Nov. 12 in Des Moines, Iowa.

INDUSTRY NEWS

Biodiesel Tested to Two Million Miles

The so-called Two Million Mile Haul, sponsored by the National Biodiesel Board, Caterpillar and several government agencies, compares performance of 10 road tractors

While B20 delivered slightly worse fuel economy, it usually costs less than straight diesel, says Steve Lursen, special projects manager for Decker Truck Lines, the Fort Dodge-based fleet involved in the test. Prices for B20 ranged from 11 cents per gallon less to "slightly higher," he says. Decker purchases B20 in bulk and has it delivered to its terminals, and that's where most of the trucks' tanks have been topped off. Some purchases are made by drivers when they find B20 available on the road.

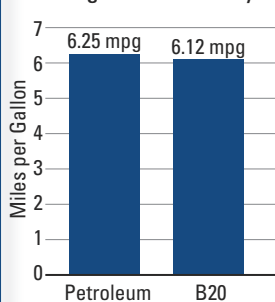
Drivers affected tank mileage numbers by up to 23 percent, far more than petrol versus B20, Lursen said. To compensate, about halfway through the test he switched drivers between the two truck groups so the fuel economy numbers should statistically even out. Previous surveys of fleet operations by maintenance organizations and manufacturers have found that variances in drivers' skills and habits can raise or lower fuel

economy by as much as 30 percent.

Decker has gained some hauling business from shippers tuned into the green movement and seeking carriers whose executives are of like mind, Lursen says. Truck operators interested in trying biodiesel should know that diesel makers have formally approved use of blends up to B5, and some will OK the use of higher blends, up to B20. But users are advised to get formal approval from their engine manufacturers before using biodiesel.

— TOM BERG

Average Fuel Efficiency



burning straight petroleum diesel with ten using B20 (diesel blended at 20 percent with biodiesel). Results have been monitored by Dr. Don Heck, a professor at Iowa Central Community College in Fort Dodge. The test began in August of 2006, and two years later, the 20 trucks had covered 1.6 million miles. Overall performance was much the same for both truck groups, Heck said. Fuel filter plugging showed up in the revenue runs that comprised the tests, especially those into Minnesota in winter.

INDUSTRY NEWS

Six Ways to Reduce Fuel Costs

The American Trucking Association (ATA) recommends six strategies to reduce fuel consumption, in what the group says is the first industry-wide environmental sustainability program to combat global climate change.

The initiative, titled Trucks Deliver a Cleaner Tomorrow, includes a website detailing the recommendations. ATA says implementing them would eliminate the equivalent of CO₂ generated by 9.6 million Americans for one year.

The six recommendations are:

- 1) Limiting speed governors on new trucks to a maximum of 68 miles per hour, and reducing the national speed limit to 65 mph for all vehicles.
- 2) Reducing idling.
- 3) Encouraging participation in the EPA SmartWay Transport Partnership Program.
- 4) Improving highways to reduce congestion, raising the fuel tax if necessary.
- 5) Using more productive truck combinations.
- 6) Supporting national fuel economy standards for trucks.

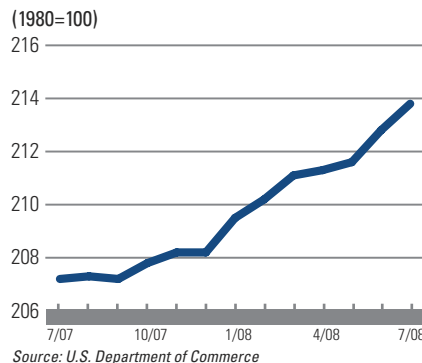
"ATA has committed itself to a series of measures that can reduce fuel consumption by 86 billion gallons and CO₂ emissions by 900 million tons for all vehicles over the next 10 years," said ATA president/CEO Bill Graves. "Our proposals are practical, reasonable, and doable. They make environmental sense, and they make common sense."

STATUS & FORECAST

CONSTRUCTION EQUIPMENT PRICE INDEX

The annual pace of construction equipment price increases more than doubled in June and July to 6 to 7 percent while new-equipment sales remained steady at a modest level and prices for used equipment began to drop. The price surge reflects the appreciation of the U.S. dollar, up 5 percent since late April making imported equipment more expensive, higher freight costs, and the 20-percent-plus surge in steel prices. Dollar appreciation will slow by year's end, and fuel and steel costs will retreat slightly.

For more analysis, visit [Economic Outlook at ConstructionEquipment.com](http://EconomicOutlook.atConstructionEquipment.com).





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JOB SOLUTIONS

Concrete & Asphalt Recycler Does Away with Dust

Residents of West Haven, Conn. feared that an asphalt and concrete recycling plant, built there in 2005, would cover their neighborhoods and surrounding areas in dust. But thanks to new dust-control technology, those residents are, for the most part, sneeze-free.

Spring Street Recycling recently began using the Dust Boss DB-60, a fully automatic high-pressure misting system to control the levels of dust produced by the recycling process.

"The plans for this facility were closely scrutinized by the regulatory authorities and local citizens," says Lou Gherlone, owner of Spring Street Recycling. "We had to satisfy everyone that we had proven technology in place to run a very clean operation that wouldn't contribute dust to neighboring wetlands or the communities."

Spring Street crushes local demolition waste into aggregate that can be processed and re-sold as clean fill material. To keep dust to a minimum, the facility employs internal dust control integrated into its



At the Spring Street Recycling plant, the Dust Boss DB-60 stops dust from infiltrating surrounding neighborhoods.

crushing operation. But some dust still escapes, and that's where DB-60 comes in.

The airborne particles are knocked down by the DB-60's oscillating ducted fan, powered by a 25-horsepower motor. Its 200-foot throw, which can cover an area of 21,000 square feet, and an internal booster pump that delivers 150 psi of pres-

sure also help to eliminate stray dust.

Less dust means that the West Haven-based recycling plant can stay open. That's important, Gherlone says, because "from every mile of concrete pavement of average thickness, nearly 6,000 tons of material can be reclaimed," and "that means no landfill and no disposal fees."

INDUSTRY NEWS

House Votes \$8 Billion Relief for Highway Trust Fund

Congress approved a measure to transfer \$8 billion from the general fund of the Treasury to the Highway Trust Fund after U.S. Department of Transportation Secretary Mary Peters revealed the trust fund would run out of money before the end of September.

The White House had previously threatened to veto the measure, calling it "both a gimmick and a dangerous precedent that shifts costs from users to taxpayers at large."

But the administration shifted positions with Secretary Peters' projections, which

revealed a much-accelerated timeline for the HTF's shortfall. The HTF is funded by an 18.3-cent federal tax on every gallon of gasoline sold and 24.3 cents for each gallon of diesel. The shortfall is due primarily to reductions in fuel consumption as the nation's drivers react to high gas prices.

"We're relieved that the Administration finally decided to join us in supporting this fix and that Congress was able to get it done quickly," says Stephen E. Sandherr, chief executive officer of AGC. "Numerous state departments of transpor-

tation announced that if the full federal funds were not forthcoming they would be forced to cancel contract lettings, slow down work on ongoing projects and, in some cases, be forced to issue debt to make payments to contractors for work that is already underway."

It has long been anticipated that the 52-year-old trust fund would move into the red next year, a result of Congressional reluctance to raise the gas tax, unchanged since 1993. But the fund, which had a \$10 billion surplus just three years ago, has had a rapid change in fis-

cal fortune as drivers, responding to higher gas prices, curtailed their driving and switched to more fuel-efficient vehicles.

Secretary Peters commended the Senate for its swift action to address the immediate crisis but added in a statement that "Congress must eliminate the billions in wasted spending, thousands of unneeded earmarks, and hundreds of conflicting and contradictory special-interest programs in order to make sure states don't face this situation again."

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Alternative Fuels *Displace "Pure" Diesel*

Natural gas and biodiesel can make good business cases,
as long as government subsidies continue

Twenty-two years ago in southern Brazil, a fleet manager was telling reporters what he thought of alcohol he was testing as a fuel for his diesel engines. In response to a question about the concept of alternative fuels, the manager declared without hesitation, "The best fuel for a diesel is diesel, and the best alternative fuel for a diesel is diesel."

That's still largely true, except oil prices have made "pure" or "straight" diesel painful to burn. And what is becoming the mainstream

product — ultra-low sulfur diesel (ULSD) — is getting panned for its slightly lower tank mileage and loss of lubricity that higher sulfur levels once provided. By federal mandate, ULSD had to be available since autumn of 2006 to fuel EPA 2007-powered trucks. It's becoming more common at fueling stations across the country, and anyone running an EPA '07 diesel should use it or risk damaging the exhaust system's aftertreatment devices.

Natural gas

Among the alternatives to diesel, natural gas is gaining the most monetary and patriotic backing. America has an abundance, and more reserves are being found. Natural gas is touted as an extremely clean fuel, emitting fewer greenhouse gasses than diesel.

Caterpillar and Cummins have long built stationary spark-ignition engines based on diesels, and experience shows that the clean-burning performance of filtered gas lengthens the time between crankcase oil changes and allows pistons, valves, cylinders, rods and crankshafts to last longer.

Cummins has worked with Westport Innovations to develop advanced combustion systems. One is high-pressure direct injection (HPDI), which uses a small amount of diesel to ignite the natural gas in the engine. This pro-

Domestically produced biodiesel can displace more expensive imported oil and cuts some exhaust emissions. But it needs more filtering, and its storage life is only about six months.



vides diesel-equivalent torque and horsepower, along with a range of 400 to 450 miles, the companies say.

Pacific Gas & Electric recently bought five Kenworth tractors powered by Cummins-Westport HPDI engines that burn liquified natural gas. Fuel costs should be half that of straight-diesel trucks. PG&E now has 1,300 natural gas-powered cars and trucks, some of them Freightliner medium-duty dump trucks with Deere gas engines. The company paid many thousands of dollars to have the trucks' original diesel engines yanked and the Deeres installed, but felt the emissions-reduction performance and the resulting "green" reputation made the conversations worthwhile.

Kenworth and Sterling offer daycab truck-tractors powered by Cummins-Westport engines that burn liquified or compressed natural gas, and Peterbilt will have one available later this year.

Natural gas is subsidized to varying degrees by federal and state authorities. Federal tax rebates of up to \$32,000 can be had for buying a truck that burns natural gas and other alternative fuels (for a list of qualifying trucks and cars, go to www.irs.gov and type "QAFMV" into the search box in the upper right corner). Buyers of hybrid-drive trucks and cars can also qualify for tax rebates.

Biodiesel

Production and distribution of biodiesel is steadily expanding, and on-road tests are showing the fuel has several benefits. The National Biodiesel Board says production has climbed from 250 million gallons annually in 2001 to an expected 600 million gallons this year. As of late August, there were 177 biofuel plants across the United States, and almost half of them are certified by an industry group.

Supply now is greater than demand, perhaps partly because biodiesel got off to a shaky start nearly three years ago. The problem was traced to biodiesel's tendency to act as a solvent, which cleans out a truck's fuel system and sends accumulated crud to fuel filters. Another problem was lack of consistent quality in then-



PG&E's latest natural-gas vehicles are five Kenworth T800 tractors with Cummins-Westport high-pressure direct injection engines. They'll haul construction materials throughout the utility's service area.

LNG fueling takes a bit of know-how, but is not difficult, users say.

available fuels. The new standards should help.

Carrying extra filters and changing them as needed, although a pain in the neck for drivers, kept engines running and, when fuel tanks and lines had been fully scrubbed, operating problems in individual trucks disappeared.

Meanwhile, drawing up of industry quality standards should boost the fuel's performance in diesel engines and its acceptance by customers, proponents feel. The American Society for Testing Materials has established standards for pure biofuel, which can be made from crops or animal fats, and more recently for biodiesel blends, which usually range from 2 percent (B2) to 20 percent (B20) as mixed



LNG fueling stations use cryogenic vessels like these spherical tanks to keep natural gas liquified at super-cold temperatures. Such stations can cost \$350,000 to \$1 million, but lower-cost stations are under development.

Aerodynamics, Slowing Down Save Big Dollars on Fuel

Operators of construction trucks rarely consider aerodynamics, especially if their vehicles run locally, with lots of stopping and starting and at low average speeds. But aerodynamics will affect trucks run steadily on freeways and open highways.

Owner-operator Skip Becker began saving money as soon as he bought a smooth-sided Genesis end-dump trailer from East Manufacturing in August 2002. It saved enough in fuel that he paid off the trailer's \$6,000 to \$7,000 premium in about eight months. Continued savings made the monthly payments on the trailer.

Compared to his old rib-sided trailer, Becker saw an improvement of a little more than 0.5 mpg with the 34-foot Genesis, raising the average turned in by his Caterpillar 550-powered '97 Peterbilt 379 from about 5.1 mpg to 5.8. "At a half a mile per gallon, you're talking \$900 a month" in saved fuel, he says. That boils down to \$34 a day in savings at today's prices.

