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38 Right-sized Ford van is bigger than it looks

CONSTRUCTION EQUIPMENT®

August 2009
ConstructionEquipment.com

Since 1949

60TH ANNIVERSARY

Controls Take Over the Market

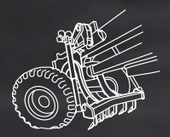
The evolution of motor graders continues p. 40

RBI

SO MANY EXCLUSIVE OPTIONS, ONE VERY OBVIOUS CHOICE.

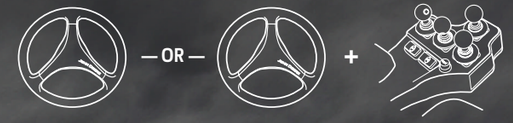
You talked. We listened. Offering one-of-a-kind advantages and unequalled options, our all-new G-Series graders let you decide how the work gets done. To learn more about the advantages that separate John Deere from the rest of the field, explore these powerful options.

— OR —



— OR —

NEW SCARIFIER OPTIONS
Work just the way you like, with a front- or mid-mount scarifier, or rear ripper/scarifier.



STEERING
Every G-Series grader comes equipped with a steering wheel. Add lever steering, located on the armrest, as part of our Grade Pro package.

GRADE PRO PACKAGE

Top-notch operators can opt for Grade Pro – a full suite of productivity-enhancing options in one convenient package:

- Industry-standard pattern fingertip controls, located on the armrest.
- Steering wheel ***and*** lever steering.
- Cross slope control – allows the operator to key-in desired slope and maintain it with just one blade lift lever.
- Trimble® or Topcon® grade-control ready.
- Improved visibility – best-in-class.
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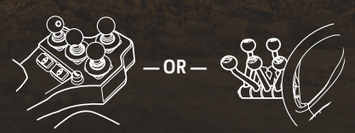

CONTROLS
Choose the style that works for you. Grade Pro fingertip controls, located on the armrest, or low-effort industry-standard levers. Either way, you'll enjoy smooth, predictable response.

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Your choice of Trimble® or Topcon®. We make it grade-control ready for full integration and you choose the system you prefer.

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CONSTRUCTION EQUIPMENT®
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FEATURES

RUNNING GREEN

20 CARB-Verification Makes These DPFs the Right Investment

It's time for California equipment owners to get busy ordering some verified diesel emissions control strategies. To qualify for double-the-horsepower credit by the end of August, retrofits must be CARB verified (see the list of currently verified technologies). Senior editor Larry Stewart advises equipment owners working in locations nationwide to browse the same list when considering machine rebuilds.

SPECIAL REPORT

30 Jump Start Operators with Virtual Training

Despite today's economy and unemployment in the construction industry, a labor shortage of trained operators and technicians lurks around the corner. Manufacturers are making their machines easier to operate and maintain, as well as providing more intuitive training devices from which to learn. One such device is a PC-based equipment-training simulator. Managing editor Katie Weiler reports on the various programs available from Caterpillar, John Deere and Simlog/VISTA Training.

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HANDS-ON TRUCKING

38 Transit Connect Is Bigger Than It Looks

Ford calls this compact van a "game changer" and it could be true. After all, the first American mini-vans in the early '60s caused the demise of "panel trucks" — conventional-cab pickups with full steel bodies — that had been around for more than 30 years. High fuel prices in recent years prompted Ford executives to bring its European-style Transit Connect to America. The Great Recession has recently pulled down petroleum and fuel prices, but they'll be edging up again. Then this vehicle will make immense sense. Truck editor Tom Berg tells you why.

BUYING FILE

40 Motor-Grader Operators Remain in Control

When Buying File last focused on motor graders, the impact of Cat's M-Series models and their joystick controls was up for debate. Three years later, how best for an operator to work a grader remains at the core of product offerings from all industry players. And the answer depends on the player being asked. Senior editor Mike Anderson details the latest graders.

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CONSTRUCTION EQUIPMENT
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60 Years Young

August marks the 60th anniversary of *Construction Equipment* magazine, a milestone we celebrate with pride and wonder. Over the decades, we've published Rebuilding America, The Global Challenge, America's Highways at the Crossroads, and now Running Green. We've won major editorial awards for 28 straight years.

As we consider the history and legacy of this great magazine, we also look forward with anticipation and excitement.

This year has not had a lot of positive in it, but two events last month brought some sparkle. Bobcat unveiled a slew of new machines, and Caterpillar revealed some field-follow news on its D7E, introduced just more than a year ago.

We were able to file stories on both of these products within days of our return from the events. The two Earthmoving Reports published in this issue were on our Web site weeks ago.

What excites us even more, though, is our coverage that will not be published — at least not with ink on paper.

- Larry Stewart's Big Iron blog on user experiences with the D7E included audio bytes of their comments in their own words. Blog readers are commenting on Cat's move to premium-price the new machine.
- Twitter: The web was abuzz in the days before and after Caterpillar's event as word of the "hybrid" label surfaced.
- Mike Anderson's online reports on Bobcat's new skid steer, excavator and mini-excavator feature video he took of the machines in action.
- Anderson's Big Iron blog captured the excitement of being interviewed by local Bismark television for his take on Bobcat and its products. A link connects to the clip as it aired the evening of the event.
- Our new weekly newsletter featured reports on both of these companies. Within the first 24 hours, more than 1,000 folks read one or both.

At *Construction Equipment*, we're all about equipment — its purchasing, maintenance and disposal. Sixty years ago, we were publishing in black and white. Today, we're publishing digitally. Different media, same great equipment coverage.

Rod Sutton, **Editor in Chief**

We welcome your comments.
E-mail: **rsutton@reedbusiness.com**
Fax: **630/288-8185**
Mail: **2000 Clearwater Drive, Oak Brook, IL 60523**

Rod

CONSTRUCTION EQUIPMENT MARKET WATCH

A summary of the month's primary machine introductions and model changes

By KATIE WEILER, Managing Editor

Komatsu

With the new Dash-6 model of the WA150 wheel loader powered by a 98-horsepower Tier-3 engine, Komatsu's hydrostatic transmission allocates only as much power as is needed for a given application. Engine output is transmitted hydraulically to a transfer case, then mechanically out to the differentials and to the four driving wheels. A new "S-mode" provides maximum driving force on slippery surfaces by controlling the engine speed and transmission motor when traveling at slow speed. The loader has an operating weight up to 17,461 pounds, a heaped bucket capacity range of 1.7 to 2.2 cubic yards, and a breakout force of 16,310 pounds.

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Elliott

Designated as the Boom-Truck 50105, the newest truck-mounted crane from Elliott features a 50-ton lifting capacity and 105 feet of powered main boom. With a tip height of 115 feet, the crane features glide swing operation for smooth and precise rotation, a Friction-Free jib extension for quick deployment and stowage, and a Load Moment Indicator system for safe boom operation. A tractor mount configuration is available.

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Caterpillar

The Caterpillar 314D CR and longer-undercarriage 314D LCR crawler excavators each pack a new engine, more hydraulic power, expanded work-tool capabilities, a new operator's station, and a new intermediate-length stick into the established compact-radius configuration. The design of the 14-metric-ton excavator limits tail swing over the side to 7 inches when using 24-inch shoes and standard counterweight. The Cat C4.2 ACERT engine is rated at 90 horsepower.

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Putzmeister

With two additions to the versatile City Pump product line unveiled at World of Concrete 2009, Putzmeister America offers even more versatility to the concrete-pumping industry. Running off an auxiliary 197-horsepower Deutz engine with a modular pump assembly independent from the chassis, the CP 1409H D model is designed primarily for export, with the ability to be shipped in a 40-foot container, says the company. Outputs up to 123 cubic yards per hour can be achieved. The truck-mounted CP 2100 HP model offers the option of higher pressure when needed. It can pump up to 139 cubic yards per hour.

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Brokk

The 6,710-pound Brokk 260 remote-controlled mini excavator is sized to handle 870-pound powered attachments. With a reach of more than 19 feet, the 48-inch-wide machine puts a lot of capability in small spaces for demolition and other specialized work. Equipped with Darda´s CC520 concrete crusher (which is specially designed for this machine), the 260 delivers cutting force of 53 tons. It is powered by a 29.5-horsepower electric motor.

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Doosan Infracore

Doosan DX350 excavator replaces the current DX340 with more horsepower and breakout force, and improved fuel efficiency. The Doosan Tier III engine delivers 271 horsepower. Arm digging force is 39,460 pounds; bucket digging force is 54,010 pounds. The 77,600-pound machine features polymer shims and redesigned bushings that enable greasing intervals of 250 hours.

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International

Navistar has unveiled an International WorkStar Hybrid 4x4, which it says is the industry's first four-wheel-drive, diesel-electric hybrid commercial truck. Designed for medium-heavy on/off-road use, the WorkStar uses Eaton's electric-drive system to run booms, diggers and other equipment while reducing engine-on operations during building and repairs by public utility crews. Other construction-oriented applications are being explored. The WorkStar chassis is rated at up to 40,000 pounds GVW.

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JCB

Newly implemented on the JCB 3CX and 4CX backhoe loaders, the Easy-control seat-mounted servo-control system improves backhoe speed by changing the valve block from flow-sharing to full-flow, distributing the maximum oil available to any cylinder. The system also increases operator/joystick feedback, says JCB, by changing the hydraulic circuit in the backhoe from a closed to an open format, allowing lever movements to determine the amount of power available at the bucket tooth. Other upgrades include a stronger fuel tank and the removal of the hydraulic speed control switch from the cab.

