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November 2007

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## RUNNING GREEN

How to succeed in the new  
world of environmental  
management p. 30



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## FEATURES



## COVER STORY: RUNNING GREEN

### 30 Diesel Owners' Turn to Carry the Clean-Air Ball

With diesel engines lasting as long as 25 years, clean-air officials in California have issued a rule that will force off-road-equipment owners to retire or upgrade older, more-polluting machines in order to make breathing safe for everyone. It is already motivating contractors in the state to replace and repower equipment. In order to satisfy the clean-air expectations of the Federal EPA, environmental regulators in major metro areas throughout the United States can enact similar rulings. The next installment of our exclusive Running Green Series will appear in January.



# Contents

## HANDS-ON TRUCKING

### 36 VHD Sleeper Means Legal Off-Road Rest



Most vocational trucks like dumpers, mixers and bulk-hauling tractors use daycabs because sleeping is not part of their drivers' usual routine. But some of these extra-tough vehicles venture far enough off-road that drivers must take rest breaks and overnight stays in place, and for them Volvo Trucks has its new VHD 430 with a short sleeper compartment and

roomy bunk that makes layovers legal. Truck Editor Tom Berg says this ruby-red tractor is among the first such tractors produced, and its chrome and bright-metal trim suggests that it was built for show as well as for going.

## Buying File: ADTs

### 40 Articulated Dump Trucks Poised To Move into New Areas

In establishing the articulated dump truck as a North American jobsite hauling solution, major manufacturers have mostly stuck to the 25- to 40-ton-capacity range. Truck models offered at tidy 5-ton increments in that range comprise the norm. Now that ADTs have found their place, the next step for the full-line manufacturers may very well be the stretching out of the standard hauling capacities offered.



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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

## Publishing Offices

Reed Business Information  
2000 Clearwater Drive,  
Oak Brook, IL 60523; Fax: 630/288-8185

**Rick Blesi**, Publisher

**Dawn Batchelder**, Marketing Coordinator

**Bruce Ksiazek**, Director of Finance

**Karen A. Ruesch**, Production Director

**Victoria Jones**, Production Manager

**Allison Ternes**, Director, Audience Marketing

**Bill Patton**, Creative Director

**Michael N. Smith**, Senior 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  
**Mac Wilcox**, Manager Database

## Reprints

**Reprint Management Services**, Reprints  
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## Equipped for Change

By now, the industry is fully aware that environmental regulations are affecting engine design and fuel options. But just where do these changes leave the equipment manager? Who's ensuring the overall environmental impact of equipment is minimized? Who's monitoring emissions, fuels, waste, and the new engine and machine technologies?

Depending on the size of the fleet, a new position of responsibility may need to be created: Fleet Environmental Manager.

Consider the ramifications of winning a job in a nonattainment area, where final award of the bid depends on the ability to guarantee certain maximum emissions levels at any given time, on any given day, over the course of the project. Consider the ramifications for operations in California, where fleets measuring more than 5,000 total horsepower must meet state-mandated emissions requirements by 2010, with others phased in by 2020.

For those fleets that were planning to move along the emissions trail led by the engine manufacturers and OEM's machine upgrades, the responsibility just shifted. Other states are studying California's moves and are now considering ways to accelerate their own emissions goals.

Equipment users have become the favored medium for change, and fleet managers need to start looking at how that change is to be managed.

To this end, *Construction Equipment* begins a new series this month, "Running Green," to help equipment managers with the new function of environmental management, whether handled by a new hire or as a responsibility absorbed by the current manager.

"Running Green" sets the goal, which we all can agree is worthy, of operating fleets in a spirit of stewardship. Our cover illustration tries to capture that spirit, and our cover story sets the stage for attaining the goal.

Our editors have discussed how to define the environmental manager's function and researched ways to encourage the successful transition into this new responsibility. Although we're hopeful, we're not naive; it will be difficult. This new manager will not just be responsible for determining which bio-fuel to purchase. This new manager will need to rethink the way fleets operate and perform.



**Rod Sutton, Editor in Chief**

We welcome your comments.  
E-mail: [rsutton@reedbusiness.com](mailto:rsutton@reedbusiness.com)  
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# MARKET WATCH

p. 18

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By KATIE WEILER, Managing Editor

## Doosan Infracore America

The DX35z excavator is a zero-tail-swing model weighing in at 7,937 pounds and using a 27-horsepower (net) Tier-3-compliant engine. According to Doosan, this new rubber-track machine, which digs to a maximum depth of 10 feet 4 inches, features electronic optimization of its hydraulic system and provides bucket and digging-arm forces of 6,636 and 4,321 pounds, respectively. The DX35z is available in either a canopy or cab configuration.

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## Prentice

Blount's Forestry Division is rolling out a shorter-wheelbase model as part of the Prentice site-preparation tractor product line. Joining the 220- and 260-horsepower 2764 and 2864 multi-purpose toolcarriers, the new 2664 models maintain, with 190 horsepower and load-sensing hydraulics, the ability to run mulchers, stump grinders and rotary mowers. The Cummins QSB 6.7L engine is designed to maximize machine performance through a "power bulge" that boosts horsepower when the engine is loaded.

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## Wacker

A new player in the earthmoving business, Wacker recently launched a line of three articulated compact wheel loaders. The company says its new wheel loaders can perform the same tasks as a higher-powered skid-steer loader, but deliver up to 30 percent in fuel savings. Models WL 18, WL 25 and WL 30 feature operating weights of 1.8, 2.5 and 3.0 metric tons, respectively, with bucket capacities of 0.26, 0.46 and 0.59 cubic yards. All are powered by Perkins engines with horsepower ratings of 25, 33 and 48 at 2,800 rpm.

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### ◀ TesCar

At only 4½ feet wide and 13 feet long, the CF 2.5 allows contractors to handle projects in restricted-access locations. Because it is controlled remotely, the operator has a 360-degree range of movement around the rig to monitor dangerous operations safely. TesCar boasts maximum drilling diameter of about 2 feet to a depth of almost 50 feet. The eight-ton rig is stable, even when delivering 19,536 foot-pounds of torque. The swing mast compresses to just 7 feet to fit under low overhead clearance. It's available from Hennessy International.

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### ▼ Elliott Equipment

Two new boom trucks — the 2695 and 26105 — feature a 26-ton capacity with 95 feet of powered main boom, giving it a 105-foot tip height; and 105-foot boom, giving it a 115-foot tip height, respectively. They come standard with FrictionFree jib extension; Load Moment Indicator system; and a variety of jib lengths, platforms and accessories. Also standard are 12-month parts/labor warranty and five-year limited structural warranty.

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### ▶ Philippi-Hagenbuch

According to the company, the 900-cubic-foot rear-eject/rear-dump combination bodies mounted on Komatsu HD325-7 trucks deliver two industry firsts: the first rigid-frame truck rear-eject body for off-highway trucks and the first rear eject/rear dump body. The custom bodies are produced with consideration of the end-users' height and width constraints. The body features a mechanical Autogate tailgate — no hydraulic cylinders.

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### ▼ Rocksaw International

The RSMM 1500-D10 Rock Miner is said to cut rock much like a chainsaw cuts wood. The cutting mechanism consists of four, 36-inch-wide, proprietary cutter chains placed side-by-side. According to Rocksaw, this cutting head is capable of opening a trench 13 feet wide and from 12 to 42 inches deep. The rock is crushed into usable sizes as the cutting process takes place. The spoil can be discharged via conveyor to either side of the machine for loading into trucks or for windrowing. It weighs 200 tons, uses a Cat engine developing 1,500 horsepower, and has a cutting capacity of between 500 and 750 tons per hour.

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### ▲ Manitowoc

Model 14000 is a fully hydraulic crane with a 220-ton lift capacity, maximum boom of 282 feet, and luffing jib up to 373 feet. Line pull on the main drum is 31,500 foot-pounds. The 14000 features Can-Bus with EPIC control system. This allows the control of six independent closed-loop hydraulic circuits. The FACT connection system is standard, for easier set-up and tear down.

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# Market Watch

## ► Schwing

The S 28 X, a four-section 28-meter boom pump, replaces the three-section KVM 28. The S 28 X incorporates a "Roll-and-Fold Z Boom combination," with the last three sections being of equal length and offering 720 degrees of combined articulation for maximum versatility. The new boom, having a low unfolding height of 19 feet 2 inches, employs Schwing's Vector System with digital proportional joystick controls and two-way communication between the pump and the operator.

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## ◀ Caterpillar

Model 992K wheel loader replaces the current 992G, and the 993K generates greater penetration, rimpull and break-out forces to deliver what Cat says is a 10-percent improvement in productivity compared to the 992G. The 993K matches both the Cat 777 and 785 off-highway trucks (100 tons and 166 tons capacity, respectively). Both models are powered by Cat's new C32 ACERT engine to comply with the EU Stage IIa emissions regulations. The 992K is designed for effective five-pass loading of the 777 truck. Both trucks will be available in the first quarter of 2008.

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## Manitex

The 50-ton 5096S boom truck is what Veri-Tek, owner of the Manitex brand, calls "the first 50-ton boom truck available on a commercially available chassis." The boom has a base rating of 50 tons at a six-foot radius, which is said to exceed maximum base ratings of conventional boom trucks by 25 percent. Maximum lifting height is 152 feet. The 5096S is available with an optional auxiliary winch, an offset jib, and an air-conditioned cab. Outriggers are controlled by a radio remote.

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## ▲ Kubota

Equipped with a factory-installed premium cab, the RTV1100 utility vehicle has been engineered for the all-weather protection of operators and passengers, featuring air conditioning, heater and defroster as standard. Powered by 24.8-horsepower Kubota diesel engine, it offers more than 1,100 pounds of cargo-load capacity in a 16-cubic-foot bed. It comes standard with a hydraulic bed-lift system, variable hydrostatic transmission, power steering and four-wheel wet-disc brakes.

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## ▲ Volvo

The 32,850-pound ECR145CL (18-foot dig depth) in the 14-ton class and the 52,910-pound ECR215CL (22-foot dig depth) are the first in Volvo's range of short-swing excavators. Compact bodies swing just 9 inches outside the ECR145CL's track width — 7 inches for the ECR215CL. A sliding door also allows the operator to get into and out of the machine easily — even when parked close to an obstruction.

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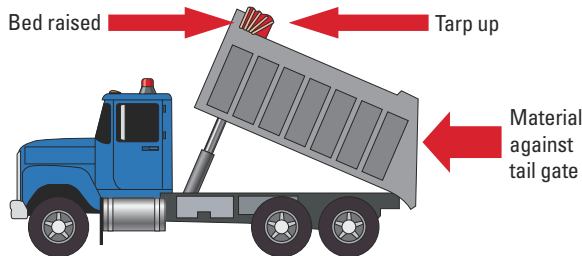


## APPLICATION IDEAS

### Limit Asphalt-Loading Segregation

Large stone in asphalt mix is prone to segregate from the smaller stone and binder when the mix is handled. Large stone tends to roll down the outside of the pile. Caterpillar's

piling the mix into cones in the dump body. When the truck is in place to dump into the paver or MTV hopper and the tarp is removed, raise the bed slightly before releasing the tailgate.



When the tailgate is released, it will flood the hopper, rather than allowing large stone to dribble off the pile first.

Raise the truck bed frequently to keep the hopper at least 25 percent full at all times.

Never allow material

publication "Segregation Prevention" suggests some basic ways to minimize segregation from the plant to the hopper.

Load trucks from pug and surge systems with at least three drops — front, rear and center — to prevent

conveyors in the hopper to be uncovered. The Cat publication warns, "running the hopper dry before recharging can cause random segregation, which is difficult to distinguish from random segregation caused by loading improperly from silos."

## MANUFACTURER NEWS

### Utility Tractors Expand Bobcat Equipment Range

The Bobcat Co. recently announced a long-term agreement with Korean manufacturer Daedong Industrial. Under the agreement, Daedong will produce a Bobcat-branded line of compact utility tractors, which is aimed at complementing the current Bobcat range that includes skid-steer loaders, compact track loaders, all-wheel-steer loaders, mini track loaders, compact excavators, telescopic tool carriers, utility vehicles and attachments. According to Bobcat, the company worked with Daedong to create a compact utility tractor that meets the needs and expectations of North American buyers.

"This alliance brings together the strengths of two respected companies," says David Rowels, president of Bobcat Americas. "By combining the Bobcat global brand, dealer network and service with Daedong's commitment to compact tractor design and technology, we can provide our customers with the quality compact-equipment experience they've come to expect from Bobcat."

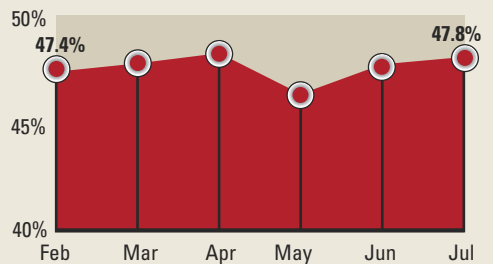
— Walt Moore

## USED EQUIPMENT

### Values Continue Level

#### The Rouse Value Index

(Avg. orderly liquidation value as % of cost)



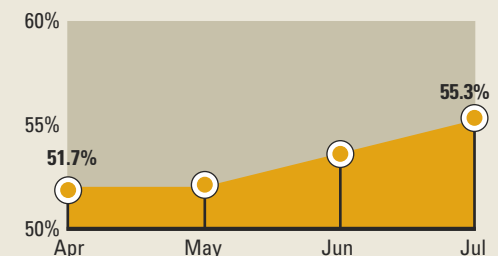
Note: Orderly liquidation value is expressed as a percentage of replacement cost (average cost paid for a new unit by large rental companies and dealers) for the average age of equipment within that category. Includes 10 categories of equipment common to rental fleets.