Becker's trailer rolls on four wide-base single tires, Michelin 425/65R22.5s, which cut rolling resistance and weigh about 700 pounds less than eight regular-size tires. He also fitted the Genesis with a Tarpcor motorized tarp which smooths air flow over the trailer's top, though its main purpose is to prevent grainy loads from blowing out. He deploys the tarp even when running empty. Becker operates locally, but he runs 500 miles a day within a 100-mile radius of the Youngstown, Ohio, area.

Genesis' sides are made of patented hollow panels, says Charlie Wells, East's director of dump-trailer products. Panels are aluminum alloy extruded into 2x10-inch rectangles, which are stacked vertically and welded together. The walls then are essentially double-sided with internal ribs.

Phillip Goyne, Yuma, Ariz., is also on a quest for better fuel economy. He pulls a Clement end-dump trailer hauling decorative rock from a quarry near home to Phoenix, and the highway running maximizes the benefits of the 37-foot trailer's smooth sides. He pulls it with a Peterbilt 385, a lightweight aerodynamic tractor with a 410-horsepower Cummins ISM, which saves about 600 pounds over an ISX. It runs through an Eaton 10-speed with an overdrive 10th gear, which keeps revs low at cruising speeds.

Goyne cut his speed from 77 mph to 65. "That uses up your log time, but getting 1 mile per gallon more (from 4.5 to 5.5 mpg) is worth it," he says. "The time lost is not as bad as I thought it was. [I make] one trip per day, so there's no revenue loss. I'm trying to get to 6 mpg. If I can save \$2,000 a month in fuel, that would keep me in the game, keep me able to own my own truck."




Owner-operator Skip Becker says his smooth-sided East Genesis end-dump with its wide-base single tires saves at least a half a mile per gallon, enough to pay for itself.

with petroleum diesel.

Biodiesel's benefits, according to the board, includes restoration of lubricity lost when most sulfur is removed to make ULSD; reduced exhaust emissions, which has been proven in industry tests; and an increase of domestic fuel production which can displace imported oil. An on-going test of over-the-road tractors running on B20 in the Midwest further shows that the fuel's average Cetane number — a measure of cold-weather starting ability — is 1.8 points higher than that of straight petroleum diesel, and cold-flow ability is the same for both.

However, energy content, measured in British thermal units, is 2.7 percent lower with B20. Thus B20 has delivered 1 to 2 percent less tank mileage for tractors using it in the test. Other experience shows extra filters might be needed, and the limit for storing biodiesel is about six months.

State and federal subsidies encourage use of biodiesel. It is subsidized in 16 states (Arkansas, Delaware, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Missouri, Mississippi, Montana, North Dakota, Oklahoma, South Dakota, and Washington) through incentives and tax rebates; most of these go to producers. A federal subsidy amounting to \$264 per cubic meter has resulted in "dumping" of American-made biofuel into Europe at artificially low prices, the European Biodiesel Board has charged. Its members can't compete, and officials say they'll file a formal complaint with the World Trade Organization.

The political factor weighs heavily within the States. Although subsidies in various forms help make a business case for using alternative fuels (including ethanol in gasoline) all grants and tax rebates have expiration dates that must be extended by legislative bodies, including the U.S. Congress. It's unknown how the political climate will affect the future of fuel subsidies, but overall success of the fuels, along with active promotional and lobbying efforts by their proponents, will probably keep the subsidies alive. 

2008-09

Class 8 Truck Report

Truck buyers are waiting in the weeds for an economic recovery, and many fleet managers are holding back on new-truck purchases until business improves. They might not know that the federal Economic Stimulus Package contains substantial tax incentives for capital expenditures, including money spent on trucks. Buyers can expense up to \$250,000 for up to \$800,000 worth of equipment that qualifies under IRS Section 179, and expense it all this year. There are many details, which tax consultants should have, but the tax breaks make it a good time to buy.

Meanwhile, January 2010 ushers in even more stringent diesel-emissions limits, and that will likely result in even more expensive engines and trucks. The upcharges of \$6,000 to \$10,000 that customers saw in 2007 are likely to be repeated in '10, builders say. Of course, there are alternatives to buying new. A variety of used vocational trucks are always

available, and there are glider kits.

Basically new trucks with used powertrains, gliders are gaining popularity among operators who want to avoid expensive EPA-'02 and '07 diesels, say the specialty builders who assemble them. Gliders are the only way to use "pre-emission" diesels in a new chassis, and recycling of other power-train components saves considerable money.

Fitzgerald Truck Parts, which sells glidered road tractors and dump trucks, reports that business is up 20 percent over last year. Indiana Phoenix, a manufacturer of front-discharge mixers, says 75 to 80 percent of its admittedly slow production is now of glidered trucks. Terex Advance, also a maker of front-discharge mixers, says 40 percent of its also-slow production is of gliders, and orders for them are up substantially over last year. Oshkosh also offers gliders.

Tommy Fitzgerald Jr., co-owner of Fitzgerald, says high fuel prices push owner-operators to look for more economi-



Sterling

L- and tandem-rear-axle LT-Line are Sterling's heavy vocational trucks and come with 7500, 8500 and 9500 designations indicating weight classes. Various L models have bumper-to-the-back-of-the-cab (BBC) dimensions of 101, 111, 113 and 122 inches with set-back (SB) or set-forward (SF) steer axles. For 2009, a truck's BBC dimension and axle position will be included on door badges. Engine choices include the Mercedes-Benz 4000; Detroit Series 60, DD13 and DD15; and Caterpillar C13 and C15. An L-Line tractor is now available with a Cummins-Westport natural gas engine, and while it's aimed primarily at Los Angeles port drayage, it could also find use in construction. Mid-range and Baby 8 Acterra trucks can be had with the Mercedes 900 and Cummins ISB, ISC and ISL diesels and the ISL Gas.



Freightliner

Business Class M2V series includes Baby 8 variants such as this 106-inch-BBC model, which uses a Mercedes-Benz 900 engine and other medium-heavy components. M2-112 models use the larger MBE 4000 diesel. The strictly Class 8 FLD-SD (for severe duty) dates to the 1980s but soldiers on, thanks partly to a long-running contract with the U.S. military. It is offered as a truck or tractor with several sleeper-cab options. Freightliner will build it through next year, but it will then be dropped and replaced by a new heavy vocational model. FLD-SDs come with the latest 2007-specification, 14-liter Detroit Series 60; the 12.8-liter Mercedes 4000; or the 15-liter Caterpillar C15. Freightliner and its sibling companies Sterling and Western Star offer several truck models as glider kits (see main article).



General Motors

Since dropping the deal with Navistar, General Motors will continue to build GMC TopKick and Chevrolet Kodiak mid-range conventionals and T-series tiltcabs. Both become 8500-Series Class 8 models when built with heavy-duty axles, suspensions, brakes and other appropriate chassis parts. The C8500 (shown) is available with high-capacity axles, up to 18,000 pounds up front and 46,000 pounds on tandem rears. Standard power for C8500s is the 7.8-liter Isuzu 6H with aftertreatment and other changes made in '07, and over the years its share of sales has risen from 10 to 90 percent compared to the once popular Cat C7. GM is one of two builders (the other is Ford) that still offers the midrange C7, but Cat will stop supplying that engine in January. The 8.1-liter Vortec 8100 gasoline V-8 will soon be dropped from Class 6, 7 and 8 models.

Cover Story: Heavy Trucks

cal power units. The rebuilt 12.7-liter Detroit Series 60 engines his crews usually install produce substantially better mileage than models with exhaust-gas recirculation introduced in October 2002.

“EGR engines get 5 to 5 and a half miles a gallon, whereas ours get 6 to 7 and a half, depending on how you drive them,” Fitzgerald says. A newly glidered road tractor sells for about \$95,000; a complete dump truck costs \$98,000 to \$105,000.

Fitzgerald offers Cummins N14s and Caterpillar C-15s as well as the Series 60s. For another \$2,500 a buyer can get a three-year/300,000-mile warranty on a Detroit engine, which is completely rebuilt with new parts; only the block and crankshaft are used. Reman'd components usually carry a warranty from their manufacturers.

Indiana Phoenix president Joe Elkins says popularity of its glidered front-discharge mixer trucks has grown since the advent of the '07 diesels. Customers can send in major com-

ponents for reuse or trade in worn-out trucks. Phoenix can also find “donor” trucks and components for so-called Certified and Super Gliders. Terex Advance offers similar products and sees much interest in the gliders due to the high cost of EPA '07 diesels, says Rob Turner, Midwest sales manager.

An assembled glider costs considerably less than a new truck — at least 25 percent less by federal regulation — and works just as well, say those in the business. And if done properly, it is not subject to the 12 percent federal excise tax on new trucks. To avoid the FET, the Internal Revenue Service requires that the price of a glidered truck must be less than 75 percent of the list price of a comparable new truck with the same equipment, according to Elkins and Fitzgerald. That's easy because new engines are so expensive.

Freightliner, Sterling and Western Star offer glider kits for several truck and tractor models. Peterbilt offers one. Manufacturers don't widely promote them because their ap-



Mack

New Titan heavy haul tractor (shown) can be built with extra-heavy-duty components for GCW ratings as high as 300,000 pounds, and it uses only a new 16.1-liter (984-cubic-inch) MP10 diesel engine with up to 605 horsepower and 2,060 pounds-feet. Titan replaces the long-nose Cummins-powered CL, which was discontinued two years ago. Granite continues as the company's main vocational model and comes with a roomier cab and other refinements. Mack redesigned the MR low-cab-forward vocational truck with a lower doghouse that provides more room for the driver and gave the truck a new name: TerraPro. All use Mack Power diesels from Volvo Powertrain, either an 11-liter MP7 or 13-liter MP8, usually in Maxidyne tune; MaxiCruise and Econodyne versions are also available.



Navistar

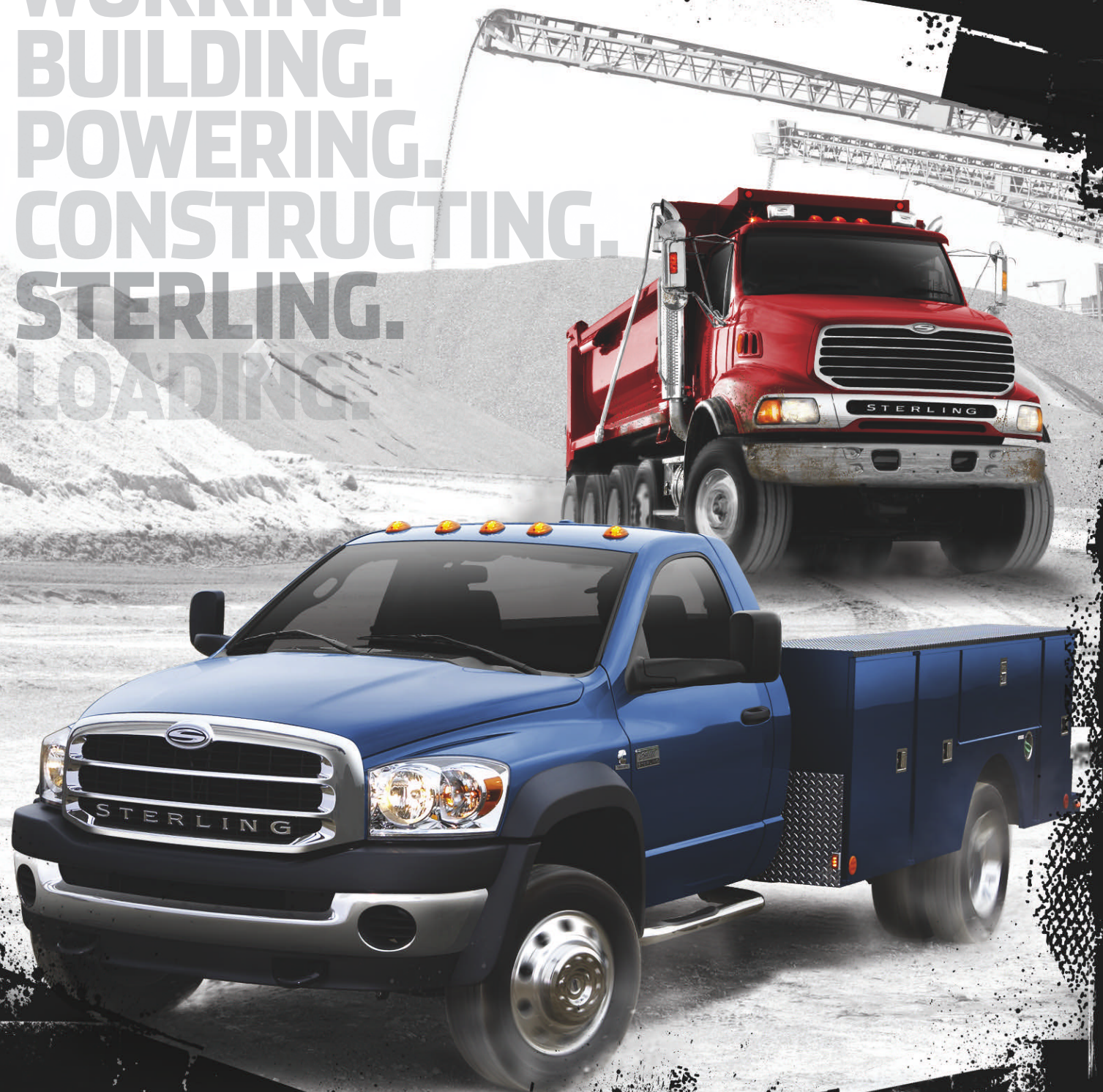
International WorkStar 7000 trucks and tractors use steel cabs from midrange models and are available with a wide variety of chassis options. Integrated Dump Trucks (shown) combine a properly engineered chassis with steel or aluminum bodies and hoists. Because WorkStars come standard with a Diamond Logic multiplexed electrical system, they can accommodate the latest electronically controlled diesels, including International's MaxxForce 11 and 13. Also available for heavy models are Cat's C13 and Cummins' ISM; midrange engines include the MaxxForce DT and MaxxForce 9 and 10. The heavy PayStar 5000i series now has a setback axle version. Engines include Cat C13 and Cummins ISL and ISM; MaxxForce 11 and 13 are slated for 2010.



