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July 2007  
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## Hardy Hauler

**ASV applies its  
track technology  
to utility crawlers  
p. 32**

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-J.D. POWER AND ASSOCIATES

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#### 32 ASV Scout: Innovation Plus Proven Technology

Since ASV began business building crawler carriers in the 1980s, then redirected its efforts toward the Posi-Track loader line, the new Scout SC-50 "tracked utility vehicle" seems to bring ASV's product-development full circle. The new model uses proven technology from the Posi-Track line, but also exhibits its own innovation.



### EXCLUSIVE: LIFECYCLE RESEARCH

#### 38 Scrapers, Graders, Track Loaders Stretch Component Life

Judging from the long engine and transmission life of these fairly specialized machines, it appears that contractors take exceptionally good care of these units. Failure rate of main components scarcely accelerates as the machines age, keeping more graders, scrapers and track loaders in primary production longer than other common machines studied by *Construction Equipment* lifecycle research.





## HANDS-ON TRUCKING

### 46 Big, Bold Nose Among WorkStar's Features



Truck Editor Tom Berg heads to Caterpillar proving grounds in Tucson, Ariz., to drive new International trucks powered by '07 Cat engines with diesel particulate filters and other equipment needed to meet the new federal exhaust emissions. International reps also explain the rebadging of their truck line, with most models getting Star-suffixed names; for example, the 7000 series (pictured) becomes WorkStar, a newly coined moniker.

## MAINTENANCE MANAGEMENT

### 50 Tread Gently When Choosing Tire Patterns

With the high cost of tires today, it is obvious that tire tread patterns are not designed for cosmetic reasons. Tire treads serve a specific purpose, especially in the often hostile environment of off-highway and construction applications. Of the

seven general tread categories (two are urban and transit service), five are more focused on applications most familiar to construction firms: over the road, mixed service, all position, steer axle, and drive axle.



## BUYING FILE

### 54 As Product Line Grows, Track Becomes Clear

They have some common parts; they are often rolled out together, but the compact track loader is not simply an altered skid-steer. And as more manufacturers offer dedicated compact-track-loader lines, the differentiation of the product becomes even more profound.



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\*Based on fuel productivity for more than 1300 hours of truck loading and hopper charging for quarry and aggregate applications.



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## Diesel Doldrums

If California's contentious debate over air quality is any indication, America's fleet faces a dire future.

Those managers responsible for on-road trucks know what the 2007 EPA regulations have done to, or will do to, their fleets as new engine technologies combat NOx and particulates. That transition will pale in comparison to the shift facing fleet managers over the next few years, when off-road engines must meet similar requirements.

This year, particulate filters and other engineering solutions changed truck design. Add in the ultra-low-sulfur diesel fuel, and equipment managers now wrestle with maintenance-management challenges.

This draconian reduction will hit off-road engines beginning next year. The Tier 4 standards require the reduction of particulate and nitrogen oxides by 90 percent. This will be phased in over several years, but the technologies will be similar to what we've seen with the 2007 truck engines.

Back to California, where state EPA officials want to accelerate the Federal guidelines. Public comment on these moves has been greater than anticipated, and the public hearing begun May 25 has been extended until the California Air Resources Board (CARB) meets July 26.

According to Ritchie Bros. Auctioneers, the discussions are already moving some fleet owners to sell machines that will be affected by California's proposed action on emissions. "If the vote passes, equipment covered by the new regulations will have to be retrofitted, re-powered or replaced — at the expense of equipment owners," according to Ritchie Bros. press materials. As a result, the auctioneer says, many fleets are selling now rather than scrapping equipment.

Equipment professionals can count on actions in California moving to Texas and rapidly across the country. If equipment owners must turn over their fleets in an accelerated fashion, or as more fleets decide to rid themselves sooner than later, the used-equipment market could become pretty dicey.

Whether in 2007, 2008, 2010 or 2030, all construction equipment must run cleaner. For equipment managers, the looming question is how do you bring your fleet into compliance? And how do you dispose of the noncompliant units?

The future is cleaner, but the path is far from clear.

Rod



**Rod Sutton, Editor in Chief**

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Albian Sands Energy, Inc.*



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# MARKET WATCH

By KATIE WEILER, Managing Editor

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## ► Caterpillar

With a rated operating capacity of 3,250 pounds, the vertical-lift 272C is the largest-capacity skid-steer Caterpillar has ever produced. Each of the 246C, 256C, 262C and 272C models boasts such machine-control features as electro-hydraulic joystick control of the hydrostatic drive system and electronic torque management. Operator comfort, too, reaches new levels with an optional sealed, pressurized cab and air suspension seat. Additional options such as high-flow XPS hydraulics expand versatility.



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## ► Sprinter Vans

Dodge and Freightliner dealers have begun selling redesigned Sprinter vans, buses and cab-chassis trucks that have new V-6 gasoline and diesel engines, fresh styling, and better handling than previous versions. High-cube vans include a Mega roof (shown), and cab-chassis versions can be mounted with a variety of work-truck bodies. Diesel V-6 claims high fuel economy, while lower-cost gasoline engine makes sense for low-mileage operators. They are rated as 2500 Class 2 and 3500 Class 3 trucks.



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## ► Dodge Truck

Dodge says it is pricing the Ram 4500 and 5500 Chassis Cab trucks under competitors as it begins production this month. Ram 4500, rated at 16,500 pounds GVW, and Ram 5500, rated at 19,500 pounds, will use only the 6.7-liter Dodge Cummins Turbo Diesel, with horsepower and torque of 305 and 610 pounds-feet, mated to manual or automatic transmissions. They'll come with two-door Regular or four-door Quad Cabs and with two- or four-wheel drive. They are similar to the current Ram 3500 HD, but have beefed-up frames, suspensions, axles, brakes and wheels. Ram 4500's retail price starts at \$34,050 and the 5500's begins at \$36,050.



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## ◀ Volvo

Volvo created a full-suspension option with shock absorbers and automatic leveling and stability control for the A35E and A40E articulated haulers. Capacities increased — the A35E by a ton, and the A40E by two tons. The new Volvo D16 engine in the A40E boasts 12 percent more power and 19 percent more torque than the engine in the A40D. Volvo improved gear-ratio overlap in the new automatic, nine-speed transmission for more consistent power transfer. These models also have new frames, axles and a new drop box with longitudinal differential and 100 percent lock up.

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# Market Watch



## ◀ Bobcat

The Bobcat 425 ZTS (zero-tail-swing) excavator weighs in at 5,849 pounds in standard trim, or 6,257 pounds with the long-arm option. The excavator has a maximum digging depth of 8 feet 4 inches and a maxi-

um reach at ground level of 14 feet 10 inches. A long-arm option increases those numbers to 9 feet 4 inches and 15 feet 9 inches, respectively, but does result in a slight (3-inch) tail swing, because of added counterweight. The new machine uses a 26-horsepower, liquid-cooled diesel engine and provides an auxiliary hydraulic flow of 13.2 gpm.

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## ▶ JCB

JCB exchanged six-cylinder Isuzu engines for a new four-cylinder diesel from the supplier to bring its JS Auto excavators into compliance with Tier 3 regulations. The smaller engines — with exhaust gas recirculation, intake-air cooler, and electronic governor — deliver up to 25 percent more horsepower and torque than their predecessors, and use up to 12 percent less fuel. The 11 new tracked and four new wheeled models range in size from 30,800 to 57,200 pounds.



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## Terex

Terex CMI Series 6 concrete slipform paving kit replaces typical nut-and-bolt connections with a wedge/pin locking system, reducing downtime from width changes, the company says. Benefits include a smoother ride, shorter hydraulic hose assemblies, and lower mobilization expenses. The kit offers widths from 12 to 38 feet, and it is available for SF3500B and SF 6004 series pavers.

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A large yellow Caterpillar roller is shown paving a road surface. The roller has "CATERPILLAR" written on its front. In the background, a dump truck is unloading material, and several construction workers in safety gear are visible. The scene is set on a construction site under a clear blue sky.

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## **John Deere**

New features enhance the productivity of D-Series motor graders. Placed for good visibility between the blade and front wheels, a mid-mount scarifier option for the 670D, 672D, 770D and 772D models comes equipped with a full set of 11 teeth for strong ground penetration. For the all-wheel-drive 672D, 772D and 872D, a new low-speed precision mode allows the operator to dial down the tractor speed in first, second or third gear to about 0.25 mph.

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## **Extec**

The S-6 Doublescreen mobile screening system incorporates two 10-x5-foot screen boxes, each with its own drive system and each capable of being independently angled. According to the manufacturer, this design presents a massive screening area and allows an exceptionally clean product. The system uses a patented screen-box lift mechanism to facilitate mesh changes, and it features long, chevron-type belted side conveyors.

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## **Vermeer**

The TG5000 tub grinder features a 60-inch-deep, 12-foot-wide tub opening. The bottom of the tub flares outward from the tub wall, allowing the hammermill to cut under the vertical wall of the tub, helping to reduce bridging and permitting steady feeding of material. Powered by a Tier 3 Cat six-cylinder diesel, the unit boasts excellent power and fuel economy. An optional cab and loader can be mounted on a pedestal.

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# Market Watch

## ▶ Kobelco

Using a 150-hp, Tier-III-compliant, six-cylinder diesel engine that develops 490 pounds-feet of torque, the SK210LC Acera Mark 8 excavator weighs in at 47,800 pounds and digs to 22 feet. It is equipped with Kobelco's Intelligent Control System, which is designed to provide precise hydraulic response and to manage the machine's overall working efficiency. Double-flow hydraulics are designed to power a wide range of attachments.

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## ◀ John Deere

Updated to the J-Series, the 1050 crawler dozer is powered by a new Tier 3 Liebherr 12-liter engine with a wet-sleeve design, providing electronic fuel management and 335 net horsepower at 1,600 rpm. The slow engine speed aims at longer life, low fuel consumption and low noise levels. The 1050J calls on a full-featured, single-joystick-controlled, hydrostatic drive train, allowing for power turns under load, counter-rotation, and dynamic

braking. It has an infinitely variable speed range from 0 to 6.8 mph.

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## ▶ Sakai

The triangular track drive system on the CV550 single-drum vibratory roller can climb 45-degree slopes while compacting. The vibratory drum delivers more than 50,000 pounds of centrifugal-force output. The CV550 is powered by a 169-hp turbocharged Isuzu diesel. Two configurations are available: a smooth drum for semi-cohesive soils, and a padfoot drum for cohesive soils.

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## ▼ Custom Equipment

Suited to indoor applications, the Hybrid family of compact scissor lifts has been expanded with two new models.

The HB-1430 weighs 1,650 pounds with a rated load capacity of 670 pounds, and it features a two-person 25-x60-inch platform with a 30-inch slideout deck. A global version of the HB-1030, the HB-1030E weighs 1,324 pounds with a rated load capacity of 750 pounds.

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## ◀ Volvo Trucks

VHD vocational trucks built for concrete mixer duty are now standard with Volvo Enhanced Stability Technology (VEST) to reduce the possibility of rollovers in the high-center-of-gravity vehicles.

Made by Bendix, VEST uses the truck's anti-lock braking system and traction control to monitor wheel speeds and compare them with other dynamic motions in the chassis and, if necessary, reduce power and apply individual brakes to lessen the chance of rollovers. VEST uses sensors to determine steering angle, lateral acceleration, and pressure in the rear suspension's air bags to measure driver input and vehicle response in changing situations.

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## ▼ Bri-Mar

Bri-Mar's four Low Profile Heavy-Duty Dump Trailers can be used to haul materials as well as transport light equipment. All have 81½-inch-wide beds that are 12, 14 or 16 feet long. With deck heights of 27 to 31 inches, most light equipment can be loaded on them using 6-foot ladder ramps. GVWR ranges from 10,000 to 14,000 pounds, and trailer payloads range from 6,600 to 9,750 pounds. Optional gooseneck models are capable of greater payloads.

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710J	123 hp	17 ft. 10 in.
310SJ TMC	92 hp	14 ft. 11 in.
410J TMC	96 hp	16 ft. 1 in.



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# Market Watch



## ◀ Caterpillar

A Z-bar loader linkage puts fewer obstructions in the operator's line of site to the work tool, and improves dump clearance and digging forces for the 906H, 907H and 908H compact wheel loaders. A high-speed option boosts travel speed from the standard 12.4 mph to 21.7

mph. Buyers choose between a horizontal-pin quick coupler and a skid-steer loader coupler to match their attachments, and can equip the loader with high-flow auxiliary hydraulics.

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## ▼ Caterpillar

Caterpillar's Auto-Connect quick coupler for 20- to 40-ton excavators integrates hydraulic connections for fully automatic tool changes — the operator never has to leave the cab. As many as



six hydraulic, fluid, pneumatic or electric lines can be plumbed through the coupler to supply attachments. Rigid work tools without hydraulics, such as buckets, do not require conversion to be picked up by the Auto-Connect cou-

pler. Bucket breakout force does not change.

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## ◀ GOMACO

The GT-3400 integrates GOMACO's G21 electronic controller for grade, steering, cross-slope, reverse steer and all other paving functions with a radio-remote handset. The operator controls all functions from anywhere — even on the ground close to the mold. The transmitter changes frequency every 200 milliseconds to maintain uninterrupted control. The handset can be plugged into a tether and the wireless transmitter disabled when radio use is restricted. The three-tracked GT-3400 will slipform a 2-foot radius. Direct drive delivers 27,280 foot-pounds of torque at the 24-inch-diameter trimmer head. The 27,500-pound machine is powered by Caterpillar's 127-horsepower 3054E diesel engine.

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## ▶ Topcon

The Topcon/Sauer Danfoss joint venture, TSD Integrated Systems, claims AutoPave will provide paving grade-control accuracy equal to a robotic total station at about half the cost of using Millimeter GPS. It achieves ¼-inch accuracy by adding a laser reference to GPS positioning. Topcon's PZL 1 transmitter emits a patented 'fan beam' signal 33 feet high, sweeping a 2,000-foot diameter. A sensor atop a mast on the toe arm of the paver controls the grade. Multiple Topcon rovers can work with millimeter accuracy from the same laser.

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## ▶ Komatsu

Komatsu's 135-horsepower, 28,600-pound WA250PZ-5 wheel loader replaces the WA250-5 and WA250PT-5 with what Komatsu calls PZ kinematics. The PZ linkage combines the benefits of both previous models, with the breakout force at ground level of a Z-bar boom, and high tilt-back force at maximum boom height typical of PT kinematics. The boom provides parallelism for easy pallet handling and it has few connection linkages and bolts, enabling maximum stability, high payloads, and clear view to the work tool.

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## Trimble

The Trimble SCS900 Tablet Edition puts the software's data management and graphics features into the processing power of a tablet PC, extending use of Trimble site positioning systems to field managers. It provides easy access to the same digital design data that field crews are using so users can review and edit designs on the tablet. The supervisor can drive the site, measuring ground elevation and monitoring current cut/fill depths. The system puts control of the GPS system in the hands of the supervisor.

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# The Power of Choice

## The New GT-3400, Nothing Remotely Like It...



The GOMACO GT-3400 is the first new curb and gutter machine to be remote controlled! The remote control is lightweight and gives the operator total freedom to move about the operation. The remote features all the necessary functions, including vibrator adjustment and an emergency stop. The GT-3400 can be right-hand or left-hand pour. It features a revolutionary, high-powered trimmer, and changing molds is quick and easy with the new Hook-and-Go system. Its total length is less than 20 feet (six meters) and the new three-track design features All-Track Steering. The GT-3400 is the beginning of a whole new class of curb and gutter machines. There's nothing remotely like it!

Choose from several models of GOMACO curb and gutter machines... the choice is yours.

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## MANUFACTURER NEWS

### Case Celebrates Backhoe-Loader Milestone

The year was 1957, and the Edsel (note the billboard) still had a future. The Edsel was around for only three model years, but the construction machine in the foreground was just the first in a long line of successors, which have carried on that machine's basic concept for 50 years.



The machine in the old photo is a Case 320 backhoe-loader, the first machine Case purpose-built for digging and loading in construction applications. The backhoe-loader concept, says Case, replaced the farm tractor fitted with a loader attachment and a jury-rigged backhoe.

