Reed Business Information.

40 Bust extended-life coolant myths



50 Heavy lifters perform the grunt work



63 We shine the spotlight on HDD's latest



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May 2007
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Trends in Trucks

Exclusive research uncovers strategies for managing pickup lifecycles

p. 30

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CONSTRUCTION EQUIPMENT

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Cover photo supplied by General Motors ©

FEATURES

EXCLUSIVE RESEARCH REPORT

30 More Bang for the Truck

Earlier this year, *Construction Equipment* surveyed equipment owners to determine how pickup trucks are acquired, specified and managed. Equipment-management strategy has shifted in recent years from maintenance-oriented to asset-oriented. Most managers today treat their fleets as capital investments.



MAINTENANCE MANAGEMENT

40 Bustin' the Myths of Extended-Life Coolant Care

Extended-life coolants (ELC) have been used in the construction industry for at least a decade, yet misunderstandings and myths still persist in the field. Contributing Editor G. C. Skipper interviews several industry experts to get to the bottom of some of those myths. For example, according to Elizabeth Nelson of Polaris Labs, you can't just put ELC in a unit and forget about it. "If you do," she says, "it's like playing Russian roulette. It doesn't matter what the product is; if you don't pay attention to it, you are going to have a premature engine failure."



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SPECIAL REPORT: MANAGEMENT

44 Solid Safety Stance





Safety requires more than lip-service. It must have ownership from the top down as well as from the bottom up. A work site is a dangerous place, but it doesn't have to be an unsafe place. We report on six specific dangers on a work site that may seem obvious, but also may be easily overlooked.

BUYING FILE

50 As Market Finds Way, the Big Shift Is On

Rough-terrain, straight-mast forklifts are finding a niche with lift capacities rarely considered in the past with this equipment type. Placing a load with a long reach may often now be the telehandler's job, but when it comes to pure grunt lifting, the rough-terrain forklift could be the heavyweight champ.



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Editorial Staff
Rod Sutton, Editor in Chief
630/288-8130; rsutton@reedbusiness.com
Larry Stewart, Executive Editor
314/962-0639; lstewart@reedbusiness.com
Walt Moore, Senior Editor
630/288-8132; wmoore@reedbusiness.com
Mike Anderson, Senior Editor
519/986-1789; michael.anderson@reedbusiness.com
Katie Weiler, Managing Editor
630/288-8142; kweiler@reedbusiness.com
Tom Berg, Truck Editor
Mike Vorster, Contributing Editor
Preston Ingalls, Contributing Editor

Publishing Offices
Reed Business Information, 2000 Clearwater Drive, Oak Brook, IL 60523; Fax: 630/288-8185
Rick Blesi, Publisher
Dawn Batchelder, Marketing Coordinator
Heather Burlingame, Web Editor
Bruce Ksiazek, Director of Finance
Karen A. Ruesch, Production Director
Victoria Jones, Production Manager
Allison Ternes, Circulation Manager
Bill Patton, Creative Director
Mary Sondergaard, Art Director
Monina Tan-Pipilas, Production Artist

Sales Representatives
Mary Adee, Regional Manager
630/288-8134; Fax: 630/288-8185
madee@reedbusiness.com
Michelle Lorusso, CBC, Regional Manager
770/209-3623; Fax: 630/288-8185
mlorusso@reedbusiness.com
Terry McGinnis, Regional Manager
801/273-8790; Fax: 801/273-8799
tmcginnis@reedbusiness.com
Michael Ostrowski, Regional Manager
630/288-8139; Fax: 630-288-8185
michael.ostrowski@reedbusiness.com
Jan Varnes, Account Representative
630/288-8143; Fax: 630/288-8185
jan.varnes@reedbusiness.com
Mike Hancock, International
Tel: 011 44 208/652 8248

Spec Check: Spec-Check.com
Bill Borthwick, Manager Product Analysis
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America Idles

For morning exercise and a quiet start to a busy day, a walk around the junior-high track works wonders for the soul. Today, though, we passed one of the Park District's pickup trucks idling on that same track while workers prepared the long jump pit for tomorrow's meet.

It ran for the 15 minutes we were there, and probably until the pit was finished.

According to the EPA, we idle away some 220 gallons of diesel every five seconds, mostly in over-the-road haulers and locomotives. Of course, that number also includes off-highway construction equipment, too.



Rod Sutton, **Editor in Chief**

In the past few years, numerous states and counties have enacted anti-idling laws aimed at mandating the practice, or shall we call it a habit, of turning off the engine when it is not needed. Cook County's law, which includes Chicago, reads thusly: "It shall be unlawful for any person to cause or permit the operation of the main engine of any motor vehicle when parked or standing." This is followed by a bevy of exceptions, including "whenever operation of the main power train is essential to a basic function" such as in cement trucks and aerial-work platforms.

When reading the list of exceptions, most would identify them as common sense. But common sense would also suggest that workers not leave pickups idling while they dig in the sand.

On April 4, the U.S. Supreme Court gave the U.S. Environmental Protection Agency the authority to regulate carbon monoxide emissions from vehicles.

After reading dozens of news reports and opinion pieces on this decision, we're convinced that the nation remains sharply divided on the role of government in this issue. But the Court has lessened that restraint, and the drum beat for emissions regulations has already increased.

We can engage in debate surrounding ethanol, mandated diesel retrofits, and Al Gore, but we are all called to be stewards of the planet. If you consider yourself, and your fleet, in that mindset, it is common sense to stop unnecessary idling of your engines. Train your own truck drivers to turn off engines, and push for a training program for other operators and drivers in your organization.

It will reduce fuel costs, engine wear, and noise. And it just might keep government out of your business.

Rod

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A SUMMARY OF THE MONTH'S PRIMARY MACHINE INTRODUCTIONS AND MODEL CHANGES

MARKET WATCH



p.18

By KATIE WEILER, Managing Editor

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Volvo

The L60F, L70F and L90F wheel loaders are designed to enhance performance and operator comfort, compared with their E-Series counterparts. The new loaders use the 5.7-liter, six-cylinder Volvo D6E diesel engine, which develops 158, 171 and 175 gross horsepower, respectively. The engines are designed, says Volvo, to deliver high torque at low speeds, thus conserving fuel. Approximate top-end operating weights for the machines are, respectively, 27,000, 31,000 and 37,500 pounds.

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Stone

Rhino 84X vibratory roller marks the company's move into heavy compaction, giving it an 84-inch roller that joins the 43-, 54- and 66-inch models. The 12-ton roller provides up to 63,000 pounds of compaction force, with a low range of 42,743 pounds. Power is provided by a 130-hp Cummins water-cooled diesel. ZF no-spin differential axle delivers maneuverability and climbability, the company says. Optional padfoot conversion kit is available.

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Custom Equipment

At an operating weight of 1,170 pounds, the HB-1030 is not only the smallest self-propelled scissor lift aerial platform on the market, it is also the lightest by about 800 pounds. The company designed the electric-drive HB-1030, with a maximum platform height nearly 5 feet lower than any other machine, specifically to work on weight-restricted flooring. The machine has a 60-x25-inch platform and will lift 750 pounds.

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Gehl

The RS5-19 is a compact, low-profile telehandler with a rated lifting capacity of 5,000 pounds and a boom reach of 19 feet 1 inch. (Overall height is 6 feet 4 inches.) It uses a 64-hp Deutz diesel engine, and its two-speed hydrostatic transmission features an inching valve. Three-mode steering is standard, as is an auxiliary hydraulic system, which incorporates an inching valve and provides flows to 22 gpm.

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Genie



The Z-40/23N self-propelled articulating boom aerial-work platform is 4 feet 11 inches wide to fit through standard-sized double doors. Turning radius is 2 feet 11 inches. Up-and-over maximum clearance is 21 feet 3 inches; maximum working height is 46 feet 5 inches; and maximum horizontal reach is 22 feet 8 inches. The machine weighs 15,230 pounds.

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Caterpillar



Replacing the 446D, Caterpillar's 450E backhoe-loader falls in the 17-foot dig-depth class and is the largest backhoe-loader in the line. It is powered by a 124-net-hp Cat C4.4 electronically controlled Tier 3 engine, which has 21 percent more horsepower and 10 percent more torque than its predecessor. New Cat axles and modified transmission increase top travel speed 25 percent to 25 mph. The new extendible stick features an external slider design.

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Isuzu Truck

Isuzu 2008-model Class 3, 4 and 5 N series low-cab-forward trucks offer a steel cab with new mounts that filter out vibration; doors about 4 inches wider for easy entry and exit; new gauges and dashboard; behind-seat storage boxes; and standard power windows and door locks. The 5.2-liter, four-cylinder diesel uses exhaust-gas recirculation, advanced fuel injection, and exhaust aftertreatment to comply with federal and state emissions laws.

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Hitachi



Zaxis 17U-2 can travel through passageways as narrow as 40 inches, thanks to adjustable-width tracks and a backfill blade with foldable end sections. In its standard configuration, net power is up from 12.3 to 14.6 horsepower; operating weight increases from 3,814 to 4,173 pounds; and maximum lifting capacity over the front is up from 864 to 2,158 pounds. Maximum dig depth increases by 1 inch to 7 feet 1 inch.

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Ditch Witch

Model 420sx vibratory plow is said to borrow technology from the walk-along 410sx, but adds riding capability, greater horsepower (40 hp), and several features that other articulating plows in its class do not have. One of those features is its dual-speed attachment drive; another is its fold-down ROPS, which reduces the unit's height by 18 inches. The plow is designed to install lines up to 3 inches in diameter and up to a 24-inch cover depth.



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Market Watch



Komatsu

Improvements to PC300LC-7 and PC400LC-7 hydraulic excavators include enhanced productivity, better fuel economy, reduced sound levels, and solid reliability. Serviceability has also been facilitated by the location of the radiator and hydraulic oil cooler, mounted side by side. Operating weights range from 73,432 to 77,298 pounds on the smaller unit, and from 95,901 to 101,684 pounds on the larger. Flywheel horsepower is rated at 246 and 345, respectively.

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Caterpillar



With an operating weight of 34,381 pounds, the 953D track loader features a 148-net-hp Cat C6.6 ACERT diesel engine. The 953D's hydrostatic drive system, which provides infinite speed variation to 6.2 mph, employs two variable-displacement hydraulic pumps and two variable-displacement, bent-axis motors. Capacity for the general-purpose bucket is 2.42 cubic yards.

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Terex

The four-wheel-drive PT2000, PT3000 and PT4000H site dumpers are nimble on rough terrain, with articulated steering controlled by a single joystick. The 33-hp PT2000 and 43.2-hp PT3000 haul 4,409 and 6,615 pounds of payload, respectively. The PT4000H will haul 3.22 heaped cubic yards, with payload capacity of 8,820 pounds.

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Wacker

Wacker launched a new generation of asphalt rollers with the 1-ton RD 12-90 and 1.5-ton RD 16-90. The RD 12's compaction force increased 15 percent with more exciter frequency for faster travel speeds. The 2,490-pound unit with 35.4-inch drums comes with a 20.5-hp Wacker engine. The 3,274-pound RD 16-90 is powered by a 26.8-hp Lombardini diesel and offers dual drum vibration. With both drums vibrating, it can produce up to 6,800 pounds centrifugal force.

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Manitou

MT 732 telehandler is powered by a Tier II Perkins 84-hp naturally aspirated engine. Patented load-placing system (LPS) joystick controls have dual-linked joysticks for both lift and place controls, as well as directional control of the transmission. The left hand is free to steer. Power shuttle transmission has four forward, four reverse gears, and shift-on-the-fly capabilities.

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Volvo

The two newest excavators from Volvo are models EC160C, with an operating-weight range of 37,830 to 42,760 pounds; and EC210C, with an operating-weight range from 46,920 to 51,200 pounds. Both use a Tier-3 Volvo D6E diesel engine, rated at 117 and 147 horsepower, respectively. Maximum dig depths for the units are 21.1 and 24.0 feet, respectively. Compared with B-Series counterparts, the new models feature refined hydraulic control, improved operator's cabin, and strengthened undercarriage design.

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Komatsu

The GD655-3 motor grader comes equipped with a Komatsu Tier 3 turbocharged engine with variable horsepower of 180 to 200. The Komatsu power-shift transmission provides on-the-go, full-power shifting, inching capability, and automatic shifting in higher ranges. Operators can choose either direct drive or torque-converter drive; eight forward speeds and four reverse provide a wide operating range. The machine weighs 33,950 pounds and has a blade width of 12 or 14 feet.

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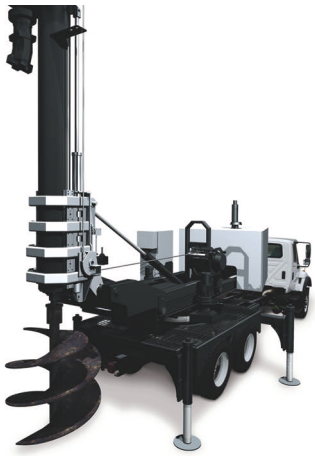

Bay Shore Systems

The LoDril Truck Rig features a LoDril LLM-40 mounted on an International 7600 truck chassis. It has a drilling depth of up to 40 feet and a drilling diameter of up to 60 inches. According to the company, the rig will pack 24,000 ft.-lbs. of torque and will be able to travel between jobs at full highway speed. The rig also operates with clearance under 21 feet.

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Mack Trucks

Mack has redesigned its heavy-duty MR low cab-over-engine model with more room for the driver and plug-in electrical hookups for bodies and accessories. Now called the TerraPro Cabover, the truck's cab has a new interior with a lower engine cover for better view to the right, repositioned steering column for more belly room, integrated armrest, better seats, new gauges and indicator lights, suspended pedals, easy-to-reach parking brake valve, head/tail light controls reachable from the ground, and more. In-cab and behind-cab plug-in connectors ease wiring of controls, body lights and power equipment. The chassis is available with multi-axle configurations, Mack's Camelback or M-Rod tandem suspensions.

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Case

CX B series excavators are 20 percent more fuel efficient than their predecessors, the company says. Models CX160B, CX210B, CX240B and CX290B are the first to be introduced. Horsepower ranges have been boosted 17 percent, powered by Tier III Isuzu engines. Cab noise has been reduced by 4.7 dB(A); exterior noise by 3.0 dB(A). Maintainability, measured by the SAE score, was improved 39 percent, Case says.

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Liebherr

The R 924 Compact (minimal-tail-swing hydraulic excavator) is designed for work in applications in which space is restricted. It has a reach of 32 feet 10 inches, a dump height of 28 feet 3 inches, and handles buckets in the range of 0.46 to 1.57 cubic yards. The R 924 Compact weighs between 52,690 and 58,643 pounds, depending on configuration, and uses a four-cylinder Liebherr diesel engine rated at 164 horsepower.



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Toolbox Tips

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May 2007

No. 25 in a Series

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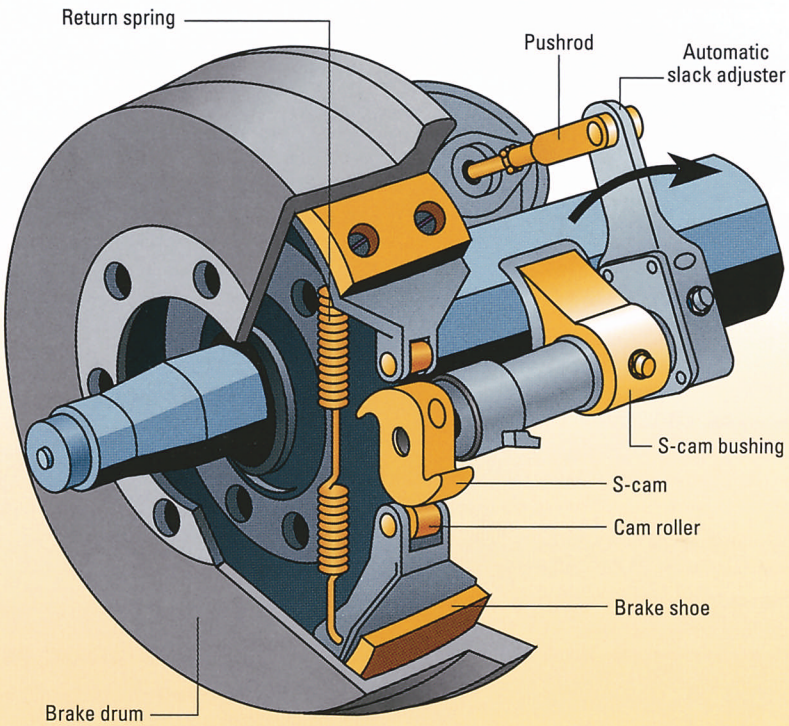
Reliable, Low-Cost Braking Is a Matter of Discipline

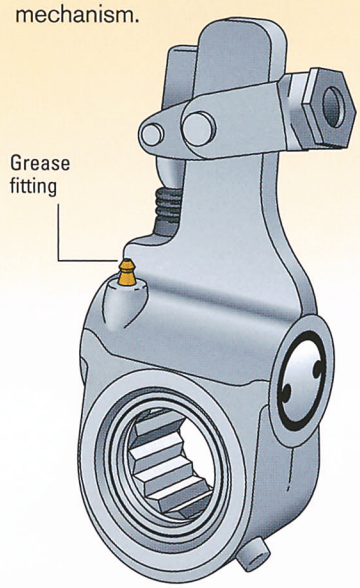


Measure Elusive Wear

Air S-cam brakes are remarkably reliable, considering the force they must withstand. Inspect them for wear–not only the obvious shoe and drum wear, but also hard-to-see wear in the slack adjuster, S-cam bushing, cam and roller–by measuring push-rod stroke. The Commercial Vehicle Safety Alliance recommends how to measure pushrod stroke in this online document: **http://www.cvsa.org/resourcecenter/publications/7978_air_brake.pdf.**

"Automatic" doesn't mean "maintenance free"

Automatic slack adjusters (ASAs) should be greased with regular preventive maintenance on brakes. However, manual adjustment of the ASA should not be part of that PM. Except in unusual circumstances, the need for manual adjustment is a symptom of an underlying problem. Possibilities include excessive wear on other brake components or failure of the slack adjuster's clutch mechanism.



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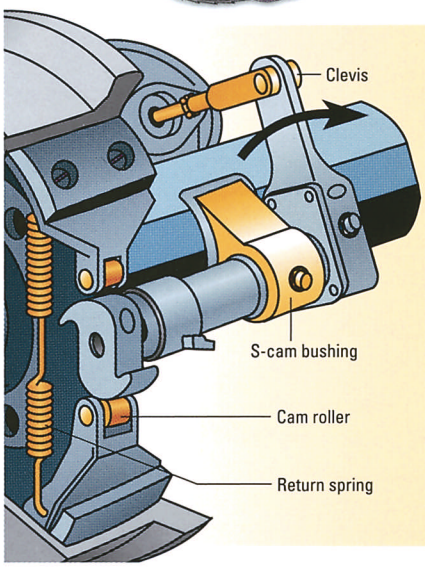
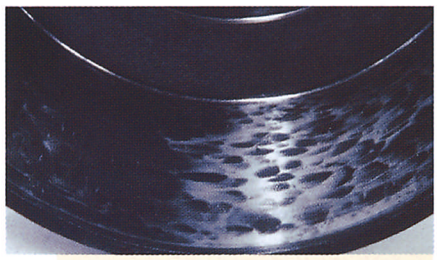
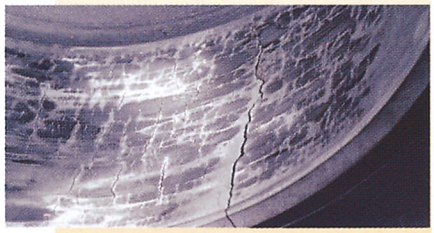


Reusing Parts Is False Economy

Tired springs and wear to the S-cam rollers, clevis pin, and bushings hamper brake performance and can lead to more frequent, more costly repairs in the future. If you're replacing the shoes, replace the hardware, too.



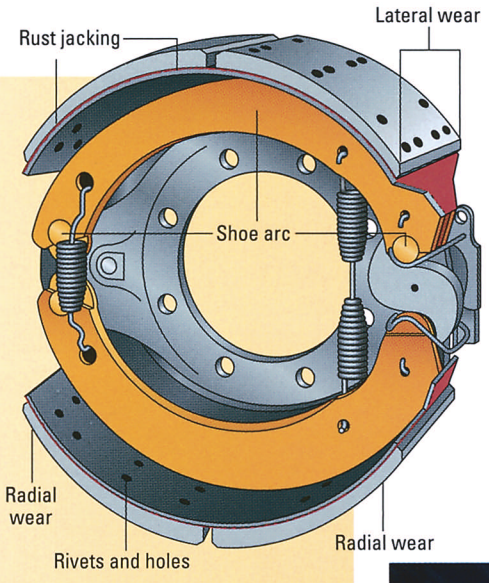


Analyze Heat Damage

Heat damage (discoloration, cracking) occurs when one brake is doing more than its share of the work. The imbalance may be because that brake is set too tight (insufficient clearance), or because the others are set too loose. Martensite (top) is a type of heat damage that forms during light braking applications. The eventual outcome is cracking.

Inspect Shoes Carefully

Inspect shoes for radial wear (around the circumference) and lateral wear (side to side), loose rivets or elongated holes, and rust jacking. Replacement shoes must have the correct friction material to preserve balance and braking performance. Properly burnishing new shoes is important; make sure drivers understand how. Don't assume relined shoes meet the spec; measure the arc and check the mounting points to confirm their suitability.





Edge Markings Are Only a Guide

A key consideration in maintaining brake balance is using the specified friction material on all wheels. In theory, edge markings tell you the coefficient of friction for the shoes. In practice, however, friction characteristics vary considerably. Shoes with the same rating from a single manufacturer can have measurable differences in performance. Even two blocks of friction material from the same shoe can have different characteristics.

It's hard to manufacture friction materials that have high homogeneity, that is, materials where the mix of resin and frictional fibers are consistent throughout. The best way to minimize variations is to:

- Buy all shoes from just one manufacturer.
- Buy all the shoes needed for one brake job at the same time from the same vendor to reduce the likelihood of inconsistencies between batches of friction materials.
- Avoid one-wheel brake jobs, and consider relining all the brakes in an application–such as all four brake sets on a truck's tandems–at one time.

Tool Box Tips are not to be used in lieu of the manufacturer's manuals.

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**Source: Michelin Research Center. Compared with XM27 tire.*

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MANUFACTURER NEWS

Burkeen Brand Underground Products to Carry On

Burkeen Corp. of Winder, Ga., recently purchased the Burkeen line of underground construction products with the intention of resuming production for all models. "We will have all models put back into production over the next two years," says co-owner Michael Barnes. Burkeen Corp. has no relationship with the defunct Burkeen Manufacturing, which had developed a full line of walk-behind and ride-on trenchers and plows over a 20-plus-year period. The new ownership group will continue with the Burkeen name for the product line, says Barnes.

For a look at the HDD sector of the underground market today, see Spotlight on page 63.

IRON WORKS

"Old Iron" at Work, on Display

The Quinebaug Valley Engineers Association (QVEA) and the Northeast Rockbusters Chapter of the HCEA will co-host the 22nd Annual International Convention and Old Equipment Exposition at the Zagray Farm Museum in Colchester, Conn., July 20-22, 2007.



HCEA's convention features old iron in the dirt, usually operated by machine enthusiasts.

Hundreds of pieces of equipment will be featured. Some will be on display; others will be put to work in the dirt by equipment enthusiasts. The featured machine for 2007 is a 40-ton Northwest Model 80-D cable-operated shovel.

For more information, visit www.hcea.net or www.qvea.org, or e-mail hcea2007@yahoo.com or info@hcea.net.

ENGINE NEWS

Cummins Approves B20 Biodiesel

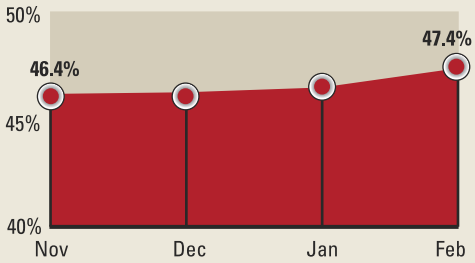
Cummins approved biodiesel B20 blends for use in its 2002 and later emissions-compliant ISX, ISM, ISL, ISC and ISB engines. This includes recently released 2007 products. Cummins says it is able to upgrade its previous position, which limited use to B5 blends, to B20 for three key reasons. First, the American Society of Testing Materials specification ASTM D6751 now includes an important stability specification for B100 biodiesel. Second, the availability of quality fuels from BQ-9000 Certified Marketers and Accredited Producers is growing rapidly; and third, Cummins has completed the necessary testing and evaluations to ensure that customers can reliably operate their equipment using B20 fuel.

The popularity and use of biodiesel fuel continues to climb. Recent studies predict that by 2008, 1.2 billion gallons of B100 biodiesel will be produced in the United States. Find out more about Cummins at www.everytime.cummins.com.

MANAGEMENT

Equipment Values up 2.1%

The Rouse Value Index
(Avg. orderly liquidation value as % of cost)

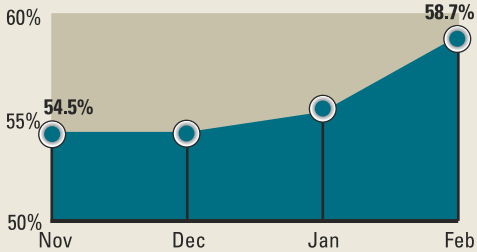


Note: Orderly liquidation value is expressed as a percentage of replacement cost (average cost paid for a new unit by large rental companies and dealers) for the average age of equipment within that category. Includes 10 categories of equipment common to rental fleets.

Source: Rouse Asset Services

Average February sales values for used equipment typically operated in rental fleets have risen 2.1 percent from November numbers.

Skid-Steer Values Jump
(Avg. orderly liquidation value as % of cost)



Of the 10 equipment categories typically owned by rental firms, skid-steer loaders registered the greatest jump in OLV, moving up 6.9 percent over January. For more information, visit www.rouseservices.com.

ASSOCIATION NEWS

AEMP Rewards Top Equipment Pros

The Association of Equipment Management Professionals (AEMP) set aside time during a busy conference schedule at its 25th Annual Meeting in Corpus Christi, Texas, to recognize people who exemplify peak performance among equipment managers and technicians:

FLEET MASTER:

Dale Warner's most recent accomplishment has been saving about $3.5 million over the past three years from C.J. Miller LLC's equipment operations. In 26 years as an equipment manager, Warner has developed systems and disciplines necessary to measure machine usage and severity using fuel consumption. He finds the measure more effective for managing service, predicting repairs, and replacing machines than hours or miles of use.



Dale Warner, of C.J. Miller, won the 2006 Fleet Masters Award, co-sponsored by AEMP and *Construction Equipment* magazine. Warner, center, accepted the award along with members of the executive team of C.J. Miller.