Peterbilt

Vocational 365 and 367 (shown) are built as trucks and tractors with forward- or rear-set front axles. A Model 340 is Peterbilt's “heavy 7” offering, using midrange power trains on heavier-duty chassis. The traditionally styled long-nose 389 with smoother exterior styling replaced the old 379 (a common dump-truck model on the West Coast), and the medium-nose 388 replaces the 378 tractor. Long-nose Class 8 vehicles will use the 15-liter Cummins ISX and Cat's C15, while medium-nose trucks will have the 11-liter Cummins ISM and Cat's C13. Cummins ISL and Cat C9 diesels will continue as light-weight options. As with Kenworth, Peterbilt's medium- and medium-heavy models will use Cummins-built 6.7- and 8.3-liter diesels, called PX-6 and PX-8, respectively.

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Cover Story: Heavy Trucks

peal is limited and they compete with sales of new trucks. A few dealers assemble gliders and so do a few fleets.

Cat, Navistar developments


Perhaps the most startling development in the truck-building world recently was Caterpillar's decision to drop out of the North American truck-engine business in 2010. Cat cited industry consolidation and the trend by OEMs to develop their own engines, which has made it increasingly tough for independent vendors to compete.

Cat will continue to support all truck engines it has sold over the years, and will continue to build engines for its own off-road machinery, which comprise 90 percent of the Engine Division's activity. Cummins will be the sole surviving independent come 2010.

Cat and Navistar International, meanwhile, agreed to collaborate in truck sales, with Cat's overseas dealers to handle International medium- and heavy-duty trucks and Navi-

star supplying a Cat-branded heavy vocational truck starting in 2010. Navistar will thus greatly expand truck sales in China and other Asian countries, and perhaps elsewhere. And Cat dealers here will have something new to sell, a situation that has angered International dealers.

Navistar also announced a joint venture with American LaFrance that will have LaFrance building vocational trucks using International engines and possibly other components. LaFrance now makes the Condor heavy low-cab-forward truck originally designed by Freightliner, plus a Class 7 variant. These probably will be the basis for the new trucks, which will be sold through International dealers and perhaps LaFrance's, too.

Finally, Navistar and General Motors have cancelled a pending deal which would've had Navistar buying GM's medium-duty truck business. GM will keep the business for now, but indicated the sale could be revived when the economy brightens. 



Kenworth

Vocational lineup for 2009 is led by the T800, a versatile model now available with a Cummins-Westport LNG engine. Other recent options additions include a proprietary AG130 four-bag front axle air suspension, which is disc-brake compatible and available in a 13,200-pound rating; and Allison 4000 and 4500 series automatic transmissions for construction and shorthaul applications using a Cummins ISX with up to 1,650 pounds-feet of torque. The Extended Day Cab option is now offered on on/off-highway C500 vocational models. Available heavy-duty diesels are Cummins' ISL, ISM and ISX, and Caterpillar's C13 and C15. Class 6 T270 and Class 7 T370 models add the 2-bag AG210L, a 21,000-pound rear suspension; they use Cummins-built Paccar PX-6 and PX-8 engines.



Volvo

High-hood VT800 daycab tractor can be ordered with the Volvo D16 or a Cummins ISX, and is at home in vocational duties. The VHD continues as Volvo's main vocational truck, and a VHD 430 tractor added last year has a short sleeper for over-nighting; both come only with a D13 diesel from Volvo Powertrain. Volvo's VHD and VNL (for long-nose) tractors are newly available with 69,000-pound-capacity Meritor tri-drive rear axles now needed for extra-heavy loads in some northeastern states; the tridem rides on Hendrickson-Volvo PriMaax suspensions with up to 63,000 pounds capacity. The VNL is available with a 16,000-pound front axle, double-channel frame rails, and a pusher axle for heavy-haul operations; it can be ordered with the D16 or ISX.



Western Star

The 4900 series is often built for vocational duty, and the extra-heavy-duty 6900 is as much at home off-road as on. As part of the Sterling organization (and therefore the Freightliner family), Western Star will use the Detroit Series 60 in its 4900 FA (forward-steer axle) and SA (setback steer axle) models, with the newer Detroit DD15 and soon-to-be-gone (by the end of '09) Cat C13 and C15 engines as options. The 6900XD will have the Series 60 engine as standard and the Cat C15 as an option; the DD15 will appear in 2010. Western Star has introduced a kit to convert any tractor with a Stratosphere sleeper to a daycab, giving it a new "second life." The kit includes a new overhead console, roof cap with reinforcements, headliner, back wall and trim panel, and new rear-window glass.



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Mini vs. Compact What's the Difference?

Equipment manufacturers define smaller excavators different ways, but the bottom line is more models are available to serve more market needs

So, you're in the market for a compact crawler excavator. Or are you?

The question's intent is neither facetious nor whimsical. In reality, it can be rather difficult for equipment buyers to definitively peg what they want, given how different manufacturers define what is and what is not a compact or mini-excavator, or whether or not those two terms are even one in the same.

The classification of mini-excavators is defined as those up to 6 metric tons, or about 13,200 pounds. Although some OEMs hold true to that designation in the marketing of their smallest excavators, increasingly some do

not. And whereas the latter group is comprised of such manufacturers as Gehl or Kubota that only offer compact excavators and, as such, are encompassing all of their models into their respective product families be those machines below 6 metric tons or not, there are other players like Caterpillar and JCB that offer product families of full-sized excavators and even

beyond, yet are grouping their 8-metric-ton machines into their "mini" families.

In the case of Caterpillar, the migration of the 307 and 308 models down to the mini family from the small excavator family was customer-driven, says Darren Wilson, mini hydraulic excavator industry manager for North America.

"There are still a lot of applications where guys can use a 7- or 8-ton machine in the same job where they once used a 5- and 6-ton machine," says Wilson. "They don't have to go to a lowboy to drag that 308 around. They can still pull it on their trailer behind a six-wheel truck.

"More than anything, what's happened is that the customer base that was using the 5- and 6-ton machine has the capacity to haul around a larger machine, and they have learned they can get a lot more work done."

He cites excavation contractors who serve the residential pool market as a prime example of equipment users who benefit production-wise from the additional reach and less on-site repositioning required of a 308, while retaining the ability to move the machine from site to site as easily as the 305 model they might have used formerly.

Terex includes machines as large as the 12.5-metric-ton TC125 into its "compact" family, which reflects an extension of mini-excavator traits into larger sizes, says Bill Parker, compact excavator product manager.

"Actually, Terex broke it down very much like the market data does, where below 6 met-



The swing boom on the Hitachi ZX85USB-3 excavator enables digging parallel to walls with an "ultra-short-swing" machine that's still sized at 8.5 metric tons. That is beyond the official mini-excavator size, but in a range many manufacturers still define as compact.

The Cost of Ownership

Size	List Price	Hourly Rate*
Less than 1.0 metric tons	\$20,640	\$8.87
1.1 - 2.0 metric tons	\$30,198	\$12.22
2.1 - 3.0 metric tons	\$37,097	\$15.34
3.1 - 4.0 metric tons	\$44,822	\$18.19
4.1 - 5.0 metric tons	\$58,424	\$25.69
5.1 - 6.0 metric tons	\$64,105	\$28.05
6.1 - 8.0 metric tons	\$100,244	\$45.72
8.1 - 11.0 metric tons	\$99,235	\$44.54

* Hourly rate represents the monthly ownership costs divided by 176, plus operating cost. Adjusted operating unit prices used in the calculation are diesel fuel at \$3.96 per gallon, mechanic's wage at \$44.79 per hour, and money costs at 4.75 percent.

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

ric tons is what they call a mini-excavator, and above that they call it the 'midi'. Now that was the German definition, and for translation over here into North America it was combined into the compact group. Along with our mini-excavators, we have a 6-metric-ton, we have a 7.5-metric-ton and, as well, we have the 12.5-metric-ton," says Parker. "I think, more than anything, compact was a marketing buzzword done to say, 'Hey, listen, we've got some larger excavators with shorter tail swing that'll help get us into some more restrictive landscape sites and job areas.' I think it just evolved."

The "compact" TC125 remains, though, at or around 28,000 pounds.

"It's a machine that actually offers a little bit more than a standard 12- or 12.5-metric-ton excavator," says Parker. "It actually competes upwards with our (30,500-pound) TXC140. From a dig perspective, it's got that performance, but what this offers is a dozer blade on the front, standard, that you don't get on some of these larger excavators. It's also a little bit unique with respect that it is the only one that we offer out of our compact product line that does not offer the articulated boom. Performance-wise, it's a dynamite machine . . . and it's got that reduced tail swing. It only extends out about 4.5 inches."

One happy family

For compact equipment manufacturers such as Gehl, Kubota, Bobcat and IHI, it's been



With the 7.5-metric-ton Case CX75, the offset boom pivots at a point between the arm and boom, allowing the bucket to be placed off-center for parallel digging even beyond the edge of the machine's own tracks. Is this machine size a compact? That depends on who you ask.

less a matter of slotting their machines into one family or another, but rather extending the product families they have long established as a corporate focus.

Gehl's excavator family includes the 16,975-pound 753Z, the 17,548-pound 803 and even the 25,397-pound 1202 (with corresponding models under the Mustang brand). Kubota groups its excavators by design, specifically the zero-tail-swing U Series and the conventional KX Series, the latter of which includes the 8-metric-ton KX080-3. Bobcat's extensive compact-excavator family extends to

Buying File: Compact Excavators

Compact Crawler Excavator Specs (5 to 8 metric tons)