If we could, wouldn't it be interesting to invite the man on the 1957 Case 320 into the cab of the 580 Super M? Taking note of the new machine's pilot controls, cushy seat, climate-control system and coffee-cup holder (what'll they come up with next?), he'd probably think that running a backhoe-loader today could hardly be considered "work."

— Walt Moore

## MANUFACTURER NEWS

### IR, Lingong Round Out Volvo Line

At the Bauma trade show in Munich, Germany, Volvo Construction Equipment President Tony Helsham announced that the company plans to integrate its motor-grader products with the recently acquired Ingersoll Rand Road Development division into one Volvo CE road-machinery business group headquartered in Shippensburg, Pa.

Acquisition of the IR division includes a full range of heavy compactors, asphalt pavers and milling machines. The acquisition also thrusts the Volvo brand into the North American materials-handling market, as it includes IR's U.S.-produced telehandlers and rough-terrain forklifts.

Volvo CE gains 20 dealers in North America and distribution companies in Europe and Russia, which will extend the company's reach in the regions.

"Strategically, the acquisition of

Ingersoll Rand Road Development fits exceptionally well with Volvo's current operations within motor graders and positions Volvo as a full-range manufacturer of heavy road construction equipment," says Helsham. "Geographically, the purchase also fits Volvo CE very well and provides attractive growth possibilities by capitalizing on the common dealer network in North America, Europe and Asia."

Volvo CE is also integrating acquired Lingong, the No. 4 Chinese wheel-loader producer. Volvo and Lingong's combined wheel-loader production will be 25,000 units, which Helsham says will top the global market. Lingong comes with 170 distributors in China. The two acquisitions position Volvo to push for its goal of becoming the world's third-largest producer of construction equipment by the end of 2009.

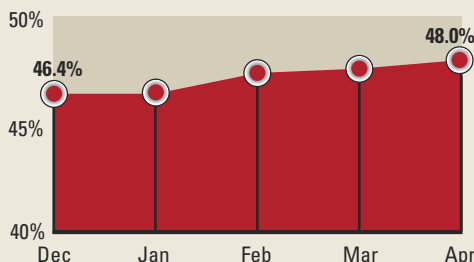
— Larry Stewart

## USED EQUIPMENT

### Auction Values Are Holding Strong

#### The Rouse Value Index

(Avg. orderly liquidation value as % of cost)



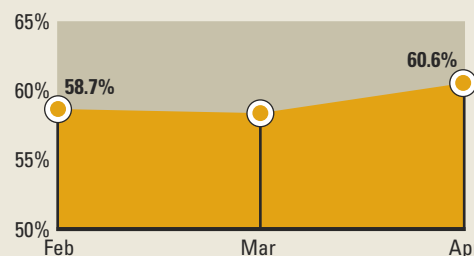
Note: Orderly liquidation value is expressed as a percentage of replacement cost (average cost paid for a new unit by large rental companies and dealers) for the average age of equipment within that category. Includes 10 categories of equipment common to rental fleets.

Source: Rouse Asset Services

Values for used equipment across the major rental categories were up 1.0 percent in April, compared to March. They are up 3.1 percent from six months ago. Each of the top 10 rental-equipment category indexes posted value increases when compared to values for the previous month.

### Skid-Steer Loaders Rebound

(Avg. orderly liquidation value as % of cost)



Skid-steer values are up 6.7 percent over the past six months, posting a 3.7-percent increase in April.



# Managers Digest

For more headlines: [ConstructionEquipment.com](http://ConstructionEquipment.com)

## TRUCK NEWS

### Dodge Prices Heavier Rams; New Sprinter Vans Enter Market

Dodge Truck is using aggressive pricing to kick off its entry into the Class 4 and 5 market with its Ram 4500 and 5500 models, which enter production this month. Starting price for the 4500 Chassis Cab is said to be \$645 less than for a major competitor, Ford's F-450, and the Dodge comes standard with diesel power and an array of other features.

Meanwhile, updated Sprinter vans are entering the market with revised suspensions, new engines and fresh styling. As with the previous model, diesel-powered Sprinters claim exceptionally high fuel economy. They come with high-volume van or bus bodies, and as stripped cab-chassis

vehicles.

Suggested retail price for the 2008 Dodge Ram 4500 Chassis Cab is \$34,050 and base price for the Ram 5500 Chassis Cab is \$36,050. Both include a destination charge of \$900. Although called Heavy Duty, the trucks are medium-duty in weight ratings: 16,500 pounds gross vehicle weight for the 4500 and 19,500 pounds GVW for the 5500. They go on sale this fall.

The midrange Rams, using cabs from the 1500, 2500 and 3500 series pickups and frame designs from the more recent Ram 3500 Heavy Duty, will be sold only as Chassis Cab vehicles for the mounting of a variety of commercial bodies. They'll come



Dodge says its Ram 4500 (shown) and 5500, with GVW ratings of 16,500 and 19,500 pounds, respectively, are priced under competitors.

only with the 6.7-liter Dodge-Cummins Turbo Diesel, rated at 305 horsepower and 610 pounds-feet, with 6-speed manual or 6-speed automatic transmissions. They'll be available with two-door Regular or four-door Quad Cabs and with two- or four-wheel drive.

Their frames consist of new front sections and upgraded C-channel main-rails spaced 34 inches apart in the rear, with bolted crossmembers. They also have higher-rated suspensions, brakes, wheels and tires, giving them a slightly higher stance than the Class 3 Ram 3500 HD on which they are based. They'll be assembled at a DaimlerChrysler plant in Mexico, where 3500 HDs are now built.

The gasoline Hemi V-8 will not be offered in the Ram 4500 and 5500 HDs, executives said, because more than 85 percent of customers

for Class 2 and 3 pickups and cab-chassis models pick the diesel, and few commercial customers are likely to want gas engines.

Conversely, the new Mercedes-Benz-built Sprinter vans have a new 3.5-liter gasoline V-6 option along with a new 3-liter, V-6 turbo-diesel, which replaces the old inline 5-cylinder M-B diesel. Both come standard with 5-speed automatic transmissions. The new Sprinters ride and handle better than the previous models, and have modernized styling inside and outside. They are rated as 2500 Class 2 and 3500 Class 3 trucks.

The Class 4 and 5 commercial truck mar-

ket that the heavier Rams will compete in now sees sales of about 140,000 units a year, Dodge execs said, and is expected to grow about 20 percent by 2015. Ford and General Motors now grab most sales in the conventional-cab segment, though International also offers conventional and low cab-forward models and Hino has conventionals.

Both Ford and GM also sell LCFs, as do Isuzu, Mitsubishi Fuso and Nissan UD. Competition will be based on features and price, and most contenders are expected to fiercely defend their current market shares.

— Tom Berg



Redesigned Sprinters come as chassis-cabs (shown) or as vans and buses. They have new engines, fresh styling, and handle better than previous models.

## CLARIFICATION

### Xtreme's New Telehandler

Xtreme Manufacturing manufactures the XRM1267 telehandler; it does not import it from Dieci, as was stated in the May Lifting Report. We regret the error.



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# Managers Digest

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## INDUSTRY EVENTS

### Educational Opportunities Abound at Louisville Show

Equipment professionals will have an even greater opportunity to test their IQ at ICUEE this year.

The 2007 edition of the International Construction and Utility Equipment Exposition (ICUEE) will offer attendees a wider variety of pre- and at-show educational sessions targeting underground, above-ground and overhead applications. New for ICUEE 2007, all show seminars will offer Continuing Educational Units credit to attendees.

Pre-show programs include an advanced horizontal direc-

tional drilling workshop conducted by Underground Construction Technology (UCT) and two certification courses from the Occupational Safety and Health Administration (OSHA). An underground industry authority, UCT will be offering a special co-located education program throughout ICUEE.

Other on-site educational opportunities include a trench rescue awareness program

from the National Utility Contractors Association (NUCA) and a fiber restoration exhibit by the North American Telecommunications Damage Prevention Council (NTDPC). The NUCA program will help contractors better understand trench safety issues, including hidden hazards associated with rescue operations. The NTDPC exhibit will include live fiber optic splicing as part of its overview on what forms an underground fiber optic

telecommunications network and what is required to repair it when damaged.

A field trip to the McAlpine Locks and Dam is also part of the ICUEE educational program. The complete schedule is available at [www.icuee.com](http://www.icuee.com).

Known as "The Demo Expo," ICUEE will be held Oct. 16-18 at the Kentucky Exposition Center in Louisville. The 2007 show will feature hands-on working equipment demonstrations and more than one million net square feet of the latest in equipment, technologies, products and services.

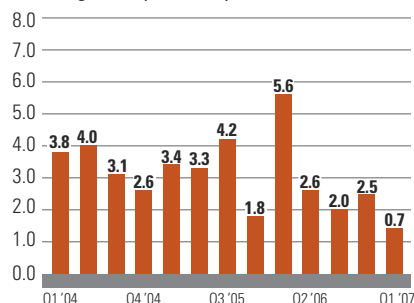


## STATUS & FORECAST GROSS DOMESTIC PRODUCT

The 0.7-percent economic growth rate reported for the winter quarter is the low point for this business cycle. GDP growth will progressively move back to about 3 percent by the end of 2007 and remain at that level through 2008. Already, early second-quarter economic reports show a pickup since winter. This includes employment, consumer spending, factory production and business investment, wage rates and consumer confidence.

For more of July's economic analysis, check Economic Outlook at [ConstructionEquipment.com](http://ConstructionEquipment.com).

(% change from previous quarter)



Source: U.S. Department of Commerce

## ACQUISITION TRENDS

### Pickups Offer Numerous Options

Only 25 percent of *Construction Equipment* subscribers add trim packages to their pickup trucks, according to new research conducted by the magazine. On the other hand, nearly nine of 10 have put automatic transmissions and air conditioning in their trucks. Reasons vary, but many fleet managers decide on options depending on which can be recouped at resale. For more on this and other trends in pickup-truck usage, visit [ConstructionEquipment.com](http://ConstructionEquipment.com).

#### OPTIONS

Automatic transmission	87%
Air conditioning	86%
Towing package	76%
Heavy-duty suspension	69%
Four-wheel drive	67%
Stereo	59%
Extended cab	48%
Limited slip/locking diff.	44%
Special tires	38%
Crew cab	32%
Dual rear wheels	29%
Trim package	26%
Power take-off	10%

Source: Construction Equipment 2007  
Pickup Truck Usage Survey





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#### KX71-3

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#### RTV900

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## **ASV Scout: Innovation Plus Proven Technology**

This new rubber-track carrier borrows established technology from its loader counterparts, then adds some good ideas of its own

By WALT MOORE, Senior Editor

The Scout uses a proprietary, suspended undercarriage similar to that used for ASV's Posi-Track loaders, except that it has an oval configuration with a non-elevated sprocket.



Photos: George Pfoertner®



## QUICK SPECS

- Model.....ASV Scout SC-50
- Net HP ..... 46
- Operating Weight..... 4,560 pounds
- Ground Pressure ..... 2.56 psi
- Overall Width ..... .66 inches
- Track Width..... 15 inches

## REPORT FIELD REPORT FIELD REPORT FIELD REPORT



**Left:** Payload capacity in the 1.3-cubic-yard dump box is 3,300 pounds; and the Scout, with a two-speed drive system, can hustle along at 11.5 mph in high range.



The Scout's dump-box tailgate can pivot from the bottom or top. Top pivot allows spreading material, and in this position, the tailgate latch is controlled with a handle accessible from the driver's seat.

**N**ow and then *Construction Equipment* editors run across what seems to be an emerging product category, and such it is with rubber-track hauling machines, typically identified as "crawler carriers" or "crawler utility vehicles" or "all-terrain carriers." Although these units have been around for a while, we're hearing more about them from manufacturers such as Hitachi, IHI, Komatsu, Morooka and Yanmar, which, collectively, have 18 basic models ranging in horsepower from 10.4 to 400, and in operating weight from 2,200 to 35,000 pounds.

It's a bit unclear just where the line falls among these models to separate dedicated haul units from those having a more multipurpose character. But one of the newest entries in this product category, the ASV Scout SC-50, is definitely in the latter group, reflecting a utilitarian design, which, according to Brad Lemke, ASV's director of product development, will allow



the Scout to work effectively in a wide range of applications, including construction.

The Scout's overall design and its potential for application versatility prompted *Construction Equipment* editors recently to visit ASV at its Grand Rapids, Minn., headquarters for a hands-on introduction to the new machine. We spent the better part of a day with Lemke and Hannah Tanata, product-marketing manager, who explained that the Scout is a logical extension of ASV's rubber-track-loader technology.

A standard ROPS surrounds the Scout's operator's compartment, right, to which can be added an optional roof and rear window assembly (and a front tip-out windshield), left. Add lift-off doors, center, to completely enclose the cab. Heat is included with the enclosed-cab option.





**Design details, clockwise from upper left: With the Scout's engine cover removed, ASV's Lemke holds the two simple wiring harnesses that connect the auxiliary-hydraulic joystick to its control valve; a side compartment gives access to routine-maintenance points and to the fuel filler for the Scout's 30-gallon tank; and a heavy-duty cover for the front auxiliary-hydraulic panel includes a bail for towing or tie-down.**

But ASV is hardly a newcomer to the rubber-track-carrier market. When the company opened its doors in 1983, its first product was the Track Truck, a half-track vehicle designed as a year-round, all-terrain transporter. When Track Truck users began to push the vehicle beyond its design limits by equipping it with homemade attachments, the new company turned its engineering expertise toward developing rubber-track loaders with legitimate attachment-handling competence. From that beginning, the present Posi-Track loader line has emerged.

So, in a way, ASV's product-development efforts have come full circle, because the new Scout SC-50 uses much of the proven technology embodied in Posi-Track models. The Scout, for example, is fitted with an oval-track variation of the company's proprietary rubber-track undercarriage, the R-Series Traction and Support System (RTSS), which employs multiple rubber-rimmed wheels to spread machine weight evenly over the tracks.

Each of the Scout's track assemblies uses



10 such wheels — eight bogies (smaller wheels) and two larger idlers. With 59 inches of track-on-ground, the 15-inch-wide, proprietary rubber tracks provide a total contact area of 1,770 square inches, yielding an approximate ground pressure of 2.5 psi. And like Posi-Track models, the Scout's undercarriage uses a roller-type sprocket, and its track frames are suspended with torsion axles (two per track frame), which have the ability to flex in rough terrain. The undercarriage is virtually maintenance-free, having only two grease fittings per side.

The Scout's power train is similar to that



of the Posi-Track RC-50 loader, using the same four-cylinder, 46-net-horsepower Perkins diesel engine and nearly identical Rexroth hydrostatic-drive system. The point, says Lemke, is that this combination of design elements gives the Scout the needed performance characteristics for its various potential applications, but does so by using much of the proven content of ASV loaders.

### Design innovation

But the new Scout also exhibits its own brand of innovation. Its optional dump body, for example, can be quickly mounted (or removed) from its large, flat, diamond-plate rear deck, which can be fitted with cargo-restraining side rails when the dump body is off. An optional auxiliary hydraulic system, which delivers 16.3 gpm at 3,000 psi, provides quick-connect fittings at the back of the cab for powering deck-mounted equipment, and at the front bumper for front-mounted attachments.

The Scout also is the first ASV machine to use an electro/hydraulic joystick for auxiliary-hydraulic control. Two slender wiring harnesses link the joystick to the auxiliary control valve, eliminating the pilot valve and plumbing associated with a conventional auxiliary system. The joystick allows, for example, lift, lower and angle functions for a front snow blade, plus raise and lower functions for the dump box (via an integral thumb control). A trigger on the joystick controls a float position for front attachments.

ASV also has simplified steering and directional control with innovation. On the steering shaft, just forward of the cowl, are two thick plastic cams that rotate with the steering wheel to control the movement of two spring-loaded plungers in a pilot valve, which regulates oil flow in the drive system. In similar fashion, for directional control, a large floor-mounted “quick-shift” pedal rocks side-to-side to allow instant (and smooth) forward/reverse changes.

These features do make the Scout an easy and intuitive vehicle to drive. We found the steering sensitive at first, and it took a few maneuvers to get the hang of steering-wheel-



movement-to-track response, but it's a technique soon mastered. As a safety feature, each occupant must have a seat belt fastened, and the operator must push an “unlock” button before the Scout will move.