Source: Rouse Asset Services

Values for used equipment across the major rental categories continued to hover at about 48 percent of cost, dipping 0.8 percent from June to July. Straight and articulated boom lift categories posted decreased values for the first time in five months. Certain earthmoving categories also slid.

#### Wheel Loaders Build

(Avg. orderly liquidation value as % of cost)

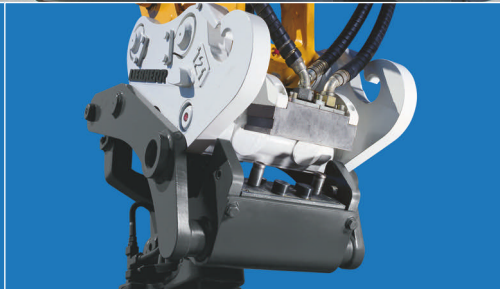


Wheel loader values have posted five consecutive monthly value increases for a total gain of 8.1 percent over the past six months.



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## MANUFACTURER NEWS

### *New Holland Marks 35 Years in SSL Business*

The year is 1972: The last ground troops are withdrawn from Vietnam; sales of the Volkswagen Beetle exceed those for the Ford Model-T (15,007,034 units); and New Holland introduces its first skid-steer loader, the L35.

"The L35 was the first skid-steer in the construction industry with ROPS and a vertical parallel-lift boom system," says Terry Sheehan, vice president, New Holland Construction. "Since its introduction, New Holland has produced more than 200,000 skid-steers, and the 220,000th unit is due to roll off New Holland Construction's production line in 2007."

At a recent press conference, Franco Fenoglio, CEO of New Holland Construction, gave an overview of NHC's parent organization, the Fiat Group. Among the Fiat Group's endeavors are Iveco trucks and engines, a strong line of agricultural products and automobiles, including Fiat, Alfa Romeo, Maserati and Ferrari (in which the Fiat Group has a 90-percent interest).

— Walt Moore



**This chrome and black L175 skid-steer commemorates New Holland Construction's long run in the market.**

## MANUFACTURER NEWS

### *Skyjack Reaches Out To Ontario "Neighbor"*

As virtual next-door neighbors in southern Ontario, the manufacturers of the Skyjack and Zoom Boom equipment brands have long been familiar with one another. Now, they will be one in the same.

Linamar Corp., of Guelph, Ontario, announced Aug. 22 the finalization of a purchase agreement for CareLift Equipment Ltd., of nearby Breslau, Ontario. The CareLift business, which includes the Zoom Boom telescopic-handler family, complements Linamar's Skyjack business, the manufacturer of aerial-work platforms.

Linamar says it will retain the 60 current CareLift employees and continue the existing lease on the CareLift site at Breslau, which is located about 15 miles to the west, near the city of Kitchener. Beyond that, the plan is for Skyjack to house the telehandler business, which will be structured under Linamar's industrial group and managed by the Skyjack team.

— Mike Anderson

## MANAGEMENT RESOURCES

### *Webinar Series Highlights Strategies*

ConstructionEquipment.com has partnered with the Association of Equipment Management Professionals (AEMP) to present a series of web-based seminars geared toward the professional equip-

ment manager. The next event, "How to Design Effective Shop Facilities," will air Dec. 5, 2007. (If you missed the first webcast, an archived version is available.)

Attendees will learn how to plan a new shop or retrofit an

existing one. Topics will include staffing, space allocation, and parts management. Subsequent webinars will cover emissions, warranty and performance guarantees, negotiations and safety.

The webinars feature material from AEMP's Certified Equipment Manager program, presented by AEMP members and moderated by ConstructionEquipment.com editors. Current CEMs will be able to earn one credit toward recertification for each webinar attended.

# What does Multiquip know about cutting?



## HEAVY EQUIPMENT FORUMS

### Do You Discuss Safety Hazards?

**User #1:** Here in my corner of the world, employers are required by law to exercise "due diligence" at the worksite. They have to do everything "reasonable" to provide safe working conditions and practices. Part of this work-site safety is the "tailgate meeting," which is documented by the Supervisor/Employer so proof can be shown in the event that a safety officer comes on site and asks. Also, if an accident was to happen, it would be proof that the employer was practicing due diligence.

**User #2:** We have work-site meetings at the commencement of every job. The tailgate is where I explain the intricacies of each job. At the last job,

we discussed asbestos removal, demolition, overhead power lines, and machinery hazards due to restricted access, manual lifting, and dust control.

**User #3:** We call them toolbox talks. I have to document what safety stuff we talked about and turn it in monthly, or I don't get paid.

**User #4:** My own personal experiences indicate that these meetings must be documented on paper and everyone present needs to sign off. Why? Let's say you have a meeting on Monday where everyone is instructed not to go under a gravel screening plant while it is in operation. Every-

one that works at that operation is present and signs off. On Wednesday, the plant maintenance mechanic violates this instruction and is found lying on top of the plant generator fuel tank, dead. [Investigators] reviewed all documentation and visited the screen plant manufacturer's facility.

The saving grace in this tragedy was that I always made a copy of the original weekly toolbox meeting sheet after everyone signed off. I turned in the original to the project safety director, and the copy then went into my own files in my office desk. A day or two after the incident, the safety director let me know that he could not find the original copy. I said, "no problem," and pulled out my copy. We then made a

dozen copies, and my original copy went into the office safe.

That little sheet of paper did not stop a good man and personal friend from being killed despite his being aware of the dangers. He chose to disregard the warnings he had been given. The paper did save the company and several supervisors severe penalties and potential loss of our jobs, not to mention what likely would have been large legal fees.

In today's tort-happy atmosphere, you have to cover yourself every way you can.

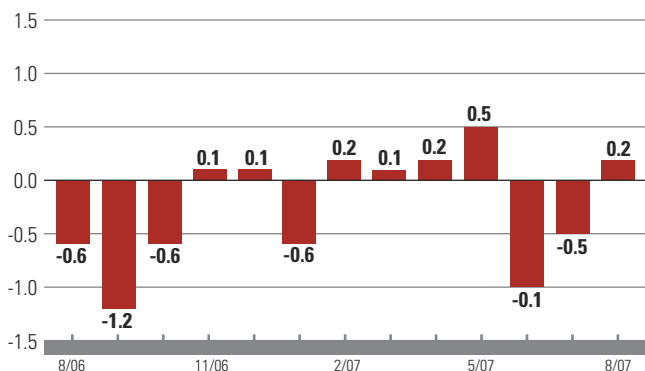
*HeavyEquipmentForums.com is a user forum where professionals in the heavy-equipment industry can exchange ideas and post questions or comments. Posts have been edited for clarity and content.*

## STATUS & FORECAST TOTAL CONSTRUCTION SPENDING

Total spending, including inflation, declined 4.5 percent in the last 18 months, but it will turn around into a slow increase late in 2007 when housing starts stop declining rapidly. A 7-percent rise is forecast for 2008 after the 2-percent drop in 2007, the first decline since the early 1990s. Measured after inflation, construction spending will begin expanding early in 2008. The expansion will be slower than overall economic growth until the end of 2008.

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

(% change from previous month)



Source: U.S. Department of Commerce

## SAFETY TRAINING

### NUCA Program Available At Cat Rental Stores

Cat Rental Stores throughout North America will offer the National Utility Contractors Association (NUCA) excavation safety and competent person training program.

While announcing its corporate endorsement of the NUCA program, equipment-manufacturing-giant Caterpillar indicated that participating Cat Rental Stores will offer the training as part of their services by the end of 2007.

NUCA's excavation safety and competent person training "was specifically designed to inform construction managers and workers about excavation safety and the applicable laws, regulations and best practices," says George Kennedy, NUCA vice president of safety.

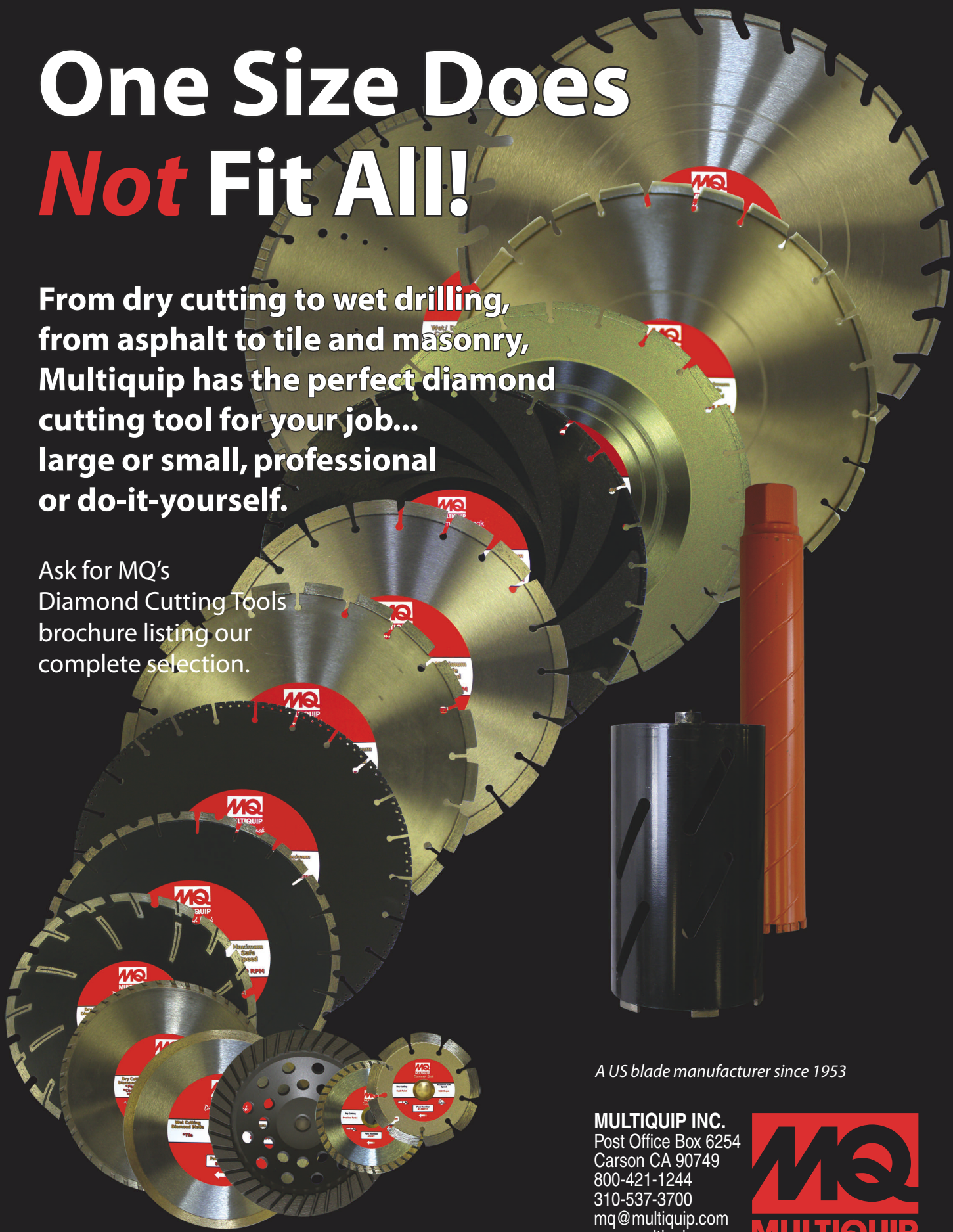
In addition to being an OSHA requirement, the NUCA training program provides participants with experience and knowledge of soil analysis, identification of hazards, and the proper use of protective systems such as trench shoring.



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## OPERATOR TIPS

### Dump-Truck Specs Include Basics and Advanced Designs

In the market for new trucks? Even if you're an old pro at setting up and buying trucks, you can always pick up a tip or two from the people who design and build them because they see what kind of equipment, old and new, is used all over the country. It could be

staying mostly on pavement? These considerations affect the type of frame and suspensions, and the material in the body.

■ Don't buy too much power. High-horsepower big-block engines are heavy and cost more to buy than lighter alternatives that still produce

Operating characteristics vary with engine make and model, and gearing is especially important with the latest diesels.

■ Be sure axles and suspensions are tough enough. A rear tandem and suspension rated for 46,000 pounds can handle an assortment of applications and duties. If it's on a truck with two or more auxiliary axles, it also needs enough "creep" rating — the capacity to shoulder the heaviest loads at low speeds when the auxiliary axles are raised. Also, consider locking differentials for extra traction.

■ Are components too heavy? Recent suspension designs can be as strong as the old-style type you're used to, and will probably ride better. It might also save hundreds of pounds. Think about suggestions you get from salespeople, ask for referrals to truckers who are already using newer stuff, then pick their brains.

■ Right-size the tank. Diesel fuel in summer weighs about 7 pounds per gallon, so that 120-gallon tank that extends range can also reduce legal payload and lower fuel economy. Maybe an 85- or even a 56-gal-

lon tank might be enough to get through a work day.

■ Pick the right air cleaner(s). An underhood air filter with an optional pre-cleaner can do a good job at low cost and with less weight than a pair of external air cleaners. But if the truck will spend a lot of time in dusty conditions, whether on or off road, the dual cleaners might be worth their considerable extra cost. Dual 15-inch air cleaners will last more than seven times as long as a single 11-inch underhood air cleaner before needing replacement.

■ Consider maintenance. Look at where everyday checks must be made, where fluids must be replenished, where electrical components and air parts are located. How easy is it to replace a cracked windshield, and what does a new piece of glass cost?

■ Make drivers comfortable. The make and model of the truck establishes how roomy the cab is, but options like a longer cab and extra noise insulation can keep drivers more rested and therefore safe and productive.