Model	Operating Weight (lb.)	Arm Length	Max. Dig Depth	Reach at Ground	Dump Height	Net Power (hp)
Bobcat 337G	11,040	5'0"	12'0.4"	18'10.7"	12'5.7"	48
Komatsu PC50MR-2	11,110	5'4.6"	12'6"	19'11"	13'10.5"	39.1
Yanmar ViO55-5	11,312	n/a	13'0.7"	20'4"	14'5"	38.7
Caterpillar 305C CR	11,465	n/a	11'5"	18'6"	12'6"	47
Kubota U45S	11,465	n/a	11'10"	19'3"	13'0"	42
JCB 8055 RTS	11,510	6'3"	12'4"	19'6"	13'6"	55.5
Kubota KX161-3S	11,532	n/a	12'7"	20'1"	13'8"	47
Komatsu PC58UU-3	11,540	5'3.8"	13'1.5"	18'3"	15'1"	40
Coyote CE55	11,905	n/a	12'3"	19'0"	12'6"	42.3
Kubota KX161-3 Angle Blade	11,950	n/a	12'7"	20'1"	13'8"	47
Hyundai R55-7A	12,020	5'3"	12'6"	9'9"	13'3"	55.2
Volvo EC55B PRO	12,125	5'1"	12'5"	19'6"	13'4"	49.8
Doosan DX55	12,346	5'3"	12'5"	n/a	13'5"	56.4
Takeuchi TB153FR	12,450	n/a	12'10"	20'4"	12'9"	38.2
Terex TC60	12,458	6'1"	12'10"	n/a	12'2"	51.5
IHI 55NX	12,498	n/a	12'5"	n/a	12'2"	37.1
Gehl 603	12,566	5'6"	12'7.4"	20'0"	13'1"	57
Mustang 6003	12,566	n/a	12'7.5"	20'0"	13'1.3"	57
IHI 55N-2	12,733	n/a	12'8"	n/a	13'6"	55.5
Doosan DX60R	12,830	4'10"	12'3"	n/a	13'0"	50.4
Volvo ECR58	12,963	5'0.6"	11'9.7"	19'5.9"	13'0.3"	50.8
JCB 8060	13,210	6'2.8"	13'7"	20'3"	13'1"	57.6
Hitachi Zaxis 60USB-3	13,653	4'11"	12'4"	n/a	13'8"	54
John Deere 60D	13,653	4'11"	12'4"	n/a	13'8"	54
IHI 65NX	14,400	n/a	12'10"	n/a	13'10"	55
Caterpillar 307D	15,598	n/a	13'3"	20'2"	17'1"	56
Komatsu PC78US-6	15,850	5'5"	13'5"	20'6"	17'0"	54
IHI 70Z	16,055	n/a	14'1"	n/a	16'11"	57
Gehl 753Z	16,193	5'7"	13'3"	22'9"	14'9"	57
Mustang 7503ZT	16,193	5'7"	13'3"	22'9"	14'9"	57
Coyote CE75	16,380	5'5.4"	13'2.3"	21'4.9"	14'9.2"	57
New Holland E70	16,400	6'9.5"	14'10"	21'7"	17'9.8"	54
Kobelco 70SR	16,400	6'9"	14'9"	21'7"	17'9"	54
Bobcat 442	16,538	6'7"	13'11"	n/a	17'1"	73
Hyundai R75-7	16,601	5'5"	13'1"	n/a	14'11"	56
Wacker Neuson 8003	16,810	6'1"	14'1"	23'0"	15'10.5"	70
Terex TC75	17,086	6'7"	13'11"	n/a	13'8"	73
Hyundai R80-7	17,200	5'6"	12'7"	20'4"	17'0"	58
Takeuchi TB175	17,230	n/a	15'2"	23'9"	17'2"	58
Caterpillar 308D CR	17,306	n/a	13'5"	20'4"	17'5"	56
Link-Belt 75 Spin Ace Tier III	17,461	5'7"	13'7"	21'0"	17'3"	54
Case CX75	17,468	5'7"	13'7"	21'0"	17'3"	54
Gehl 803	17,548	6'1"	14'1"	23'1"	15'10.6"	57
Mustang 8003	17,548	n/a	14'1"	23'6"	15'10.6"	57
New Holland E80	17,600	6'9.5"	15'3.5"	24'5"	17'3"	54
Kobelco 80CS	17,600	5'11"	14'4"	23'0"	15'8"	54

Source: Spec-Check Expanded Specs (as of August / 08)

the 16,538-pound 442. IHI's "compacts" include 6.5- and 8-metric-ton models, the 65NX and 80NX-3.

"Gehl has continued to expand the compact excavator offering to include machines larger than the typical 6-metric-ton range because end-users understand the benefits of the compact-excavator design," says Brian Rabe, Gehl product manager, compact excavators. "There is currently a product gap between compact excavators and larger conventional crawler excavators that customers are beginning to see, and they desire to bridge that gap.

"Incorporating a swing boom, dozer blade and short/zero-tail-swing radius into a larger excavator allows operators to perform similar jobs such as digging against a fence, wall or foundation with much greater efficiency and precision than even a more capable, larger machine. As our customers' businesses grow, their need to work on larger jobsites with more efficiency leads them to machines larger than the typical 6-metric ton, but they still can use the same jobsite techniques as with the smaller machines."

For those manufacturers offering a full excavator product line servicing all markets, the change is reflected in the type of customer who is using the machines slightly larger than the 6-metric-ton "mini" threshold.

"Traditionally, the 8-ton machine on a jobsite was with a customer who had a lot of large iron, and the machine was more of a utility tractor for that particular contractor," says Caterpillar's Wilson. "It was the smallest machine on the site — the most nimble, the most agile. It was easy to move around on the job and not nearly as expensive as moving a 20- or 30-ton machine that needed to be in production digging to make its value on the jobsite justifiable. They could use that 8-ton machine to move around and place pipe, where they'd want that 320 hogging dirt dragging a trench."

Now, says Wilson, that 308 is more than likely to be with a utility customer who's already got the truck and trailer to haul a 305 or 306. The way he sees it, the 308 has gone from being the smallest machine on a site to being the largest machine on a site.

Other approaches


For manufacturers neither repositioning their 6-metric-ton-plus excavators nor extending their sole compact product families, the slotting of excavators is often based on operating weight alone. Deere groups machines by size: 0 to 6 metric tons; 6 to 40 metric tons; and 40 to 80 metric tons. Hitachi's first group is called "compact" and the second is "mid size." Case's "compact" family ends with the 5-metric-ton CX50B, and its "tracked excavator" family begins with the 7.5-metric-ton CX75SR.

At Komatsu America, the newly updated MR-3 compact series, which features a version of the Komtrax fleet-management system as standard, is topped by the 5.5-metric-ton PC55MR-3. "We felt Komtrax would be an unrivaled feature for the utility product," says David Caldwell, product manager, compact hydraulic excavators. "There are competitive units available out there, but most guys are having to put them on as aftermarket kits."

Moving beyond the MR-3 Series, Komatsu America currently offers as part of its "mid-sized class" the new minimum-radius PC88MR-8, which at more than 18,000 pounds takes the place of the PC78MR-6. A new, lighter PC78 is on its way, says Caldwell.

As a Dash-8 machine, the PC88 has the same Komtrax program, working modes and operator features of the larger machines. "It's got big-machine features in a utility product," says Caldwell. "It incorporates the good of the MR-3 product with the good of the Construction Division product. We're really excited about it."

So, you're in the market for a compact excavator. Or you think so?

To help out, we extended the definition for the product gallery and specification areas of our coverage, but had to saw it off somewhere. In the product gallery, our cap is 11 metric tons. 



Caterpillar D-Series "mini" excavators, including the 8-metric-ton 308D SR, outperform their C-Series predecessors by 22 percent in bucket force and 10 percent in stick force, says the company. Lift capacity has also been increased with the addition of a larger counterweight.

Gallery of Compact Excavators

WACKER NEUSON

New Product Family Hits Market

An entirely new line of equipment for Wacker Neuson in North America, a five-model compact excavator family includes two "true" zero-tail-swing models. With the 3.5-metric-ton 38Z3 and 5-metric-ton 50Z3, the tail stays entirely within the tracks during swing. The line's largest model — the 8-metric-ton 8003 — combines 69.5 horsepower, high-output hydraulics, and a maximum digging depth of 14 feet 1 inch in a short-tail-swing configuration. Yanmar three- or four-cylinder engines power all Wacker Neuson excavators.

Number of models: 5

New models: 1404, 3503, 38Z3, 50Z3, 8003

Product-line features: Each of the five Wacker Neuson excavators features boom-mounted working lights, rubber tracks, a dozer blade and control pattern selection system. A full line of attachments is available for all models.

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CATERPILLAR

Minis Welcome D-Series Upgrades

Three D-Series excavators joined the Caterpillar compact or mini lineup in the spring of this year. The 307D and compact-radius 308D CR models are replacements for C-Series models, while the all-new 308D CR SB combines the compact-radius design with a swing boom for even more versatility. The D-Series excavators outperform their predecessors with 22-percent higher bucket forces and 10-percent higher stick forces, says Caterpillar. Lift capacity has been increased with the addition of a larger counterweight, and a reported 15-percent gain in traction forces improves dozing and turning performance.

Number of models: 10

New models: 307D, 308D CR, 308D CR SB

Product-line features: Each of the three new D-Series compacts is powered by a new turbocharged Mitsubishi 4M40 TL engine, rated at 54 net horsepower. The 308D CR and 308D CR SB are among six compact-radius excavators ranging in size from about 7,500 to 18,500 pounds, providing tight-work-area options for various applications.

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CASE

Added Hydraulic Horsepower for Models

All seven of the Case excavators under 11 metric tons have been reintroduced this year with Tier-4 engine upgrades, including the zero-tail-swing CX17B, CX27B, CX31B, CX36B and CX50B compacts. The 8.3-metric-ton CX80 is similar in size class to the minimum-swing-radius CX75, but boasts one major difference in features. With the center-swing boom, the CX80 can be positioned right along a foundation or dig directly next to buildings. The versatile swing boom can be positioned anywhere within a 130-degree arc. For its part, the CX75 has an offset-boom option. Case has increased hydraulic horsepower on all models to better handle the range of attachments being used by the compact carriers today.

Number of models: 7

New models: CX17B, CX27B, CX31B, CX36B, CX50B, CX75, CX80

Product-line features: Case continues to stress easy maintenance across all product lines, and these machines are no exception featuring swing-out access panels that supply full access to coolers and hydraulic valves. Ground-line daily maintenance checks require no tools, increasing the likelihood the necessary duties will be completed.

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BOBCAT

Variety of Configurations Available

As part of an 11-model compact excavator line topped by the 7.5-metric-ton 442 model, Bobcat recently introduced a replacement for the smallest member of the family. With a dig depth of 6 feet, the 1-metric-ton 418 replaces the 316 and, designed to work in the tightest of areas, was developed to take on a zero-tail-swing configuration when the tracks are extended. Bobcat offers a range of conventional, zero-tail-swing and zero-house-swing models. The two zero-house-swing machines, the 430 and 435, are also available with a hydrostatic FastTrack drive system.



Number of models: 11

New model: 418

Product-line features: Bobcat now offers an angle blade option on the 335, 337, 430 and 435 compact excavators. This allows operators to hydraulically angle the blade plus or minus 25 degrees, creating a four-way blade with up, down, right angle and left angle movement.

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GEHL

Factory-Installed Thumbs on All

In 2008 Gehl introduced the 283Z compact excavator that, with a transport weight of 2.7 metric tons, can be moved on some passenger vehicle trailers. With a superstructure that rotates entirely within the tracks without overhang, as reflected in the Z model designation, the newest Gehl excavator comes standard with two-way auxiliary hydraulics featuring a direct-to-tank return line to seamlessly power attachments. Also new this year, all Gehl compact excavators are available with factory-installed thumbs. All models except the 603 and 753Z have been updated with Tier 3 engines.



Number of models: 10

New model: 283Z

Product-line features: Gehl compact excavators feature (as standard) hydraulically dampened drive levers and pedals to ensure precise handling, as well as independent boom swing, rubber tracks and dozer blades. Models 223 and 373 have a house leveling feature that enables the digging of vertical trenches on hillsides without benching or filling.

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JOHN DEERE

'Compact' Family Continues to Expand

The 6.2-metric-ton 60D is a new model size for John Deere that represents the largest of what the company classifies as its compact excavators. It stands 8 feet 5 inches in height and 6 feet 7 inches in width, with a tail-swing overhang of 12 inches when rotated 90 degrees. Yet, the 60D boasts many features found on Deere's larger excavators, including auto idle, auto speed shifting and multiple engine working modes. The addition this year of the 8.5-metric-ton 85D gives Deere a size and configuration option between the conventional-boom 75D and the 120D.



Number of models: 7

New models: 60D, 75D, 85D

Product-line features: The family's smallest model, the 17D introduced in 2007, features adjustable-width tracks with a foldable-end backfill blade, facilitating the ability to travel through a 40-inch opening.

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KOMATSU

Even Smallest Machines Utilize Komtrax

As Komatsu continues to update its compact-excavator offering, the focus has been on the development of MR or minimum-swing-radius machines. For Conexpo-Con/Agg 2008, the PC35MR-3 and PC45MR-3 debuted with features found on most if not all of the other MR-3 Series compact machines, including the web-based wireless Komtrax fleet management system, a standard thumb mounting bracket, standard auxiliary hydraulics and an integrated counterweight. The 8.8-metric-ton PC88MR-8 incorporates features of the updated Dash-8 medium and large Komatsu excavators, including five working modes and the fully featured Construction Equipment version of Komtrax.



Number of models: 7

New models: PC18MR-3, PC27MR-3, PC35MR-3, PC45MR-3, PC55MR-3, PC88MR-8

Product-line features: An optional power angle blade allows operators of the MR-3 compact excavators to angle the blade 25 degrees to the right or left, which is particularly useful when backfilling trenches. Wide entrances and strategically placed handholds provide easy access to the tilt-forward operator stations.

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Gallery of Compact Excavators

VOLVO

Series Transformation Taking Form

With the Conexpo-Con/Agg 2008 announcement of the new EC35C and ECR48C, Volvo's C-Series transformation of its 10-model-size compact excavator line was underway. The line is comprised of five conventional and five short-radius model sizes, the latter group designated ECR and topping out with the 8.5-metric-ton



ECR88. The EC35C and ECR48C both use the Volvo D2.2D diesel engine rated at 36 horsepower. The 3.5-metric-ton EC35C digs to 11 feet 10 inches

from its conventional upper structure, while the 4.8-metric-ton ECR48C can dig more than 13 feet deep. Simultaneous control of swing and the boom offset enables faster, precise performance.

Number of models: 10

New models: EC35C, ECR48C, EC55C

Product-line features: The joystick is equipped with an electronically proportional roller, allowing the operator to adjust hydraulic flow to the attachments as needed. A Volvo-patented mono-pump hydraulic system efficiently uses one system for all hydraulics.