TECHNICIAN OF THE YEAR: PUBLIC

Bruce Nelson, a technician with the Virginia DOT since 1998, graduated from Nashville Auto Diesel College in 1980 but has never stopped learning. He maintains ASE Certifications including Master Automotive with eight certifications, Master Medium & Heavy Duty Truck with seven certifications, Master Truck Equipment with three certifications and certification in Advanced Level Truck Diesel Engine Diagnosis — 19 ASE certifications in all.

TECHNICIAN OF THE YEAR: PRIVATE

Mark Adduce had earned a bachelors degree in biology when he realized his interest in taking things apart and putting them back together was better suited to equipment mechanics than to the medical degree that he was pursuing.

Adduce is now a reliability technician with Ryan Central, in Janesville, Wis. He's responsible for the company's telemetric program, and uses it to ensure that Ryan's equipment works as it should. In daily diagnostics, Adduce has incorporated sophisticated technologies such as thermography, vibration analysis, elemental and LPC analysis.



Mark Adduce (center) of Ryan Central accepts his Technician of the Year Award from Bob Decker, chair of the AEMP Foundation, and Roger Mohr of John Deere.

MANUFACTURER NEWS

Ford Power-Stroke's Shaky Future

Ford sued Navistar, supplier of diesel engines for SuperDuty trucks, in late January, claiming that Navistar hadn't shouldered its share of engine warranty expense and that it had improperly raised prices. Navistar, parent company to International Truck and Engine, responded by threatening to idle the Indianapolis plant where it makes the 6.4-liter diesel PowerStroke and ceasing shipments to Ford's Louisville Super-Duty plant.

An Oakland County, Mich., Circuit Court judge subsequently issued a 30-day temporary restraining order that required Navistar to resume shipments. Ford is seeking an injunction to extend that requirement until resolution of the warranty suit.

The popular Super-Duty trucks comprise about 40 percent of Ford's F -Series truck sales and are profitable products. The struggling No. 2 U.S. auto maker launched a redesigned SuperDuty line this year.

— LARRY STEWART



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KA09

HEAVY EQUIPMENT FORUM

Is Biodiesel Gaining Acceptance?

User #1: Any of you running biodiesel in your equipment?

User #2: The price of corn is going through the roof here [in Australia], (up 81 cents at the farm gate) as it can be used for bio-fuels. Canola is currently the No. 1 "raw" source for biodiesel.

User #3: I don't think using used cooking oil is wise. I think it would have problems with contaminants.

I have soydiesel available in my area. I think new vegetable oils are the way to go.

User #2: Like it or not cooking oil is a huge problem to dispose of, a huge source for biodiesel, and very widely used. Google "biodiesel"; there are reams of information.

User #4: Will the biodiesel run in eletronic injectors as well as mechanical injectors?

User #5: I'd like to see in writing what a [engine] manufacturer's position is on this and what effect it will have on the newer engines' components and their warranty.

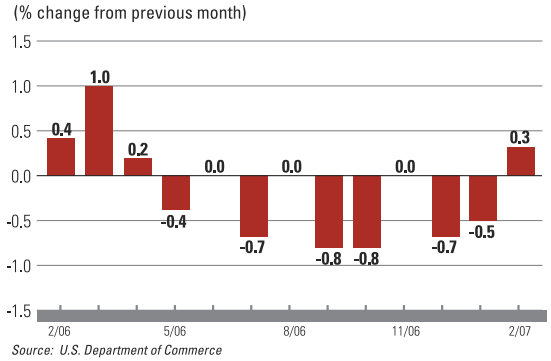
I'm no expert on fuel chemistry, refining, blending, but it seems to me that increase in use of bio-fuel comes at a bad time when manufacturers are introducing new-technology Tier 3 engines.

User #6: Most equipment manufacturers either openly endorse B5 or tacitly allow its use. They're all striving toward proving that B20 is OK, too. Why? Because B5 is commonly in use in Europe and other parts of the world, and B20 is rapidly becoming more common. Their engines are already burning the stuff.

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

STATUS & FORECAST

TOTAL CONSTRUCTION SPENDING



Source: U.S. Department of Commerce

Spending rose 0.3 percent in February after declining slightly over the previous eight months. A few more months of modest decline or no change are likely before a slow rebound in construction activity begins. This will be driven by a turnaround in residential construction when the excess inventory of homes for sale is reduced to a near-normal level. Contractor purchases and rentals will stay near the current depressed level into the summer.

For the full text of this month's economic analysis, check Economic Outlook at Construction Equipment.com

INDUSTRY NEWS

LoJack Reports Say Theft Is Rising

LoJack's sixth annual Construction Equipment Theft Study, an analysis of LoJack stolen-vehicle recovery reports for calendar 2006, indicated that more than $18.6 million in stolen construction-equipment assets were recovered. It is an increase of more than 18 percent compared to 2005.

Activity of professional theft rings rose again in 2006, with law enforcement discovering 14 theft rings and chop shops (compared to 11 in 2005) by tracking and recovering stolen equipment equipped with the LoJack System.

"Professional thieves see construction theft as a low-risk, high-reward theft opportunity," said Richard T. Riley, LoJack's chairman and CEO. "...Since construction equipment carries a hefty price tag, the rewards for thieves are high. That's precisely why equipment owners need to have a solid action plan to protect their equipment and their businesses from theft. That plan should involve keeping good records of all equipment, employing as much physical security on the jobsite as possible and using products that not only deter thieves, but also track and recover equipment if it is stolen."

Since LoJack entered the construction market in 2000, the company has recovered nearly $70 million in stolen construction equipment.

Popular Equipment = Popular Theft Targets

Types of LoJack-equipped machines most frequently stolen

1. Backhoe-loaders, skip loaders, wheel loaders
2. Skid-steers
3. Generators, air compressors, welders
4. Forklifts and scissor lifts
5. Light towers
6. Light utility/work trucks
7. Trailers

Source: LoJack

These equipment types represent more than 70 percent of all construction equipment recoveries documented by LoJack in 2006.



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By ROD SUTTON, Editor in chief



More Bang for the Truck

Managers of pickup trucks must determine whether to run them into the ground or treat them as any other equipment asset, watching costs and optimizing residual value

Earlier this year, *Construction Equipment* surveyed equipment owners to determine how pickup trucks are acquired, specified and managed. The accompanying charts provide a skeleton, or snapshot, of how equipment managers responded. In subsequent interviews, we attempted to hang some flesh on those bones to determine how pickups are managed.

And that started the debate: Drive pickups into the ground, or manage costs to obtain maximum resale value?

Equipment-management strategy has shifted in recent years from maintenance-oriented to asset-oriented. Most managers today treat their fleets as capital investments. In some cases, the equipment fleet captures as much as 80 percent of the organization's capital dollars. When an equipment-using organization acknowledges this, the fleet of machines shifts from being simply consumable tools to being assets. Assets retain value, require management over their lifecycle, and carry a residual value that can be maximized at disposal.

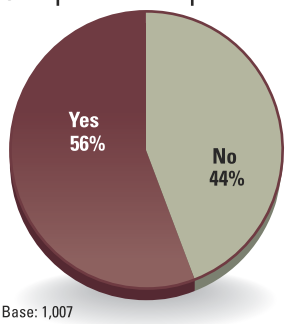
Two divergent management philosophies exist for pickup trucks. Traditionally, these trucks have been used up, rotated down, and tossed aside. Senior-level managers receive decked-out new trucks (usually as part of a benefits package), and trucks move down the ladder as they age or deteriorate. Low-level functions end up with the rusty cast-asides until the trucks became too expensive to justify. Residual value is nil.

At the other end, equipment managers attempt to do as recommended by Mike Vorster, David H. Burrows Professor of Construction Engineering & Management at Virginia Tech and author of *Construction Equipment's* "Equipment Executive" column.

"Cars and pickups must be in their own separate group so that they can be caused to balance their own books," Vorster says. "Costs for different groups are incurred and recovered in different ways, and there are frequently different financial expectations for each group." Many managers already do this with the heavy-equipment fleets; pickups can be managed the same way in order to capture the vehicle's peak residual value at point of disposal.

Of course, these are opposite ends of a management spectrum that allows a mixture of the two strategies. One example is a long-term mining operation in which pickups no longer need travel over the public roadways. Tags are removed, and the truck spends the rest of its

Pickups Disposed Before Major Components Replaced



Base: 1,007
Source: Construction Equipment
2007 Pickup Truck Usage Study

Managers who want to optimize residual value try to dispose of their pickup trucks before major components fail.



Lifecycle Data
(Avg. miles before major repair, rebuild or replacement)

Tires	38,133
Batteries	63,958
Brakes	46,409
Exhaust	90,701
Air conditioning	93,862
Suspension	94,926
Gasoline engine	159,416
Diesel engine	235,657
Transmission	140,545
Differential/transfer case/axles	165,955

Note: 28,029 miles driven per year, on avg.
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Lifecycles for major components, even though some 40 percent of trucks are disposed of before replacement, indicates the useful life of a pickup truck. Of course, these are industry averages, so actual numbers will vary by application and management philosophy.

Pickup Usage Varies by Size
(% who operate each type of truck)

	Compact	½-Ton	¾-Ton	1-Ton & Supers
Transportation for management	51	63	31	13
Transportation for workers/laborers	28	44	53	30
Pulling trailers/other equipment	2	13	50	67
Running errands	55	46	29	10
Transporting fuels/lubes	7	15	30	34
Transporting tools	11	25	46	45
Transporting parts	18	31	37	26
Other hauling tasks on jobsites	11	21	38	51

Source: Construction Equipment *2007 Pickup Truck Usage Study*

Smaller trucks are used for transporting people and running errands. Larger trucks, not surprisingly, pull heavier duty, including being outfitted with lube or service bodies.

useful life running around the mine. The mine management has determined up front not to be concerned with residual value.

The peak-residual-value strategy requires purchasing the truck at the right price and disposing of it at the right time to reduce ownership costs and maintenance expense, says Brad Allen, manager of procurement shared services for MDU Resources Group. "You haven't worn it out, and it hasn't broken," he says.

Key to managing for peak residual value is properly specifying the truck for its function. MDU works with each of its four subsidiary operations to develop the need around which specifications are built. "Once we define need, we try to find the best spec for that unit," Allen says. "Instead of running [a truck down] through multiple applications and keeping it 10 or 15 years, we've tried to keep it narrow.

The parts runner may get a newer, fuel-efficient vehicle instead of a hand-me-down with 200,000 miles."

One need that has diminished among some fleet-owning organizations is the inclusion of a pickup truck in employee benefit packages. Some are moving away from supplied vehicles altogether; others are moving from pickup trucks to SUVs and automobiles. In either case, equipment managers can more ably focus on function for their pickup trucks. At Hubbard Construction, management has chosen to put salespeople and upper managers into more fuel-efficient vehicles, including sedans, says Steve Ricke, division manager equipment/construction services.

"We're using vehicles more efficiently," Ricke says. "[In the past,] you would see 15 trucks; now, you'd see a pool truck. Company vehicles just aren't there. We're pushing senior management from Expeditions to Ford 500s. Expeditions are not even in the spec for executives."

"It's a tool, not a retention device," says Matt Miller, executive vice president, Hawkins Construction. Although Hawkins offers trucks as a benefit, Miller says the company looks closely at function when specifying pickups.

Those who work in the heavy/highway functions typically work out of 3/4-ton pickups. "They're off-road more; the trucks are spec'd heavier," Miller says. "A building guy, doing commercial buildings and driving on the road, will get a half-ton. A half-ton saves on the purchase price and gas mileage."

Specialty functions, such as service applications, usually require 1- or 1.5-ton pickups, often fitted with specialty bodies (see table). Equipment managers say specifying the truck for the function enables them to accurately set useful life and, consequently, accurately determine the truck's peak residual value. Many call this the "sweet spot."

"Based on historical data, we have a sweet spot where we get out," says Ricke. "[The truck] will attract someone who can get a couple more years out of it."

At MDU Resources, Allen specs the trucks for resale as much as possible, keeping an eye on the consumer market. For that reason, options that won't fly with consumers typically are not specified. "You want something a consumer would buy at resale," he says. "We look at resale as much as we do the upfront cost."

Hawkins tends to go a step further, buying "bare-bones," says Miller. "We try to eke out efficiencies by spending a dollar less on capital that could be spent on another piece of equipment. We try to have a good cycle of trucks; every year we're buying 10 or 12. We have

Number of Pickups Drops
(avg. per company)

Type	2007	1998
Compact	6.0	5.7
½-Ton	7.9	12.6
¾-Ton	7.3	8.5
1-Ton	5.6	13.6
1.5-Ton	4.8	15.6

Base: 1,027
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Raw numbers of pickups kept in fleets has dropped, primarily on the heavy end. The advent and popularity of SUVs has no doubt had an effect on this.

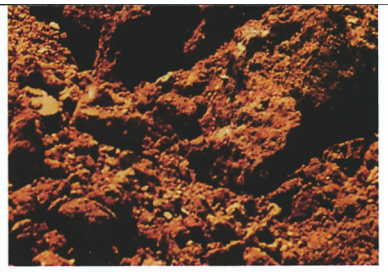
Types of Rear Bodies
(by truck size)

	Compact	1/2	3/4	1	1.5
Standard bed	92	93	93	89	88
Service body	47	38	42	47	53
Dump body	28	21	21	27	32
Platform	28	21	22	26	28
Van body	13	7	7	9	9

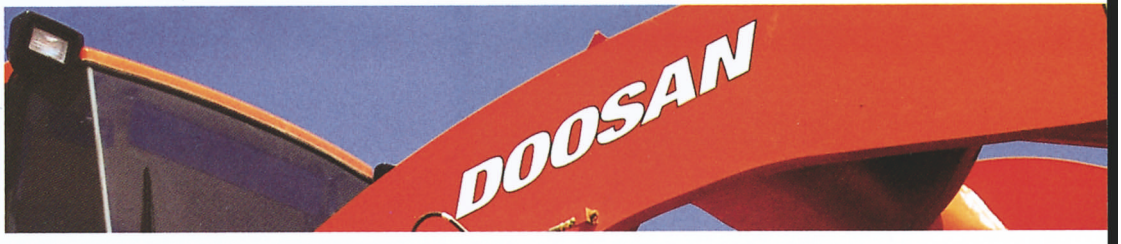
Base: 1,021
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Regardless of the size of the pickup truck, the standard bed is the most common body specified, followed by service bodies.









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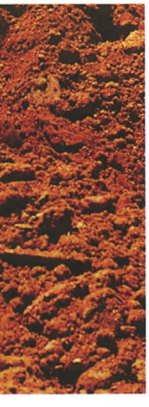



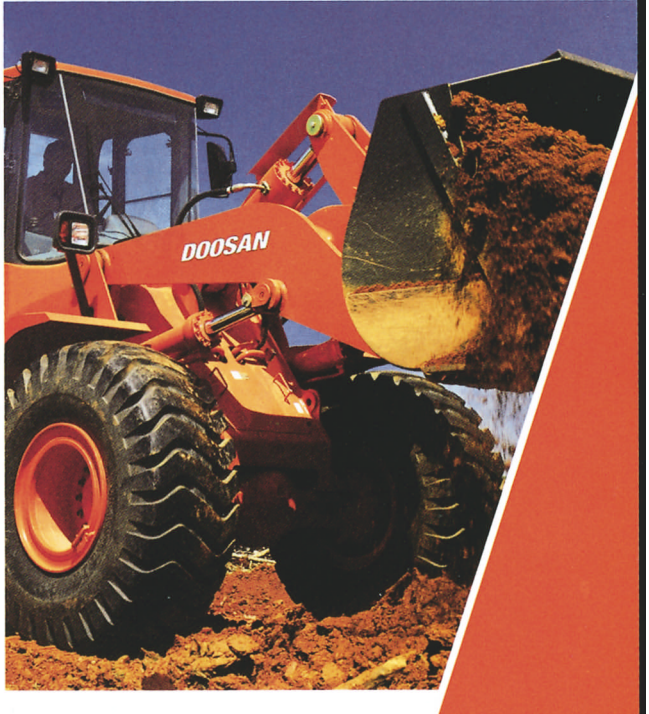

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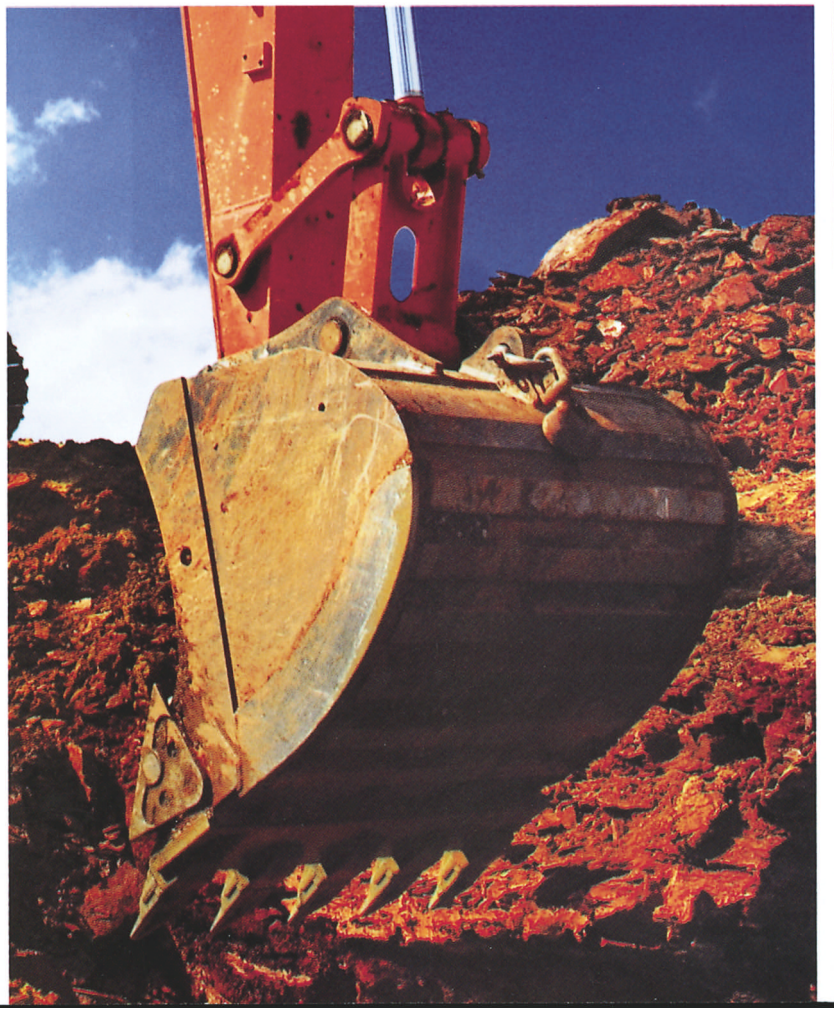



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- Only manufacturer with internal EGR system—doesn't have to be removed for routine maintenance, unlike competitors

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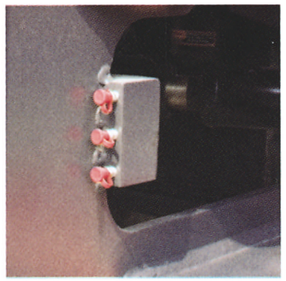

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DX


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DX140W


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DX190W


NEW
DX210W


NEW
DX180LC


NEW
DX225LC


NEW
DX255LC


DX300


DX340


DX420


DX480

Brief Specs—DX

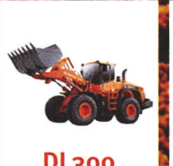
	DX140W	DX190W	DX210W	DX180LC	DX225LC
Operating Weight (lbs.)	30,313	39,242	43,872	39,683	48,721
Maximum Digging Depth (ft./in.)	15'	19'7"	19'9"	20'1"	21'9"
Net Engine HP (SAE1349)	132	155	162	118	148
Bucket Digging Force (lbs.)	19,003	25,794	27,558	24,909	33,510
Arm Force (lbs.f)	16,138	18,519	21,385	19,626	27,778
Swing Torque	24,187	34,176	46,197	33,988	46,848

	DX255LC	DX300	DX340	DX420	DX480
Operating Weight (lbs.)	54,233	66,580	76,721	92,370	106,900
Maximum Digging Depth (ft./in.)	22'4"	24'1"	24'7"	25'4"	25'7"
Net Engine HP (SAE1349)	166	197	247	293	328
Bucket Digging Force (lbs.)	35,494	44,974	47,840	59,524	67,900
Arm Force (lbs.f)	26,676	30,423	38,140	43,430	49,800
Swing Torque	56,318	74,956	84,337	84,836	93,306

DL


NEW
DL200


NEW
DL250


DL300


DL400


DL500

Brief Specs—DL

	DL200	DL250	DL300	DL400	DL500
Operating Weight (lbs.)	25,851	31,966	38,140	49,604	67,682
Net Engine HP (SAE1349)	137	153	217	280	335
Tipping Load, Full Turn (lbs.)	16,506	22,487	26,676	36,376	44,092
Bucket Capacities (cu. yds.)	2.6	3.3	3.9	5.1	6.2
Break Force (lbs.)	23,149	29,568	36,419	49,458	60,180
Tipping Load Straight (lbs.)	19,370	26,896	31,967	41,667	50,706

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80 trucks, and I don't want to buy 25 trucks in one year and none in the next."

Miller tracks truck age, maintenance cost, and mileage when making the disposal decision. "We analyze the bottom 17 percent every year," he says. "Some might have super-high miles, some might have been in a tough environment with excessive wear and tear, and some might just cause us problems.

"If there are none that have been abused, we'll tear them off by miles," Miller says, allowing Hawkins to rid itself of one-sixth of its pickups. Hawkins gives pickup trucks a useful life of six years.

MDU keys in on ownership and operating costs, emphasizing ownership. John Harmon, corporate equipment manager for MDU Resources subsidiary Knife River, says many managers do not understand that ownership costs continue even after the truck is paid for. "[They] run it out to 100,000 miles, and people think there's no ownership expense because it's paid for. The market is telling us what our ownership expense is; it's the difference between acquisition and resale."

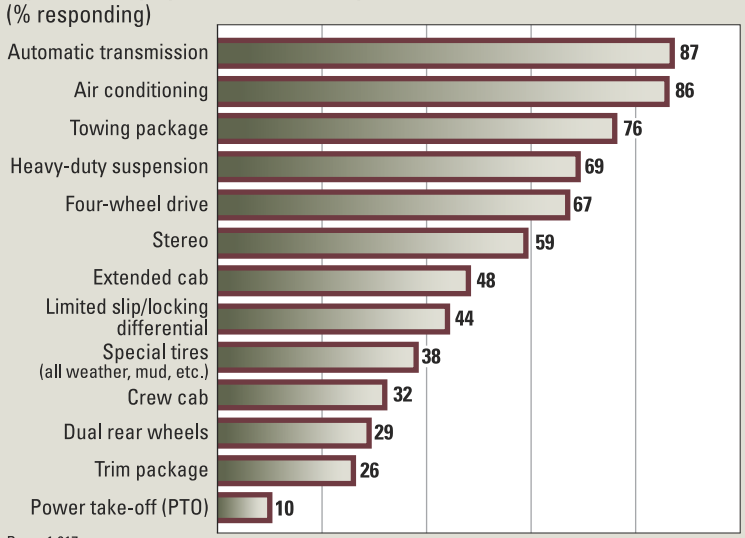
MDU disposes based on residual value, mileage and warranty, Allen says. "We want to eliminate the repair costs, so we'll get rid of it when it's out of warranty.

"You have to view the pickup fleet the same way you view a [wheel loader] fleet," he says. "You have to lower the cost. You want to drive down the cost of a [wheel loader] so operations can charge right." Although Allen concedes that MDU cannot do that with pickups, the philosophy drives MDU's strategy.

"There are cases where we may keep [a pickup] 15 years, but we need the numbers to make sure we have made the right decision," Allen says.

Hubbard sells its pickups before large components fail, as do 56 percent of the respondents to the *Construction Equipment* survey. "Our plan is to never put a transmission, differential or engine in," Ricke says. "We'll do brakes and maybe an exhaust. If it's a problematic truck, eating our lunch, we'll walk away."

Optional Equipment on Pickups
(% responding)



Base: 1,017
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Managers often outfit their pickup trucks with their eye on resale at the consumer market, so options must bring value to that later transaction.

Types of Equipment Carried
(% responding)

Tool box	90
Bed liner	55
Welding equipment	34
Lube equipment	30
Air compressor	31
Snow plow	25
Hoist & boom/crane	12
Lift gate	10
Portable cleaning equipment	8
Winch	8

Base: 1,000
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Used primarily for transport, nine of 10 pickups carry a toolbox. As their use becomes more specialized, other equipment is added.

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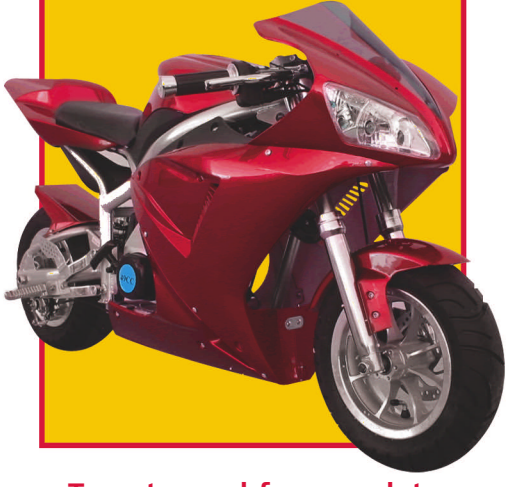

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Nearly 60 percent of respondents reported that the most common reason for replacing a pickup truck was that repair costs exceeded the value of the truck. Because the replacement of a major component can eradicate residual value, fleet managers who manage for the sweet spot do not put undue focus on in-house maintenance.

About 40 percent of respondents reported that they turn to independent service retailers and dealers for preventive maintenance; 70 percent do so for major component work, such as engines and transmissions. Hubbard works with its manufacturer to arrange set rates for local dealers in the regions where Hubbard's trucks operate.

"We try to outsource as much as possible," says Harmon at Knife River. "You're better using [in-house service] space and skills on other machines, rather than have them tied up on a pickup."

Hayward Baker, which operates across North and South America, outsources the management of its pickup fleet, says Don Lambert, corporate equipment director, to PPH FirstFleet, a third-party management firm.

"We will customize a maintenance policy or profile," says Bob Hertzog, director of truck services for PPH FirstFleet. "We have all the detailed asset information, including acquisition cost and approximate lifecycle. "One group [of trucks] may be in a mine, and another might be servicing equipment. We customize that policy right down to the

Who Does the Maintenance?
(% responding)

	Preventive maintenance	Major components
Staff	73	41
Independent service retailer	26	46
Manufacturer-authorized dealer	13	24

Source: Construction Equipment *2007 Pickup Truck Usage Study*

Preventive maintenance, such as oil changes, is done by three-fourths of respondents. Much more than that, though, and the service is shifted out of the shop to a third party.