— Tom Berg



that the tried-and-true you're accustomed to might be improved upon.

To that end, Kenworth Truck published advice on how to spec a dump truck. Brian Lindgren, vocational market sales director at the company's headquarters in Kirkland, Wash., started with the basics:

■ Know the state and local weight laws in your area of operation. These limit legal poundage and, in effect, dictate wheelbase, number of axles and other details of chassis configuration. Knowledgeable salespeople at the dealership might suggest new components that can boost payload, revenue and profit.

■ What exactly will you be hauling, and where? Some cargoes are rougher on the chassis and body than others, especially when they're loaded. Will you be going off road a lot or

good power and torque. Generally, 400 horsepower and the torque that comes with it are plenty for most applications, and an 11- or 13-liter engine can save 500 to 700 pounds and thousands of dollars over a 15-liter model.

■ Be sure ratio range is sufficient. An 8LL-type of transmission, paired with a proper axle ratio, has low-low ratios that can get a heavily loaded truck started, but a high enough top gear for brisk cruising on freeways and highways. But trucks or tractor-trailers grossing over 90,000 pounds need more ratios, such as those in a 13- or 18-speed transmission.

■ Get the axle ratio correct. Working with the transmission and tire/wheel size, the axle ratio should allow the engine to spin at about 1,600 rpm at your desired cruising speed.

## MANUFACTURER NEWS

### Bridgestone Acquires Bandag

Bridgestone Americas completed its \$1.05 billion cash merger with Bandag. The name of new company has become Bridgestone Bandag LLC, and it will be headed up by Saul Solomon, chairman, CEO and president of Bandag. Solomon had served as vice president and general counsel of Bridgestone Americas. Bandag's headquarters will remain in Muscatine, Iowa.





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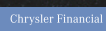



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# RUNNING GREEN

By LARRY STEWART, Executive Editor

## ***Diesel Owners' Turn to*** **Carry the Clean-Air Ball**

California's in-use diesel fleet rule will force changes to the dirtiest diesels in the field while it pushes environmental responsibility into your hands

**W**ith diesel engines lasting as long as 25 years, clean-air officials in states with the worst air are pushing to retire or upgrade older machines in order to make breathing safe for everyone. California's Air Resources Board (ARB) created a rule this summer, which environmental regulators in major metro areas throughout the United States are studying closely, that forces emissions criteria into equipment owners' repair-and-replacement decisions.

"We're not fighting the new ARB regulations; we're moving forward with the times. But the proposed regulations certainly accelerated our plans," said Lloyd Smith, senior vice president of Skanska USA Civil, after the company liquidated several million dollars worth of machines at a Ritchie Bros auction in Los Angeles last May. "We need to be updating our fleet with newer equipment and selling some of the older equipment in preparation for the regulations that are coming."

The Federal Clean Air Act describes the goal: Clean the air to protect the health of everyone, including those with weak respiratory systems such as the elderly, asthmatic, and infants. The nation's Environmental Protection Agency (EPA) sets air-quality standards limiting many pollutants to reach the goal. Particulate matter (PM) and ground-level ozone are most pertinent to diesel engine emissions. Ozone is formed when nitrogen oxides (NOx) combine with volatile organic compounds in sunlight. EPA determines compliance by sampling and analyzing air in an environment.

The PM and NOx limits EPA imposed on

new diesel engines are different — strategies measured at engines' exhaust stacks intended to reach clean-air goals. EPA hasn't challenged existing fleets, but the federal agency's air-quality goals give the state agency — ARB — incentive to regulate the dirtiest diesels out of California.

The ARB rule, passed in July, affects an estimated 180,000 off-road vehicles used in construction, mining and other industries. It is intended to reduce emissions by a combination of measures, including retrofitting diesel particulate filters and encouraging the replacement of old engines with newer emission-controlled models. By 2020, diesel PM emissions from machines working in California will be reduced by 74 percent and NOx by 32 percent, compared to unregulated emissions.

Deadlines vary according to fleet size. For small fleets, which include small businesses or municipalities with a combined fleet horsepower of 2,500 or less, implementation does not begin until 2015. Medium fleets, with 2,501 to 5,000 horsepower, have until 2013; while large fleets, with over 5,000 horsepower, must begin complying in 2010.

The new rule also allows PM-nonattainment areas to opt in to stricter regional requirements as long as incentive funds are available. The air districts that could take advantage of this provision are the South Coast Air Quality Management District and the San Joaquin Valley Air Pollution Control District. This provision could as much as double the NOx-emissions reduction in these districts.

ARB asserts the rule will prevent 4,000 premature deaths statewide and avoid \$18 to

**FIRST** In A Series



\$26 billion in premature death and health costs. According to the agency's estimates, compliance will cost the industry up to \$3.5 billion. Industry analysts argue that the price to equipment owners for meeting ARB's in-use-diesel rule will be more like \$13 billion.

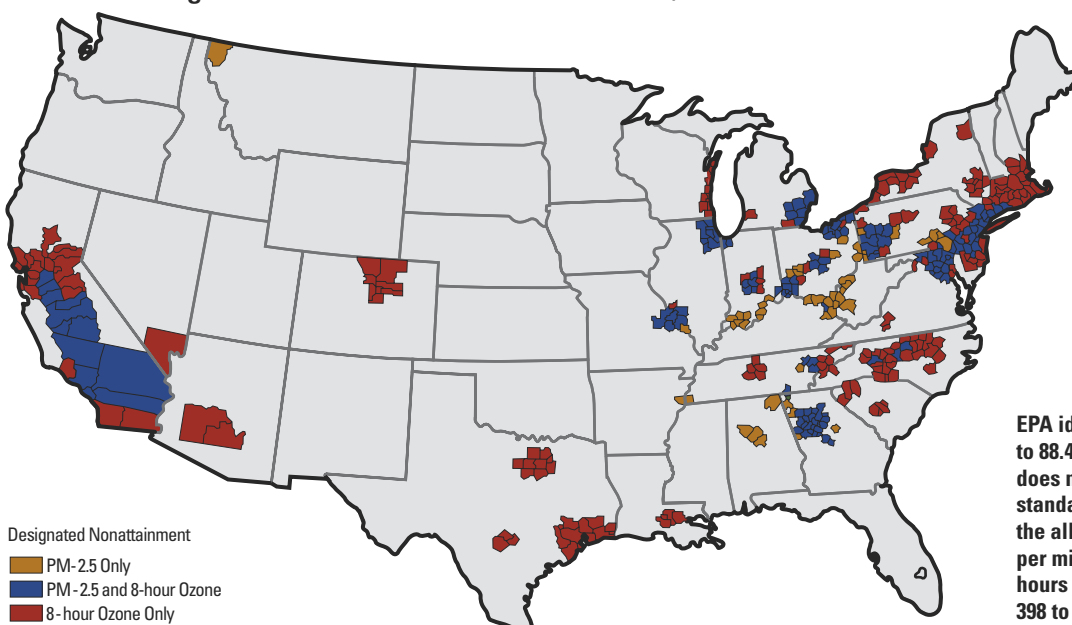
"Both sides are painting their own scenarios, but it is hard to project how this will play out," says Michael Coates, West Coast representative for the Diesel Technology Forum. "Everybody is in favor of clean air, but the real question is, who is going to be paying for it?"

"Regulating in-use vehicles is an extreme step," Coates adds, "but the need to clean up the air in several California regions is also extreme. Keep in mind that the Environmental Protection Agency (EPA) is moving along the same path (with emissions standards for new diesel engines) . . . just not as dramatically."

The price for noncompliance is high. EPA motivates officials like those at ARB to improve air quality with the threat of withholding federal funding for local projects if they do not move positively toward clearing the air in non-



## Counties Designated Nonattainment for PM-2.5 and/or 8-hour Ozone Standard



Several counties have only a portion of their county designated nonattainment. These counties are represented as whole counties on the map.

Sukut Construction, of Santa Ana, Calif., has repowered more than a hundred machines, intending to make its clean fleet a competitive advantage over firms that have not taken the initiative.

EPA identified 208 counties, home to 88.4 million people, with air that does not meet minimum quality standards. A proposal to reduce the allowable ozone from .08 parts per million averaged over eight hours to .07 or .075 ppm could add 398 to 533 counties (of 3,077 total counties in the United States) to the non-attainment list.

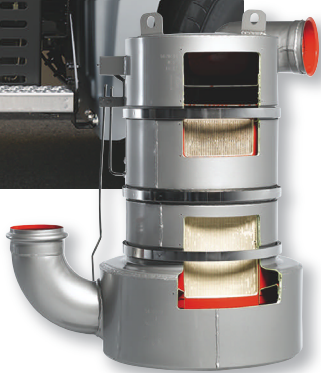




# RUNNING GREEN



**Emissions regulations on new 2007 diesel engines slash allowable PM by 90 percent, requiring a regenerating diesel particulate filter like this one installed on a Mack class-8 truck. Similar kinds of filters will be required to clean up the exhaust of older diesels in California, and probably other states, starting in 2010.**



attainment areas — areas that have not yet attained air-quality standards.

Nonattainment is hardly confined to Southern California. Well before Jay Leno took over for Johnny Carson making jokes about Los Angeles smog, the Northeastern megalopolis from Washington, D.C. to New Hampshire's coast was identified as a nonat-

tainer, as was the stretch of Lake Michigan shoreline from Gary, Ind., to Chicago and north to Milwaukee.

Add Atlanta, Phoenix, Dallas, Houston, Denver, Saint Louis, Memphis, Charlotte, and many others to the list of cities where the air is not safe for the youngest and the oldest citizens to breathe without risking illness. Virtually everywhere great populations gather, though, the air seems to sour. EPA air monitoring has identified 208 counties, home to 88.4 million people, with air that does not meet minimum quality standards. This despite all of the engineering hoops through which designers of new engines have jumped.

Today's diesel engines emit particulate matter that is at the lower limit of detection, and NOx emissions that are 80 percent cleaner than when the fleet rules were first adopted. But too many older, heavily polluting diesels remain in use to attain clean-air objectives. Construction is a significant generator of health-compromising NOx and PM, creating 32 percent of all mobile-source NOx emissions and 37 percent of PM emissions, according to EPA inventories.

Clean air is most urgent in California because mushrooming populations ensconced on landscapes where thermal inversion commonly traps the worst pollution raised the issue there first. Ninety percent of Californians live in areas with unhealthy air. The state's size, and the scope of its severe air-quality problem, makes ARB a leader in air-quality strategies.

Environmental jurisdictions around the country (and the world) look to ARB's rulings to decide how to improve their air. The Texas Department of Environmental Quality, for example, is spending grant money and proposing rules to reduce smog-causing NOx around the Dallas/Fort Worth Metroplex and Houston/Galveston. New Jersey has a grant program like those in California and Texas used to reimburse private industry for some of the cost to retrofit or repower machines with cleaner-burning diesels.

If the ARB ruling survives the inevitable legal challenges and actually produces cleaner air without sparking an economic revolution, other state agencies will have a responsibility to their citizens to emulate the California rule.

ARB regulations require that diesel engines not smoke. Diesel-equipment owners will be required to perform annual smoke tests to confirm that they run clean. The California agency will also put compliance officers in the field to inspect diesel vehicles. Violators face fines and must bring their vehicles into compliance. Once a vehicle or engine is in compliance, it must remain in compliance throughout its residence in California.

Vehicles that do not pass the smoke test must either be moved out of state or retrofit with ARB-verified diesel emission control strategies. ARB works with companies to verify die-

## Air, Water and Earth Count on You

**This is the first article in a multi-part series** dedicated to helping equipment professionals navigate the environmental issues most pressing on their operations. The series resumes in January with an article about retrofit technologies available to bring older diesels into compliance with California's new ruling on equipment in use.

You don't have to be a tree hugger to want to deal responsibly with the wastes produced by making a living with construction equipment. You just have to be a law-abiding citizen. We hope this series helps take some of the mystery out of running green.



sel emission control strategies that significantly reduce diesel PM, are durable, and have a mandatory warranty.

The Carl Moyer Program uses government grants to help fund replacement of polluting diesel engines. It was established in 1999 to offset the extra cost of reducing NOx emissions below the levels called for by current standards. The state has paid about \$200 million in Moyer incentives to clean up more than 7,000 diesel engines.

Moyer retrofit-program administrators estimate rebuild cost based on the equipment specifications, dealers' parts estimates, and the users' utilization history. A grant is issued to pay the difference between the rebuild cost and the total cost of replacing the old smoker with a new engine. For example, if a replacement engine costs \$170,000, and the rebuild-cost estimate is \$50,000, the program pays \$120,000 toward the repower.

"We're also taking care of all the major preventive maintenance while the machine is in here — welding up cracks and that sort of thing," says Mike Bowman, Coburn Equipment's equipment manager. The Chino, Calif., contract scraper fleet has replaced dozens of engines under the Moyer program, and Bowman considers the investment a major uptime advantage. "We're not only reducing our emissions, but we're going to have less problems with our fleet — making these tractors like new again."

Emissions-reduction plans can also include operational modifications. For example, California imposed limits on idling time for over-the-road trucks. A draconian example of regulators gone awry occurred in Texas in 2000, when the State Implementation Plan (SIP — master plan that identifies how the state will meet federal clean-air deadlines) aimed to meet EPA air standards in the smoggy Dallas-Fort Worth and Houston-Galveston areas by prohibiting use of off-road diesel equipment before noon from April to October each year.

"Construction companies could not have absorbed the financial impacts of these tactics and remained viable," says Bob Lanham, vice president with Houston-area contractor, Williams Brothers Construction.