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NEW HOLLAND

Bigger Machines Create Less Noise

Repowered to meet Tier-4 emissions requirements, the New Holland line of compact excavators also boasts increased bucket



breakout forces, proportional controls for fine leveling and grading and, on several units, the availability of longer arms for greater reach and dig depth. The 3,600-pound E18B offers hydraulically controlled variable track width, ranging from 39 to 52 inches, the latter size at which the machine takes on the zero-tail-swing configuration of the E27B through E50B compact models. The "mid-sized" E70B zero-tail-swing and

E80B short-radius models offer dig depths into the 15-foot range.

Number of models: 7

New models: E18B, E27B, E30B, E35B, E50B, E70B, E80B

Product-line features: The integrated sound and dust-reduction system of the E70B and E80B cuts operating noise by 5 dB(A), making these "mid-sized" excavators as quiet as smaller units.

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YANMAR

Mini New Member of Multi-Family Range

As a member of the Vi0 product family, Yanmar's new 1.7-metric-ton mini is a true zero-tail-swing excavator designed to allow for 360-degree turning of the counterweight within the width of the crawler. The Vi017's tracks are adjustable down from 49 to 37 inches for cramped-site access, and the short-pitch, rubber-track tread blocks offer enhanced driver comfort in travel mode. The mini-excavator has a maximum digging force of 3,417 pounds while providing a digging depth of 7 feet 7 inches.

Number of models: 10

New model: Vi017

Product-line features: Offering models up to 20,730 pounds in operating weight, Yanmar's "compact" range is split into three families. Two SV machines offer ultra-tight turning, topped by the SV100 model, while the 8-metric-ton B7-5A uses a "Sigma" offset boom for zero tail and front swing overhang.

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KUBOTA

Focus Turns to Zero-Tail-Swing Units

To enhance operator comfort, speed and efficiency, Kubota located the two-speed travel switch on the dozer lever of the new U15, U25 and U45 zero-tail-swing compact excavators, complemented by adjustable wrist

rests to help reduce arm movement. While each of Kubota's four U-Series excavators has a 360-degree turning radius, the new models boast differentiating features beyond their sizes: The 1.5-metric-ton U15 features a hydraulically adjustable track gauge; the U25 boasts a swivel negative brake and intelligent control system; and the likewise-intelligent U45 has a load-sensing hydraulic system, auto idling system and angle blade with float.

Number of models: 10

New models: U15, U25, U45

Product-line features: Judged one of *Construction Equipment's* Top 100 products in 2007, the tight-tail-swing KX080-3 model moved Kubota beyond its traditional "mini-excavator" offering. The 64-horsepower, 8-metric-ton package tops the company's KX Series of excavators.

Visit ConstructionEquipment.com/info and enter 168



HITACHI

Big-Machine Traits in Compact Package

At just a shade over 6 metric tons, the new ZX60USB-3 is the largest of what Hitachi considers compact excavators. It, along with the 8.5-metric-ton ZX85USB-3, is a new size offering within the



Hitachi lineup that features swing boom for digging parallel to walls and foundations. The ZX60USB-3 has many features found on Hitachi's larger excavators, such as a choice of standard and economy engine modes, automatic shifting between high

and low speed propel, and auto idle for the saving of fuel.

Number of models: 7

New models: ZX60USB-3, ZX75US-3, ZX85USB-3

Product-line features: As with the ZX85USB-3, the reduced-tail-swing ZX75US-3 at about 8 metric tons carries over features found in other Dash-3 machines, such as regenerative flow on the boom, stick and bucket cylinders for faster down movements, extremely fine control and multi-tasking.

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TAKEUCHI

Updated Models Feature Enhancements

While introducing new 3.5-metric-ton TB235 and 5.0-metric-ton TB250 models, Takeuchi has also incorporated a number of enhancements to its compact excavator product line. A side-by-side radiator/hydraulic oil cooler combo offers a much greater cooling capacity — 38-percent on the TB235, according to the company — and a new larger operator's compartment has 12-percent more interior volume and 15-percent more foot room. New interim Tier-4 engines power the excavators, which come with a control pattern selector valve as standard.



Number of models: 9

New models: TB235, TB250

Product-line features:

A four-pump hydraulic system allows the Takeuchi excavator to handle multiple functions with ease, resulting in faster cycle

times and increased production. Cushioned hydraulic cylinders operating the boom, arm and swing reduce jarring.

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MUSTANG

Longer Undercarriage Enhances Stability

With the introduction this year of the 2.7-metric-ton, trailer-compatible 2803ZT, Mustang has added a fourth zero-tail-swing model to its compact excavator family. While eliminating rear overhang is the main ambition of the zero-tail-swing design, the 2803ZT "goes a step farther" by enhancing stability with a longer undercarriage, says Mustang. For added stability, the slim machine offers a sturdy track width and optional counterweight, in addition to a large cab. A side-mounted engine and rear-mounted hydraulic and fuel tanks provide easy maintenance access.

Number of models: 11

New model: 2803ZT

Product-line features: All Mustang compact excavators feature an advanced hydraulic system designed to allow simultaneous, multiple-hydraulic functions without loss of power or speed. Use of a double variable-displacement pump and self-balancing power regulation provide increased operating speed and power.

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TEREX

Hydraulic System Ensures Flow

The newest addition to the Terex zero-tail-swing excavator lineup, the 5-metric-ton TC50 benefits from Terex's use of axial-piston, variable-displacement pumps and motors in a load-sensing and load-independent flow division hydraulic system. Oil flow is distributed to the cylinders independent of the load, allowing multiple actions at one time. An offset boom design with built-in swing allows multi-width excavation, parallel-to-wall operation, and clear visibility for the operator. Top-mounted, inverted boom cylinders help prevent dirt build-up on the cylinder seals and hoses.

Number of models: 9

New model: TC50

Product-line features: The use of spherical bearings, longer-wear main pin connecting points, and perforated tin/bronze bushings reduces maintenance costs and increases uptime, says Terex. Each compact excavator is built with a large operator's platform featuring two-sided entry.

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Gallery of Compact Excavators

IHI

Zero-Tail-Swing Introductions Continue



With an operating weight of 10,206 pounds, the new zero-tail-swing 40VXL is the latest addition to the 13-model IHI compact excavator lineup. Powered by a 38.5-horsepower Yanmar engine, the 40VXL offers a digging depth of 11 feet 10 inches and digging force of 9,854 pounds. Standard equipment includes a four-post canopy, auxiliary hydraulic piping, pattern change valve, suspension seat, backfill blade and rubber tracks. The 40VXL's introduction in the fall of 2008 follows the 11,700-pound, zero-tail-swing 55NX debuted last year.

Number of models: 13

New models: 40VXL, 55NX

Product-line features:

According to IHI/Compact Excavators Sales, all models in the full IHI line of con-

ventional and zero-tail-swing machines comply with Tier-4 engine requirements.

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LBX

Spin Ace Models Start at Under 8 Tons



In the formal definition of mini excavators, those up to 6 metric tons, the Link-Belt product line would not be considered a player in the market. But when the definition

of compacts is extended, a couple of LBX's Spin Ace models fit the bill. At 17,461 and 18,585 pounds, respectively, the newly updated 75 Mono Boom Tier 3 and 80 Swing Boom Tier 3 minimum-swing excavators are powered by re-engineered Isuzu engines boosted to 54 horsepower. Both the 75SA and 80SA models come standard with a blade attachment.

Number of models: 2

New models: Spin Ace 75 Mono Boom Tier 3, Spin Ace 80 Swing Boom Tier 3

Product-line features: A choice of arm lengths — 5 feet 7 inches or 6 feet 11 inches — is available for both the 75SA and 80SA models. A wide, low-noise cab design features a large entry door and expanded leg room "floating" on silicon-filled isolation mounts.

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DOOSAN INFRACORE

Compact Sizes Defy Operator's Space

Typical of the company's medium- and heavy-duty excavators, Doosan's zero-tail-swing DX compact excavators boast spacious operating areas with ergonomically designed working controls that ensure convenience and comfort for the person at the controls. According to the company,



DX compact excavators offer a host of features, including an electronics package for optimum performance and fuel economy; dual-walled exhaust silencers to reduce noise; convenient hose routing, wiring harness layout and filter placement; and centralized grease points on the boom and arm.

Number of models: 6

New models: DX27Z, DX30Z, DX35Z, DX55, DX60R, DX80R

Product-line features: A wheeled version of the DX55 model is additionally available as part of the Doosan compact equipment offering.

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JCB

Reduced-Tail-Swing Model Makes Debut

At Conexpo-Con/Agg 2008, JCB introduced the reduced-tail-swing 8055 RTS model as a replacement for the 8052 in the 5- to 6-metric-ton excavator range. Beyond the tail swing of just over 2 inches, a new feature is electronic throttle control, which facilitates an auto idle kick-down for improved fuel efficiency. As on the 8080-style machine at the top of the JCB product range, the 8055 has fold-up tracking pedals as standard. As with the smaller 8045, the cab/canopy is isolated from the slew frame to reduce noise and vibration levels for the operator. This is enhanced with the use of an isolated seat base.

Number of models: 11

New model: 8055 RTS

Product-line features:

The JCB compact excavator lineup offers conventional and zero-tail-swing models



ranging from slightly less than 1 metric ton to 8 metric tons in operating weight and from 5 feet 6 inches to 13 feet 10 inches in digging depth. The top-of-the-line 8080 features an advanced management system, as found on many of JCB's full-sized JS and JZ Series excavators.

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Buying File: Attachments

Work Tools Provide Versatility

Kenco

For use on the smallest excavators and up, Kenco's barrier lift attachment can be used to move any concrete structure, including median barriers, sound walls, curbing and piling. An automatic actuator allows for hands-free barrier movement, and the use of elastomer pads provides performance even in wet weather. All models are available with optional self-aligning guides that extend down from one set of the pads to allow the lifter to align itself with the barrier wall whenever the lifter is lowered into position.

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Atlas Copco

With a service weight of 200 pounds, the PB 110 Penta Series hydraulic breaker from Atlas Copco has a high power-to-weight ratio for mini-excavators ranging in size from 1.3 to 3 metric tons. The PB 110 accepts hydraulic flow of up to 9.2 gallons per minute at 1,885 pounds per square inch, delivering a maximum of 1,700 blows per minute. As with the 440-pound PB 210 featuring Krupp percussion technology, the PB 110 has the VibroSilenced damping system.

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Geith

For mini-excavators of any size or make, Geith's new MX Series buckets feature a dual-radius design and tapered profile that collectively both require less resistance when penetrating the ground and allow debris to be cleared more effectively. The 400BHN steel side cutting edge provides a long-lasting smooth edge with effective abrasion resistance. Featuring larger cutters and additional gusseting across the top, extreme-duty bucket versions are also available. The new Geith buckets were initially available with the coupler, to be followed by thumb models.

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BTI

Cutting steel beams is not solely the work of full-sized excavators equipped with shears. Featuring large-bore hydraulic cylinders combined with speed/regeneration valves for enhanced cutting force and cycle time, BTI's SH Series of hydraulic shears includes models suited to compact excavators.

The SH25R works as a second member on excavators that range 2 to 3 metric tons and as a third member on carriers ranging 4 to 5 metric tons. The SH50R fits excavators ranging from 3.5 to 6.5 metric tons.

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Amulet

For mini-excavators as small as 2,800 pounds, Amulet's new low-cost ST rigid and hydraulic bucket thumbs feature a curved, multi-serrated profile that retains the grasping and handling ability sought after by demanding contractors. The ST model performs in rock wall building, land clearing and all aspects of material removal or placement.

Built in the United States, Amulet's ST thumbs are available with or without cylinders.

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CEAttachments

Eliminating the need for a separate tilting attachment, CEAttachments offers the Edge tilting/grading bucket for compact excavators. Tilting up to 45 degrees in either direction, the bucket is available in sizes ranging from 33 to 60 inches, depending on

excavator model, for slope and ditch applications. The bucket does not include teeth, and a replaceable bolt-on cutting edge is optional. The tilting bucket can also be used with an Edge quick-attach coupler, also available from CEAttachments.

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For more compact-excavator attachments, visit ConstructionEquipment.com.

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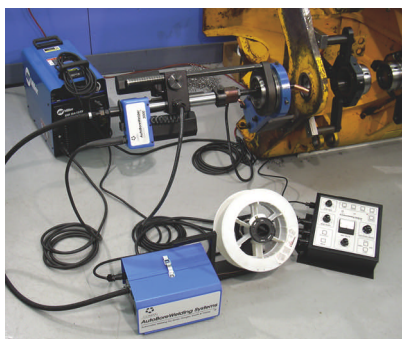
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Welding Equipment

CLIMAX

Quick and easy repairs of tractors, wheel loaders, excavators and other heavy construction equipment are possible with the BW3000Z AutoBoreWelder. The BW3000Z's "step" technology enables users to designate skip-weld areas, and adjust step size, rotation speed, wire feed rate, and arc voltage from one location. Equipped with a standard 6-inch stroke package, the welder attaches directly to several Climax boring machine mounting fixtures, allowing a single setup for both welding and machining operations.