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Kleemann

Kleemann's flagship Mobicat C 120 Z mobile jaw crusher accommodates feed sizes up to 43x28 inches, and will handle up to 385 tons of material per hour. A two-deck, independent pre-screen can be fitted with punch sheet, grizzly and wire mesh for prescreening. Sized, graded product can be produced from the pre-screen, increasing the crusher's overall performance and efficiency. The MC 120 Z is fitted with a lined, heavy-duty vibrating feeder below the crusher to prevent blockage, reducing belt wear.

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JLG

The 619A and 723A compact telehandlers are ideal for landscaping, construction and agricultural applications. The 619A provides nearly 6,000 pounds of capacity at a maximum reach height of 19 feet, while the 723A handles nearly 7,000 pounds at a maximum height of 23 feet. The telehandlers, both of which are equipped with all-wheel steer, are maneuverable even in crowded jobsites, according to JLG. The company also says operators will enjoy the spacious cab, tilt steering, and joystick-control design for more precise control.

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Bobcat

A new auxiliary hydraulics option routes hoses and couplers to the front of the Bobcat CT440, CT445 and CT450 compact tractor loaders for the use of hydraulically operated attachments. Approved attachments requiring front auxiliary hydraulics include a utility grapple, spreader, hydraulic pallet fork, Model 10 auger, standard-duty snow blades and Bobcat's Tilt-Tach system. The Bob-Tach quick attachment mounting system is already available for the compact tractors.

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Case Construction Equipment

Joystick steering on Case's E Series full-sized wheel loaders will, says the company, cut operator fatigue and boost machine productivity in repetitive-cycle operations. Housed in the left armrest of the machine, the option includes a joystick lever; a forward, neutral and reverse switch; and a transmission kick-down switch. Joystick steering can be used in all gears and work modes, operating at full response with the loader traveling at under 12 mph and at 80 percent when over 12 mph, says Case. With six full-sized models from the 521E to the 1221E, E Series loaders range from 135 to 320 net horsepower.

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Morbark

Originally released in 2008, the Model 40/36 biomass chipper is now available in a track configuration to allow for greater mobility in the field and forest. The chipper can fill a chip truck to the legal load limit in just 15 to 20 minutes while maintaining high fuel efficiency, according to Morbark. And because the internal drive feed system has few moving parts, the chipper requires less maintenance.

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Northshore Manufacturing

Weighing in at 53,000 pounds, the Builtrite Model 5100-SE stationary electric material handler was designed for industrial, heavy-cycle-duty applications. It features 47 feet of horizontal reach, 12,000-pound lift capacity, and high-pressure hydraulics at 4,000 psi. Driven by a 250-horsepower TEFC (totally enclosed fan cooled) electric motor, the 5100-SE is easy to maintain and emissions-free, according to the company. Operation is achieved via either the cab or remote control.

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Stay in control and in the know with the JDLink™ Machine Monitoring System. JDLink lets you manage multiple jobsites from the comfort of your desk. It gives you real-time info on machine location, utilization, and fuel consumption with just a click of the mouse. This easy-to-use system also transmits machine alerts and diagnostic trouble codes, which can dramatically reduce downtime. Call 800-503-3373 or see your local dealer to find out how JDLink lets you manage your fleet from the comfort of your seat.

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MANUFACTURER NEWS

Hybrid Dozer's Cab Innovations

Much of the talk about Caterpillar's D7E bulldozer understandably focuses on its hybrid-electric drive train and its promised 25-percent improvement in material moved per gallon of fuel burned. But among the 100 patented, or patent-pending, innovations involved in developing the D7E is a patent on the center-post cab aligned with the precleaner, exhaust stack, single lift cylinder and grade-control mast. The view through the angled doors to either corner of the blade is unparalleled in a dozer in the D7E's size.

— LARRY STEWART

Aligning the precleaner, exhaust stack, single lift cylinder and grade-control mast with the D7E's single, center cab post provides the clearest view a dozer operator will find.

View from the D7RII's operator seat.

SUPPLIER WATCH

Manitex Buys Badger

Manitex International, a provider of boom trucks, rough-terrain forklifts, and special mission vehicles, bought into the rough-terrain-crane business with the purchase of Badger Equipment, a maker of specialized rough-terrain cranes and material handlers. Badger had announced earlier this year that it would introduce a new line of specialized rough-terrain cranes, including a 30-ton model, and Manitex anticipates the launch will remain on schedule. Initial shipments are expected this current quarter. The $3 million acquisition from Badger's owner, Avis Industrial, included $250,000 in Manitex common stock and a $2.75 million, five-year note bearing interest at 6 percent. Badger had revenues of approximately $10 million and positive net income in 2008.

MANUFACTURER NEWS

Caterpillar to Sell Bare-Frame Artic Trucks

Caterpillar will offer a family of articulated-truck bare chassis to support specialty machines not included in the Cat product portfolio. Sales of the bare chassis (standard configurations and long rear frames) without the dump bed will be targeted toward Cat dealers and original equipment manufactures who specialize in applications such as water trucks, high capacity waste, lube and fuel trucks and the like. Working with dealers, OEMs and end-users, Caterpillar OEM Solutions Group can assist with application and integration issues, helping determine the best solutions for mounting a variety of tools and attachments.

Caterpillar OEM Solutions Group is committed to working with dealers and OEMs to outfit articulated-truck chassis for specialties such as water trucks, high capacity waste, lube and fuel trucks.

Cat Artic Truck Bare Chassis

Base Model	740	735	730	725
	Standard Rear Frame			
Rear Frame Length (inches)	170	170	153	153
Payload (tons)	47	41	35	30
	Long Rear Frame			
Rear Frame Length (inches)	232	232	212	212
Payload (tons)	46	39	34	29.5

RUNNING GREEN

Electric Truck to Work in PG&E Fleet

Pacific Gas and Electric Co. (PG&E) is helping develop America's first all-electric utility truck with an aerial device. The first test unit, engineered by Smith Electric Vehicles U.S. (SEV U.S.) with an Altec AT37-G aerial boom, is doing line work to gather performance data in PG&E's California service area.

"We hope our involvement will lead to the accelerated development and mainstream acceptance of electric vehicles in our industry," said Dave Meisel, director of transportation services for PG&E.

The battery-electric Smith Newton, proven in other applications in England, is being tested in California with a 38-foot aerial work platform.

The Smith Newton is the world's largest battery-electric-powered truck. Smith has been building electric vehicles in Britain since the 1920s, and maintains more than 5,000 commercial vehicles for customers there now.

An on-board charger can refresh a fully discharged Newton battery in about eight hours, and regenerative braking extends the lithium-ion storage cell's range beyond 100 miles. The Altec articulating lift reaches a maximum height of 37.8 feet and 28.3 feet of reach.

SEV U.S. initially will focus on battery-electric-powered vehicles, using chassis from existing manufacturers, to address depot-based, route delivery and service fleets. Trucks will be assembled at the company's 80,000-square-foot plant in Kansas City.

SEV U.S. will upfit Ford chassis to deliver Ford's first North American electrified vehicle, a battery-electric light-duty van called the Transit Connect (see Hands-on Trucking, p. 38).

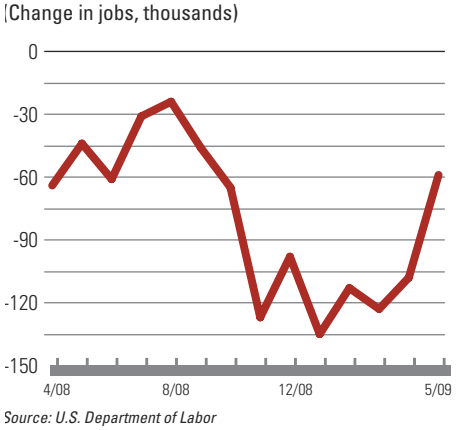
Newton Specs

Motor	120 kw induction (161 horsepower)
Payload	Up to 16,280 lbs
Gross Vehicle Weight	16,535 to 26,455 lbs
Range (single charge)	>100 miles
Top Speed	50 mph

STATUS AND FORECAST

Construction Employment

Contractors cut 59,000 jobs in May, the fewest since last September. There were substantial cuts in heavy construction where the construction stimulus program has yet to be significant, and relatively few cuts in nonresidential buildings where construction spending has declined the most. At least 100,000 more layoffs are expected yet this year followed by more than 200,000 new jobs by the end of 2010. The hiring ahead will be mostly for residential and heavy construction work. For more analysis, visit our Economic Outlook at ConstructionEquipment.com.



Source: U.S. Department of Labor

SUPPLIER NEWS

Topcon Unit Hones in on Construction

A new business unit at Topcon Positioning Systems is focused exclusively on construction. The TPS Construction Business Unit "encompasses every aspect of our operations from product development straight through the operations to serving the needs of the customers," says TPS president and CEO Ray O'Connor. Topcon's survey instrument division also becomes a separate business unit.

"We are taking the two premier brands in the survey global marketplace — Topcon and Sokkia — and building an organization to maximize our opportunities in every segment of the survey business," says O'Connor.

Jamie Williamson, formerly senior vice president and general manager of the TPS Survey and Construction Business Unit, will head up the TPS Construction Business Unit, which offers such products as machine control systems, lasers, and construction total stations via a dealer network throughout the United States, Canada and South America.

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- **Equipment Appraisal Expert – Levi Dungan, CEM**
- **Environmental Specialist – Mike Buckantz**

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- **Managing Assets in a Changing Market**
- **Owner Understanding of the Equipment Department Value**
- **Optimal Appraisal Strategies**

AEMP

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For Immediate Release

AEMP Launches the *Equipment Manager Specialist (EMS)* Program

The Association of Equipment Management Professionals Certification Commission is proud to present the Equipment Manager Specialist (EMS) program at the fall 2009 Asset Management Symposium in conjunction with the Certified Equipment Manager Institute (CEMI).