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Average Miles Before Replacement
(by type of truck)

Compact	168,796
1/2-ton	166,069
3/4-ton	170,186
1-ton	168,677
1.5-ton	169,256
Total	165,304

Base: 928
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Regardless of size, pickup trucks tend to be replaced at around 170,000 miles.

Acquisition Preferences
(% responding)

Cash purchase	58
Independent finance company	15
Full-service lease	2
Local bank finance	34
Lease	7
Rent	0.2

Base: 1,009
Source: Construction Equipment *2007 Pickup Truck Usage Study*

Acquisition methods for pickup trucks do not vary much from that of heavy equipment, but rental does not play much of a role.

component level."

Hertzog says PPH FirstFleet's network of service providers bills back to the management company through a card program, which enables them to build a vehicle-level history of operational data.

Data enable equipment managers who target peak residual value to recoup value from the trucks when they are disposed. Others who buy a pickup truck for life, sliding it down the management ladder, do not need to pay as close attention. Even so, knowing and tracking how pickup trucks perform, including repair costs and component lifecycle, will ensure that the organization still obtains the maximum bang for its pickup trucks.



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How a 3-inch card can build a 30-story building.

By G. C. SKIPPER, Contributing Editor



Bustin' the Myths Of Extended-Life

Know the chemical differences, applications and maintenance requirements

Extended-life coolants (ELC) have been used in the construction industry for at least a decade, yet misunderstandings and myths still persist in the field. One misunderstanding, according to Elizabeth Nelson, coolant program manager with Polaris Labs, is the idea that you can put ELC in a unit and virtually forget about it.

"You can't do that," Nelson says. "If you do, it's like playing Russian roulette. It doesn't matter what the product is; if you don't pay attention to it, you are going to have a premature engine failure. One of the biggest problems we've had in the field is that people don't pay any attention to the cooling system."

Extended-life coolant is made up of completely different chemistry than conventional coolant, Nelson says. "You are working with a chemical reaction," she says. "It's not like oil where you are working with things like wear metals." Plus, she says, ELC chemistry makes it unnecessary to add supplemental coolant additives (SCA) as may be added in conventional coolants.

"The important thing to remember with ELC is that you still have to monitor the coolants," Nelson says.

Extended-life coolant will last considerably longer in construction applications than conventional coolants. With the use of an extender every 6,000 hours, machines can log 12,000 to 15,000 hours on extended-life coolant, Nelson says. What some fleet managers don't realize, however, is that a machine's mechanical problems, regardless of the coolant product or the formulation, will render the coolant ineffective.

"I'm talking about combustion gas leaks, hot spots in the system, air leaks and electrical ground problems," says Nelson. "Not only can these things lead to premature engine failure, they will destroy your coolant."

Dan Arcy, technical marketing manager for Shell Lubricants, identifies one extended-life coolant myth. "There are a lot of myths out there," he says. "One of them is that ELC and conventional coolants are not compatible and you cannot mix them. Actually you can. If you have extended-life coolant in the machine and you accidentally add a gallon of conventional coolant, say about 10 percent, it's going to be fine. But if you put more in the system, 20 percent for example, then you have to treat the coolant as a conventional coolant. You'll have to add more SCAs."

Mixing the two dilutes the coolant, says Carmen Ulabarro, market development specialist at Chevron Global Products. "With ELC, we recommend no more than 25 percent dilution [with conventional coolant]," she says. "If you go beyond that, then you should maintain the coolant in the system just like it is a con-



Photos: Graphic Source©

Coolant Care

ventional coolant and start regular test strip testing and SCA additions." For the full benefits of extended-life coolant, she says, it must be at least 75 percent of what is in the system.

Nelson disagrees about mixing coolants. "We worry about two things," she says. "One, suppose you have an extended-life warranty and the pH is between 8.0 and 9.5, which is normal for ELC. With conventional coolant it takes about 8.5 pH to hold silicate up in solution. If you have an ELC coolant with a pH level down to 8.2, which is fine for ELC, and you mix that with conventional coolant that has higher silicate, you take a chance of knocking the silicates out of solution. They are very dependent on the pH."

The second reason, she says, is that mixing dilutes the carboxylate acids (an organic corrosion inhibitor present as a key component in an additive package). When that happens, she says, the benefits of those acids are negated and the coolant requires treatments as with conventional coolants.

"That is a waste of money," Nelson says. "You're taking higher technology and throwing it out the window."

Extended-life coolant offers many advantages, Ulabarro says. Coolant can last up to 15,000 hours; reduces cooling-system maintenance costs; improves heat transfer compared to silicate-containing coolants; improves water pump life; and offers complete protection of all cooling-system components, including aluminum. More construction fleets are finding that ELC helps their equipment perform better and reduces downtime, she says.

"Construction equipment usually is exposed to potentially hotter conditions than over-the-road trucks, since they are moving much slower and the radiator cooling efficiency may not be there," Ulabarro says. "The no-silicate formulations of ELC help improve heat transfer, help water pumps last longer, and help reduce overall maintenance cost."

But there are disadvantages, she says. One is the lack of end-user understanding of how to maintain the product and, two, dilution beyond the recommended limits due to poor maintenance practices. Outside of those two factors, any piece of equipment in any construction fleet can use and benefit from extended-life coolants, she says.

Although storage of extended-life coolants is almost identical to that of conventional coolants, fleet managers should keep in mind that ELC is ethylene glycol-based, Ulabarro says. Ethylene glycol, in concentrate form, will freeze at 7F. That's not the case with a 50/50 premix.

"If coolant drums are placed outside, they should be placed on their sides," Ulabarro says. "Also, if a coolant is purchased and not used for several months, it is a good idea to agitate

Laboratory analysis of extended-life coolants is as important as lab tests on conventional coolants. Here, sample bottles of both conventional and ELC samples are processed at Polaris Labs, Indianapolis.
Photo: Polaris Labs

the product in case there has been some segregation of the inhibitors. This is much less a problem with ELC-type coolants, but a little bit of agitation is always good."

Extended-life coolants may require less maintenance, but they have to be maintained, Arcy says. "In diesel applications, you should take a sample of coolant every month when you service the vehicle and check it for clarity," he says. "Just hold it up in a clear jar and look through it. If it's clear and bright, you're okay. There shouldn't be any kind of particles floating in it."



A technician with Polaris Labs pulls a sample of extended life coolant for testing. ELC should be monitored as closely as conventional coolants since some mechanical malfunctions in equipment can trigger chemical reactions in the coolant.
Photo: Polaris Labs

The second step, he says, is to take a fractometer and test the freeze point of the coolant. "Basically, a 50-50 mixture gives you a freeze point of -34F. That's all you need to do to maintain ELC."

By comparison, Arcy says, conventional coolants require a sample be pulled, checked visually (it can be green, pink or fuchsia), and the use of a refractometer to check the freeze point. If everything checks out, test strips can be used to determine how much SCA is in the mixture.

Arcy warns against topping off low coolant levels with water. "With a 50/50 mixture, they will pour in a gallon of concentrate coolant and add about the same amount of water," he says. "When that happens, the system gets out of whack over a period of time. That's why you have to check the freeze point: to find out if you are over-concentrated or under-concentrated. You make the adjustments at that time. Making those adjustments probably takes longer than actually doing the test."

Polaris' Nelson recommends having a laboratory evaluate the coolant's pH level at every preventive maintenance check. "You can tell a lot about what's going on with your cooling system by checking ph and glycol levels," she says. "That should be done with ELC as well as conventional coolants."

One of the biggest problems encountered in the field, Nelson says, is the formation of degradation acids. "Fleet managers need to understand that with ELC, you're working with chemical reactions that are taking place due to temperature pressure and flow.

"When temperatures ran at 160 to 180 degrees, you didn't think about the cooling system," she says. "But when engine OEMs started bringing engine temperatures up, and when they climbed to 190 degrees or above, that's when we started seeing chemical reactions taking place. That's why you really need to pay attention to what's going on in the cooling system."

For example, Nelson says, if corrosion sets in and the coolant passages become clogged, "you're going to cavitate and start breaking down the ethylene glycol and that forms acids." The same is true with combustion gas leaks.

Converting a fleet from conventional to extended-life coolant can be done several ways. One way is to do the conversion when equipment comes in for scheduled preventive-maintenance visits. Another is to convert the entire fleet at one time by using coolant extenders.

"When you convert a system, we recommend you completely drain and flush the system, then fill it up with a 50-50 mixture," says Shell's Arcy. "If you don't want to do that, you can use Shell Extended Life Coolant conversion fluid. You pull a sample, look at it to make sure it's clear and bright, use a refractometer and test strips and, if everything is okay, you drain a gallon of coolant from the system. Then you pour in a gallon of the conversion fluid."

Once the extender is poured in, he says, the system goes from a conventional-coolant system to an extended-life system. After the conversion, fleet managers should run the system, get it hot, take a sample, and send it to a lab to confirm the conversion process. Conversion fluids are a particularly good way to go if there is a low-mileage vehicle in the fleet, Arcy says.

Chevron's Ulabarro cautions against gradual fleet conversion. "Having dual coolant inventories only creates confusion and leads to dilution," she says. "I would recommend that the entire fleet be changed if a conversion is going to happen. The best time to do this is when new equipment is coming in that has been ordered with ELC in it."

Extended-life coolants offer many benefits. Equipment managers can reap the rewards of those benefits if they properly understand the coolant's performance and properties. CE

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By G.C. SKIPPER, Contributing Editor

Solid Safety Stance

Machine safety — both on the job and in the shop — is a must

Safety requires more than lip-service. It must have ownership from the top down as well as from the bottom up.

"Plain and simple, you cannot afford to overlook safety," says William Vandenbrook, motor equipment superintendent for the City of Madison [Wis.]. "Although safety is an extremely broad subject, it is an extremely important issue to all. The moment that a manager or supervisor or foreman ignores it in the face of an employee, he has just reduced his entire safety program forever. You can't afford to do that because of the liability you have out there today."

Federal and state regulations must be identified and adhered to. Because of all the different jurisdictions, staying legal can turn into a high-wire balancing act.



Sometimes fleet professionals who do enforce safety practices when it comes to equipment, manpower and shop environment, "get a bad tag for their costs," says Vandenbrook. "However, they are looking out for the liability of the whole company or the organization or the city. I can't put a value on that."

Although a municipal fleet manager such as Vandenbrook may face different hazards than a construction fleet manager, one truism applies to both — a work site is a dangerous place, but it doesn't have to be an unsafe place.

Nobody knows that better than Jack Butler, president of Butler, Cranes & More. For more than 30 years, Butler has worked with heavy equipment. He has held positions with construction companies and crane operations, and has organized and taught safety classes for numerous clients.

"Construction jobsites are dangerous places," he says. "When heavy equipment is operating, jobsites become even more dangerous. Noise; equipment exhaust; earth vibrations; swinging buckets, booms and ropes; and backup alarms all add to the clamor."

Butler singles out six specific dangerous conditions at a work site. First of all, some equipment operators, especially younger workers or new-hires, need to know how to enter and exit a machine. "OEMs recommend a three-point contact while climbing on or off a piece of equipment," he says. "If you follow those procedures, you probably won't get hurt."

The second danger applies to older workers. They sometimes become complacent and accustomed to their surroundings. For example, the threat is real when equipment is back-

ing up. "Back-up alarms give a false sense of security," Butler says. "When you get on a jobsite with multiple pieces of equipment, everyone becomes accustomed to hearing them. I knew a crane operator who was killed when a concrete truck backed up over him. He simply walked out behind the truck."

A third dangerous situation involves machines, such as excavators, that can reach up and touch power lines. "There again, people become complacent and just forget about the wires," Butler says. "There are two dangers here. One, you can electrocute the operator. Two, if an excavator comes into contact with a power line, the jolt going through that machine is like a welding iron. It leaves what I call little BBs from the arc. Later on, the BBs can get into the valve spool and the operator can't control the stick."

Fourth, in an excavation more than four feet deep, some type of shoring or trench boxes must be used to protect from collapsing sides.

Fifth, putting together huge units, such as cranes, requires a level area for the assembly. Sometimes stone or gravel is laid down to support the equipment, Butler says. "They haul in limestone and lay down four-inch rocks. That makes it hard to walk on for the mechanic on the ground who is carrying heavy parts. Preparing for machinery set up and tear down is very important."

Finally, a danger Butler calls "a hot topic today," involves quick couplers. "There have been several deaths because of this," he says. "Three deaths occurred in Ohio because buckets fell off the machines."

Although quick-coupler attachments have certain procedures that operators are trained to use, says Butler, "they don't follow the training. Take a water-line job, for instance. The operator might use a 48-inch bucket for the excavation. Then he'll slide the box ahead and work inside the box or he will switch buckets and put a smaller bucket on. He'll do this 20 or 50 times a day. When he switches buckets, he doesn't follow the procedure to make sure it is connected and locked. He swings back over and the bucket falls off."

Although there are several types of bucket attachments available, 90 percent, says Butler, are hydraulic. "They have a hydraulic cylinder with a latch that fastens around the bucket pin," he says. "There's also a safety light in the cab that tells the operator when the bucket is latched. But what happens is, when the operator tries to latch onto that pin, he hasn't fully



Trench safety must never be overlooked or disregarded. Shoring or trench boxes must be used to protect workers from collapsing sides.

'Shall Is Law'

It doesn't matter what kind of fleet you have, the long arm of the law — in this case federal, state and local regulations — will reach you.

Keeping up with what is legal and what isn't sometimes can be a challenge to many fleet professionals. Yet savvy experts have come up with a simple way to interpret all that legalese found in governmental documents.

First of all, the regulations that apply to local situations, they say, often are simply rewrites of federal regulations, such as OSHA. If you comply with one, you comply with the other — but you have to know what you're reading.

For example, says Perrine of Leslie Equipment, there is a difference between the word "should" and the word "shall."

"'Should' means OSHA recommends that you do whatever it is," Perrine says, "and if you don't do it you could be fined. If the regulation says 'shall', you better be darn sure you do it because, if you don't, you definitely are going to be fined."

What fleet managers need to remember, he says, is, "Shall is law."

engaged the bucket. The latching mechanism will close, but the machine doesn't know if it closes around the pin or around air. The equipment only knows that it's closed."

Todd Perrine, vice president, product support at Leslie Equipment, a John Deere distributorship, says fleet managers should also be aware of hidden work site dangers. "There are a lot of unknown hazards, such as jobsites that are built on hazardous waste dumps." he says. "Mechanics and vehicles go out there without really knowing what they might be touching."

Based on his front-line experience, Butler says lack of training makes a jobsite dangerous. "If you don't know a danger exists, or a risk exists, you're apt to find it unexpectedly," he says.



OEM guidelines will provide substantial safety information, such as what items to inspect during machine walk-arounds. Operators should receive the proper training to conduct comprehensive machine inspections.

"I know of a young lad who was hired several years ago to help on a pavement recycling machine," says Butler. "He obviously didn't understand the dangers of that job. On his first or second day at the jobsite, he climbed up on the equipment and, some way or another, got his leg down in the machine. The auger took his leg off. Because of the resulting lawsuit, the boy doesn't have to worry about income for the rest of his life, although he does have to live with the loss of a limb. As for the contractor, he certainly could have afforded some training."

Training at Leslie Equipment is done in two ways, says Perrine. Because the market area served by the distributor includes mining operations, Leslie employees, before they go into a mine shaft, go through 30 to 40 hours of training that meets requirements of the Federal Institute of Equipment Mining and Safety. "Then they have to have eight-hour refresher courses every year," he says.

In addition, Perrine plans to launch a weekly publication called Tool Box Talk that focuses on safety issues. Circulated to all company work crews, employees will be required to read the publication, sign it, and send it back in. "That will allow us to track who has and who has not read it," says Perrine.

Another method used by Leslie Equipment to raise safety awareness among employees is to conduct monthly shop inspections to check such things as rigging, shop cleanliness, exposed outlets or wiring that could shock someone, and trip hazards.

As for the city fleet in Madison, says Vandenbrook, training focuses on technicians who work on fleet equipment. To climb further up the career ladder, technicians are encouraged to receive training through the Automotive Service Certification program.

In addition to training, fleet professionals can take other steps to make a work site safer, Butler says. "You've always got fall hazards at a building site, so attention to general housekeeping is important. Supplies need to be picked up. Don't have welding leads, extension cords, water hoses and discharges hoses lying around. And floor openings should have warning signs. You might have people trained in site-specific rules, but a mechanic coming in from outside may not know that a piece of plywood is covering the opening. I've seen sites where they don't put anything at all over the opening."

As for equipment, Butler says, "every OEM publishes guidelines. Operators and managers should be familiar with them. Everyone tells you to do a walk-around inspection. The things that get missed are pins — keeper pins, retain-

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ing bolts that are missed. When a pin comes out, sooner or later a part of the equipment will fall off."

Butler advises starting the inspection while still 50 feet from the machine. At that distance, any brake or hydraulic fuel leaks or flat tires are easily spotted.

Check for worn tires. If they need replacing, do it, not just because of safety, but also to prevent further downtime on the machine. Of course, check lights, look for broken glass, cracked windows that obscure the operator's view, make sure the wipers work, and check the lugs to see if any are missing.

Butler believes strongly in ensuring that machine controls are all free when the machine is first moved. "Make sure steering is responsive," he says. The operator needs to move the equipment a short distance and stop it to check the brakes. Don't forget the parking brake, as well, or the seat belts.

One simple step that fleet managers can take to make jobsites safer, says Perrine, is to go to the job trailer first. "They will do a hazardous analysis with you and go over any hazards — chemical lines, wires, blasting areas. You should do this before you even go out to work on the equipment. They will tell you if you need to wear hearing protection or if you need steel-toe shoes." In short, he says, "a quick stop at the office trailer will give you information right up front to keep you from getting into trouble."

Safety reaches beyond personnel, equipment, and bricks and mortar. It also involves adhering to both federal and state regulations for both motor vehicles, such as dump trucks, and off-road units such as graders. One falls under Department of Transportation jurisdiction; others are regulated by OSHA. Combined with whatever state and local rules apply, staying legal can turn into a high-wire balancing act.

Vandenbrook, however, has handled the regulations problem for Madison's fleet this way: For every piece of equipment purchased by the city, he says, "we create the ABCs — A service, B service and C service. Part of that includes the safety inspection which is based on the manufacturer's recommendations," he says. "We go through the operator's manual of the vehicle and whatever is mounted on it — dump truck, garbage truck — and look at what the OEM recommends for servicing and inspections."

All that information is built into a written sheet so the technicians know what to look for. "After you've done the same garbage truck a dozen times," you don't need the sheet very often," Vandenbrook says. "But to start with, you do." The up-front cost of setting up based on OEM recommendations, "is well worth it," he says. "The OEM recommendations will take into account all those government regulations."

Safety is too far-reaching, too important, and if not practiced, too costly to treat lightly or ignore. "When you talk about safety," Vandenbrook says, "you've got what the technician does, what the operator does, what the supervisor does, and what the shop does, such as handling fluids correctly. If you do things safely, it just makes things easier for folks." CE

Safety Tips Review

The following are a few guidelines that will help create a safe work environment and increase safety awareness among employees.

- On large construction jobs, visit the office trailer before entering the site. It's a quick, easy way to find out where hazardous areas, wires, chemicals and other dangers are located.
- Have personnel wear reflective vests so they are clearly visible on the jobsite.
- Institute a safety-glasses policy to protect eyes and similar procedures to protect ears, hands and feet with appropriate safety wear.
- Fleet managers should track the number of injuries by type. Review the results at monthly shop meetings or send memos out to mechanics and operators.
- Keep communications with workers open. If an injury occurs, workers will hear about it through the rumor mill. Investigate the accident and send out an e-mail giving details on what really happened and what should be done to prevent similar accidents in the future. This will give employees something to talk about.
- For noisy work environments, such as frequent use of hammers, consider having your employees' hearing checked annually. If hearing problems increase, workers may not be using ear plugs. Correct the problem. Also, monitor your shop to make sure the decibel levels are not out of spec.

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By MIKE ANDERSON, Senior Editor

As Market Finds Way, The Big Shift Is On

Rough-terrain, straight-mast forklifts finding niche with lift capacities rarely considered in past with this equipment type

In the three years since *Construction Equipment* last investigated the rough-terrain, straight-mast forklift market, list prices for new machines have crept up ever so slightly.

Machines with a lift capacity of less than 6,000 pounds are, on average, up 2.45 percent to a little more than $46,000. Machines in the category's bulk class, ranging 6,000 to 10,000 pounds in capacity, are up 3.15 percent to $54,177.

Now, equipment buyers will quickly point out, if only their actual costs were up ever so slightly.

Fueled by diesel, hourly costs have increased 81.6 and 84.3 percent, respectively, in those two classes. So while the price on the dealer's tag may not seem all that different, once that forklift is off the sales yard and onto the customer's, it needs to produce in a big way.

With the rough-terrain-forklift market seemingly now leveled off in the wake of the telescopic-handler explosion of the past decade, a big way may just be the future path for this equipment type. Placing a load with a long reach may often now be the telehandler's job, but when it comes to pure grunt lifting, the rough-terrain forklift could be the heavyweight champ.

As part of our last close-up, a third price average was listed for machines over 10,000 pounds, but in hindsight that number of $94,480 was "skewed" by the inclusion of the largest machines, according to Dave Murray of EquipmentWatch.com. This time, Murray calculated separate average prices of $66,825 for machines with capacities of 10,000 up to 20,000 pounds, and $152,646 for those with a capacity of 20,000 pounds and higher.

"I see things definitely getting heavier," says Nick Acocella, factory sales manager with Omega Lift. "We've had quite a bit of interest in our product on the heavier end of the spectrum — 20,000-, 30,000- and 50,000-pound, all-wheel-drive, rough-terrain machines, mostly for the industrial market.

"I can speak from our history. We did a lot of business in construction, and it's expanded tremendously from that into the industrial market. With yard work — whether it's steel,

Average RT Forklift Costs

Lift Capacity Class (lb.)	*Hourly Cost 2007 / 2004	List Price 2007 / 2004
Less than 6,000	$25.42 / $14.00	$46,083 / $44,980
6,000-9,999	$29.49 / $16.00	$54,177 / $52,520
10,000 and up**	na / $25.00	na / $94,480
10,000-19,999**	$38.55 / na	$66,825 / na
20,000 and up**	$79.39 / na	$152,646 / na

* Hourly rate is the monthly ownership costs divided by 176, plus operating costs
** Effective 2007, EquipmentWatch.com split this size class
Source: EquipmentWatch.com, phone 800/669-3282





Many rough-terrain, straight-mast forklift manufacturers are focusing more and more on larger models to meet particular market needs. One of those manufacturers is Manitex Liftking, whose high-flotation "deep-mud special" is shown at the immediate left.

lumber, military — everybody seems to be looking at a heavier machine that they can accomplish more with," says Acocella. "Anytime you have an unimproved yard where a conventional forklift is not going to work well, our machines are fitting in very nicely."

A multi-line manufacturer offering a full range of rough-terrain forklift families, Omega has established the Mega Series of larger vertical-mast models, offering lifting capacities ranging from 8,000 to 20,000 pounds. Providing lifting capacities up to 50,000 pounds was the next step — and along came the HERC Series.

"That's been, I guess, where our customers have taken us and where we have developed a very nice niche in the marketplace. There aren't a whole lot of manufacturers that offer a rough-

terrain vehicle above 12,000 pounds, let alone 20,000," says Acocella.

The bigger the machine needed, the more specialized that OEMs like Omega become.

"We pride ourselves on providing the customer with the machine that they need instead of something that we might have on the shelf," says Acocella. "We really spend a lot of time getting to know the application and producing a truck for the customer that is exactly what they're looking for."

Similarly, one of the Liftking brand's "core

Rough-Terrain Forklift Specifications (10,000-lb. capacity & up)

Model	Max. Lift @ 24 in. (lb.)	Max. Lift @ Full Height (lb.)	Max. Fork Height	Gross HP	Drive Wheels	Turning Radius	Operating Weight (lb.)
Liftking LK10M22/42	10,000	3,000	30'0"	86	2/4WD	11'5"	15,100
Load Lifter 4400-10D	10,000	10,000	30'0"	86	4WD	14'7"	18,450
Manitou M 50	10,000	5,500	20'2"	80	2/4WD	14'10"	19,245
Manitou MSI 50	10,000	10,000	15'7"	82	2WD	9'6"	17,500
Master Craft C-10-700	10,000	6,400	21'0"	78	2/4WD	14'1"	18,286*
Master Craft RT/C-10-440	10,000	-10,000	21'0"	80	2WD	14'1"	18,286
Master Craft Scrambler 10	10,000	10,000	14'0"	80	2WD	13'3"	17,993
Noble R80 10K 2WD/4WD	10,000	10,000	14'0"	83	2WD	17'8"*	17,200*
Sellick S-100	10,000	9,000	18'0"	83	2/4WD	14'10"	16,805
Wiggins AT-96/W100	10,000	5,000	30'0"	86	2WD	12'3"	17,100
Xtreme XT100B	10,000	n/a	30'0"	84	2WD	9'3"	20,480
Kawasaki 60 K-Lift	12,000	12,000	14'0"	110	4WD	15'3"	20,575
Liftking LK12M22/42	12,000	5,000	19'0"	86	2/4WD	11'6"	19,000
Load Lifter 2400-D	12,000	12,000	14'0"	86	4WD	14'11"	19,600
Load Lifter 4400-12D	12,000	12,000	30'0"	86	4WD	14'7"	19,700
Master Craft Scrambler 12	12,000	12,000	14'0"	80	2WD	13'3"	18,933
Sellick S-120	12,000	9,300	22'0"	83	2/4WD	15'3"	19,495
Waldon 8500C Forklift	12,000	12,000	14'10"	110	4WD	12'6"	21,100
Wiggins AT-120/W120	12,000	6,000	30'0"	86	2WD	15'0"	18,000
Xtreme XT120	12,000	12,000	12'2"	84	2WD	14'4"	23,952
Xtreme XT120B	12,000	n/a	30'0"	84	2WD	15'0"	23,952
Wiggins AT-120/W140	14,000	6,000	30'0"	86	2WD	15'0"	19,900
Liftking LK16M22/42	16,000	n/a	14'0"	120	2/4WD	16'6"	21,480
Load Lifter 4400-16D	16,000	16,000	30'0"	129	4WD	13'9"	23,565
Omega Lift 4412T-16S	16,000	16,000	12'0"	122	4WD	14'4"	26,200
Wiggins AT-120/W160	16,000	8,000	30'0"	86	2WD	15'0"	21,000
Load Lifter 4400-18D	18,000	18,000	30'0"	129	4WD	14'7"	28,415
Taylor TB-180S	18,000	n/a	11'0"	160	2WD	n/a	n/a
Liftking LK20P22	20,000	n/a	14'9"	100	2WD	22'5"	31,050
Load Lifter 4400-20D	20,000	20,000	30'0"	129	4WD	18'8"	31,640
Taylor TB-200S	20,000	n/a	11'0"	160	2WD	n/a	n/a
Taylor TB-250M	25,000	n/a	11'0"	160	2WD	n/a	n/a
Liftking LK 3022	30,000	30,000	15'8"	152	2WD	16'2"	46,450
Taylor TB-300L	30,000	n/a	11'0'	160	n/a	n/a	n/a
Liftking LK 43K	43,000	43,000	8'4"	160	2WD	18'3"	48,500

* Spec listed is for 2WD configuration

Source: Spec-Check.com Xpanded Specs, Information Received As of April/07

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Attachments Transform Forklifts into 'Whole Fleet'

At first glance, a forklift seems straightforward enough, almost single purpose in role.

