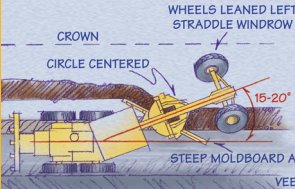


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**34** We manage GM's new pickups



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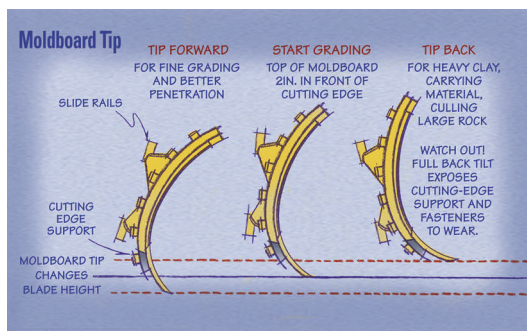
Cover photo: George Pfoertner ©

## FEATURES

### PRODUCTION HEROES

#### 28 Use All of a Blade's Features To Build Better Roads

Motor-grader operators who are maintaining roads but want to climb to the top levels of the earthmoving profession — to become finished-grade operators — can practice the skills they need by taking full advantage of all the articulated-motor-grader's features. Executive Editor Larry Stewart interviews training experts from motor-grader manufacturers as well as an instructor from the Union of Operating Engineers and shares several tips for operators to achieve elite finish-grade status.



### HANDS-ON TRUCKING

#### 34 Driving Experience Key to GM's Pickups

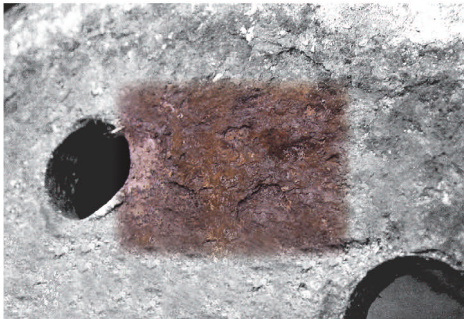
Truck Editor Tom Berg says the half-ton Silverado and Sierra have been restyled inside and out, mostly for the better, but not always. Berg is not a fan of the new push buttons on the dash and driver's door because they have to be studied, but he did enjoy a more powerful engine and a smoother ride.



## PREVENTION ILLUSTRATED

### 38 How to Keep Wheels Tight

A number of reasons cause wheel looseness, but topping the list is improper torque. When you torque down a nut to the recommended level, it stays put. But to maintain the proper torque, you have to re-



torque. Other recommended procedures for correcting wheel looseness are: refurbish the wheel to maintain its integrity, and replace worn fasteners with new nuts, studs and clamping plates.

## COVER STORY: Buying File

### 44 Specialized Work Platforms Stretch Makers' Market Share

Aerial-work-platform sales have grown enough to accommodate manufacturers competing for niche users with specialized machines. A growing percentage of aerial-work platforms are sold with accessories that outfit them specifically for the work that they will be doing. The range of ways to customize these machines has grown considerably.



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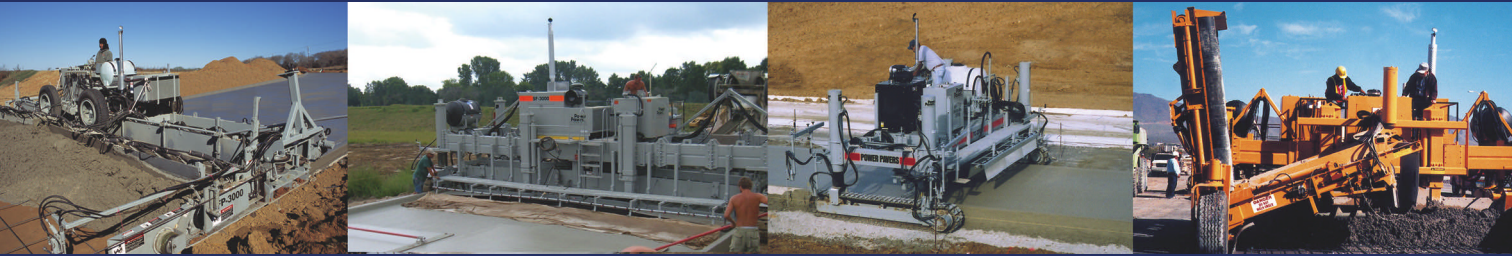
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## Not Coming Home

Last month, as some of our co-workers were returning from lunch, traffic quickly halted for an accident that had closed the road. Lying on its side was a backhoe-loader, which had fallen off the flat-bed trailer hauling it.

As the truck and trailer were passing under a bridge, the machine hit the bridge and was knocked off the trailer. Tragically, the backhoe-loader fell sideways into oncoming traffic and landed on top of two cars. One woman was killed.

The woman in that car would not be coming home. She was not at fault, and there was absolutely nothing she could have done to avoid or protect herself from this accident. But she was dead.

Our thoughts also turned to the truck driver and how he must be suffering. We don't know the specifics of the incident, but no traffic tickets were issued at the scene. We can only presume that no grievous mistakes were made and that this was an accident, pure and simple.

Any manager of a fleet of construction equipment, however, surely considers this and every accident related to machinery not only a tragedy, but also a mystery. Were there any actions that could have prevented this?

"Safety is no accident" has become a cliché. Safety sessions, posters and benchmarks are becoming common. And they are all important. But like the sound of backup alarms on trucks, are we really paying attention?

It only takes a moment for a warning signal to be missed or for a situation to change dramatically. In many cases, no human being could react to what so rapidly unfolds in front of him or her.

But for every truly accidental tragedy, how many other tragedies are avoidable? How many times does our attention drift leading up to that critical moment, the last moment in which anything could be done to avoid disaster?

We're not calling for more and better safety programs, nor are we pointing unnecessary fingers. We are simply grieving a tragedy. It's local for us, but it happens all over the country more often than it should.



Rod Sutton, Editor in Chief

We welcome your comments.  
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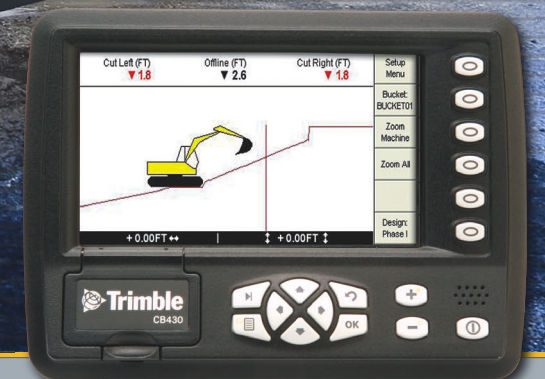
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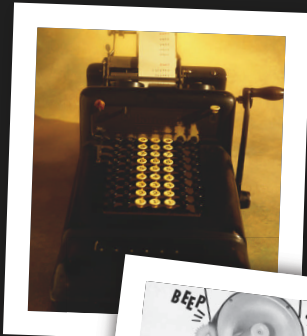
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# MARKET WATCH

By KATIE WEILER, Managing Editor

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## ▶ Agco

According to Agco, its 63,000-pound, 570-hp Challenger MT975B is the world's largest four-wheel-drive, articulated ag tractor. Four models in the MT900B Series use Caterpillar C15 and C18 diesel engines with peak power up to 615 horsepower and peak torque of 2,040 ft.-lbs. An accessory package includes a scraper plate with hydraulic couplings and belly guards for contractors who want to pull scraper pans. Manufacturer suggested list price for the MT975B is \$350,000.

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## ◀ Ingersoll Rand

Part of a new series of wheel-mounted asphalt pavers, the PF-6160 and PF-6170 feature a hopper capacity of 14.4 tons and a production rate of 820 tons/hour.

With a 10-foot screed, maximum paving width is 26 feet. The auger system works independently of the conveyor system, and sonic sensors on these two systems provide precise material flow.

Self-cleaning chains on the conveyor system are automatically tensioned. A hydrostatic, direct-traction drive system eliminates 70 percent of all mechanical drive-train components to reduce maintenance costs.

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## ◀ Manitowoc

Model 16000 lattice-boom crawler crane, with a rated lift capacity of 440 tons, often finds application in wind-power-equipment installations, petrochemical work, and fabrication yards. The crane is now available with the company's lift-enhancing MAX-ER attachment. The attachment can provide up to 256 tons of counterweight, thus in-



creasing the crane's lift capacity at given radii. The 16000's standard boom length is 315 feet, but boom length can be increased with the MAX-ER to 394 feet.

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## ▶ Vermeer

Replacing the D300x500, the new D330x500 Navigator HDD offers 50,000 ft.-lbs. of rotational torque and 330,000 pounds of thrust/pullback force. It is powered by a Tier 3, 540-hp Cat diesel engine. The operator's station has been redesigned and reconfigured. Vermeer says the machine allows a single operator to run all functions from the roomy operator's station.

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# Market Watch

## Custom Equipment

The Hy-Brid HB-1030 is an electric scissor lift with 10-foot platform height that weighs only 1,175 pounds. The lift is designed for use in building projects with increasingly limited floor loads, and will lift two workers and 750 pounds of capacity. A dual-wheel front steering system reduces damage to finished floors, and proportional electric drive extends battery life. Access to the platform is easy with a 20-inch step up.

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## Komatsu

Model WA430-6 wheel loader has an operating weight between 40,840 and 41,226 pounds. The machine generates power from a 231-net-hp Komatsu diesel engine, with an Electronic Heavy Duty Common Rail fuel-injection system. It has a dumping clearance of 9 feet 11 inches when equipped with a 4.6-cubic-yard general-purpose bucket with bolt-on cutting edge. The loader features a wide, spacious cab mounted with Komatsu's viscous mounts to keep noise to a minimum at 74 dB(A).

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## Komatsu

Two new rigid dump trucks, the HD465-7 and HD605-7, are powered by 715-hp turbocharged, air-to-air after-cooled diesel engines that meet Tier 3 requirements. They feature Komatsu's electronically controlled counter-shaft transmissions with K-ATOMICs. Both the service points and greasing points have been centralized for ease of maintenance. Oil-change intervals have been extended to 500 hours for engine oil and 4,000 hours for hydraulic oil. Spacious, ergonomic cabs feature easy-to-view instrument panel.

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## Astec

Astec now supplies retrofit burners (the Phoenix Phantom and Phoenix Coal) for aggregate-drying/asphalt-production plants. With the retrofit models, Astec can offer burner replacement or a complete, installed system. Each burner is designed to meet the user's exact specifications, and each burner is tested on one of Astec's three tri-fuel (oil, gas, coal) test stands.

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## Komatsu

A new series of D85 crawler dozers — the D85EX-15 and D85PX-15 — boasts that all major components, including hydraulics, power train, mainframe and cab, are engineered by Komatsu. Operator comfort is improved with new hexagonal cab design with tinted glass windows, new suspension seat, and air filters that prevent dust from entering the cab. The dozer has a turbocharged Komatsu engine that provides 264 net horsepower and meets Tier 3 emissions. It also features the Komtrax monitoring system and Palm Command Control Steering.

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# Market Watch

## ► Terex Roadbuilding

Terex Cedarapids CR 300L Series asphalt pavers (the rubber-tire CR352L, rubber-track CR362L, and steel-track CR362LS) now provide more "highway-class" features in an 8-foot commercial paver. The new, longer machines (by 9 inches) provide an 11-percent increase in hopper capacity (to 10 tons), but are no heavier than their predecessor models, facilitating transport. The new models provide paving widths from 8 to 18 feet, and screed choices include the electric or fuel-oil-heated Stretch 16, the electric VersaScreed 8, or the fuel-oil-heated Fastach 8.

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## ◀ National Crane

Series 1300H truck-mounted crane has a 30-ton capacity, filling the gap between the company's 1100 and 1400 series. It is the largest capacity crane that can be mounted on a three-axle truck while maintaining an overall vehicle length less than 40 feet, the company says. Patent-pending control console moves from one operator station to the other. Pilot-operated hydraulics provide smooth operation and precise load control. Maximum tip height is 162 feet with the 110-foot boom and 44-foot jib.

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## ► Link-Belt

With a rated lift capacity of 250 tons, the five-axle ATC-3250 uses a full-power, seven-section latching boom that extends from 43.3 to 223.1 feet. The boom sections extend independently by means of one double-acting hydraulic cylinder, and four pinned positions on each section provide 38 combinations to match loads and extensions. When the lattice fly is used in combination with all four extensions, the ATC-3250 has a tip height of 358 feet.

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## ► UpRight

The AB48 HSRT rough-terrain boom is built on a four-wheel-drive chassis that can travel 13.6 miles per hour. Hydraulic outriggers level the machine on rough terrain. The combination of articulated, telescopic and jib booms extends the working height up to 55 feet 5 inches and stretches horizontal outreach to more than 23 feet.

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## ► Komatsu

Upgrades on the PC600LC-8 excavator include a Tier 3 engine, increased speed and stability, and enhanced serviceability. The unit is powered by a 386-flywheel-hp Komatsu engine, which uses a cooled EGR system. A new hydraulically driven variable speed cooling fan provides quieter operation and improved fuel economy. The machine comes equipped with three working modes, two boom mode settings, and a Power Max control. It also has the Komtrax wireless equipment-monitoring system.

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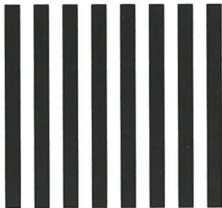
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**2. Please provide me with information on attachments for the following applications:**

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<input type="checkbox"/> Landscaping - Contracted Maintenance	<input type="checkbox"/> Site Development/Land Clearing	<input type="checkbox"/> Agriculture
<input type="checkbox"/> Landscaping - Design, Build and Install	<input type="checkbox"/> Excavating and Grading	<input type="checkbox"/> Industrial
<input type="checkbox"/> Snow Removal	<input type="checkbox"/> Concrete and Asphalt	<input type="checkbox"/> Mining

**3. Would you like someone to contact you regarding:**

<input type="checkbox"/> Demonstration	<input type="checkbox"/> Price Quote	<input type="checkbox"/> Rental	<input type="checkbox"/> Trade-In	<input type="checkbox"/> Used Equipment
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**4. What is your purchasing time frame?**

<input type="checkbox"/> Immediately	<input type="checkbox"/> 1-3 months	<input type="checkbox"/> 4-6 months	<input type="checkbox"/> 6-12 months	<input type="checkbox"/> Over 12 months
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**5. Are you a current customer of a:**

<input type="checkbox"/> Bobcat dealer who handles Bobcat equipment	<input type="checkbox"/> Other compact equipment dealer	<input type="checkbox"/> Have not previously purchased compact equipment
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# 2007



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## OPERATOR TIPS

### Angle or Dozer Blade?

Obstacles to earthmoving or grading in the mud, on slopes, or in tight spaces can be overcome by turning a compact track loader into a mini dozer with an angle blade or dozer blade. But the two attachments are not always interchangeable, so which one is best? Renting them allows you to test and determine the best fit.

Angle blades can be hydraulically angled 30 degrees right or left. Adjustable, removable skid shoes add stability and provide depth control on hard surfaces such as asphalt or concrete. Angle blades can be set at three different heights to accommo-

date specific dozing requirements or tire arrangements.

Operators should be able to lock the blade for aggressive earthmoving, while for lighter tasks such as pushing livestock waste or snow, the pins can be removed for easier blade trip.

Look for a blade with tilt and angle features. A quality blade should have reversible cutting edges, while durable, wrapped hoses will help ensure leak-free operation. Universal couplings can adapt the blade to multiple loaders.

Dozer blades incorporate a more rugged blade with powered tilt and angle control. Bolt-



Angle blades are better suited for general earthmoving and snow removal than fine grading. Source: The Cat Rental Store

on cutting edges should be reversible to extend wear life. Angled end bits, modeled after crawler-dozor blades, allow flush cutting against a vertical surface when the blade is fully tilted.

Consider your most common work when

choosing a blade. Landscaping typically requires more precise cuts and final grading and so the adjustability of a six-way blade can be a significant advantage. Angle blades are better suited for rough

grading, snow removal and general earthmoving. The biggest work tool may not always be the best choice. But if you do a lot of fine grading, the widest blade can ensure reach beyond the track width.

## LETTER TO THE EDITOR

### Auto-Lube Systems Worth a Look

Over a 40-plus-year career in heavy earthmoving and mining I had encounters with auto-lube-equipped equipment, and it was always a major plus in the long run for reducing costs due to wear of rotating components. I would've installed many more of these systems on smaller equipment, particularly loaders, if only the initial cost for purchase, installation, and training hadn't been so high. It's really tough to convince owners that over the long run, the money saved in equipment maintenance, repair, and especially downtime is well worth the initial cost of the system. I would consider auto-lube systems even on [large] backhoe-loaders. Other small machines that muck about in the dirt would also benefit. This is true whether you own one machine or a hundred.