A construction coalition led by the Texas chapter of the Associated General Contractors prevailed on the state legislature to replace the rules with the Texas Emissions Reduction Plan (TERP). The voluntary grant and rebate program to support emissions retrofits is funded from a number of sources, including a 2-percent surcharge on sale and rental of construction equipment.

Austin Bridge & Road's Clay Jones, equipment operations manager, headed up the Austin-based contractor's TERP application.

"The state, through a formula based on frequency of the equipment's use and its horsepower, grants money to companies per ton of nitrogen oxide that is removed from the environment," he says.

The \$433,000 grant awarded to the contractor supported replacement of 12 pieces of equipment — six haul trucks and six off-road earthmovers.

"We were granted \$242,000 just for the trucks. If we were to sell them on the market, we might get \$60,000 for them," Jones said.

"This grant money enables us to move forward in a much more timely manner to replace some of our older equipment," said Jim Andoga, Austin Bridge & Road president. "As a result, we can help provide much cleaner air in the Dallas-Fort Worth area. Hopefully, our children and grandchildren will see the real benefits of the program."

As research on the health effects of air quality deepens, acceptable pollution limits will likely tighten. EPA Administrator Stephen Johnson, acting in June under a court order to review the national ozone standard, proposed reducing the allowable level from .08 parts per million averaged over an 8-hour period to .07 to .075 ppm.

A panel of outside scientific experts advis-



**Volvo's Gryphon concept wheel loader is intended to exemplify wheel loaders of the 2020s, but Volvo CEO Tony Helsham says a precursor of its hybrid drive will be commercially available in Volvo wheel loaders by 2009.**





# RUNNING GREEN

ing EPA unanimously recommended that the new standard be lowered to within a range from .07 to .06 ppm.

"The science clearly shows that the current standard does not adequately protect public health from the harm caused by ozone," says Arthur Marin, executive director of Northeast States for Coordinated Air Use Management (NESCAUM). "EPA recognized this shortcoming but, unfortunately, it didn't go far enough with its proposed change."

"There's not much else we can do at this point to get NOx emissions from new engines down," says Joe Suchecki, a spokesman for the Engine Manufacturers Association. "We've already got regulations in place, and they call for NOx emissions of 'near zero' by 2010."

Suchecki said EPA's revised standard "would put more pressure on states to retrofit older diesel vehicles."

"I think for most states, the major source of NOx is now mobile sources," he says, "and if they lower the standard from .08 to .07, they'll have to look harder at those older engines."

In its proposal, EPA said "mobile sources and the electric-power industry were responsible for 78 percent of annual NOx emissions in 2004."

Glen Kedzie, environmental counsel for American Trucking Association, says the federal government doesn't have the power to mandate retrofits of older trucks, but it can designate counties as nonattainment areas for the ozone standards, forcing the states to develop plans to reduce ozone.

"They may or may not include retrofits (to diesel engines in the field)," he adds, "but that's a tool in their toolbox."

Observers with American Road and Transportation Builders Association (ARTBA) estimate the change could result in 398 to 533 new counties designated as non-attain-

ment areas, at risk of losing highway funding.

Technologies for achieving ever-cleaner diesel power are hardly science fiction. Volvo Construction Equipment CEO Tony Helsham says the Volvo Group is spending "billions of Swedish Kronors every year" to develop hybrid drive systems, and claims that the construction-equipment company will roll out hybrid-driven wheel loaders that boast up to 50 percent fuel-consumption reduction in 2009. Roller applications, he notes, are also likely early candidates for the emissions-slashing technology.

Caterpillar's CEO, Jim Owens, said the company is testing unique combinations of low-emissions diesels and electric drives as hybrid fuel and emissions reducers. Large trucks, track-type tractors, and large wheel loaders are at the top of the development priorities. But he says Caterpillar has no timeline established for introduction of a product.

"We just have to get demand from customers to put them in place," he says.

NESCAUM's 2007 report — in the association's 40th year — speaks of the practical reality of clearing the air.

"This report is intended as a testament to the fact that cutting edge pollution-control programs and public-health protection in the Northeast have occurred in lockstep with economic development. Even as the region demanded and pursued clean air, its economy has grown impressively over the past four decades, challenging the myth that aggressive pollution-control programs stifle economic growth."

Engine manufacturers have been carrying the ball for clean air since the EPA's first diesel emissions limits went into effect in 1991. They will no doubt continue to stretch their engineering abilities in the name of cleaner air in the coming decades.

But now it is equipment professionals' turn to share the innovation load. Fleet owners have to come up with creative ways to upgrade diesel engines and reduce emissions in the field economically.

"Just as we had to change our culture and manner of thinking with regards to OSHA," says Lanham, from Williams Brothers, "the same mindset shift must occur again with the Clean Air Act."

## Related Reading

**California Air Resources Board**  
[www.arb.ca.gov](http://www.arb.ca.gov)

**EPA**  
[www.epa.gov](http://www.epa.gov)

**ARB Verified Technologies List**  
[www.arb.ca.gov/diesel/verdev/vt/cvt.htm](http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm)

**EPA Verified Technologies List**  
[www.epa.gov/otaq/retrofit/verif-list.htm](http://www.epa.gov/otaq/retrofit/verif-list.htm)

**Texas Emissions Reduction Plan**  
[www.tceq.state.tx.us/implementation/air/terp](http://www.tceq.state.tx.us/implementation/air/terp)

**Northeast States for Coordinated Air Use Management (NESCAUM)**  
[www.nescaum.org](http://www.nescaum.org)

**Diesel Technology Forum**  
[www.dieselforum.org](http://www.dieselforum.org)





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*Barbara Smith  
Albian Sands Energy, Inc.*



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# Hands-On Trucking

By TOM BERG, Truck Editor

All chromed up and ready for work or show, the VHD-430 sleeper-cab tractor poses with its outrigger-equipped test flatbed. A shiny grill covers the 1,280-square-inch radiator needed to cool the EGR'd EPA-'07 diesel.



## **VHD Sleeper Means** **Legal Off-Road Rest**

Decent power from a new EPA '07 diesel and notable gearshift improvement make the 430 a nice place to work

**M**ost vocational trucks like dumpers, mixers and bulk-hauling tractors use daycabs because sleeping is not part of their drivers' usual routine. But some of these extra-tough vehicles venture far enough off-road that drivers must take rest breaks and overnight stays in place, and for them Volvo Trucks has its new VHD 430 with a short sleeper compartment and roomy bunk that makes layovers legal.

This ruby-red tractor is among the first such tractors produced, and its chrome and bright-metal trim suggests that it was built for show as well as for going — to Canada, where

loggers are among the truckers who can use on-board sleeping accommodations. The vehicle was temporarily working at Bendix Commercial Vehicle Systems' shop near the Transportation Research Center's sprawling complex northwest of Marysville, Ohio, which is maybe 40 miles from my home, so I sought some seat time in it.

Bendix technicians had been using the tractor to calibrate settings on their electronic Roll Stability Control, part of ABS that helps prevent rollovers; they hitched up a test trailer whose outriggers — which, when deployed, keep an aggressively cornering rig from turn-



ing over — had been stowed for highway travel. The rig was ready to go when Volvo product manager Frank Bio and I drove up.

We departed soon after checking in with no particular route in mind, and I decided to use more two-lane highways than freeways. It was quickly apparent that this tractor rode almost as nicely and was as quiet and comfortable as Volvo's limousine-like VN highway tractors. Of course, the VHD (for Volvo heavy duty) has a stronger chassis meant for on/off-road rigors. It might not be high on vocational truckers' lists of trucks to consider, but it ought to be, for it's arguably good looking, both in photos and in actuality, with stout yet curvaceous lines that at once suggest toughness and modernity.

And this one showed a major improvement in an area on which I tend to focus, which is shift quality. Most Volvos I've driven have not been good in this respect, and "rubber lever" is among the expressions a Volvo driver might use in describing his regular ride. So here I am in this VHD 430 and its Fuller 18-speed, going through all of the nine main gears smoothly, float shifting without the clutch once in a while and splitting gears for the fun of it. "What's the deal with this gearshift?" I asked Bio later in the run.

"They made a change in the shift linkage, but it actually was done to get the shift lever further to the center, to get it out of the driver's way when he heads for the sleeper," he said. The lever's base is now in the center of the wide cab instead of offset to the left; it's now bent to put the knob close to the driver, but has a solid feel. "Moving the lever required a change in the linkage, and a side benefit is the easier shifting. I don't know exactly what they did to the linkage, but it works better."

It sure does. And being able to shift easily and smoothly helps a driver's confidence in other areas of operating the truck — for instance, turning through tight intersections without worrying about whacking cars in other lanes. I made several such maneuvers in small cities in central Ohio, for we followed state and U.S. highways much more than Interstates. Never once did I feel stressed while driving this rig, not even when a lady motorist had to back up a bit to let me finish a hard right turn in a

## TEST SET

**Tractor:** Volvo VHD64BT430, 6x4 conventional-cab w/43-in. sleeper, BBC 145.6 inches, on 11.81-in.-high x 3.54-in.-flange x 0.38-in.-thick straight-rail main frame

**Engine:** Volvo D13, 12.8 liters (782 cu. in.), 485 hp @ 1,600 to 1,900 rpm, 1,650 lbs.-ft. @ 1,025 to 1,500 rpm, w/engine and exhaust brake; EPA-'07 legal

**Clutch:** Eaton Solo 16.5-inch 2-plate, 9-spring

**Transmission:** Eaton Fuller RTLO-16918B, 18-speed

**Front axle:** 20,000-lb. Meritor FL941 on 16,500-lb. multi-leaf springs, w/TRW THP60 integral power steering

**Rear axles:** 46,000-lb. Meritor RT-46-160 w/locking differentials and 4.10 ratio, on Hendrickson Primaxx air-ride

**Wheelbase:** 269 inches

**Brakes:** Meritor Q+ S-cam drum w/ Bendix ABS and automatic traction control

**Fuel tank:** 70-gal. 22-in.-diameter polished aluminum

**Tires & wheels:** Michelin 11R24.5 on Alcoa Dura-Bright polished aluminum discs

**Fifth wheel:** Conmet Simplex II on 24-inch slider

**Trailer:** 48-ft. flat w/test outriggers

really tight corner. I waved a thank-you and we went merrily on our way.

The VHD doesn't have a really tight turning radius because its wheel cut is somewhat limited. This is a function of its higher-rated front end — the steer axle at 20,000 pounds and suspension at 16,500 pounds, rather than the common 12,000 pounds in a highway tractor — and there's not enough room for the tight wheel cut you find on some road tractors, including the VN. The VHD's not by any means clumsy, but I did need a little more room while turning.

Strong power and torque were always on tap from the new D13 diesel, the only engine available on the VHD. Its displacement is 12.8 liters (about 782 cubic inches); and this one was rated at 485 horsepower and 1,650 pounds-feet, but like most Volvo engines, feels stronger than its numbers suggest. It provided brisk (for a big rig) acceleration. One feature central Ohio lacks is mountains or even big hills, so I can't say anything about how the engine pulls long, steep upgrades.

The D13-485 makes its peak torque from 1,025 to 1,500 rpm, and power meanwhile



**A D13 diesel, the only engine offered in the VHD, makes up to 485 horsepower and 1,650 lbs.-ft.**



# Hands-On Trucking



**The cab's interior is nicely trimmed, and repositioned gearshift lever allows smooth operation.**

ramps up toward its maximum; that begins at 1,600 rpm and continues to 1,900 rpm, and falls off as the 2,100-rpm redline is reached. But it's best to upshift at 1,600 to 1,700 or even lower to get better economy, according to Volvo's engine people. The combination engine and exhaust brake didn't get much of a workout, either, but they did do some of the service brakes' work as I approached traffic lights and stop signs.

Of course, the D13 was an EPA '07-spec diesel, with an advanced, electronically controlled combustion system that burns fuel so cleanly that you can't see any smoke or smell any odor. Among the equipment is a diesel particulate filter that grabs any soot that gets out of the cylinders; the "compact" filter, looking somewhat like a big coffee urn, is tucked under the cab behind the passenger steps, and from there the tailpipe runs up the cab's rear wall near the corner. The end of the stack is perforated for about a foot and a half, which dissipates high heat during DPF regeneration; this might prevent lighting a tree afire while parked in the woods (this is a logging truck, remember?).

The driver learns of a "regen" through the LCD information display about the steering wheel on the instrument panel. An active regeneration began as we approached a country intersection, and I pulled off to photograph it. Otherwise, there's no indication performance-wise, and an indifferent driver can just motor




**A diesel particulate filter is hidden behind passenger steps, while the tailpipe winds up the back of the sleeper-cab; the perforations at the end of the pipe diffuse hot exhaust gases, especially during DPF regeneration.**

along without worrying about it, unless he parks where the hot gas (up to 1,200 F, engineers say, though it's probably less by the time it runs through the long tailpipe, even without the perf-type diffuser) could light a tree afire.

You might think that the intricate passages inside the filter would choke off the engine, but they don't. The engine's designed to work with it and does so very well, at least from the driver's perspective; not enough of these new diesels are out there yet to establish a reputation regarding reliability and longevity, but we'll eventually find out.

Because this truck was built for Canada, the speedometer's primary numbers showed kilometers per hour while miles per hour were in smaller yellow numbers. That way, the driver can watch his speed no matter which side of the border he's on and how the limits are posted, and can see that when the speedo's needle rests on 100 kph, it really means 62 mph. Furthermore, a Canadian football field's length is still 110 yards, not metric meters, thanks to the good ol' standard units of measure. Some things endure.

As should this VHD. It appeared stout and tight and was certainly quiet, smooth riding and comfortable, and was enjoyable to drive. Its interior was a combination of simple design and nice fabrics and well-fitted plastic panels. Most drivers would appreciate working in a place like this, and I sure did, if even for just a few hours. Next time I might not give it back. 