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MILLER ELECTRIC

At just 45 pounds, the lightweight Passport Plus MIG Inverter is portable, and its arc performance is well-suited for welding steel and stainless steel.

When combined with the Miller Spoolmate 100 Series spool gun, Passport Plus can also weld aluminum up to a quarter-inch thick. It can carry an eight-inch spool of wire and 12 ounces of CO₂ shielding gas for welding on steel and mild steel. Aluminum welding is possible by connecting an external argon gas cylinder and the Spoolmate 100.

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MULTIQUIP

The new BDW180MC is a 180-amp welder powered by five 12-volt rechargeable batteries. According to Multiquip, the unit's use of DC power helps it provide smoother welds. Capable of running off the battery pack or while plugged in, the batteries recharge during operation if connected to a power source. The welder produces no emissions, meaning it can also be used indoors. It weighs 129

pounds and comes standard with wheels for easier transportation around the jobsite.

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KOIKE

The compact and portable Wel-Handy Multi welding carriage from Koike offers all-wheel drive, magnetic force traction, and a low center of gravity for increased pulling power and stability. Weighing just 15 pounds, the carriage has a pulling power of 66 pounds. No track is needed, eliminating the costs and time to set up rails, according to Koike. The Wel-Handy works best with Lincoln and Miller MIG welding torches.

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Spotlight

ESAB

The lightweight CaddyTig 2200i TIG welder from ESAB was designed for durability and ease of use. Although portable, the unit's compact design doesn't compromise the important cooling of the internal components. And because the most sensitive parts are inside the machine, they remain dust free. Other features include ESAB's two-program function, which allows the operator to pre-program and change programs during welding.

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LINCOLN ELECTRIC

Weighing in at less than 15 pounds, the easy-to-carry Invertec V155-S is feature-packed and ideal for stick welding. The Auto-Adaptive Arc Force feature minimizes electrode sticking and spatter, and Automatic Hot Start makes striking the arc easier in stick mode. The V155-S can operate from a portable generator thanks to its 115/230-volt auto-reconnect operation, and it can also plug into a 200-foot, 230-volt extension cord for increased portability.

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YORK PORTABLE MACHINE TOOLS

Boasting a myriad of automation features, the York Smartweld System model 830 borewelder calculates weld speed and adjusts the rotation speed during face weld operations. Operators can choose from three welding molds: circular, which welds complete diameters; segment weld for welding partial bores; and skip weld for welding diameters but skipping over bore. The 830 has a bore range diameter of 1.5 to 30 inches, giving the machine a wide working range, and it can be mounted to most portable boring bar set-ups.

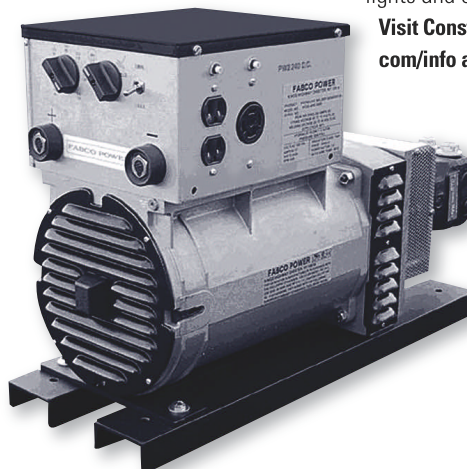
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FABCO POWER

At 165 pounds, the Hydro Arc 7500 is a hydraulically driven DC welder/AC generator combination. It provides 240-amps DC and 120/240-volts AC, while producing 7,500 output watts. Attaching your own air compressor transforms the Hydro Arc into an inexpensive 3-in-1 system. The unit also operates AC tools, air compressors, lights and other tools.

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Three Responses to Budget Variances

Variances are inevitable, but the methods used to account for them must be evaluated for their impact on the organization



Mike Vorster

David H. Burrows Professor of Construction Engineering and Management at Virginia Tech. See [Construction Equipment.com](#) for full archives of "Equipment Executive."

Emotions and creativity kick in when it comes to reassigning a negative variance that impacts the bottom line of an operating statement.

Last month we defined three steps necessary to analyze an equipment account and obtain the information required to manage results and achieve financial targets.

First, ensure that all revenue is correctly reported. Second, ensure that costs and revenues balance within each class or equipment group. Third, ensure that costs and revenues balance by the four major cost categories: owning costs, operating costs, fuel and overhead.

Managers who follow these three steps are better able to understand the reasons for budget variances, take appropriate action, and ensure that budgeted revenue and actual cost are as closely aligned as possible. Even so, budget variances will occur and will need to be consolidated or reassigned.

Emotions and creativity kick in when it comes to reassigning a negative variance that impacts the bottom line of an operating statement. Emotions and creativity kick in when it comes to reassigning a negative variance that impacts the bottom line of an operating statement. A number of fairly standard methods are found in practice. None is perfect. Let's use an example to look at three and describe their strengths and weaknesses.

Our example company has recorded a total cost of owning and operating its fleet for a given period of \$13,380,000. During that time it has generated \$12,350,000 in revenue by billing jobs for the equipment they have used to give a negative variance of \$988,000 on the equipment account. What do you do with this \$980,000 variance, who is responsible, and how do we match responsibility and accountability?

Method A. The equipment department or division is centralized and has responsibility and authority for all equipment costs. The financial statements of the operating divisions and the equipment division are consolidated at the corporate level.

Under these conditions, the \$988,000 loss is carried at the corporate level and does not impact the financial statements of the construction divisions. It appears to be a simple process that leaves responsibility and accountability for equipment cost clearly in the hands of the equipment division, and it does not require any detailed analysis to implement.

The disadvantages, however, are legion. Primary is the fact that operating managers are totally insulated from the true cost of the equipment they use. They pay the agreed rate and are not responsible for the impact of their decisions on equipment costs. Jobs where the equipment is well-operated pay the same as jobs where over-application and abuse are the order of the day. Tough applications are subsidized at the expense of easy jobs. The internal rate is accepted as a measure of true equipment cost, which it is, as far as operations are concerned.

Method B. The equipment department or division is centralized with responsibility and authority for all equipment costs. Company philosophy holds that operations makes the money, so the gain or loss on the equipment account is redistributed to the operating divisions according to some arbitrary rules, such as a percentage of the equipment revenue generated by each division.

This also appears to be a good plan. Budget variances are redistributed to the operating divisions and their financial statements are adjusted accordingly. In the example, the company will apportion the \$988,000 variance according to the amount of equipment revenue generated and deduct an appropriate amount off the bottom line results of each division. It seems simple and logical — each operating division carries its share of the loss on the equipment account.

The behavioral aspects of this method — reallocating a loss in the equipment account

using an arbitrary process — are extremely negative. First, operating-division managers resent having their bottom lines affected by losses accrued in a responsibility center over which they have no direct control. Second, the reallocation process is not perceived as fair. Managers believe the losses were built up in the “other” division where “they” underutilized, abused or underreported the equipment. Other than reasonable simplicity and an overt expression that money is made in operations, the style has few if any advantages.

Method C. The fleet is divided into a number of operating fleets made up of the equipment used by a particular long-term project, operating division or operating company. The equipment division looks after and sets standards for managing the fleet as a whole, but it costs each operating fleet separately in order to produce an operating statement for each separate fleet. Any variance in the budget vs. actual cost performance for an operating fleet is consolidated into the project, operating division or operating company results for the unit that generated the variance.

This is a complex method of dealing with budget variances and relies on three things for success. First, transfers between operating fleets must be minimized, and machines must work in a particular operating fleet for the majority of their working life. Second, information and accounting systems must be able to cost each operating fleet separately. Third, there must be accurate and well-understood mechanisms to allocate and assign the cost of shared services, shops, and general overhead. Under the conditions set out in our example, we would know exactly which project, operating division, or operating company was responsible for how much of the \$988,000 loss. Each unit would then consolidate the calculated amount into its own bottom-line results.

Many of the disadvantages associated with methods A and B disappear. Each operating manager experiences the true cost of the equipment actually used in his or her unit. No arbitrary reallocation of variances perceived to have been generated in another division occurs, and an environment is created where equipment managers work closely


Evaluate the Method

	Positive Impact	Negative Impact
Method A) Budget variances are consolidated at a company level.	Simple and straightforward. Equipment and operating divisions carry the full impact of their budgets and budgeting decisions. Equipment moves easily throughout the company and carries its cost with it.	Neither project nor operating division managers are aware of true equipment costs. Everyone pays the same rate. Internal transfer prices become synonymous with equipment cost.
Method B) Budget variances are reallocated to projects or operating divisions based on equipment revenue.	Expresses the fact that money is made in operations.	Project or division managers do not accept arbitrarily reallocated variances coming from areas not under their control. They attack the system as unfair.
Method C) Budget variances are determined by operating fleet and reallocated to operating divisions.	Variances are accurately calculated and reallocated for each operating fleet. Variances are carried by the organizational unit where the machines worked. Responsibility and accountability are matched within each unit.	The cost of shared services, shops and overhead needs to be allocated to sub-fleet accounts. The creation of relatively static sub-fleets can lead to lower utilization and duplication of some services.

with operating managers to maximize utilization and reduce costs.

Of course, mechanisms must be in place to handle the transactions that occur when equipment is transferred from one operating fleet to another or when a machine works outside its home unit. Mechanisms must also be in place to assign the cost of shared services and overhead. The impact of the overhead allocation process — even when seen to be relatively arbitrary — pales when compared to the negative impacts of a perceived, unfair reallocation of a negative budget variance.

The budget-control process has to do with setting targets and motivating performance. Negative differences between budget and actual are usually seen as a measure of failure, and no one likes them to occur. But they do, and the way an organization reallocates or assigns them can have a real impact on motivation and behavior. Badly done, the negatives of each method can outweigh the positives.

Look at the system and determine if it matches responsibility, authority and accountability. It must be accurate, fair and equitable. 

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Track Managers Cut Crawler-Loader Costs

Reader advisors get long loader life spending just half of first cost on repairs by minimizing undercarriage wear

Owners of crawler loaders larger than 105 horsepower spend about half of their original purchase price, on average, for repair parts and labor over the life of the machine. Only 15 percent of owners spend 75 to 99 percent of first cost on repairs, and 8 percent of owners spend 100 or more percent of purchase price on repairs.

Carefully managed undercarriage, and its lower cost, seems to support this reasonable repair-cost experience for a tracked machine that routinely works hard for 10,000 hours or more.

A significant portion of the *Construction Equipment* Reader Advisory Board, a select group of contractors committed to accurate control of equipment costs, seems to have successfully mitigated the effects of premature undercarriage wear. Eighty percent of our reader advisors turn track-chain pins and bushings as part of their regular undercarriage maintenance program. Half of them are able to take full advantage of pin and bushing life before the turn most of the time. That kind of consistency tends to control track costs.

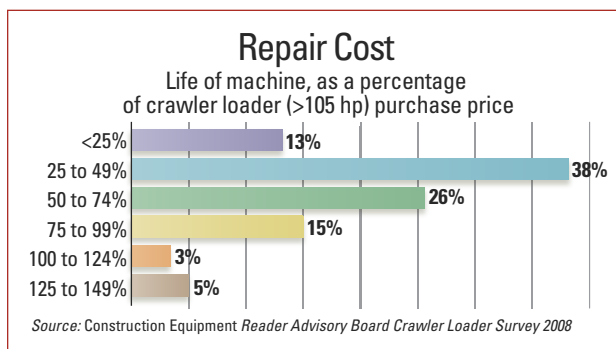
Operating conditions seem to favor long undercarriage life. The average machine operated by our reader advisors works 34 percent of its hours on relatively forgiving soil, gravel and turf. It works about 15 percent of the time in rocky soil and 17 percent on asphalt or concrete pavement. Advisory board machines only endure about 10 percent of their working hours in demolition debris or shot rock.

SEARCH for this story's headline at ConstructionEquipment.com to find the results of nearly 40 perspectives on the cause of premature track wear and as many methods for improving undercarriage life recommended by CE Advisors.

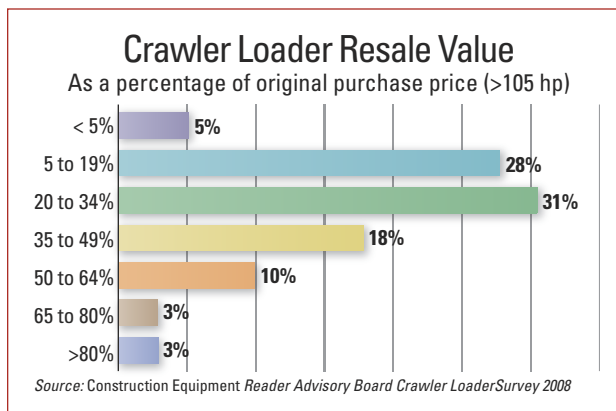
On average, crawler loaders larger than 105 horsepower draw 27 percent of their original purchase price in resale. But while the bulk of crawler loaders resell for less than 35 percent of their original investment, a significant portion of reader advisors (28 percent) realizes in the neighborhood of 50 percent resale value (35 to 65 percent).