So look hard at these devices the next time you get around to them and consider what the advantages may be to you. Chances are, if you know your costs and pencil it out, you would be strongly inclined to purchase.

— Submitted online by Joe Doremire. Read more of Doremire's comments in the TalkBack section at [ConstructionEquipment.com](http://ConstructionEquipment.com).

## TRUCK AUCTION

### International Donates Truck to Benefit AEMP Legacy Scholarship

International Truck and Engine is donating an International 7000 Series truck to the Association of Equipment Management Professionals (AEMP) to assist its Legacy Scholarship Program. The International 7000 Series truck will be auctioned on March 8, 2007, on [IronPlanet.com](http://IronPlanet.com) with all proceeds being used to develop AEMP's scholarship program. The Legacy Scholarship will be awarded to an applicant who is focusing on being a heavy-equipment technician in the construction, government equipment, or off-road industry. The scholarship is a two-year, full-ride scholarship to an approved technician training program. For more information, visit [www.aemp.org](http://www.aemp.org).

# Managers Digest

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

## HEAVY EQUIPMENT FORUM

### Looking for Motor-Grader Operating Tips

**User #1:** I have about 1,000 hours on a motor grader. I have a good feel for it. I'm trying to improve the way that I go about moving the material. I was wondering if you can help me with some operating techniques.

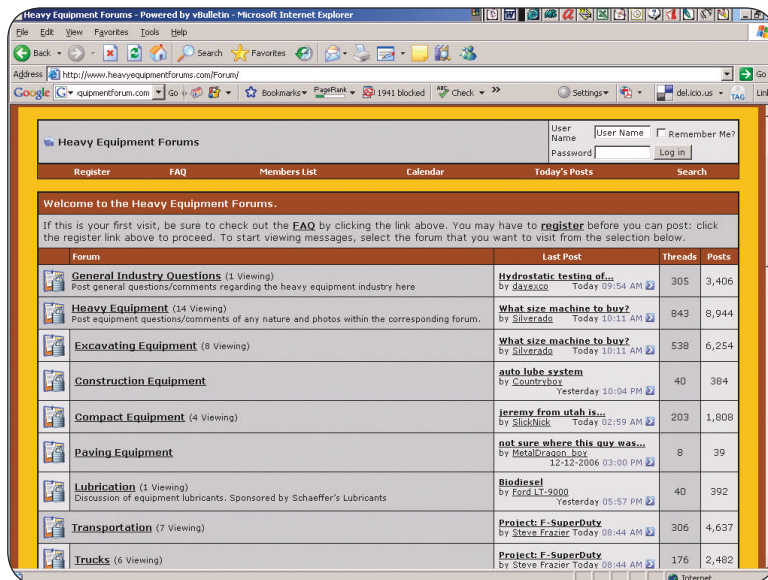
For instance, I went to a new job with 4 inlets and a high point in the middle of the road; I know to keep my runs long, but it is hard for me to define the ridge

points by making those long runs. It's easier for me to dish out the inlets first, then make longer runs touching it up.

If you had a parking lot with inlets flowlines high points, you would start at the lowest points and work your way to the high points right?

**User #2:** Go slow, take your time, keep the controls close to you, and don't mess with the dirt too much.

**User #3:** We can tell



you everything you need to know, but not all of it will work for you. You have to find the tricks that work for you.

When I build a lot like that, [I] go about defining my low points, usually a catchbasin, and then work up from there. Push outward and upward till I get to my high point. If I [have] several of them, I work them in sections, first one then the next, as long as I can keep up to the trucks hauling in material.

**User #4:** It's a tough call to give specific advice on a job without actually seeing it. Way too many variables, and it's rare to find two operators that do things the same. That said, I can share some advice or tips of things I've learned along the way.

Patience really is the virtue of a good finisher,

and that saying of experience is the best teacher is so true. One of the best grader operators I've ever had the privilege to have worked and learned from once told me that he only really felt 100% confident after about 7 years of finishing under his belt.

Visualization is also very important. It really helps to have a mental picture as a goal to achieve. Again, this takes time and experience.

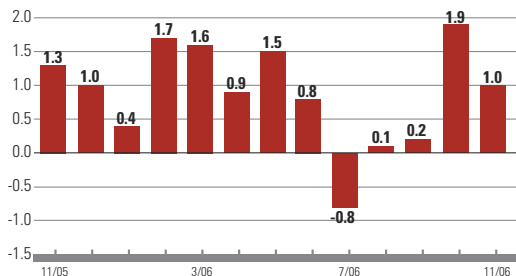
**User #5:** Working with graders is a pretty individual thing. However, a few basic rules do apply. 1) Work the material no more than

you have to. 2) Slow and steady does it, at least until you get really good at it. Good grade checkers are worth their weight in gold and the quicker they are, the better they make you look. 3) Good compaction makes trimming easier. I personally don't bother too much with keeping material on my blade when trimming. I'd rather have it well compacted and use a bit of weight on the blade to steady it all. You may even have to roll the blade forward a bit to cut more easily, but you aren't then carrying big mobs of material for long distances.

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

## STATUS & FORECAST PUBLIC CONSTRUCTION SPENDING

(% change from previous month)



Source: U.S. Department of Commerce

Spending is expanding after a four-month pause from June through September. November spending is up 10.6 percent from a year ago. The key market driver is the above-average rise in tax receipts from strong economic growth that persisted into early 2006. Although that is now ebbing, the growth in tax collections will remain above average well into 2007. This will support an annual increase in public spending in '07-08 of 6 to 7 percent.

For the full text of this month's economic analysis, check Economic Outlook at [ConstructionEquipment.com](http://ConstructionEquipment.com).

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 **NEW HOLLAND**

# Managers Digest

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## TRUCKING NEWS

### Long-Bed, Full-Size Tundra Will Seek Commercial Business

Toyota Motor Sales, U.S.A., is laying hopes of expanding its commercial and fleet business in a long-bed

version of the enlarged second-generation Tundra pickup, due out early next year. The company announced

the 8 foot-1 inch long-bed product during a work-truck meeting to underscore the importance of commercial business customers.

The new Tundra is as large or larger than competitors' current full-size half-ton pickups. It will come with V-6 and V-8 engines, including a new 5.7-liter V-8. With that engine and an optional towing



Two-door Regular Cab with 8 foot-1 inch bed will be the new full-size Tundra's base work truck. The long-bed will also be available with a 4-door Double Cab.

package, a Regular-Cab Tundra will tow a trailer weighing more than 10,000 pounds, the company said.

Like the current Tundra, the new truck will be assembled only in

the United States from components and parts made here. The new Tundra was designed and styled here strictly for the North American market, executives said.

— TOM BERG

## GIANTS

### Top 10 Rental Giants

Company	Fleet-Replacement Value*
United Rentals	\$4,000
Sunbelt Rentals	\$2,200
Hertz Equipment Rental Corp.	\$2,075
RSC Equipment Rental	\$1,696
NES Rentals	\$800
Maxim Crane Works	\$744
H & E Equipment Services	\$600
All Erection & Crane Rental	\$457
Aggreko North America	\$428
Neff Rental	\$420

\* U.S. dollars in thousands

## MANUFACTURER NEWS

### Trimble Acquisitions Expand Capabilities

Trimble has developed a "Connected Construction Site" strategy, which is aimed at "improving construction-project management by providing easy integration of project data and customized status information to the construction professional in real time."

To that end, the company has made two recent acquisitions (Meridian Project Systems

and XYZ Solutions) that complement and expand its Connected Construction Site concept.

Meridian Project Systems, says Trimble, "provides enterprise project-management and lifecycle software for optimizing the plan, build and operate lifecycle for real estate, construction and other physical infrastructure projects."

## MANUFACTURER NEWS

### First JLG-Built Cats in Dealer Inventory

Nov. 16 marked the delivery of the first telehandlers manufactured by JLG and branded with the Caterpillar name. More than 100 new Cat telehandlers had shipped from JLG's plant in McConnellsburg, Penn., when Caterpillar, JLG and Cashman representatives celebrated the first deliveries at the North Las Vegas-based Cat dealer's store.



Caterpillar, JLG and Cashman dignitaries gathered to commemorate the first deliveries of JLG-built, Cat-branded telehandlers in mid-November.

"This is a big day for Caterpillar and JLG," said Scott Cooper, Caterpillar marketing manager for the telehandler alliance between Cat and JLG in the Americas. "The new telehandlers are tailored to the needs of contractors in North America, and they are fully supported by Caterpillar-parts inventory, service, warranties, and Cat Financial programs. These machines are even shipping ahead of schedule."

JLG is supplying six models of new Cat telehandlers to North and South America. The new TL Series includes four models based on JLG-branded designs and incorporating Cat components. Capacities range from 6,500 to 12,000 pounds, and maximum lift heights from 42 to 55 feet.

JLG will build two Cat designs — the 7,000-pound TH220B and 8,000-pound TH330B — in Belgium. Maximum lift heights are 20 and 24 feet, respectively.



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Komatsu excavators have set the standards for productivity, operator comfort and reliability over the years. And, with the introduction of our mid-sized -8 series, the standards have been raised yet again.

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From enhanced safety features to extended maintenance intervals, the PC200LC-8, PC220LC-8 and PC270LC-8 show what happens when the best engineers put the latest technology to work. The results are always...

# Fill up the bucket, not the tank.

# X<sub>2</sub>



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# Production Heroes: Motor Graders

By LARRY STEWART, Executive Editor

## *Use All of a Blade's Features To Build Better Roads*

Taking full advantage of motor-grader flexibility boosts everyday operators to the elite finish-grader status

**A grader moldboard tips forward or back to put the cutting edge at the best angle to cut and roll material. To penetrate hard surfaces or for finishing work, tip the top of the moldboard 4 to 5 inches ahead of the cutting edge. Cutting high bank slopes or deep ditches also requires more forward tip for proper cutting-edge-to-material contact.**

**M**otor-grader operators who are maintaining roads but want to climb to the top levels of the earth-moving profession — to become finished-grade operators — can practice the skills they need by taking full advantage of all the articulated motor grader's features.

"One of the biggest problems we find in the field is that many operators don't have the experience in construction to know how to approach the job correctly," says Henry Pietens, training and marketing support manager for

motor graders at Volvo. "If you drive gravel roads much, it's apparent that there are a lot of intermediate-level operators [working road maintenance] who don't understand the importance of proper crown and slope. We end up with flat roads with potholes and washboard."

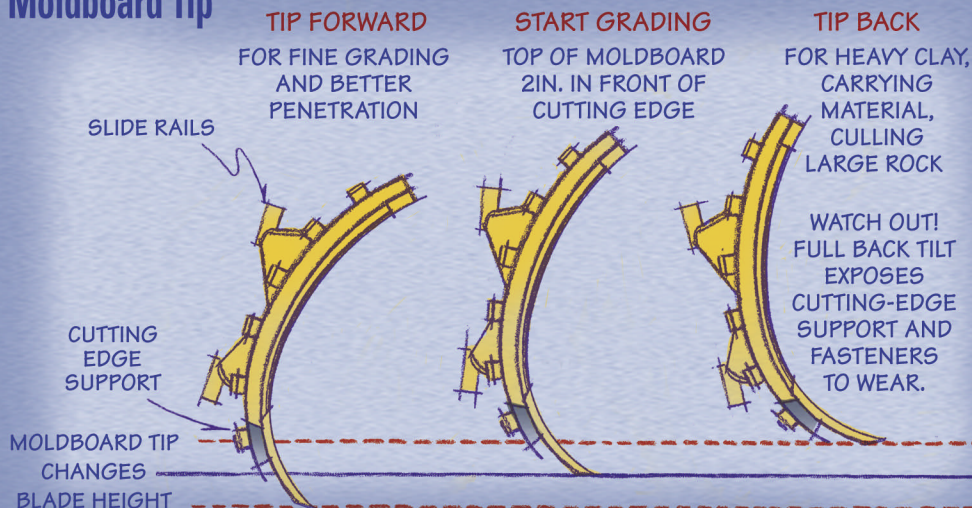
The most important aspect of road maintenance is providing good drainage. It starts with the road crown in straight sections and super elevation in curves. A straight road's wear surface should rise toward the centerline ¼- to ½-inch per horizontal foot, or about a 3 percent slope from the shoulder to the center of the road.

This will vary with the type of gravel used in the surface and expected annual rainfall. Curved road surfaces should be flat, but inclined on a 6 percent slope down to the inside of the corner.

Ditch slopes should vary depending on the type of road being constructed, the soil type, ditch depth, and width of available right of way. Whenever possible, though, ditch slopes should be flatter than 2:1, or 50 percent.

Vee-ditches should be

### Moldboard Tip



**The key to road maintenance is good drainage. Straight sections should be crowned — the travel surface should rise ¼ to ½ inch per horizontal foot (3 percent slope) to the shoulders. In curves, the travel surface should be flat, and sloped about 6 percent to the inside of the corner. Ditches should be at least 2 feet lower than the road travel surface. Use flat-bottom ditches where large amounts of rain or snow fall.**

at least 2 feet lower than the road wear surface, but depth will vary depending on road and soil type and available right of way. A flat-bottom ditch can handle large amounts of rain or snowfall, and cutting flat-bottomed ditches can supply extra material if it is needed to elevate the road. In regions subject to extreme precipitation, raise the travel surface high enough to prevent water from seeping under the road. A raised surface also allows snow to blow off the road, reducing drifting.

“We also find that a lot of operators are not familiar with all the features on the machine,” says Pietens, “and they can’t begin to maximize the machine’s potential if they don’t use all of the features that contribute to efficiency.”

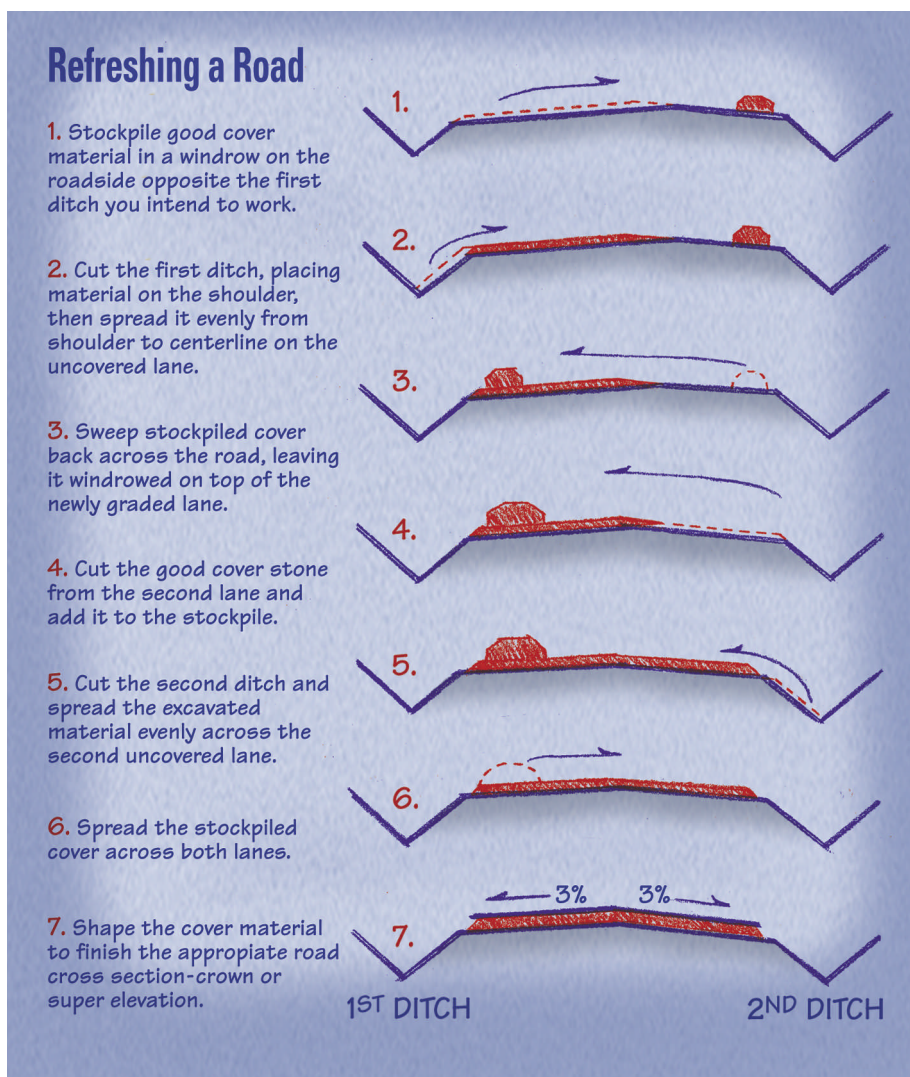
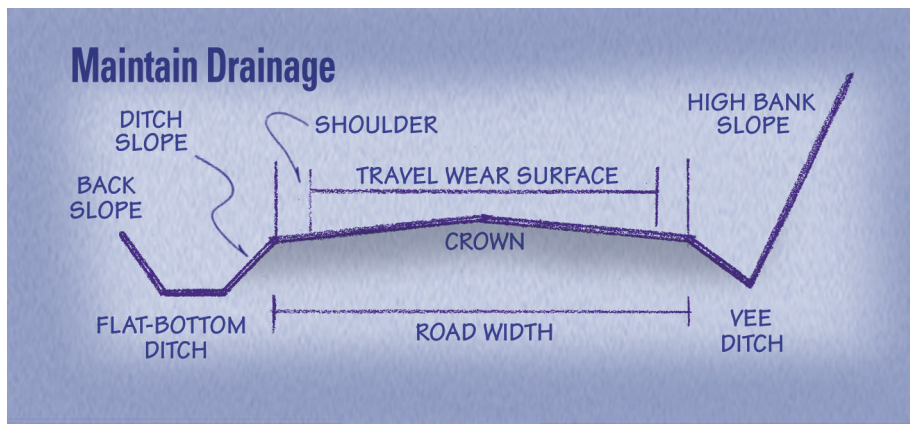
Grading starts with selecting the proper speed and moldboard angle.