The Equipment Manager Specialist designation is a recognized standard for developing the qualifications of a person involved with equipment in a private, municipal, or government fleet within the first five (5) years of career development. It is an attainable goal for individuals who want to obtain the skills, knowledge, and experience necessary to become a Certified Equipment Manager. To achieve this goal it takes personal motivation and depends on dedication to professionalism and acceptance of the challenge.

The experience will help the individual develop a depth of understanding of fleet management skills and the ability to interact on a professional level with all fleet-related professionals. ***Register for this event at aemp.org***

Theresa Anderson, CEM
AEMP Certification Commission Chair

Description of an Equipment Manager Specialist

For purposes of the exam, the description of an Equipment Manager Specialist is an individual employed in the equipment management industry from zero – five years that possesses knowledge of:

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   - Procurement & Negotiations
   - Risk Management
   - Warranty and Performance Guarantees
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   - Life Cycle
   - Specifications
   - Information Technology
3. **Policies**
   - Employee Training
   - Environmental
   - Human Resources
   - Safety
4. **Controls**
   - Outsourcing
   - Parts Management
   - Preventive Maintenance
   - Shop and Facilities Management
5. **Customer Service**

Coming soon to AEMP – The *Certified Equipment Support Professional* designation. Designed for suppliers of equipment for private/municipal/government fleets.

Program at a Glance

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Special Events

Monday, October 26

- Symposium Opening Reception

Tuesday, October 27

- Industry Focus Group Breakfasts
  Sponsored by Manitowoc, John Deere
- Industry Focus Group Luncheons
  Sponsored by Caterpillar, International, Qualcomm
- Reception, Dinner & Keynote "7 Things Contractors Need to Know." Presented by Mr. Charles Vander Kooi

Wednesday, October 28

- Industry Focus Group Breakfasts
  Sponsored by Castrol, Komatsu
- Industry Focus Group Luncheons
  Sponsored by Trimble, Volvo Construction Equipment
- Certified Equipment Manager Institute (CEMI) Dinner

Symposium Speaker Highlights

Charles Vander Kooi has been involved in the construction industry for over four decades, 15 years as an estimator and upper-management employee of companies, and 26 as a leading consultant and speaker. He has bid over a billion dollars in work in his career. As a private consultant, he has helped over 1200 companies in their estimating/bidding systems and has lectured to over 200,000 people nationally and internationally. Constantly in demand, Mr. Vander Kooi speaks at an average of 80 trade shows, conventions, and associations each year teaching his philosophy across the US, Canada, Latin America, England, and Australia. He consults with an average of 50 clients annually, assisting in and improving their performance. He has authored several books to the industry, created and publishes *HardScape* Magazine and his seminars are available on audio as well as video.

Dr. David Reinders is Division Economist and Chief Market Information Officer for John Deere Worldwide Construction and Forestry. In that capacity, he is responsible for all aspects of global industry forecasting for the Division. Dr. Reinders holds a Ph.D. in economics. He currently resides in the Quad Cities of Iowa / Illinois.

Levi Dungan, CEM, Accredited Member, American Society of Appraisers, is the owner of Dungan & Company LLC, an equipment appraisal firm specializing in the valuation of construction related equipment and plants. Prior to forming his own company he spent twenty plus years employed by Sundt Construction Company, in various positions with increasing responsibilities, cumulating in three years as Corporate Equipment Manager. His years of experience in the maintenance and management of construction equipment has given him a unique view of the condition and value of the assets he is contracted to appraise.

Certified Equipment Manager Institute (CEMI)

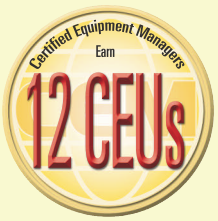
The Certified Equipment Manager Institute (CEMI) leads to the Certified Equipment Manager (CEM) or Equipment Manager Specialist (EMS) designations, the industry's premiere credentials for asset managers of heavy off-road equipment and municipal/government fleets.

Core Knowledge Areas of Focus:

The Certified Equipment Manager is required to exhibit mastery in the following 16 areas:

- Benchmarking
- Employee Training
- Environmental
- Financial Management
- Human Resources
- Life Cycle Analysis
- Negotiations
- Outsourcing
- Parts Management
- Preventive Maintenance
- Risk Management
- Safety
- Shop/Facilities Management
- Specifications
- Technology
- Warranty and Performance Guarantees

Schedule at a Glance

Symposium Time Schedule	Symposium Sessions	Institute Time Schedule	CEM Institute Sessions
Tuesday, October 27, 2009			
7:00-8:15 AM	***INDUSTRY FOCUS BREAKFASTS*** *Sponsored by John Deere and Manitowoc*		
8:30-9:00	**Intro: Why Connect the Equipment Department to the Company?** *–Brian Jacoby*	8:30-9:20	**CEMI 1 Environmental** *–Levi Dungan, CEM*
9:00-10:00	**"Strategies for Connecting Your Equipment Department to Your Company"** *–John Igel, Ron Wallace, Ben Holmstrom, Greg Kittle, CEM, Bill Rumpke Jr., Daryl Crear, Bob Andrade, CEM, Theresa Anderson, CEM*	9:25-10:15	**CEMI 2 Negotiations** *–Lorne Fleming, CEM*
10:00-10:30	***BREAK***	10:15-10:30	***BREAK***
10:30-11:20	**"Strategies for Connecting Your Equipment Department to Your Company" Panel** *–Moderated by Brian Jacoby. Panel members listed above.*	10:30-11:20	**CEMI Life Cycle** *–Guy Gordon, CEM*
11:20-12:15 PM	**"State of Economics in the Construction Equipment Industry"** *–Dave Reinders*	11:15-12:15 PM	**CEMI 4 Information Technology** *–Pat Crail, CEM*
12:15-1:30	***INDUSTRY FOCUS LUNCHEONS*** *Sponsored by Caterpillar, International and QUALCOMM*		
1:30-1:45	**Intro "What' My Equipment Really Worth in Today's Market?"** *–Dan Connelly, CEM*	1:30-2:20	**CEMI 5 Parts Management** *–Angel Sosa, CEM*
1:45-2:45	**"Equipment Appraisal and Sale Preparation in a Global Market"** *–Levi Dungan, CEM*	2:25-3:15	**CEMI 6 Warranty** *–David Wilson*
2:45-3:15	***BREAK***	3:15-3:35	***BREAK***
3:15-3:45	**Online Auctions** *–Paul Hendrix*	3:35-4:25	**CEMI 7 Employee Training** *–Sam Houston, CEM*
3:45-4:15	**Onsite Auctions** *–Rob Blackadar, Dean Siddle*	4:30-5:20	**CEMI 8 Human Resources** *–Sam Houston, CEM*
4:15-4:45	**Retail Sales of Used Equipment** *–Dan Connelly, CEM*		
4:45-5:45	**"International Global Market Issues Panel"** *–Dick Brannigan, CEM, Greg Kittle, CEM, Paul Hendrix, Rob Blackadar, Dan Connelly, CEM, Lee Haak*		
7:00-8:30 PM	***RECEPTION AND KEYNOTE DINNER*** **"7 Things Contractors Need to Know"** *–Charles Vander Kooi*		
Wednesday, October 28, 2009			
7:00-8:15 AM	***INDUSTRY FOCUS BREAKFASTS*** *Sponsored by Castrol and Komatsu*		
8:30-9:20	**"People Management"** *–Charles Vander Kooi*	8:30-9:20	**CEMI 9 Shop & Facilities** *–Roger Thompson*
9:30-10:00	**"Emissions Update"** *–Mike Buckantz*	9:25-10:15	**CEMI 10 Finance** *–Bill Vanden Brook, CEM*
10:00-10:30	**"AEMP Emissions Task Force Update"** *–Lorne Fleming, CEM, Bob Merritt, CEM*		
10:30-10:45	***BREAK***	10:15-10:30	***BREAK***
10:45-11:15	**"AEMP Telematics Committee"** *–Pat Crail, CEM, Ken Calvert*	10:30-11:20	**CEMI 11 Benchmarking** *–Greg Kittle, CEM*
11:25-12:15 PM	**"On-line Resources for the Asset Manager"** *–Aaron Mayer, Sara Sanderman*	11:25-12:15 PM	**CEMI 12 Outsourcing** *–Diego Navarro*
12:15-1:30	***INDUSTRY FOCUS LUNCHEONS*** *Sponsored by Trimble and Volvo Construction Equipment*		
		1:30-2:20	**CEMI 13 Specifications** *–Gil Gilbert, CEM*
		2:25-3:15	**CEMI 14 Safety** *–Dave Gorski, CEM*
		3:15-3:30	***BREAK***
		3:30-4:20	**CEMI 15 Preventative Maintenance** *–Chris Anderson, CEM*
		4:25-5:15	**CEMI 16 Risk Management** *–Dave Gorski, CEM*
		6:00-7:30 PM	***CEMI DINNER***
Thursday, October 29, 2009			
		8:00AM-Noon	**EXAM**

Symposium Schedule

Monday, October 26

*6:00 – 7:00 PM – **OPENING RECEPTION***

Tuesday, October 27

*7:00 – 8:15 AM – **INDUSTRY FOCUS BREAKFASTS***

Sponsored by:

JOHN DEERE

Manitowoc

8:30 – 9:00 AM

"Why Connect the Equipment Department to the Company"

A company's Equipment Management Department is a critical asset and must be directly involved with the management decision making process. When the Equipment Department is involved with company strategy development, goal setting, and financial decisions the equipment manager understands the bottom-line and company direction and can assist in goal achievement.