According to ASV, the combination of the Scout's beefy frame, good weight distribution and strong undercarriage accounts for the machine's considerable hauling and towing capacities. In standard trim, the Scout has an operating weight of just over 4,500 pounds, but can handle a 4,000-pound load on its 24-square-foot deck, or 3,300 pounds in its 1.3-cubic-yard dump box. Towing capacity in either configuration is 5,000 pounds. Along

**Top:** The dump box has an integral hydraulic cylinder and an integral sub-frame that mounts to the deck with six bolts.

**Bottom:** With the bolts removed and hydraulic lines disconnected at the rear of the cab, fork slots at the rear of the box allow for an easy lift off. Side pockets on the box accept sideboards.



with other potential deck-mounted attachments (a concrete mixer, core-drilling/soil sampling package or fire-fighting apparatus, for instance), additional front-mounted attachments (perhaps sweepers and augers) will be developed. Currently under development is a Category-1, three-point hitch for attachment use at the rear of the vehicle.

Also under consideration is a utility package that would allow using the Scout's auxiliary hydraulic system to power a variety of hydraulic hand tools. And for logging and landscaping, or in any application requiring a machine



Although the Scout's tracks don't counter-rotate, it's plenty nimble.



With its suspended undercarriage, the Scout provides a supple ride at top speed.

that leaves no footprints, the Scout can be fitted with ASV's smooth turf tracks, which leave the ground virtually undisturbed. ASV is working with a number of partners in a wide range of industries to develop application-specific work packages, says ASV's Tanata, and will investigate and expand this offering to meet customer requests.

The base configuration of the ASV Scout SC-50 has a suggested list price of \$26,495. The basic Turf Edition, with smooth tracks, lists for \$28,495.

## TALKBack

What is your opinion? Go to the online article at [ConstructionEquipment.com](http://ConstructionEquipment.com).



Track trailers, such as this log loader, using an ASV undercarriage, might be useful tools in many applications.



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## Scrapers, Graders, Track Loaders Stretch Component Life

Durability of major components keeps these earthmovers  
in primary production longest

**R**esults of *Construction Equipment's* 2007 Component Lifecycle Research suggest that the decline in population of scrapers and crawler loaders may be nearing its end, and that it would be very difficult for another type of machine to apply fine grade as inexpensively as motor graders. With 20 percent of these machines' populations persisting in primary production for 25,000, 18,000 and 20,000 hours (respectively), those who run them seem to be minimizing their ownership and operating (O&O) costs.

If competition from articulated dump trucks and excavators had left a significant number of underutilized scrapers or crawler loaders in North America, median hours of use per year would not be 1,225 and 1,500 — among the highest of earthmovers.

*Construction Equipment* regularly surveys contractors to find out how long they expect major components in various machines to last. Of course, operating conditions have a major influence on the life of components and machines. But manufacturers generally observe the 20th percentile — across all applications — as the reliable life of most components. Some engineers call it  $B_{20}$  life. It's the point at which 20 percent of all components have failed, and the earliest limit of what *Construction Equipment* calls "typical life."

Median is the same as the 50th percentile, or  $B_{50}$  life. It's the point at which half of compo-

nents have failed, and equipment manufacturers recommend that this be the outer limit of most users' life expectations. In fact, they encourage equipment users to manage components to their  $B_{20}$  life because the risk of component failure usually escalates so steeply after that. For example, a previous *Construction Equipment* lifecycle study looked at backhoe-loaders and articulated dump trucks. Results indicated that 20 percent of engines in 30-ton articulated dump trucks fail by 9,000 hours and another 30 percent of them are down within the next 1,000 hours. A *Construction Equipment* lifecycle study on excavators, wheel loaders and dozers found that half of engines in 20,000-pound and larger excavators last about 10,000 hours, and another 30 percent fail in the following 2,000 hours.

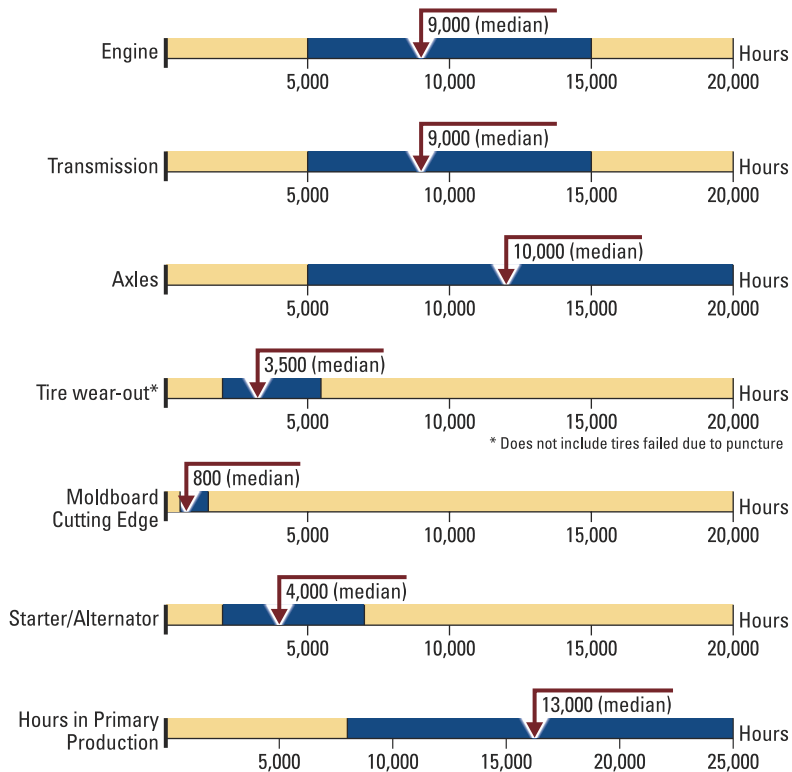
One of the great distinctions with this year's lifecycle study is the production endurance of graders, scrapers and crawler loaders. Among other machine types *Construction Equipment* has researched — excavators, wheel loaders, crawler dozers, ADTs, and backhoe-loaders — 80 percent of units have been moved out of primary production by 12,000 to 18,000 hours. To be fair, crawler loaders reach their  $B_{80}$  production life at 18,000 hours. But 20 percent of motor graders are still in primary production at 20,000 hours, and 20 percent of motor scrapers are still producing at 25,000 hours.

Graders'  $B_{50}$  production life is 12,000





## Scraper Life (≥14 cu yd)



Source: Construction Equipment 2007 Lifecycle Study

Typical Range (60% of responses)

## Die Hard

Half of all scrapers persist in primary-production roles for 13,000 hours. It's the longest tenure among machine types *Construction Equipment* has researched (including excavators, wheel loaders, crawler dozers, articulated dump trucks, and backhoe-loaders). A significant portion — 20 percent — of all scrapers are still in primary production at 25,000 hours. Using median component lives, total scraper O&O cost remains within a 45-cent range from 10 to 13 years of age. Repairs in the 14th year cause O&O to jump 80 cents per hour, making it (at about 17,500 hours) the most economical time to replace the average machine.



# Exclusive: Lifecycle Research

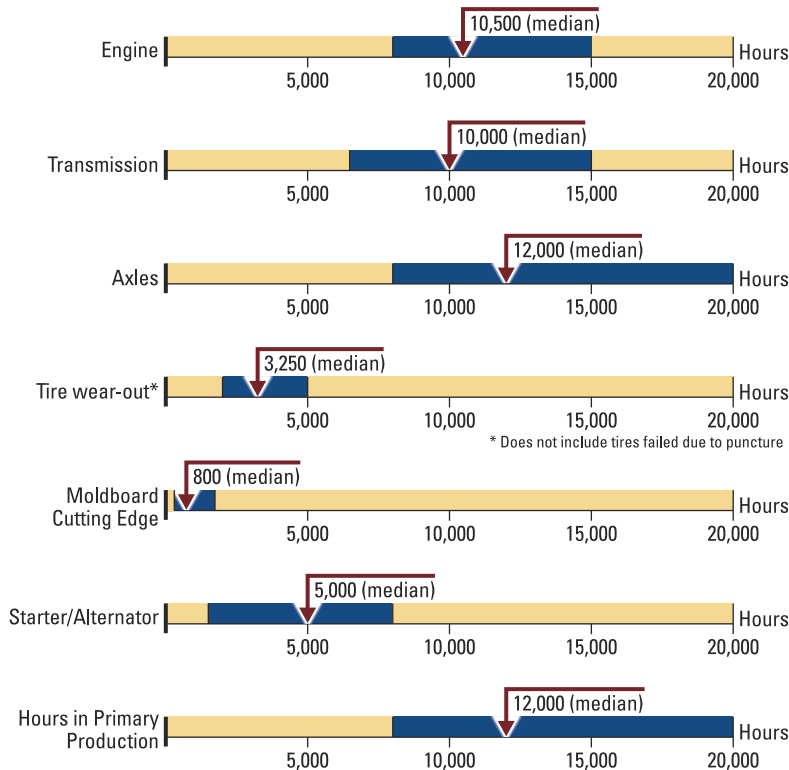


hours, and half of scrapers stay in primary production for 13,000 hours — the longest among machines *Construction Equipment* has researched.

Relatively low risk of pushing major component lives may be facilitating long scraper, motor-grader, and crawler-loader life. As noted above, it's risky to run an ADT engine beyond 9,000 hours without maintenance — rolling in new crankshaft bearings and replacing fuel injectors, for example.

In comparison, there is much less risk in pushing the engines and transmissions in graders, scrapers and crawler loaders to their B<sub>50</sub> life. Twenty percent of scraper engines and transmissions fail within the first 5,000 hours, for example, and it takes another 5,000 hours for the next 30 percent of those power-train components to fail. The rate of failure accelerates, but not steeply enough to prevent most of

## Motor Grader Life (145 to 300 hp)



Source: Construction Equipment 2007 Lifecycle Study

Typical Range (60% of responses)

## Defying Depreciation

Using motor graders' very consistent median component lives in an ownership and operating (O&O) cost equation for many different years during a common machine's life yielded uncommon results. Stable ownership costs, plus climbing repair costs kept the total O&O fairly constant through the 13th year. Because grader residual values tend to flatten out after 13 years, and because hours of use per year tend to stabilize at about the same point in the machines' lives, total O&O cost drops slightly each year after year 14 (about 13,600 hours).



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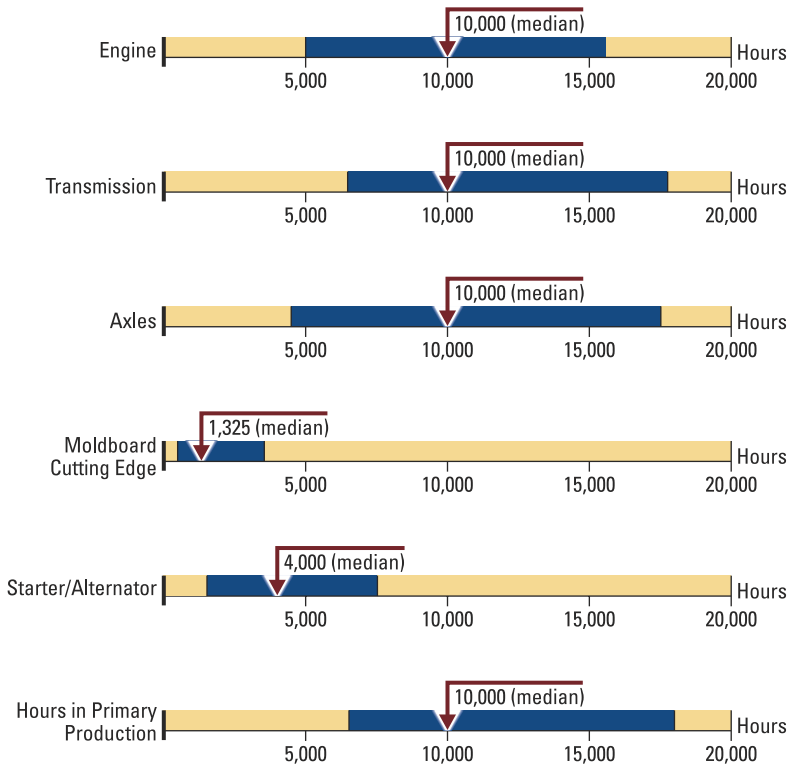


those machines from working two more years without requiring repair.

Component-life benchmarks like this can be as useful for justifying investments in improved maintenance as they are for managing repairs. For example, if you want to stretch component life beyond  $B_{20}$  life, you can reduce risk of failure by changing oil and filters and conducting other maintenance rigorously according to the manufacturer's recommendations. In many organizations, that can require a careful training program for service people, or even outsourcing some maintenance. Using premium materials, such as fluids and filters, may also reduce wear.

Component-life expectations are an elusive part of the solution to one of the most important questions equipment professionals must answer if they're going to field cost-effective

## Crawler Loader Life ( $\geq 105$ hp)



Source: Construction Equipment 2007 Lifecycle Study

Typical Range (60% of responses)

## Persistent Producer

With median production life of 10,000 hours, crawler loaders' usage more closely resembles that of wheel loaders, excavators, and other more populous earthmovers. The far reaches of the typical range remains an important distinction, however. Only wheel loaders and articulated dumps equal 20 percent of crawler loaders' ability to reach 18,000 hours in primary production. The track-loader sweet spot — the point in their life where O&O cost is at a minimum — appears to be in their 12th and 13th years, around 11,500 hours.



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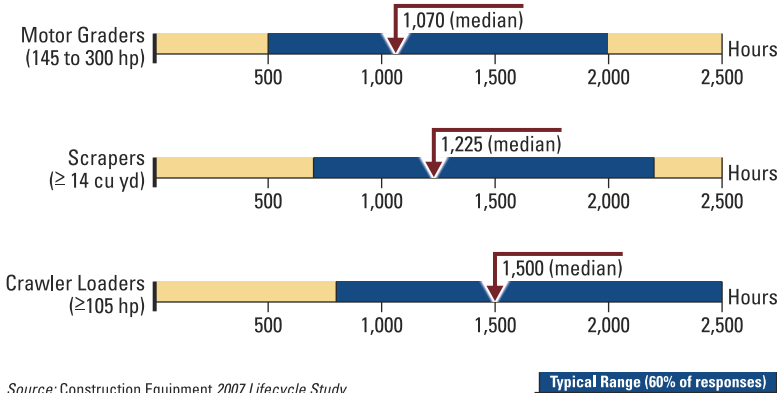
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# Exclusive: Lifecycle Research

## Hours Per Year



tive equipment: What's the economic life of each machine?

Ownership and operating costs start high because of the steep drop in the machine's value (depreciation) the first years the machine is in use. When O&O is at its nadir, depreciation has started to level off, and repair costs have not yet begun to rise steeply. This is the end of the machine's economic life — while its residual value remains decent and before major repair expenses are necessary.

Most of the factors necessary to estimate future O&O costs are reasonably easy to estimate. Purchase price is known, residual value can be estimated, taxes and insurance are relatively fixed, and maintenance costs are generally fixed per hour of machine operation. Repair costs are elusive, though.

We plugged B<sub>50</sub> lives of the main component groups from this study into an O&O-cost spreadsheet with some estimates of repair costs for each component. Then we added estimated residual values for a Caterpillar crawler loader in the Midwestern United States from the residual-value tool Dr. Mike Vorster has written about in the Equipment Executive column, along with declining average annual hours (about what you would expect as a machine ages and requires more service) for a number of years in the life of the average crawler loader. Total O&O cost dropped through 10 years, leveled off in years 12 and 13, and began to climb in year 14. The sweet spot — where O&O cost is at a minimum for crawler loaders


that average around 1,000 hours per year and achieve engine and transmission life of about 10,000 hours — appears to be in their 12th and 13th years, at 11,400 to 11,700 hours.

Conducting the sweet-spot exercise using motor graders' B<sub>50</sub> component lives yielded a twisted result. More-consistent ownership costs, plus climbing repair costs kept the total O&O climbing slightly through the 13th year, at about 12,900 hours. (Of course, total O&O cost rose only 30 cents from year 10 to year 13.)

Because Cat motor-grader residual values tend to flatten out after 13 years, and because hours of motor-grader usage per year also tend to stabilize at about the same point, total O&O cost drops slightly each year after year 14 (about 13,600 hours).