Sixty-eight percent of respondents to the crawler-loader survey are highway and heavy constructors and are based in 21 states, evenly disbursed in all regions of the country. Fleet-replacement values are fairly evenly spread from \$5 million to more than \$100 million.

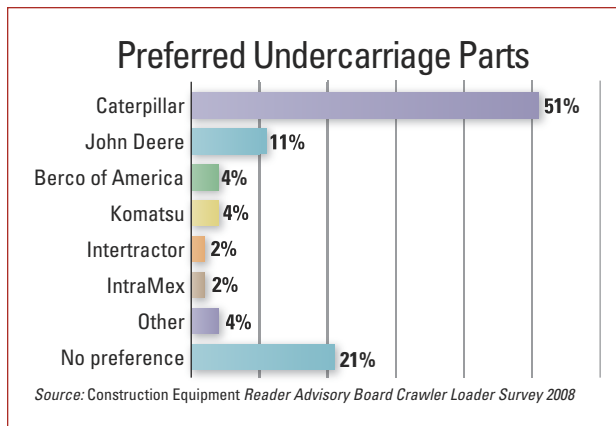
Reader Advisory Board research is co-sponsored by Case Construction Equipment.



On average, owners of crawler loaders larger than 105 horsepower spend a little more than 48 percent of original purchase price on repair parts and labor over the life of their machines.



While 64 percent of crawler loaders resell for less than 35 percent of their purchase price, 28 percent of reader advisors report that they get in the neighborhood of half of their investment back on resale.



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Caterpillar C-Series Loaders Sport Steel Undercarriage

New compact track loaders pack a hefty punch in a small package

Caterpillar has updated its line of rubber-track loaders with the introduction of the C-Series compact track loaders. Central to the 279C, 289C and 299C are the steel embedded track and steel undercarriage components, which extend machine life even in rough operating environments.

"It's actually a rubber track with steel bars embedded inside the tracks," says Pierre Verdon, Caterpillar skid steer and multi-terrain loader industry manager. "And the way it works is that the sprockets located in that area are going to plug into the track and create traction."



Caterpillar C-Series Compact Track Loaders

Model	Rated Operating Capacity (lb.)	Operating Weight (lb.)	Net HP	Bucket Pin Height at Max Lift (in.)
279C	3,200	9,892	82	123
289C	3,850	10,365	82	127
299C	4,150	10,730	90	129

Designed for durability and aggressive traction, the undercarriage utilizes an external-type sprocket, steel track rollers and idlers, conventional spring-type recoil mechanism, and rubber tracks. But even with its sturdy build, the C-Series offers a smooth ride for operators, as the undercarriage is suspended by a pair of torsion axles on each side allowing the track assemblies to flex independently.

"The one thing I do like about this machine, with the new undercarriage that it has underneath and the steel tracks with the sprockets, is it does seem to have a little bit more power," says Steven Stratton, president of Steven Stratton Inc. "You get more power to the ground. It is a lot easier to clean and it's quieter."

The C-Series is powered by the Cat C3.4T inline, four-cylinder, turbocharged diesel engine with a 201-cubic-inch displacement. Boasting two-speed drive systems capable of

The C-Series' steel undercarriage boosts power and facilitates cleaning while delivering a smooth ride.

reaching a maximum speed of 8.5 miles per hour, the three models can quickly traverse large work sites.

Rated operating capacities are 3,200, 3,850 and 4,150 pounds at 50 percent tipping load, with a net horsepower of 82 for the 279C and 289C, and 90 for

the 299C.

Thanks to a foot throttle, which can be used to adjust engine speed or reduce sound levels, operators can be productive while remaining comfortable, according to Cat. The C-Series track loaders also feature independently adjustable joystick controllers, which are console-mounted for improved forearm support, and a suspension seat. For added comfort, Caterpillar offers a sealed, pressurized and heated cabin, with options to upgrade to air conditioning and an air-ride seat.

"You can see right down onto the tracks, which is really good for us because we're working right next to the buildings," says Shon Johnson, operator with Arizona Onsite.

To facilitate maintenance, the lift-arm safety braces, rear door that swings 90 degrees, and tilt-up cab give technicians easy access to important internal components.

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Taking It to the Streets

MacLean Engineering makes move above ground with newest product

At first glance, it's an unorthodox product introduction for an equipment manufacturer that, for 35 years, has exclusively served the hard-rock underground mining industry worldwide.

Not so, says MacLean Engineering's Scott Johnston. A sidewalk-friendly, all-season municipal vehicle designed to serve the North American market, the MacLean MV is "a natural evolution" for a company specialized in building rugged machines for niche markets working in harsh conditions. In that respect, the MV is right up the road forged by company founder Don MacLean, who built a legacy of innovation based in the underground mining hub of Sudbury, Ontario, Canada, with such product lines as the Scissor Bolter mechanized bolting systems and Blockholder secondary breaking systems.

"We wanted to look at other things we could build that took advantage of our core strengths," says Johnston, technical sales manager and product development manager with MacLean's diversified products division.

"Whereas there are large manufacturers in the mining market that build products that have very broad market appeal, Don uncovered some specific needs within that broad market and built machines to cover those more specific needs. Also, underground mining is an extremely demanding environment, and it's an extremely toxic and corrosive environment in general," says Johnston. "Municipal tractors take advantage of heavy frames and axle, working in that toxic, corrosive salt and sand environment, in extreme conditions.

"We realized these are areas where we do have some expertise in. Albeit they're in a different field, but the environment is very similar. We wanted to build products that shared a common level of technology and similar, very demanding environment, and that's how we got to this tractor."

Powered by a 127-horsepower Caterpillar engine, the articulating and oscillating MV is driven by a hydrostatic transmission coupled with two-speed mechanical gearbox and, with full-time four-wheel drive, can reach a working speed of



Historically focused on hard-rock underground mining products, MacLean Engineering's first venture in above-ground equipment is the MV municipal vehicle.

Basic Specs: The MacLean MV

Operating Weight	6,292 lb.
Width/Height/Length	49.4"/82.4"/13'1.8"
Engine Power	127 HP
Torque	376 ft.-lb.
Drive	Hydrostatic
Max. Working Speed	7.5 mph
Max. Travel Speed	20 mph

about 7.5 miles per hour and travel speed of about 20 miles per hour. Key to the versatility demanded of the municipal market, says Johnston, the MV stands out from other equipment types for its ability to power attachments both hydraulically and mechanically.

"A standard agricultural tractor is strictly rigid-framed and, when you go to power an attachment, you power it with a mechanical power take-off (PTO). Then take a skid steer, for example: That's also a rigid-framed machine that drives like a tank. When you need to power an attachment, you would power it hydraulically with a connector on the front of the machine," he says. "On a municipal tractor like ours, we have a wide variety of methods to power attachments, from a high-horsepower snow blower to a front-mount broom or rear-mount sander. Our tractor has a front-mount mechanical PTO, as well as front- and rear-mount standard high-flow hydraulics."

About two years after starting with a clean sheet of paper, says Johnston, the first MV rolled off the assembly line at a new Ontario plant in mid-January. Six months later, the company announced an agreement to acquire 25-year-plus attachment manufacturer Kanlan, which supplies such tools as snow plows, blowers and water tanks for MacLean and other OEMs.

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Soucy Fits Rubber Tracks to Many Machines

Maker of Cat and ASV rubber tracks now retailing retrofit kits for 30- to 500-hp tractors

Soucy exhibited its ST-900 heavy-duty track modules on a JCB telehandler at Conexpo 2008 as its official introduction to the construction market aftermarket. The Quebec-based company has been making rubber track, drive wheels, idlers and rollers for ASV, Caterpillar, Bombardier, and other OEMs for quite some time. They began marketing complete track modules directly to ag-equipment users about five years ago.

One of the primary differences between the Soucy track module and most other rubber-track systems is that Soucy doesn't use belt tension to transfer drive torque to the belt. Instead, they mold their track belt with two or three rows of drive lugs projecting to the inside. Lugs interlock with horizontal bars placed around the circumference of the drive wheel. The drive wheel is a spinning cage, rather than a toothed sprocket. With multiple rows of lugs, there are always 10 or 12 lugs engaged with the cage wheel at the same time.

"We've got each lug boxed off (between the bars of the cage wheel) so the belt can't slip on the sprocket," says Peter Watkins, Soucy's U.S. sales manager. "Dirt can't get packed in between the wheels and the belt and cause slippage, and you don't have to worry about losing pressure in a tensioner and then getting slippage or the belt coming off the sprocket."

"The track module uses less horsepower because there is not the great tension on the belt."

Soucy engineers estimate that a tractor on Soucy tracks in a drawbar application — doing heavy backfilling or vibratory plowing — will use about 10 percent less fuel than the same machine on tires.

Kits are designed to bolt to the ends of a machine's axle using the wheel studs. So a rubber-tired machine converted to tracks using these modules can be switched back to tires again, if desired. Changing the tires for tracks and back is about as easy as changing tires, for those who have a hoist to lift the track modules.

The ST-900 heavy-duty track modules are mostly custom projects. Those on the JCB telehandler in the accompanying photo are 25 inches wide and weigh about 2,000 pounds each. Outfitting the whole machine like this costs about \$55,000.

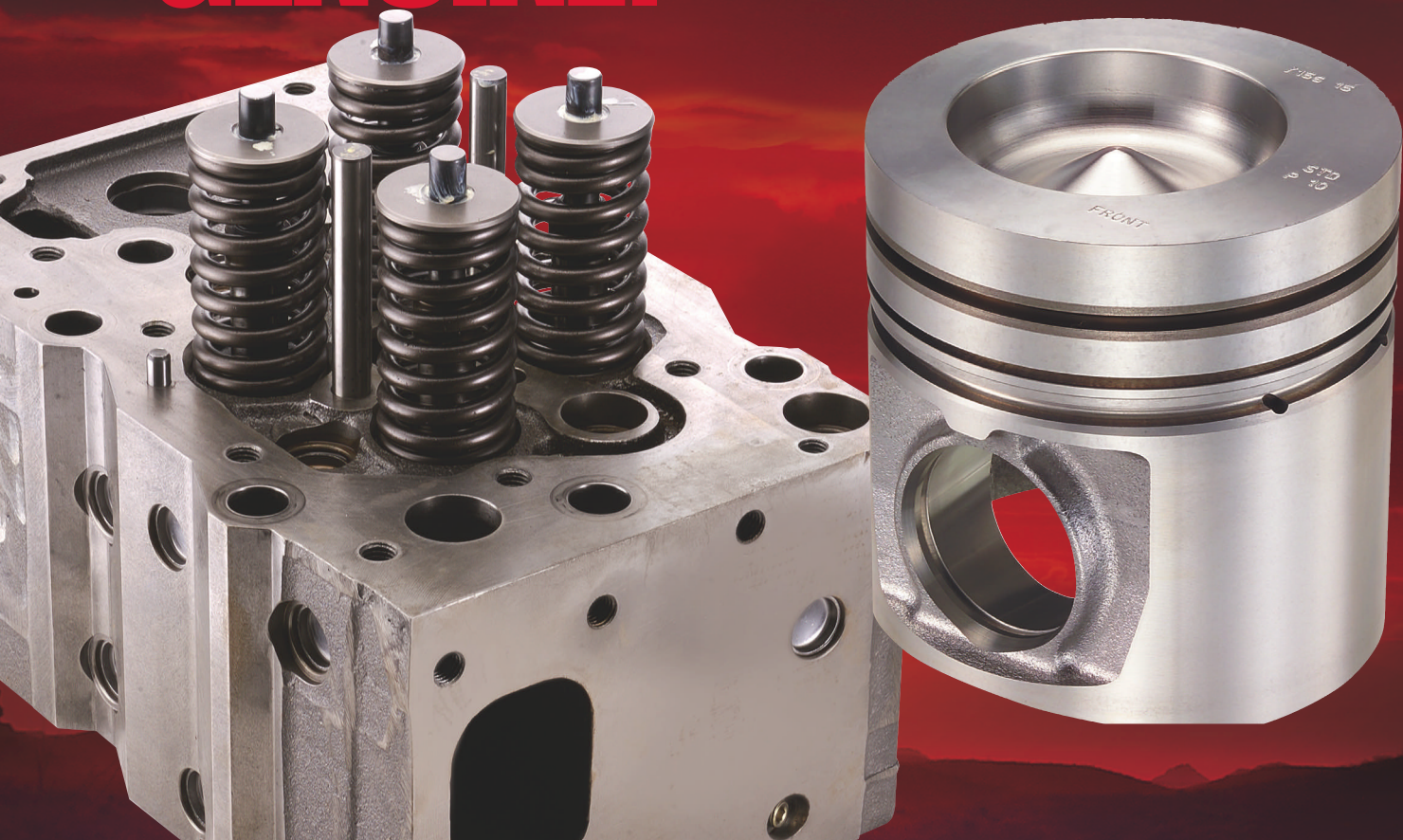
Soucy makes track kits in 15-, 20-, 25-, and 32-inch widths to fit everything from 30-horsepower tractors or utility vehicles up to 500 horsepower articulated tractors. The biggest 32-inch-wide kits weigh 3,000 pounds each. It costs about \$75,000 to fit all four corners of a big tractor.