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# Articulated Dump Trucks Poised to Move Into New Areas

While manufacturers firm up core 25- to 40-ton-capacity offerings, product-line expansions begin to take form

In establishing the articulated dump truck as a North American jobsite hauling solution, major equipment manufacturers have mostly stuck to the 25- to 40-ton-capacity range. Truck models offered at tidy 5-ton increments in that range comprise the norm.

Now that ADTs have found their place, the next step for the full-line manufacturers may very well be the stretching out of the standard hauling capacities offered.

At the Bauma 2007 show in Germany, two 50-ton-class trucks were debuted. At least one of those, the Moxy MT51, will be coming to Conexpo-Con/Agg in Las Vegas next March.

At the other end, manufacturers established in the European market, such as JCB and Hydrema, continue to provide North America with smaller-capacity ADTs (those up to 22 tons in capacity).

"We see movement in increasing payload capacities, so we are working on larger trucks," says K.C. Clarendon, articulated dump truck product consultant with John Deere Construction & Forestry. "On the flip side, over the past couple of months, in the market for a smaller truck in the 18- to 20-ton range we've seen a good bit of interest from customers as well."

"But I'd have to say even more so in the 50-ton class."

With 250D, 300D, 350D and 400D models, John Deere is among the major manufacturers that cover the core 25- to 40-ton range.

Likewise for Caterpillar, which offers the 725, 730, 735 and 740 models.

"We're always looking at where our customers want to go with these trucks," says Ann Schreifels, articulated trucks product specialist with Caterpillar.

But when a customer asks for a larger articulated truck, there are pressing questions that need to be answered first, she says.

"Does he want a bigger version of the truck he has right now, meaning the same gradeability, same top speed, same mobility?" asks Schreifels. "Or, if you go bigger, would it be dedicated to one job, since transport issues would come into play? Would you expect to climb a grade as steep with a 50-ton truck as you do with a 40-ton truck?"

"These are all questions we are looking at," she says, "and determining if the market is there for it and what exactly are they asking for."

No doubt, product-development professionals with Volvo, Komatsu and Case — all of which have made significant product-line upgrades up to the 40-ton line — are doing the same type of analysis.

While other equipment types have hit the North American marketing brick wall thrown up by the housing downturn, ADTs motor along at a pace of a little under 4,000, albeit a tad slower than the "vertical" market of a year ago.

"We haven't seen it drop that much," says Deere's Clarendon. "I think it's more about the



Equipment manufacturers such as Case continue to refine their articulated truck offerings in the core 25- to 40-ton-capacity range. Case recently completed its B-Series rollout, including the top-of-the-line 340B model. For some players in the game, the time has come to look beyond.

## The Cost of Ownership

Size	List Price	*Hourly Rate
Up to 19 M Tons	\$152,626	\$50.22
20 - 25 M Tons	\$328,722	\$83.24
26 - 29 M Tons	\$396,759	\$93.88
30 - 34 M Tons	\$484,725	\$110.03
35 M Tons & Over	\$569,661	\$123.62

\* Hourly rate represents the monthly ownership costs divided by 176, plus operating cost. Adjusted operating unit prices used in the calculation are diesel fuel at \$2.83 per gallon, mechanic's wage at \$43.07 per hour, and money costs at 5.75 percent.

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





# Buying File: ADTs

## Articulated-Dump-Truck Specs

Model	Payload (lb.)	Heaped Capacity SAE 2:1 (cu. yd.)	Full Cycle Dump (sec.)	Dump Angle (degrees)	Net HP
Hydrema 912D	22,000	7.3	n/a	75	131
Hydrema 912D MultiTip	22,000	7.3	n/a	75	131
JCB 714	28,660	9.6	19.7	84	144
JCB 718	36,000	12.56	20	84	168
JCB 722	44,092	15.7	24	74	242
Hydrema 922C	44,094	15.7	13	72	274
Case 327B	51,147	18.0	26	68	300
John Deere 250D	51,150	18.0	17.9	70	265
Moxy MT26	51,809	18.4	21	70	299
Caterpillar 725	52,010	18.8	18	70	301
Volvo A25D	52,911	19.6	21	74	293
Volvo A25D 4x4	52,911	17.0	14	59	293
Terex TA27	55,115	20.3	19.5	65	335
John Deere 300D	60,190	21.7	17.9	70	285
Komatsu HM300-2	60,360	21.7	n/a	n/a	329
Moxy MT31	61,729	22.0	21	70	336
Terex TA30	61,730	22.9	19.5	65	333
Volvo A30D	61,730	22.9	21	70	336
Caterpillar 730	62,000	22.1	20	70	317
Caterpillar 730 Ejector	62,000	22.1	27	n/a	317
Case 330B	62,082	23.0	26	68	334
Case 335B	69,445	26.2	24	68	380
Komatsu HM350-2	71,400	25.9	n/a	70	394
John Deere 350D	71,650	26.3	20.6	70	380
Volvo A35D	71,650	26.2	22	70	382
Caterpillar 735	72,090	25.8	18	70	385
Moxy MT36	72,091	26.3	23	70	388
Terex TA35	74,957	27.5	20.5	66	388
Case 340B	79,366	28.8	24	68	426
Komatsu HM400-2	80,640	29.2	n/a	70	438
John Deere 400D	81,570	29.4	20.6	70	413
Volvo A40D	81,571	29.4	22	70	414
Moxy MT41	82,012	29.7	23	70	438
Caterpillar 740	83,775	30	19	70	436
Caterpillar 740 Ejector	83,775	30.2	38	n/a	436
Terex TA40	83,775	30.2	20.5	66	437
Moxy MT51	102,008	37.7	23	70	508

Source: Spec-Check Expanded Specs (as of September/07)

jobs where these are going. The housing market took a pretty good crash, but where these are used are in road-building and mass-excavating jobs mostly, and I haven't seen them really drop down. There's actually a good number of them out there for bid right now."

ADT applications are expanding, too.

"We've made some in-roads into markets that they weren't used too much for in the past — quarrying and mining applications," says Clarendon. "A lot of that has been driven by rigid-frame-truck availability — or not being available. That's helped us get in there, and also to show the customers the versatility of these trucks, in terms of everything from haul-road maintenance to inclement weather and how they work through all that."

More and more users, says Caterpillar's Schreifels, do see the articulated trucks as "more versatile than if they had a construction truck or a rigid-frame truck.

"There you have to prepare for the trucks to arrive," she says, "where here the articulated trucks are usually breaking new ground."

Schreifels is likewise seeing her company's articulated trucks going into different surroundings. In Nebraska, for instance, a feedlot operation is using the trucks to haul manure.

"Probably where people get the most creative is with our Ejector trucks," she says. "We have a job right now in Missouri where they are actually filling the truck with wet concrete, and pushing the concrete out for a dam construction job."

In addition to the standard-dump 730 and 740 models, Caterpillar offers two corresponding ejector-body models. With their ability to push out the load as compared to dumping, the 730 Ejector and 740 Ejector are suited for spreading material on the go.

"We've got one guy who's actually



put a divider down the middle,” says Schreifels. “He puts one type of material on one side, another type on the other, and then he can spread them side by side, so that there ends up being two windrows. Then, he comes back with a stabilizer, because he has to put that particular mix down for some stabilization. I call that truck ‘the epoxy model.’”

Others have been enhanced with funnels and wings.

While the Ejector models would still represent less than 20 percent of the total turned out by Caterpillar in the respective class sizes, “we’ve seen in the last couple of years a real surge in demand for them,” says Schreifels. “People are starting to get over those, ‘Oh, this is new and different’ kind of jitters. They’re more accepting now and more willing to take a look at them.”

Ejector-body articulated trucks require less jobsite support equipment, and they offer a safer system when working with restricted overhead clearance or soft underfoot conditions, she says. Then there are the faster cycle times.

“It takes you the 12 seconds to eject the load, and then you’re up to full speed on your way back to get reloaded,” says Schreifels. “You’re not waiting for the bed to raise, you’re not waiting for the bed to lower, or putting the parking brake on. You’re going however fast you want to go, and then you retract the blade on your way back.”

While ADT manufacturers consider an expansion of the traditional product size offering, they have been busy upgrading their established products, too.

Case completed the B-Series updating of the line this year with the rollout of the 335B and 340B models, following up on the 2006 debut of the 330B and a new model size, the 327B. Along with the swing-out fenders, Case added a tilt cab that provides technicians with easy access to the drivelines, transmission, hydraulic valves and lines, for ground-level preventative maintenance checks. An automatic-lubrication system continuously greases all lube points from a central distribution block.

With three model sizes covering the 30- to 40-ton-capacity range, Komatsu has over the past 18 months rolled out the -2 Series of the

HM trucks, offering increased horsepower and improved fuel economy based on transmission control, steering and hydraulic-system upgrades. Komatsu offers full hydro-pneumatic suspension in both the front and rear.

As part of its new E-Series, Volvo used the backdrop of Bauma to introduce a Full Suspension option for the two largest of its four established model sizes. The new A35E FS and A40E FS models employ shock absorbers at each wheel position that are linked to microprocessors that automatically control the truck’s stability.


On the compact side, Hydrema recently introduced the D-Series model of the 912, the smallest ADT on the market, also available in a side-dump MultiTip version. The 912D MultiTip has an “auto bed return” option that allows the truck to turn and lower the bed automatically.

As with Hydrema, JCB offers a 22-ton-capacity model. The tri-axle, constant six-wheel-drive JCB 722 is equipped with a transmission and intermediate axle differential lock that can be engaged to provide equal torque distribution to each of the three axles in poor ground conditions.

JCB also offers the smaller 714 and 718 models, which can be switched between four- and two-wheel-drive, depending on terrain conditions. All three of JCB’s models are equipped with limited-slip axles.

Indeed, the ADT market is here to stay.

“Generally speaking,” says Clarendon, “they’ll go in quantities of 2, 4, 8, 20 — a fleet — to be loaded by excavators and wheel loaders.”

As a choice among hauling systems, says Schreifels, “people know what articulated trucks are and know what they can do. They are a ‘go-anywhere’ kind of vehicle.” 



**From the large to the small models, such as the Moxey MT 41 (above) to the JCB 714 (below), articulated-dump-truck manufacturers are increasingly offering a wider range of size options.**



## Web Resources

**Find articulated-dump-truck manufacturers’ web-sites in the online version of this story at Construction Equipment.com. Just click on Archives, Buying File, and you’ll find a link to this story.**



# Gallery of Articulated Dump Trucks

## CASE CONSTRUCTION EQUIPMENT

### B-Series Offering Now Complete

The B-Series updating of Case's ADT line was completed this year with the rollout of the 35-ton-capacity 335B and the 40-ton 340B models, each featuring a 13-liter version of the air-to-air-cooled, four-stroke diesel engine. Along with increased horsepower, the Tier 3 engines feature a variable-geometry turbocharger that provides an optimized air-to-fuel mixture for peak performance.

**Number of models:** 4

**New models:** 335B, 340B in 2007; 327B, 330B in 2006

**Product-line features:** Case retains the wide frame and low dump body that differentiates its ADT line. Along with a lower center of gravity, this design provides room for the dump cylinders to be housed inside the frame.

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## JOHN DEERE

### Smart Technology Enhances Product Line

With an industry-standard four-model ADT family covering the 25- to 40-ton-capacity market, John Deere now offers an electrohydraulic dump body tip control as part of its Tier 3-compliant D-Series. The system's Production Limit feature allows the operator to set the maximum dump height, which saves time during the dump cycle.

**Number of models:** 4

**Product-line features:** Most recently, John Deere grew a new product out from its ADT line. Purpose-built to serve the growing market need for dust control, the 300D Water Wagon combines the tractor of the 300D with a 7,000-gallon water tank equipped with up to eight spray heads, a gravity dump bar and remote water cannon.

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## CATERPILLAR

### Dump or Ejector Bodies Available

Along with the 25-, 30-, 35- and 40-ton-capacity-class articulated trucks, Caterpillar offers ejector-body versions of the 730 and 740 models. Interest in the 730 Ejector and 740 Ejector is continuing to grow among customers requiring a versatile hauling system for spreading on the go, say Caterpillar officials.

**Number of models:** 6

**Product-line features:** The differentials on Caterpillar's articulated trucks can be engaged and disengaged on the go. With the wet-clutch design, as compared to mechanical "dog" clutch systems, the operator does not lose momentum coming up to a slope or a muddy spot that requires lock-up.

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## MOXY

### Getting Bigger All the Time

In the late 1990s, Moxy introduced the Plus 1 concept to the worldwide ADT market, moving beyond the standard 25-, 30-, 35- and 40-ton-capacity nomenclature with such models as the MT26, MT31, MT36 and MT41. Well, at the Bauma 2007 show last spring in Germany, the company went further, rolling out the ground-breaking MT51 with a payload of 102,008 pounds.

**Number of models:** 5

**New model:** MT51

**Product-line features:** Offering a heaped capacity of 37.7 cubic yards, the MT51 currently tops the worldwide ADT product offering. It is powered by a 508-horsepower, 15-liter Cummins engine.

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# Gallery of Articulated Dump Trucks



## KOMATSU

### More Horsepower, Better Fuel Economy

In rolling out the -2 ADT Series, Komatsu boosted the horsepower on its HM300-2, HM350-2 and HM400-2 models. In the case of the 30-ton-capacity HM300-2, torque also increased 9 percent, tractive effort increased 9 percent, and overall productivity in high-load applications increased 10 percent. Transmission control combined with steering and hoist hydraulic system enhancements to improve the fuel economy of each of the Tier 3-compliant trucks.

**Number of models:** 3

**Product-line features:** Boasting a number of industry exclusives, Komatsu offers full hydro-pneumatic suspension both front and rear, a full-size buddy seat, and a service-free center articulating hinge.