Presenter: Brian Jacoby – National Sales Manager, BP Lubricants

9:00 – 10:00 AM

"Strategies for Connecting Your Equipment Department to Your Company" Four teams of asset management industry leaders that have made the concept of connecting the equipment department to the company a viable management plan will share the strategies, pitfalls, and triumphs that helped them succeed.

Presenters: John Igel and Ron Wallace, George J. Igel & Company, Inc.; Ben Holmstrom and Greg Kittle, CEM, William Charles Construction; Bill Rumpke Jr. and Daryl Crear, Rumpke Consolidated Companies, Inc.; and Bob Andrade, CEM and Theresa Anderson, CEM

*10:00 – 10:30 AM – **BREAK***

10:30 – 11:20 AM

"Strategies for Connecting Your Equipment Department to Your Company" PANEL

This is an opportunity to interact with industry experts on ways to develop the concept within your company.

Moderated by: Brian Jacoby, National Sales Manager, BP Lubricants. Panel members listed above.

11:20 – 12:15 PM

Asset Management General Session "State of Economics in the Construction Equipment Industry"

Presenter: Dave Reinders, John Deere Worldwide Construction and Forestry Division (See Mr. Reinders' bio on page 3.)

Key points to be addressed…

- What is the global business outlook for the construction industry?
- How is the recovery likely to unfold around the globe?
- Is 2009 an abnormality or is it the new norm for things to come?
- What is the impact of the American Recovery & Reinvestment Act (i.e., the stimulus package) on the construction industry?
- What is the outlook for housing and for non-residential construction in North America?

*12:15 – 1:30 PM – **INDUSTRY FOCUS LUNCHEONS***

Sponsored by:

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1:30 – 1:45 PM

"What Is My Equipment Really Worth in Today's Market?"

Presenter and session moderator, Dan Connelly, CEM, Vice President, Materials for Oldcastle Materials, Inc.

This session will provide an introduction to the topic and the afternoon presenters.

1:45 – 2:45 PM

Asset Management General Session "Disposing of Your Equipment"

Presenter: Levi Dungan, CEM, AM, President, Dungan & Company, LLC

This fast paced, interactive session will provide participants with an in depth analysis of best practice methods needed to maximize the resale value of your equipment.

In this session you will learn:

- The critical need for accurate records maintenance applied to the importance of keeping your equipment well maintained
- How to create a disposal schedule to optimize times to dispose of your equipment
- Sources available for selling your equipment and which one best fits your needs

*2:45 – 3:15 PM – **BREAK***

AFTERNOON SESSION OVERVIEW:

Managing the acquisition or disposal of equipment is always important but can become critical to a company's bottom-line during uncertain economic times. Having the right equipment available for a job while not having unused equipment sit idle can certainly impact the way jobs are bid and completed.

The following presentations by IronPlanet, Richie Bros. Auctioneers, and Oldcastle Materials will assist the manager, CFO, COO with the information and knowledge needed to make timely decisions concerning the management of equipment fleets in uncertain times.

3:15 – 3:45 PM

"Online Auctions"

Presented by Paul Hendrix, Equipment Purchasing Analyst, Iron Planet

3:45 – 4:15 PM

"Onsite Auctions"

Presented by Rob Blackadar, Major Accounts Manager and Dean Siddle, VP of Equipment Evaluation, Richie Bros. Auctioneers

4:15 – 4:45 PM

"Retail Sales of Used Equipment"

Presented by Dan Connelly, CEM, Vice President, Equipment, Oldcastle Materials

Symposium Schedule

4:45 – 5:45 PM

"International Global Market Issues Panel"
This is an opportunity to interact with industry experts on global market issues and their impact on your company. *Panel Members are: Dick Brannigan, CEM, Equipment Operations Manager, John R. Jurgensen Company; Greg Kittle, CEM, Vice President of Corporate Purchasing, William Charles Construction; Paul Hendrix, Equipment Pricing Analyst, IronPlanet; Dan Connelly, CEM, Vice President, Equipment, Oldcastle Materials, Inc., and Rob Blackadar, Manager, Major Accounts, Richie Bros Auctioneers, Lee Haak, Director of Komatsu Remarketing*

7:00 – 8:30 PM

Reception, Dinner, with Keynote Speaker, Charles Vander Kooi
Mr. Vander Kooi will present, "7 Things Contractors Need to Know." *(See Mr. Vander Kooi's bio on page 3.)*
Essential Learning:
- Organization
- Keeping Control
- Looking at the figures
- Keeping or selling Equipment

Wednesday, October 28

7:00 – 8:15 AM – ***INDUSTRY FOCUS BREAKFASTS***

Sponsored by:

Castrol KOMATSU

8:30 – 9:20 AM

"People Management"
Presented by Charles Vander Kooi
Essential Learning:
- The Egg Sucking Dog
- The good, bad & ugly
- Keeping the crew motivated
- The four business personalities

9:30 – 10:00 AM

"Emissions Update"
Presented by Mike Buckantz, President, Associates Environmental
Mr. Buckantz will present the latest regulatory information on compliance issues facing equipment managers.

10:00 – 10:30 AM

"AEMP Emissions Task Force Update"
Presented by Lorne Fleming, CEM, Director of the Equipment Division of Grace Pacific Corporation and Bob Merritt, CEM, Director of Maintenance, Washington Division of URS.
Mr. Fleming and Mr. Merritt will present an overview of strategies being developed by AEMP members to assist equipment managers in the area of Emissions Regulation Compliance.

10:30 – 10:45 AM – ***BREAK***

10:45 – 11:15 AM

"AEMP Telematics Committee"
Presented by Pat Crail, CEM, Fleet Information Officer, John R. Jurgensen Company and Ken Calvert, Director of Comtrax/IT Support, Komatsu America
Mr. Crail and Mr. Calvert will present the Committee's progress and plans for the future integration of telematic information.

11:25 – 12:15 PM

"On-line Resources for the Asset Manager" *Presented by Aaron Mayer, Equipment Manager, Ryan Central, Inc. and Sara Sanderman, AEMP*
Mr. Mayer and Ms. Sanderman will show well known and little known on-line resources and how you can use them to improve asset management.

12:15 – 1:30 PM – ***INDUSTRY FOCUS LUNCHEONS***

Sponsored by:

Trimble VOLVO Construction Equipment

Listed below are some of the companies whose asset managers benefitted from a previous AEMP Asset Management Symposium:

- *AMECO*
- *Armstrong Coal Company, Inc.*
- *Associated Bringham Contractors*
- *Boh Bros. Construction Co.*
- *Branch Highways Inc.*
- *Cajun Constructors Inc.*
- *CH2M HILL Alaska Energy & Chemicals*
- *City of Ft. Collins*
- *City of Huntsville*
- *City of Jacksonville*
- *City of Lynchburg*
- *City of Madison*
- *City of Mesa*
- *Copart, Inc.*
- *Dulles Industries*
- *Flatiron*
- *Hayward Baker, Inc.*
- *Independence Excavating*
- *Insituform Technologies*
- *Iron IQ*
- *John R. Jurgensen Co.*
- *Johnson Bros. Corp.*
- *L.D. Kemp Excavating*
- *Manatee County Fleet Services*
- *Mass Excavation/ Davis Construction*
- *Maxim Crane Works*
- *McCartney Construction Co., Inc.*
- *MCM Corp*
- *Mears Group*
- *Mulzer Crushed Stone Inc.*
- *Oldcastle Materials*
- *Parsons Construction*
- *Perini Corporation*
- *RMCI Inc.*
- *Robert Heely Const.*
- *Rudolph & Sletten Inc.*
- *Rumpke Consolidate Companies, Inc.*
- *SJ Louis Construction of Texas*
- *Skanska USA*
- *Sundt Construction*
- *Terrace Construction*
- *The Shelly Company*
- *Washington Group Division of URS*
- *Waste Management, Inc.*
- *WRS Compass*
- *Zachry Construction Corp.*

"I have found the equipment management education and networking opportunities offered at AEMP conferences to be balanced and objective and I look forward to close interaction with industry experts and leading edge professionals."

Daniel Connelly, CEM, Vice-President/Equipment Oldcastle Materials, Inc.

Hyatt Regency O'Hare, Chicago, IL

Experience the dramatic rebirth of the iconic Hyatt Regency O'Hare. Long the standard among Chicago hotels near O'Hare, our 1969 John Portman structure has been transformed into a modern and sophisticated site. Exciting new dining choices and luxurious amenities from top to bottom add welcoming touches throughout our O'Hare airport hotel, while our convenient location - with fast access to both downtown and the airport - makes us ideal for every visitor.

The hotel has complimentary shuttle service to and from the airport.

Symposium Rate $129. For Reservations call the Hyatt Regency O'Hare at 847-696-1234 and mention AEMP to receive Symposium rate. Cut-off Date: 10-2-09

AEMP is home of the Equipment Triangle...

It is reflected in our Mission, Vision, Core Values, and our Standards of Ethical Conduct. AEMP recognizes the intricate relationships that exist between the Equipment Manager, Dealer/Supplier, and the OEM. AEMP's programs focus on that relationship, stressing the importance of creating a winning situation for all involved. AEMP invites you to be a part of the Triangle.