The folks at Star Industries see it differently, as evidenced by their slogan: "Star Attachments Turn a Forklift into a Whole Fleet of Equipment."

Fort Worth, Texas-based Star Industries has developed such heavy-duty forklift attachment product lines as self-dumping buckets, self-dumping hoppers, Load-N-Tow platforms, Lift-N-Tow cranes, concrete-placing hoppers, safety work platforms and jibs, as well as the replacement forks, ram poles, spreader bars and fork extensions traditionally associated with forklifts.

"Star Attachments are very inexpensive in comparison to the cost of the forklift and yet they add tremendous versatility," says sales manager Paul Kelly. "With Star Attachments, a forklift can place concrete, elevate personnel, perform many loader jobs, and even perform tasks that would normally require a crane."

There is a big need for this, says Kelly.

"It is not uncommon to see a job where the forklift is the only piece of equipment that stays on the project from start to finish. The way metal building contractors utilize a forklift today is a prime example."

Kelly walks us through such a scenario:

"They bring the forklift onto the job at the very beginning. The first task is to unload the building from the trucks. Next, utilizing a Star jib or truss boom, they erect the structure saving the cost of bringing a crane onto the job. With the Star spreader bar, they can handle even the long limber components that can be difficult to handle without damage. If there is a concrete mezzanine, often a Star concrete hopper attachment can place the concrete and save the added cost of a concrete pumping service.



"Progressing with the job, a Star safety work platform elevates personnel to install the insulation and metal skin on the building. And, even as the job finishes up, the forklift is there with a bucket attachment to handle any needed backfill and job cleanup."

The thorough use of attachments on a forklift provides the best utilization of the equipment investment dollar, says Kelly.

capabilities is the ability to customize our products to a customer's application," reports Tim Hayes, vice president of sales and marketing for Manitex Forklifts, parent to Liftking. "We are North America's largest 'job shop' when it comes to making unusual adaptations for customers."

Be it to load vehicles onto trailers or for extreme-flotation military use, the Manitex Liftking is getting bigger thanks to the P Series, with capacities of 22,000 pounds and beyond.

The Liftking brand is now part of the Manitex Forklifts group, which also comprises such brands as Schaeff, Noble and Lowry, the latter of which had previously been acquired by Liftking.

Load Lifter is another make of rough-terrain, straight-mast forklifts that is looking to serve a market beyond 20,000 pounds, the company reports. With lift capacities ranging up to 30,000 pounds and lift heights of up to 30 feet, Load Lifter's RT forklift line will serve a wide variety of needs in construction, industrial, agriculture, forestry and lumber.

Web Resources

Find rough-terrain, vertical-mast forklift manufacturers' websites in the online version of this story at ConstructionEquipment.com. Just click on Archives, Buying File, and you'll find a link to this story.

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Gallery of Rough-Terrain Forklifts



INGERSOLL RAND

Deere Engines Power Forklifts

When Tier II engines were implemented for this equipment category in 2005, Ingersoll Rand's rough-terrain vertical-mast forklifts moved to the J Series. Both available in two- and four-wheel-drive, the 6,000-pound-capacity RT706J and 8,000-pound-capacity RT708J models utilize an 80-hp John Deere 4045 diesel engine.

Number of models: 2

Product-line features: Boasting zero tail swing and a tight turning radius, Ingersoll Rand's J Series rough-terrain vertical-mast forklifts feature large functional cabs with good visibility. The durable design of the models is backed by a standard three-year, 3,000-hour warranty.

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JCB

New Lighter Masts Quicken Lifts

With maximum lift capacities of 6,000 and 8,000 pounds, respectively, JCB's 930 and 940 rough-terrain, straight-mast forklift models are purpose-built with a one-piece frame. A new line of high-speed Clearview and Freelift masts range from 15 to 30 feet, and are lighter in weight with larger side thrust rollers. When equipped a 22-foot Clearview mast at maximum height, lift capacities for the 930 and 940 are 3,500 and 4,400 pounds, respectively.

Number of models: 2

Product-line features: Each of the JCB rough-terrain forklifts is powered by a four-cylinder diesel engine generating 76 horsepower, driven for quick, smooth operation in all terrain by a JCB SyncroShuttle transmission. The two model sizes are each available in either two- or four-wheel drive.

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CASE

Established Power Provides Lift

With lift capacities of 5,000, 6,000 and 8,000 pounds, respectively, the three established G Series rough-terrain forklift models offered by Case can be equipped with two mast heights — 15 and 22 feet — to cover most applications. Other mast heights are available for special applications. For easy operation and reduced operating costs, the 585G, 586G and 588G models feature a four-speed synchronized transmission with self-adjusting, wet-disc brakes.



Number of models: 3

Product-line features: G Series rough-terrain forklifts are built with the same engine and power train as used in Case's backhoe-loaders, providing the tractive force required to work in muddy conditions or on sloped sites. The Case 4-390 engine generates 75 horsepower.

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Gallery of Rough-Terrain Forklifts

LOAD LIFTER

Newest Model Hoists 20,000 Pounds

Most recently, Load Lifter introduced the 4400 F Series, a "true" rough-terrain performer with full power-shift transmission, four-wheel drive, and outboard planetary drive axles. Capable of lifting 20,000 pounds, this is the latest of Load Lifter's high-visibility forklifts. In addition, Load Lifter redesigned the 4400D Series forklifts with a new cab promoting visibility and safety for operators.

Number of models: 5

Product-line features: Rough-terrain forklifts from Canadian-based Load Lifter offer lift capacities ranging from 4,000 to 30,000 pounds and lift heights from 8 to 30 feet. The versatility to handle various construction, agricultural, mining, forestry, lumber and industrial applications is enhanced with rugged mainframes, powder coating and custom attachments.

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WALDON

Compact Units Offer Power Choice

Lauded as "the most compact forklift of its capacity available in it class," the Waldon forklift is available in three model sizes. Designed as the 5100, 6000C and 8500C models, the articulating, four-wheel-drive lift trucks range in operating weight from 9,156 to 20,335 pounds and, at maximum lift heights of about 15 feet, they register maximum lift capacities of 4,000 to 12,000 pounds.

Number of models: 3

Product-line features: Waldon's 4,000- and 6,000-pound-capacity forklifts offer a choice of engines. The Model 5100 is available with Deutz F3L912D or Cummins 4B3.9 diesels, or the gasoline- or LPG-powered Nissan H25. The 6000C is offered with the Deutz F4-L912D or Cummins 4B3.9 diesels, or the LPG-powered Hercules G-2300. The larger 8500C lift truck calls on the turbocharged Cummins 4BT3.9 diesel.



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XTREME

Turning Radius Key to Machines

The four models in Xtreme Manufacturing's XT-B Series of straight-mast forklifts range in lifting capacity from 6,000 to 12,000 pounds at increments of 2,000 pounds. The smaller XT60B offers a lift height of 21 feet, while the XT80B, XT100B and XT120B each reach 30 feet. For Xtreme, limiting the turning radius of the machines is a focus, and the three larger models have an outside turning radius of 13 feet 7 inches.

Number of models: 4

Product-line features: Each of the four current Xtreme straight-mast forklifts offers choices in their mast, carriage and fork configurations, as well as such options and accessories as fourth function valves, a load cushion hydraulic system, a work-light package, a rotating beacon and mirrors.

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Gallery of Rough-Terrain Forklifts

STONE CONSTRUCTION EQUIPMENT

Options Available for Smaller Jobs



Stone does not offer what would officially be labeled as rough-terrain forklifts, but does have industrial lift products that can be used both indoors and outdoors. Available are two models with three interchangeable mast options.

Number of models: 2

Product-line features: With a choice of ride-on or walk-behind machine operation, Stone's LJS200 model also offers operators the ability to raise and lower the forks via either a foot pedal or hand control, depending upon preference. Exclusive, spin-off hubs allow the outer tires to be removed to drive the machine through a standard door opening.

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OMEGA LIFT MANUFACTURING

Big Lifting Options Get Even Bigger

In the world of Omega Lift Manufacturing, there is something larger than Mega. It's called the HERC, one of the company's four different series of vertical-mast forklifts comprised of 12 core models. The Mega Series, with capacities from 8,000 to 20,000 pounds, has lift heights ranging 15 to 21 feet. If that's not enough, the massive HERC Series boasts lift capacities up to 50,000 pounds, powered by a turbocharged, 175-hp Perkins engine.

Number of models: 12

Product-line features: Omega covers all bases with its vertical-mast forklift offering. The 2X Series consists of two-wheel-steer models with lift capacities from 6,000 to 12,000 pounds, available in two- and four-wheel drive. The 44236 Series has two machines, with capacities of 6,000 and 8,000 pounds, offering lift heights up to 34 feet.

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HARLO

Side-Shift Masts Handle Loads

The Material Handling Division of Harlo Products offers two core rough-terrain forklift models that branch out via a range of engine and mast options, as well as a choice between two- and four-wheel drive. The HP 5000, with a lifting capacity of 5,000 pounds, is offered in Cummins or Deere power configurations. The HP 6500/8500 model, with masts capable of lifting 6,500 or 8,500 pounds, can utilize Cat, Cummins or Deere power.

Number of models: 2

Product-line features: All Harlo rough-terrain forklifts offer side-shift masts. For seasonal conditions, cabs are available as an option from the Michigan-based manufacturer, whose market ranges from forestry and agriculture to mining and construction.

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LIFTKING

Large Product Line Joins Growing Family



Now part of the vast Manitex Forklifts family along with the Schaeff, Noble and Lowry brands, the Liftking line is comprised of 24 models, including the P Series. While maintaining a small turning radius, the P Series machines are built to a 22,000-pound capacity, and even larger as specifically required. The Manitex Liftking line has introduced a roll-back engine cover.

Number of models: 24

Product-line features: With a focus on operator comfort, Liftking forklifts offer as standard a tilt steering wheel and adjustable suspension seat. With all levers and controls out of the way, easy access is possible from either side of the machine. Unusual adaptations to meet specific customer needs remain a staple of the former Liftking Industries of Toronto.

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*Based on 2007 Dodge Ram 3500 Heavy Duty Chassis Cab vs. 2006 Ford and GM one-ton pickup-based chassis cab models. Properly secure all cargo.

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BUSINESSLINK Chrysler Financial BUCKLE UP

By MIKE ANDERSON, Senior Editor

Horizontal Directional Drills

VERMEER

A narrowly designed rack-and-pinion drive system provides Vermeer's D36x50 Series II horizontal directional drilling unit (pictured) with smooth operation in a small footprint. Carrying 600 feet of one-piece Firestick II drill stem in 15-foot lengths, or 500 feet of Firestick II in 10-foot lengths, this horizontal directional boring machine is built to perform a wide range of medium-diameter, mid-to-long-distance utility installations, providing 5,000 ft.-lbs. of torque and 36,000 pounds of pullback force.

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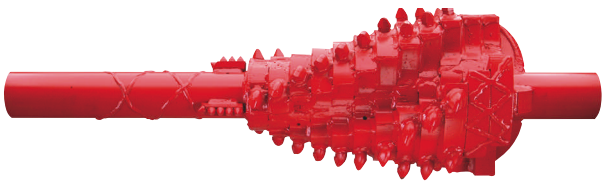

MELFRED BORZALL

With the new Ogre reamer (pictured) from Melfred Borzall's Directional Depot, each shark tooth carbide cutter takes off only ¼ inch more soil than the previous stage, providing smooth, efficient cutting. The angled jets shoot water in the direction opposite to which the reamer is turning. Combined with a slow taper and deep-spiraled fluting, the Ogre produces maximum mixing and pumping action. Though easy to rebuild, the Ogre features hardfacing on all wear areas, including the shaft. Another new Melfred Borzall product, the Quick-Swivel has a unique design that allows it to lock on and stay in line with the drill head. The mini Quick-Swivel allows HDD contractors to complete direct pullbacks without removing the drill head.

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STRAIGHTLINE

Central to the design of StraightLine's Model SL2020 horizontal directional drill is the elimination of complex electrical systems in favor of hydraulic-over-hydraulic controls. Powered by a 99-hp John Deere diesel engine, the SL2020 utilizes a 30-gpm triplex mud pump. At a width of 52 inches, the unit fits in congested residential areas, yet with 20,000 pounds of thrust/pullback and 2,000 ft.-lbs. of rotary torque, is designed to perform as a much bigger rig. Machine stakedown is matched to the size of the unit, as is the machine-fit rack and pinion. Simple hydraulic and electrical circuits are intentionally designed to be contractor-serviced.

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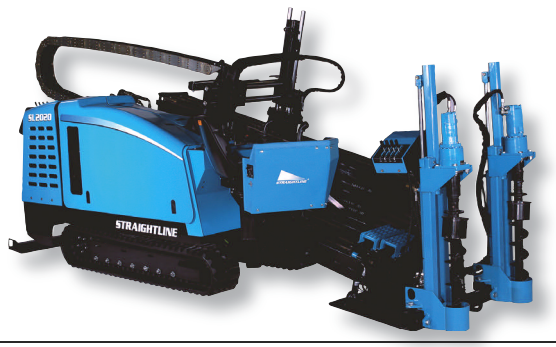



DITCH WITCH

Even boasting a high horsepower among the models competing in the 12,000-pound class of horizontal directional drilling machines, the Ditch Witch JT1220 Mach 1 (pictured) produces less than 100 dB(A) of noise, allowing contractors to work longer hours in congested commercial or residential areas. Although a compact unit, the JT1220 Mach 1 boasts an innovative pipeloader design and strong maneuverable undercarriage system. The larger Ditch Witch JT2020 Mach 1, with 20,000 pounds of pulling power, combines quiet operation with a high ratio of power to size. A rack-and-pinion thrust system provides outstanding power transfer and performance to perform a variety of tasks.

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ATLAS COPCO

Atlas Copco engineers combined advanced hard-rock cutting structures with reliable sealed bearing technology to create a complete line of pilot bits and hole openers for the horizontal-directional-drilling market. A full range of sizes and cutting structures are available, ranging in diameter from 4¾ to 17½ inches. Also, Atlas Copco offers random rock split bit hole openers in diameters ranging up from 8 inches. These hole openers utilize custom-designed and manufactured "Random Cutting Structure" bit thirds. Atlas Copco Secoroc initiated the supply of a finished split bit reamer to the HDD industry.

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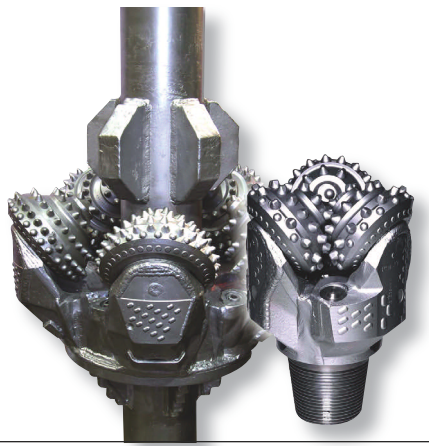

UNDERGROUND EQUIPMENT



Underground Equipment's place in the horizontal-directional-drilling market is the lightweight, portable side of the spectrum. The company manufactures nine machine models and associated tooling capable of boring diameters from 2 to 28 inches. With weights of 22 to 395 pounds, the machines are all designed for wet boring, and are built to create the bores only. They are are not designed or powered to move pipe. Underground Equipment's products are widely used by water and sewer utilities, and by utility, plumbing, sewer, irrigation and landscape contractors.

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CME

Central Mine Equipment designed the CME-50DD horizontal directional drilling unit with dual range thrust and rotation. This high-torque/low speed or low-torque/high-speed system is changed from one mode to another with the turn of a selector valve, even without the need to stop rotation. Carriage travel speed and force can also be changed from low to high range as drilling conditions dictate. A pivoting operator's station allows for improved view of all drilling operations. Safety and convenience is enhanced via remote-control tramming of the machine, which utilizes a rack-and-pinion drill-rod feed and retract system.

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TORO

A bore drive head attachment allows the users of Toro's mini loaders to dig under sidewalks and driveways to simplify irrigation and cable installations. With shorter rod lengths and the ability to lower the bore head, operators can work in both confined and open areas. The boring unit's universal joint further increases productivity by allowing contractors to keep rods in a horizontal digging position in the toughest soil conditions. Weighing 120 pounds, the Toro bore drive head attachment measures 24 inches in width and 22 inches in length.

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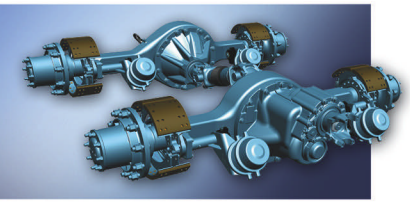

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By PRESTON INGALLS, Contributing Editor

Preventive-Maintenance Program Shines

ASRC Energy Services evaluates failure trends, improving planned maintenance from 58 to 80 percent

For Terry Howard, director of equipment operations for ASRC Energy Services (AES), the environment poses his greatest challenge. Howard manages fleet operations for Anchorage-based AES, which handles fleet management for the 800-mile-long Trans-Alaskan Pipeline System.

To service the pipeline's geographically distributed area, a constant staff of 110 people and 10 seasonal workers are currently stationed throughout Alaska in four primary shop facilities in Prudhoe Bay, Fairbanks, Valdez, and Pump Station 3 in the Northern Region, and in an additional six minor facilities.

"Conditions can range from 40 to 50 degrees below zero with wind and snow, to total darkness for months in the northern areas," Howard says. "In Valdez, there has been 12 feet of snow so far this year."

Howard, a Certified Equipment Manager who has been with AES since 1977, keeps his fleet mobile with a strong preventive-maintenance program. For five years, preventive maintenance on-time completion has remained at 95 percent or above, an improvement from the previous 45 percent. In the last 12 months, planned versus reactive maintenance has risen from 58 to 80 percent, and fleet-equipment availability has ranged from 97 to 99 percent.

Five years ago, each facility operated independently with limited resource sharing, Howard says. Now the team strives for continual improvement, meeting weekly by telephone to review key performance indicators, discuss problems, and share resources. The group addresses performance against budget, equipment availability, on-time maintenance completion, planned versus actual maintenance, inventory, downtime, customer service, and compliance measures. The parts department, based in Fairbanks, maintains an additional set of performance indicators.

"What gets reported gets managed," Howard says. "When our Monthly Managers Report is published, we collectively review for anomalies, these issues that can be drilled down to the source and resolutions sought." By systematically implementing improvements in their shop planning, scheduling, and preventive-maintenance programs, AES



Photos: Chris Arend©

AES continuously reviews and updates preventive-maintenance inspection check sheets.

PROFILE



Terry Howard, Director of equipment operations

ASRC Energy Services

Headquarters:
Anchorage, Ala.

Specialty:
Manages the fleet for the Trans-Alaskan Pipeline System

Equipment Value:
$100 million

Fleet Makeup:
4,000 units

Support Staff:
120

Facilities:
Prudhoe Bay, Fairbanks, Valdez, Pump Station 3 (Northern Region)

Website:
www.asrcenergy.com

has seen fleet operations performance indicators continue to rise.

Using an internal failure analysis approach similar to the TapRooT methodology, Howard's team examines equipment-failure trends and sets preventive maintenance to address problems before they occur. TapRooT is a root-cause failure analysis process that can be used manually or with an optional software program. The TapRooT system helps people solve problems by finding and fixing root causes that, when corrected, stop problems from happening over and over again. Howard's team has based their Alyeska Loss Prevention System (ALPS) on the TapRooT approach. ALPS provides a step-by-step approach to identify causal factors and mitigating action items for losses, near losses, loss-prevention observations, and loss investigations.

As an example, a recent Loss Investigation Report identified a crack in a steel tube hydraulic line on a skid-steer, resulting in the stoppage of a snow-removal operation. Following the ALPS steps, the team discovered that the line cracked at a bend where the metal was stressed during the forming process and that, upon disassembly, the line's rubber mount was out of place. To avoid a recurrence, the team enacted a plan to inspect the part at more frequent intervals and to utilize adhesive to prevent the rubber mount from sliding out of its bracket. A post-implementation review validated the solution.

Howard says the process of improvement in planned versus reactive maintenance is "more evolution than revolution."

"Fleet availability is a by-product of overall trend management," he says. A critical component of ongoing upward trending is a whole-hearted commitment to the preventive-maintenance program.

In another weekly pipeline-wide teleconference, the AES team reviews fleet-management reports and reacts to areas that need improvement. In these meetings, master mechanics from each facility provide explanations as needed for anomalies, issues are discussed, potential resolutions are evaluated and, as needed, items are flagged for additional attention.

Additionally, Howard and his team continuously review and update the existing preventive-maintenance inspection check sheets. They have developed equipment-specific preuse, campaigns to fix, check, and redesign inspection sheets to fill gaps identified in their ongoing meetings.

One example of the AES team's improvement is the refinement of an in-depth scheduling process. The group focused on a more defined process for estimation of shop repairs, allowing for adequate time, resources and repair priority. Now, rather than address failures, preventive work is scheduled seven to 10 days in advance, and technicians are given an adequate amount of time to perform inspections.

AES maintenance and reliability improvement efforts resulted in what Howard calls his greatest success to date, winning the 2005 Fleet Masters Award.

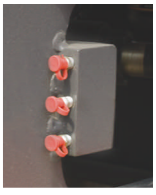
The newly constructed Fairbanks facility, state of the art for Alaska, contributes to the success of the operation. The facility is the primary shop for scheduled repair work on the Pipeline. It is equipped with two 9-ton bridge cranes, five 1.5-ton jib cranes, a central lube distribution system, a portable wireless heavy-duty four-point lift, a medium-duty vehicle four-post drive-on lift, and two light-vehicle four-post drive-on lifts. The shop also has an exhaust system with sliding hose reels, air-filtration system, office and parts room, drive-through wash bay with floor jets and water-recycling system, and a heated floor with in-floor drains.



Utilization rates at AES have inched forward toward perfection, improving from 97 to 99 percent.







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By MIKE VORSTER, Contributing Editor

The Shop Is More than a Workshop

A well-functioning shop supports five key areas for an equipment-owning operation

The shop is the most maligned and least-understood organization in the company. When folks say to me, "Hey, Mike, let's go and look at the shop," I really do not know what to expect. Will I see a large yard full of equipment, cleaned, adjusted and ready to go to work? Will I see repair bays where mechanics work to recondition and rebuild equipment? Or will I see a fuel-storage area where fuel and lube trucks collect the supplies they need for the next shift?

I will probably see all of the above and more. "The Shop" is truly the home base and nerve center for many functions essential to a smooth-running construction company.

We have often said that equipment management is not an end in itself and that it exists only to support the construction function. Nowhere is this more evident than in the shop, where it is difficult to differentiate between what is done to support and manage the fleet and what is done to ensure that construction operations receive the equipment and logistics support required to get their job done. Intra-organizational differences should be set aside. The shop exists, or should exist, with one clear objective: to ensure that the company has competitively priced, reliable equipment in the right place at the right time.

Let's look at what the shop does to better understand the breadth of its operations and the contribution it makes to the company as a whole. Every company will differ depending on size and geographical spread, but every shop supports the company in at least five key areas.

1) The Yard. We need a place to receive, store, and make ready the myriad of equipment, tools and supplies that come and go on every job. Some yards are neat, clean and tidy. Others are nothing other than the end result of the instruction to "go dump that in the yard." Are we surprised, then, that the bridge screed takes long to set up and make operational when it spends the winter wedged between the rope shovel last used in 1955 and the barrier wall sent back from the last job? Are we surprised that we cannot find the skid-steer attachments we want because Joe, who dumped them in the bottom of the yard last fall, has relocated to Alaska?

Yards exist to make sure that company assets, no matter how small, are inventoried, stored and protected. They reduce costs by preserving and recycling the equipment, attachments, tools and supplies we use and improve efficiency by keeping it on hand and ready to work. Yet, too often, they do not receive the attention and budget allocation they deserve.

2) Dispatch. The dispatch function ensures that the equipment, attachments, tools and supplies are in the right place at the right time. It sets the tone for the relationship between equipment and operations and, as with the yard, seldom receives the attention it deserves. It is there, it functions, and we expect that moves will be performed on time and with the required permits.

Dispatch is a high-stress job. You seldom find a dispatcher who is not torn between priorities or in the middle of a conflict between two individuals, both of whom believe that their job must receive the only available track loader. It requires good information on where everything is at the moment, how hard it is working, and who needs what in the next short while.

Companies differ as to how they recover the cost of dispatch: Some see it as general overhead, some build it into the equipment rate, and some see it as a direct cost to the re-



Mike Vorster

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

It is difficult to see a company operating without a competent yard to inventory and store equipment waiting for its next assignment.

ceiving job. Regardless, the dispatch function improves asset utilization, supports operations, and is part of what we expect the shop to do.

3) Field Support. This area serves three critical groups: fuel and lube technicians, preventive-maintenance technicians, and road mechanics. All must have a place to call home, keep supplies and consumables, receive instructions, plan routes, and set priorities. The shop provides these facilities and acts as a central point where technicians and mechanics obtain what they need and prepare for the work they perform in the field. The shop also provides the record keeping and cost-management expertise needed to reconcile quantities, set budgets, and achieve targets.



The shop supports five critical aspects of company operations.

Of critical importance to the whole operation is the need to purchase, receive, store and distribute the fuel, oil, filters, consumables and parts required to keep the fleet up and running. Field support operations depend on the nature and spread of the company's operations. It is not unusual to require that everything functions 24/7 so that machines can be fueled, maintained and repaired in the field outside normal work hours.

The shop is more than a repair facility. It is a home for people and equipment and a nerve center for the logistics needed to make the company work.

4) Repair and Fabrication. This is what most people see as the principal function performed by the shop. It certainly is the most visible, and the repair bays, fabrication shops, and paint booths involved frequently make up the majority of the operation. Competent repair shop management requires that the work be identified, planned and scheduled well in advance; that it be performed to achieve set standards for productivity and quality; and that a good work-order system is used to record equipment costs, set budgets, and develop machine histories.