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## VOLVO

### A Smooth Breakthrough for Artic Trucks

When the equipment world gathered in Germany for Bauma 2007, Volvo was among the ADT manufacturers turning heads. As part of its E-Series, the worldwide equipment manufacturer introduced a Full Suspension option for the larger A35E and A40E models, set to roll out later in the year. The system employs shock absorbers at each wheel position linked to



microprocessors that automatically control the truck's stability.

**Number of models:** 6

**New models:** A25E 4x4, A25E, A30E, A35E, A35E FS, A40E, A40E FS

**Product-line features:** With the E-Series, the capacity of the two largest Volvo ADTs has been increased, to 37 tons for the A35 and to 43 tons for the A40. These models have new frames, axles, and a drop box with longitudinal differential and 100-percent lock-up.

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## JCB

### Company Focuses on Smaller Models

With its three-model product line, JCB offers smaller-capacity alternatives to the standard 25- to 40-ton ADT offering. Both twin-axle, four-wheel-drive units, the 14-ton 714 and 18-ton-718 models offer payload capacities of 9.6 and 12.6 cubic yards, respectively. The tri-axle, six-wheel-drive 722 had a rated payload capacity of 15.6 cubic yards.

**Number of models:** 3

**Product-line features:** JCB's electronic management system facilitates communication between the truck engine and transmission, providing a single interface for monitoring and troubleshooting both components. The system also maps the transmission to the engine power curve to ensure maximum economical power output.

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## HYDREMA

### Compact Truck Offers Side-Dump Version

The updated D-Series model of the compact 912 articulated dump truck was recently rolled out, featuring a larger, redesigned cab with computerized displays, including onboard diagnosis. The old throttle cable has been replaced by an electronic speeder and features cruise control. Compared to the 912C Series 2 model, the 912D offers a 7-percent increase in horsepower and a 20-percent boost in torque.

**Number of models:** 3

**New model:** 712D, 712D MultiTip

**Product-line features:** The Hydrema 912D is also available in a MultiTip model, featuring side-dump capability. The 912D MultiTip has an optional auto bed return feature.

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## Hammers and Breakers

### ALLIED

For use on excavators in the 60,000- to 80,000-pound range, Allied's new Rammer Model G 88 G-Series hydraulic hammer is available in a standard "City" version for quiet operation. Pro Control allows the operator to control the impact energy of the hammer to deliver the appropriate power, while Idle Selector lets the operator change the settings to accommodate specific breaking conditions. At the same time, Fixed Blow Energy ensures the new Rammer G 88's blows are delivered at full power. Breaking at a rate of 300 to 480 blows per minute, this hammer requires 42.3 to 60.8 gallons per minute of hydraulic flow at 2,030 to 2,180 pounds per square inch of pressure.

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### ATLAS COPCO

For use with 18- to 34-metric-ton excavators, Atlas Copco's MB 1700 hydraulic breaker features the AutoControl monitoring system that adapts the frequency and power output to match operating conditions. The first stroke is fired at half-power to create



a pilot notch that will center the tool and prevent slip-page. Power output is then adjusted to match the density of the material to be broken. Weighing 3,750 pounds, the MB 1700 has a maximum hydraulic input flow of 42 gallons per minute at a maximum operating pressure of 2,610 pounds per square inch.

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### BOBCAT

Meeting the 750-foot-pound impact energy class, the Bobcat HB1180 hydraulic breaker is approved for use on a wide range of Bobcat compact excavators, and compact track, skid-steer and all-wheel loaders. As with



the three smaller Bobcat hydraulic breakers designed for concrete and general demolition, the HB1180 has a new internal design with fewer moving parts. Another recent Bobcat product introduction, the drop hammer attachment is designed for asphalt and concrete slabs, breaking to a depth of 18 inches.

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### CASE

With their narrow, rectangular shape, Case hydraulic hammers are suited for work in tight trenches and crowded sites. Low-pressure nitrogen charge cushions recoil on the rebound stroke, resulting in less wear on the skid-steer or backhoe-loader carrier. With the CH300, CH500, CH750 and CH1000 models ranging in impact energy rating from 350 to 1,200 foot-pounds, Case hammers are less sensitive to system backpressure, and have a fully hydraulic design that protects the carrier's hydraulic circuit from damage.

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## CE ATTACHMENTS

For use on mini-excavators and skid-steer loaders, the lightweight Edge breakers from CEAttachments are designed for use in tight work envelopes, sidewalk and driveway removal, or any tough demolition task. With large-diameter pistons providing high impact energy, these hammers do not require back head charging, and all employ a through-bolt design with large reverse-taper CD threads for greater surface contact and added strength. Edge breakers are available in impact classes ranging from 150 to 1,500 foot-pounds.

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## HUSKIE

With IPC Industries' introduction of the latest Huskie breaker series, an increase in power for some models is attributed to a redesign of the operating piston, main valve and internal porting. In addition, the low-pressure nitrogen gas charge has been slightly increased. Each Huskie breaker employs a "gas-assist" operating cycle that uses the hydraulic system to provide most of the power. The low-pressure gas charge helps control recoil and hose surge without the need for a second accumulator.

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## CATERPILLAR

Matched for the Caterpillar 345C and 365C excavators, the new H180D S hydraulic hammer features a larger piston and tool for a 15-percent increase in productivity compared to the previous model. With Auto Shut Off, the hammer is turned off when no material is present beneath, reducing high stress levels caused by blank firing. Sound suppression is standard on the 8,600-pound H180D S, which features a heavy-duty suspension system to reduce carrier shock loads. For easy set-up, Caterpillar hammer settings are pre-programmed in Cat excavator tool control systems.

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## INGERSOLL RAND

With the addition of the SC-50 model, Ingersoll Rand introduced new features to the established Tramac SC breaker series. Two strong retaining pins and locks keep the bushing and tool in place, while an automatic pressure regulator feature ensures constant energy with every blow. A fully enclosed, reinforced and dampened cradle reduces noise and vibrations that can be transferred back to the carrier. With an operating weight of 1,102 pounds and an operating pressure of 1,881 pounds per square inch, the Tramac SC-50 fits carriers from 14,000 to 30,000 pounds.

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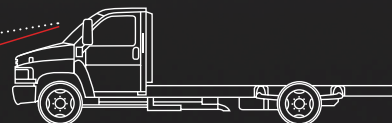


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\*Based on a comparison of a 2008 GMC TopKick C4500/C5500 2WD 60" CA to 2008 Ford F-450/F-550 2WD 60" CA. Vehicle shown with equipment from an independent supplier. ©2007 GM Corp.



# Spotlight

## JOHN DEERE

New Worksite Pro breakers from Deere feature a solid one-piece design that does not need side bolts, resulting in a tougher compact loader and excavator attachment. The low-pressure, nitrogen-charged design cushions operators from recoil, while a narrow shape allows work in tight quarters. Instead of a high-pressure accumulator, the breakers employ hydraulics and a gas-assist cycle to develop force, resulting in more efficient operation and high power-to-weight ratios. There are few seals and moving parts, and no special tools are needed.

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## SURESTRIKE

Designed for breaking oversize quarry rock or concrete, secondary hammers from Surestrike International generate their power from a heavy steel weight free-falling onto a steel tool. Customers benefit from little heat build-up or tool wear because the rock or concrete is broken quickly and easily. With fewer hammer blows, vibration and destructive forces to the carrier framework and components are minimized. Surestrike secondary hammers are available in four sizes, ranging from 20,000 to 75,000 foot-pounds.

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## KENT

To accommodate work environments demanding reduced noise, Kent's Qt large-series breakers are encased with one-piece enclosures protecting critical components. Compared to previous models, the six F-Series Qt breakers for excavator and pedestal applications have a higher back head pressure and larger piston diameter for a 20-percent increase in impact energy. The corresponding increase is 25 percent for Kent Demolition Tools' medium

breaker series, comprised of three models for mini-excavators, large skid-steers and backhoe-loaders, as shown here.

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## STANLEY HYDRAULIC TOOLS

As a complement to its demolition attachment product lines, Stanley has acquired the Cyclone line of drop hammers from Universal Technologies. Three model sizes — the DH1500, DH3500 and DH9000 — are offered to fit walk-behind tool carriers, compact loaders and mini-excavators for flatwork demolition projects. Stanley already offers mounted breakers, plate compactors, and the LaBounty lines of shears, concrete pulverizers, universal processors and grapples.

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## Past Experience Fuels Decisions for Future

Consistency in equipment use key to Luck Stone's historical data

Looking back allows Luck Stone Corp. to look forward.

That doesn't mean employees of the Virginia-based stone and aggregates company spend their days reminiscing, but rather compiling, analyzing, and referring to sound historical data in making equipment-maintenance, rehab and replacement decisions. This comes from being consistent, says Butch Rakes, an assistant mobile equipment manager at the family-owned-and-operated Luck Stone, founded in 1923 by Charles Luck Jr.

"We try to be specific in the type of equipment we buy," says Rakes. "It's easier to trend one particular type of equipment, and so we really don't have a lot of everything. By doing that, you can take the historical data, you can trend it, and then you can go by it and say: 'Well, this transmission historically is going to last 15,000 hours.' So, you know to put

those markers up into those areas — that in 15,000 hours we're going to have to schedule to put a transmission in this or that truck."

It starts on the first day any piece of equipment hits the ground running at a Luck Stone quarry.

"Absolutely, the record-keeping starts down with the service man," says Rakes, who works in Luck Stone's construction aggregates division, "and we have a good maintenance program in place with our computerized system. When we fuel up every day, we enter the data of how much fuel we've burned for that day and how many hours that particular machine has run for the day. That goes into the computer and adds onto the existing data.

"If a machine's got 5,000 hours on it and we put an engine in it, then we go back and re-zero that engine, to reflect that the ma-

## PROFILE



**Butch Rakes**  
Assistant Mobile  
Equipment Manager

### Luck Stone Corporation

**Headquarters:**  
Richmond, Va.

**Specialty:**  
Roadbuilding and infrastructure, residential and commercial building

**Fleet Makeup:**  
619 pieces of heavy equipment, 300 pick-up trucks, 126 large trucks

**Support Staff:**  
Comprised of four divisions, Luck Stone employs approximately 1,200 people, making it one of the largest private, family-owned-and-operated aggregates suppliers in the United States

**Market Range:**  
Mid-Atlantic Region, predominately Virginia, North Carolina



Photos: Mark Mitchell

**By tending to stick with specific types, makes and models of equipment, Luck Stone is able to fully leverage the value of historical data, says assistant mobile equipment manager Butch Rakes.**



# Great Managers



**Company technician Roger Levesque monitors and records data pulled from one of Luck Stone's 35-ton-capacity Caterpillar articulated trucks.**

chine might have 5,000 hours but the engine's got zero. And then every time someone enters fuel into the system, and it knows how many hours it ran for the day, then it starts ticking up the time on that new engine as well as the 5,000 hours on the machine and any other component we want to track. So, we keep up with that machine — it's got 6,000 hours, the engine has a 1,000, the transmission has 2,000 or whatever — and that gives us a way to budget our repairs for the next years, or our replacements, or our rebuilds."

Beyond the record-keeping of operators, mechanics and service people, all of whom regularly receive operational and maintenance training on such topics as cold-weather starting, Luck Stone

has inspectors who make the rounds of the various facilities to help determine the state of the equipment at work.

"By staying on top of our repairs, and staying on top of the equipment and the type of conditions they are in, we pretty much know through our historical data what we're looking at," says Rakes, who credits company leaders for long setting the standard.

With the four primary businesses of construction — aggregates, architectural stone, real-estate development and Lee Tennis clay-court surfacing, Luck Stone today has about 1,200 associates, which is more than double the number of employees from just 10 years ago. President and chief executive officer is Charles Luck, IV.


The effectiveness of the mobile-equipment-fleet's historical data relies on the consistency of equipment application, type, make and even model. Take, for instance, the 988-size in-pit loaders that, at standard capacities of 8 to 10 cubic yards, are at the core of Luck Stone's predominately granite operations.

"It's in the face all the time; it's digging and clawing all the time," says Rakes. "That's just a very rough application.

"We try to rebuild every piece of equipment at least one time. Each piece of equipment has a certain lifespan, and we know by our records how long that lifespan is. A pit loader, with the environment that it's in, we know we only want to rebuild that thing one time. So, once it's at 80 percent of its second life so to speak, then we know it's time for it to be evaluated: 'Is it still a good machine, can it be put into different role, or does it need to go away from here?'"

Admittedly, says Rakes, there are occasions when "there's just a particular piece of equipment that you look at it and you're thinking, 'we're spending more money on it than what we're getting out of it; it just seems to be down all the time, or there's something broke on it all the time, or it's just in rough shape.'"

Chances are, he saw that coming down the road from way back.

"We know through historical data the type of conditions our equipment is in, from plant to plant," says Rakes. "We know how many times we can rebuild something, or when it is time to replace something." 



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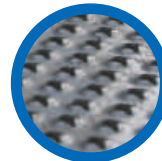
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## Actions Speak Louder than Budgets

Tackle the causes of cost, not just accounting for cost, and the budgets will take care of themselves

It is hard to believe that this is the 50th “Equipment Executive” article. I enjoy writing them and hope they have contributed to the way you run your fleet. The topics we’ve covered have benefited greatly from the opportunities I have to talk and interact with the best in the business. This article draws heavily from a conversation that explored a very simple concept: If you want to win, keep your eye on the ball, not the scoreboard.

Many managers spend too much time accounting for cost rather than taking action to minimize or eliminate the causes of cost. We routinely argue over back charges for a cracked windshield, and we seldom investigate why or how the damage occurred in the first place. We emphasize cost control but forget that if you perfect and win every play, the score will follow.