“Motor graders can be used to do a number of different tasks, some of which are better suited to high speeds than others,” says Matt Turner, manager of Caterpillar’s demonstration and learning center. “When you’re doing delicate work or pioneering work, you have to go slow — use the first two or three gears. Sweeping snow or knocking the rocks and washboard off a gravel road you can do fast.”

Most grading is done at moldboard angles from 10 to 45 degrees.

“Too many grader operators will work without enough angle on the blade. They end up pushing material like a dozer,” says Scott Mennenga, instructor with Local 150 of the In-

ternational Union of Operating Engineers in northern Illinois. “You want a nice smooth motion to get a windrow rolling off the end of the blade.”



**Here are the steps for rejuvenating a rough road that has a good cover of gravel worth saving. You may have to start by loosening the surface material with a ripper/scarifier.**

# Production Heroes: Motor Graders

Grading is most efficient when material is rolling across the blade from its leading edge (the toe) to its trailing edge (heel). If the rolling action dies or material stops flowing, increase the blade angle.

“You can tell right away how experienced

Leaning the front wheels can also vary the cutting depth, but this feature is much more important to keeping the grader pulling in a straight line. The top of the front wheels are normally leaned in the direction that material comes off the moldboard.

“You can fine grade with the wheels straight up and down,” says Mennenga, “but you want to get those front wheels leaning in the direction of the windrow, working with you, when the windrow gets heavy.”

Set the front wheels in a vertical position when working side slopes or ditches or lean them up the hill for better steering control. Or when working across a slope using articulation, you can lean the wheels down the slope to prevent the front-axle from reaching its oscillating limit. An operator can also use wheel lean to make slight steering corrections without taking his hands off the hydraulic controls.

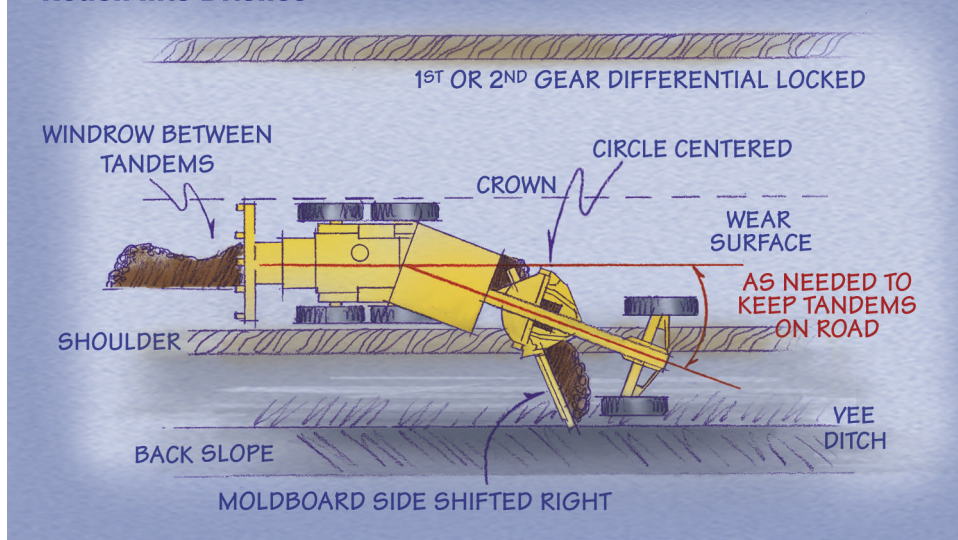
Many grading jobs can be done with the motor-grader frame locked straight — most finishing work, light to medium windrows, some ditch cutting, ripping and scarifier work, for example. But manufacturers designed frame articulation to add flexibility that makes today's graders capable of much more than rigid machines.

“When you're carrying a nice heavy windrow, you'll want to use articulation to put more power behind the blade,” says Mennenga. “If you keep a straight machine, it might struggle a little. Operators will notice if they articulate the wrong way, the machine will slide away from windrow.”

As the front of the machine starts to slide away from the moldboard heel, articulate the back frame toward the toe to counteract the side load.

Flexing the frame also improves the grader's maneuverability. Articulating into turns gives the shortest turn radius for close-quarter work, cul-de-sacs or corners. Articulating also allows steering the leading end when backing

## Reach Into Ditches



**When shoulders are soft, here's how you cut ditches without rutting them. Articulate toward the moldboard toe (leading end) far enough that you can drive the toe-side front wheel into the bottom of the ditch and leave the heavy tandems up on the road-wearing surface. Leave the link bar centered. Circle the moldboard to an angle that promotes smooth material flow up out of the ditch, and side shift for the desired reach into the ditch. Raise the moldboard's heel (trailing end) to match the ditch slope. Tip the top of the moldboard about two inches in front of the cutting edge.**

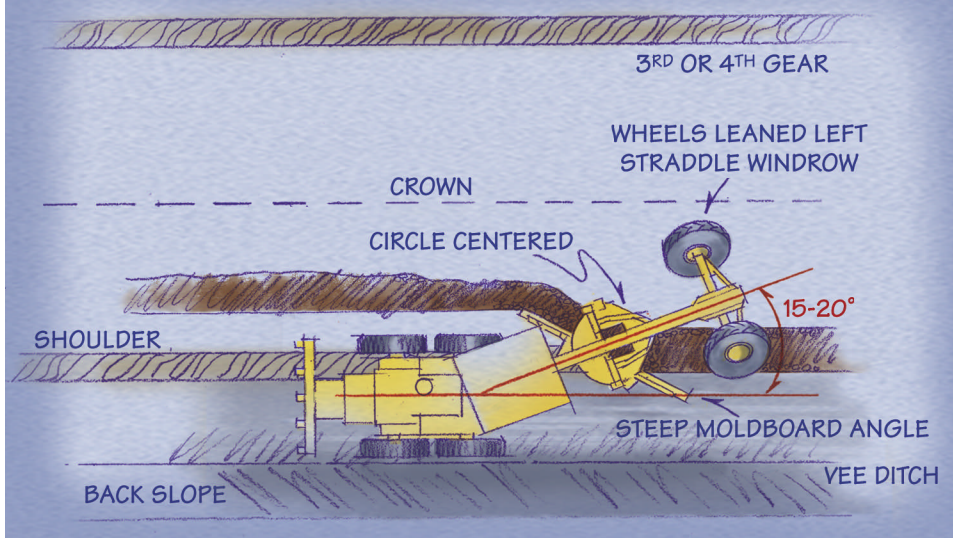
an operator is by how he sets up the blade — is he putting it down in the dirt and getting the work done, or is he pussy-footing around?” Mennenga says. “When you're making the first passes, you want to get that blade down on the ground, get a nice medium windrow going and get everything knocked down flat. You might have to make several passes on a road before you start to fine tune.”

Moldboard tip has something to do with depth of cut. Most grading passes should start with the moldboard top positioned about 2 inches ahead of the cutting edge. For better penetration, start with the top of the moldboard more forward, the cutting edge more perpendicular with the grade.

Tip the moldboard forward or back slightly to start and maintain the desired cutting action and to roll material smoothly across the blade.

Tipping the moldboard forward or back also changes depth of cut across the entire moldboard.

## Moving a Heavy Windrow



the machine.

Crab steering — articulating the frame and steering the front wheels in the same direction — improves the grader's side-slope capability, and allows the tandems to be offset away from edge fill to prevent rutting, or keeps them on a smooth surface for faster finishing.

Articulating the rear frame toward the toe of the moldboard approximately 2 to 5 degrees (1 to 1½ times the width of the tire) will often reduce the machine's tendency to bounce. This crab mode is extremely effective when cutting washboard from a road's wear surface. In the crab mode, the grader's front axle is no longer perpendicular to the direction of travel. This puts one front tire slightly ahead of the other. One tire rides up on top of a corrugation in the road while the other is still in the bottom. As the tires roll up and down through the washboard, the front axle will pivot, keeping the front frame stable. The degree of articulation required to make this technique work will vary with the space between corrugations.

Be careful: Caterpillar warns against using crab mode when scarifying washboard roads. Because the frame is not traveling parallel to the direction of travel in crab mode, it could bend the scarifier shanks or linkage.

Another caution for operators who have little experience with articulated graders is to watch both ends of the blade when articulating.

"If you're delivering a nice windrow right outside the rear tires, the blade's heel is going to be near that front tandem," says Mennenga. "You have to make sure the blade is far enough away that when you do articulate you don't slash the tire with the blade."

For best results with stone surfaces, dress the road when moisture is present: after a rain or after the road has been sprayed by a water wagon. Drag the surface when hard and dry, with the cutting edge near 90 degrees to the surface.

Cut to the depth of major potholes. Don't fill them with loose material because traffic will quickly displace the loose material and the holes will reform.

A grader's center-shift link bar is designed to increase the moldboard's reach from the centerline of the machine. Maintenance work is normally done with the center-shift lock pin in the center position, and the drawbar and circle centered under the main frame. But repositioning the link bar will increase the motor grader's productivity when ditching, backsloping and moving large windrows.

Offsetting the circle allows you to keep the mainframe running on a level surface at the top of the ditch or base of a slope while the moldboard cuts beside the machine. When moving large windrows with the link bar repositioned either side of center, the moldboard can be adjusted to a steep angle and it will still leave the windrow outside the tandems.

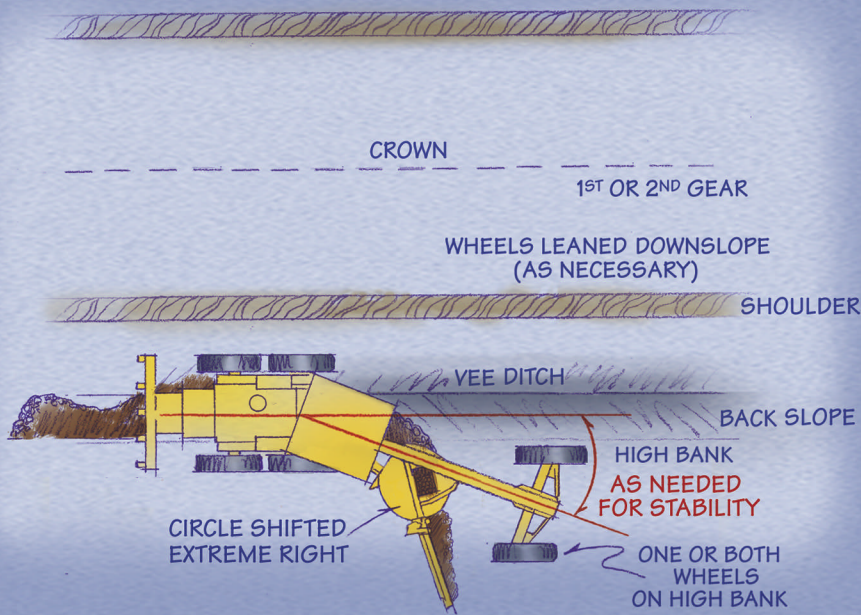
There are several holes or positions in the link bar allowing the operator to choose how far to offset the circle from the frame's center line. It is recommended to use the first and second holes for cleaning shallow ditches, processing and moving large windrows, and combined with articulation to build narrow, flat-bottom ditches and backfill curb radii.

Begin to reposition the circle in these first offset positions by shifting the drawbar as far as possible towards the ditch or slope to be graded. Ground the moldboard by placing both lift levers in the float position. Release the center-shift lock pin (on most machines a light

**If a ditch needs a lot of work, and spoil starts rolling under the tandem tires, the windrow must be moved off the shoulder. Use articulation to get behind large windrows or wet, stubborn material. Articulate toward the heel 15 to 20 degrees and drive the tandems into the bottom of the ditch, against the backslope. Leave the front wheels on the shoulder, straddling the windrow. Leave the link bar centered and circle the moldboard to a blade angle steep enough to roll the material. Side shift to move the windrow outside the tandems. Lean the front wheels toward the heel as necessary to hold your line.**

# Production Heroes: Motor Graders

## To Scale a High Bank



**To reach up a high bank, move the link bar to its extreme toward the bank. Articulate the frame to place one or both front tires on the slope, leaving the rear frame at the base. This may compromise some control of the finished slope. Bring the moldboard's heel near the outer edge of the rear tire and adjust the toe to the desired slope. Tilt the blade to near the center of its tip range. Start with the front wheels vertical, but lean them downhill as necessary to keep both tires in contact with the slope. Go slow — first or second gear, low to medium engine rpm — to allow maximum control.**

on the control panel will illuminate when the pin is retracted). With the levers still in the float position, move the center-shift lever in the direction opposite that used before retracting the pin. For example, if the lever was pulled back to shift the drawbar right, now push the lever forward.

The center-shift cylinder will roll the linkage around freely, moving the link bar sideways. Line up the link-bar hole with the hole in the carriage and re-insert the pin. When the light on the console goes off, the pin is in. Now you can sideshift the drawbar towards the slope to be cut and use the lift cylinders to adjust the slope angle.

The hole in the link bar farthest from center is recommended for use when cutting ditch back slopes and high banks, cleaning deep ditches, grading and dressing fill slopes, disposing of sod/oversize rock on back slopes, and for use with articulation to grade steep slopes.

To offset the circle extreme right, ground the moldboard on the right side and use the same process as before to release the pin. Once the pin is released, simultaneously push forward on both the right lift and the center-shift levers and pull back on the left lift lever. Line up the holes and insert the pin.

When grading, use only enough down


pressure to accomplish the task. Excessive down pressure on a hard, dry surface eats up cutting edges, demands more horsepower and fuel, and cuts productivity. Sliding and tire spinning increases tire wear. Extreme down pressure may even splinter the cutting edges, which could cause tire damage.

Mennenga recommends operators who are maintaining roads practice feeling for variations in grade.

"As the front tires run over rough terrain, they will go up and down," he says. "You want the blade down on the ground carrying material, but as the front end goes down, you're going to need to fill that area. You have to raise that blade just a little bit when the wheels drop. Then bring the blade back down when the wheels come up."

"But you don't want to overfill either," Mennenga adds. "You have to be able to feel it."

"The motor grader is a nice long machine, and when the blade is full, it does carry material over small dips and make them smoother," says Mennenga. "But it won't correct for 3/10ths to 4/10ths variations without adjusting the blade."

"Any time you're applying a finished grade, you should build it about a 10th or so high, so that when you make your final pass you have some material on the blade," Mennenga concludes. "If not, on the final passes, you will be short on material." 

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## 'Driving Experience' *Key to GM's New Pickups*

The half-ton Silverado and Sierra also show new emphasis on design, inside and out, for better and for worse

**S**o there we were, barreling along a gravel road northwest of Phoenix, seeing if this new GMC Sierra's suspension, frame, and steering really added up to the fine "driving experience" that General Motors executives had touted at dinner the night before. I was driving too fast down a short grade that ended in a dip over a culvert, but I braked gently and steered around some protruding rocks as we hit bottom at a halfway sane speed.

The truck's steering was steady, the suspensions fore and aft bore the sudden gravity-inspired load well, and all was in control. I don't know if my tense passengers saw things that way at that moment, but my driving partner and I both remarked repeatedly at how well the truck — this one and others we drove during this ride-and-drive event late last fall in Arizona — rode and handled.

The man in the back seat was an engineer who worked on development of the new-series chassis and in fine-tuning the shock absorbers.



**Pure Pickup interior is nice but not fancy. Gauges are easy to read, but HVAC switches are smallish push buttons. A big knob below the radio turns it on and off, and a small screen has images of other buttons for further tuning.**

We complimented him on his work and meant it, because the new GMC and Chevrolet Silverado 1500 series pickups are noticeably nicer than the vehicles they replace.