Work done in the company's repair bays or fabrication shop is little different from that performed by dealers and/or third-party specialists. Company facilities have the advantage of being more flexible when it comes to planning and scheduling the work and are certainly more focused on the needs of the company. They are, however, often at a disadvantage when it comes to the tools and technologies needed to repair or rebuild complex components under controlled conditions.

5) Home Base. Our review of the previous four functions performed by the shop neglects the fact that the shop provides a home base for everybody and everything. Mechanics, technicians and suppliers come and go; information is exchanged; and the whole organization works together to support field operations. The shop is more than a repair facility. It is a home for people and equipment and a nerve center for the logistics needed to make the company work.

We can discuss the need for comprehensive shop facilities and exchange thoughts on the wisdom of using dealers or third parties to perform our work. But when we do this, we downplay the role that the shop plays in providing a home base for our operations. It is difficult to see a company operating without a competent yard to inventory and store equipment waiting for its next assignment. It is difficult to see a company working without an ability to deploy its fleet to required locations at a moment's notice. It is difficult to see how it can work without providing field personnel with a home base for their operations.

We can debate how many repair bays we need to support a fleet of a certain size, and we can argue whether or not engine or transmission rebuilding is a construction core competency. There is, however, no doubt that yard operations, dispatch, field support, basic emergency repair, and short-run fabrication capability are core competencies for success in construction.

It is no good having competitively priced equipment if it is not well looked after in the yard, speedily dispatched when needed, and reliably supported by competent and dedicated field personnel.

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CONSTRUCTION EQUIPMENT

By WALT MOORE, Senior Editor



Estimated maximum operating weights for Volvo's new F-Series wheel loaders — L60F, L70F and L90F — are 27,120, 30,860 and 37,480 pounds, respectively.

Next-Generation Volvo Wheel Loaders

Three new F-Series models further refine their predecessors' power-train design and operator's environment

Sometimes things stay the same, and that can be good. Sometimes things change, and that also can be good. For example, one design feature Volvo has kept the same on in its three new F-Series wheel loaders — the L60F, L70F and L90F — is the "all-rounder" concept. This concept employs the company's patented torque-parallel (TP) loader linkage, designed to combine high breakout forces with parallel lift action throughout the lifting range, while working in concert with a Volvo coupler for handling a selection of buckets, forks and attachments, including brooms, log grapples and material-handling arms.

Also retained in the design of the F-Series models is Volvo's Contronic machine-intelligence system. The system monitors operating systems, stores operating data, facilitates troubleshooting and allows updating and adapting machine performance and function to changing operating conditions. The Contronic system also has the ability to automatically restrict engine power if it senses that a potential malfunction will damage the engine or transmission.

But since change also can be good, the F-Series models are fitted with a new engine, new transmission and new cab. Powered by the 5.7-liter, Tier-III-compliant Volvo D6E engine, the loaders deliver 6 to 13 percent more horsepower and up to 15 percent more torque, compared with their E-Series predecessors. The new machines have net horsepower ratings of 154, 168 and 172, respectively. According to Volvo, the new engines produce high torque at relatively low speeds, contributing to high rimpull, low fuel consumption, and reduced sound levels both inside and outside the cab.

The new Full Automatic Power Shift transmission, with four gear ranges forward and reverse, is designed to change ratios independent of machine speed and engine speed, thus allowing precise gear selection to match operating conditions. New software in the electronic control unit, says Volvo, adapts to an operator's style of driving by "optimizing gear-changing parameters." The new transmission is notably quieter than its predecessor, says the company, and maximum speed in the L90F is up by 25 percent.

Volvo's Care Cab is also a new design highlight of the F-Series models. The cab is not only longer and wider than that of predecessor models, says the company, but it's also quieter and provides enhanced visibility. The new laminated front windshield is nearly 25 percent larger, and thinner pillars allow better sight lines in all directions.

Also in the cab, Volvo's lever-steering system is an option, allowing the operator to steer the machine and make directional changes from controls in the left armrest. Other options include Boom Suspension System, designed to absorb the shock of boom movement during travel, as well as a long boom, providing extra height for loading tall trucks and hoppers.

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By ROD SUTTON, Editor in chief

Telehandler Pushes High-Lift Envelope

Xtreme XRM1267 lifts 6,800 pounds to 67 feet

In the range of telehandlers with lift height greater than 55 inches, Xtreme Manufacturing's XRM1267 pushes the performance range. According to the company, this telehandler will take 6,800 pounds to 67 feet high, and 3,000 pounds to its maximum horizontal reach of 53 feet 9 inches. It has a lift capacity of 12,000 pounds.

The telehandler has "the ability to be able to load material into the fifth floor of a building," says Lee Kramer, vice president, engineering for Xtreme. "Both the lift height and reach are prime features."

Launched earlier this year at World of Concrete, the XRM1267 is imported from Italy in an exclusive agreement by Xtreme to market and sell the telehandlers in the United States. Xtreme is owned by Don Ahern, who also owns Las Vegas-based Ahern Rentals. Dieci manufactures the machines in Italy and sells them in the European market.

A key feature on the XRM1267, Kramer says, is the roller boom. "The roller boom replaces the wear pad, which is a maintenance issue," he says. "It also improves the performance of the boom." Daily service points are grouped together at one location, he says. In addition, all electrical wiring terminates at one central location for ease of troubleshooting.



Xtreme XRM1267 lifts 3,000 pounds to a maximum reach of 53 feet 9 inches.

Other features include a 130-hp Perkins turbocharged diesel, 360-degree visibility, and planetary four-wheel drive. Operating weight is 46,300 pounds.

List price for the XRM1267 is $245,000. Warranty on the telehandler is 10 years on the frame and chassis, five years on the roller boom, three years on hydraulics, and two years on the power train.

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Spec Comparison of High-Reach Telehandlers

Model	Max. lift height	Lift capacity @ max. height (lb.)	Max. lift capacity (lb.)	Max. reach
Xtreme XRM1267	67′	6,800	12,000	53′ 8″
Ingersoll Rand VR-1056C	56′ 2″	6,000	10,000	41′ 6″
Genie GTH-1056	56′	4,000	10,000	40′
Pettibone 10056 Extendo	56′	4,500	10,000	42′ 1″
ZoomBoom ZB10056	55′ 10″	5,000	10,000	41′
Caterpillar TL1055	55′	5,000	10,000	42′ 6″
Gehl DL-10H / 55	55′	5,500	10,000	40′ 9″
Gradall 544D10-55	55′	5,000	10,000	42′
Omega Lift 10T55-E ARM	55′	4,000	10,000	36′
JLG G12-55A	55′	5,000	12,000	42′
LiftKing LK 120R Traverse Action	55′	4,000	12,000	37′ 1″

Note: List may not include all of a manufacturer's models; see Spec-Check.com for more comparisons.
Source: Spec-Check.com



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By LARRY STEWART, Executive Editor

Steep-Slope Roller Cuts Cost by a Third

Sakai CV550 vibratory soil roller eliminates one operator and one machine for compacting 45-degree slopes

COMANCO Environmental Corp. bought the first two of Sakai's CV550 compactors available in North America because the track-driven rollers can climb the 45-degree slopes of landfill cells. The Florida-based contractor has completed hundreds of environmental-protection projects. Building solid-waste containment demands compliance with strict federal mandates, including dense compaction of steep slopes, and the environmental sensitivity makes the projects hard to finish profitably.

Usually, a bulldozer with a winch pulls a compactor up the slope. It's far from cost effective. According to Steve Kitzmiller, a COMANCO project manager, the approach "certainly cut our margins, especially when we were having difficulty making density and required additional passes."

Other alternatives included pulling 1,000-pound vibratory plate compactors up the slopes using an excavator boom, or simply tracking up and down the slopes with a dozer.

Using Sakai's CV550 in place of a conventional roller and dozer with winch saves about $3,000 per month, or nearly a third of the total equipment cost for compacting slopes. It is said to halve the labor cost.

"Improved safety is the biggest advantage, though," says Jesse Roberts, COMANCO's heavy equipment coordinator. "We only have one man and one machine on the slope, and don't have to rig up the operation to deal with different project scenarios."

Based on Sakai's SV510 roller with drive wheels, the tracked CV550 machine gets a heavier main frame and thicker drum shell. The triangular track is designed by Sakai. The drum delivers 50,000 pounds of centrifugal compacting force as it climbs. Its 169-hp turbocharged Isuzu diesel is significantly more powerful than SV510's 138-hp Isuzu.

The standard Sakai 12-month or 1,000-hour warranty, with a three-year major-component warranty, applies to the two CV550 Series machines.

Aside from hydraulic problems caused by a vandal who dumped sand into the oil tank, COMANCO has had no mechanical issues with one CV550 that has clocked more than 1,500 hours.

"It works exceptionally well for what we've been doing with it on the slopes, but it is extremely slow (compared to wheel-driven compactors) on flat ground," he points out. Projects that require a lot of flat compacting work are assigned a wheeled roller. COMANCO got rid of the second CV550 when managers discovered they are not general-purpose rollers.

Two configurations are available: the CV550D with a smooth drum for semi-cohesive soils and the CV550T padfoot drum for cohesive soils. Sakai says street price is about $190,000 for the smooth drum and $200,000 for a model with padfoot.

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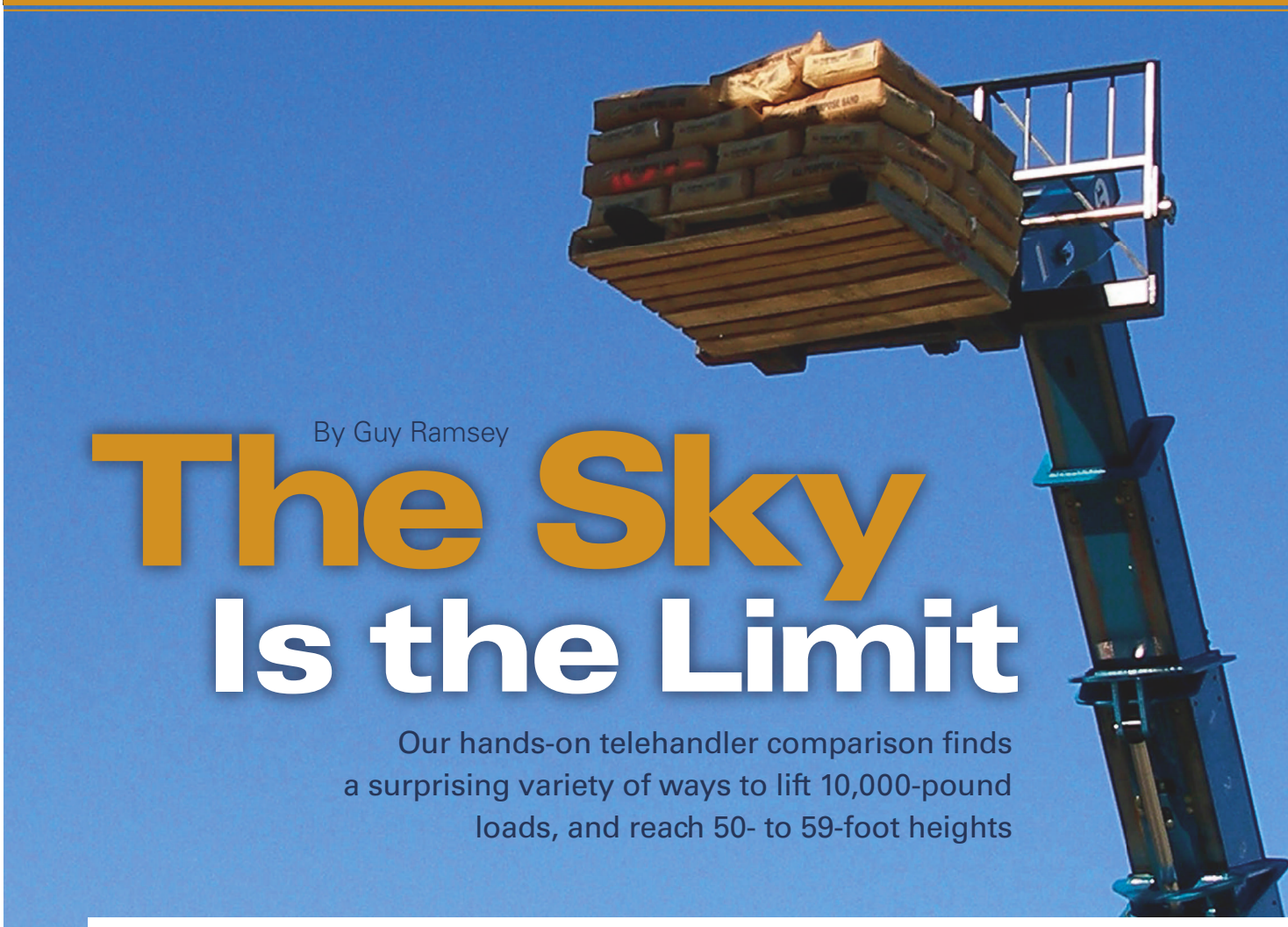


By Guy Ramsey

The Sky Is the Limit

Our hands-on telehandler comparison finds a surprising variety of ways to lift 10,000-pound loads, and reach 50- to 59-foot heights

Telehandler Showcase Specifications

	Max. Lift Height	Cap. at Max. Height (lbs.)	Max. Outreach	Cap. at Max. Reach* (lbs.)
Gehl DL-10H/55	55' 0"	5,500	40' 9"	2,000
Genie GTH-1056	56' 0"	4,000	40' 0"	2,000
Gradall 544D10-55	55' 0"	5,000	42' 0"	3,000
Ingersoll Rand VR-1056C	56' 2"	6,000	41' 6"	3,000
JLG G10-55A	55' 0"	5,000	42' 0"	3,000
Lull 1044C-54 Series II	54' 0"	4,000	45' 0"****	1,500***
Manitou MT-1745 HSL Turbo	54' 5"	6,600	39' 9"	2,000
Mustang 1155	55' 1"	5,500	40' 9"	2,000
Pettibone Extendo 10056	56' 6"	6,000	42' 1"	3,000
SkyTrak 10054	53' 2"	4,000	39' 0"	3,000
Xtreme XRM1254	53' 6"	10,000	38' 0"	3,000
CareLift ZoomBoom ZB10056	56' 0"	4,000	41' 0"	2,000
Caterpillar TL1055	55' 0"	5,000	42' 5"	3,000
Genie GTH-1056**	56' 0"	4,000	40' 0"	3,000
JCB 550-170 Loadall	54' 9"	5,000	41' 5"	1,100

Growth of telehandler sales has been robust, to say the least, and units with lift capacities between 9,900 and 11,000 pounds and lift heights from 50 to 59 feet have outpaced the rest of the market. Sales for 10,000- to 12,000-pound machines have increased 90 percent since 1999, compared to a 72 percent increase in all telehandler sales. As contractors recognize the opportunities and applications these larger machines present, demand will no doubt drive these machines to heights once thought impossible.

It is amazing to me how machines that are so similar in what they do can be so different in execution. Among a dozen machines participating in the Telehandler Showcase, there are three distinct design differences: the Gradall unit's pivot steering, the Lull's traversing boom and, to a lesser degree, the Manitou and Mustang machines' low-mounted booms.

High-mounted booms are best suited for pick-and-carry applications, where the

The first-ever Telehandler Showcase, cosponsored by *Lift and Access* and *Construction Equipment* magazines, celebrated progress in the fast-growing 10,000- to 12,000-pound telehandler market. Held in Phoenix last October, the Showcase hosted 12 of the 14 brands in that weight class with 50- to 59-foot lift heights. Present at the inaugural event were Manitou, JLG, Gehl, Genie, Gradall, Ingersoll Rand, ZoomBoom, Pettibone, Mustang, Lull, Xtreme, and SkyTrak. The new Caterpillar TL 1055 was a last-minute scratch due to production delays. A JCB representative attended, but the company was unable to produce its Model 550-170 for the Showcase. Xtreme does not produce a 10,000-pound unit with a 50- to 59-foot lift height, so the 12,000-pound XRM1254 was brought instead.

	Outside Turn Radius	Weight (lbs.)	Engine Make / Power	Axle	Transmission	List Price
	146"	28,460	John Deere / 115	Carraro	Dana	$144,000
	207"	31,500	John Deere / 125	Dana Spicer	Dana	$149,985
	175"	33,570	John Deere / 125	Carraro (front)	Rexroth	$150,125
	154"	32,300	Cummins / 110	Dana	Dana	$134,700
	168"	34,400	John Deere / 125	Dana	ZF	$146,340
	164"	31,900	Cummins / 110	ZF	ZF	$154,650
	174"	24,438	Perkins / 101	Dana Spicer	Rexroth	$125,345
	148"	28,460	John Deere / 115	Carraro	Dana	–
	150"	32,500	Cummins / 110	Carraro	Carraro	$140,460
	164"	28,123	Cummins / 110	ZF	ZF	$143,025
	148"	35,530	Perkins / 122	Carraro	Carraro	$147,042
	158"	32,400	Cummins / 110	Dana	Dana	$129,120
	168"	34,700	Caterpillar / 125	Dana	ZF	$139,210
	156"	29,500	John Deere / 125 or Perkins / 127	–	–	$149,985
	161"	26,810	JCB / 100	JCB	–	$140,000

All of the machines in the test were rated at 10,000 pounds except the 11,000-pound Mustang 1155 and the 12,000-pound Extreme XRM-1254.

** With outriggers*
*** Re-launched February 2007*
**** With 80-inch traverse*

The Telehandler Showcase kicked off with the Operator Event, in which 19 local operators from the framing, masonry, steel erection, roofing, and demolition industries came to run the equipment, talk to the manufacturers' reps, and report their likes and dislikes in a post-event survey.



forks are typically carried at least 24 to 36 inches off the ground. At this height and higher, visibility to the right front, side, and rear of the machine is optimum. On the other hand, low-mounted booms are better tool handlers. Visibility is optimal when the forks are carried low (at less than 36 inches), during attachment use, or when they are lifted much higher (above 7 or 8 feet).

Information provided in the following individual machine reviews is intended to provide background to help you make your buying or rental decisions. Many details for the individual write-ups were gathered from the Walk-Around Presentations during the Telehandler Showcase, and you can watch video of those presentations at ConstructionEquipment.com.

Rental, framing, masonry, steel erection – it really doesn't matter what type of business you are in, a key part of your purchasing decisions must be made on the machine that best fits your needs.

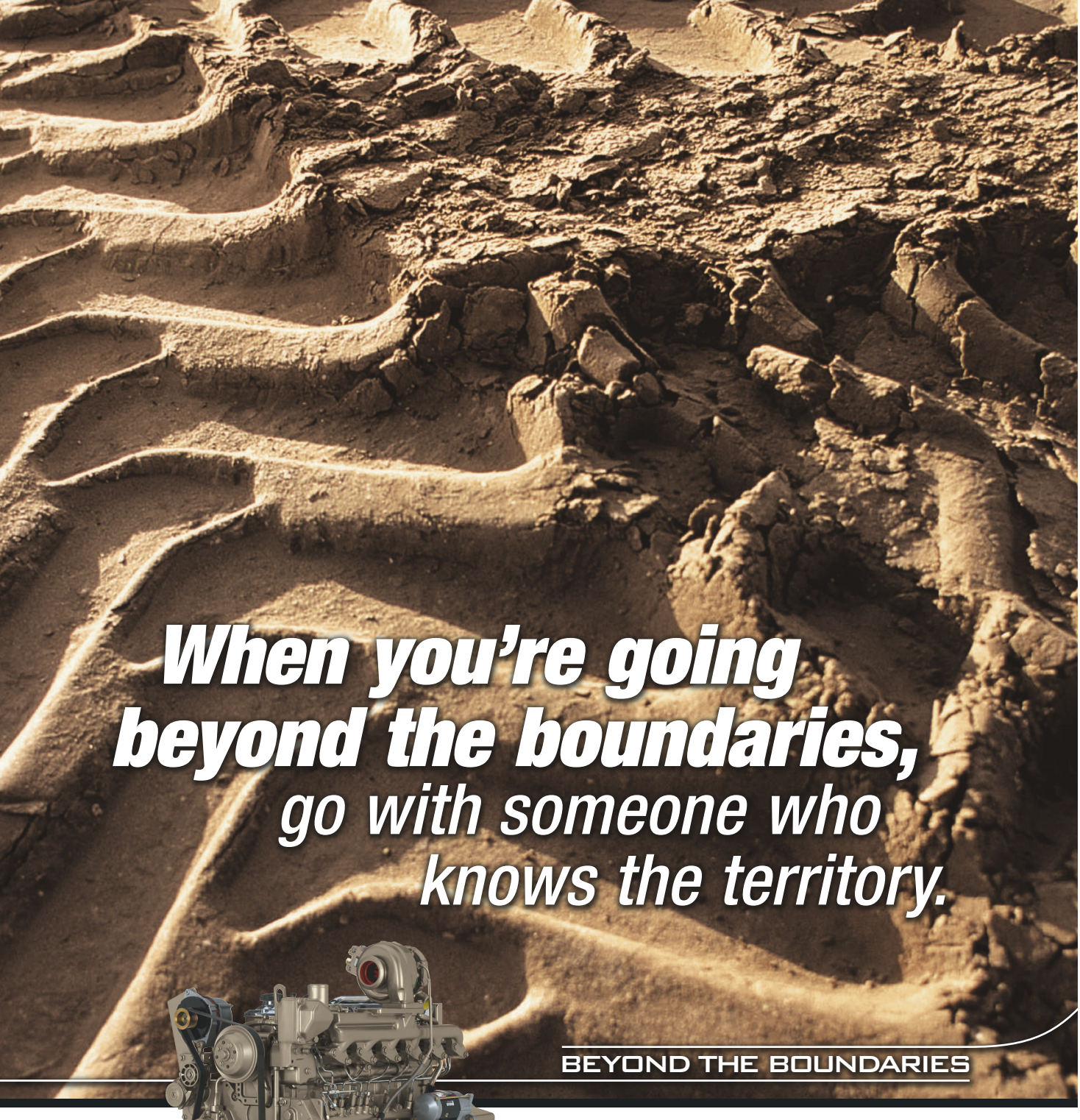
To learn more about what users think of 10,000- to 12,000-pound telelhandlers, we invited 19 Phoenix-area operators involved in masonry, framing, steel erection, roofing, construction, and demolition to spend an afternoon with the 12 machines at the Showcase. In total, these professionals had an average of 15.7 years of experience operating telescopic handlers.

During the Operator Event, attendees were urged to climb in each telehandler to get a feel for the cab and controls and assess the machines' features and benefits, including shooting the boom in and out, testing the turning radius, and lifting palletized loads to the deck of an elevated mast-climbing work platform.

> "It is amazing to me how machines that are so similar in what they do can be so different in execution."
> — Guy Ramsey

After they had run each of the machines, we asked the operators a number of questions about telehandlers in general and this product class specifically. Survey questions included percentage of time spent in certain machine configurations; telehandler design preferences; and ranking the importance of features and options.

All but one of the 15 operators who answered the debriefing survey reported that the 10,000- to 12,000-pound capacity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telehandler with 50- to 59-foot lift heights meets their capacity and lifting needs, while six respondents said the maximum forward reach and the maximum lift height falls short of their load expectations.

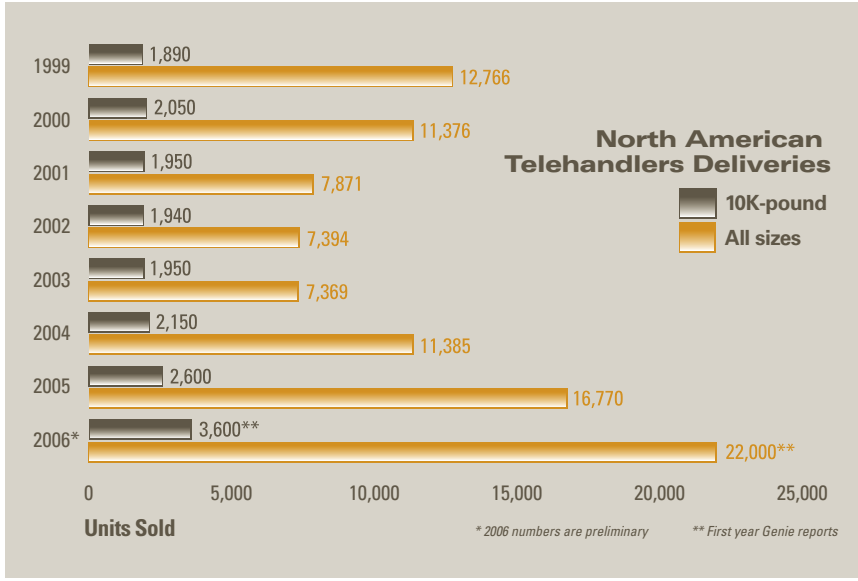
Six operators said they operate at full height more than 50 percent of the time, but only four operators work at full forward reach more than 50 percent of the time. On average, they spent 15 percent of the time operating in two-wheel steer, 78 percent in four-wheel steer, and only 7 percent in crab steer.

When it came to ranking the most important design elements of a telehandler, the operators rated visibility to the front, visibility of the forks at maximum height, and visibility at the right side of the carriage the three most important features. The lowest-rated features were auxiliary hydraulics, tilt steering, and additional storage. Features the operators felt were missing included LMIs, a remote gauge for tire pressure, remote controls, mirrors, and single-point service access.

Once you find the telehandlers that meet your jobsite requirements, the next step is to carefully consider the overall cost of machine ownership and operation.

Be mindful of the fact that the actual expense to maintain or repair a telehandler is often not the highest cost of a breakdown. Downtime associated with the machine out of service also must be estimated. Features and benefits must be weighed against durability and serviceability.

On the following pages, the individual machine write-ups are presented in the same order as they were shown during the Telehandler Showcase. To avoid redundancy in the write-ups, all machines are equipped with ROPS and FOPS certified cabs and two-, four-, and crab-style steering, unless otherwise noted. Also, all power shift transmissions are fully modulated, which protects the transmission and allows the telehandler to decelerate to an acceptable engine rpm before downshift-



Sales for 10,000- to 12,000-pound machines have increased 90 percent since 1999, compared to a 72 percent increase in all telehandler sales.



The Telehandler Showcase's second day consisted of the Walk-Around Presentations. Each OEM presented its respective product to all of the assembled participants — component vendors, Showcase sponsors, and editorial staff from *Lift and Access* and *Construction Equipment* magazines.