Costs do not just happen; they arise because of the action we take to address issues, solve problems, and optimize the future. The costs we experience work their way into budgets that measure performance and encourage appropriate action. The right action lowers costs, improves budgets, and prompts more good work. It can also go the other way; the wrong thing increases costs, worsens budgets, and everything spirals downward.

Four things can help us win the game and produce a score that reflects our success.

**1. Run an effective, respected organization.** We’ve discussed the pros and cons of centralizing or decentralizing fleet management. It is a complex issue, but the bottom line is simple. Equipment and field operations share and contribute equally to the principal company objective: to produce completed construction on time and on budget. This shared interest makes it possible for equipment and field operations to value the

contribution that each makes, and emphasizes the fact that the two groups are mutually interdependent.

It is hard to imagine that a company with a substantial investment in its fleet can be successful without an effective, respected organization responsible for the lifecycle management of its equipment assets. This group can significantly reduce costs by emphasizing the balance between long-term, lifecycle-driven decisions required to manage a fleet and the short-term, production-driven decisions required to complete construction on time. Equipment managers must again stress their role in reducing costs to the company as a whole. Emphasizing the value of your expertise is a better strategy than defending what some see as the added cost of your organization.

**2. Understand the basic functions and do them well.** Every company approaches equipment management in its own way. There are, however, six basic functions that must be performed regardless of how the company is set up. Focusing on the functions and doing them well will reduce costs and improve alignment between competency, responsibility and authority across the company.

The first two functions — acquisition and disposal, and compliance and risk management — combine to define the owning cost of the fleet and are minimized by bringing together operational planning, finance and administration to set capital budgets, obtain the necessary financing, and manage risk at minimum cost.

The third function, transport and logistics, requires close interaction with jobsites. Costs are minimized by competent production planning and communication regardless of



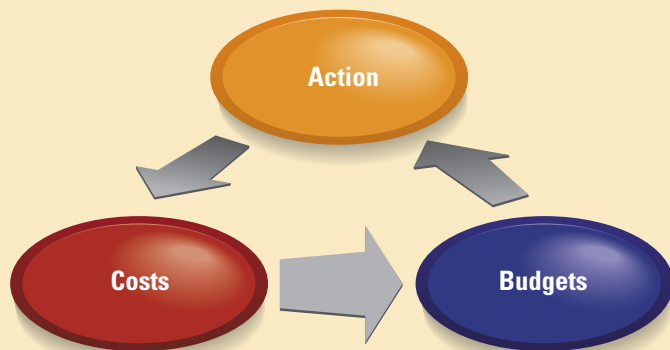
**Mike Vorster**

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

*Collecting data and using it in a condition-based maintenance program improves reliability and lowers cost. It demonstrates the value of your organization.*



## Equipment Management Scoreboard



**Costs work their way into budgets that measure performance and encourage appropriate action. The right action lowers costs, improves budgets, and prompts more good work.**

who carries responsibility or who pays for moving which machine.

The next two functions, field maintenance operations and shop and yard operations, make up the operating costs. Here we see a need for close interaction between operations and equipment if costs are to be lowered. It truly does not matter who pays for a tire damaged by rocks on the haul road. The costs have been incurred, and the right thing to do is to take action to ensure it does not happen again.

The final function, fleet and asset management, brings together the expertise needed to ensure that the investment in the fleet produces the best returns. Good decisions must consider all stakeholders, and the only way to improve return on the capital invested in the fleet is to focus on the fleet as a company asset, regardless of who carries what cost and who has what budget responsibility.

**3. Focus on prevention, drive for zero failures.** There are three ways of writing work orders. The first way is to have the machine write them for you after it has broken down and disrupted carefully laid production plans. These work orders start with a machine saying something like this. "Sorry to have to call you out to this difficult place at this difficult time, but my hydraulic pump has finally quit and I cannot work anymore. Sorry for the problem; it is a pity you never sent in the oil sample you took a couple of weeks back. If you had, you would have noticed some large particles that have been causing me a problem for a while." These work orders are the worst kind. They are expensive and lie at the root of


the belief that equipment managers care little about production.

The second way of writing work orders is to have them written by a clock as it ticks past a certain point. "It is time to change the oil in the excavator. I do not know if it is necessary, but it is the prudent thing to do. Who knows, you may be preventing a problem." These are warm-feeling type of work orders. They give the impression that you are on top of your game. They do, however lie at the root of the belief that equipment managers spend too much money.

The third way of writing work orders is to listen to your fleet and know what is going on. You write these work orders based on condition data you have collected. Your note to production starts, "we have noticed some large particles in the hydraulic oil of the excavator. We will take it off shift at 7 a.m. next Wednesday. Please plan production on this basis. You can expect downtime to be short and costs to be minimized as we have the required people and parts on hand." This is clearly the way to go. There will not be a disruptive failure, and you will be doing the right thing at the right time. Collecting data on the condition of your fleet and using this in a condition-based maintenance program improves reliability and lowers cost. It demonstrates the value of your organization.

**4. Manage fleet average age.** Many prior articles emphasize the importance of making regular investments in the fleet in order to reduce the problems that occur when an unusually young fleet easily beats budget relative to established lifecycle norms or an unusually old fleet has no option but to exceed annual costs and budgets based on shorter, more conservative life estimates.

There will be times when high investments bring average age down, but there will also be times when capital expenditure is reduced and we must get the most life out of the iron we own. This is part of the normal business cycle, but it must be understood and managed. Reducing capital expenditure carries with it an obligation to the increased operating cost of the older fleet. Again, this is not an "equipment" problem that will go away by reallocating costs, shuffling budgets, or pointing fingers.

Nothing is achieved by looking at the scoreboard while the ball slips through your hands for yet another dropped pass. 





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<b>ENGINE</b>	Isuzu	Kubota	Case	Cat
Engine make	3LD1	D1105-T	A455M2	3054C DIT
Engine model	0.0	31.5	75.0	97.0
Net engine power - hp				
<b>DRIVE</b>	Hydrostatic	Hydrostatic	Synchromesh/Pwr Shift	Synchromesh/Pwr Shift
Transmission type	1 / 1	1 / 1	4 / 4	4 / 4
No. of speeds (fwd/rev)	5.5	4.7	24.5	26.8
Max. travel speed - mph	2WD	2WD	2WD/4WD	2WD/4WD
No. of drive wheels	2WS	2WS	2WS	2WS
Steering configuration				43
<b>HYDRAULICS</b>				
Hydraulic pump flow - gpm	2400	--	3050	3811
Relief valve pressure - psi				12" - 36"
<b>BACKHOE</b>				
Backhoe bucket width range - in	12" - 36"	--	12" - 36"	18" 6"
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## Caterpillar Digs in to Fill Gap

Large wheel loader product line welcomes completely new model suited for mining

Instead of continuing to stretch out its existing large wheel loader models, Caterpillar is filling a product-line gap with an entirely new model.

On what was described as a “historic” day at the company’s Aurora, Ill., factory, Caterpillar gathered equipment end-users, dealers and trade press for the Sept. 27 debut of the all-new 25-ton-payload 993K wheel loader. At a bucket range of 16 to 19 cubic yards, the 993K will serve market needs between the established 992 and 994 models. The 992, for which a K-Series model will follow immediately upon the 993K’s early 2008 production start, had crept up to the 15- to 16-cubic-yard market with the most recent G-Series. The 994F, the product line’s granddaddy, is normally in the 18.5-

“Typically, we have two different wheel loaders that will load the same truck,” says Aneloski. “The 993K High Lift will load a 785, and that will give you X percent of production. The 994 Standard Lift will also load the 785, and it will produce more. So, the customer there has a choice: ‘How much production do I need?’”

The 993K wheel loader is powered by the Cat C32 ACERT engine, which at 950 net horsepower delivers 19 percent more power than the 3508B engine used in previous Caterpillar mining loaders. As with other 993K components such as brakes, final drives and differentials, the C32 engine is used on other Caterpillar mining machines as well, thus simplifying parts inventory management.

According to Cat, the all-wheel-drive 993K’s positive flow control hydraulics represents the next generation of load-sensing hydraulics, with additional sensors at the pumps creating enhanced responsiveness for the operator.

For safe machine access, the 993K has wide stairs on the left and right sides, as well as a window washing platform. A rear-access egress system is an option.

With its tough digging ability, the Caterpillar 993K wheel loader crosses nicely from a quarry machine to a mining machine, says Aneloski.

“If you can use the production capability of it,” says Aneloski, “this is going to be a very good machine for you.”

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**A totally new model, the Caterpillar 993K wheel loader is matched to the 777 off-highway and 785 mining trucks.**

to 25-cubic-yard market, but will handle as much as 47 cubic yards of material when equipped with a coal bucket.

Featuring Z-bar linkage, the 993K generates 20 percent more breakout force than the 992G.

“This fills the gap,” says Randy Aneloski, Caterpillar senior sales engineer for large wheel loaders. “This is going to be a good machine for mining applications — which are typically hard digging applications — and for large quarries.”

At four and six passes, respectively, the Caterpillar 993K wheel loader will match to the 100-ton-payload 777F off-highway truck and 150-ton-payload 785C mining truck.

### Basic Specs: 993K Wheel Loader

	Standard	High Lift
Engine Model	Cat C32	Cat C32
Flywheel Power	950 hp	950 hp
Operating Weight	294,670 lb.	296,800 lb.
Loader Payload	25 tons	25 tons
Bucket Capacity	16-19 cu. yd.	16-19 cu. yd.
Dump Height	15'3"	17'4"
Reach at Full Lift	8'2"	8'6"
Static Tip Load	161,687 lb.	134,639 lb.
Breakout Force*	159,562 lb.	159,416 lb.

\* Equipped with 17-cubic-yard bucket



# Truck Report

By TOM BERG, Truck Editor

## Cummins 2010 Heavy Diesels Won't Need Urea, But Mediums Will

Cummins-powered heavy trucks won't need an extra aftertreatment device in its exhaust or a urea tank hung somewhere on its frame

Cummins has announced that its heavy duty on- and on/off-highway truck engines will not need urea injection to meet federal emissions limits in 2010, but that its medium-duty diesels will. Avoiding the urea method of cutting oxides of nitrogen, which some competitors have already committed to, means Cummins-powered heavy trucks won't need an extra aftertreatment device in its exhaust or a urea tank hung somewhere on its frame.

Multi-axle dump trucks and other construction-oriented vehicles with limited frame space are among those which will

benefit from the development, and buyers of heavy trucks in general might prefer the seemingly simple approach. Cummins officials were restrained in noting that advantage during their announcement in mid-October because their smaller diesels must use the bulky urea-injection equipment.

In its larger engines, Cummins will cut oxides of nitrogen (NOx) — the principal target of regulations that will take effect in January 2010 — with greater amounts of cooled exhaust-gas recirculation. EGR is now successfully used in current North American engines; that and higher fuel-injection

pressures and lower air-fuel ratios, all aided by more precise turbocharging and managed by more powerful microprocessors, will be enough to limit formation of NOx, Cummins engineers said. This strategy works in large displacement diesels, but not in smaller engines that work harder and see wider variances in operations, engineers explained. That's why Cummins' midrange models will need selective catalytic reduction (SCR), the more formal name for urea injection. Both heavy and medium-duty engines will continue to use diesel particulate filters in their exhausts.

High-pressure fuel injection is part of so-called common-rail fuel systems now employed by many diesel makers to improve combustion and meet increasingly stricter emissions limits here and abroad. Cummins' "XPI" system for 2010, developed with Scania of Sweden, will use pressures of 32,000 psi or more, and will combine with multi-phase injection to tightly structure the burning of the fuel-air mixture and help limit the formation of NOx and other pollutants.

The ratio of air to fuel, which has dropped from as high as 28:1 not long ago to 24:1 now, will drop further, to

### 'Clean Idle' Exempt

California's strict limits on diesel idling will affect more trucks starting in January, but at least two builders say their diesels will be exempt from the rules. Cummins and Mitsubishi Fuso announced that their diesels burn cleanly enough to idle beyond the 5-minute limit to be imposed on most medium- and heavy-duty diesel-powered trucks. At least eight other states adopt California's rules, so the new limits could spread.

In 2005, the California Air Resources Board decreed a 5-minute idle limit for certain trucks and buses. CARB has tightened it, effective Jan. 1, to require automatic idle-shutdown devices on 2008-model vehicles grossing more than 14,000 pounds. Exempt are trucks whose engines continue to work while parked, such as concrete mixers and dump trucks discharging loads. A sleeper-cab exemption ends Dec. 31, and CARB inspectors are said to be already watching for trucks whose engines are idling "needlessly."

However, engines emitting less than 30 grams of NOx per hour will be allowed to idle indefinitely, CARB's regulations say. Cummins and Mitsubishi Fuso say their current EPA-'07-spec diesels meet that limit and have been certified by CARB as such, so can idle as long as their owners or drivers want. Those trucks can display a special "Clean Idle" sticker that should keep authorities from citing their drivers.

Mitsubishi says its Fuso trucks will get the sticker before they are sent to dealers in California. Cummins-powered trucks may or may not have the sticker applied by truck builders, so owners whose trucks operate in California would be wise to ask dealers for the stickers.



Trucks whose engines are certified by CARB as "Clean Idle" can display this sticker.



perhaps 19:1, engineers said. Reduction in the amount of air in the cylinders cuts oxygen, which reduces combustion temperatures and cuts formation of NOx. This is also the purpose of EGR, which sends exhaust gas into the cylinders to crowd out some oxygen-bearing air. Cummins' variable-geometry turbocharger assists in this by carefully modulating the amount of inlet air and the extent to which it's compressed.