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Twenty-five-inch-wide tracks significantly improve flotation and can improve fuel economy by as much as 10 percent in drawbar applications.

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⬆ E-Z Drill

Using E-Z Drill's new Model 20 UTL drill, utility companies can drill through road surfaces at intervals to check for gas, narrow leak areas to a stretch between holes, and reduce the amount of pavement that must be removed to make a repair. Although designed for the gas industry, the 207-pound, pneumatic Model 20 UTL can handle many vertical drilling needs. The standard 18-inch drill depth can be customized to reach several feet deep. Drill bit diameter ranges from 5/8 inch to 2½ inches. The motor requires at least 100 cubic feet per minute of compressed air.

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▶ Allmand

Three new Port-A-Lite Balloon-Lite models are designed for high illumination levels with minimum glare. The BL 2000 TH uses an instant-on 2,000-watt tungsten halogen bulb and produces 33,000 lumens of illumination. The BL 1000 MH and BL 2000 MH are more powerful, with energy-efficient metal halide lamps. One 1,000-watt metal halide lamp produces 110,000 lumens in the BL 1000 MH, and two 1,000-watt lamps combine for 220,000 lumens in the BL 2000 MH. Tripods for the Balloon-Lite are offered in heights of 11, 15.4, 18 and 27 feet.

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✔ Hilti

Described by Hilti as "the most powerful combihammer on the market," the TE 80 ATC-AVR puts a new 1,700-watt motor to work with a number of such established Hilti drill product features as active torque control (ATC), active vibration reduction (AVR) and a theft protection system (TPS). It is designed for a wide range of demanding heavy drilling and demolition jobs, including hammer-drilling concrete, masonry and natural stone in diameters ranging 0.75 to 6 inches; drilling through-holes in concrete and masonry up



to 6 inches in diameter; heavy chiseling; and more.

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Snap-tite

QuikXchange quick-connect hydraulic coupling system is designed to quickly connect or disconnect hydraulic lines going to hammers, breakers, or other hydraulically operated attachments on excavators more than 40,000 pounds. Easily connected under pressure, the drybreak system allows for clean disconnection and enables one person to change hydraulic lines in 5 minutes or less. The 1-1/4-inch unit comes in three ISO-6162-2 Type 1 Flange connection sizes from 1 to 1-1/2 inches with a working pressure over 6,000 psi.

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✔ Topcon

Topcon developed machine-control kits for Komatsu's D51 slant-nose dozer model with customized mounting brackets, cables, hydraulic and machine-control components to simplify installation and save time in the field.

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Market Watch Lite



Lincoln Electric

Operating at as low as 5 amps on both AC and DC for thin materials, ranging up to a maximum of 230 amps for heavier TIG and stick welding applications, the Precision TIG 225 welding source offers arc performance for applications ranging from aluminum and sheet-metal fabrication to automotive welding. Lincoln's Micro-Start II technology minimizes high frequency used for arc starting and delivers enhanced arc stability throughout the welding cycle. A standard pulse control allows users to visually set the desired pulse frequency before ever striking a welding arc.

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Stehr

The SBV 60 H hexagonal plate compactor is capable of being operated by a 2.5-metric-ton mini-excavator, despite its "6-ton" output classification with 60 kN of centrifugal force. It comes with base plates measuring 26.5x26.5 inches and 33x33 inches. Stehr plate compactor attachments have a 100-percent vertical compaction force. Actually suitable for use by hydraulic excavators up to 15 metric tons, the 650-pound SBV 60 H compactor is simple to attach and detach.

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Haas

Find the exact location of a truck, dozer, excavator or any other type of equipment with the Haas H1000 GPS vehicle tracker. The H1000 also automatically transmits vehicle records and programmed activities to a business or personal computer, as well as mobile phones. As an added bonus, the unit can monitor operator driving habits and send alerts if operators violate driving conditions.

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▼ The Shoe

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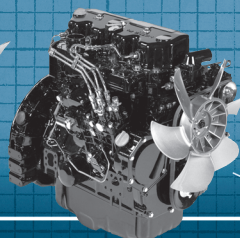
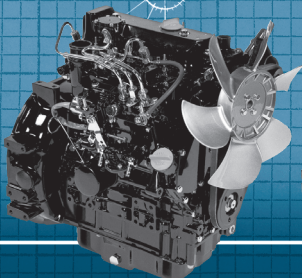
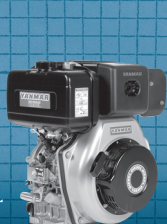
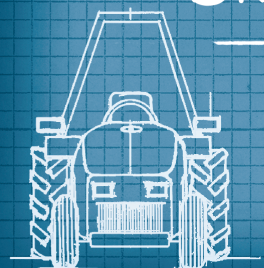
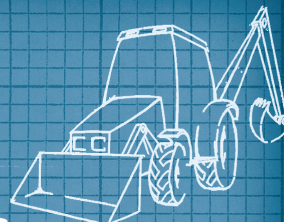
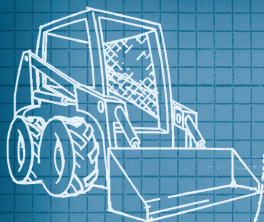


▲ UIC

Unassisted Implement Connections (UIC) developed a Quic attachment system that grabs on to 4-inch pins welded inside a backhoe or excavator bucket. On the UIC implements, 1½-inch steel hooks (painted yellow in the photo) engage the pins and hold the rake, blade or pipe implement in place. Pockets on the back of the UIC implement keep it from moving side to side. Workload is transferred to the bucket through the bucket teeth. Quic Rake, Quic Blade and Quic Pipe implements are made in lengths that vary from 4 to 12 feet.

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▶ Metabo

As a combination hammer, model KHE 96 SDS-Max allows users to move from masonry drilling to demolition without switching tools, the company says. Rotational torque is 1,062 inch-pounds, and impact energy ranges from 1.0 to 27.0 joules per blow. Drilling range is 1 to 2 inches using solid bits and 6 inches using core bits. The chisel can be locked into 16 different positions. The 15-amp motor has a no-load variable speed of 125 to 250 rpm, and 0 to 1,950 bpm.

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▶ ConocoPhillips

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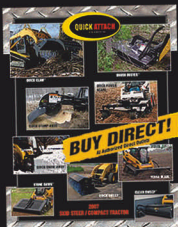
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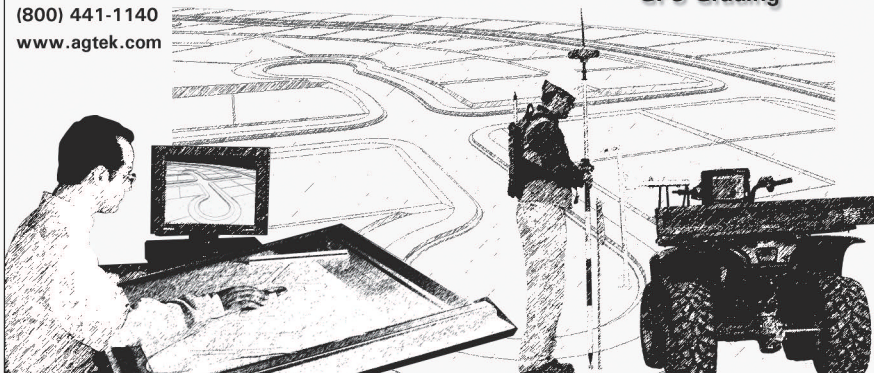
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Iron Works

By KEITH HADDOCK, Contributing Editor

Bucyrus 120-B Mining Shovel

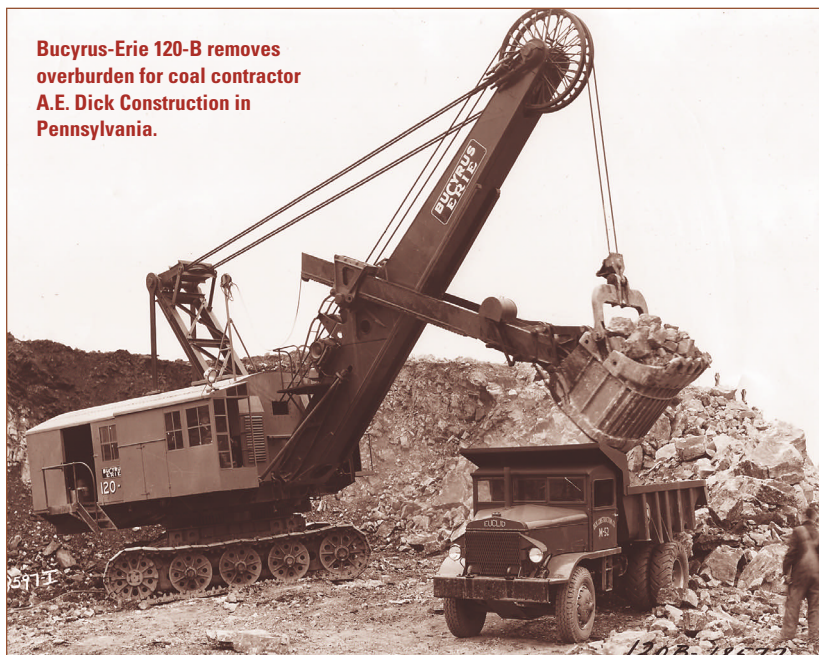
When nothing on the market would efficiently dig and load large quantities of tough rock, Bucyrus pioneered the quarry and mine shovel

In the 1920s, quarries and hard-rock mines were expanding their use of shovels to load haulage vehicles with larger quantities of material than ever before. The only shovels heavy and robust enough for tough quarry work were the old-faithful steam railroad shovels, many of which had found their way into large quarrying operations. Although some had latterly been converted to crawlers, freeing them from restrictive railroad tracks, their working capabilities were still severely hampered by long steam boilers at the rear, and boom and dipper assembly with swing limited to about 180 degrees. Shovels with 360-degree swing were available, but these were either small construction-sized units or long-boomed gangly stripping shovels not robust enough for hard digging. Clearly there was a need for a machine that combined the railroad shovel's robustness with the stripping shovel's full-swing capability.

In 1925 Bucyrus answered the call with the 120-B, announced as the world's first mine and quarry shovel designed for loading rail cars or trucks. Initially introduced as a 4-cubic-yard shovel, the 120-B tipped the scales at 170 tons, and its robust construction and "over-design" earned it an enviable reputation for reliability in the toughest digging. It was ruggedly built, utilizing massive castings and riveted construction in an era when welding was not yet established. It moved on standard 36-inch-wide crawler shoes and sat firmly on a substantial undercarriage measuring 17 feet wide by 19 feet 4 inches long. Its 32-foot-long boom and 22-foot dipper handle provided a maximum dumping height of 21 feet 6 inches at 39 feet 3 inches radius. The twin dipper handles were mounted outside the boom, and the crowd motion was driven by rack-and-pinion from a boom-mounted motor.

When electric welding came of age in the mid 1930s, the 120-B shovel graduated from riveted to electric-welded construction. While retaining its rugged steel castings for carbody and revolving frames, its welded boom and other assemblies permitted increased dipper capacities to 5 cubic yards with no significant gain in overall machine weight. Some of the 120-Bs were steam driven, and the last two sold in 1939 were the very last steam shovels built in America.

The electric 120-B shovel utilized separate DC motors for



its various motions and employed the Ward-Leonard system of control. This system, used on all Bucyrus shovels until recent times, replicated the precise control of the former steam shovels and provided maximum torque at stall speed. AC power was supplied to the shovel via a trailing cable which drove a 275-horsepower motor-generator set. This in turn provided DC power to the hoist, crowd and swing motors, with crawler propel driven from the main hoist motor through a train of gears, shafts and clutches.

About 330 of the 120-Bs were sold around the world over a period lasting almost three decades. During this time, other shovel manufacturers and Bucyrus themselves developed full lines of different sized quarry and mine shovels based on similar design parameters, and it's on these that today's high-capacity electric mining shovels have been developed.

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Learn more about machines built by Bucyrus in Keith Haddock's just-released and fully illustrated book: "Bucyrus Construction and Mining Machines 1880 to 2008", now available in bookstores. Also, consider a membership in the Historical Construction Equipment Association, www.hcea.net, and be sure to visit ConstructionEquipment.com for past Iron Works features.

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