The new trucks' ride on good pavement was likewise better controlled, as a stiffer frame resists flexing and makes the suspension springs do their jobs. That results in a smoother ride and less vibration of the kind you feel in your feet. There's less of that in the new trucks than in previous models.

And they have more "design." Bob Lutz, vice chairman of product development, has been pushing design — a synonym for styling — throughout GM's car and truck lines, and it shows. The trucks have been restyled inside and out, mostly for the better, but not always.





Known internally as GMT900, the new series of light-duty pickups have bolder, chunkier looks that are more apparent in person than in pictures. The trucks are now on dealers' lots, and you won't have any trouble spotting them if you haven't already.

In some ways, the older models are better. They have large rotary switches to control HVAC functions and large push buttons on the radio. You can glance at them and immediately understand what they do, and operate them almost without looking. These were designed by ergonomics engineers, but those people now might be out on the street because new-school designers have fashioned stylish push buttons attractively arrayed in groups on the dash and driver's door. The new switches have to be studied, then picked out carefully while you're supposed to be watching the road.

An optional radio/navigation system includes a touch screen with images of push buttons and a keypad through which you can input street addresses. The system guides you to any destination with voice prompts while an

icon on the screen shows progress along a road. Lost anyway? You can push the On Star button above the windshield and an operator will determine where you are by Global Positioning Satellite and give you directions.

Some folks might like these electronic niceties, but a long time ago I learned how to read printed maps and road signs and just get there — not that this keeps me from getting lost, including on one leg of this trip north of Phoenix. But I'd never order the nav system or its complex stereo radio/CD player, which I couldn't even figure out how to turn on. A simpler radio does include a large on/off/volume knob, but I still had to look hard at its LCD screen to figure out how to change stations, etc.

New side-view mirror controls, which are on the armrest on the driver's door, also require looking at to operate rather than simply feeling and manipulating, as with older electro-mechanical switches. As before, you can adjust the mirror glass for line of sight, and an additional pair of switches allow you to fold the mirrors flat against the door — a new feature

**Driving on sometimes rough gravel was almost as smooth as on pavement, and with 4x4 and 2x4 configurations. New exterior styling is more obvious in person than in pictures, and there's more differentiation between GMC and Chevy versions.**

# Hands-On Trucking



**Rear-hinged back doors on Extended Cab open almost flat against the bed for easy loading and unloading.**



**Vortec Max 6-liter V-8 has an aluminum block and various mechanical and electronic advancements. Maybe the neatest is Active Fuel Management, which turns the V-8 into a V-4 when power demand is low.**

that lets you get closer to a mail box or toll booth or whatever. But both mirrors, not just the one you need to get out of the way, fold or redeploy whether you want them to or not.

The new controls didn't bother my tech-savvy driving buddy, who chuckled at my consternation. But he agreed with another gripe, about an annoying lack of grab handles in the front-seat area. The driver has no assist handle except for the steering wheel's rim, and the passenger has only one, mounted above the window. GM's new pickups, even 4x4s, don't sit overly high, but it's still necessary for shorter folks to pull themselves in, and it's not easy with these trucks. On the other hand, in the rear-seat area of GM's Extended and Crew cabs, there are two handles at each door — one above the window and one on the B-pillar — making it easy for passengers to climb in.

Once inside, drivers and passengers should find the new interiors a pleasure to see and feel. The Luxury Inspired package includes a stack for the radio/nav system and HVAC controls, and that joins with a center console that includes an armrest with storage bins and several cup holders. Panels have rich-looking coverings, and the shifter on the console has nice brushed-metal trim.

The Pure Pickup package has a simpler, straight-across dashboard that looks like it belongs in a truck, and its plastic surfaces are nice without being fancy. Both have gobs of storage; for instance, there are two glove boxes in the dash in front of the passenger and, with the Pure Pickup setup, a bin under the manually adjusted seat. Got stuff? These trucks can stow it.

Wanna go? These trucks do, with either the 315-hp, 5.3-liter or 367-hp 6-liter V-8s.


Both have Active Fuel Management, which cuts back to four cylinders under light load to save fuel, then back to eight when more power's needed. Two other engines, a 195-hp 4.3-liter V-6 and a 295-hp 4.8-liter V-8, are standard on base models.

The 6-liter Vortec Max is a new option, and raises towing capacities to as much 10,500 pounds — a level that most other competitors' half-ton pickups are now at or close to. Equipped with a special NHT trailer-towing suspension package, a new GM pickup feels very stable, and the engine pulls especially strong at 25 to 50 mph. The Max also propels a lightly loaded pickup with vigor, though it and the automatic transmission are so smooth that the acceleration sensation is underwhelming.

The Max has an aluminum block and cylinder heads, and it weighs about a hundred pounds less than a 6-liter V-8 with an iron block. The aluminum version is not built to lighten a pickup's front end — though it benefits a bit from this — but to put the truck in a slightly lower weight class where it more easily passes the Environmental Protection Agency's emissions tests, one engineer explained.

Competitors have 5- and 6-speed automatics in their trucks, but I think the 4-speed Hydra-matic — a 4L60 with the 5.3 V-8 and a 4L70 with the 6-liter — does a more than adequate job, as it never seems to cause the engine to lug or overrev, and it's wonderfully smooth. But more gears equal greater efficiency and the competition has to be answered, so GM's got a 6-speed in the works for this line of trucks.

Most folks these days buy light-duty pickups for personal use, which is why most new Silverados and Sierras, like their predecessors, will be sold with 4-door Extended or sedan-style Crew cabs. The rear seats on both fold up for storage of fragile or valuable items that shouldn't be left in the bed.

Adjustable securement devices for the bed are newly optional from the factory. Several types of aluminum rods and tool boxes can be mounted on bars on the beds' interior sides, and can be slid fore and aft to hem in loose cargo. The tool boxes slide for easy access but can still be locked in the bed. Drop-in plastic liners are also available. So these new pickups can do a lot of work. 

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## ***How to Keep*** **Wheels Tight**

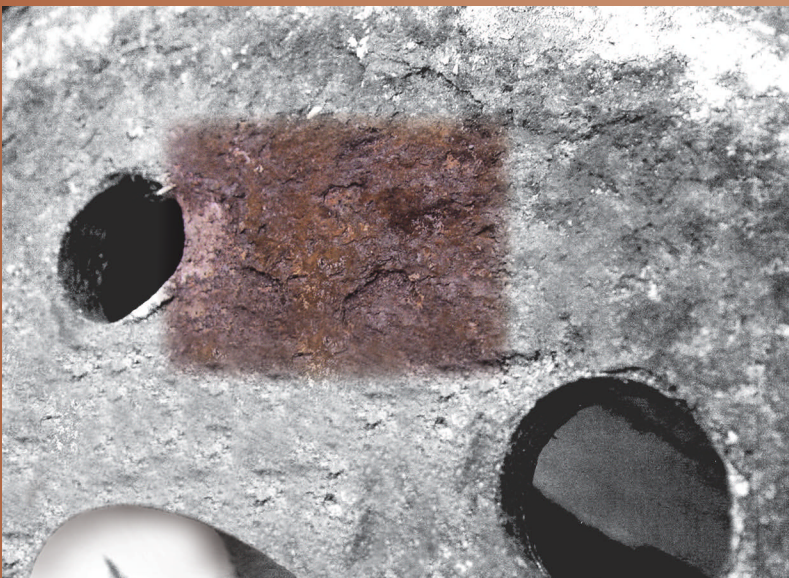
Although accurate torque is the solution, keep an eye on conditions that hasten the loosening of wheel nuts

**A** number of reasons cause wheel looseness, but topping the list is improper torque. When you torque down a nut to the recommended level, it stays put. But to maintain the proper torque, you have to re-torque.

It's necessary to maintain torque at the recommended torque level for the stud size, so when the vehicle is first brought into the garage, check the torque number. With new wheels, torque should be rechecked after the first 50 to 100 miles, then at regular intervals

depending on the application. That could be 10,000 miles; it could be every 2,000 miles.

Over time, the tightness of the clamped surface changes. The clamping force may change due to paint crushing when the wheel is torqued down or it could be caused by vibration. A torque wrench measures resistance to nut rotation. With brand new studs and little thread imperfections, that's all measured as part of the initial torque. As the nut is loosened and retorqued, however, it can have a different value than the initial torque. This is called



### **Corrosion Damage**

Extreme corrosion on the mounting surfaces will contribute to the loss of clamping forces and wheel looseness. Corrosion will also contribute to fatigue cracks. A wheel refinishing program should include the thorough removal of rust and corrosion. If mounting surfaces show no signs of cracks or pitting, wheels can be repainted and returned to service.

“seating in.” All the clamping force isn’t being generated to the components because some of it is being used up in friction between the nut threads and the stud and between the nut and the surface it’s going against.

Retorquing at certain intervals applies to all wheels. Even though used wheels may hold the torque better because they’ve already gone through “seating in,” they still must be retorqued to maintain the proper clamping force.

Rust, corrosion and excessive paint play a role in the loss of torque and torque retention.

In routine wheel maintenance, most fleets clean off the rust and corrosion and repaint the wheels. It not only maintains the appearance of the wheels, but also protects wheel performance. If wheels corrode, the rust often pits the surface. Once that occurs, the effective thickness of the part is only the thickness from the bottom of the pit to the other side. If the pits become too deep, the wheel no longer has its designed strength.

Pits develop into cracks. Any small crack or blemish acts like a magnet for stress, which then concentrates itself around that blemish. In wheel refurbishment, after rust has been filed and removed, check the surface for signs of cracks or pitting. If there are none, the wheel can be repainted and put back into service. If

corrosion is evident, don’t use the wheel. If the corrosion is minor, sand it off. Too deep, however, and the wheel strength is undermined.

Although it is common practice to paint wheels, keep paint off of the threads. When torquing the nuts, the paint will build up resistance to rotation of the nut. That gives a false reading and will cause improper clamping force.

Some fleet technicians torque down the wheels and paint over the top of the nuts. The threads under the nut are protected; but when they are removed, the paint gums up the nut. To avoid later trouble, never paint wheels while they are on the vehicle. If that’s not possible, make sure the threads are protected.

Excessive corrosion on the nuts or threads will render torque wrenches inaccurate because of friction. A few drops of oil on the threads will alleviate the problem, if carefully applied. If oil comes into contact with the area where the nut sits, clamping force will be lost. It will slip and slide, and an accurate torque reading will be impossible. This applies primarily to stud-piloted wheels.

With hub-piloted wheels, the two-piece flange nuts come lubricated between the hex and the flange. They must not be lubricated between the nut flange and the wheel surface.

Worn out threads also diminish clamping



## Replace Worn Fasteners

Most fasteners show signs of extended use, thread wear, and corrosion. They should be replaced. Rusting threads on studs should be cleaned thoroughly with a wire brush. Damaged nuts or studs showing severe corrosion should be replaced. Excessive corrosion on nuts or threads gives inaccurate readings of torque wrenches due to friction. A few drops of oil on the threads alleviate the problem.

# Prevention Illustrated

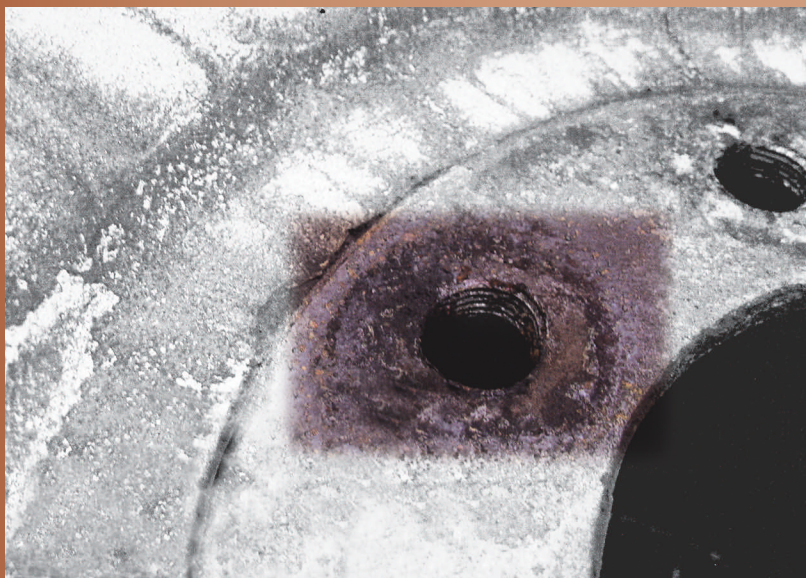
force by preventing transfer of clamping force to the nut. As a result, wheels loosen. The nut mounting area can wallow out or wear, and parts could actually break because the nuts aren't loaded properly. Cleaning threads, putting a drop of oil on them, and keeping them well serviced will help to prevent this from happening.

Don't try to refurbish fasteners in stud-piloted wheels. If worn, they need to be thrown

away. Once they are used and no longer have the proper chamfer, they should be scrapped.

At the end of the day, the recommended procedure for correcting wheel looseness is pretty straight forward — maintain proper nut torque, refurbish the wheel to maintain its integrity, and replace worn fasteners with new nuts, studs and clamping plates.

*Information provided by Accuride Wheels Corp.*



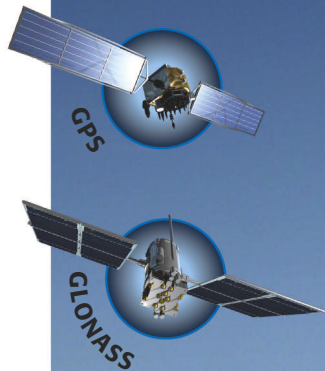
## Excessive Paint

Paint adjacent to mounting surfaces should not exceed 3.5 mil maximum thickness. Excess paint thickness will contribute to loss of clamping forces and wheel looseness. Although it is common practice to paint wheels, keep paint off the threads. When torquing the nuts, the paint will build up resistance. That's what causes the improper clamping force.



## Clean First, Then Repaint

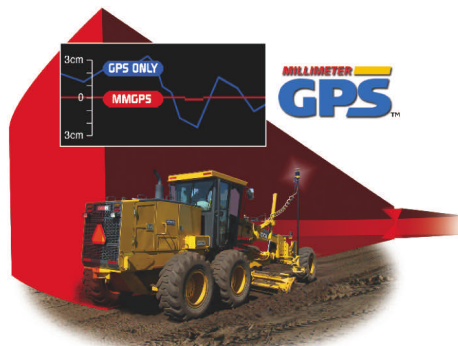
Wheels should not be repainted without proper cleaning. Mounting-surface corrosion will proceed to varying degrees of severity. In wheel refurbishment, check the surface for signs of cracks or pitting. If there are none, the wheel can be repainted and put back into service.



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# Buying File: Aerial-Work Platforms

By LARRY STEWART, Executive Editor

## **Specialized**

Sales of aerial-work platforms have grown large enough that most buyers can expect specialized tools to improve their productivity

# Work Platforms

## **Stretch Makers' Market Share**

**A**erial-work-platform sales have grown enough to accommodate manufacturers competing for niche users with specialized machines. A growing percentage of aerial-work platforms are sold with accessories that outfit them specifically for the work that they will be doing. Certainly the addition of generators wired to power outlets in the platform has become a staple. But the range of ways to customize a work platform has grown from simple options to the very design of drive systems and capacity of platforms. It's a renaissance that is changing the very nature of aerial-work platforms.

Popularized by JLG's Workstation in the Sky concept and communicated broadly by that company's marketing might, several manufacturers are counting on innovative features designed around the needs of specific trades such as iron workers, HVAC installers, glazers,

"Tradesmen are using AWP's to lift more than people. They need to put tools and materials up in the air, so why not give them an AWP with some tools they need — a rack for securing glass or handling duct, or a platform that has electrical outlets, a welder, or even a masonry saw — built right in?"

Pursuit of these niche applications is an indication that the market for standard access machines has grown large enough. Large enough to inspire buyers and renters to modify machines to improve safety and productivity in special applications. Large enough to generate the revenue necessary for manufacturers to research and develop niche products. Large enough that some AWP manufacturers are staking their companies' success on specialized products.

Some smaller AWP builders such as MEC and MLE, who live from day to day trying to skirt big marketers' strength in mass-produced lifts, are staking the success of their construction sales on their ability to build machines they can entrench in demanding trades such as steel erection and tilt-up construction.

Man & Material Lift Engineering (MLE), a company that has long specialized in lifts for clean rooms and other manufacturing, recently entered the construction market with a heavy-lifting telescopic AWP line — a 40-foot model that will lift 3,000 pounds and a 60-footer rated to lift 2,000 pounds. MLE sells Quad Lifters (at as much as a 12 percent premium, compared to competitive machines) on the

and masons to distinguish their products from those of AWP juggernauts capable of going toe-to-toe on the bargaining floor with rental giants who buy most units sold in North America each year.