This Event is Sponsored by AEMP's Strategic Alliance Partners

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Asset Management Symposium

	Before 9-1-09	After 9-1-09
AEMP Member Registration	$715	$795
Non-AEMP Member Registration	$925	$995

Certified Equipment Manager Institute (CEMI) & Equipment Manager Specialist (EMS) Program

Eligibility for CEM:

- Applicants for the examination must meet the following minimum criteria on the CEM application:
  - A minimum five years experience in equipment maintenance and/or management is required.
  - A minimum of 25 total points must be accumulated to qualify to sit for the exam.
  - Points must be accumulated in the Mandatory Requirements section of the application, and points may be acquired, but are not required, in the Optional Experiences section.

Eligibility for EMS:

- Applicants for the examination must meet the following minimum criteria on the EMS application:
  - Zero - five years of industry experience.

Applications Due:

- September 29, 2009

Exam Dates:

- October 29, 2009

Download the CEM or EMS Applications at aemp.org
(Certification pull down menu at the top of the AEMP home page)

Registration:

Description	*Member*	*Non-Member*
CEMI by 9-1-09 (CEM Exam)	$995	$1,195
CEMI after 9-1-09 (CEM Exam)	$1,195	$1,395
CEMI Only – Non Exam by 9-1-09	$715	$925
CEMI Only – Non Exam after 9-1-09	$795	$995
CEMI EMS by 9-1-09	$875	$1,075
CEMI EMS after 9-1-09	$1,075	$1,275
CEM Exam Only	$340	$495
EMS Exam Only	$225	$395

Hotel Reservations

For Reservations call the Hyatt Regency O'Hare at 847-696-1234. Mention AEMP to receive Symposium rate of $129.
Cut-off Date: 10-2-09

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GREEN RESOURCES

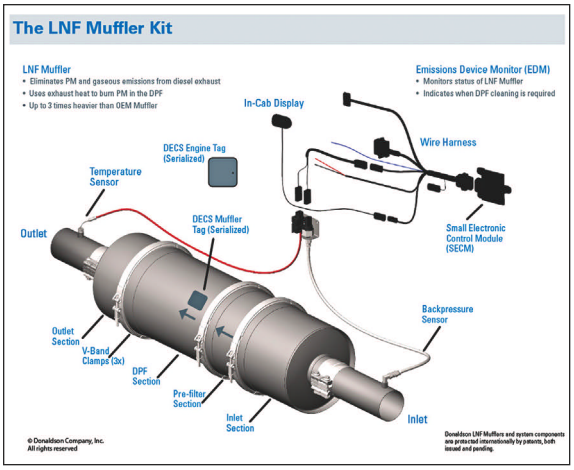
California Air Resources Board Verifies Donaldson On-Road Devices

Donaldson received Level 3+ verification by the California Air Resources Board (CARB) for two new on-road emissions retrofit devices.

SEF Muffler – The Donaldson Semi-Active Electric Filter (SEF) Muffler System is verified for select 1991- through 2006-model-year diesel engines used in on-road applications. It is designed for fleet vehicles that return home every night and can be plugged into an electrical outlet for DPF regeneration.

LNF Muffler – The Donaldson Low-NO2 Filter (LNF) Muffler System is verified for use with select 1993- through 2003-model-year diesel engines used in on-road applications. It is a cost-effective diesel particulate filter for vehicles with sufficient duty cycles to permit passive regeneration.

Specific engine families and conditions for which the SEF and LNF Muffler Systems have been approved are in the Executive Order on the CARB webpage at: www.arb.ca.gov/diesel/verdev/verdev.htm.



Donaldson's passive-regeneration LNF Muffler is verified for use with select 1993- through 2003-model-year on-road diesel engines.

SUPPLIER NEWS

ESCO Buys Brazilian Operation Outright

U.S.-based wear parts manufacturer ESCO has acquired complete ownership of a former joint venture in Brazil. Formed in 2007 with Soldering, a maker of wear-resistant steel products for the mining, industrial, heavy construction and cement markets, the Brazilian operation employs 450 in the mining-heavy state of Minas Gerais.

"This partnership combined our two companies' competitive advantages — Soldering's strong reputation in Brazil and ESCO's reputation for superior products and technical capabilities," says Larry Huget, ESCO president and chief operating officer.

The business will continue to be known as ESCO SOLDERING and, says Huget, "will provide distribution for ESCO products in the growing Brazilian market, combined with a strong manufacturing presence for premium wear solutions and services."

By LARRY STEWART, Executive Editor

CARB-Verification

Makes These DPFs The Right Investment

California approval means these retrofits will satisfy "best available control strategy" clauses in emissions rules around the country

Diesel particulate filter (DPF) retrofits ordered before the end of this month are sure to qualify for double the horsepower credit toward particulate-matter (PM) compliance with California's In-Use Off-Road Diesel rule. In other words, verified diesel emissions control strategies (VDECS) ordered in the next couple of weeks for two scraper engines that total 988 horsepower, for example, bank a 1,976-horsepower credit for the owner even if they aren't installed until after the Dec. 31, 2009, double-credit deadline. Credits are applied in the first year that the contractor's fleet does not meet fleet-average targets established by the California Air Resources Board (CARB) for off-road diesel fleets.

So it's time for California equipment owners to get busy ordering some VDECS. To qualify for the credit, retrofits must be CARB verified (see the list of currently verified technologies at www.arb.ca.gov/diesel/verdev/vt/vt.htm). Equipment owners working in locations nationwide should be browsing the same list when considering machine rebuilds.

County and municipal ordinances and federal bid specifications are increasingly demanding that equipment working in badly polluted jurisdictions be fitted with the "best available control technology" (BACT) for reducing diesel emissions. And when California gets the EPA waiver it needs to fully implement its In-Use Off-Road Diesel rule, any other state can pick up and apply the same regulation. As many as 19 other states and the District of Columbia, which all contain counties that fail to attain air quality meeting the EPA minimum standards, are moving toward implementing the CARB rule. Construction-equipment owners in those states will have to use VDECS on equipment they want to keep.

The Environmental Protection Agency is deferring to CARB in determining accept-

Cleaire's Lonestar DPF (detailed opposite) on this 2006 Deere 6081 engine is the only Level 3+ verified diesel emissions control strategy with CARB Mark 2 status (reducing NOx 40 percent in addition to PM 85 percent).

able emissions-control equipment. EPA automatically lists VDECS as EPA-verified (see www.epa.gov/otaq/retrofit/verif-list.htm). There are more products on EPA's list of verified diesel-emissions technologies, but the slim pickings available on the CARB Level-3-verified list are your only sure bets.

The in-use diesel rule offers no compliance credit for applications of Level 2 VDECS (50-percent reduction in PM emissions) until all of a fleet's engines five years old or older have been retrofit with Level-3 VDECS (85-percent reduction in PM emissions), if compatible Level 3 devices are available.

The range of engines for which there is a verified filter technology is narrow. Tier 1 engines produce so much soot that they challenge exhaust-filter reliability. Unregulated engines built before Tier 1 went into effect in 1996 typically must be upgraded before they can work with a DPF.

Diesel particulate filters are typically cylindrical elements of a high-tech ceramic such as silicium carbide in a steel sleeve. Diesel particulates catch on the porous ceramic walls as exhaust passes through. A diesel oxidation catalyst — a honeycombed structure coated

Caterpillar offers a verified, Level 3+ diesel particulate filter for rubber-tired and tracked off-road vehicles (non-Caterpillar machines included) with select Tier 1 and Tier 2 engines ranging up to 600 horsepower — double the horsepower of three of the other five passively regenerated DPFs . The Caterpillar **DPF** passive regeneration system requires an engine that runs at exhaust temperatures of 464 degrees Fahrenheit (240 degrees C — what Cat calls "Normal Operating Temperature") or more at least 40 percent of the time. The Cat DPF allows the lowest temperatures among passive-regenerating VDECS. Customers will have a single point of contact for service and warranty support — Caterpillar dealers that are familiar with the equipment applications — and that can be a fairly compelling value. Pre-engineered under-hood installation options are available for some Cat machines.

Visit ConstructionEquipment.com/info and enter 202

Cleaire currently has three products — one passively regenerated and two active-regeneration systems — CARB verified for off-road use. **Lonestar**, the passively regenerated product, is built around a modular design that adds a lean NOx reduction catalyst to the wall-flow diesel particulate filter that is common to most Level 3+ VDECS. The lean NOx catalyst makes Lonestar the only VDECS verified at Level 3+ Mark 2, adding a 40-percent NOx reduction to the 85 percent PM reduction required for Level 3 status. It is verified for use with 1996 to 2009 engines from 150 to 350 horsepower. **Phoenix** is Cleaire's diesel-burning, active-regeneration system. It is conditionally verified for Tier 1 through Tier 3 engines (roughly model years 1996 to present) up to 12 liters. **Skyline** (formerly known as Horizon) is an electrically powered active-regeneration verified product, approved for Tier 1 through Tier 3 engines. An integrated electric heating element should be plugged in to shore power daily to process captured PM. Cleaire's **Allmetal**, which is awaiting verification, is an all-stainless version of the passively regenerating Lonestar. Cleaire's technologies are also CARB verified to Level 3 or better in its on-road packages called Longview (passive regeneration), Vista (active-regenerating diesel burner) and Horizon (active regeneration using electric power).

Visit ConstructionEquipment.com/info and enter 203

Independent Construction repowered several scrapers to improve reliability. Cleaner exhaust allowed the scrapers to be fit with banks of HUSS VDECS to assure compliance with CARB diesel emissions rules and preserve the scrapers' place in the California fleet as long as necessary to extract their considerable frame value.

with catalyst that generates heat when exposed to exhaust — upstream from the filter burns away accumulated soot, maintaining reasonable backpressure. The process is called passive regeneration. The assembled DPF typically looks like, and produces the effect of, a large muffler.