The scraper sweet spot, when calculated using B<sub>50</sub> lives for scraper components, looks more like that of crawler loaders because scraper depreciation doesn't level off like that of motor graders, and annual scraper usage tends to drop steeply between 10 and 15 years. Total scraper O&O cost declines ever so slightly each year into the 13th year, logging about 16,600 hours. (From the 10th year to the 13th, hourly costs fall less than 45 cents.) Expensive maintenance events in the 14th year cause O&O to jump 80 cents per hour.

Using industry-benchmark component lives to estimate the economic life of machines is an interesting exercise. But it is just an exercise. As much as operating conditions affect component life and repair cost, it's important to do the math with life and cost values derived from your own fleet's experience.

Depending on how your numbers compare to industry benchmarks, the results might inspire you to improve maintenance and reduce costs with extended machine life. Or they might help you resist the urge to tamper with a maintenance program that's out-performing the industry. 

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# Hands-On Trucking

By TOM BERG, Truck Editor



You need shades to view the front end of this tractor and its big chromed grill, which stays upright as hood tilts. Sealed-beam halogen headlamps weren't needed on this sunny day. Thanks to the big windshield (left) and hood's downward slope, you can see well over it.

## Big, Bold Nose *Among WorkStar's Features*

The taller hood houses a bigger radiator for '07-spec diesels, which at this event were all yellow

In case you haven't noticed, truck and component makers are in a temporary but deep recession as customers wait as long as they can before acquiring any 2008-model vehicles powered by the more expensive EPA '07 diesels. Like all builders, International Truck and Engine is trying to drum up interest in these products, and so is Caterpillar, which supplies two of its heavy-duty diesels to International.

In its promotional efforts, Caterpillar likes to tie the excellence of its machinery to its



truck engines, and uses its proving grounds to do so. One is the Tinaja Hills facility southwest of Tucson, Ariz., where the two builders recently hosted a ride-and-drive event for dealers and customers. I was invited to join them, and as at previous events here with other truck builders, I drove as many trucks as I could get my hands on, including the “brilliant red” 7000 series tractor you see here.

All had '07 Cats with diesel particulate filters and other equipment needed to meet the new federal exhaust emissions limits. On most trucks the DPFs, which double as mufflers, were mounted on the frames with single tailpipes running stack-style up the cab corners. The engines all ran strong and produced absolutely no smoke or odor. When these trucks and engines eventually get on the road and work sites, drivers, workers and sidewalk superintendents will all breathe easier.

International representatives explained the rebadging of their truck line, with most models getting Star-suffixed names like those used in the 1970s and '80s, before numbers took over. Included are two severe-service models: The 7000 series becomes WorkStar, a newly coined moniker, and the premium 5000 series becomes PayStar, an old-line name that went dormant recently but was revived last year. The International name has been dropped from the badging, except within the small orange-diamond logo in the grill and stamped into rear of sleeper boxes.

The numbers are still used in the data book, though, and there are five versions of the 7000 series, including the 7600 highlighted here and the 7700, which uses a heftier main frame. Both come with either Cat's C13 or Cummins' ISM. By later this year, they'll also be available with International's new series of MaxxForce 11- and 13-liter diesels, based on designs from MAN of Germany and assembled in a new plant in Alabama.

Cat and Cummins power will continue as options in these heavy vehicles, International reps told me. Of course, in their presentations at Tinaja Hills, they talked only about the yellow diesels — C13s in WorkStars, whose engine compartments are sized for nothing larger, and



The interior is automotive in design, and seat covers are posh leather. A WorkStar badge replaces 7000-series numbers, but they're still in the data book.

C15s in the bigger PayStars. The C11 is gone, as the C13's larger displacement is needed to cope with the '07 emissions limits.

With scores of folks wanting to drive or ride and about 20 trucks and tractors available, time in each was necessarily limited. There was no highway driving, but the dusty stone roads effectively simulated many work sites. And there was a steep grade to climb, testing the skill and nerve of some guests. All trucks were loaded, so we had to use low-range (but not low-low) gears and go easy on power because

## TEST SET

**Tractor:** 2008 International WorkStar 7600, steel conventional daycab on air-bag rear mounts, 6x4, setback front axle, BBC 107 inches

**Engine:** Caterpillar C13 ACERT, EPA '07 compliant, 430 hp @ 2,100 rpm (445 @ 1,400-1,600 rpm), 1,650 lbs.-ft. @ 1,200 rpm

**Clutch:** 15.5-in. Eaton Solo self-adjusting

**Transmission:** 10-speed Eaton Fuller RTO(F)-16908LL, double-low, overdrive

**Front axle:** 14,000-lb. Dana Spicer I-140W wide-track on parabolic taperleafs, w/Sheppard M100 hydraulic power assist

**Rear axles:** 40,000-lb. Dana Spicer DS405/RD405 on Hendrickson HAS-402-55 air, w/locking rear-rear differential and 4.33 ratio

**Wheelbase:** 187 inches

**Brakes:** Bendix Spicer S-cam w/MGM long-stroke chambers and Bendix ABS

**Tires & wheels:** 11R22.5 Goodyear G287 on polished aluminum discs

**Trailer:** 38-foot Eaglerock smooth-side aluminum end dump



# Hands-On Trucking



**Big windows make for good visibility to the sides and rear. Lots of polished metal, including tanks for fuel and the wet kit, accent the “brilliant-red” paint.**



**Cat C13 engine lurks behind splash guards and under the air cleaner, but most everyday check items are accessible.**

of loose footing on the trail.

It was a glorious, sunny day, with temps in the low 90s, but pleasant because “it’s a dry heat,” as they say in Arizona. Still, air conditioning was on in almost every truck I climbed into, and I almost always shut off the A/C and lowered the windows. That was easy in the WorkStar tractor I focused on, as it had power windows — not your usual chosen option in a work truck, but one that’s becoming more common as most drivers like the convenience.

The bright-red tractor’s interior was nicely trimmed in grey plastic, and its National seats were leather covered — another unusual touch for a work truck. Its automotive-style instrument panel was set up with gauges and switches that were easy to see and use. Rocker switches control most electrical functions, with rotary knobs for HVAC settings. The electrical system is multiplexed — International calls it Diamond Logic — and the system claims operational and maintenance advantages.


Visibility to the sides and rear was excellent, thanks to big windows. And the view

through the large windshield was better than I expected, given the WorkStar’s new, tall nose — several inches higher than the previous design. This is the feature that most interested me, because from outside the nose seems high enough to impede vision. However, from behind the wheel it’s barely noticed because it slopes downward, and I could spot people walking close to the front end. Will a snow-plow blade be sufficiently visible? John Wadden, International’s severe-service marketing manager, notes that plow blades are tall, too, so spotting them shouldn’t be a problem.

The nose is bigger on all 7000 models partly for style and mostly to house a larger radiator needed to cool the ’07-spec diesels. The radiator, which has 1,469 square inches of core area on this tractor, sits atop the frame rails rather than between them. This keeps it away from road debris and off-road obstructions, and allows a front-mounted PTO to be driven straight off the engine without a hole in the radiator for the driveshaft. Wadden and his colleagues think those are important advantages in a vocational truck.

The C13 is the most powerful engine offered in the WorkStar 7600 and 7700, with up to 470 horsepower and 1,750 pounds-feet; the one in this tractor was rated at 430 and 1,650. With the hood tilted, the engine almost hid behind splash guards and under the air filter housing, a necessity with a compact-BBC design — 107 inches on the WorkStars — and an internal cleaner. But everyday fluid checks and inspection points are fairly easy to get at. The C13 mated to an Eaton 8LL transmission makes a nice combination and was more than strong enough to move this tractor-trailer over the trails and up that steep hill I mentioned.

With the setback front axle — about 9 inches farther back than on the 7600’s set-forward variant — there’s room for sharp wheel cut and a tight turning circle. The axle rides on parabolic leaf springs which worked smoothly; and air bags under the seat, rear cab mounts, and on tandem axles further smoothed the ride. As always, Sheppard power steering offered good feel of the trail surfaces with little mushiness.

Among WorkStar features is a “whisper” sound-deadening package that insulates drivers from road/engine noise. Two older 7000-series dump trucks were there, so we could hear the difference between them and the new trucks; and sure enough, the WorkStars’ sound levels were noticeably lower. In fact, they were so low that I could barely hear the engine brakes, which took away some of the fun. But many drivers will probably appreciate the peace and quiet at the end of a workday. So might you. 

## TALKBack

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# Maintenance Management: Tires

By G. C. SKIPPER, Contributing Editor

## ***Tread Gently When Choosing Tire Patterns***

Application is only the first step to determining tire usage. Tread patterns offer various benefits.



**Selecting the right tread pattern for tires used on the often-hostile road surface of a construction site, as shown here on this dump truck, can help resist “chipping and chunking” caused by stones and gravel. (Photo: Goodyear Tire & Rubber.)**

**W**ith the high cost of tires today, it is obvious that tire tread patterns are not designed for cosmetic reasons. Tire treads serve a specific purpose, especially in the often hostile environment of off-highway and construction applications.

Of the seven general tread categories (two are urban and transit service), five are more focused on applications most familiar to construction firms: over the road, mixed service, all position, steer axle, and drive axle. In any fleet operation, of course, equipment managers follow the recommendations of their tire supplier when it comes to selecting the right tread pattern for the right job.

At last year's Vehicle Maintenance Management Conference in Seattle, however, general guidelines for matching tread patterns with specific applications were presented.

Since some construction fleets also have over-the-road vehicles, it is appropriate to include “highway tires” in the overall mix. Designed to operate on paved surfaces on local and long-distance runs, the rubber compound, tread pattern and casings of highway tires are generally made for long wear, fuel economy, and retreading. Some OTR tires can be used in any position (steering, drive or trailer), while others are limited to specific positions.

Mixed-service tires are designed to run on a wide variety of surfaces ranging from paved roadways to gravel to dirt. As the name implies, vehicles that perform mixed services use this type of tire and tread. Not only are they suitable for highway speeds, they have enhanced tread wear for travel on abrasive surfaces and therefore resist tread chipping and chunking caused by rocks, wood and other damaging objects. Waste hauling, construction site deliveries, and logging are typical applications.

All-position tires typically have rib tread design that provides all-weather traction and improved fuel economy. These tires can be used in all positions, such as the steering axle. A typical application would be on Class 6 and 7 trucks. They are also suitable for use in high-severity situations where the wear rate is high. They function satisfactorily as steer tires, on vehicles with



short wheelbases, high turn frequency, and heavy steer axle loads. Many fleet managers often simplify tire inventory by placing all-position tires on both steer and drive axles.

Steer-axle tires are engineered for line haul applications and are designed to resist irregular wear. A typical application for these slow-wear-rate tires is on tractors and vehicles with low turning frequency duty cycles. The tread pattern design allows each rib to carry an equal share of the load and that, of course, means the tire lasts longer.

Drive-axle tires have deep treads and patterns for extra traction and longer tread life. In-line haul service, for instance, would use cross bar or lug type highway drive tires for high torque situations such as a single tractor pulling double trailers.

In specifying a particular tire-tread pattern, fleet managers should not base their purchasing decision on a “worst-case scenario,” says Curtis Decker, Continental Tire’s national manager, fleet engineering. Managers should be realistic when it comes to application. “They should sit down and take a look at their average application to see what their main need is,” he says.

“I understand why they look at a worst-case scenario. It’s very painful to have a perfectly good piece of equipment with no flats, no mechanical problems, and still not be able to use it to go off-road because the tire tread pattern isn’t right. In the back of their minds, these fleet managers tell themselves, ‘This will never happen to me again.’” Decker suggests that managers are throwing away money by not spec’ing the right tread.

Decker also says fleet managers can have a great influence in tread design. One of Continental’s tires, the HDO, came out of a meeting the company had with a fleet operator. “During a meeting five years ago, a fleet involved in extremely heavy-duty forestry applications told us what it needed, and we designed the HDO,” Decker says. The tire was built exclusively for the fleet for two years and worked so well that Continental made the design available to a wider off-road market, Decker says.

Equipment managers need to evaluate whether their particular application requires a



traction pattern or a wearing pattern, says Roger Best, senior field engineer, Bridgestone/Firestone Off-Road. “In heavy rock, you get deep cuts to the tire,” he says. “If the vehicle is going to run 30 or 40 mph, you might consider a tread pattern that will not be susceptible to heat separation.”

Although variables seem endless in selecting the right tread pattern for the right work environment (Bridgestone has 30 different patterns alone), Best provides some examples. For quarry applications, Bridgestone has a heavy-duty tire, the VRQP, designed for use on small or medium dump trucks.

“This tire would be used by a customer using an end dump to haul rock out of a quarry pit,” Best says. “Tread patterns for this application are designed for shorter hauls at lower speeds, say less than 20 mph and 75-ton payloads.”

This tread design isn’t meant to provide a lot of traction, he says. “Generally the roads are made of rock, which wears the tires out, so customers want a design that resists wear.”

**Vehicle’s application must, of course, be considered when specifying tires. But tire makers caution about over-spec’ing, when equipment managers look at worst-case scenarios instead of consistent vehicle need.**



# Maintenance Management: Tires




**Working closely with the tire supplier, fleet managers should be able to choose tread patterns that provide maximum tire wear at the best overall cost.**

Best says computer-aided design programs enable tire manufacturers to design tread patterns for a given application. “We look at how the tire runs on the road and then design the grooves in the pattern,” he says. “We determine where they should be placed on the tire to optimize the wear. We look at how the footprint is concentrated when it touches the ground and other factors.”

Tread patterns differ according to the functions they fulfill, says Tim Miller, marketing communications manager for commercial tires, Goodyear Tire and Rubber. “Determining a specific tread pattern for a specific application is an evolutionary thing rather than revolutionary,” he says. “We typically take something we’ve used in the past and, over time, gather comments and information on tread wear from the field. Sometimes we find out we need to go in a little different direction when it comes to tread-pattern design. Sometimes the tread pattern is cosmetic and sometimes it is an actually physical, technical need that the tire has.”

Construction firms should look for “chipping and chunking,” Miller says. “From a rubber technology point of view, you’re going to get great wear out of a highway tire, but if you use that same tread compound on an off-road tire, it will chip and chunk and cause other problems.”

In selecting a tire-tread pattern, you can’t choose one out of a catalog, Miller says. “You need historical background to know if it’s going to work.” The best source is the contractor’s tire supplier, he says. That source, linked with the contractor’s own fleet history of tire wear, can take fleet managers where they want to go.

It ultimately comes down to how you plan to use the tire. “In matching tire to application,” Best says, “you need to look at the whole package: tread, type of pattern, casing construction, where the tire will run, speeds, temperatures, climate and road surface.” 

## **TALK**Back

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## ***As Product Line Grows,*** **Track Becomes Clear**

Identity crisis no more as compact track loaders play  
a distinct role in equipment fleets

**T**hey have some common parts; they're often rolled out together, but the compact track loader is not simply an altered skid-steer.

And as more equipment manufacturers offer dedicated compact-track-loader lines, the differentiation of the product becomes even more profound.

"It is totally a different machine," says Dave Evans, product specialist for Caterpillar skid-steer and multi-terrain loaders. "You would operate it differently and you would maintain it differently."

Evans was speaking at the late spring introduction of the new C-Series of multi-terrain loaders or MTLs — the Caterpillar designation for compact track loaders.

"To get the most productivity out of the machine, you're not even going to drive it the same. It may share the same tools and look the same, but it's a night-and-day difference," says Evans. "On a skid-steer, you would counter-rotate and return to your jobsite. On a MTL, to maintain the maximum production of that machine as well as the life expectancy and maintenance, it doesn't take any longer to instead do a three-point turn. You are cutting down the ingestion of material into the undercarriage, and cutting down the material to clean out at the end of the day.

"It's all about owning-and-operating expense for the customer, really."

With the new C-Series, comprised of the 277C, 287C and 297C models ranging from 82 to 90 horsepower, Caterpillar is introducing its largest model yet, and incorporates some traits of the legendary tractor technology that most historically defines the company. Further separating these machines from their likewise young skid-steer cousins, all three of these track-loader models offer a choice of a single- or dual-level undercarriage.

"Metal-faced seal technology is taken down from the rest of the Cat family of track-type tractors. We incorporated that technology into our MTLs and put it standard equipment through all the track frames," says Evans.

"Before C-Series, we had a torsion axle that went from the left to the right side of the machine, all the way through the frame of the machine. Now with C-Series, it's four independent torsion axles, one for each corner of the machine. The track frame is independent from the frame of the machine. Then, on the dual level, we have four sets of wheels that are independent from the track frame itself, so you have two levels of suspension."