The Workstation proposition basically says

**According to JLG, direct electric drive is about 65-percent efficient, compared to 30-percent efficiency from hydraulic drive.**



strength of their ability to replace telehandlers and small cranes on some building sites. In fact, to approach the T40MH-3000's capacity at 40 feet of lift height, you have to put a basket on the end of a telehandler.

MLE's accessories are designed to take advantage of a fully functioning personnel lift with tremendous capacity. Extendable material racks, a 1,000-pound winch, or a pair of 500-pound winches actually mount on the basket. Another attachment that replaces the standard platform puts a one-man basket on the back side of a pallet-fork carriage. Operator controls stay up on the end of the boom, with the load being placed.

Quad Lifters come with a multi-capacity load chart that looks like a telehandler's. As with any lifting machine, they give up capacity to remain stable as the load is boomed down (even derated, though, Quad Lifters out-lift competitors). MLE's Load Sensing Platform clearly shows the operator how much weight is on the platform, and MLE president Jeff Bailey says operators should be trained to use the machines.

These machines are far from run-of-the-mill 40- and 60-foot booms. In fact, MLE created them by mounting a 40-foot boom on their 60-footer's carrier, and a 60-foot boom on their 80-footer's carrier. So you end up with a 60-foot lift that weighs 31,500 pounds and has a nearly 20-foot turning radius to its outside edge.

If restricted work sites and machine weight are issues, Genie's new S-60HC with capacity to lift 1,250 pounds to its 60-foot platform height could be an alternative. Both the Genie and MLE's T60MH-2000 will take their full rated loads out past 40 feet in horizontal outreach. The Genie is a somewhat more conventional machine, though, weighing in at just over 22,000 pounds and turning within an 18-foot radius.



**MEC's rough-terrain drive system has three modes, with a Quad-Trax mode that splits oil flow to four separate circuits for all-wheel traction. Each motor senses load, and if one wheel loses contact with the ground, the machines' full power is diverted to the wheels with traction. Model 3072RT can climb 45-percent grades.**

## To Stretch Battery Life

The quickest gauge of a scissor lift's duty-cycle range used to be a look at the power ratings of the battery package. Most scissor lifts have battery packs in the 245 ampere-hour range, but that is beginning to change as engineers design more efficient machines with smaller battery packs. Smaller batteries are lighter, which translates to longer duty and lower costs (220 ampere-hour battery packs cost about \$250 less than 245 ampere-hour battery packs). And since they aren't storing as much energy, they recharge faster.

To wring more duty cycles from smaller batteries, manufacturers make machines lighter using lighter alloys, by consolidating operating systems to eliminate parts, and by shrinking hydraulic reservoirs. Precision bearings and better machining on scissor pins reduce friction.

Replacing hydrostatic drive with electric drive delivers the greatest improvement in duty cycles because the machine doesn't have to pump fluid to the drive motors. According to JLG, direct electric drive is about 65-percent efficient, compared to 30-percent efficiency from hydraulic drive.

Asking about the number of duty cycles a lift can be expected to run is an informative purchasing guideline, but remember that there are no standard tests for duty cycles. Duty cycles for scissor lifts range between 30 and 150 cycles. Long-cycle machines will not only work more between battery charges, but they will also power various accessories such as welders, lights or DC-to-AC inverters for electric tools for a longer period of time.

Mechanical contractors, glaziers, brick layers, and other trades are often looking to move heavier loads and up to three people into and out of hard-to-reach areas, so the high-capacity booms can be an advantage in certain niches.

# Buying File: Aerial-Work Platforms

Strong commercial construction has created a ground swell of demand for small rough-terrain (RT) scissor lifts that can put tradesmen within reach of three- and four-story work. Contractors need scissor lifts that perform like

RT booms on the site before there is a concrete slab or power to recharge batteries to keep pace with building development. That way the same machine can be useful for installing mechanical systems and other interior work as the

## Scope of the Product Lines

### Articulated Boom Aerial-Work Platforms

Manufacturer	Number of Models	Platform Height	Horizontal Reach	Up-and-Over Clearance	Capacity (lbs.)	Weight (lbs.)
Bil-Jax	5	34'5"-50'0"	21'0"-30'6"	n/a	300-475	3,112-5,181
Genie	20	29'2"-135'0"	20'6"-69'9"	12'8"-75'6"	500-600	14,220-44,900
Haulotte	7	32'10"-128'0"	21'11"-69'11"	17'3"-54'2"	500-551	13,006-49,613
JLG	30	30'0"-150'0"	20'0"-79'3"	13'1"-80'0"	500-1,000	14,600-58,100
NiftyLift	14	25'3"-63'0"	11'6"-43'4"	n/a	265-500	1,870-13,508
Snorkel	3	40'10"-60'0"	23'7.5"-43'1"	16'2"-n/a	500	12,625-24,800
UpRight	1	37'7"	18'4"	17'8.6"	475	7,470

### Telescopic Boom Aerial-Work Platforms

Manufacturer	Number of Models	Platform Height	Horizontal Reach	Capacity (lbs.)	Width Stowed	Weight (lbs.)
Genie	11	40'0"-125'2"	31'8"-80'0"	500-1,250	7'6"-8'2"	11,650-44,640
Haulotte	6	39'7"-134'0"	34'9"-63'11"	500-790	7'6"-8'1"	13,227-30,522
JLG	13	40'0"-135'0"	29'0"-80'0"	500-2,000	7'6.5"-8'2"	12,525-45,000
MLE	6	40'0"-151'0"	n/a-80'0"	500-3,000	5'9"-8'2"	17,500-45,000
Scanlift	3	54'0"-72'0"	n/a-36'1"	500-507	6'4"	6,657-9,471
Skyjack	2	40'0"-45'0"	n/a	n/a	n/a	n/a
Snorkel	15	37'0"-126'0"	32'0"-71'1.5"	500-600	6'4"-8'6"	6,660-42,150

### Scissor-Lift Aerial Platform

Manufacturer	Number of Models	Platform Height	Capacity (lbs.)	Width Stowed	Wheelbase	Weight (lbs.)
Custom Equipment	1	10'0"	750	2'6"	n/a	1,175
Genie	17	15'0"-53'0"	500-2,500	2'6"-7'6"	4'4"-9'4"	2,575-16,620
Haulotte	11	14'7"-53'0"	500-1,980	2'5"-7'5"	4'6"-9'1"	2,976-15,070
JLG	12	18'9"-43'0"	500-2,500	2'6"-7'10"	5'3"-9'8"	2,750-15,300
Lift-A-Loft	16	15'0"-31'8"	750-2,250	2'7"-7'10"	n/a	1,960-7,650
MEC	9	15'0"-37'0"	500-1,250	2'7.8"-6'0"	4'2"-7'2"	2,700-8,500
Skyjack	18	15'0"-50'0"	500-2,500	2'8"-7'8"	n/a	2,400-14,470
Snorkel	7	19'0"-39'10"	500-1,750	2'6"-7'0"	4'6"-7'5.5"	3,040-9,300
UpRight	18	19'0"-30'7"	500-1,300	2'6"-7'0"	n/a	3,100-6,540

To compare the specifications of individual models of articulated-boom and telescopic-boom aerial-work platforms as well as scissor lifts, go to [ConstructionEquipment.com](http://ConstructionEquipment.com).

building is finished. But the scissors must have stowed dimensions that allow them to squeeze through standard double doorways.

The lure of the commercial building market is so great that most key names in scissor-lift manufacture — Genie, Haulotte, MEC, Skyjack — have introduced new RT scissors in the past 18 months. Indeed Skyjack abandoned its venerable differential drive system on its 68RT line to make an RT scissors with 32 feet of platform height, for example, retract down to a 69-inch stowed height. The compact RT scissors use a more conventional hydrostatic drive system, with individual wheel motors plumbed into two circuits uniting drive flow on opposite corners of the machine. Skyjack publishes the machines' theoretical gradeability at 50 percent.

MEC stepped beyond traditional AWP hydrostatics with its Quad-Trax drive system, outfitting its 3072RT and 3772RT scissors with all-wheel traction control powered by a variable-displacement pump. Mid-sized MEC RTs have three drive modes. The first two mirror what's available in most scissor lifts — a series mode that routes hydraulic flow to each wheel motor in turn for fast ground speeds, and a parallel mode that divides oil to two circuits supplying wheel motors on opposite corners. The third, MEC's Quad-Trax mode, splits oil flow to supply four separate circuits. Each motor senses load, and the system can transfer flow to the wheels with the best traction. The 30-foot model 3072RT can handle 45 percent grades.


Early last year, Genie introduced a similar traction-control drive system on its GS-68 RT scissor lift that allows each wheel to work independently of the others. Divider valves were added to isolate flow to each wheel. If one tire loses contact with the ground, the unit maintains 75 percent of its power, the company says. Operators can tackle sites with 35- to 40-percent slopes.

Makers of ultra-compact articulated booms (small enough to fit through a standard single door) are trying to take advantage of the industry's move to rough-terrain mobility. NiftyLift added a 4x4 version of its popular SP34, 34-foot boom, and introduced a 52-foot model to its line — the SP53 4x4 — last summer. The British company also fields a line of four track-

mounted articulated booms. Since November, ReachMaster has been distributing two track-mounted articulated booms made by the Italian company, Hinowa. Both makers claim these machines can climb up to 60 percent grades.

While most mass-produced AWP's are being sold today with at least the generator wired to electrical outlets on the platform, it may be a while before any significant percentage of rental outlets can offer you the choice of a plain-ol' 40-foot boom, or a 40-footer with welding terminals in the basket.

If you're a regular AWP renter, it's good to know which options are available to tailor machines to your job so you can ask for the ones that make your rental more productive. For example, don't forget to order self-leveling outriggers if you're using your RT scissor lifts on unimproved surfaces.

If you buy AWP's for routine specialized use, you owe it to your bottom line to have a close look at the options available not only from the big names, but from niche competitors. There are still a lot of brands available, for the time being, and you might find somebody out there building access equipment with features that perfectly suit your needs. 

## Web Resources

Specifications	ConstructionEquipment.com
Bil-Jax	<a href="http://www.biljax.com">www.biljax.com</a>
Custom Equipment	<a href="http://www.customequipmentlifts.com">www.customequipmentlifts.com</a>
Genie	<a href="http://www.genieindustries.com">www.genieindustries.com</a>
Haulotte	<a href="http://www.haulotte-us.com">www.haulotte-us.com</a>
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Lift-A-Loft	<a href="http://www.liftaloft.com">www.liftaloft.com</a>
Man & Material Lift Engineering (MLE)	<a href="http://www.manliftengineering.com">www.manliftengineering.com</a>
MEC Aerial Work Platforms	<a href="http://www.mecawp.com">www.mecawp.com</a>
NiftyLift	<a href="http://www.niftylift.com">www.niftylift.com</a>
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UpRight	<a href="http://www.upright.com">www.upright.com</a>

# Gallery of Aerial-Work Platforms



## UPRIGHT

### RT Boom Travels 13 mph

UpRight's AB48 HSRT rough-terrain boom is built on a four-wheel-drive chassis that can travel 13.6 mph. Hydraulic outriggers level the machine on rough terrain. The combination of articulated, telescopic and jib booms extends the working height up to 55 feet 5 inches and stretches horizontal outreach to more than 23 feet. The revived brand also introduced two new trailer booms in the last half of 2006, TL37 and TL49K, with jib, power-rotating platform, and hydraulic outriggers as standard equipment.

**Number of models:** 37

**New models:** AB48 HSRT, the TL37 and TL49K

**Product-line features:** In September, the Tanfield Group, new British owners of UpRight, published a comprehensive machine price list that showed dramatically lowered list prices of almost all UpRight machines.

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## SNORKEL

### Fixed-Axle Lifts with 80- and 85-Foot Booms

Snorkel's TB80FA and TB85JFA are fixed-axle versions of the company's 80- and 85-foot jib-boom products. The TB85JFA reaches 76 feet 8 inches horizontally from an 8 foot-6 inch width, and weighs 38,000 pounds.

**Number of models:** 24

**New models:** TB80FA and TB85JFA

**Product-line features:** Snorkel now offers jib booms that range from 42 to 126 feet. The company markets 15 telescopic booms, seven scissor lifts, and three articulated-boom lifts.

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## NIFTYLIFT

### 4x4 Boom Packs More Power

NiftyLift added a 4x4 version of its popular SP34, 34-foot boom, and introduced a 52-foot model to its line — the SP53 4x4 — last summer. A two-cylinder water-cooled engine boosted the SP34 4x4's horsepower from 9.5 to 12 horses. The NiftyLift drive system employs two flow splitters, front and back, to develop four-wheel drive. The system allows the operator to select series mode for improved speed, as well.

**Number of models:** 24

**New models:** SP34 4x4, SP53 4x4, and SP50N

**Product-line features:** NiftyLift is a British company that produces articulated-boom aerial-work platforms. The company designs lightweight, compact machines; and there are typically no lighter, narrower artic booms in its size classes that deliver more horizontal outreach.

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## SKYJACK

### Skyjack Submits Hydrostatic RT Drive

Skyjack engaged the competition for compact, rough-terrain scissor lifts with the 26-foot SJ 6826RT and 32-foot SJ 6832RT, abandoning its proven differential drive in favor of what it calls CrossOver Symmetrical four-wheel drive. Like many rough-terrain drives, it divides hydraulic flow between two circuits — one to serve drive motors at the right-front and left-rear wheel, the other to serve the left-front and right-rear wheel. Skyjack claims up to 50-percent theoretical gradability. The new RTs have 60-inch deck extensions and may be driven with them fully extended and at maximum height. The engine tray swings out 90 degrees, hydraulic manifold tilts out, and the wiring system is color coded and numbered consistent with all Skyjacks. Automotive-style relays handle all of the machines' "thinking" — there are no computers onboard.

**Number of models:** 20

**New models:** SJ 6826RT, SJ 6832RT, SJ 40T, and SJ 45T

**Product-line features:** Skyjack has begun to manufacture the SJ 40T and SJ 45T — 40- and 45-foot telescopic boom lifts that mark the company's re-entry to the boom-lift market.

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## REACHMASTER

### Compact Reaches Up, Over and Down



Standard features allow the ReachMaster Basic DL82N/DL92N Series lifts to pass through single door openings, travel, and set-up on virtually any surface to reach work heights up to 92 feet. An automatic safety system adjusts reach according to basket load. When the actual lift area is confined, ReachMaster's Falcon series has double 10-foot jibs for up-and-over clearance of up to 80 feet, horizontal outreach of 24 feet 10 inches, and flexibility to reach up and over, and then either up or down again. The FS 95 (with 95-foot work height) is capable of passing through an opening 2 feet 7 inches wide and 6 feet 7 inches high.

**Number of models:** 11

**New models:** DL72N, DL82N, DL92N, LL46 and LL63

**Product-line features:** Options include electric power, water or air to the basket, alternative power supply, and battery options. New Hinowa compact booms ride on tracks.

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## GENIE

### Sixty-Foot Boom Lifts 1,250 Pounds

The platform on Genie's new S-60 HC offers a full range of motion while lifting 750 pounds. The model is stable with 1,250 pounds of load extended 40 feet 8 inches horizontally. The S-60 HC's automatic envelope control system monitors weight in the platform to determine maximum outreach of the boom. Genie plans to make the high-capacity boom option available across the entire S Series.

**Number of models:** More than 60

**New models:** Z-135/70 and S-60 HC

**Product-line features:** In most articulating-boom size ranges, Genie models are at the top of either up-and-over clearance or horizontal outreach. Genie offers a variety of work-station options such as built-in 275-amp welders with terminals in the basket; on-board generators and compressors with power outlets and air plumbed to the platform; pipe cradles and plate-glass or panel cradles; and tool trays.

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# Gallery of Aerial-Work Platforms

## MLE

### Forty-Foot Boom Lifts 3,000 Pounds

Man & Material Lift Engineering says its Quad Lifter telescopic booms can replace telehandlers and small cranes on some projects. The T40MH-3000 is the highest-capacity telescopic boom in the industry at 3,000 pounds. The T60MH-2000 will take 2,000 pounds up to its 60-foot height, or extended 40 feet forward horizontally. The T40MH and T60MH cost 8 to 12 percent more than standard lifts of comparable height, but they are designed to lift materials safely.

**Number of models:** 6

**New models:** T40MH-3000 and T60MH2000

**Product-line features:** Quick-attach hardware allows operators to quickly add a 1,000-pound winch or extendable racks for handling sheet goods, or trade the platform for pallet forks with a one-man basket mounted behind the carriage. The T40MH and T60MH join an 80-foot model rated at 2,500 pounds, and plans are laid for a 100-footer with 2,000 pounds of capacity.

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## LDC

### Power Jack Eases Trailer Setup

UniLift 538 articulated-boom and 542KB telescopic-boom aerial-work platforms include a new power jack option to reduce the manual effort required to set the outriggers. The power jack, with a built-in level indicator, can take the weight of the trailer-mounted boom lifts off of the outriggers, allowing for quick and easy setup.