Verifications come loaded with qualifiers stipulating the kinds of engines for which VDECS are suited, the conditions under which they will regenerate, the type of machines on which engines can be mounted (rubber tired, track mounted, or steel wheeled).

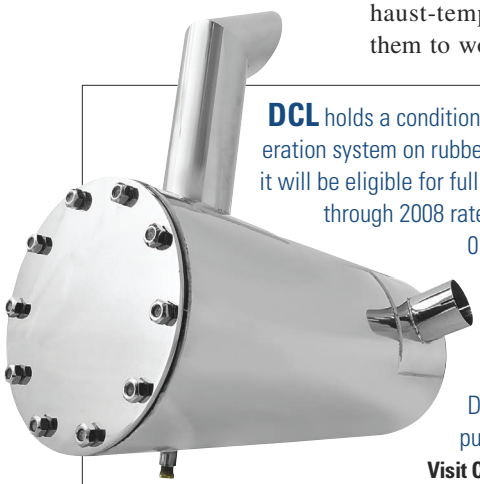
Passive VDECS for mobile off-road applications are all verified with minimum-exhaust-temperature conditions necessary for them to work. To determine if an engine can be retrofit with a passive-regenerating device, its exhaust temperature must be measured in various operating conditions with a thermocouple linked to a data recorder. The engine has to run hot enough, long enough for reliable passive regeneration.

In the ideal world, all VDECS would regenerate passively, with no need for additional energy or supporting systems. Unfortunately, there are many engines whose exhaust temperatures are too cool for reliable passive regeneration.

Three of the five passive VDECS on the market are only suitable for engines up to 300 horsepower. Caterpillar has verified its passive DPF in applications up to 600 horsepower, and the ECS Purifilter is conditionally verified up to 750 horsepower. None of the passive-regenerating VDECS can work with engines that produce more than 0.2 grams of PM per brake horsepower-hour.

Active regeneration systems supply extra energy in the form of diesel fuel or electricity to clean DPFs. Electronic systems in on-road trucks, for example, monitor exhaust back pressure and begin injecting fuel as necessary. Small amounts of diesel (3 to 10 ounces per regeneration) mist a catalyst, which heats up to burn off PM accumulated on the filter.

Active systems have no minimum-temperature requirements, but they do not dramatically extend the range of engine families for which there are compatible exhaust retrofits. And they add complexity to the machine. Concerns about proper installation, durability, and being caught between the engine manu-



DCL holds a conditional Level-3+ verification with CARB for use of its **MINE-X SOOTFILTER DPF** as a passive-regeneration system on rubber-tired mobile equipment. On completion of the remaining two-thirds of its durability testing, it will be eligible for full verification. The MINE-X SOOTFILTER DPF is verified for use with engines model years 1996 through 2008 rated between 175 and 300 horsepower, and certified to particulate-matter emissions levels of 0.15 grams per brake horsepower-hour or less. Engines in this size range were not required to certify PM emissions that low until 2003, when Tier 2 went into effect. Some engines certified at 0.2 g/bhp-hr. early, though, and they're listed in the CARB-Approved Engine Families List attached to the verification executive order. Buyers looking to consolidate purchasing with fewer retrofit dealers might look into the MINE-X SOOTFILTER DPF because the passive DPF is also Level-3+ verified for use with stationary prime and emergency standby generators, pumps, and compressors up to 300 horsepower.

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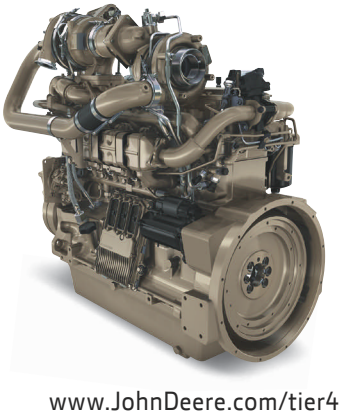

www.JohnDeere.com/tier4

facturer and the VDECS maker in service and warranty disputes can be discouraging.

Three of the four active-regeneration VDECS for mobile off-road equipment apply only to engines of up to 12 or 15 liters of displacement — two of those are suitable only for engines made after 1995. The ECS Combifilter specifies no engine-model-year limits, and applies to engines up to 12 liters displacement. The HUSS FS-MK filters — active-regeneration diesel burners — are verified for engines with no size or age limits.

Independent Construction, from Concord, Calif., has fit scrapers with banks of three or more HUSS VDECS. The active-regenerating filters are verified for multiple installations in series with virtually any diesel engine. Of course, there are practical limits to how many filters an owner wants to maintain. To keep the scrapers' PM production down to manageable levels, and to upgrade the machines' reliability, Independent has repowered most of these scrapers with Tier 2 engines (supported by state grant funding).

Fuel-burning active VDECS can work without interrupting the machine's productivity. They are attractive for rental fleets that demand reliability with no operator intervention in a wide range of operating conditions.

Electrical active-regeneration systems must be attached to shore power to regenerate. The vehicle can't work while it is plugged in, so the option is primarily for equipment operating in central locations such as in quarries, refuse transfer, airports and warehouses or material yards.

Model years mentioned in verification documents are guidelines rather than rules. Each VDECS is actually verified to work with engines certified to specific maximum PM rates. With every verification, there is a document that lists acceptable engine families for use with the device.

Successfully using VDECS inevitably

The **ECS Purifilter** is conditionally verified for use with off-road diesel engines with maximum power output ratings from 50 horsepower to 750 horsepower, making it the passively regenerated VDECS capable of handling the most powerful off-road engines. It is verified for use with engine model years ranging from 1996 to 2008, but compatible engines must be certified to produce no more than 0.2 grams of particulate matter per brake horsepower-hour. Some diesels certified at that PM level ahead of time, but the first off-road diesels were not required to meet that limit until 2001. Purifilter will be eligible for full verification on completion of the remaining two-thirds of its durability testing. The **Combifilter** from ECS is an actively regenerated (plug-in electric) DPF that works with diesels up to 12 liters displacement in rubber-tired off-road equipment. ECS is also seeking off-road verification of its **Purifilter Plus**, which is currently verified for on-road heavy-duty diesels. Purifilter Plus employs a passive Purifilter DPF plus a Combifilter element for active regeneration at intervals scheduled suitably (weekly, biweekly, at engine-maintenance intervals, for example) to meet specific engines' soot-loading rate under actual operating conditions.

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Level 3 Off-Road-Vehicle VDECS

		Engine Compatibility				
		Size	Model Years	Applications	Regeneration	Exhaust Temp Required
Caterpillar	Diesel Particulate Filter	175 - 600 hp	1996 - 2005	Off-road: rubber-tired and tracked	passive	240°C – 40% of the time
Cleaire	Lonestar	150 - 350 hp	1996 - 2009	Off-road: rubber-tired	passive	260°C – 70% of the time
Cleaire	Phoenix	up to 12 liters	1996 - 2009	Off-road: rubber-tired (conditionally verified)	active (diesel burner)	none
Cleaire	Skyline	<=15 liters	1996 - 2007	Off-road: rubber-tired	active (electric plug-in)	none
DCL Int'l	Mine-X SootFilter DPF	175 - 300 hp	1996 - 2008	Off-road: rubber-tired (conditionally verified)	passive	350°C – 30% of the time
ECS	Purifilter	50 - 750 hp	1996 - 2008	Off-road: rubber-tired (conditionally verified)	passive	320°C – 25% of the time
ECS	Combifilter	<=12 liters	pre 2008	Off-road: rubber-tired	active (electric plug-in)	none
ESW	ThermaCat	175 - 300 hp	1996 - 2009	Off-road: rubber-tired and tracked	active (diesel burner)	210°C – 15% of the time
HUSS	FS-MK DPFs	no limit	pre 2009	Off-road: rubber-tired and tracked	active (diesel burner)	none

CARB verifies that Level 3 verified diesel emissions control strategies (VDECS) reduce exhaust particulates by 85 percent or more, and that they will continue to do so reliably for reasonable the life of the device. Conditionally verified technologies have proven to reduce PM by 85 percent and have consistently performed for at least one-third of the required test hours. They're considered the same as Level 3 devices, but must achieve full verification within three years.