Caterpillar's growth in this product area has not come in isolation. The equipment manufacturing giant is a minority owner of ASV, the Minnesota-based small equipment

**With this spring's introduction of the C-Series, Caterpillar has introduced its largest compact track loader yet, the 297C shown at the right.**



manufacturer that drove compact-track-loader technology from the niche to the mainstream. ASV builds the Caterpillar undercarriage, and yet itself remains the most prolific of compact-track-loader innovators, offering a product line of 11 models based on the Posi-Track technology.

ASV approaches the track loader as anything but a doctored skid-steer — the company, in fact, doesn't make a skid-steer — and designs its machines from the ground up to run on a suspended rubber track undercarriage, not common rigid track technology. Last year, ASV expanded its full product line with the introduction of the 80.5-horsepower SR-80, which features an exclusive, independent,

**Compact track loaders, such as the Gehl CTL80 shown right, bring compact attachment technology to jobsites best accessed by crawlers.**





# Buying File: Compact Track Loaders

## Compact-Track-Loader Specifications

Model	Operating Load @ 35% Tipping Load (lb.)	Gross Output (hp)	Standard Flow (gpm)	Optional Flow (gpm)	Ground Pressure (psi)	Operating Wt. (lb.)
ASV Posi-Track RC-30	560	31.5	10	n/a	2.5	3,305
ASV Posi-Track RC-30 Turf	560	31.5	10	n/a	2.5	3,305
Polaris ASL 300	560	31.5	10	n/a	2.5	2,935
ASV Posi-Track RC-50 with RC-60 Arms	1,330	50	16.3	n/a	3.5	6,200
ASV Posi-Track RC-60	1,330	60	17.4	n/a	3.5	6,200
ASV Posi-Track RC-60 Turf	1,330	60	17.4	n/a	3.5	6,200
Caterpillar 247B	1,367	62	15.6	n/a	3.8	6,668
Bobcat T140 K-Series	1,400	49	16.9	n/a	5.2	6,660
Caterpillar 257B	1,615	62	15.6	26	4.3	7,559
Gehl CTL60	1,620	66	18	n/a	4.86	7,497
Mustang MTL16	1,620	66	18	n/a	4.86	7,497
Takeuchi TL130	1,620	67	18	n/a	4.86	7,646
Case 420CT	1,750	59	19.5	32.5	5.2	7,350
Bobcat T180 K-Series	1,800	n/a	16.3	25.5	4.8	7,367
JCB 180 Tracked Robot	1,808	60	15.9	30.4	5.06	8,000
ASV Posi-Track SR-70	1,925	71	30	n/a	3.7	7,890
Bobcat T190 K-Series	1,900	n/a	16.3	25.5	4.9	7,612
JCB 190 Tracked Robot	1,985	82	20	32	n/a	9,702
Caterpillar 267B	2,030	73	22	n/a	3.1	9,371
Caterpillar 277B	2,065	82	22	n/a	3.1	9,411
Gehl CTL70	2,083	81	19.8	n/a	4.1	9,590
Mustang MTL20	2,083	81	19.8	n/a	4.1	9,590
Takeuchi TL140	2,083	81	19.8	n/a	4.1	9,769
Case 440CT	2,100	89	21.9	32.6	5.0	8,915
ASV Posi-Track SR-80	2,170	80.5	30	n/a	3.15	8,972
New Holland C175	2,200	60	17.2	25.5	5.3	7,535
John Deere CT322	2,200	66	19	29	5.1	8,305
Thomas T320	2,200	87.4	21	40	5.8	10,000
JCB 1110 Tracked Robot	2,250	92	20	32	n/a	10,198
ASV Posi-Track RC-85	2,380	86	38	n/a	3.3	9,710
Gehl CTL80	2,470	97	23.4	n/a	4.3	10,692
Mustang MTL25	2,470	97	23.4	n/a	4.3	10,692
Takeuchi TL150	2,470	97	23.4	n/a	4.3	10,902
Komatsu CK30-1	2,485	n/a	21	34	n/a	9,546
Case 445CT	2,500	80.5	21	33.7	4.3	9,815
New Holland C185	2,500	78	19.3	34.7	4.0	9,155
Bobcat T250 K-Series	2,500	n/a	21.2	37	4.0	9,347
Caterpillar 287B	2,520	82	22	33	3.8	10,275
ASV Posi-Track RC-100	2,660	99.5	38	n/a	3.8	10,150
Case 450CT	2,700	88	22.1	37.2	4.8	10,915
Komatsu CK35-1	2,755	n/a	21	34	n/a	10,053
ASV Posi-Track RCV	2,800	86	20	38	3.6	10,500
New Holland C190	2,900	80	21.9	37.3	4.3	9,811
Bobcat T300 K-Series	3,000	n/a	21.2	37	4.2	9,702
John Deere CT332	3,200	82	24	34	4.3	10,825

Source: Spec-Check.com Xpanded Specs, Information Verified As of May/07



multi-level suspension undercarriage. The 71-horsepower SR-70 has many of the same features.

According to company officials, the ASV approach can be divided into three “equally important” categories:

1. Contact Points. Bogie wheels transfer the machine weight through the track into the ground. More contact points mean more area of the track is transferring vehicle weight, thereby providing more traction. Having more contact points also reduces the amount of weight per wheel. By having less weight per wheel, there is lower actual ground pressure, higher flotation and less ground damage.

2. Internal Drive. Instead of the sprocket poking through the track to drive, the inside of an ASV track is comprised of rugged molded rubber drive lugs which mesh with the internal drive sprocket. Internal drive provides a faster maximum speed, track integrity and less friction.

3. Suspension. Increased traction, longer track life and longer machine life due to less vibration are benefits to any piece of construction equipment. Most importantly, suspension makes for a much more comfortable and productive operator.

Yet, as just one of 12 companies responding to *Construction Equipment's* survey of equipment manufacturers offering compact track loaders, this market is now clearly important to the full-line brands, including Komatsu, Case, New Holland, John Deere and JCB. Still another group serves the market for smaller-sized machines commonly called mini-track loaders.

At Caterpillar, the arrival of the 10,000-pound-plus 297C is pushing the compact track loader into applications traditionally covered by other machine types.

“It’s made for low ground pressure. This style of machine lets you float across terrain, but you’ve still got production digging capabilities and low-end torque, just like a great big dozer today,” says Kent Pellegrini, an industry manager responsible for multi-terrain and skid-steer loaders.

Bring on the jobs, says his Caterpillar colleague Evans.

“When you look at hydro-mechanical tools, for instance mulchers for land-clearing

**The Bobcat T180 compact track loader is well suited for a variety of attachments.**



### Average CTL Costs

Operating Load @35% Tip Load (lb.)	List Price	*Hourly Rate
Up to 700	\$16,689	\$12.96
701-975	\$20,183	\$14.60
976-1,250	\$24,039	\$17.78
1,251-1,350	\$36,020	\$24.01
1,351-1,600	\$36,202	\$24.36
1,601-1,750	\$41,881	\$26.84
1,751-2,200	\$46,934	\$29.30
2,201 and up	\$56,351	\$33.60


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

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

applications, operators want to be able to have high-flow capability as well as the horsepower behind it to handle that tool and to take down the large material with any production,” he says. “You have all that capability in the larger feller-bunch-style forestry products, but now to have it in an MTL, it’s just that much greater to get into tight areas in low-ground-pressure applications.”

It will be intriguing to watch just how much larger future models go.

“It all depends on the application,” says Pellegrini. “If they’re pushing a lot of dirt and can’t afford a D3, it may be an option for them to come down here to start.

“Going bigger than this, you’re getting into dozers. Then again, I shouldn’t say that, because the customer’s always going to dictate where we’re going to go. If there’s a demand for it, sure, I think anybody will go there.” 

## TALKBack

What is your opinion? Go to the online article at [ConstructionEquipment.com](http://ConstructionEquipment.com).

### Web Resources

**Find compact-track-loader manufacturers’ websites in the online version of this story at [ConstructionEquipment.com](http://ConstructionEquipment.com). Just click on Archives, Buying File, and you’ll find a link to this story.**



# Gallery of Compact Track Loaders



## CATERPILLAR

### New Series Debuts This Year

With the May introduction of the larger C-Series machines, Caterpillar has increased the size of its "multi terrain" or compact-track-loader offering. With an operating capacity of 4,233 pounds, as rated at 50 percent of tipping load, the 297C is the largest-capacity machine of its type that Caterpillar has ever produced. As a vertical-lift machine designed for enhanced truck loading capabilities, the 297C is joined by the 287C. The smallest of the new C-Series models offered, the 277C has radial lift linkage.

**Number of models:** 6

**New models:** 277C, 287C, 297C

**Product-line features:** Caterpillar enhances machine control with the C-Series offering of electronic torque management, as well as electro-hydraulic joystick control of the hydrostatic drive system. Available as an option of each model, High Flow XPS hydraulics enable customers to equip C-Series machines specifically for the work they do.

Visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info) and enter 150

## KOMATSU AMERICA

### Two Models Offer Lift Choice

The CK30 and CK35 are the first two compact track loaders manufactured by Komatsu at the production facility in Newberry, S.C. Shipments of the 84-hp track loaders began one year ago. The CK30 is a radial-lift model with an operating capacity of 2,485 pounds as rated at 35 percent of tipping capacity, while the vertical-lift SK35 offers a rated operating capacity of 2,755 pounds.

**Number of models:** 2

**New models:** CK30, CK35

**Product-line features:** Using two-speed control, Komatsu compact track loaders come equipped with pilot proportional joystick controls, two-way auxiliary hydraulics, a bucket self-leveling system and automatic power control system. Contributing to track retention are the upper track guide system, three flange front idler system, and common mount of the idler and number one roller.

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## JOHN DEERE

### Models Call on Company's Crawler Experience

Entering the market in 2005, John Deere offers the CT322 and CT332 compact track loaders at 66 and 82 horsepower, respectively. The undercarriage features all steel rollers, idlers and sprockets, and the rubber track is steel-imbudded for durability. Deere's extensive experience with crawlers results in the use of dozer roller seal and bearing technology on the compact loaders, as well as complete track cleaning with the use of only a shovel. Double flange rollers and idlers result in a smooth ride.

**Number of models:** 2

**Product-line features:** Deere now offers the new cool-on-demand, variable-speed fan that rotates at full speed only when necessary. As well as providing more efficient cooling, this clutch fan is substantially quieter, resulting in operator comfort, fuel economy and enhanced job-site communications.

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## BOBCAT

### Enhancements to Cooling and Undercarriage

With the addition of the newest T320 model in May, Bobcat's K-Series compact-track-loader line ranges from the T140 up to the T320, ranging 1,400 to 3,200 pounds in rated operating capacity. The T140, T180 and T250 offer radius lift, while the T190, T300 and T320 feature vertical lift. Available on all K-Series models is a new SmartFAN cooling system, featuring a variable-speed, hydraulically driven fan that senses machine operating temperature, then self-regulates to rotate only as fast as needed. The addition of another roller to the track undercarriage on the T180 and up not only provides a smoother ride, but also improves roller life and overall track life.

**Number of models:** 6

**New model:** T320

**Product-line features:** The Bobcat speed-management feature, activated from inside the cab, provides more consistent loader and attachment performance while minimizing the strain on operators. With speed management, operators can simply "dial in" their required travel speed in increments up to 7 miles per hour, while maintaining driveline torque and full hydraulic power.

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## TAKEUCHI

### Flotation to Go, Traction to Work

By utilizing a high-sprocket, double-reduction, planetary final drive system as a durable method of speed control and torque amplification, the Takeuchi TL130, TL140 and TL150 compact track loaders capitalize on superior traction and digging force. A planetary drive system eliminates drive chains, chain cases, axles and hubs. The final drive is kept out of dirt and debris, minimizing the possibility of contamination, while the self-cleaning frame allows for less debris in the track.

**Number of models:** 3

**Product-line features:** Takeuchi's rubber tracks combine the capabilities of a track loader with the ability to operate on improved surfaces. Pilot-operated joystick controls provide the operator with precise, fingertip control of loader and travel functions. For maintenance, the tilt-back operator's compartment offers quick access to the engine and hydraulic system.

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## GEHL

### Large High-Flow Option Now Available

With three standard models ranging from 66 to 97 horsepower, Gehl most recently introduced a high-flow option for the largest model, the CTL80. Providing nearly 40 gallons per minute of high flow, this option allows the high-horsepower, high-capacity CTL80 to perform optimally with high-flow attachments. For the CTL60, CTL70 and CTL80 models, the published rated operating load, at 50 percent of tipping capacity, ranges from 2,315 to 3,528 pounds.

**Number of models:** 3

**New model:** CTL 80 High Flow

**Product-line features:** Gehl compact track loaders utilize a pilot joystick control system with push-button auxiliary hydraulics and float positioning. Other standard features include two-speed drive; a hydraulic self-leveling lift system; an engine auto shutdown system; multi-readout instrumentation; and a deluxe, multi-adjustment, high-back suspension seat.

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# Gallery of Compact Track Loaders

## NEW HOLLAND

### Newest Model Ideal for Tight Spots



With the C185 and C190 models established, New Holland recently introduced the C175 to meet the needs of landscapers, utility contractors and others who require the features of a smaller size compact track loader. Boasting a published rated operating

capacity of 2,200 pounds and an operating weight of 7,535 pounds, the C175 can get into hard-to-reach areas and fit on most standard trailers with its overall width of 71.1 inches, length of 129.5 inches and ground pressure of 5.3 psi.

**Number of models:** 3

**New model:** C175

**Product-line features:** Along with a new deluxe cab design, each of New Holland's compact track models features the superior lift capacity and reach of the Super Boom vertical lift linkage, which delivers more forward reach at maximum lift height for precise load placement. The wide stance, low center of gravity and good stability combine with a standard suspension seat to provide a smooth ride.

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## MUSTANG MANUFACTURING

### Ready to Handle More Attachments



With the addition of a high-flow model version, Mustang is trumpeting the ability to power high-flow, high-performance attachments with its largest of three compact track loaders. The high-flow output is nearly 40 gallons per minute. Another new feature option added to the product line is a foot throttle. Now, operators have the advantage of operating the engine throttle by foot, hand, or a combination, to suit their personal preference.

**Number of models:** 3

**New model:** MTL 25 High Flow

**Product-line features:** All three Mustang compact track loaders feature full pilot joystick controls as standard, allowing for easy fingertip control. Each model also features two speed drive, an automatic engine shutdown system, and a hydraulic self-leveling, high-back, six-way suspension seat.

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## CASE

### Pilot Controls Come with Choice

Pilot controls are offered as standard on the larger Case 440CT and 450CT compact track loaders, either of which can be ordered from the factory with H or ISO patterns. With the H pattern, familiar to experienced Case operators, the operator uses the left-hand control to operate the left drive motor as well as to raise and lower the loader arms. The right-hand controller is used to operate the right drive motor and the bucket curl and dump. With the ISO pattern, the drive functions are in the left controller and the loader arm/bucket functions are in the right controller.

**Number of models:** 4

**New models:** 420CT, 440CT

**Product-line features:** Case compact track loaders incorporate a unitized, welded-steel, tub-style chassis designed specifically for heavy workloads. Inline loader linkage and straddle-mounted pins place the loader arms, lift cylinders and tilt cylinders on a single vertical plane, increasing both operator visibility and loader integrity.

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## SCOUT SC-50

- 4,000-lb Bed Capacity
- 1.3-yd<sup>3</sup> Box\* Capacity
- 2-speed Travel to 11.5 mph
- 30-gallon Fuel Capacity
- 16.3-gpm Hydraulic System\*
- 2.5-psi Ground Pressure
- 50-hp Diesel Engine

\* The dump box and auxiliary hydraulic system are available as an option. Ask your ASV Dealer for details.



# THE RUBBER TRACK REVOLUTION CONTINUES

About 25 years ago ASV began to change how the world thinks about rubber tracks. Today ASV is changing how you think about utility vehicles. Introducing the Scout SC-50 - the world's first rubber-tracked utility vehicle capable of productive work and travel over rugged or soft terrain.