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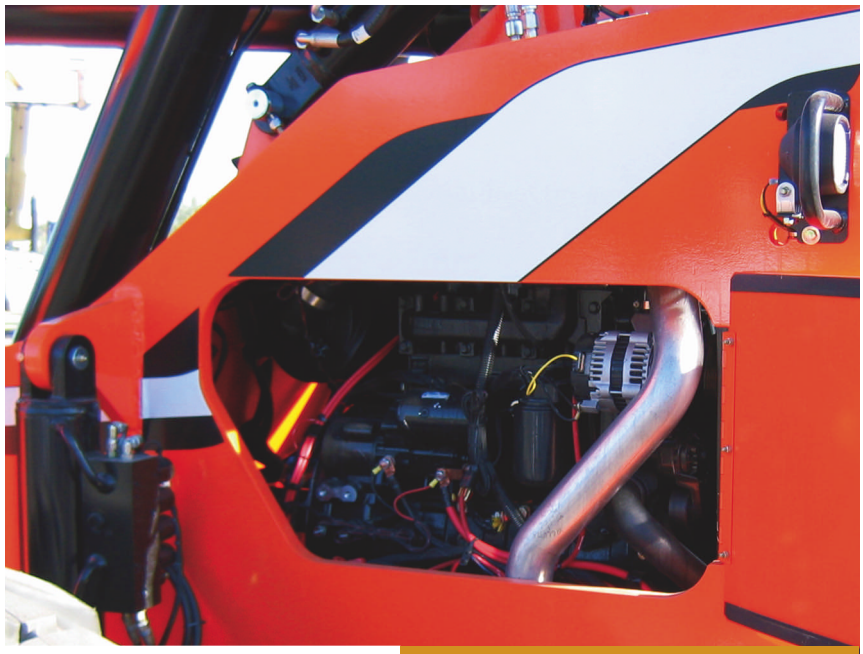
Engine Placement

There are two camps when it comes to telehandler engine mountings: Those who prefer engines located in pods mounted beside the frame, and others that like engines center- or rear-mounted within the frame.

It is widely believed that the earliest telescopic material handler was the Extendo, produced by Pettibone in about 1969. The Extendo and other early telehandlers were designed with the engine mounted in the frame, which was driven largely by the engine, transmission, and driveline technology of the day. OEMs turned to readily available, tried-and-true tractor technology. This fact drove not only engine placement, but also boom pivot locations. The boom-pivot point was mounted either high above or behind the engine.



SkyTrak's rear-mounted in-frame engine. Three of the 12 telehandlers reviewed at the Showcase had engines mounted in-frame, near the rear of the machine.

European markets demanded more compact and more versatile machines. Concerns about all-around visibility drove them to lower the boom-pivot point, allowing for better visibility on the right-hand side of the unit when the boom was fully lowered. Lowering the boom mandated a revision to the layout and included moving the engine to a location on the side between the wheels.



JLG's Dave Baxter points out the advantages of the side-mounted engine. Four of the 12 Showcase telehandlers had engines in pods mounted on the side of the frame.

On day three of the Telehandler Showcase, each OEM was asked to make two roundtable presentations. The first session allowed manufacturers to discuss the intangibles of their product, such as product support and other items that add value and drive buying decisions. In the second session, the manufacturer's reps answered specific product questions and discussed design considerations.

Machines from Merlo, Manitou, and Caterpillar came to market in the late 1980s and early 1990s. Over-the-boom visibility and the perceived service-access advantages of side-mounted engine designs came at a cost premium if a hydrodynamic drive was used. But according to Dana Spicer, a leading supplier of driveline products to the telehandler industry, the volumes produced today make the cost more manageable.

It is interesting to note that of the 14 machines in the 10,000-pound capacity, 50- to 59-foot lift height class, six have side-mounted engines and eight are mounted in-frame. The eight companies with in-frame engines – Pettibone, Xtreme, ZoomBoom, Lull, SkyTrak, Ingersoll Rand, Gradall, and Genie – all participated in the Telehandler Showcase.

Side-mounted engines are very easy to access. All are located under large swing-up hoods typically made of fiberglass or



Xtreme is a great example of a well-thought-out, mid-engine installation. Five Showcased machines carried their engines mounted nearly centered within the frame.

ABS plastic. We like the fact that these are easy to secure under lock and key, and items like the fuel filter, fluid check points, the battery, and its disconnect are all handy. The only drawback is that some service points, typically the starter, are located on the back side of the engine and require lying on your back and crawling under the engine – something you wouldn't want to do on a muddy jobsite.

Two key advantages of side-mounted engines is that placement of the pod should reduce both engine noise and heat transfer to the operator's cab. Unlike the JLG, Mustang, and Gehl telehandlers, Manitou's pod engine is mounted at right angles to the chassis. The transverse configuration allows equal access to both sides of the engine.

In the in-frame camp, there are two locations being utilized. The SkyTrak, Lull, and Genie telehandlers place the engines more toward the rear of the frame. This is the most traditional location for engine placement. The more recently introduced models from ZoomBoom, Xtreme, Pettibone, and Ingersoll Rand place the engines closer to the middle of the frame. Although service points on the rear engine units are quite adequate, there are some access limitations when compared to the wide-open access offered by the newer mid-engine designs.

Those that adhere to the in-frame engine design claim unique advantages. In-frame engines do not have the additional cost and maintenance associated with the required transfer box between the transmission and the driveline. In-frame marketers argue that the absence of the pod actually improves right-hand side visibility – especially when the boom is elevated to carry position. They also point out that the pod engine could limit maneuverability when attempting to crab up next to a post or beam. Although not really an operator issue, engineers must also deal with keeping the center of gravity along the centerline of the machine. When an engine is mounted on the side, significant counterweight must be added.



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Equipment Ergonomics



Xtreme offers a unique Y-controller that cradles the operator's forearm, allowing control of frame sway without removing a hand from the wheel or joystick.



Mustang's single multi-function joystick, right-side glass, and cushioned armrest all enhance comfort in the cab

Modern ergonomics first emerged in World War II when airplane controls were redesigned to reduce pilot error. Since then, the science of designing machines, products, and systems to maximize safety and comfort has expanded to a number of engineered goods – including construction equipment.

Operator cabs have significantly changed in the past 20 years, moving away from fixed seats and poorly positioned hand controls to suspension seats, ergonomic joysticks, and anatomically correct positioning that enable operators to see the load better, access controls easier, and minimize back strain and fatigue. Overall, ergonomics have allowed operators to work safer and be more productive.

At the Telehandler Showcase, North American telescopic handler manufacturers highlighted features incorporated into their 10,000- to 12,000-pound capacity machines that are designed to enhance comfort. These included improved visibility with the placement of the boom and roof bars, and larger cabs, arm rests, and suspension seats for operator comfort. Right-hand side glass is a standard feature on many telehandlers, which helps to reduce engine noise. Additionally, manufacturers reported different advantages for the placement and use of single multi-function and dual controls, depending on their configuration.

But what ergonomic features do operators like? Phoenix-area telehandler users from the steel erection, masonry, framing, roofing, construction, and demolition industries were surveyed at the Telehandler

Special thanks to the Telehandler Showcase's sponsors:
John Deere Power Systems, Waterloo, Iowa; Urethane International, Alpharetta, Ga.; Power Great Lakes/ Power Solutions Inc., Wood Dale, Ill.; and Polygon Co., Walkerton, Ind. We also would like to acknowledge help we received from Lance Sullivan, fleet product and service manager of Sunstate Equipment Rentals, Phoenix, who offered his services during the roundtable presentations; and Jack Kucksdorf, president of Kucksdorf Consulting, Random Lake, Wis., who offered technical support. Finally, we would like to thank Ross Equipment Rentals, Phoenix, for providing logistical support and equipment.



Showcase operators who preferred dual controls found they were easier to handle. Only three machines in the Showcase had dual joysticks.

Showcase during the Operator Event about features and benefits they prefer. Among the questions in the survey were preferences on cab and control configuration. The operator's preferences for open cab or closed cab with heat and air conditioning were split about 50-50. In Phoenix, the reasons are obvious as to why operators would like to sit in a closed cab with AC, but operators who were partial to an open-cab configuration noted there was better visibility, and they were able to hear more in an open cab.

The inclination to use a single multi-function joystick or a dual joystick also was noted during the survey. Two-thirds of the operators preferred single multi-function controls, reporting they liked it because they didn't have to look around for the joystick, enabling them to keep their eyes on the load, and they were able to leave their other hand on the wheel. Those with a bias toward dual joysticks found they were easier to handle, and they could get more functions or options with these controls.



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Outrigger Placement

At the Telehandler Showcase, each machine was equipped with outriggers — or stabilizers, in the case of Ingersoll Rand — to attain their load capacities at maximum height and outreach. Some units have interlocks to limit machine operation without deploying the outriggers (see the telehandler-features spreadsheet below). The reach charts for these respective machines vary greatly, so buyers and users should look closely at the charts when buying, renting, or operating these machines.

As with engine location (read more in the story on page 9), there is a clear line of differentiation when it comes to how the outriggers are mounted. They are either mounted to the frame or the front axle. The spreadsheet below identifies the differing designs for each model. Also similar to the engine location, it is no surprise there are two differing opinions about which mounting system works best.

The inset image shows the frame-mounted design. Notice on the Gradall that the supports are clearly part of the chassis. Once the outriggers are set in place, the operator must either use the outrigger itself to level the frame or raise both outriggers, re-level, and reset.

Axle-mounted outriggers are directly linked to the machine axle, which moves independently of the frame. This allows frame-leveling when the outriggers are already in place, so the stance does not have to change. By comparison, frame-sway is not possible with frame-mounted outriggers.

Those that market machines with frame-mounted outriggers would argue that once the outriggers are set and the unit is properly leveled, swaying the chassis is not necessary once the load is in the air. These manufacturers also like to point

Showcase Machine Features

	Introduced	Outrigger mounting	Engine location	Rollers or slide pads in boom	Telescopic (crowd) cylinder location	Standard tire fill
Gehl DL-10H/55	1998	Frame-Mounted	Side-Mounted	Slide Pads	External Below Boom	Pneumatic
Genie GTH-1056	2000	Axle-Mount	Rear (In-Frame)	Rollers	External Below Boom	Calcium Chloride
Gradall 544D 10-55	1997	Frame-Mounted	Mid-Mounted (In-Frame)	Slide Pads	External Below Boom	Calcium Chloride
Ingersoll Rand VR1056C	2001	Frame-Mounted "Stabilizers"	Mid-Mounted (In-Frame)	Slide Pads	Internal	Pneumatic
JLG G10-55A	2004	Frame-Mounted	Side-Mounted	Slide Pads	External Below Boom	Pneumatic
Lull 1044C-54 Series II	2005	Axle-mounted	Rear (In-Frame)	Slide Pads	Under Boom	Calcium Chloride
Manitou MT-1745 HSL Turbo	2003	Frame-Mounted	Side-Mounted	Slide Pads	External Below Boom	Pneumatic
Mustang 1155		Frame-Mounted	Side-Mounted	Slide Pads	External Above boom	Pneumatic
Pettibone Extendo 10056	2001	Axle-Mounted	Mid-Mounted (In-Frame)	Slide Pads	External Below Boom	Pneumatic
SkyTrak 10054	2000	Axle-Mounted	Rear (In-Frame)	Slide Pads	External Below Boom	Pneumatic
Xtreme XRM1254	2006	Axle-Mounted	Mid-Mounted (In-Frame)	Rollers	Internal	Foam-Filled
ZoomBoom 10056	2003	Axle-Mounted	Mid-Mounted (In-Frame)	Slide Pads	External Below Boom	Pneumatic

out that they believe frame-mounted outriggers can be mounted higher, which improves the approach angles.

There is one exception to both configurations. Ingersoll Rand does not use outriggers, but instead, it has stabilizers. Unlike outriggers, stabilizers are not intended to support the weight of the machine or the load, and they only come into play if the machine was to laterally lean on them on one side or the other. As shown in image (top, right), the stabilizers are frame-mounted but are designed to allow frame-sway up to 40 percent of the normal operating range.

Frame-mounted outriggers, as on this Gradall (below), allow higher mounting for more ground clearance. Five Showcase machines have frame-mounted stabilizers.





(Above) Ingersoll Rand's unique frame-mounted stabilizers aren't designed to support the entire weight of the machine and load, but they allow frame-sway to function when they're deployed.

	Rear axle stabilization (RAS)*	Warranty
	Above 60°. Set park brake and shift to neutral, axle locks and sway speed is dampened.	B-to-B: 1 year; Drivetrain: 2 years or 2,000 hours; Frame Structure: 10 years
	Above 55°. Disengage transmission and lock-out axle.	B-to-B: 1 year; Hydraulic: 3 years; All structural: 5 years
	Dampened speed when above 45°.	B-to-B: 1 year; Drivetrain: 2 years; Structure including boom: 5 years
	E-Z Lock system. Above 40° sway is dampened, 6° max. Axle locks with brake activation.	B-to-B: 1,000 hours; Engine: 2,000 hours (optional 3,000-hour extended engine warranty)
	None	B-to-B: 1 year; Drivetrain: 2 years; Structure including boom: 5 years
	Between 20° and 40°. Limited to operation in 1st and 2nd gear.	B-to-B: 1 year; Drivetrain: 2 years; Structure including boom: 5 years
	Axle locks when boom above 60°.	1 year or 2,000 hours. Extended warranties available.
	Above 60°. Set park brake and shift to neutral, axle locks and sway speed is dampened	B-to-B: 1 year; Drivetrain: 2 years or 2,000 hours; Frame Structure: 10 years
	Axle locks with parking brake activation. Dampened pivot above 25°.	2 years or 2,000 hours
	Stabil-Trak Above 40°. Shift to neutral and set brake, axle locks and pivot is dampened	B-to-B: 1 year; Drivetrain: 2 years; Structure including boom: 5 years
	Above 40° sway is dampened when in gear or brake released. Override allows sway in neutral or with service or park brake applied	Chassis: 10 years; Boom and Rollers: 5 years; Hydraulics: 3 years; Drivetrain: 2 years
	Above 45°. Put in neutral, activate brake, and axle locks. Also has dampened pivot mode.	B-to-B: 1 year; Hydraulic: 3 years; All structural: 5 years; Engine: 2 years or 2,000 hours

** Sway = Frame-Leveling*
*** B-to-B = Bumper to Bumper*
*** OR = Outriggers*

SkyTrak 10054

Long before it became part of JLG Industries, McConnellsburg, Pa., the SkyTrak product line was the largest selling brand of telehandlers in North America. Under JLG's ownership, SkyTrak continues to hold its place at the top. From its rugged, unitized steel frame and industry-leading stability system to its widely used attachment system and straightforward controls, this utilitarian machine was designed to be simple, reliable, and easy to operate.

The SkyTrak 10054's cab is an open design and provides good operator visibility.

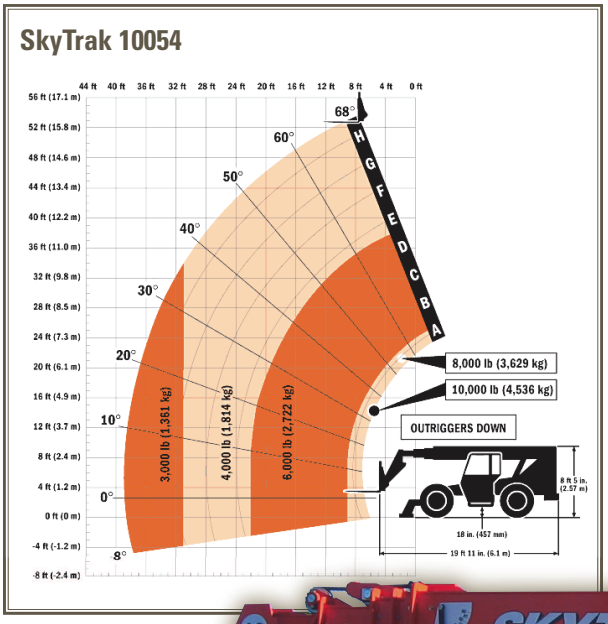
Two large joysticks are used to operate the machine, and for ultimate simplicity, they are cable-activated and full-pressure hydraulic. Identification and operation of these Spartan, yet effective, controls are virtually child's play.

All SkyTrak machines come standard with the widely used TRAK-Attach system. This attachment system is prevalent in the market, and JLG recognizes it can't control what attachment might be used on its machines. Therefore, it provides a full set of quick-reference load charts in a flipbook format for virtually all commonly used attachments.

The SkyTrak 10054 uses a ZF-supplied, four-speed modulated power-shift transmission and continues the ZF theme through to the axles, which now feature 55° turning angles. The drive train is powered by a 110-hp Cummins QSB 4.5-liter turbocharged engine and turns a variable flow, load-sensing gear pump. The engine lies within the frame as far to the rear as possible, which contributes to the machine's counterweight and helps to hold the GVW to a relatively low 28,123 pounds. Access to the engine and all service points are available from either side of the frame via a pair of adequately sized, swing-out steel panels. Although the hydraulic oil and fuel tanks are adjacent to each other, only the fuel fill is exposed. The oil fill point is hidden under a bolted steel panel. A hydraulically activated, wet-disc system with four independent brakes is located inboard between the differential and planetary drives.

Outriggers feature a radial design and reach out about 45° angles to the chassis. This makes it so that they land about halfway between the sides and front of the machine, which is intended to improve both longitudinal and lateral stability. Similar to the Lull, the outriggers pivot off the front of the chassis, and frame-leveling is allowed once they are in place. With the outriggers in position, 4,000 pounds can be taken to its maximum height of 56 feet and 3,000 pounds to its 39-foot forward reach.

Rear-axle stability is achieved with the patented Stabil-Trak system, which dampens the movement of the axle whenever the boom is above 40°. This system has pretty much set the standard for the industry. An interlock system requires outriggers to be properly loaded before the boom can be extended past 29 feet. All cylinders in the critical load path are fitted with integral load holding valves. Tires are pneumatic and don't require ballast.





Xtreme Mfg. XRM1254

Introduced by Xtreme Manufacturing, Las Vegas, in January 2006, the XRM1254 was the newest product participating in the Showcase. At 12,000 pounds, this telehandler has 1,000 pounds more capacity than other machines at the event. But because the XRM1254 is Xtreme's closest machine to the class under review and it fit our maximum lift height requirements, we felt it would be appropriate to include this up-and-comer.

Xtreme's design is driven by three key philosophies: visibility, durability, and accessibility.

On the durability front, the XRM1254's hydraulic oil runs through a three-stage filtration system, which includes a suction strainer, followed by a 10-micron high-pressure filter and, lastly, a 10-micron low-pressure filter on its return to the all-steel hydraulic tank. The heavy duty, three-section boom rides on durable melonited rollers, which incorporate sealed bearings that ride on melonited shafts. All pivot points are sealed and use melonited pins and either spherical ball bearings or high-compression bronze bushings. The dash and all safety decals are made from self-adhesive Lexan. The labels are printed on the back side for total protection.

The XRM1254 utilizes an innovative aluminum radiator with three replaceable sections, and engine water, transmission oil, and engine charge air are all cooled by the radiator. The engine is mounted directly to a Carraro TLB2 power-shift transmission and fueled by a 72-gallon all-steel fuel tank. The hydraulic flow is provided by a proven Kawasaki model K3BL80 variable-displacement piston pump.

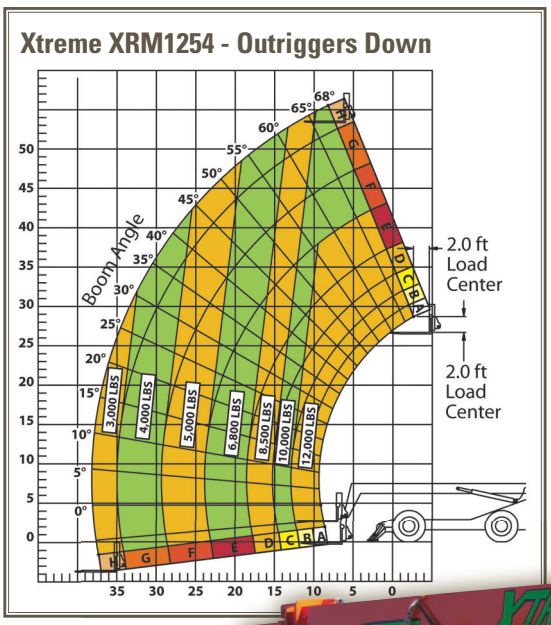


Frame design optimizes visibility.

Accessing the XRM1254's service points is easy, as most are mounted on the same side of the engine. An electric fuel pump will self-prime the injectors if the unit runs dry. The engine and all hydraulic components are in-frame and shielded by Kevlar reinforced fiberglass covers. Hydraulic test ports are located so the test gauges can be viewed while operating each function.

The service brake system has individual circuits for the front and rear brakes. Each has its own brake accumulator to keep the system properly charged at all times. Should brake pressure ever drop below specification, a dash-mounted light illuminates to notify the operator.

Direct, dual-control mechanical joysticks are connected right to the HAWE Hydraulic control valves to command the main boom and frame-sway functions. Fork tilt is controlled by a proportional electric thumb switch on the forward stick, which is intended to provide reliability, as well as precise positive control. The stick that controls the frame-sway features a Y-shaped handle that cradles the operators forearm and allows for one-handed, simultaneous control of all functions. These controls are mounted to a steel sub-assembly that can be adjusted fore and aft to fit the operator's personal preference.





JLG 10-55A

Of the four product lines that make up the McConnellsburg, Pa.-based JLG Industries' family of telehandlers, the JLG 10-55A was the only homegrown JLG machine at the Showcase. Because it was a clean-sheet design, this machine has a unique look, design and feel.

Maximizing visibility was a key driver in the development of the JLG 10-55A, which is addressed with its high-mounted boom and how it is mounted to the frame. Gradall's influence is apparent in both the position and unobtrusive design of the boom uprights. Combine these boom attributes and the view is exceptional – especially in the carry position.

JLG also points out that the frame design was integral to the visibility parameters. The center spine, or "backbone," design is narrow and has two significant impacts. It allows the side-mounted engine to sit close to the operator – the tighter it sits, the better the line of sight to the right side of the machine. The narrow chassis also allows room for a wider cab, which is identified as a component of visibility.

Even though the JLG 10-55A is high-boom mounted, it is designed to sit low, producing a balanced, low center of gravity. That is not to say that it has poor ground clearance. At 18 inches, it is one of the best. Weight distribution is minimal, with a difference of less than 500 pounds from one side to the other. With the outriggers down, you can take 3,000 pounds to the maximum 42-foot horizontal outreach. The boom is designed to work quickly. When stowed, JLG reported the boom can be elevated in about 15 seconds and telescoped to full length in around 16 seconds. The frame-mounted outriggers are positioned high to improve approach angles.

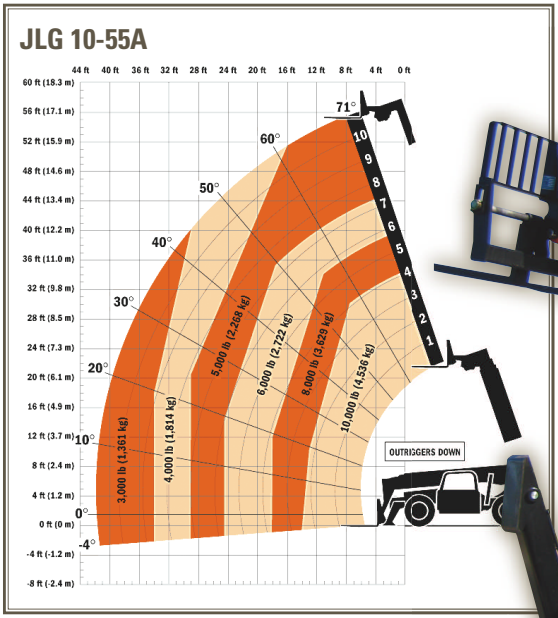
A 125-hp John Deere 4045TF275 Turbo diesel engine is side-mounted and drives a fully modulated four-speed ZF power-shift transmission. Hydraulic flow is provided by a load-sensing piston pump. All major component and service points are located under the vast, lockable ABS composition hood. With everything out in the open, service access is excellent to everything except the starter – you have to go underneath the engine for that chore. The cover is sloped to minimize any visual obstruction from the cab. Intake air is pulled through a two-stage dry air cleaner. It is centrifugally pre-cleaned with continuous dust ejection, and it also incorporates a replaceable dry filter element. A visual service indicator is located on the canister.



The center spine impacts the engine position and allows for better line of sight.

The low overall design facilitates easy access to the very roomy cab, where you will find a well-positioned suspension seat. A single joystick controller runs the pilot-operated lift and telescope functions. An acrylic cover protects the full array of analog gauges.

To expand the versatility of the JLG 10-55A, a variety of optional attachments can be utilized with its Quick-Switch system.





Manitou MT-1745 HSL Turbo

Even if you didn't know the Manitou MT-1745 HSL telehandler was built in Europe, you would still find its appearance unique. No matter the product, European styling is distinct.

Manitou has long been at the forefront of producing modern, aesthetically pleasing, and ergonomically sound equipment. Designed with utility in mind, Waco, Texas-based Manitou North America has incorporated three important features into the MT-1745 HSL. First is its low-mounted boom placement – something developed in Europe, where it is very much the norm there and virtually the rest of the world.

Next is the placement of the operator's seat. Sitting high in the panoramic cab, visibility is excellent when the low-mounted boom is in the stowed position.

Last is the boom's design. The MT-1745 HSL was the only product at the event using a 100-percent hydraulically extended boom – meaning there are no chains or sprockets to inspect, tension, or replace. This also makes this unit a true tool handler. When fitted with an optional digging bucket, the Manitou is capable of delivering 15,430 pounds of breakout force. To help cope with the stress of this force, the chassis is made up of a very robust box-frame design. Another feature that helps fulfill the tool-carrier philosophy is the 124° head rotation, which better handles buckets and grappling attachments. Additionally, the boom structure is strengthened through the use of a two-piece unitized design with welded C channel sections.

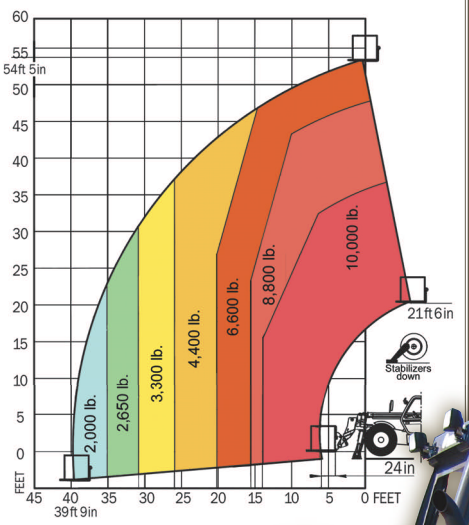
A top-mounted, main-extension cylinder extends out the second- and third-stage boom tubes, while an isolated, internally mounted cylinder works the tip, or fly, section. Stabilizers must be down in order to extend the tip section. The maximum lift height is 42'10" with the stabilizers up, and with them down, the MT-1745HSL can reach its full 54'6" maximum lift height. An interlock with pressure sensor ensures the outriggers are properly loaded before the tip can be deployed.