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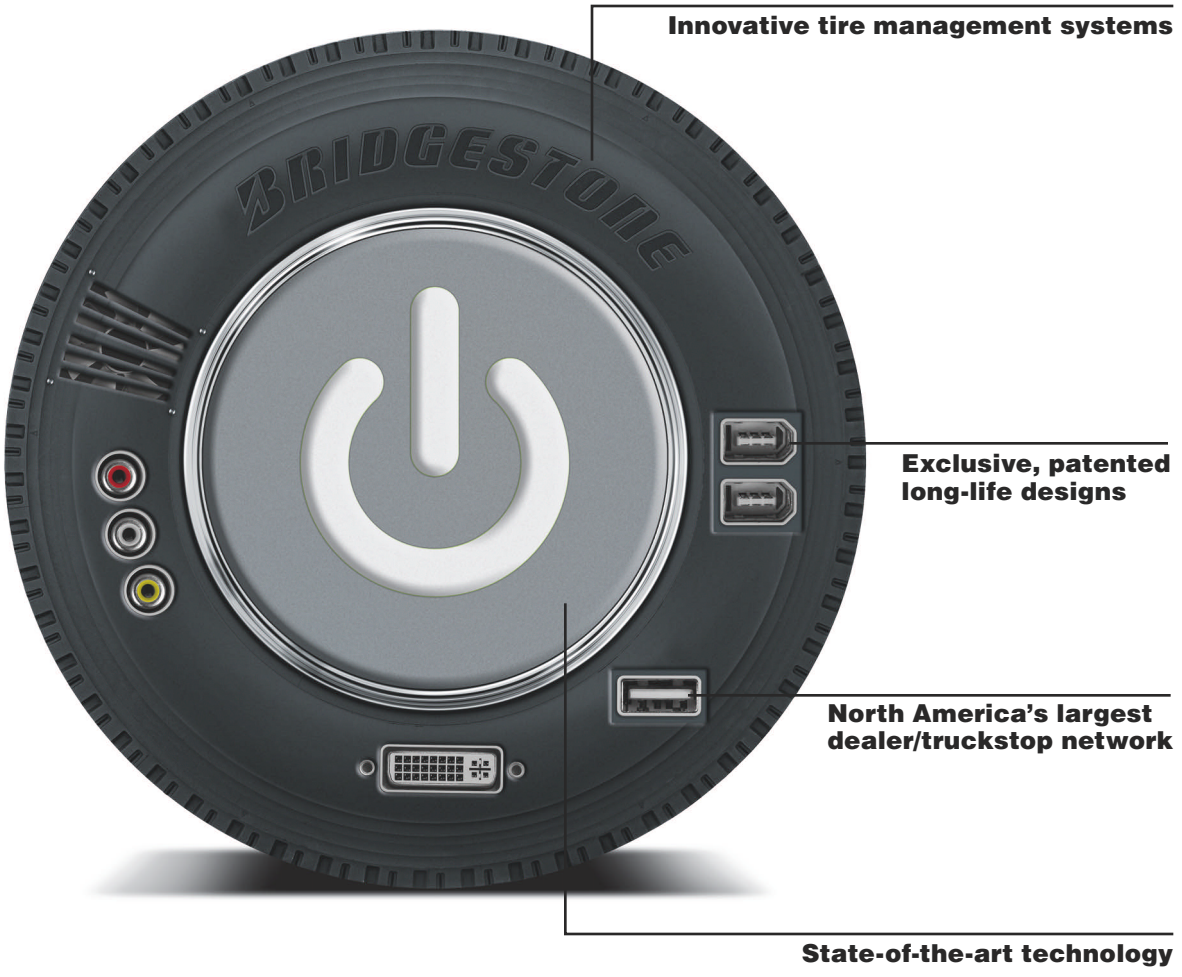

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The **ThermaCat** from **ESW Canada** is the first mobile, off-road Level 3+ VDEC to combine a passive diesel particulate filter (DPF) with an active-regenerating diesel fuel burner (Purifilter Plus, from ECS, is a competitor still seeking CARB verification). It's verified for engines up to 15 liters. The hybrid system is intended for vehicles working severe-duty cycles, where exhaust temperatures are low. As long as the vehicle is operated at exhaust temperatures above 500 degrees Fahrenheit (260 deg. C), ThermaCat will regenerate passively fast enough that active regeneration is not necessary. When the vehicle runs long periods with exhaust temperatures below 500 deg. F, backpressure will increase as the filter accumulates soot. Once the exhaust-gas backpressure reaches a preset value, diesel injection activates automatically during normal vehicle operation to raise the filter's internal temperature and burn more diesel PM off the element. ThermaCat is verified to work with engines whose exhaust temperature reaches 210 deg. C just 15 percent of the time.

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The CARB verified **HUSS FS-MK** diesel particulate filters as Level 3+ diesel emission control systems for use with most on-road engines through 2006 model year, and most off-road diesel engines through the 2008 model year. HUSS proved to CARB that multiple FS-MK filters can be mounted in series on vehicles to accommodate diesel engines of any size and PM output level. The company claims to have applied the active, diesel-burning filters on engines up to 800 horsepower. Volvo Construction Equipment entered a strategic partnership with the Swiss aftertreatment maker, to provide diesel-exhaust retrofits for Volvo construction equipment. Various configurations of the FS-MK filters are available as Volvo-approved products through Volvo CE dealers. Huss systems are available in a similar way for Volvo's other heavy-duty diesel brands, Volvo Trucks, Mack Trucks, Volvo Penta, and Volvo Bus for retrofits globally.

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More Online

Level 3 Stationary VDECS
www.constructionequipment.com/articleDetail/CA6668097.html

Level 3 On-Road VDECS
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comes down to making educated choices and working with reliable vendors. There are some obvious choices. Caterpillar, for example, has verified its own passive DPF for mobile off-road applications. Cat products come with Cat dealer support and one-stop warranty accountability.

Other indications of VDECS-maker staying power include OEM partnerships. For example, in 2008 Cat named CleanAIR an allied vendor of exhaust retrofit products specifically for stationary diesel engines. This kind of partnership is likely to give the maker volume and experience that will help them meet the demands of many applications.

Similarly, Volvo has named the HUSS FS-MK Series a Volvo-approved product. Volvo has worked with HUSS to match engines and applications — both off-road and on — to HUSS products. The VDECS can be purchased through Volvo CE and the various Volvo truck brands' (Volvo, Volvo Penta, Mack) dealers.

All the makers of VDECS, because they've gone to the trouble and expense of having technologies verified, are committed to the market for the long haul.

New emissions-retrofit devices continue to be added to the verified list. If you don't have to retrofit machines now, it may be worth waiting to see what new products are verified in the coming months. Don't hold out false hope, though — it is unlikely that a simple retrofit solution for engines made long before 1996 is forthcoming.

Most pre-Tier-2 engines (2002 or earlier, up to 299 horsepower) will have to be gone from California in the next seven or eight years. The BACT ordinances — like those in New York City and the Chicago area's Cook County — will effectively start pushing pre-2003 off-road diesels out of their jurisdictions.

The Big Apple requires emissions-retrofits now, and Cook County's diesel pollution ordinance will start requiring them soon. Keep an eye on the CARB Level 3 Verified Technology list, and start planning fleet investments now. Waiting until the last minute to try to comply will be devastating for most construction equipment users.

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By KATIE WEILER, Managing Editor

Jump Start Operators With Virtual Training

Save on fuel, maintenance costs and machine hours by training operators via PC before they step foot in the dirt

Despite today's economy and unemployment in the construction industry, a labor shortage of trained operators and technicians lurks around the corner. The American Recovery and Reinvestment Act promises $787 billion for making improvements to our infrastructure and roads, but do we have the manpower and expertise to run and maintain the equipment necessary to build those projects?

The answer remains to be seen. Efforts have been underway to educate young people about careers in construction. Manufacturers, contractors and industry associations are offering scholarships and training programs to high-school students to pique their interest. Manufacturers are also making their machines easier to operate and maintain, as well as providing more intuitive training devices from which to learn.

One such device is a PC-based equipment simulator for training purposes. Designers and engineers have tapped into video-game technology with the use of software, joysticks and a monitor to provide a virtual jobsite setting and step-by-step exercises designed for entry-level operator training. The PC-based technology began in the forestry industry about 10 years ago. And in 2005, excavator simulator training was introduced to the construction market. Since then, training programs have grown to include wheel loaders, haul trucks, motor graders, scrapers and cranes.

This technology is quickly becoming adopted by training schools all over the world. Many manufacturers offer their own versions and market them to schools, contractors, dealers and municipalities. Simulator training can be used for employee screening, cross training, job fairs, jobsite planning and more. Benefits quickly outweigh the costs. By not using actual machines for initial operator training, companies will save on individual instructor costs, fuel consumption, machine wear-and-tear, maintenance, engine-use hours, and emissions reduction. In addition, it is much safer for operators and jobsite personnel if a student operator masters his basic skills in the classroom.

Caterpillar, John Deere and Simlog/VISTA Training are the main players in the U.S. virtual-construction-equipment training

Michael Hoeg, senior instructional designer and developer for John Deere, demonstrates a truck-loading exercise from the excavator simulator.

market. Volvo announced in April that it offers a wheel loader, excavator, and articulated haul-truck simulator in various formats from a higher end (cab on a hydraulic motion platform) to a portable, briefcase sized simulator — neither of which are PC-based. Volvo did studies internally and with a university to analyze motion vs. non-motion simulator training and simulator vs. real-machine training. Based on those results, Volvo opted to offer only motion-based training. But that realism comes with a price. Volvo's simulator software license starts at $25,000 and doesn't include hardware.

For lower-cost, PC-based virtual training options, Caterpillar, John Deere and Simlog/VISTA Training offer different variations based on similar operator-training principles. All three companies promote a three-step approach to training: Online/DVD courses, virtual jobsite training, and instructor-led courses. The companies encourage entry-level operators to take part in the online courses as they provide helpful background before stepping their virtual foot in the machines.

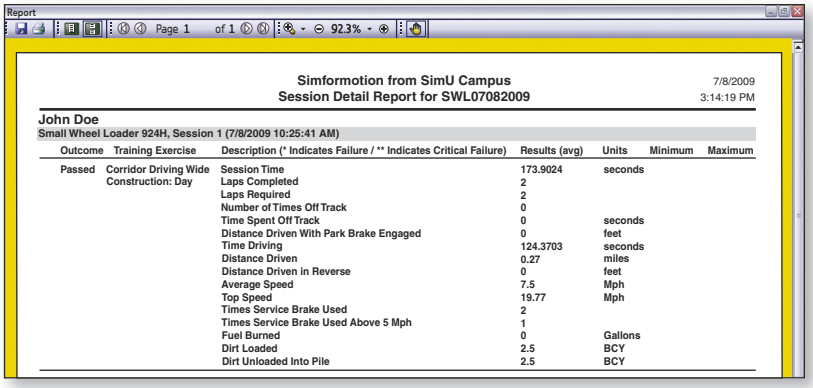
The following pages focus on the simulator portion of the training programs (primarily earthmoving equipment) and explore their similarities and differences.