The Scout uses a field-proven undercarriage with 15-inch wide rubber tracks and suspension for maximum traction, low ground pressure and operator comfort. A large fuel capacity lets you work in remote locations that other equipment cannot reach. Front and rear auxiliary hydraulics\* let you mount a wide range of attachments and tools. The flat-bed offers 24-ft<sup>2</sup> of cargo space and the hydraulic dump box\* carries 1.3-yd<sup>3</sup> of material - even more when side boards are used.

Outfit the Scout with a wide range of options including an enclosed cab, heater, tilt-out windshield or ROPS canopy so you and a passenger can travel in comfort. Adjustable bucket seats, cupholders and 12V power ports complete the package. There's also a special Turf Edition available with smooth green tracks.

For more information about this powerful utility vehicle, contact your ASV Dealer or visit [www.ASVI.com](http://www.ASVI.com) today.



# Gallery of Compact Track Loaders



## ASV

### Machines Built from Ground up

Approaching the compact-track-loader product as anything but a modified skid-steer loader, ASV designs its machines from the ground up to run on a suspended rubber track undercarriage, providing traction and a smooth ride. In 2006, ASV expanded its full product line with the introduction of the 80.5-horsepower SR-80, which features an exclusive, independent, multi-level suspension undercarriage. The 71-horsepower SR-70 has many of the same features as the SR-80, such as a choice of cab interiors, a high-performance hydraulic system, 15 inches of ground clearance and a precision-balanced chassis. The SR-70 runs on a new, rugged suspended undercarriage with 15-inch-wide rubber tracks.

**Number of models:** 11

**New models:** SR-80, SR-70

**Product-line features:** ASV undercarriages feature two types of suspension. On single-level versions, the entire undercarriage is suspended from the chassis of the machine by torsion axles. On most models, these torsion axles are independent, so there are four suspension points connecting the chassis to the undercarriage, providing a smooth ride. With ASV's dual-level suspended undercarriage, as on the SR-80 model, torsion axles are used in addition to a second level of suspension that allows the bogie wheels to flex for exceptional comfort and traction.

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## ROHMAC

### Going Where No Operator Needs to Go

As part of its unique Microtraxx line of equipment for confined spaces, Rohmac offers two compact track loaders each controlled by a seven-function radio remote control, suiting them for safe access to such areas as box culverts. With basic unit weights of 4,200 and 4,850 pounds, respectively, the MT 3234 and SL 436 models offer lift capacities of 1,500 and 1,650 pounds.

The MT 3234 offers drawbar pull of 3,300 pounds and ground pressure of 4.6 pounds per square inch, while the two-speed SL 436 extends the drawbar pull to 4,350 pounds with a ground pressure rating, when fully loaded, of 7.6 pounds per square inch. As standard, power is provided to both models by Lombardini diesel engines, rated at 24.5 and 30 horsepower, respectively. Power-plant alternatives are available for the larger machine.

**Number of models:** 2

**Product-line features:** Along with a quick disconnect system to accommodate attachments other than a loader bucket, Rohmac's Microtraxx SL 436 model offers a 360-degree swing capacity as part of its remote operation. Operated by radio remote control, both Microtraxx compact track loaders minimize operator exposure and thus are particularly well suited to hazardous jobsites and applications.

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## JCB

### Compact-Track-Loader Line Receives Update

With the entire line updated this year, JCB offers three compact track loaders ranging in operating weight from 8,113 to 10,934 pounds, and in gross engine output from 60 to 92 horsepower. Series II improvements include a choice of three control patterns — JCB Servo, hand and foot, and dual foot — as well as increased hydraulic flow and pressure, increased breakout forces, and the use of Dieselmix engines on the larger 190T and 1110T models.

**Number of models:** 3

**New models:** 180T, 190T, 1110T

**Product-line features:** JCB's single-arm design provides side entry and exit for operators, particularly beneficial when employing a large hydraulic attachment, such as a tree spade or trencher. The single arm is slung low to provide the best visibility possible for operators to work quickly and safely on confined jobsites.

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## Tools Put CTLs to Work

### AIM

As part of a complete line of products for compact track and skid-steer loaders, AIM Attachments offers grapple rakes featuring a gusseted top clamp with guard-protected dual hydraulic cylinders. An all-new back-frame design also allows better clearance for hydraulic hoses. Attached via standard universal-style hookup and constructed of wear-resistant steel, AIM grapple rakes come in widths ranging from 60 to 84 inches.

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### Allied-Gator

Expanding the processing capabilities of compact equipment, Allied-Gator's MT 5, MT 10 and MT 15 Multi-Tool models deliver increased shearing, cracking and crushing force with the patented Power-Link & Guide System. These three models range in weight from 700 to 2,700 pounds, generate 140, 206 and 315 tons of force, and are available in fully rotating and non-rotating models. Allied-Gator's patented Quick-Change jaw sets can be changed in the field in less than 15 minutes by the operator alone.

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### ATI

Doing its "Level Best" to facilitate the use of compact track loaders in delivering a smooth grade, ATI now offers a fully automatic Level Best grading box with dual controls. Grading to within one-eighth of an inch accuracy, be it in elevation and cross-slope applications, the dual Level Best product works with Apache, AGL, Laser Alignment and Topcon laser controls. The grading box is available in widths of 72, 84 and 96 inches.

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### Fecon

Bull Hog mulcher attachments from Fecon combine a patented rotor design with double carbide cutting teeth to process any size wood quickly into any texture. With their enhanced cutting capabilities, the

teeth still carry a tool life up to 500 hours. The BH99HD mulcher model is shown at work with the FTX 325 track carrier. Other company products suitable for use on compact track loaders include bunching shears, stump grinders and rear grapples.

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### Coneqtec/Universal

With seven models ranging 12 to 40 inches in cutting width, the new AP Pro Series of heavy-duty planer attachments from Coneqtec/Universal uses a true two-speed direct-drive motor that facilitates shifting from high speed to high torque with the flip of a switch. A patented open drum eliminates re-milling, and the front-down design and center pivot eliminates bouncing and reduces noise and dust. With the AP planers, which cut to a depth of 6 inches, spoil aggregate is not pulverized and available for recycling.

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### Hiniker

The reversible Fox 380 C-Plow by Hiniker combines conventional and back-drag plowing into a single design. Measuring 96 inches in width, the Fox is operated as a conventional plow in the forward plowing mode, with normal hydraulic angling and trip-edge functions. For back-dragging, the upper three-quarters of the moldboard is hydraulically folded over, creating a rear-facing blade.

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# Productivity runs in the family.



The right equipment for any job. Count on the Mustang line of construction equipment to dig deeper, lift more, and power through any task. From skid-steer loaders and track loaders to compact excavators and telehandlers, it's all in the family. No wonder Mustang is the compact construction equipment of choice. Put the performance and versatility of Mustang to work for you. And keep tough jobs in the family.

To locate your nearest dealer, visit [www.mustangmfg.com](http://www.mustangmfg.com) or call 800-562-5870.



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# Buying File: Attachments

## Ingersoll Rand

With the introduction of several new attachments available for use on any compact track or skid-steer-loader brand, Ingersoll Rand offers box blades, pallet forks, industrial grapples, and three compact bucket configurations.



Six models of hydraulically controlled grapples are available to handle hard-to-handle or bulky, uneven loads. Two independent cylinders allow the user to grapple odd-shaped objects, while the inertia-welded cylinders and hydraulic cushioning provide consistent clamshell operation.

Visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info) and enter 218

## Loftness

An updated brush shredder that mounts to compact equipment with a minimum of 48 hydraulic horsepower has been introduced by Loftness Specialized Equipment/US Attachments. The new Carbide Cutter G2 — or Generation 2 — mulches material six inches in diameter, with reserve capacity to handle larger material when needed. Like the original Carbide Cutter and the Timber Ax, the Carbide Cutter G2 continues the use of a shear bar in a contained cutting chamber to help process mulch with the lowest horsepower requirement.



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## Rockland

Designed to work like a lever, the patent-pending Tree Jack from Rockland Manufacturing is essentially a long beam attachment with a side clamp that grasps the base of the tree near the far end. Available for carriers rated at 65 horsepower and up, the attachment is able to effectively pull trees up to 12.5 inches in diameter, completely removing the tree and root structure in one step. The fulcrum is at the farthest point of the beam, resting on the ground. As the carrier's lift arms rise, the side clamp on the beam also rises, plucking the tree.



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## John Deere

Among the Worksite Pro line of attachments for compact equipment, John Deere offers hydraulic breakers with a solid one-piece design eliminating the need for side bolts. The low-pressure, nitrogen-charged design cushions operators from recoil, while the narrow shape allows work in tight quarters.

Instead of a high-pressure accumulator, Deere breakers employ hydraulics and a gas-assist cycle to develop force, resulting in high power-to-weight ratios. With few seals and moving parts, and no special tools needed, maintenance is simplified.

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## York

A landscape rake specifically designed by York Modern Corp. for use with compact loaders, the Model SSF may be set to

push or pull as well as angle to discharge material either left or right with five working positions. With available rake models measuring 72, 84 and 96 inches in width, the push/pull floating frame is supplied with the proper mounting plate attached. Model SSF can also be equipped with optional caster wheels, grader blade, hydraulic angle and end boots.

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## Loegering

Bolting directly to the standard hubs of a compact wheeled machine, Loegering's Versatile Track System — or VTS — utilizes forward placement of the front idler wheel to maintain flotation and stability. By placing the front idler

significantly ahead of the front hub position, VTS gains stability when digging and backing out of trenches, as well as hauling and dumping heavy loads. Adjusting independently from one side of the machine to the other, the bi-directional suspension automatically applies the tracks back to the surface.

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## Machine Control

### CATERPILLAR

Depending on need and application, AccuGrade can have a wide variety of definitions for Caterpillar motor-grader operators. The basic system provides cross slope control. The operator selects which side of the blade to activate for automatic control and controls elevation manually. When combined with AccuGrade elevation control technologies, the system provides automatic elevation control to one or both sides of the blade. Beyond AccuGrade Cross Slope, available systems are AccuGrade Sonic or Laser for two-dimensional elevation control, and AccuGrade GPS or ATS for three-dimensional elevation control.

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### LEICA

The three-dimensional DigSmart machine automation control system from Leica Geosystems features a TrenchTool mode that can be operator-selected at the onboard computer. This Leica SmartTool will guide the operator as to exactly where to both trench and backfill. A second mode is SlopeTool, which ensures the operator does not over-excavate no matter how complex the specified profile is. A third mode, RampTool establishes height-position planes keyed to GNSS elevation data. The DigSmart 3D is compatible with all Leica 1200 survey instruments. Another Leica machine automation control product, GradeSmart 3D allows most production functions of a dozer or grader to be carried out by commands from the onboard computer.

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### TOPCON

Topcon's new LPS-900 system features its X-TRAC tracking technology and integrated radio communication for higher speed operation under all conditions. Driven by Topcon's robotic total station technology and 3D automation technology, the LPS-900 provides dual use as a base for high-accuracy machine automation or traditional robotic surveying operation, supplies grade information in a continuous stream via high-speed radio, and allows simple switching from GPS+ to LPS whenever the specs or job demands.

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### APACHE TECHNOLOGIES

Tornado F2 laser grade-control system from Apache features the CB52 dual control box that simultaneously controls the lift and tilt of a skid-steer loader, compact track loader or dozer blade. When used with Bullseye receivers, the CB52 provides automatic blade control that keeps the machines operating at maximum speed to save time, fuel, material and labor on grading jobs. Designed-in flexibility covers a range of needs, from simple elevation display through complex grading jobs requiring automatic blade control.

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## OEM CONTROLS

The largest provider of electro-mechanical joysticks and electronic control modules for the off-highway construction industry, OEM Controls' newest hall-effect and CANbus joysticks join the multi electro-hydraulic valve driver CAN module. The electronic module, the OCM1, has the display screen and adjustment keypad on the module instead of a separate tool. It also has current-regulated outputs that will maintain consistent output to the valves during temperature and/or voltage fluctuations.

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## MOBA

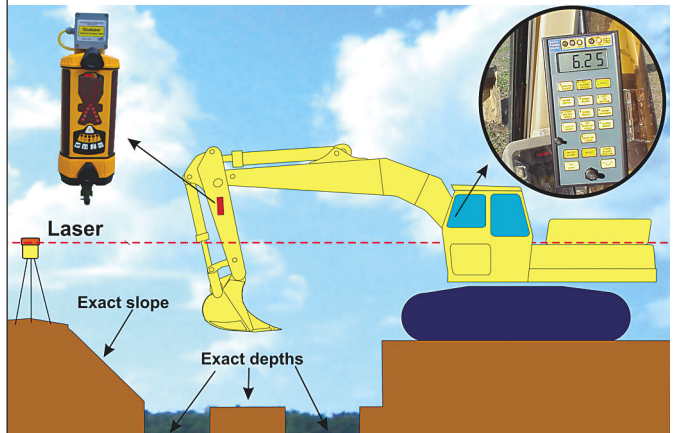
Delivering ultrasonic grade and slope control in one unit, the MOBA CSS100 was developed specifically for the commercial-class paving market, where slope control may be used less often than on highway-class machines. The CSS100 offers the ability to utilize slope control without the added expense of a modular grade and slope system typically used in highway applications. Like other MOBA grade controls, the CSS100 utilizes multiple waterproof, ultrasonic transducers for increased accuracy and reliability. The system also includes a remote handset for grade and slope adjustments.

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## OCALA

One of the simplest and least expensive ways to improve excavator productivity is to install a depth monitor. Developed by Ocala Instruments, the excavator monitor gets a reference from a rotating laser with an automatic laser receiver on the dipper stick, so the display inside the cab shows exactly the depth of the tip of the bucket from the laser height. The unit installs in less than one hour, and it can be moved to another excavator in minutes.

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## TRIMBLE

As creator of the patented dual Global Positioning Systems for machine control, Trimble offers a complete line of three-dimensional and conventional grade-control systems on the market. From laser or sonic-based through modernized GPS+GLONASS, these systems are easy to use, fully upgradeable, and flexible enough to meet a wide range of application and jobsite requirements. Trimble grade-control systems are designed to quickly pay for themselves in increased productivity and reduced overages.

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## JOHN DEERE

Offering "plug-and-play" convenience via an open architecture approach, the John Deere 750J and 850J crawler dozer models are now available with an Integrated Grade Control option. These machines now can be shipped from the factory with hardware, software and wiring ready to support the grade-control system of the customer's choice. Deere is working under separate development agreements with two of the leading suppliers of grade-control systems to provide this technology for dozers, graders and other machines. The 750J and 850J dozers are the first to be available with this technology for integrated grade control.

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## AGL

A new product from machine-control-system manufacturer AGL, the EAGL 3000 self-leveling rotating laser uses high-performance tilt sensors to ensure precise, repeatable self-leveling of better than plus or minus one-sixteenth of an inch at a distance of 100 feet. The user can rake in a single slope, matching up to 6 percent positive or negative slope in the X axis, while the Y axis remains compensated. One-touch electronic leveling in horizontal provides fast and simple setup. AGL's automatic systems are easily adaptable to a variety of machines, from dozers and motor graders to trenchers and agricultural tractors.

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## RIEKER

Available as a display or remote sensor package, the RDI digital inclinometer from Rieker Instrument Co. improves the construction vehicle operator's ability to detect dangerous roll-over situations before equipment damage or injury can happen. Incorporated into many OEM products as an early-warning feature, the RDI can be supplied with any combination of digital LCD display, analog 0-5V output and RS232 output, with up to four open collector switch outputs providing maximum functionality.

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## SOKKIA

Any of the Sokkia machine-control solutions can be used for manual or automatic dozer systems in rough earthmoving, leveling and spreading material, or for excavator systems for deep digs like canals and ponds. In conjunction with machine-control systems and guidance programs, Sokkia's fully robotic, fully tracking SRX total station and the 72-channel GNSS-capable GSR2700 ISX GPS receiver improve the quality of finish grading. Using the precision of the SRX total station, the operator can use visual grade information to monitor and manually adjust the elevation of the blade.

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## How to Calculate Rate of Return

Make sure the value of the income stream equals the present value of the money spent

Last month we introduced the concept of discounted cash flow as a formal way of quantifying the fact that a transaction scheduled for some future date does not have the same weight, or value, as a transaction that occurs in the present. Money in hand has value in that it can be used to accrue interest or reduce the cost of debt; future transactions contain an element of risk. We showed how you compound up a transaction when you “move” it from now into the future and how you discount back a transaction to determine its equivalent value when you “move” it from some future date back to the present. We concluded by showing how you discount a series of transactions to determine the net present value (NPV) of the annual cash flows associated with investment alternatives.