One thing that jumps out on this machine is how nice the operator's seat is. The fully adjustable suspension seat is as nice as the one in your car. The single, large multifunction joystick is perfectly positioned, and control labeling is clear and precise. The MT-1745HSL also is equipped with a wheel-alignment indicator light, which informs the operator when the rear axle is properly aligned with the front.

Unique to the event is the unit's side-located, transversely mounted engine. The Perkins 1104C-44T turbocharged diesel sits at right angles to the frame. Extra insulation limits the amount of engine noise that emanates from under the fiberglass hood. Servicing is made easy as the transverse mount provides equal access to both sides of the engine. An electrical fan cools a remote-mounted oil and coolant radiator.

Power is transferred seamlessly by a Rexroth hydrostatic transmission with four forward and reverse speeds, which are achieved by utilizing a driveline splitter. The splitter is employed to keep the engine rpm up – for maximum hydraulic oil supply to powered attachments – when a slow ground speed is desired. A pair of Parker variable-displacement gear pumps supplies a massive 54 gpm for all non-drive functions. Again, the extra flow capacity supports this purpose-built tool handler's capabilities.

Manitou MT-1745 HSL Turbo - Outriggers Down





Gradall 544D10-55

The Gradall 544D10-55 is one of two machines – the other being Lull 1044C-54 – with a truly unique design. Its blue exterior makes it easy to pick out of a crowd, but that is not the only thing that makes the Gradall telehandler, built by JLG Industries, McConnellsburg, Pa., distinctive. Its axle configuration features 90° pivot-steering.

The rear-pivot design keeps the outside turning radius at only 178 inches, which is less than the overall length of the machine – a major selling point. Only the recent advent of tighter 55° turning axles on competitive machines has allowed larger, longer wheel-based, four-wheel steer machines to compete with this capability. However, a more complex design, more service points, and possibly more wear-point potential are the trade-off that comes with the ability to pivot 90°.

Independent hydraulic drive motors coupled with Fairfield torque hubs power each rear wheel. The front axle is a rigid, limited slip design supplied by Carraro. On the floorboard of the cab, a separate pedal is used for differential axle lock. When depressed, in conjunction with the accelerator, this traction lock splits the oil flow between the front and rear axles. A separate set of relief valves protects the rear-drive motors from any pressure spikes.

The Rexroth-supplied hydrostatic transmission is sensitive to engine rpm. Maximum operating pressure is 6,300 psi, and the transmission comes online when the 125-hp John Deere 4045HF275 Turbo engine is turning at about 1,100 rpm. Another feature of the hydrostatic drive is the ability to de-stroke the pump, which is accomplished by depressing the brake pedal halfway. De-stroking the pump allows the operator to inch, or feather, the drive and/or brake with the use of one pedal. It also allows the drive speed to be regulated independently from the engine speed.

Because all controls are pilot-operated, there are no electronics involved in the direct operation of the machine. On a standard unit, controls are grouped on the right side of the steering column. An optional left-hand fork tilt, frame-leveling control is a very popular option on the West Coast.

The 544D10-55 has a fairly long wheelbase and a very low center of gravity, which translates into greater lifting capabilities and added stability when carrying a load over rough terrain. The machine lifts 4,000 pounds to the maximum 55-foot lift height without the use of outriggers; however, outriggers are required to take 3,000 pounds to full horizontal reach of 42 feet. Primarily a pick-and-carry machine, the unit offers great visibility to the side and rear when a load is in the carry position. Good visibility is due in part to the low engine mount and boom support structure design. While this particular mid-mount engine is not the easiest of the group to service, most critical service points are accessible.

Other points: Tires have hydro-fill for stability. The hydraulic oil filler is located right next to the fuel filler, so keep a lock on the cap. JLG has gone to great lengths to make its four-section boom assembly easy to service and repair. If service is required, the hydraulic sub-assembly at the rear is removable in 45 minutes. Axles feature 90° pivot-steering.



Pettibone Extendo 10056

The name Pettibone is synonymous with telehandlers, and the 125-year-old Baraga, Mich.-based company has a heritage with this product category that reaches back nearly four decades. The 10056 is part of the company's Extendo product line, and although very mainstream in appearance, it incorporates several unique features.

On the boom, the telescoping sections ride on steel rollers, and the two wide-stance main lift cylinders are mounted to angle in ever so slightly at the top. This design is intended to help keep the boom centered as it elevates to relieve stress and is accomplished by mounting the cylinders with a spherical bearing. One of the main lift cylinders also pulls double-duty as a master cylinder, eliminating the need for a dedicated cylinder to keep the forks and carriage in proper balance.

Power comes from a Tier II-compliant, 4.5-liter Cummins electronically controlled engine, which belts out a peak 110 turbocharged horses. The engine is mid-mounted at an in-frame location.

It is apparent that Pettibone has made serious efforts to maximize service access while minimizing preventive-maintenance needs. One way is to minimize oil contamination with the utilization of a Parker dirt box, or a tank within a tank. All oil added to the system goes into the primary tank, where it is then filtered through a 10 micron pre-filter when entering the secondary tank. Removing the tank's filler cap requires a large wrench, which all but eliminates the chance of accidental fuel contamination.

The 10056's fuel and oil tanks are split on either side of the frame. Fuel is stored in a tank that hugs the back of the cab, while the hydraulic tank is located on the opposite side of the frame. Pettibone made the hydraulic tank as narrow as possible to allow for better access to the engine.

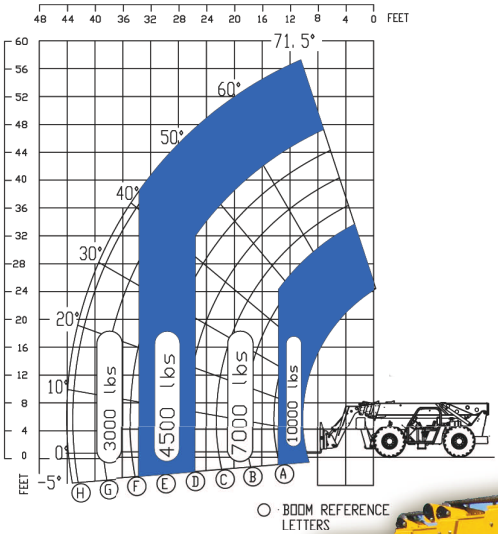
Power is transferred through a Carraro-supplied TLB2 four-speed (forward and reverse) power-shift transmission. The transmission is fully modulated, which allows the telehandler to decelerate to a safe rpm before down-shifting. Carraro also supplies the entire driveline, which incorporates the new Precision Steer axle system. Developed to correct the Ackermann steering geometry, Precision Steer is the first axle designed for four-wheel drive and four-wheel steering applications. Prior to using this axle, Pettibone's telehandler tires were toed in 9° in four-wheel steering; with this axle, misalignment has been reduced to only 4°.

The 10056's unique hydraulic system consists of a Parker-supplied pressure-compensating, variable-displacement piston pump. Pettibone asserts that this design offers a quicker response to controller input. The key to this system is that it runs at a constant 2,850 psi, producing zero hydraulic flow until it is asked to supply it. Once requested, the flow peaks at a maximum 38 gpm.

For priority steering and braking, a Sun Hydraulics-supplied sequencing valve diverts all flow for braking and steering, should the system's pressure drop below 2,600 psi. Proportionality for the main and auxiliary boom functions come from a combination of pilot-operated hydraulic and fully proportional electro/hydraulic valves.

Main boom functions are controlled through a single dual-axis joystick with an integral Hall-effect thumb rocker switch for secondary or auxiliary functions. The set-up allows for true variable flow for three functions simultaneously.

Pettibone Extendo 10056 - Outriggers Down





Gehl DL-10H/55

If you're having trouble deciding on a low- or high-mounted boom, Gehl Co., West Bend, Wis., has eliminated the need to look elsewhere. You can order either style using the company's Select-a-Boom System. The DL-10H/55 model with a high-mounted boom participated at the Showcase. The four-section boom features a top-hat design, on which a separate external hydraulic hose carrier protects the hoses and provides easy access for inspection and service.

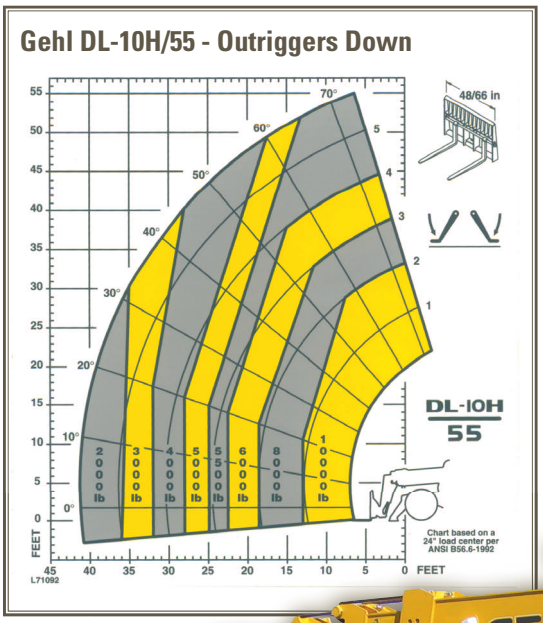
On the Gehl DL-10H/55, a longer wheelbase and all-tubular frame make it possible to lift 5,000 pounds to full height without using outriggers. However, the use of outriggers significantly improves forward-reach capabilities. When the outriggers are down, the footprint is narrower than the width of the machine, and loads weighing up to 2,000 pounds can be taken to the full 40'9" forward reach.

The Dynattach tool-mounting system, which automatically locks onto the tool, means operators only have to get out of the cab once to unlock it. The DL-10H/55 at the Showcase displayed the optional Personnel Work Platform (PWP) system, which enables the use of an ASME/ANSI-compliant work platform in conjunction with a wireless pendant e-stop. The system is activated by depressing the brake pedal for approximately five seconds and flipping a switch located in the cab. A dash-mounted indicator light confirms that the parking brake has been automatically set, and the transmission is in neutral. Once set, the operator controls the boom functions from the cab. The worker in the platform can stop movement at any time. Radio Remote Boom Control, an upgrade to the PWP system, gives workers in the platform control of the ignition and boom functions. A trigger switch meters the speed of operation. Gehl also makes available an optional 180° manual platform rotation system.

The operator's seat sits high in a roomy 57-cubic-foot cab, and this unit was equipped with an optional enclosed cab. Operators will appreciate the adjustable-height armrest and the tilt steering wheel. The wraparound dashboard uses rocker switches for many of the controls.

Carraro-supplied double reduction axles deliver a tight 55° turning angle, producing a 12'2" inside turning radius. The transmission, an electronically modulated power-shift four-speed Dana T16000, features 5-1/4-inch clutch plates. The transmission is mated to a side-mounted, 115-hp John Deere 4045T turbocharged diesel engine. The ECM protects the engine when high coolant temperature or low oil pressure occurs, giving the operator a 30-second warning before shutting down. Operation is then allowed with 30-second delays, or as long as the levels stay below the prescribed thresholds.

Sitting above and in front of the engine is a centrifugal Turbo II pre-cleaner with continuous dust collection, and engine exhaust is vented upwards to limit stirring up jobsite dust. The side-mounted engine and its service points are located under a large, lockable fiberglass cowling. The engine mount is low so once the hood is raised, all service points are handy. A master electric disconnect makes it easy for the unit to be completely disabled for security and servicing.





Lull 1044C-54 Series II

First introduced in 1996, the Lull 1044C-54 is part of McConnellsburg, Pa.-based JLG Industries' stable of material handlers. The Series II update took place in 2005, and at that time, the only major change was the conversion from Cummins to John Deere power. The Lull and Gradall machines were the two most unique products participating in the Showcase, but what's interesting is the features setting them apart are actually decades old.

On the Lull 1044C-54, the unique feature is the Transaction boom, which allows the entire boom to slide forward horizontally without moving the machine an inch. The horizontal load placement system is exclusive to only Lull and Pettibone's Traverse product line, but the Lull is the only unit with this capability at this high of capacity. To accomplish horizontal load placement, the boom is mounted on a subframe that carries the entire assembly. Riding on massive rollers and rails, the carriage assembly can slide forward 80 inches on the main chassis without losing the 55-foot maximum vertical reach. When the stowed boom is rolled completely forward, the load is 88 inches in front of the outriggers.

Powering the Lull 1044C-54 is a 115-hp John Deere 4045TF275 engine. Hydraulic flow is produced by a pair of Barnes load-sensing, pressure-compensating gear pumps. The engine assembly is rear-mounted, and although fairly accessible, the placement just doesn't stack up to the side-mounted or more modern mid-mounted engine designs. The engine location and sub-assembly required to carry the Transaction boom creates a viewing obstacle to the side and rear of the machine when the boom is in the forward position. However, with the boom back and in the carry position, which is how you would be driving the majority of the time, the view is surprisingly unobstructed.

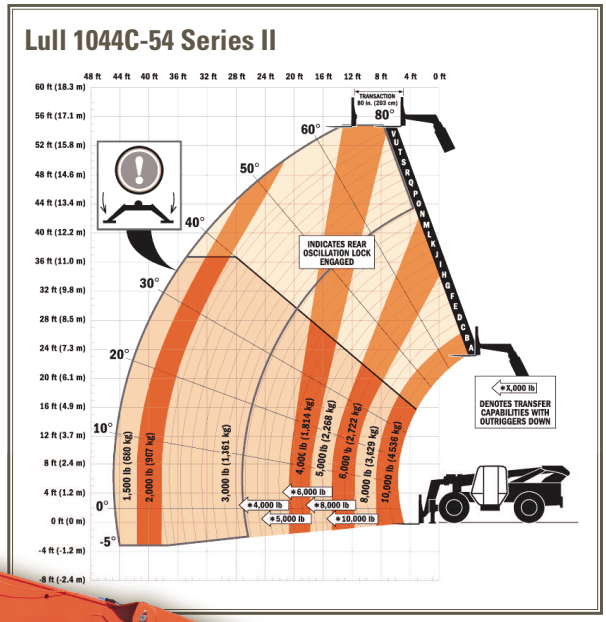
Visibility is aided by a high seat position coupled with a wide-open cab. The full suspension seat provides a clear view of all controls. A complete set of analog gauges and a variety of warning lights are standard. Fully proportional, pilot-operated joystick controls command all boom, frame, and auxiliary functions.

To service the Lull 1044C-54, the hydraulic system test ports for each individual circuit are conveniently located and easily accessed below the cab. A set of LEDs under the dash helps troubleshoot electrical problems. Although the fuel and hydraulic oil tanks are neighbors, a wrench is required to access the oil fill, minimizing the chance of cross contamination.

A ZF four-speed forward, three-speed reverse modulated power shift transmission drives Dana-supplied axles. Four outboard, wet disc service brakes, and the spring-applied, hydraulically released parking brake is located on the driveline. Tires are hydro-filled.

Outriggers are mounted to pivot off the front axle, which allows the frame to be leveled – even when they are down. Reaching out at a 90° angle from the frame, they produce a broad 192-inch-wide footprint when deployed. The extra width is necessary for the stability required moving all the weight forward. Outriggers are also equipped with a load pressure switch to ensure they are down and properly loaded. Oversized outrigger pads are used to reduce ground pressure.

Quick-attach auxiliary power is standard on the Lull 1044C-54. One notable option is a tower attachment, which allows the unit to raise 4,000 pounds at 62 feet.





Genie GTH-1056

If you are not familiar with the Genie GTH-1056 telehandler, you may recognize the similarities between it and the Terex TH1056-C. Genie Industries, Redmond, Wash., took responsibility for Terex telehandlers back in 2005, quickly changing the nomenclature to GTH-1056 and the color to its signature blue and gray. The all-new GTH-1056 was not quite ready for the Showcase, but was officially introduced in February.

Instead of wasting time on discussing a now out-of-production machine, we are reviewing improvements made to the new product. Genie arranged for us to see the new telehandler in January.

The new Genie GTH-1056 is a clean-sheet approach with the most notable difference being the position of the engine, which has been moved back as far as possible in the all-new 2-foot-shorter, 15-inch-lower frame. The shift in position creates more counterweight and trims 2,000 pounds from the overall GVW while actually increasing the load charts.

Genie is unique in that it offers two engine options: a 125-hp Perkins or a 127-hp John Deere. The old unit's engine installation was in-frame – and it was not the most convenient to service. In an attempt to eliminate the possibility of vandalism or inadvertent damage, the old telehandler's components were also less accessible for service. However, access for servicing the new GTH-1056 is attained through a pair of doors on either side of the engine.



Genie's GTH-1056 on-display at the Telehandler Showcase (bottom) was recently updated and reintroduced this month.

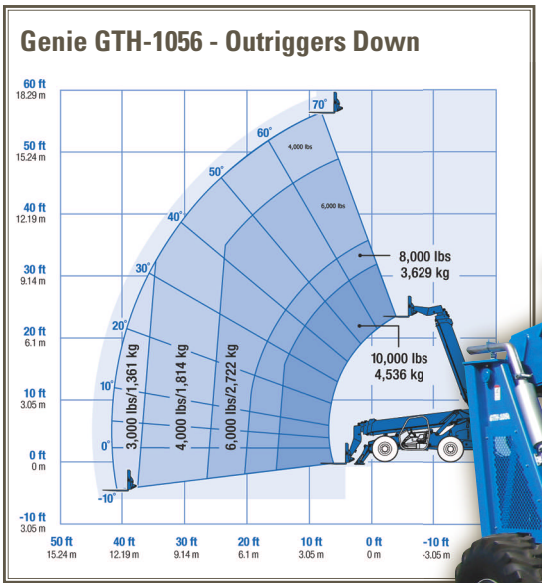
If there is ever a major engine problem, provisions have been made to slide the engine out the back side with a forklift. The new machine also incorporates a hydraulic system that is load sensing and pressure compensating.

The shorter frame and new 55° turning axles significantly improve the outside turning radius by nearly 4 feet. Since 1988, Terex has used a roller bearing boom. While it is a major debate in the industry over which is better, Genie has moved away from rollers to the more common poly slide pads. The hose for auxiliary hydraulics has been moved inside the boom, and the hydraulic and fuel tanks have been redesigned. Sitting side by side, a lockable steel panel not only restricts access to the oil tank's fill point, it also secures the battery. The plate's robustness also protects everything from falling objects.

Now built in-house, the cab features a new dashboard and interior. A single joystick controls boom functions and sway. The rear-axle stabilization system has vastly improved, now allowing the rear axle to free-float with boom angles up to 59°. Above 59°, the axle floats at a dampened rate. The only time the axle locks is when the boom is above 60°. Maximum length of boom extension is expected to be 48 feet.

Carried over from the previous design is the Dana T16000 Series three-speed, power-shift transmission, which drives the Dana-Spicer axles. Each of the four planetary drives has individual wet disc service brakes.

Pneumatic tires are now standard equipment. The quick-attach system also has been redesigned to be compatible with the widely accepted SkyTrak system.





CareLift ZoomBoom ZB10056

Breslau, Ontario-based CareLift Equipment Ltd. is owned by one of the largest masonry companies in North America, and the ZoomBoom product line owes its existence to its owner's desire to build a machine required to withstand the brutal Canadian winters. The ZB10056's entire frame is cut from heavy 1½-inch plate steel, and virtually everything on the machine is made of steel. Needless to say, its robustness is quite apparent.

The ZoomBoom ZB10056 model was first introduced in 1998 as the ZB10055 and later updated in early 2003. Those updates included, but were not limited to, repositioning the engine closer to the center of the frame and lowering the cab slightly. The reach height also was stretched an extra foot. One objective of the redesign was to improve rearward visibility. Since this change was made, the view through the boom-supported uprights has opened up very nicely. Under the "deep-seated" frame, all components are recessed up and out of harm's way.

Entering the high-sitting Safety Cab-supplied operator cabin requires little effort, and its elevated location in the fully adjustable suspension seat provides extra visibility.

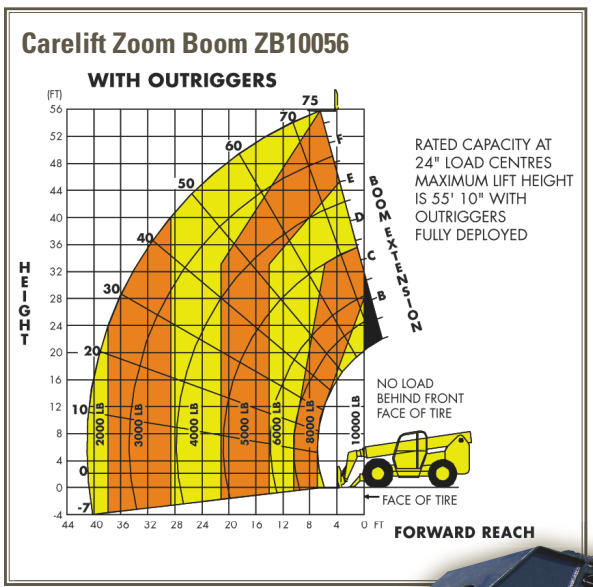
The cab's interior features a spacious work area, and all controls are easy to identify. A Murphy PV (Power View) 100 LCD readout in the cab displays oil pressure, water temperature, and alternator output, to name a few. One simple yet notable feature on all ZoomBoom telehandlers is the adjustable joystick control pedestal, which allows the multifunction joystick controller's position to be customized, providing an ideal angle and height for individual operators.

The ZB10056 features a mid-mounted, in-frame drive train and a 110-hp Cummins turbocharged engine. Although this particular unit was equipped with a Dana T16000 Series four-speed power-shift transmission, look for an upgrade to the T20000 Series made in April.

Power flows to the Dana-supplied drive axles, while the 41-gallon diesel and hydraulic oil tanks are fixed on the side opposite the cab. Although these tanks are located next to each other, they are clearly tagged. Additionally, a wrench is required to access the hydraulic oil, and the fuel filler is pad lockable, which should eliminate any chance of unintentional cross contamination.

One unique safety feature is the "Mine Code" back-up system, which is optional on this unit. The system consists of a 5-gallon accumulator and an additional valve that maintains the steering reserve pressure in the event of a line pressure drop or the total loss of power. Mine Code is not separate from the normal steering system.

The ZB10056's wet disc service brakes are split into two separate circuits: one for the front and one for the rear axles. Two accumulators provide dead engine braking in the event of pressure loss.





Mustang 1155

The Mustang 1155 telehandler is every bit as aesthetically pleasing as any of the products at the event. Part of Owatonna, Minn.-based Mustang Manufacturing's Deluxe Series, the 1155 is feature packed and can perform a wide variety of tasks. Although this would make a wonderful rental machine, Mustang believes this product will lend itself well to owner-operator applications.

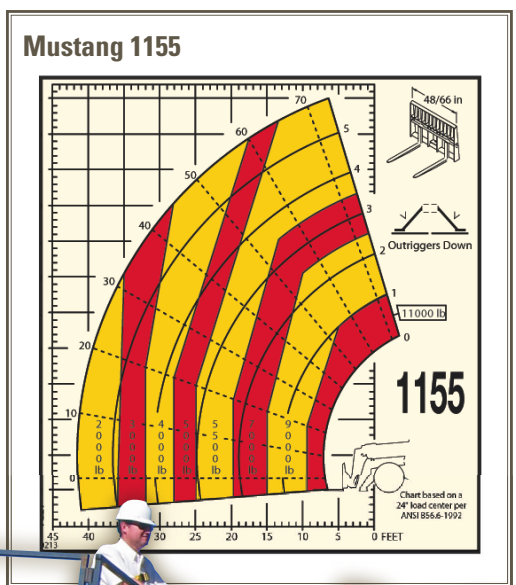
Besides Manitou, the Mustang 1155 was the only other product at the Showcase that featured a low-mounted boom. While the Manitou incorporates a full hydraulic boom, Mustang's boom features a more conventional, hydraulic cylinder with a dual-chain combination to extend and retract the boom. Welded robotically, the boom tubes are a four-piece, top-hat assembly, which means the top plate uses thicker steel – where it really counts. The boom features an external hose carrier, and the low boom contributes to its short 7'11" overall stowed height.

Maximum lift capacity to 55 feet is 5,500 pounds with the outriggers down. Capacity at this height is only de-rated 500 pounds when working on rubber. However, the 1155's capacity drops from 2,000 to 250 pounds when working on rubber at the 40'9" maximum forward reach. This unit was fitted with the Quickattach 2 system. At 48 inches, its tool attachment plate is nearly twice as wide as the standard 28-inch system and is intended to be better suited for buckets and other wide attachments. Head rotation is 132°.

The 1155 on display at the event was equipped with the Work Platform Safety (WPS) system, which enables the use of an ANSI/ASME-compliant work platform to work in conjunction with a wireless pendant e-stop. The system is activated by depressing the brake pedal for approximately 5 seconds and flipping a switch located in the cab. A dash-mounted indicator light confirms that the parking brake has been automatically set, and the transmission has shifted into neutral. Once set, the operator in the cab can control the up, down, and telescoping functions. The worker in the platform can stop movement at any time. An upgrade to the WPS system is the Radio Remote Boom Control, which allows workers in the platform to start and stop the engine, raise, lower, extend, and retract the boom. Mustang also offers an optional 180° manual platform rotation system.

Ergonomics are a high priority. The cab is a massive 57 cubic feet and features an automotive-style, wrap-around dash. A tilt steering wheel and a tri-function joystick are standard in the Deluxe Series package. The joystick's three functions are metered and include lift, tilt, and extend. A trigger on the leading edge of the joystick allows instant maximum hydraulic flow for tilt or auxiliary functions. Another switch automatically aligns the rear axle when coming out of four-wheel or crab steering modes. Mounted on the dash is an air filter monitor. Although the cab is partitioned by a Plexiglas panel on the boom side of the cab, a wire screen is a no-charge option.

The Mustang 1155 utilizes a side-mounted, 115-hp John Deere 4045T turbo engine, which works through a fully modulated four-speed Dana T16000 powershift transmission. Located under a large fiberglass hood, you can find virtually every service point and key component on the machine. For added security, a key-locked kill switch is also located under the hood.





Ingersoll Rand VR-1056C

The VR-1056C is the largest product in Ingersoll Rand's VR telehandler line-up, and it is built at the company's plant in Shippensburg, Pa. Although mainstream in capabilities, the VR-1056C features a different route in its design and application of some key operating systems.

Visibility from the roomy cab is exceptional, thanks in part to the low position of the mid-mounted engine and the minimal obstructions presented by the A Frame-style boom supports. The placement and design of the uprights really improve rearward visibility. The four-section boom is a four-plate design and incorporates an internal crowd cylinder and hose placement.