**Number of models:** 2

**Product-line features:** The UniLift models reach working heights of up to 42 feet. The battery-powered units have 360-degree effective working range and convert quickly for use as a crane. With unit weights less than 3,000 pounds, UniLifts tow behind a pickup truck.

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## JLG

### Vertical Masts Reach from a Small Footprint

JLG acquired the Toucan line of self-propelled, mast-style personnel lifts in its purchase of Manitowoc's Delta Manlift. Models E18MJ and E26MJ reach 18 and 26 feet high and offer 9 feet of horizontal outreach with platform capacities of 500 pounds. Small footprints — overall width of 39 inches — give them access to tight work areas. The E33MJ reaches horizontally 14½ feet and is just 47.2 inches wide. Masts rotate 360 degrees. With 20-percent gradability and shod with non-marking lugged wheels, Toucans are suited for work on improved surfaces.

**Number of models:** 51

**New models:** E18MJ, E26MJ, E33MJ and 1230ES

**Product-line features:** JLG continues to probe niches with machines and options tailored to specific tasks. Workstation-in-the-Sky options include bins and workbenches, generators, welders, glass trays, air compressors and plasma cutters. The second-generation of the 7,500-watt SkyPower — JLG's most popular workstation option — drives the generator with a belt to ease the load on the engine. SkyWelder is upgraded to reflect changes in Miller Electric's CST 280-amp welder.

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#### Operating Check List

- ☐ Monitor hydraulic system temperatures
- ☐ Use rod protectors
- ☐ Change hydraulic attachments carefully and wipe couplers
- ☐ Watch for drift and other signs of contamination

#### Service Check List

- ☐ Change oil while it's warm and agitated
- ☐ Remove old filters carefully
- ☐ Filter the oil that comes through drop lines
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# Gallery of Aerial-Work Platforms

## MEC

### RT Scissors Drive Like Posi Traction

MEC's Quad-Trax drive system for rough-terrain scissor lifts delivers all-wheel traction by managing power to each wheel. Mid-sized MEC RTs have three drive modes — a series mode that routes hydraulic flow to each wheel motor in turn for fast ground speeds. The mid-terrain mode divides oil to two circuits — one supplying the right front and left rear wheel motors, and the other circuit driving the opposite wheels. Quad-Trax mode splits oil flow to supply four circuits — one for each wheel motor individually. Each motor senses load and the system can transfer flow to wheels with the best traction.

**Number of models:** 9

**New models:** MEC 2047ES, MEC 2657ES, MEC 3247ES, MEC 3072RT, MEC 3772RT, MEC 2541RT, MEC 3391RT and MEC 4191RT

**Product-line features:** Quad-Trax has brought about some drive-train component upgrades. While some RT scissors in this size range use RE Series White Wheel motors (rated at 8,000 inch/pounds torsional load), MEC is using White's DT Series motors, which are rated at 24,000 inch/pounds torsional load.

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## HAULOTTE

### Booms Reach 130 Feet

Haulotte challenges the United States' domestic skyscrapers with its new telescopic HB135 JRT boom with platform height of 134 feet, and the 129-foot HA130 JRT articulating boom aerial-work platform. Both reach the third-highest platform heights in their respective categories. The articulated boom delivers 63 feet of horizontal outreach, and its up-and-over clearance is more than 58 feet. The HA130 JRT turns in an outside radius of 16 feet 9 inches, about the same space as many 50- or 60-foot booms.

**Number of models:** 34

**New models:** HA130 JRT and HB135 JRT

**Product-line features:** Haulotte also plans to bring several trailer-mounted lifts with platform heights from 46 to 63 feet to North America. The Haulotte DI range is the result of a distribution agreement with Finnish manufacturer Dino Lift.

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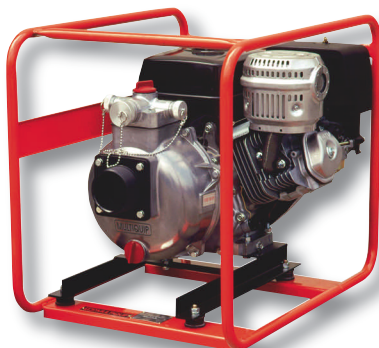
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## Water/Trash Pumps

### MULTIQUIP

According to Multiquip, its new QP-305SLT centrifugal pump has a maximum shut-off head of 328 feet with a top pressure of 142 psi, making it the company's highest-head model. The 110-pound pump has a maximum discharge rate of up to 145 gpm, and it features a dual-impeller system to generate higher pressures. The pump has three discharge ports — two 1-inch ports and one 1.5-inch port; a 3-inch port is optional. An 11-hp Honda GX-340 drives the QP-305SLT and features a low-oil shutdown. A smaller pump in the Multiquip line, the QP-205SH, can move as much as 106 gpm with a head of 246 feet. It is powered by a 5.5-hp Honda.

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### STANLEY

Stanley Hydraulic Tools offers a range of hydraulically driven pumps, including dewatering and trash pumps. The model SM50 dewatering pump, for example, with 3-inch ports, weighs 21 pounds, can fit in a space only 11 inches deep and 10 inches square, and has an output capacity of up to 500 gpm. In the trash-pump line, the model TP08 has a discharge capacity of 800 gpm and uses a 4-inch inlet diameter. The TP08, weighing 59 pounds, is designed to pump high volumes of water, sand slurries, sludge and solids up to 3 inches in diameter. The pump uses approximately 9 gpm of hydraulic flow.

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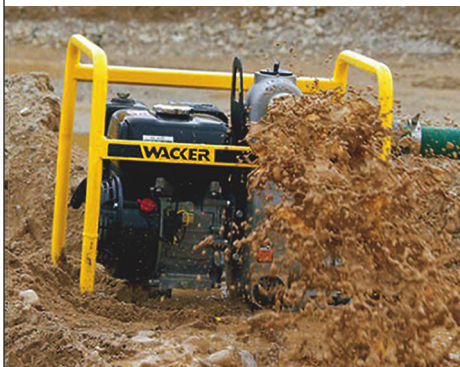


### WACKER

Wacker's pump line includes a range of centrifugal dewatering models, centrifugal trash models and submersible models, the latter available in either single- or three-phase configurations. The model PT 2 trash pump, shown here, has a 2-inch suction and discharge diameter. Engine choices include a 6-hp Wacker gas, 5.5-hp Honda gas, or 4.6-hp Hatz diesel. This 131-pound pump has a maximum discharge rate of 210 gpm, maximum suction lift of 25 feet, and maximum head of 106 feet. It can accommodate 1-inch solids. The pump is self-priming and incorporates a

hardened ductile-iron impeller and volute, plus an aluminum housing. Carbon ceramic mechanical seals are used to promote long service life.

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### ATLAS COPCO

The Atlas Copco LTP 3 submersible trash pump is designed for removing debris-filled water from construction and excavation sites. The 3-inch pump handles stones and other debris up to 2.5 inches in diameter, and it has a discharge capacity of 507 gpm and a lifting head of up to 104 feet. A range of hydraulic power packs is available to drive the LTP 3. The power packs feature a "power-on-demand" system that decreases engine speed when the pump is disengaged. An optional flow divider and extension hoses allow the pump to be driven by hydraulically powered carriers.

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## GODWIN

A new line of portable, gasoline-powered Wet-Prime pumps from Godwin Pumps is available in dewatering, trash, diaphragm, plastic, and pressure models. Wet-Prime pumps are capable of maximum heads from 50 to 285 feet and maximum flows of 32 to 422 gpm. According to Godwin, the pumps are ideal for applications including construction dewatering, landscaping and irrigation, farming, remote firefighting, and marine construction.

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## SUBARU ROBIN

The Subaru Robin pump range includes a selection of centrifugal-clear water, diaphragm, high-pressure, semi-trash and trash types. The semi-trash models, the 2-inch PKX201ST and the 3-inch PKX301ST, are designed for handling water with small solids and light debris. Both pumps are powered by a Subaru Robin gas engine, rated respectively, at 4.5 and 6 horsepower. The 2-inch model has a delivery volume of 153 gpm, and that for the 3-inch model is 246 gallons. Both semi-trash pumps feature a hardened cast-iron volute and an abrasion-resistant, cast-iron, three-blade impeller.

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## ITT FLYGT

Included in ITT Flygt's new 2600 Series dewatering-pump line are six models, ranging in output from 1.2 to 27 horsepower. They are designed to cover nearly any dewatering application, from mines and construction sites, to quarries and other harsh environments. The pumps are available with discharge ports ranging from 2 to 6 inches, and they provide hydraulic performance ranging from 150 to 1,400 gpm and heads from 40 to 230 feet. A patented DuraSpin hydraulic system and newly designed impeller are aimed at sustaining performance and at improving wear-resistance. A single



screw allows fast adjustment for maximum pump performance. Visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info) and enter 166



## HONDA

The Honda WDP30 heavy-duty, 3-inch diaphragm pump is driven by a 4-hp Honda GX120 commercial-grade engine. This self-priming diaphragm pump has a discharge rate of up to 80 gpm, and it uses 3-inch NPT suction and discharge ports. The suction head lift is 16 feet dry and 24 feet primed. The pump weighs 120 pounds and can handle solids up to 2.4 inches in diameter.

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## STOW

The Stow DP-2 is a self-priming diaphragm pump designed to handle clear water, heavy sludges and slurries. According to the manufacturer, the DP-2 is suited for handling septic-tank cleaning, slow seepage from small excavations and industrial waste. The pump has a capacity of 3,000 gallons per hour and is driven by a 4-hp Honda GX120 gas engine. Pump features include a heavy-duty aluminum body, machine-steel pipe nipples and strainer.

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## HYDRA-TECH

The Hydra-Tech product line includes a wide range of pump types, including vortex-flow, solids-handling, axial-flow and centrifugal-screw models, as well as pumps with agitators to move sand and slurries. The hydraulically powered S4VHL Vortex-Flow Pump (shown) has a 4-inch discharge port, a maximum flow of 750 gpm, and can handle 3-inch-diameter solids. Available with either an aluminum body (160 pounds) or a ductile-iron body (295 pounds), the pump will fit through a 20-inch manhole and has a maximum head of 210 feet. Hydraulic requirements include a 25 gpm flow and a 3,000-psi operating pressure.

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## RED HAWK

The Red Hawk WP30 is a self-priming, 3-inch water pump driven by a 6.5-hp engine and having a discharge capacity of 265 gpm. The pump weighs 83 pounds and has a total head lift of 92 feet and a suction head lift of 26 feet.

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## THOMPSON



The Arctic Knight from Thompson Pump & Manufacturing is a cold-weather package that allows diesel-powered pumps to be used in climates as cold as minus 40F. The

Arctic Knight uses a self-contained, thermostatically controlled heating system, which operates from the on-board fuel supply to regulate the temperature inside the pump enclosure. To prevent liquids from freezing when the pump is off, an auto-drain feature drains fluid from inside the pump and piping system. The drain system requires no external electric power to operate, and its powerful valve prevents debris from interfering with closure of the drain.

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## A 'Natural' Move to Cost Savings

New York State Department of Transportation fuels fleet with natural gas

Joseph Darling knows his plan to convert the New York State Department of Transportation's fleet to natural gas is a winner.

"Because natural gas is such a clean-burning fuel," says Darling, the department's director of fleet administration and support, "our oil changes have been extended out about 2-1/2 times on the light-duty fleet."

Vehicles for which oil changes were recommended at 4,000 miles are now having the service done at 10,000 miles, "and from some of the oil sampling we've got, we're still changing clean oil."

According to a five-year analysis conducted by Darling back in 2003, the department's compact sedans powered by compressed natural gas (CNG) averaged a cost-per-mile of 3 cents, compared to 8 cents for those powered by gas. For pick-up trucks and vans, the CNG vehicles cost 6.9 cents per mile, compared to 14.5 cents per mile for gas-powered units.

"Some of this was due to fuel cost savings, but not all of it," he reported.

When wear parts were disassembled, there was evidence of less carbon build-up, thus less friction.

NYDOT switched to an entirely new information system in late 2004, and the data compiled since on the newer vehicles is "rather insignificant" at this stage. But the evidence has long been clear to Darling.

"At that time, we were saving 20 to 50 cents per gallon on fuel costs, but recently we have experienced savings of over \$1 per gallon," he reported this winter.

"Right now, it is costing \$1.33 for CNG at our facilities versus \$1.83 for gasoline and \$2.16 for winter-mix diesel fuel."

To that point, the winter had been mild in the Northeast, so diesel prices had not escalated as much as often is the case, when heating oil demand is higher. In the summer, gas prices will rise and diesel prices will subside.

The drawback to CNG is the cost of the supply and storage infrastructure required to service the fleet, "but if you figure in the remediation and liability costs associated with

## PROFILE



**Joseph Darling**  
Director of Fleet  
Administration & Support

**New York  
State DOT**

**Headquarters:**  
Albany, NY

**Specialties:**  
State public works, snow and ice removal, alternative energy

**Equipment Value:**  
\$300 million

**Fleet Makeup:**  
13,000-plus vehicles ranging from compact sedans, pick-ups, vans and utility vehicles to special-purpose vehicles for road maintenance and construction, snow and ice removal, and asset tracking

**Support Staff:**  
450 mechanics, parts room staff, supervisors, and clerical and administrative staff

**Market Range:**  
Entire of New York State, supporting a 110,000-mile state and local highway system, including 17,000 bridges

**Louis St. Amour, Highway Maintenance Worker 1 with the New York State Department of Transportation, fuels up with natural gas for another day of wintry upstate highway care.**



Photos: James McEntee/Getty Images®

# Great Managers

a gasoline or diesel fuel tank replacement, the overall costs to own a CNG facility is lower.”

Furthermore, the liquefied natural gas (LNG) option that would best serve the heavy-duty fleet would help lower facility costs, said Darling. The compressor is replaced, which lowers the operational and maintenance expenditures, while capital costs remain the same, he said.

What’s holding New York State back from full fleet implementation of natural gas fuel is a statewide legislative moratorium placed on LNG follow-

ing a fatal industrial accident on Staten Island in 1976. The accident was the result of a welding mishap unrelated to LNG itself, but happened to take place in an LNG facility, said Darling.

CNG has limitations not unlike hydrogen — another alternate fuel that is garnering support.

“In a gaseous state, it is hard to store enough natural gas on board for an over-the-road trucking operation or for any long-distance operation involving multiple hours out on a job without refueling capacity,” said Darling.

“With liquefied natural gas, you get more volume in the same area, which addresses a lot of range limitations

that are associated with compressed natural gas. It also comes from a lot of renewable sources, so there’s a renewable benefit there.”

By taking methane from such readily available sources as landfills and wastewater-treatment plants, “you can create an enormous amount of liquefied natural gas to displace our use of petroleum fuels.

“Most states in the country could move toward LNG right now,” he said. “It would be a benefit to them, because a lot of states don’t have pipeline capacity like we do in New York State. With LNG,

you can liquefy it and ship it in a cryogenic tanker and store it on site, and either dispense it as a liquid or vaporize it into compressed natural gas, whichever way you decide to use it.”

Besides the 800 light-duty vehicles utilizing CNG, NYDOT did retrofit 35 heavy-duty snowplows to “what we call dual fuel. They’re standard diesel engines that are compression ignition. They start as a pilot on diesel fuel, and through electronics, they convert over to natural gas at about an 80/20 mixture, so you’re still using some diesel fuel for lubrication, but most of the fuel is displaced with natural gas.”

In terms of vehicle performance, the use of CNG poses no disadvantage. Besides the volume limitations, a drawback for full use is the requirement for steel tanks that naturally increases vehicle weight.


“We’ve built 58 natural-gas fueling facilities across New York State. I have about 200 fuel facilities within DOT across the state, so that’s only about a quarter of my total capacity,” said Darling, based in the state capitol of Albany.

Built in a three- to four-year span, the 58 facilities mean that CNG is available for light-duty fleet use and limited heavy-duty fleet use pretty well from one end of the state to the other.

“The key for full implementation across the entire fleet is for the LNG,” said Darling, “so that we can go to those other 150 sites — because they’re not convenient to pipelines — and build LNG storage facilities there.”

While state legislation is delaying full implementation of natural-gas use in DOT vehicles today, it was a state government initiative that actually got the ball rolling on natural gas use.

With his state designated as non-compliant of EPAct standards, Governor George Pataki created in 1997 a Clean Fuel Vehicle Council with the express desire to implement alternate fuels in the state’s fleet. The council considered various alternate fuels, including biofuels, hybrids, electric, methanol and natural gas.