This month, we address the age-old question, “What is the rate of return and how do I calculate it?”

Many methods of determining rate of return exist. None is necessarily “wrong,” but some are more right than others. We must un-

derstand the calculation, know the limitations, and know what the results mean. Here is a simple example to show how easy it is to misunderstand what you are doing. Assume you are going to spend \$20,000 on a furnace that burns old oil to heat your workshop, saving \$5,000 per year on electricity. The calculation appears simple: You will earn \$5,000 per year on an investment of \$20,000, so the rate of return is 25 percent per year. This is only true, however, if you are going to use the furnace for a long time. If you do it for four years, all you do is break even. You make no return on the \$20,000 invested. If you run your furnace for five years and use the discounted cash flow methodologies described in June, you will discover that the rate of return on your furnace is a little under 8 percent.

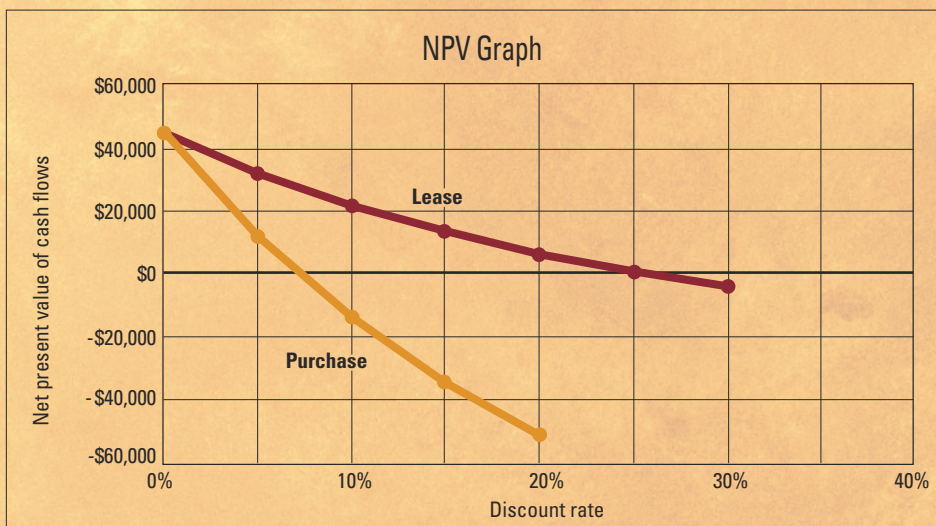
Equipment investment decisions are, of course, much more complicated than heating furnaces. Time periods are relatively short, and annual cash flows are not uniform.



**Mike Vorster**

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

*Many methods of determining rate of return exist. None is necessarily “wrong,” but some are more right than others.*



Note that the net present values (NPV) of the cash flows based on these two rates are very small.



## Two Cash-Flow Scenarios

### Direct purchase

1	End of Year	0	1	2	3	4	5	Total
2	Buy	(\$180,000)						
3	Operating gain		\$40,000	\$40,000	\$35,000	\$35,000	\$25,000	
4	Sell						\$50,000	
5	Annual cash flows	(\$180,000)	\$40,000	\$40,000	\$35,000	\$35,000	\$75,000	\$45,000
6	Discount rate at 7.2%	1.00	0.93	0.87	0.82	0.76	0.71	
7	Present value of cash flows	(\$180,000)	\$37,313	\$34,807	\$28,411	\$26,503	\$52,977	\$11

### Lease

1	End of Year	0	1	2	3	4	5	Total
2	Lease	(\$50,000)	(\$20,000)	(\$20,000)	(\$20,000)	\$20,000		
3	Operating gain		\$40,000	\$40,000	\$35,000	\$35,000	\$25,000	
4	Sell							
5	Annual cash flow	(\$50,000)	\$20,000	\$20,000	\$15,000	\$15,000	\$25,000	\$45,000
6	Discount factor at 25.7%	1.00	0.80	0.63	0.50	0.40	0.32	
7	Present value of cash flows	(\$50,000)	\$15,911	\$12,658	\$7,552	\$6,008	\$7,966	\$96

Net present value of annual cash flows decreases as the discount rate increases. The rate of return is indicated by the point where the line intersects zero, the red line. The flatter the graph, the better the return.

Using the example from June, let's calculate the rate of return arising from the decision to either purchase the machine or lease it.


The figures used in the two scenarios are summarized in the accompanying tables. Discount factors for the purchase decision are based on a rate of 7.2 percent per year, and the factors for the lease decision on a rate of 25.7 percent per year. Note that the net present values (NPV) of the cash flows based on these two rates are very small.

A simple definition for rate of return is that rate which causes the NPV of the annual cash flows to be zero. In other words, the rate of return of an investment is the discount rate that causes the present value of the income stream generated by the investment to be equal to the present value of the money spent. The best way to do the calculation is to draw a graph showing how the NPV of the annual cash flows goes down as the discount rate increases. The point at which the graph crosses the zero line is, by definition, the rate of return of the investment.

The graph for both our scenarios starts at \$45,000 when the discount rate is zero. This is because a discount rate of zero neglects the time-value of money and, therefore, the NPV is the same as the sum of the

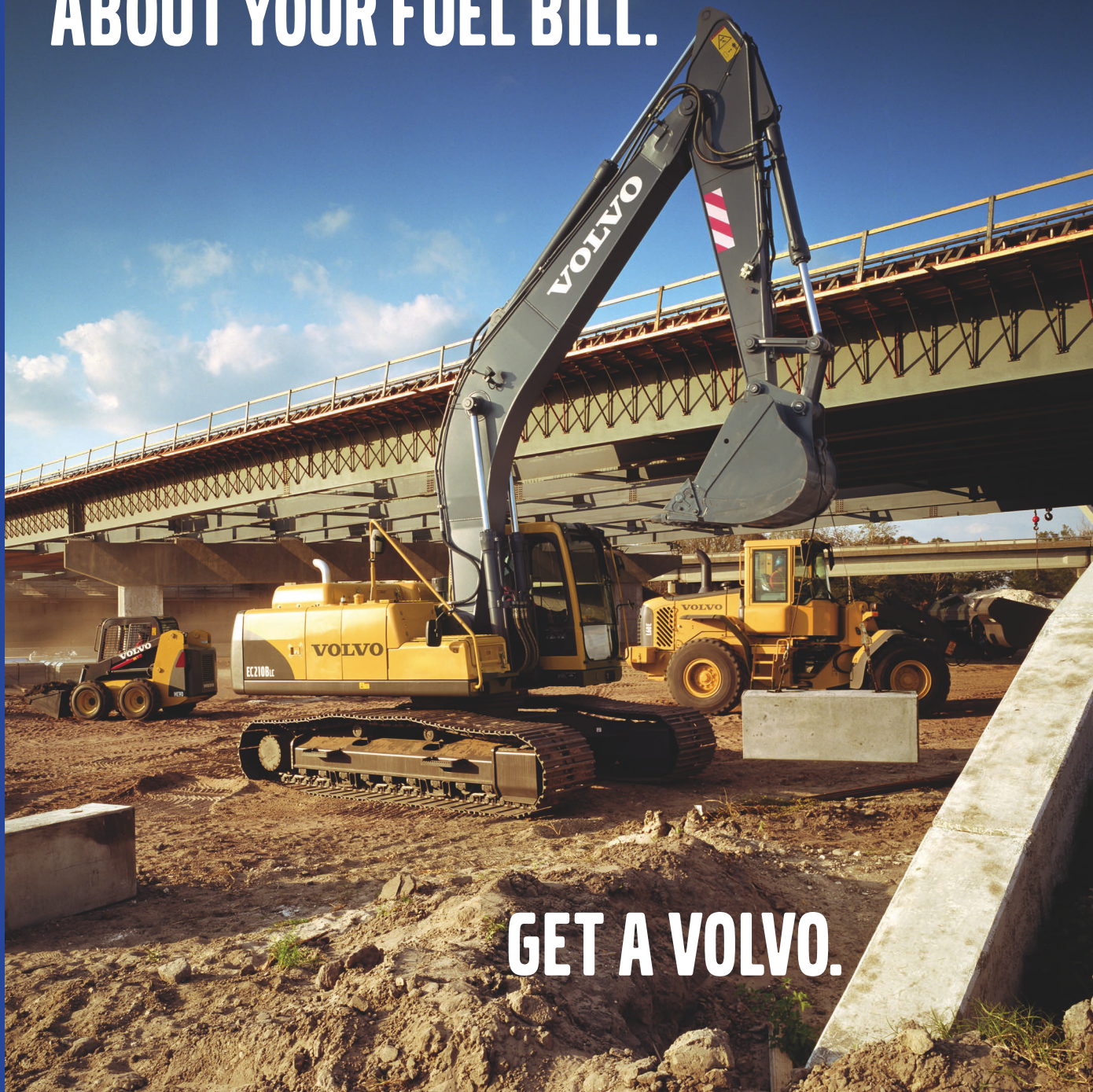
annual cash flows. The purchase option is cash negative at the beginning and locks up a lot of money. Its NPV graph falls quickly to become zero at 7.2 percent. The lease option is much less cash-intensive, and the graph falls slowly to cross the zero line at 25.7 percent.

So, both alternatives have the same cash flow total, but the purchase option has a dangerously low rate of return. The lease option has a graph that runs flatter and produces a higher rate of return. A review of the cash flows indicated that this option required less investment and became cash positive before the end of the third year. Doing the analysis quantifies that review and adds confidence to the decision.

Calculating the rate of return on an investment is critical for success. In the end, the calculation is not all that difficult. You estimate the annual cash flows, assume a discount rate, and calculate the NPV at the assumed rate. You then change the rate, repeat the NPV calculation, and plot a graph like the one we used. The rate of return is that rate which causes the NPV graph to be zero. Better investments have higher rates of return and have NPV graphs that do not fall rapidly as the discount rate or time-value of money increases. 



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# Earthmoving Report

By MIKE ANDERSON, Senior Editor

## Caterpillar Changes Model Designation

Replacement of U excavator reflects reduced-radius configuration of new 24-metric-ton machine

The ongoing evolution of the Caterpillar hydraulic excavator product line to the D-Series is bringing with it an actual new model designation.

Editors who gathered recently in Peoria, Ill., for extensive new equipment rollouts covering various Caterpillar product lines were introduced to three updated excavator models serving the key 19- to 24-metric-ton class. The standard-configuration 320D L replaces the 320C L and the compact-radius 321D LCR replaces the 321C LCR; while the reduced-radius machine, formerly identified as 320C LU designation for Utility, is now the 320D LRR.

"The compact radius has really come to signify zero," says John Walker, Caterpillar senior sales and market consultant for heavy construction, "and the reduced radius is not necessarily a zero machine, but where we have physically reduced the radius."

The RR designation is more true to the design of the former U model, he says, "and you'll see more of that down

the road, we think, as we go on with our product development in future years.

"The other thing is the fact that U, meaning Utility, has a different connotation in North America than it does in other places around the world. The machine really is a very productive tool, and depending on where you apply it — what the job task and the work environment is — the machine does provide more output."

Each of the new models is powered by the Tier 3-compliant Cat C6.4 ACERT engine delivering 148 horsepower,

### Basic Specs: Caterpillar D-Series Excavators

	320D L	320D LRR	321D LCR
Operating Weight	47,554 lb.	53,361 lb.	53,307 lb.
Cat Engine	C6.4 ACERT	C6.4 ACERT	C6.4 ACERT
Net Power	148 hp	148 hp	148 hp
Bucket Force	28,079 lb.	28,079 lb.	28,079 lb.
Max. Reach	32'4"	32'4"	31'9"
Max. Dig Depth	20'11"	20'11"	21'9"
Track Length	14'7"	14'7"	14'7"





an increase of 10 horsepower over the C-Series machines. The ADEM A4 electronic control module provides flexible fuel mapping, allowing the engine to respond fast to varying application needs. Additionally, the standard power mode can reduce fuel consumption as much as 8 percent when performing work not requiring full power; Automatic Engine Speed Control cuts engine speed in light-load situations; and the cooling system has a demand fan controlled by a viscous clutch.

With the new D-Series excavators, operating weights range from 47,554 pounds for the standard-configuration model to 53,361 pounds for the reduced-radius machine, which uses about 5,000 pounds in extra counterweight to best utilize the same design and footprint as the standard machine, just into tighter spots. Tail swing is reduced from 9 feet to 6 feet 6 inches.

The compact-radius machine, with a tail swing of 5 feet 6 inches, incorporates a different design in which the boom is positioned farther back in the upper frame, reducing the front swing radius when the boom is pulled up.

The choice boils down to application. Compared to the standard-configuration machine, the 321D LCR provides 22

percent more lift over the front and the 320D LRR provides 19 percent more lift over the side, says Walker. "Hence, the need for a different model."

For each of the three new models, higher pressure creates stick and bucket forces that are about 7 percent greater than their predecessors. For enhanced control, the redesigned main hydraulic valve improves joystick response. As with the previous models, the D-Series models use a hydraulic cross-sensing system that maximizes hydraulic power for faster implement speeds.

For operator comfort, fully automatic in-cab climate control determines which air outlet is best in each situation. With all glass affixed directly to the structure, thus eliminating a need for window frames, the D-Series cabs are new, be they the spacious operator station of the standard- and reduced-radius models or the efficient, smaller cab of the compact-radius machine.

The introduction of the 320D L, 320D LRR and 321D LCR models extends the Caterpillar D-Series upgrade to the entire core 19- to 35-metric-ton excavator line, right up to the 330D L and 328D LCR models.

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## New Roller Covers More Ground

Stone enters a new size class with its 84-inch vibratory soil compactor

Stone Construction Equipment's introduction of its new Rhino 84X vibratory soil compactor, with an 84-inch-wide drum, not only rounds out Stone's Rhino line (already having 43-, 54- and 66-inch models), but also, says the manufacturer, "is the first step in moving Stone into heavier equipment." According to Lynne Woodworth, the company's president and CEO, the new Rhino 84X was developed in response to customer requests for a larger soil compactor, and its development is indicative of Stone's expanding emphasis on its compaction line.

The new soil compactor is available either as a smooth-drum machine (SD84X) or in a padfoot configuration (SD84XC), the latter being equipped with a padfoot shell. The operating weight of the smooth-drum version is 27,337 pounds, while that of the heavier padfoot variation is 31,057 pounds. The 84-inch drum on these machines is 60 inches in diameter, and the centrifugal force developed by both is rated at 42,743 pounds in the drum's low amplitude setting (.035 inch), and 62,989 pounds in its high-amplitude setting (.071 inch). Vibration frequency in the high-amplitude setting is 1,800 vpm; and in the low-amplitude setting, 2,100 vpm.

The 84X uses a 130-horsepower Cummins diesel engine coupled to a Sauer-Danfoss hydrostatic transmission that powers a heavy-duty ZF drive axle with a no-spin differential. The new model's articulation joint uses a heavy-duty spherical bearing and reinforced pivot point that also provides oscillation. Under the hydraulically assisted engine hood, at the rear of the machine, are located

the 84X's pumps and filters, as well as its 58-gallon fuel tank and its 58-gallon hydraulic reservoir. The swing-up fiberglass hood provides wide-open access to routine service points, says the manufacturer, promoting good maintenance. For diagnostic work, the hydraulic test ports are easily accessible.

The 84X features an enclosed operator's cabin, complete with heat, air conditioning and an XM radio as standard equipment. Large windows with wipers are designed for optimum visibility, says the company; and large, dual-entry doors simplify access to the cabin. A fully instrumented console reports on machine operating systems, and the company's "4-in-1" directional-control/vibration-control lever is designed to place major controls conveniently in the operator's right hand.