Cummins and other builders now employ SCR in Europe and Japan, where different emissions regulations and more expensive fuel favor urea injection. American builders owned by European firms, like Volvo Powertrain and Detroit Diesel/Mercedes-Benz, have previously said they'll use SCR in North America in 2010, and have formed a consortium to develop an infrastructure to distribute and sell urea solution to truck operators.

The non-SCR approach for its larger diesels requires Cummins to expand its heavy-duty lineup from the current two models to three 2010 models. Today's 15-liter ISX will continue, though of course with '10 modifications, and it'll be augmented by 16- and 11.9-liter derivatives. The ISX-16 will cover ratings of 500 horsepower and higher; lesser ratings will be handled by the ISX-15 and the ISX-11.9. The 11.9 will re-

place the current 11-liter ISM truck engine, which will remain in production for industrial and export sales.

Cummins' midrange models will continue their current displacements/names: 6.7-liter ISB, 8.3-liter ISC and the 8.8-liter ISL, all with SCR, engineers said. Cummins already makes a 2010-legal engine, the ISB-based Turbo Diesel used by Dodge in its 3/4- and 1-ton pickups, and that will continue in '10 and beyond. This engine uses an NOx adsorber instead of SCR, which is simpler than the other methods, but does not work on engines with heavier duty cycles (CE Sept. '07, p. 70).

Cummins engineers are already working with truck builders to help them package the SCR urea tank into their chassis and plan for distribution of the liquid urea solution. Because urea dosage will be a small percentage of fuel use, tanks will be comparatively small. The tanks will have to be filled about as often as medium-duty chassis are lubed, engineers said. A Cummins-branded product called StableGuard will be sold in bulk and in several container sizes.

Caterpillar and International have not yet announced how they'll meet the 2010 limits. Neither has Paccar, which is developing its own heavy-duty diesels for use in its Kenworth and Peterbilt trucks. Those announcements are expected soon.

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# Market Watch Lite

By KATIE WEILER, Managing Editor

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## ◀ Diamond Products

Core Cut CC4144D rear-differential concrete saw is powered by a 44-horsepower Kubota turbo diesel. The battery is located on the rear door for serviceability, and a pivoting dashboard allows access to the electrical system. It has single-lever operation for forward/reverse and raise/lower. Blade guards come in 14, 20, 24, 26 or 30 inches with a maximum cutting depth of 11-3/4 inches with a 36-inch guard.

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## ▲ Lincoln Electric

Lincoln Electric has expanded its Inverter line with the new V205-T DC and the enhanced V205-T AC/DC TIG welder. The Inverter V205-T AC/DC TIG welder is a compact TIG power source intended for critical AC or DC TIG welding. Updates include added circuitry in the stick-crisp mode for enhanced 6010 electrode welding performance, improved TIG arc starting, and selectable start polarity. The Inverter V205-T DC has the same features, minus AC TIG welding. The new welder's output rating is 200 amps at 40-percent duty cycle.

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## ◀ Ditch Witch

Ditch Witch now offers nine different sizes of Tornado Bits for horizontal directional drilling applications. This all-purpose bit, says the company, is designed to work in varied ground conditions, including sandstone, chunk rock and hard soils. Bit sizes range from 3 to 6.4 inches.

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## ▼ Blizzard

According to the manufacturer, the SpeedWing snowplow incorporates a multi-position-blade design that "can move snow like a V-plow, but is as operator friendly as a straight blade." The SpeedWing defaults to a scoop position for straight-ahead plowing, but when angled, the trailing wing falls in line with the blade, while the leading edge maintains its forward position to reduce spillover and to "effectively use the entire blade width for higher-capacity windrowing."

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## ▶ Trimble

The CCS900 Compaction Control System is designed, says the company, as a "compaction control solution that combines finished-grade quality control and analysis with advanced compaction control and documentation." The system is designed to allow the earthworks contractor to compact sub-surface material to a target density, analyze sub-surface grade for deficiencies in the surface, and catch grade-control mistakes in real-time, prior to the start of the final road-building process. The CCS900 Compaction Control System is based on the Trimble GCS900 Grade Control System.

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**WOODY WELD, PRESIDENT OF ACME LIFT COMPANY**, speaks from experience when he talks about using the GlobalTRACS® equipment management system.

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The GlobalTRACS system automatically retrieves equipment data, then converts it into the actionable information Acme needs to manage its fleet for maximum profitability. Woody's team now has usage hours, location, and health of every machine at their fingertips.

"GlobalTRACS changes everything," Woody says. "It changes your ability to run your business. It changes how you relate to your customers. It changes how you manage dispute and conflict. Without it, we'd be back in the Stone Age—where so many equipment companies still are."

"For me, investing in this technology is all about *survivability*—of both the wireless equipment and the company that stands behind it," Woody advises. "In both cases, nobody beats QUALCOMM."

For more information (and to get the rest of the story), visit [www.globaltracs.org/acme](http://www.globaltracs.org/acme) or call us at 1-800-348-7227.

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**Lite**



### **Diamond Products**

The Core Cut CC1800XL portable walk-behind saw adds several new features. Sturdier handles can be mounted pointing in or out; a lift bar has been added; and a water valve can be mounted on the left or right. The unit comes with 14- or 20-inch blade guards and has a maximum cutting depth of 7-5/8 inches.

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### **Cordpro**

The Cordpro is a device designed to keep long electrical cords manageable. According to the manufacturer, when the cord is fed into the device, it is organized into two separate, flexible chambers, allowing access to either end of the cord and allowing just the amount required to be unreeled. Plug in the cord, and it unreels as you work. When the cord retracts, the two halves wind past each other to avoid tangles.

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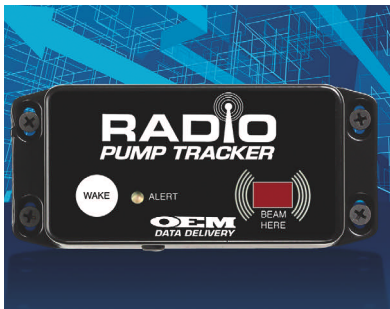


## Vermeer

Vermeer has added a new cutting system to its line of stump cutters. Yellow Jacket is designed for easier serviceability and maintenance in the field. Split-faced carbide cutting tip is indexable, says the company. The operator loosens a nut and rotates the tooth. Each tooth has two cutting edges, and the second edge is protected while the first edge is used. When rotated, the almost-new cutting surface can be used. The system will be standard on all stump cutters except the SC90 and SC130.



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## OEM Data Delivery

A compact tracking system for consumables is suited for precise control over and wireless record-keeping of mobile fuel dispensing. With the compact Radio Pump Tracker system, a pulse flowmeter is installed into the fuel plumbing of a truck or pump, connected via a harness to the pump tracker enclosure. The system identifies each vehicle serviced and the fuel pumped into it, in real time. A hand-held device or PC captures the vehicle hours, odometer readings, and gallons dispensed.

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## Arsenault Associates

A new option — Invoice Data Import (IDI) — is available for Dossier fleet-maintenance software. IDI is designed to eliminate data entry of outside vendor invoices for fleets that depend upon outside service vendors. Service vendors send invoices and repair orders in electronic files that IDI brings directly into Dossier. This feature, says Arsenault, tracks and evaluates work performed by outside providers, as well as updates fleet costs and more.

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# Market Watch Lite

## Trimble

With the addition of seven new GPS receivers and smart GPS antennae for heavy and highway contractors, Trimble now claims to have the widest selection of location and precise GPS solutions on the market. The new collection allows

customers to upgrade technology as work demands, new signals are activated, or finances become available. The new receivers use Trimble's RTK Engine, designed for

faster initialization, and track the L2C GPS signals. Some can be upgraded to include GLONASS and L5 signals.

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## Goodyear

The TVTRACK software program allows a fleet owner to document tire-related information and to calculate cost per mile. By knowing why tires are being removed and the age and number of re-treads on the casings, Goodyear says the fleet owner can assess maintenance practices and address detrimental operating conditions. Information gathered can be used in the Tire ValuCalc program to assess the total cost associated with running different combinations of tires.

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# Market Watch Lite



## Case Construction Equipment

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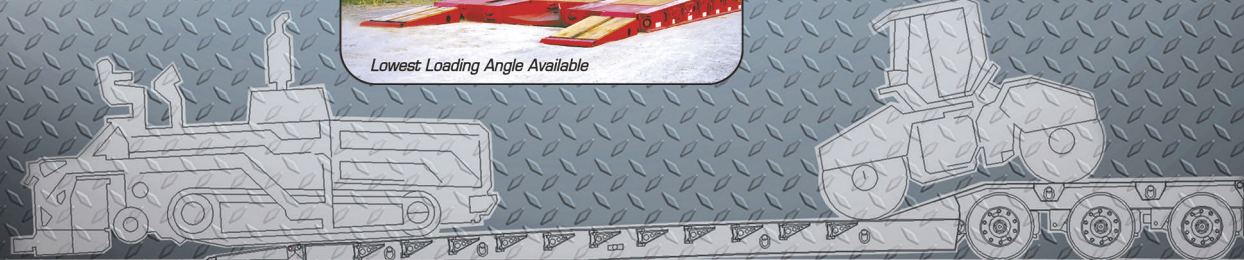
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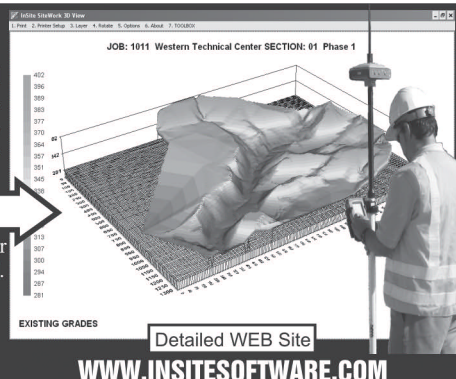
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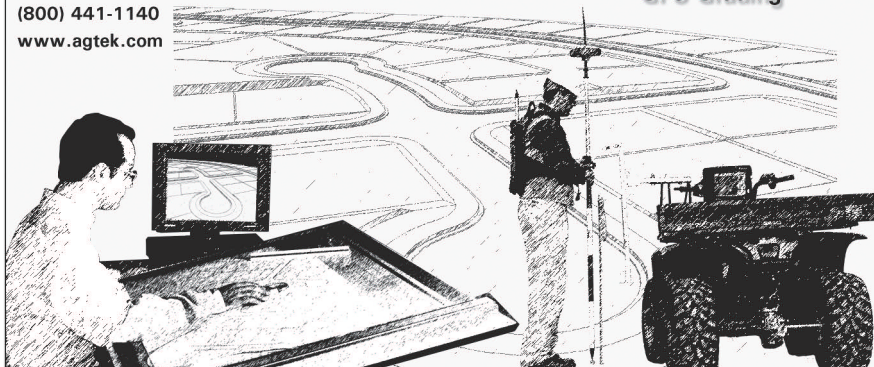
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# Iron Works

By KEITH HADDOCK, Contributing Editor

## Allis-Chalmers Compact Grader

From the Allis-Chalmers Model D of the 1940s, to the Noram 65E of today, this versatile compact grader has enjoyed a continuous manufacturing history

In the 1940s, Allis-Chalmers launched a new grader called the model 'D' to replace the former model 'W' tractor-mounted type at the lower end of its motor-grader line. The designers of that little grader could never have guessed that almost six decades later the same machine, with revisions and updates, would still be going strong. It is now known as the 65E, marketed by NorAm Construction Equipment of Palatine, Ill.

The Allis-Chalmers model D of 1949 weighed 8,500 pounds and came with a 10-foot-wide mold-board (blade). The tandem-drive machine sported a main frame of welded tubular pipe and channels. It was also the first from Allis-Chalmers to incorporate hydraulic blade lift. Its Allis-Chalmers gas engine developed 35 horsepower and drove through a 4-speed transmission providing a top speed of 18 mph. As one of the world's first compact graders, the model D's small dimensions and close-quarter capabilities opened the door to a much broader use of the motor grader. For the first time, it allowed graders to work efficiently on small projects such as housing and landscaping.

From 1954, Allis-Chalmers' compact-grader customers were given the option of diesel or gasoline power. A diesel engine of 50 horsepower was selected from the newly acquired Buda Co. to install in the diesel machine. Known as the model DD, it weighed 9,350 pounds, and top speed was boosted to 25 mph. Other features remained the same for both models, which continued in production simultaneously.

By 1964, the model DD was being built with a box-type welded frame to replace the former tubular design. Then in 1971, both the D and DD graders were superseded by the Allis-Chalmers M65 and, although retaining its 10-foot blade, weight and power increased to 10,915 pounds and 59 fly-wheel horsepower. Improvements over the former models included hydrostatic steering and new sheet metal. In January 1974, Allis-Chalmers and Fiat S.p.A. of Italy formed the Fiat-Allis joint venture. The M65 continued the success of its predecessors as the Fiat-Allis 65; and in 1979, as the 65-B, received a 68-flywheel-horsepower Fiat engine with powershift transmission and a weight boost to 13,315 pounds.



Allis-Chalmers DD grader of the 1950s.

Noram Construction Equipment was formed in 1992 to market the Fiat-Allis 65B grader in North America. Three years later, it launched the redesigned articulated FiatAllis FG65C with New Holland 80-horsepower engine and torque proportioning rear axle drive. These machines were made in the Vermeer plant at Pella, Iowa, until 2001. Then NorAm's manufacturing partner, Five Star Industries, continued building the grader on behalf of CNH Global until 2004 when it purchased the manufacturing rights from the latter. The latest version of this compact grader is the NorAm 65E launched in 2004. Still with a 10-foot blade, it gained a 110-hp Cummins engine and another weight increase to 16,800 pounds.

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