“From the information that was available then, we decided that natural gas presented the best opportunity for application to not only the light-duty fleet, which was covered under EPAct, but also to transition to the heavy-duty and construction fleet, which is a big part of DOT’s responsibility,” said Darling. “Since we’re the biggest fleet on the Clean Fuel Vehicle Council, our perspectives were given a lot of consideration.” 



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## Prevention Is Better Than Cure

We can attain zero on-shift failures, but we can't do it without well-thought-out maintenance strategies

When a machine starts a production shift, it should work without interruption, not break down, and not bring everything to a grinding halt. Our goal should be to have zero on-shift failures. It is possible, desirable and it makes good business sense.

Successful equipment managers know that their organization must reduce unscheduled field breakdowns and improve reliability. Maintenance programs must be uncompromisingly thorough, repairs and rebuilds need to be performed to strict quality standards, and replacement decisions must be timed to ensure that the fleet is as reliable as possible. Good managers emphasize prevention rather than cure and understand that maintenance actions taken before failure are more cost-effective, less disruptive, and easier to manage than repair actions taken after the machine has broken down and defined both the time and place for the urgently required repair action.

On the other hand, many believe that replacing components and taking action before failure is a conservative and expensive thing

to do. If a component is supposed to run 5,000 hours, why replace it at 4,500 hours; let it run to failure. It may last 6,000 hours; why waste the chance of 1,500 hours more component life?

Repairs are easy. The machine is broken, and it needs to be fixed right now. All you can do is spend the required amount as effectively as possible under crisis conditions. It is like opening your parachute after jumping out of the plane: a necessary reaction to a current problem, and you hope for a safe landing.

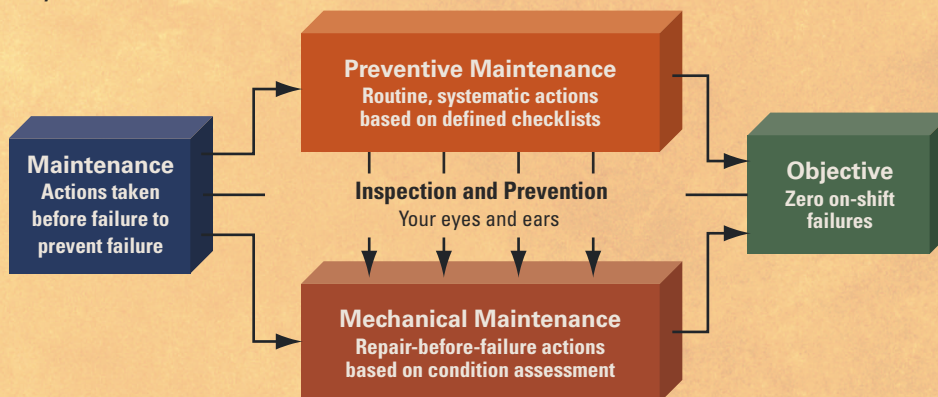
The worst thing about a repair is the collateral damage caused by the breakdown. A \$500 bearing can ruin a \$7,000 transmission; a \$100 hose can cause a \$2,000 loss in production. Collateral costs are extremely difficult to measure. They do not appear in cost reports and are often the subject of bitter debate. Regardless, there is no doubt that they exist and that they have a huge impact on both cost and productivity. We simply cannot afford equipment failures if we want to hold



**Mike Vorster**

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

### Key Issues to Address



Effective maintenance programs must have two different but equally important components. Preventive maintenance requires routine, systematic actions. Mechanical maintenance relies on information and assessment that prevent on-shift failures.

our heads high as equipment managers and if we want to complete construction on time and on budget.

Maintenance is defined as those actions that are taken before failure in order to prevent failure or extend life. Effective programs comprise two different but equally important components. The first, preventive maintenance, requires discipline. Routine systematic actions are defined in maintenance check lists, timing is set by the maintenance cycle, and work is performed according to a preset schedule. Spending can be seen as an investment rather than a cost. Without effective preventive maintenance, you truly cannot expect to succeed. The second compo-

nent, mechanical maintenance, requires courage. Repair-before-failure actions are performed to replace components before they fail based on reliable information, condition assessment, and a belief that prevention is better than disruption and the collateral costs associated with an on-shift failure.

It is possible to run a fleet based on a good preventive-maintenance program and then let components run to failure before taking any additional action. Managers who do this neglect the collateral cost of lost production, disrupted operations, increased repair costs, and crisis management. In exchange, decisions are simple: The machine must be repaired, and the money must be spent. The only decisions that need to be made are how to schedule the inevitable overtime, reduce the inevitable cost, and whether or not to use the downtime as an opportunity to replace any additional components that appear to be "tired."

The need to manage equipment costs without sacrificing reliability forces equipment managers to implement a mechanical-maintenance program that focuses on repair before failure and bridges the gap between preventive maintenance and repair. It requires courage and a firm commitment to excellence in the management of the fleet.

Here's how it works:

■ What must be done is determined by a knowledge of component lives, machine history, and the current condition of the machine. There has not been a breakdown to define exactly what needs to be done.

■ When it must be done is your call. It can be done now or later depending on your assessment of the risk between the cost of taking action too early in the life of a component and the collateral cost of a failure in the field. Again, a failure has not occurred to force the decision.


■ How much should be spent depends on your decision on the components to be replaced and the work to be done. Doing it this month would be good, but how about doing it next quarter when the budget situation should look a little better?

Our ability to implement an effective mechanical-maintenance program therefore depends on our ability to predict failure and base decisions on good information rather than conservative guesses. This means we must use the best tools and techniques available for inspection and condition assessment. The technicians performing preventive maintenance are the manager's eyes and ears. They visit the machines regularly. They must have the time, training and tools needed to inspect and report, not just to check, change, adjust and lubricate. They must provide information, and we must use it to thread the needle between conservative decisions that increase component costs and risky decisions that increase the chances of on-shift failure and collateral costs.

We must address three critically important issues.

1) We can and should set zero on-shift failures as an overall goal for the maintenance and management of our fleet. It is a simple metric, straightforward and achievable. Skeptics should look to what has been achieved in construction safety in the years since we started to believe that accidents were not inevitable.

2) We need a routine, systematic preventive-maintenance program based on checklists and schedules to perform routine actions, solve small problems before they escalate into failures, and collect the condition-assessment data needed to run a cost-effective mechanical-maintenance program. Preventive maintenance is not a science, it is a discipline.

3) We need the courage, conviction and confidence to implement a repair-before-failure mechanical-maintenance program that bridges the gap between preventive maintenance and repair. This will require an increase in the amount of effort placed on inspection, oil sampling, and other diagnostic techniques that detect impending failure in expensive components and remove the nagging doubts about whether or not the transmission could run an extra 1,000 hours before failure. 

***We must use information to thread the needle between conservative decisions that increase component costs and risky decisions that increase the chances of on-shift failure and collateral costs***

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## Ford '08 Super Duties Include Factory F-450 Pickup

New models went into production in mid-December — just in time to meet tighter federal diesel-exhaust emissions

Ford Motor Co. says it will retain its sales leadership in pickups by extensively redesigning its F-250, 350 and 450 Super Duty series with new “in-your-face” styling, an extensively reworked diesel engine, and a newly offered F-450 factory pickup option. The redesigned models will be titled as 2008s; they went into production in mid-December, just in time to meet tighter federal diesel exhaust emissions limits in January.

The F-450 Pickup with a 6-3/4- or 8-foot-long bed allows customers to tow extra-heavy trailers without the need to buy and install a custom-built tow body on a 450 series cab/chassis truck, Ford executives said. The F-450 comes only with dual rear wheels and, depending on cab style and power train, can haul up to 6,000 pounds and tow a trailer weighing 16,000 to 24,500 pounds.

The new model includes the same forward frame, axle and suspension as Ford's medium-duty F-450 cab/chassis truck, but its rear frame has splayed main rails to support the pickup body's floor. Aftermarket pickup conversions use cab/chassis vehicles with straight frame rails and suspensions better suited for various work-truck bodies, executives said.

Exterior styling of the '08 Super Duties includes a high, sculpted hood, large grill, stacked headlamp pods, crisp fender flares, and liberal splashes of chrome. Windows remain tall for good visibility. The grill sits 4 inches higher to accommodate a larger radiator needed to cool the EPA '07-spec diesel.

Functional air vents on the fenders are painted red for diesel or black for gasoline engines. Power telescoping/power fold mirrors allow easy adjustment for trailer towing and for squeezing through tight spaces. Both mirrors extend



**F-450 Pickup combines a versatile hauling bed with a stronger chassis for towing a trailer weighing up to 24,500 pounds. The bed comes in lengths of 6-3/4 or 8 feet.**

or retract at the touch of a single switch, and pushing another switch causes both to fold back against the doors or deploy outward.

Interiors have a modular look; a radio-navigation system is available on some models, and new audio and DVD options will keep backseat passengers occupied. “Quiet steel,” a composite of steel and sound-deadening compounds, is used behind the dashboard, as well as in the floor and rear wall. This reduces road noise and lets people converse in normal tones of voice.

The pickup box has a new tailgate with a standard lift-assist system; a built-in step with pole-type grab handle is optional. New tail lamps are at the corners. And the larger, wider rear bumper — housing the four-pin/seven-pin trailer connector with shared hinge — was toughened to improve capability and to help balance the overall design.

The International-built Power Stroke V-8 diesel meets the Environmental Protection Agency's January 2007 emissions limits with a larger, 6.4-liter displacement, advanced electronic controls, high-pressure fuel delivery through Piezo-electric injectors, double turbocharging and exhaust after-



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## Report



**A new tailgate comes standard with lift-assist feature and can be ordered with a built-in folding step with grab handle.**

treatment. The standard rating is 350 horsepower and 650 pounds-feet. The new diesel is said to be quieter and more fuel-efficient than the current 6-liter V-8.

Still available are two Triton gasoline engines: the 6.8-liter V-10, rated at 362 horsepower and 457 pounds-feet, and the 5.4-liter V-8, with 300 horsepower and 365 pounds-feet. Both engines use new air box and exhaust systems, and electronic throttle control with stationary elevated idle control to drive power take-offs.

Standard transmission is a six-speed manual, while the five-speed TorqShift automatic is optional. The TorqShift has new gear sets and a three-plate, two-stage torque converter to reduce turbine noise when the converter is locked.

Like other Super Duties, the F-450 Pickup can be bought with a 2-door Regular Cab, 4-door Super Cab or 4-door Crew Cab. XL, XLT, FX4 and Lariat trim levels are available, as is the King Ranch leather interior package. Ten wheel styles in 16-, 18- and 20-inch sizes are available in F-250 and F-350 trucks; the F-450 Pickup, like the 450 chassis/cab, comes with 19.5-inch wheels.

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	(% change from year ago)			
	2004	2005	2006 (f)	2007 (f)
Total Construction Spending	10.8	9.1	7.0	6.4

Total construction spending has expanded at an accelerated rate for six consecutive months after declining during the spring. Month-to-month construction increases were predominantly nonresidential by year-end. Residential spending increases will end early this year, and spending for nonresidential buildings is beginning a seven-year period of more than 10% annual growth. Strong expansion is also expected in 2006 for heavy construction projects, especially airports and water and sewer projects.  
For the complete economic outlook [click here](#)

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**Welcome to the winter edition of E-Giants: about Giants, for Giants.**  
Below you'll find a selection of information pertinent to those largest equipment fleets, including news, research and resources from [ConstructionEquipment.com](http://ConstructionEquipment.com). Be sure to click on the links to get connected.

**Red Saffin**  
Editor in Chief

**Giants' Headlines**  
**Grain Processing (LVI) Awarded Project to Construct World Trade Center Transportation Hub**  
Grain Processing Northeast, Inc., in joint venture with Fluor Corporation, Inc., Skanska, Inc. and Borel Land Lease LLC, Inc. (Pinnacle Construction), joint venture has been awarded a project to construct the permanent and temporary transportation hub for the new World Trade Center.



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## New Concept for High, Heavy Lifts

The Grove GTK1100's potential maximum hook height is nearly 460 feet, and loads of 77 tons to heights of 390-plus feet may be possible

Even though we have only computer-generated images to show you the new Grove GTK1100, initial deliveries of the new crane — according to a September 2006 press release from Manitowoc Crane Group (MCG) — “are set to commence later in 2007.” MCG’s claims for the GTK1100 are far from timid, considering that the company says it is “launching a brand-new technology for the world’s lifting industry,” and that “the crane utilizes a new concept in lifting engineering.”

As we understand the basic concept, it entails a vertical, six-section, telescopic mast, which extends to 266 feet. At the top of the mast is a slewing “upperworks” that incorporates the hoist drums and a telescopic luffing boom that extends to 197 feet. The mast is positioned on a wheeled carrier, similar in design, says Manitowoc, to a standard semi-trailer.

The carrier uses four massive outriggers, each 8 feet in height and nearly 60 feet in length (we think), arranged in a cross shape. The outriggers are connected via a pendant tensioning system to four “spreaders,” which are large lattice-like beams at the top of the mast. “This configuration,” says Manitowoc, “acts as central ballast for the crane.”

The crane’s hydraulic functions are powered from two

sources. An engine-driven hydraulic system, located on the gooseneck of the carrier, powers the mast. A second engine-driven system, positioned on the mast’s upper superstructure, powers functions in the upperworks, including the boom, the two hoist drums and the slewing mechanism. Although the boom can be used at partially extended lengths, the mast must be fully deployed before the crane operates.

According to Manitowoc, the GTK1100 arrives at the site on either four or five trailers. If regulations allow, the entire mast can be transported on the carrier; if not, a second trailer shares the mast. The four outriggers and other accessories travel on two trailers, and the upperworks (including the boom) are transported on one trailer. Typically, says the company, a 200-ton-capacity all-terrain crane will be needed to assist assembly.

Once assembled, the crane can be moved on site in three configurations, depending on application and surfaces: tower vertical, but not extended, without outriggers; tower folded with outriggers; tower folded without outriggers. The crane is operated via remote control by a person with both feet on the ground.

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According to Manitowoc, the GTK1100 may have a maximum hook height in excess of 460 feet. Initial testing, says the company, suggests the crane will lift loads exceeding 77 tons to heights exceeding 394 feet.



The new crane may find application, says Manitowoc, on wind farms and in refineries, power plants and petrochemical facilities — or in any application where mobilization logistics and mobilization costs must be kept trim.

A close-up photograph of a single metal needle lying diagonally across a dense, tangled pile of dry, golden-brown straw or hay. The lighting is warm, creating a strong orange and yellow color palette. The needle is sharp and metallic, contrasting with the soft, fibrous texture of the hay.

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## Michelin's XMCL Aims to "Radialize" Backhoe-Loaders

Radial with steel tread belts resists puncture 10 percent better and can last 46 percent longer than previous designs

In an attempt to put more radials on backhoe-loaders, Michelin replaced its nearly 20-year-old XM27 and XM37 off-road radial designs with the industry's only backhoe-loader tire with steel tread belts — the new XMCL radial. About 280,000 replacement tires are sold for use on backhoe-loaders in the world each year. Only 5 percent of them are radials. In contrast, 77 percent of replacement tires for large earthmovers are radials.

"We've had fleet owners who have experienced an advantage of more than \$700 per tire, comparing our radials versus bias-ply tires," says Todd Gillespie, North American training manager for Michelin Agro-Industrial Tires.

Priorities in designing the XMCL were to gain greater puncture resistance, resistance to sidewall damage, and longer service life. Two steel belts beneath the tread replace the Kevlar belts used in the XM27 and XM37, making the crown of the XMCL tire exceptionally puncture-resistant. More mass in the redesigned tread lugs protects tires and extends wear life. The new tires are about 5 percent heavier than comparably sized predecessors. A squared shoulder (transition from tread to sidewall) and raised sidewall ribs protect the XMCL's sidewall from damage.

The enhanced crown and sidewalls also improve the XMCL's load-carrying capacity. The XM27 had load limits of about 9,240 pounds at 6 mph and 6,400 pounds at 24 mph. The XMCL radial will carry more than 14,000 pounds at 6 mph and 9,900 pounds at 24 mph.

Michelin invited members of the press to its proving ground in Laurens, S.C., to experience the XMCL. This is hardly a perfect prospect, though, as many of the new tire's advantages accrue over hours or years of use. But Michelin mounted the new radials on one Caterpillar 430E tool carrier, and competitive bias-ply tires on a second 430E IT, and pointed us toward two sections of the testing facility.



**The trade press compared the new radials to competitive bias-ply tires by climbing a 9-percent slope cut through with gulleys. The Michelin-shod backhoe-loader soaked up the impact of driving into ditches and climbed out of them more smoothly and quickly than the backhoe on bias tires.**

First, we climbed a 9-percent grade crossed by gulleys to test the radials' traction and stability in rough terrain. Tires were inflated to manufacturer's recommended inflation pressure for the load. Four-wheel drive was disengaged in both tractors.