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**Above: The steeply sloped, contoured, fiberglass hood of the Rhino 84X enhances visibility rearward and provides easy access to service points.**

**Added conveniences offered by the Rhino 84X soil compactor include working lights front and rear, large rearview mirrors left and right, and adjustable scrapers designed to thoroughly clean the padfoot drum.**





# Getting Comparative Specs is as easy as...

**1**

**2**

**3**

Specification (Unit of Measure: English)	Allmand Brothers TLB 535 ESL	Bobcat B100 B	Case 580M Series 2	Caterpillar 430E
<b>ENGINE</b>	Isozu	Kubota	Case	Cat
Engine make	3LD1	D1105-T	446/M2	3054C DIT
Engine model	0.0	31.5	78.0	97.0
Net engine power - hp				
<b>DRIVE</b>	Hydrostatic	Hydrostatic	Synchromesh/Pwr Shift	Synchromesh/Pwr Shift
Transmission type	1 / 1	1 / 1	4 / 4	4 / 4
No. of speeds (fwd/rev)	5.5	4.7	24.5	26.8
Max. travel speed - mph	2WD	2WD	2WD/4WD	2WD/4WD
No. of drive wheels	2WS	2WS	2WS	2WS
<b>STEERING CONFIGURATION</b>				
Hydraulic pump flow - gpm	8	11.7	28.5	43
Relief valve pressure - psi	2400	--	3050	3611
<b>BACKHOE</b>				
Backhoe bucket width range - in	12" - 36"	--	12" - 36"	12" - 36"
Max. dig depth, optional extended stick - ft/in	7' 8"	--	11' 2"	13'
Loading height, standard stick - ft/in				

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## Topcon's Millimeter-GPS Now Controls Pavers

Rotating laser augments GPS to create the first 3D-GPS control system for pavers, profilers and trimmers

Topcon and TSD Integrated Systems, a joint venture with Sauer Danfoss, applied Millimeter GPS technology to paving applications with its new AutoPave product. The company claims AutoPave will provide grade-control accuracy equal to a robotic total station at lower cost and increased flexibility like a rotating laser.

Robotic total stations — whose lasers lock on and track receivers mounted on pavers — have pioneered automated, stringless grade control in paving. Global positioning systems (GPS) alone lack the precision in vertical measurements to deliver precise grade control necessary for pavers to pass profilograph tests.

Topcon's Millimeter GPS system overcomes vertical-plane limitations by augmenting GPS' excellent horizontal positioning with what they call the Lazer Zone. The Lazer Zone generates vertical accuracy to within a few millimeters, compared to the centimeter vertical accuracy of conventional real-time-kinematic GPS.

On pavers, Millimeter GPS is achieved with Topcon's zone-beam laser transmitter. The PZL 1 emits a patented 'fan beam' signal with a height of 10 meters (about 33 feet). It sweeps a 2,000-foot-diameter area with this 33-foot-high wall of laser light.

A sensor, the PZS MC, is mounted on a mast attached to the toe arm of the paver. Any time the PZS-MC sensor is positioned within the laser zone signal, the system provides vertical data resulting in millimeter precision. The laser's 33-foot field of view makes it easier to keep the sensor in contact with the guiding signal.

Up to four PZL-1 transmitters can be linked together increasing the vertical working area to 133 feet or 7,880 feet



**Any time the mast-top sensor is within the 33-foot-high laser zone, TSD's AutoPave can control paving grade to within plus or minus .02 feet, or a quarter of an inch.**

horizontally. Rovers move from one transmitter to the next seamlessly.

Because the PZL-1 is a rotating laser, not master/slave dedicated to the paver like a robotic total station, multiple Topcon rovers (integrated to anything from 3D grade-control systems to grade-checking poles) can work with millimeter accuracy from the same laser.

AutoPave is the top end of TSD's new family of automated paving control systems. It is expected to cost a little more than half of the cost of 3D paver controls using robotic total stations. The other two TSD systems include the economical ReadyPave and MasterPave, with TSD's Quattro four-headed sonic sensor.

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# Market Watch Lite

By KATIE WEILER, Managing Editor

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## ▶ PowerTech

By expanding the PicBucket line of multi-functional percussion buckets, PowerTech is offering a processing tool for demolition and excavation contractors who use 8.5- and 16-ton excavators. The new 3000 Series buckets are available in 18-, 24- and 30-inch versions. Having already established the PicBucket 1000 and 2000 Series, PowerTech is extending to the mid-sized excavator market its combination of a hydraulic hammer's power with a conventional bucket's stripping force and maneuverability.

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## ▶ Conduit Covers

The Conduit Cover functions as a universal cap-and-plug system for protecting open hoses, pipe lines or fittings that might be exposed to contamination when disconnected or removed from a component or machine during the repair process. Conduit Covers are heavy-duty polyethylene bags that can be slipped over open lines and tightly secured with a built-in flexible tie strap. Conduit Caps are available in two sizes, 4x5 inches and 6x7 inches, and are packaged in a slide-seal poly bag that can be stored easily.

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## ▶ Topcon

Topcon says its optional joystick interface box eases use of its 3D-GPS+ grade control system on Caterpillar D8T, D9T and D6 series crawler dozers. The box eliminates the need to add hydraulic valves; and it installs between the dozer's electronic joystick, its controller, and the GPS control display. Signals from the 3D control system are interpreted as if the operator were using the joystick to run the machine, the company says.

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## ▶ Luber-Finer

Extended-service coolant filters protect cooling systems for up to one year, 150,000 miles, or 4,000 hours, the company says. They can be used with conventional coolant, ethylene, or propylene glycol. Filters have specially formulated synthetic media. Additionally, filters are precharged with a controlled-release supplemental coolant additive to protect engines against corrosion, cavitation and scale.

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## ▶ Miller Fall Protection

Revolution Harnesses are designed for all-day comfort, the company says. Type 10 webbing is said to be almost twice as strong as standards require, and other features include rotary design connections and new back/shoulder padding. Cam buckles can be adjusted with two fingers. Harnesses meet all applicable OSHA, ANSI and CSA requirements, according to the company.

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## ArvinMeritor

Meritor WABCO-branded products are now part of the Meritor All-Makes Air Systems Program. The new offering includes air valves and an AD-9 style air dryer cartridge. The All-Makes Program was launched earlier this year and provides a comprehensive list of new, outright or core-free, and remanufactured all-makes air valves, air compressors, air dryers and cartridges, and air hose assemblies. The products can replace competitors' parts without piping changes on tractors, trucks and trailers.

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# Market Watch Lite



## Trimble

LM80 Layout Manager is a pocket-sized, personal layout tool that allows contractors to enter blueprints, thus creating a digital replica. It allows users to carry and manage the jobsite blueprint, regardless of the method and instrumentation. When attached to a Trimble construction total station, says the company, the LM80 significantly increases accuracy, reliability and productivity. The Trimble LM80 Layout Manager features improved measurement techniques.

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## CES Wireless

According to CES Wireless, GPS-205 is among the smallest, most powerful and economical GPS asset/vehicle tracking devices available. The device is compatible with the GPS/GPRS cellular wireless network and operates from 9 to 30 volts DC. It is also compatible with the CES FleetLinc web-based fleet-management subscriber service. The device stores GPS data if outside GPRS wireless service, and sends an advisory when GPS is not being received. The GPS-205 provides a geo-fencing capability, can provide mileage traveled information, and has a serial port for external connection.

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## Chicago Pneumatic

The Chicago Pneumatic Red-Hawk gasoline-powered breaker weighs 50 pounds and delivers 2,600 blows per minute. The breaker's engine is equipped with a catalytic converter and silencing muffler. Vibration dampening handles help to enhance operator comfort.

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## Magnum

Magnum MTP 4000S/MTP 6000S wet-prime and MTP 4000D/MTP 6000D dry-prime trash pumps move up to 3-inch-diameter solids. The 4- and 6-inch models run up to 24 hours with 110-gallon fuel tanks.

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### ▶ **Ridgid**

Ridge Tool has two new Ridgid brand industrial, two-stage, wet/dry vacuums designed specifically for cleaning up heavy debris and liquids. Available in 14-gallon (RV2400A) and 16-gallon (RV2600B) capacities, the new models use a proprietary two-stage motor and Ridgid's patented blower wheel. A three-layer pleated filter is designed to allow increased motor efficiency and to prolong filter service life. Both new models convert to blowers having a rated 150-mph velocity.

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### ▶ **Maxus X-Lite**

Maxus X-Lite air compressors are made with aircraft-quality aluminum alloy, so weigh 30 percent less than compressors with steel tanks, according to the manufacturer, Campbell Hausfeld. Aluminum tanks do not rust from the inside, so air is cleaner, the company says. First in the series is EX8016 that delivers 3.7 scfm at 90 psi. It weighs 57 pounds, and has a 4-gallon, 1.3 running horsepower twin stack. Price is \$299; warranty is five-year limited.

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### ▶ **OEM Data Delivery**

The ST-500 Radio Service Tracker system uses radio-wave technology to track machine operating time for use in job costing, machine servicing/utilization calculations. According to the company, data can include date and time of operation, service records, job hours and consumables use. This information, says OEM, can then be gathered by a PDA data collector and downloaded into virtually any computer program.

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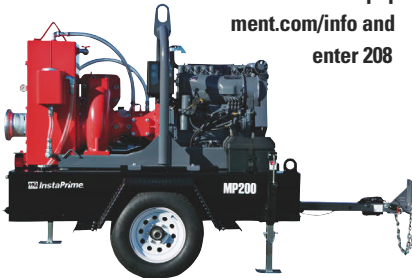


# Market Watch Lite

## ▶ **Multiquip**

InstaPrime water pumps move up to 5,000 gpm in models ranging from 6 to 12 inches. Patented screw-type impeller provides increased flow, and a 15-gallon fuel tank allows for run times up to 100 continuous hours. Deutz provides the power plants, in horsepower of 40 to 96. High-flow pumps have heads of up to 143 feet and can generate lift of 30 feet in 30 seconds.

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## ▶ **Navman**

Navman Wireless Fleet Manager allows managers to map vehicle and driver locations, analyze activities, define territories, and communicate with drivers. Onboard GPS/cellular technology and On-lineAVL, a Windows-based interface, provide managers with asset position and activity details. Qube (shown in optional case) automatically transmits machine data, including engine diagnostics. Software costs \$45 per vehicle per month, with a five-year service agreement.

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## ▶ **DBI-SALA**

The new i-Safe Intelligent Safety System combines Radio Frequency Identification (RFID)-equipped fall-protection equipment with web-based information, allowing companies to track equipment assignments, and to download equipment user manuals and inspection criteria. The i-Safe RFID tags are read by portable electronic readers that scan and account for the equipment through unique serial numbers. The recorded data is instantly available through a customized i-Safe web portal.

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## ► Kaeser

Kaeser Compressors offers a complete new line of air tools that includes paving breakers, rock drills, rivet busters, trench diggers, chipping hammers and backfill tampers. Ergonomic paving breakers are available in 50-, 60- and 90-pound models. Kaeser says the valves, pistons, and other moving parts of all MobilairTools are heat treated to a specified Rockwell hardness for durability.

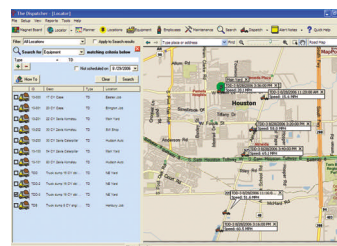
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## ► HCSS

Software developer HCSS — creator of HeavyBid Estimating, HeavyJob Field Management, and The Dispatcher Resource Management systems — integrated a GPS feature with The Dispatcher to collect better field information, helping managers reduce fuel costs, cycle times, theft losses, and to identify underused machines. The Dispatcher GPS package includes the GPS receiver, antenna and harness, data service coverage, air time and integration with The Dispatcher software.

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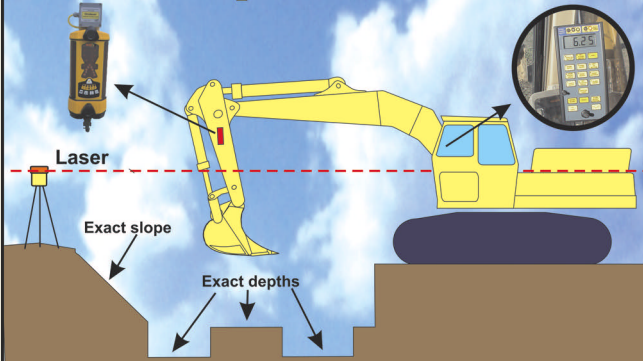
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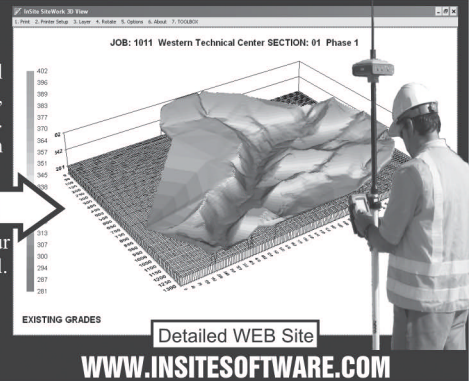
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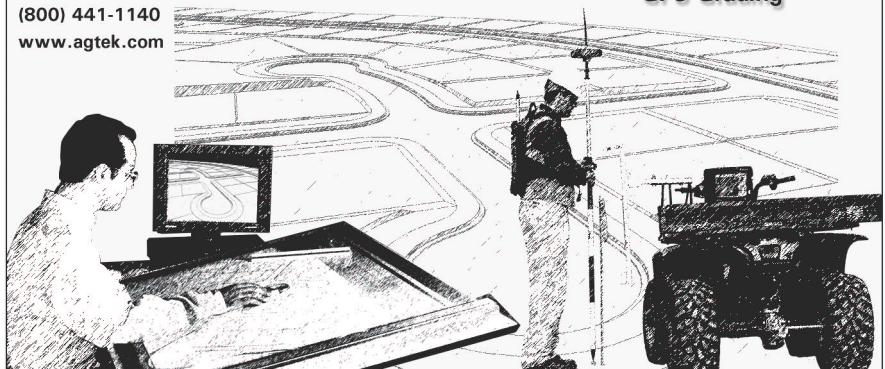
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# Iron Works

By KEITH HADDOCK, Contributing

## A Giant Excavator

The Hopto 1900 weighed 103 tons and carried a standard bucket of 5 cubic yards heaped capacity.



### Warner & Swasey's Hopto 1900 heralded the end of the cable excavator

Throughout the 1960s, hydraulic excavators had gradually been gaining ground over their cable-operated counterparts. They were not only branching out into new industries with new applications, but also gaining in size. With excavators in Europe already entering the 10-cubic-yard class, Warner & Swasey took the plunge in 1972 and introduced America's largest to date, the Hopto 1900.

The huge excavator tipped the scales at 103 tons and carried a standard bucket of 5 cubic yards heaped capacity. A pair of GM 8V-71 diesel engines totaling 616 horsepower drove four gear-type pumps delivering 296 gpm into the hydraulic system, which operated at 2,750 psi. The 1900 backhoe boasted a digging depth of 35 feet 7 inches, and at ground level had a reach of 48 feet 10 inches. When handling pipe on a deep sewer job, it could lift 58,900 pounds at a 15-foot radius.

But the most striking feature of the Hopto 1900 was its massive tractor-type undercarriage with a driving sprocket at both ends of each crawler assembly. While some prominent manufacturers of the day were still propelling their hydraulic excavators from the upper works through a center shaft and chain drive to the crawler sprockets, Warner & Swasey went somewhat "overboard" with their design.

Each sprocket was driven by a pair of hydraulic motors in the undercarriage for a total of eight motors, and each drive train incorporated a triple set of spur gears, plus a planetary final drive in each sprocket hub, for a total of 48 gears! Two-

speed travel was possible through a selector valve. When low speed was selected, oil was routed through all eight propel motors for maximum power. When high speed was selected, the same volume of oil was routed to the motors at only one end of the crawler, idling the motors at the opposite end and providing maximum speed. The advanced design included an automatic track-tensioning device operated by a hydraulic cylinder in each side crawler frame. Single-grouser or flat shoes were available.

The Hopto 1900 possessed an impressive heritage, descending from one of America's earliest hydraulic excavators. The Badger Machine Co., incorporated in 1946, developed a tractor-mounted hydraulic backhoe and called it the "Hopto" (Hydraulically-Operated Power Take-Off) because it was driven by the tractor's power take-off. From 1958 to 1977, Badger was owned by Warner & Swasey, which developed the Hopto idea into a line of crawler, wheel and truck-mounted hydraulic excavators. After 1977, the Hopto machines were made by Badger Construction Equipment at their factory in Winona, Minn. The 1900 enjoyed a lengthy production run, latterly as the Badger Hopto 1900. The last one was shipped in 1990.

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