Although it looks like a typical outrigger set-up, the VR-1056C uses frame-mounted stabilizers. Unlike other units with frame-mounted outriggers that are intended to carry all or part of the load, IR's stabilizers are simply there to provide stability if it is needed. In the down position, the stabilizers are not loaded. Since they are not carrying any weight, the machine design allows full chart capacities in conjunction with frame-sway when the stabilizers are in the lowered position. In this configuration, movement is dampened by about 50 percent and limited to 4° of sway. Shifting the stabilizers is accomplished by transferring oil from one stabilizer cylinder to the other simultaneously with the sway of the machine. Doing this keeps the stabilizer pads just barely, if at all, in contact with the ground.

The VR-1056C's boom is fitted with dual lift cylinders, which provide stable load handling and are cushioned for softer stops. At the tail of the boom, dual master cylinders keep the carriage properly sequenced. The carriage can rotate a full 113°, which is important when working with a material bucket or any other device used to load a dumpster or dump truck.

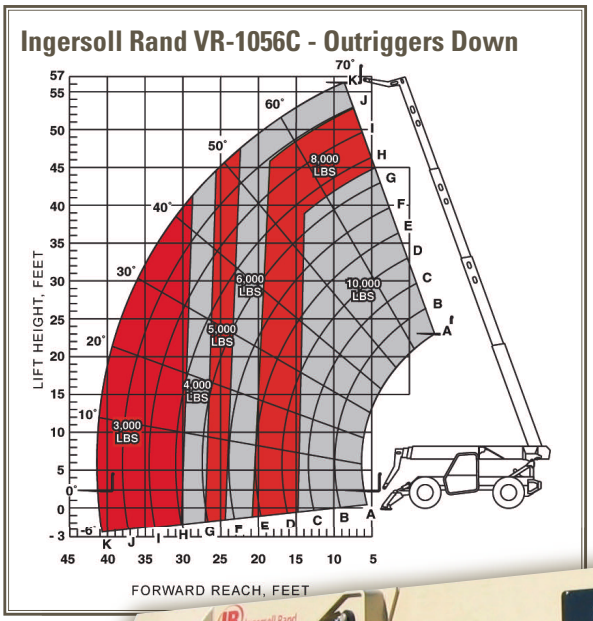
The 40-gallon hydraulic oil and 35-gallon fuel tanks and their respective fill points are side-mounted opposite the cab and sit right next to each other. Machine owners need to make sure the lockable caps are kept in place to avoid cross contamination.

A single pilot-controlled multifunction joystick provides precise control over the main boom functions, while a separate joystick controls frame-leveling and auxiliary functions.

Ingersoll Rand also provides an option to combine these functions into a single controller. The thoughtful location of the load chart on the dash, and the flip-up keyhole protector, are simple but effective features. All gauges are analog to provide clear engine status.

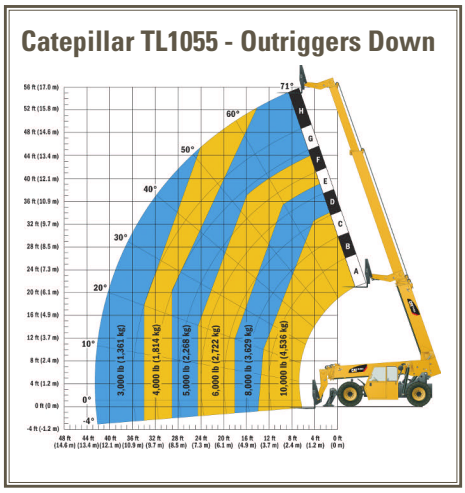
Powering the VR-1056C is a 110-hp Cummins QSB 4.5-30-T turbocharged diesel engine, which is mid-mounted in-frame and resides under a sliding fiberglass hood. Everything is top mounted with only the starter requiring extra effort for access.

While all the Showcase participants featured some type of rear-axle stabilization system, the VR-1056C is a totally isolated system. If the main hydraulic system should fail for any reason, this machine will not be affected. The unit also uses a fully modulated Dana T12000 three-speed forward and reverse, power-shift transmission, and internal wet disc brakes are incorporated on the front and rear axles.





Caterpillar TL1055



Shipments of Peoria, Ill.-based Caterpillar's TL1055 telehandler, built by JLG Industries, began in late October 2006, missing the Telehandler Showcase by a couple of weeks. Although not at the event, this machine offers some unique features worth mentioning.

According to Caterpillar, ease of operation was important in designing the TL1055. A single, pilot-operated joystick allows three simultaneous boom functions. It also operates the auxiliary hydraulic function and has an option for a second auxiliary service for work tools that require more than one hydraulic service. Hydraulic functions are achieved using a full flow-sharing hydraulic valve. A load-sensing, variable displacement pump allows full hydraulic power even at low rpm.

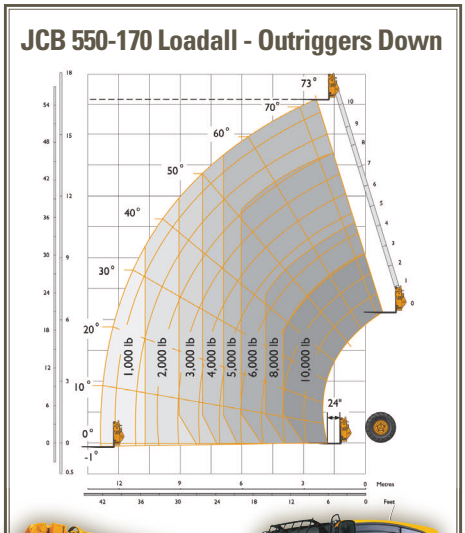


Powered by a 125-hp Cat C4.4 TA diesel engine, the TL1055 also utilizes a ZFWG98-TSC power-shift transmission. Inboard wet disc brakes are mounted to the front axle, supplied by Dana. The machine also features a wet disc, spring-applied hydraulically released parking brake.

For optimum versatility, the TL1055 is equipped with the hydraulic quick coupler, allowing the operator to quickly and easily change non-hydraulic work tools without leaving the cab. Pneumatic tires are standard, but Caterpillar offers a variety of optional tires, including rock lug and foam filled.

The combined hydraulic/transmission oil filter requires changing at 1,000 hours, and engine oil, filter changes, and routine lubrication are now only required every 500 hours.

JCB 550-170 Loadall



In 2005, JCB, Pooler, Ga., introduced the Model 550-170 Loadall as a replacement for its 5508. The 550-170 is the largest of JCB's 14 Loadall telescopic tool carriers.

The low boom configuration increases strength, which translates to an 11,000-pound on-grade breakout force. The unit's boom works with twin extension cylinders, which have been extensively tested to ensure durability.

Incorporating a unique driveline layout, the 100-hp JCB Dieselmax engine is mounted transversely on the right side of the chassis and located under a cylinder-assisted, swing-up engine compartment. A JCB four-speed power-shift transmission incorporates the torque converter and gearbox in one mounted unit.

The unit also incorporates JCB-brand epicyclic hub reduction drive/steer axles with Max-Trac torque proportioning differentials. Self-adjusting, multi-disc service brakes operate on the front and rear axle. The parking brake is a hand-operated disc brake on the output of the gearbox. Operators use a single multifunction joystick to control the machine, and a tri-control is available as an option. The rear window can open and close, allowing operators to adjust the environment.

Auxiliary hydraulics come standard, and with the option of additional auxiliary services, a wide selection of powered attachments can be used.

JCB also offers the Assetcare machinery protection plan on the 550-170. This program protects equipment owners against unexpected failure for up to five years.



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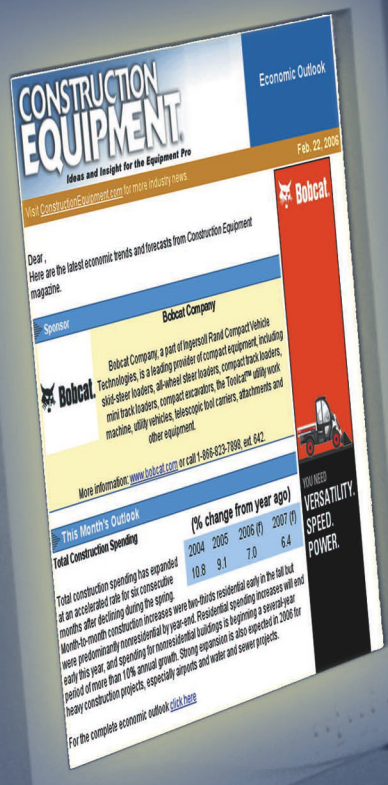

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Loegering

The QTS-Quad Track system is a set of four rubber-track undercarriage modules that bolt directly to the standard hubs of most telescopic handlers. To make the conversion, says Loegering, remove the unit's wheels, install a proprietary wheel spacer with anti-rotate mounts, and then bolt on the modules. With a ground-contact area of 3,236 square inches, the modules provide excellent flotation in soft underfoot conditions, and provide the added benefits of no flats and elimination of expense for fluid-filled tires and repair.



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Atlas Copco

Designed for use on mini-excavators, skid-steer loaders and backhoe-loaders, the LPHB hydraulic posthole borer weighs 68 pounds and delivers 332 pounds-feet of torque at 2,030 psi hydraulic pressure. The new tool accepts hydraulic oil flows from 5.3 to 15.9 gpm and provides rotational speed between 80 to 200 rpm.



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Wacker



According to Wacker, the GP 2600 and GP 4000 portable generators combine the technology of a premium generator with Wacker overhead-valve engines. GP 2600 uses the 6-hp Wacker WM 170 engine, and the GP 4000 uses the 9-hp Wacker WM 270 engine. The GP 2600, weighing 105 pounds, has a maximum output of 2,600 watts and a continuous rating of 2,250 watts; the GP 4000 weighs 152 pounds and provides 4,000 watts of maximum output and 3,600 watts continuous.

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Topcon



The GR-3 system (a triple-constellation satellite receiver: GPS, GLONASS and Galileo) now has a UHF digital radio option that covers a broad range of frequencies with greater distance than the spread spectrum option. The UHF radio adheres to transmission guidelines for a wide range of RTK applications. GR-3 has 72 universal channels that can track up to 36 satellites simultaneously. The G3 chip is designed to receive all existing signals, plus all signals from planned satellite launches in the foreseeable future.

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Vermeer

The CT670 compost turner features elevating face technology for turning compost, and Vermeer has acquired the patent and design rights from SCAT Engineering. A combination of paddles and teeth lift and tumble the compost material, which does not degrade the material and lets in more oxygen, the company says. CT670 can process up to 2,000 cubic yards per hour and handles piles up to 12 feet wide and 6 feet high in two passes.

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Market Watch Lite



Subaru Robin

The new balloon light tower self-inflates to 4 feet in diameter and provides 110,000 lumens from its 1,000-watt metal-halide lamp. A three-stage mast extends to a height of 14.2 feet. The unit features a manual winch, foldout outriggers, and steering-type pneumatic wheels.

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DeWalt

The D25980K pavement breaker delivers a rated 61 ft.-lbs. of impact energy and is built with automotive-type seals on the ram and piston to minimize the intrusion of dust and debris. The breaker has a "soft-start" feature, allowing the tool to immediately bite into the material. Active Vibration Control system combines shock-mounted, rubber-coated handles with a counterbalance mechanism in the barrel.



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Roadranger



Extended Protection Plans are now available for Eaton clutches and transmissions and Dana drive axles in construction and other severe-service trucks. The two builders' Roadranger marketing arm said the new plans add one to two years of additional coverage beyond the standard one-year warranties on components in new trucks. Cost might range from $150 for a medium-duty transmission to $2,000 for a heavy-duty 2-speed tandem axle, and can be financed along with the purchase price of a new truck.

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JCB



JCB promises users of the new Vibromax 160 double-drum vibratory roller, with a new 11.7-gallon fuel tank, that they will get a full day's more use out of the machines than competitive models without stopping to refuel. A 32.6-gallon water tank will also keep the roller on the move. Five versions of the 1.76-ton VMT160 models replace the 1.32-ton VMT120. Drum widths are 32, 36 and 40 inches, with 32- and 36-inch variants available with clear side operation.

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Ground Heaters

Arctic Bear XHD indirect-fired heater features a stainless-steel firebox and heat exchanger and is designed to handle cold environments. The unit's maximum heat output of 770,000 BTU varies with outside ambient temperature to keep the outlet temperature at a constant 210F. The heater is driven by a 240-volt, AC, three-phase generator that is, in turn, powered by a Kubota D1105 diesel engine. The generator will run 3,000 hours between oil changes.

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Lincoln Electric

Lincoln has two new portable fume-extraction systems, the Miniflex and Mobiflex. Miniflex, weighing 33 pounds, is designed for most common light- and medium-duty arc-welding applications. The system, powered by two 1.34-hp motors, features a four-stage filtration process and starts and stops automatically with the welding process. The Mobiflex system adapts to various welding applications, including stick, TIG, MIG and flux-cored. The unit's extraction arm is available in either a 10- or 13-foot length.

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Armadrillco



Sidewinder Directional Control Head T35v09 is designed for mid-range HDDs developing up to 3,500 pounds-feet of torque. The unit is about 8 feet in length and provides a 6.75-inch-diameter pilot hole. According to the manufacturer, the new drill head can be guided through virtually any ground condition and provides a maximum calculated turning radius of less than 200 feet.

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Stone Construction Equipment



The RP1130 reversible-plate compactor features a three-shaft eccentric system and is designed for use in sand, gravel, aggregates and mixed soils. The compactor develops 11,240 pounds of impact force and can travel at speeds up to 72 fpm. It weighs 926 pounds, has a 24-inch working width, and uses a 9.5-hp Hatz diesel engine.

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Vermeer/DigiTrak

DigiTrak Eclipse TensiTrak pullback-and-pressure-monitoring system provides real-time monitoring of drilling-fluid pressure and of tension applied to product during installation. The TensiTrak unit, installed between the reamer and the product, transmits data to the Eclipse receiver, which provides depth and location data for real-time tracking and for downloading to a PC after pullback.

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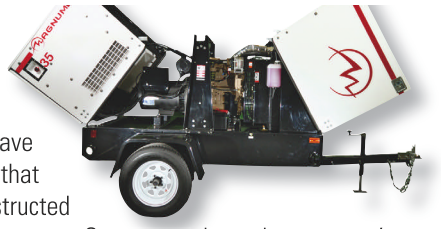
Market Watch Lite

Magnum



Magnum MMG 35FH and MMG 55FH generators have two access hoods that flip open for unobstructed access, the company says. Generators have the company's flip-tongue trailer design, which allows the trailer tongue to flip up and reduce the overall length of the unit to 100 inches. 35 kVA and 50 kVA Perkins engine options are available.

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Sweepster



With a 24-inch-diameter brush offering two rotational speeds, the WSP36 walk-behind sweeper is suited to a wide range of dirt, debris and even snow clean-up jobs on turf or paved surfaces. Five forward speeds adjust the movement of the sweeper from creep to transport, while reverse and neutral permit the easy maneuvering of the unit when not sweeping.

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Godwin



Godwin has added a new line of portable, gasoline-powered wet-prime pumps. Pumps are available in dewatering, trash, plastic, pressure and diaphragm models, and are capable of maximum heads to 285 feet and maximum flows to 425 gpm.

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R.H. Sheppard

A new XD120 Xtreme Duty power steering gear for heavy vocational trucks has been introduced to replace its 592 series, which dates to 1968. The XD120, for 18,000- to 23,000-pound steer axles, has a high output torque 78,825 inch-pounds at 150 bar (2,175 psi) operating pressure. It can be used in single- or multi-gear/multi-axle applications, and is a drop-in replacement for the 592. The XD120 claims car-like road feel.

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Atlas Copco

The QAX 24 generator, rated at 24 kVA, is constructed with a Zincor steel housing and a powder-coat finish. The new unit, powered by a three-cylinder Deutz diesel engine, requires servicing only every 500 hours. The control panel has just six buttons for operation, plus hour meter, voltmeter and ammeter. The unit weighs 2,000 pounds and is fitted with a fixed tow bar.



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John Deere

A new Integrated Grade Control (IGC) option is available for Deere 750J and 850J crawler dozers. These machines can now be shipped from the factory with hardware, software and wiring ready to support the grade-control system of the buyer's choice.

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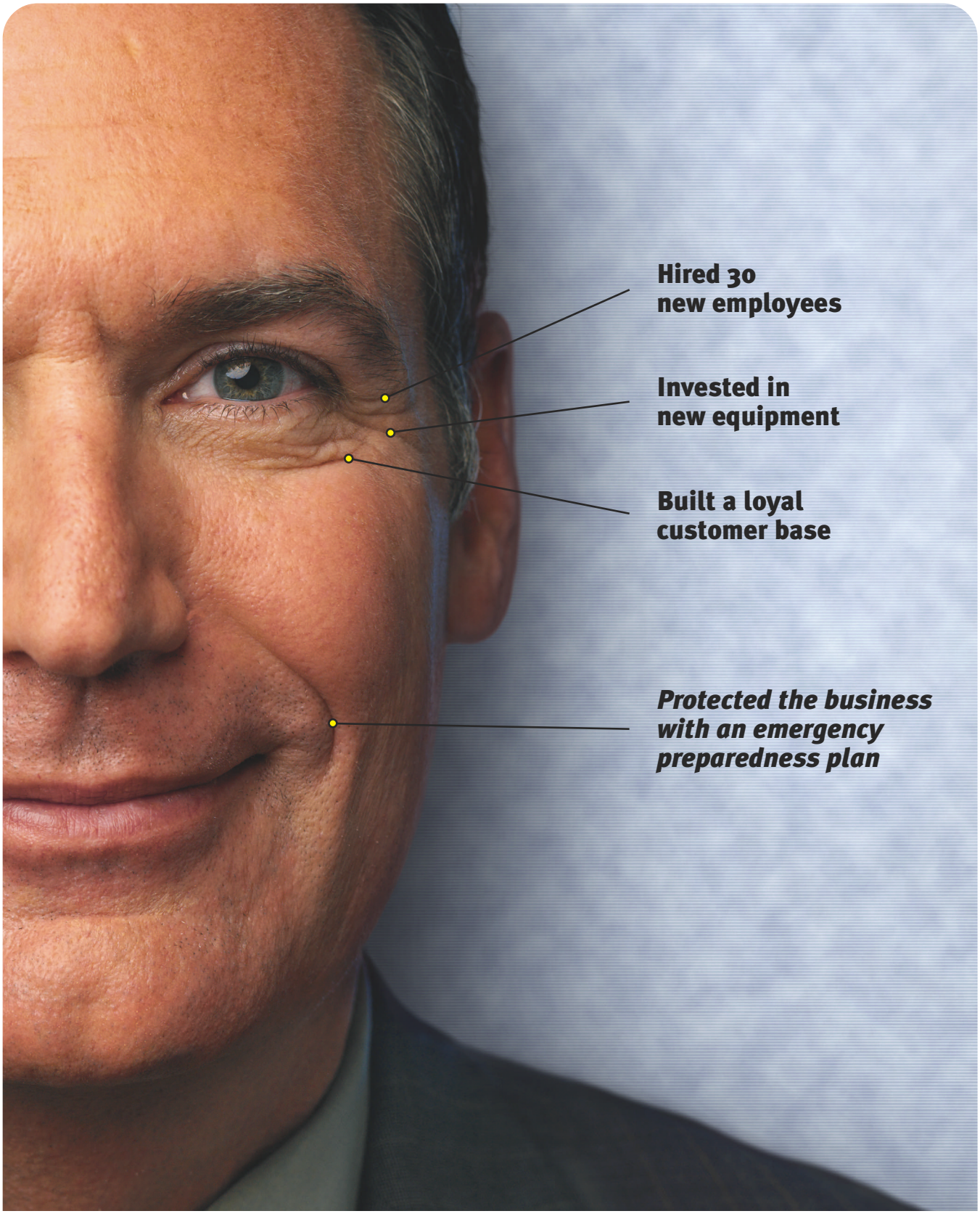

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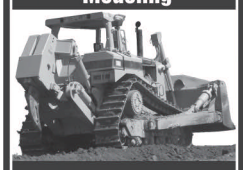

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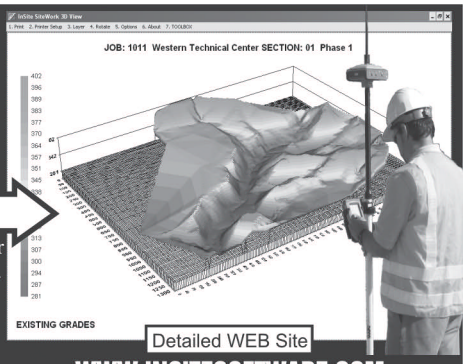

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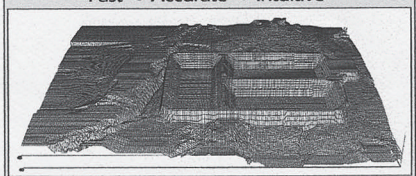

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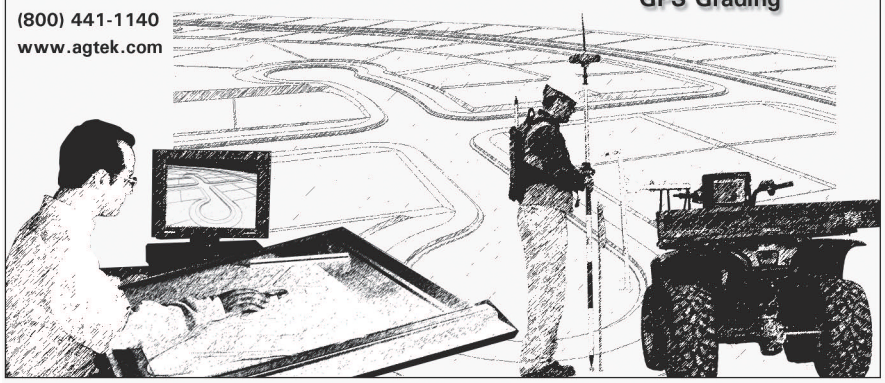

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IL, MI, WI, OH
Michael Ostrowski, Regional Manager
630/288-8139; michael.ostrowski@reedbusiness.com

IA, IL, MN, ND, SD
Mary Adee, Regional Manager
630/288-8134; madee@reedbusiness.com

East, Southeast, Eastern Canada
Michelle Lorusso, CBC, Regional Manager
770/209-3623; mlorusso@reedbusiness.com

Southwest, West, Western Canada
Terry McGinnis, Regional Manager
801/273-8790; Fax: 801/273-8799
tmcginnis@reedbusiness.com

UK/Europe/Middle East
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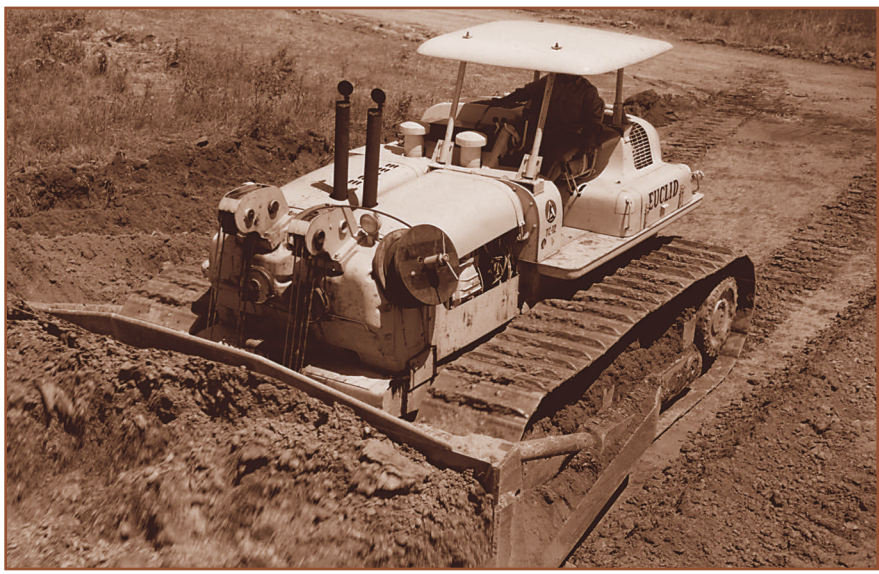
By KEITH HADDOCK, Contributing Editor

General Motors' Crawler Tractor

The Euclid TC-12 was the world's most powerful crawler tractor in 1955

Back in the early 1950s, management at General Motors Corp. (GM) decided to enter the earthmoving-equipment manufacturing business. After all, the company already had suitable engines for earthmoving equipment. Its Detroit Diesel engines were already offered by several other well-established manufacturers to power their earthmoving machines. Now all GM needed was its own range of equipment to expand application of its larger engines.

The Euclid TC-12 crawler tractor, designed and built by General Motors, was the world's most powerful crawler tractor when launched in 1955. It became a legend in earthmoving circles with its twin engines and fascinating frame design, split longitudinally to allow each half to oscillate over uneven ground.



The first production TC-12 crawler tractors, designed and built by General Motors, were rated at 402 net horsepower.

It all started in 1952 when GM hired two engineers from a leading crawler-tractor company to head up its own crawler-tractor program. They immediately set to work on the big twin-engine model that would become the TC-12, and also a smaller tractor about half its size that would be known as the C-6. The following year, GM purchased Euclid Road Machinery, established the Euclid Division of General Motors, and put itself fairly and squarely in the earthmoving business. Euclid's line didn't include any crawler equipment, so its well-respected line of scrapers and haul trucks made a perfect "fit" with GM's own crawler tractors resulting in a full line of equipment ready to challenge any competition.

In 1955, GM officially launched the TC-12 to the market. This followed an intensive development program involving two "pilot" tractors that were thoroughly tested and modified, and another 10 prototype TC-12s tested by contractors across the country. The first production TC-12 tractors were rated at 402 net horsepower derived from two GM 6-71 diesels. Two three-speed Allison Torqmatic transmissions, one for each drive train, completed the twin-power configuration. Since each engine drove one track through its own power-shift transmission, the 40-ton tractor was remarkably nimble. Two transmission levers for steering and speed, and two foot pedals for brakes were all the driver needed to control machine movement. He steered the tractor by simply adjusting the speed or direction of one track. Spin turns were possible by putting one track in forward and the other in reverse with power supplied to both tracks at all times. With all of its size, the TC-12 was faster than most other crawler tractors, achieving 6.9 mph forward and 8.3 mph in reverse.

The TC-12 received upgrades and power increases to 413 net horsepower in 1956, and to 425 net horsepower in 1958. Some 500 units were sold from 1958 to 1966 when Euclid renumbered the model to the 82-80. In 1968, following a ruling by the American Justice Department, the earthmoving products of the Euclid Division of General Motors, excluding the haul trucks, were marketed under the new name of Terex. The 82-80 carried the Terex name until production finally ceased in 1974. By then, its power had reached 440 net horsepower and its weight 52 tons. But the twin-engined concept had run its course with new, larger and more efficient big single-engined dozers being offered.

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You can read more about the evolution of construction equipment in Keith Haddock's latest book, an updated version of his fully illustrated Earthmover Encyclopedia due in bookstores now. Be sure to visit ConstructionEquipment.com for past Iron Works features.



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