It's hard for an inexperienced operator to get a real sense for wheel slip in a straight pull, but diving into and climbing up out of the gulleys did suggest some radial performance advantages. Its steel belts and heavier tread bounced much less when they struck the bottom of the ditches, so the tread stayed in contact with the soil and pulled more consistently and quickly out of the depressions.

Then we moved to a flat gravel track with cones set in an easy slalom course. The backhoe on bias-ply tires floated through the cones in what felt like a scene out of Tokyo Drift. The XMCL radials tracked sure-footed at road speed.

Michelin launched the XMCL radial in January 2007 in 12 sizes from 18 to 28 inches to fit backhoe-loaders, compact wheel loaders and telehandlers. The new tire will be available as standard equipment on 2007 Caterpillar backhoes.

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## Genesis Develops 'Shear on Steroids'

Genesis GXP MAXX Mobile Shear product line provides processors with larger-machine production from their excavators

In developing a shear to fill the need of one niche market, Genesis Attachments found a way for all shear users to get bigger-machine production without the need for a bigger machine.

The original concept behind the Genesis XP MAXX mobile shears was based on a specialized requirement of select processors that are in the business of cutting up rail cars. Those customers essentially needed an overbuilt yet transportable shear, so Genesis engineers went back to the company's established GXP line, which ranges from the 4,000-pound GXP 200 to the 45,000-pound GXP 2500, and focused on a shear to accommodate 35-ton excavators.

Today, the GXP 660 MAXX "is our hottest model," said Bruce Bacon, the company's vice president and general manager. "As a limited number of customers saw the product or heard about it, and our regional managers realized the advantages of that product being able to produce more with the same-sized carrier, all of a sudden it took off like wildfire."

The GXP 660 MAXX "can cut basically what traditionally would have required a shear on a 100,000-pound machine," said Bacon. "So, you have a less expensive excavator that uses less fuel, is easier to transport, and you can still have the same performance that historically would have required a larger machine."

"We've actually had customers who had been considering a larger shear and excavator moving down to the 660," he said, "because when they've seen the performance characteristics of it, they've realized they can do everything they need to do . . . and there's commonly a \$75,000 savings on the excavator purchase."

Into the compact shear, Genesis engineers installed a longer lever arm with a smaller opening and a longer cylinder.

"In-house, we call it 'The Bulldog,'" said Bacon. "Really, what it does is allow a customer who has a 35-ton excavator



**Known in-house at Genesis Attachments as 'The Bulldog,' the GXP 660 MAXX mobile shear packs more shear force than the next-sized shear.**

to have a shear with more power than has ever been available before in that weight class."

Retaining a transportable package, but specifically for very heavy cutting, Genesis installed a beefed-up pivot group, superstructure, and upper and lower jaw.

"Essentially, what we got is a shear on steroids," said Bacon. "What we ended up with is a shear in that weight class that has more piercing and cutting capacity than anything on the market."

At an operating weight of 13,300 pounds, the standard GXP 660 MAXX is 1,000 pounds lighter than the standard GXP 700, yet actually generates slightly more shear force than the larger model. The 660 MAXX generates a shear force of 1,475 tons at 5,000 psi and 1,625 tons at 5,500 psi, compared to 1,460 and 1,606 tons respectively for the 700 model.

The XP MAXX product line was completed with the recent market introduction of a 990-size model, designed for use on 45-ton excavators. Genesis will be offering a new automatic-lubrication system on the 660 and 990 sizes.

As with all other models in the standard GXP mobile shear line, a continuous 360-degree rotation version of the MAXX shear is available.

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### Basic Specs: Genesis GXP MAXX Shears

	GXP 660 MAXX	GXP 990 MAXX
Shear Weight	13,300 lb.	15,400 lb.
Jaw Opening	32 in.	35 in.
Jaw Depth	32 in.	35 in.
Force @ 5,000 psi	1,475 tons	1,867 tons
Force @ 5,500 psi	1,625 tons	2,053 tons
Typical Reach	10' 5"	11' 3"

Source: Genesis Attachments

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# Market Watch Lite

By HEATHER BURLINGAME, Senior Production Editor

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## FCI

FCI's new battery-actuated, hydraulically operated Patriot In-Line crimping tool uses a nickel metal-hydride battery and incorporates a high-speed hydraulic pump that generates 6 tons of crimping force. The new tool, featuring a 350-degree rotating head for operation in a range of positions, uses the company's interchangeable MD6-Series jaws, which accommodate W- and X-style dies in the permanent D3 crimping groove. According to the company, the Patriot In-Line crimper provides a consistent and reliable connection on a range of copper and aluminum terminals and splices, overhead taps, full-tension splices and "deadends."

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## Bobcat

The Bobcat 8B chipper attachment is designed to reduce wood waste from trees, branches and limbs by a factor of 10:1. The attachment is available for use on Bobcat machines with a high-flow hydraulic system, including skid-steer models (S160H-S300H), compact track loaders (T180H-T300H) and the Toolcat 5600H utility work machine. The chipper's variable gpm setting allows it to operate within two flow ranges: 26-31 and 32-37 gpm. A "smart valve" slows the chipper's feed roller when its chipping-disc speed diminishes, then restores feed-roller speed when the disc recovers to full speed. The feed-roller system also is equipped with an auto-reverse/auto-forward feature to control material flow.

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## Putzmeister

Stop Stik is a spray-on solution that makes cleaning concrete equipment quicker and easier, says the company. Users spray it on surfaces before use, and a power washer rinses away concrete. The 11-ounce aerosol cans come in six- and 12-packs, and it is also available in 1- and 5-gallon bulk liquid packages for application with a pump sprayer.

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## Trimble

According to Trimble, the new Spectra Precision Laser HD50 Handheld Distance Meter uses a visible laser dot to allow one person to measure distances accurately in situations that provide limited access or that may be hazardous. The new instrument is accurate to plus-or-minus 1/16 inch at a distance of 165 feet.

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## Michelin

In designing the new XMCL off-road radial, Michelin chose a major shift in construction by replacing the Kevlar crown belts in its predecessors — the XM27 and XM37 — with a steel belt package. Michelin credits the steel crown belts and more heavily reinforced sidewalls with the XMCL's 46-percent longer life and 10-percent greater puncture resistance compared to the XM27. The new radial is designed in 12 sizes from 18 to 28 inches to fit backhoe loaders, compact wheel loaders and telehandlers — machines that Michelin says are sold with radial tires less than 10 percent of the time. For more details, see the report on page 75.

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# Market Watch Lite

## ▶ Karcher Industrial Products

The IB 15/80 Dry-Ice Blaster is designed for cleaning metal, plastic, wood and rubber surfaces by freezing and lifting off the unwanted material — whether grease, rust, paint, asphalt or mold. The system uses compressed air to propel tiny dry-ice pellets at supersonic speed. The dry ice flash freezes the contaminant, which then drops off and can be swept or vacuumed, and the dry ice dissipates into the air. The cleaner operates on 120-volt current and uses a blasting pressure of 44 to 230 psi. Compressed-air requirements range from 150 to 300 cfm. The Dry-Ice Blaster weighs 198 pounds and is made of stainless steel.

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## ◀ Hobart



Hobart Handler 187 MIG welder has seven-tap voltage selection control so users can make arc adjustments in fine increments, the company says. At 68 pounds, the unit outputs 25 to 185 amps and operates on standard 230/240-volt power. Four- or 8-inch spools of wire can be used, and a dual-groove drive roll holds .023 to .035 diameters. Suggested list price is \$820.

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## ▶ Topcon

Topcon 3Dxi GPS+ grade reference for excavators provides grade control. Four temperature-compensated 360-degree CAN-based tilt sensors measure angles from cab, boom, stick and bucket. The system includes two GPS+ antennae, GPS+ receiver, and GX-60 control box. GX-60 provides an in-cab display that shows operators where the machine is on-site and what the bucket position is. Unit can access both GPS and GLONASS satellites.

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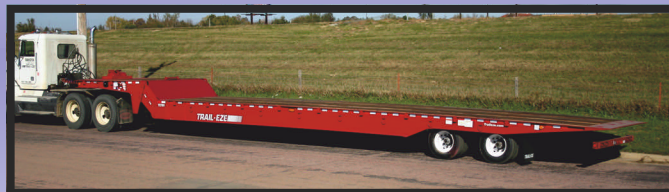
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### **Lincoln Electric**

Lincoln Electric's new website, [power-software.com](http://power-software.com), is available for fabricators who use Lincoln welding equipment that features Waveform Control Technology. The website offers free on-line software upgrades as well as the latest information, improvements and capabilities. The website also provides access to weld-set modes and personal-computer and diagnostic tools.

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### **Trimble**

The Spectra Precision Laser LG20 Crossbeam Generator from Trimble is a one-person tool designed to operate in both horizontal and vertical modes and to replace such items as the level, square, plumb bob, chalk and optical instruments in a variety of interior and exterior applications. The super-bright laser diode emits a sharp beam that can be seen at a distance up to 100 feet, and it operates to 250 feet with the Spectra Precision HR250 Receiver. The receiver features highly visible simultaneously front LEDs with a green on-grade indicator that can be easily seen indoors or outdoors, allowing one person to read elevation and alignment changes across the work area.

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### **DPL America**

Titan Equipment Monitoring is designed for remotely monitoring/tracking off-road equipment. Features include automatic and on-demand location reports; remote starter/disable capability; real-time reports of machine status (on, off, in-transit); hour-meter reporting with daily run-time log; service scheduling; and digital inputs for sensor alarms.

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# Market Watch Lite

## Lincoln Electric

The Lincoln Electric range of Pipeliner products has expanded with the addition of six new stick electrodes (7P+, 8P+, 17P, 18P, 19P and 20P). The 7P+ and 8P+ are cellulosic electrodes recommended for root, hot, fill and cap pass welding. They are designed for use in all-position welding. The remaining four electrodes are low-hydrogen types for fill and cap pass vertical up welding, recommended for DC+ use.

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## TieHook

A TieHook cleat “auto-mates” the process of securing ropes used to tie down loads to utility racks, truck beds or trailers. The device mounts vertically or horizontally on racks, flat surfaces and truck-bed rails, and is available with adapters for square and round utility racks and the latest pickup-truck rail systems. Tie-Hook eliminates complicated or poorly tied knots and makes loads more secure. Its locking cinch mechanism stands up to weather and road vibrations.

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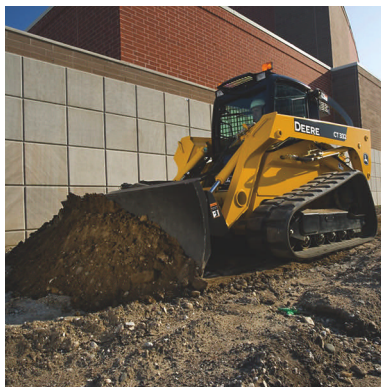


## John Deere

John Deere Worksite Pro DB84 and DB96 dozer blade attachments for skid-steer and compact-track loaders “transform” machines into compact dozers, says the company. Blades are 24 inches high with the DB84 measuring 84 inches wide and the DB96, 96 inches. Blades

have a 30-degree hydraulic angle and 10-degree hydraulic tilt. Standard is a reversible cutting edge and adjustable skid shoes. They are compatible with most other brands of loaders.

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## Volvo

The 16-liter Volvo Penta TWD1643GE diesel engine, says Volvo Penta, “is optimized for dual speed, 1500 and 1800 rpm, as required for the power-generation market.” Features of the engine include dual-stage turbochargers (each turbocharger working with its own charge-air-cooling system), a two-stage radiator and Volvo Penta’s electronic EMS 2 engine controller, which employs CAN bus technology and allows using either Volvo Penta engine-instrument and control equipment, or the user’s own instrumentation and controls via an interface in the EMS 2.

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## Lincoln Electric

Mobiflex Welding-Fume Extractor is a portable, low-vacuum system designed either for intermittent or continuous removal and filtration of welding fumes. Mobiflex filters contaminated air and circulates it back into the work area. The flexible extraction arms are available in lengths of 10 and 13 feet.

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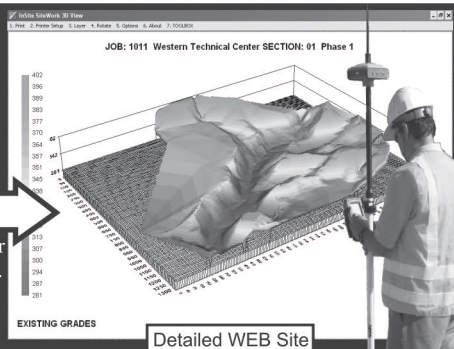
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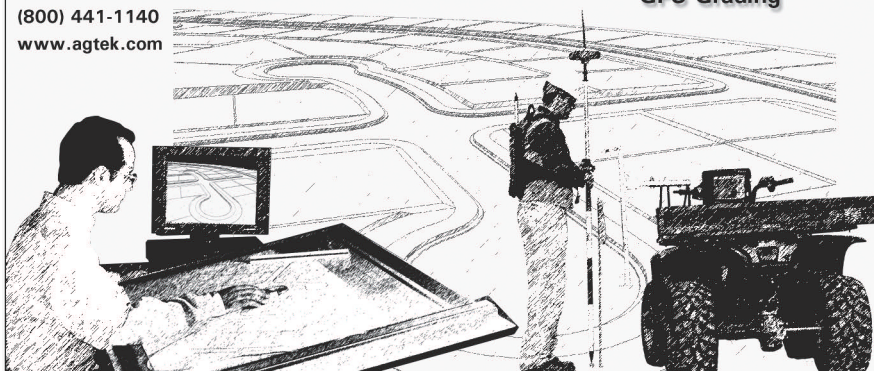
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# Iron Works

By KEITH HADDOCK, Contributing Editor

## Robbins H-100 Horizontal Drill

Heavy-duty blast-hole drill helped boost overburden production in surface coal mines

The Robbins H-100 was a high-production blast-hole drill employed by a number of surface-coal-mining companies in the Illinois Basin during the 1960s and 1970s. Starting with development work in 1960 as a joint project of Peabody Coal and the Robbins Drill Division of Joy Manufacturing, the huge drill was able to simultaneously punch two horizontal holes up to 10-5/8-inch diameter into the overburden. Rather than operate in the conventional manner from the top of the bench and drill vertical holes, this machine worked from the base of the high wall in the previously mined-out cut and drilled horizontal holes directly into hard overburden requiring blasting. In the right geological conditions, the H-100 horizontal drill offered several advantages including reduced explosives usage and greatly reduced drilling footage, translating into lower costs when compared to the vertical method.

The Robbins H-100 had an operating weight of 185 tons and was available with diesel-electric or straight electric drive. The drill unit with independent twin masts could drill one or two holes simultaneously for a depth of 150 feet into the high wall. Pressure on each bit was 90,000 pounds provided by horizontal hydraulic cylinders. Each was equipped with its own Joy rotary screw air compressor, water system, and 100-hp reversible electric motor providing rotation through a 2-speed transmission. Each drill mast could be raised or lowered to operate up to 10 degrees above or 12 degrees below the horizontal.

The upper works carrying the twin masts was mounted on a 2-crawler undercarriage fitted with 42-inch shoes. Each crawler assembly was independently driven by a reversible hydraulic motor. The operator controlled all functions from his state-of-the-art cab fitted with indicator lights showing the status of the various drill functions including hole depth, drill pressure and rotation speed.



**Robbins H-100 horizontal drill was able to simultaneously punch two horizontal holes up to 10-5/8-inch diameter into the overburden.**

The drilled holes were loaded with a special machine called a hole tamper. Designed by Robbins, the machine was mounted on a crawler tractor such as a Caterpillar D6. It consisted of a table supporting a series of square-section wooden poles hinged together in concertina fashion. A rubber-tire friction drive drove the poles horizontally into the hole pushing the detonator and explosives into position.

Robbins Drill Co. began producing rotary blast-hole drills in 1952. Davis Robbins was heavily involved in the repair of heavy stripping equipment for an operating coal company. He experienced high costs of drilling and blasting overburden up to 135 feet deep with existing machines, and called for new technology. When no one would build the drill he required, Robbins started his own drill-manufacturing company using his creative ability and industry knowledge. Throughout the 1950s and 1960s, Robbins developed a full line of crawler and truck drills including diesel hydraulic, diesel electric and all-electric models. Because Robbins provided excellent field support, distributor backup, and parts availability, his machines became popular, not only in coal-producing regions, but also in rock quarries, iron-ore mines and construction.

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*You can read more about historical surface-mining equipment in Keith Haddock's illustrated book "Extreme Mining Machines" available in most bookstores. Also, consider a membership in the Historical Construction Equipment Association, [www.hcea.net](http://www.hcea.net). Visit [ConstructionEquipment.com](http://ConstructionEquipment.com) for past Iron Works features and for an opportunity to submit photos of your oldest machines to our Gallery.*

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### Market Watch: Volvo

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

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