Caterpillar

An early adopter of the technology, Caterpillar has offered PC-based operator training simulators since 2004. The company started its Virtual Training Systems (VTS) with hydraulic excavators and has expanded to include large wheel loaders, off-highway trucks, mining trucks, and M-Series motor graders. According to Cat, the VTS simulators are designed to train and orient entry-level and inexperienced operators on basic machine operation, skills and application knowledge.

All of the simulator programs start out with "control functions" and "dashboard" to familiarize the operator with which button/joystick performs which function and the layout of the dashboard. After that comes a series of exercises to teach operators the skills they would need on a real jobsite. For example, the excavator simulator is set in a construction environment and begins with bucket placement and bucket tasks, then covers carrier positioning, truck loading, truck dumping and trenching. Each new module becomes more challenging than the previous module, building upon the skills learned in each exercise.

A new feature of Caterpillar's Gen II wheel-tractor-scraper simulator is the Free Training Module whereby an operator or instructor can customize training exercises.


Report

Page 1 of 1 92.3%

Simformotion from SimU Campus
Session Detail Report for SWL07082009

7/8/2009
3:14:19 PM

John Doe
Small Wheel Loader 924H, Session 1 (7/8/2009 10:25:41 AM)

Outcome	Training Exercise	Description (* Indicates Failure / ** Indicates Critical Failure)	Results (avg)	Units	Minimum	Maximum
Passed	Corridor Driving Wide Construction: Day	Session Time	173.9024	seconds		
		Laps Completed	2			
		Laps Required	2			
		Number of Times Off Track	0			
		Time Spent Off Track	0	seconds		
		Distance Driven With Park Brake Engaged	0	feet		
		Time Driving	124.3703	seconds		
		Distance Driven	0.27	miles		
		Distance Driven in Reverse	0	feet		
		Average Speed	7.5	Mph		
		Top Speed	19.77	Mph		
		Times Service Brake Used	2			
		Times Service Brake Used Above 5 Mph	1			
		Fuel Burned	0	Gallons		
		Dirt Loaded	2.5	BCY		
		Dirt Unloaded Into Pile	2.5	BCY		

Cat's new training-records management tool, powered by SimU Campus, will create individual student accounts, save and print detailed reports, manage simulator usage and learning activities, allow instructors to customize curriculum, and offer benchmarks based on expert-operator data.

The off-highway and mining truck simulators are set in their respective operating environments. After learning the control functions and dashboard, a student operator practices corridor driving, which teaches proper braking methods and how to follow traffic patterns. Then the curriculum becomes more difficult with positioning the truck for dumping, loading, as well as completing a haul cycle.

Probably one of the most important simulators for Caterpillar was the M-Series motor grader launched in tandem with the machine in 2006. Cat replaced all of the motor grader's conventional controls — including steering — with a pair of joysticks. That was a serious technological advancement in the motor-grader world. But seasoned operators had to be convinced the new technology was an improvement and easier to navigate. After sitting down at the simulator for just a short period of time, many were truly amazed at how intuitive the joysticks were to use and how quickly

one could learn which hand controlled which function.

The most recent Cat simulator will offer more technological advancements. Caterpillar and Simformotion reached an agreement earlier in the year whereby Simformotion will develop, manufacture and distribute Cat-branded, PC-based operator-training simulators. The first "Gen II" simulator features a wheel tractor scraper and will be available in August. The second one, scheduled for release in October, will be the 924H wheel loader. And in 2010 they are planning to release a D8T track-type-tractor simulator.

Because of the introduction of new technologies, Cat will classify its existing simulators as "Gen I" to distinguish the new products from the old. According to Larry Estep, program manager, the Gen I products will be phased into Gen II versions over the next three years. Estep also explained that Gen I software works with Gen II hardware, but Gen II software only works with Gen II hardware. Also, Gen I control pods can be used on Gen II platforms.

"We've gone to a standard Cat seat instead of using an office chair," says Estep. "We've integrated more of the Cat controls, so that when a student is sitting down at the simulator of a scraper, for example, they know that in the back is a transmission control — that's where the control stick is at; those are the buttons they'll need to operate; and the pedals are the same.

"So we have a great new design of the hardware, and we decided it was time to upgrade our software," says Estep. "What you're going to see in Generation II software didn't exist in the past. First of all is the interactive pre-operation machine inspection. Every single product we put out today will have a module that the operator has to learn first — the walk-around they have to do on that machine before they drive it. Next is a function-based controls familiarization module. So if the simulator says to open the apron, for example, it will instruct the student on the screen how to open the apron and then show the student how the machine responds to that function.

Cat's Gen II scraper simulator features different views of the jobsite and the machine at work.

"It's a physics-based machine and environment model…and we applied physics technology where you're getting an accurate replication of the soil and an accurate replication of what the machine does when you move a lever or step on the throttle," he says.

Gen II simulators will offer a host of improvements, including high-fidelity graphics, nighttime training, residential and commercial environments, different soil types, real-time instruction and feedback, free-training module, safety features and more. They will also come with a new training-records management tool powered by SimU Campus, which will create individual student accounts, save and print detailed reports, manage simulator usage and learning activities, allow instructors to customize curriculum, and offer benchmarks based on expert-operator data. That tool can also be purchased as an option for existing Gen I products for $499/license.

"With SimU Campus, we're collecting data about faults, in order to measure the things you did right and wrong," Estep says. "We're collecting data about your performance in specific training modules. We measure things like average depth of cut and the time it takes to do that. We also calculate how much fuel you would've consumed. We give the data points that allow a machine owner or instructor to calculate their savings. We don't calculate dollar savings because we don't feel that's giving real accurate data. Because there is so much variation in actual cost from job to job, we don't want to present a cost-savings value that might not be realistic."

The new simulators are only offered as a complete Caterpillar package to ensure operators are using controls that mimic the actual machine's controls. However, the display devices can be purchased separately or as part of the package. Gen I simulators are priced per one-time license: $7,750 for the excavator; $13,125 for the M-Series graders; $25,000 for the large mining truck. The Gen II wheel tractor scraper simulator's total cost will be in line with Gen I products; all Gen II products will include a PC, and the display device will be optional.

Gen I Trucks, Large Wheel Loader, and Excavator simulators are available in Spanish, English and French. The motor grader is only available in English. Gen II products will be available in Spanish, English, French and Chinese; a license will cover all languages. During installation you can choose one or all of the languages to install. For more information, visit www.cat.com/training and click on Simulators.

John Deere

At Conexpo-Con/Agg 2008, John Deere launched its first earthmoving training simulator for hydraulic excavators. It has been gaining traction as

most of the 2009 trade shows touted the new simulator, and there were long lines of attendees who wanted to test their virtual abilities and challenge each other for top assessment scores. Although this training is machine-family specific, Deere says the learned operator techniques can be used on other manufacturers' equipment as well. Since then, the company launched its second simulator for a 4WD loader in July, and a motor-grader simulator will arrive later this year.

The main objectives are to demonstrate various operating techniques and practice safe operation on a virtual jobsite. A simple drop-down menu allows users to choose among English, Spanish or French-Canadian languages at any time throughout the training. The graphics are quite realistic with details such as different shadings of color to represent deeper levels of dirt and 3D affects such as dirt spillage and dirt trickling down a pile. Training exercises are very intuitive, and tasks are prompted by changing colors when the machine is positioned where it needs to be. In addition, both backhoe and excavator controls are offered.

Eight of the most common excavator tasks are programmed as lessons in the simulator. The eight modules are: operator-controls overview, placement for trenching, end-of-day parking, dig from a bench/load an ADT, dig a level trench, pick and set a trench box, pipe movement and load onto a low-boy trailer.

■ Lesson one familiarizes the operator with joystick controls. A graphic of each joystick function is displayed at the bottom of the screen. Students are prompted with arrows that indicate which function to engage.

■ Lesson two teaches the operator how to use foot pedals. Tasks include maneuvering the excavator to specific locations on the jobs and placing the bucket into a trench at the correct angle.

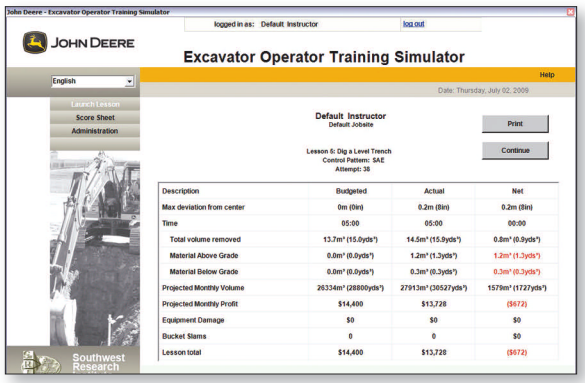
■ Lesson three requires parking the excavator and maneuvering it around obstacles and safety hazards. Safety violations are tabulated and equipment damage is calculated.

■ Lesson four is the first productivity task whereby an operator has to load two ADTs from a bench in different positions — in a 7-minute time frame. During the task, the operator can see percentage of bucket fill and truck fill, as well as time left on task. Production spillage, equipment damage and bucket slams are all recorded. If any safety violations occur in any of the following lessons, an operator fails the test as there is zero tolerance for those violations.

■ Lesson five requires digging a 3-foot level trench along an excavation line as far as possible in a 5-minute time frame. The operator must maneuver backward while keeping a straight line and also avoid a hidden water line.

■ Lesson six is a timed event that involves managing an 8,800-pound trench box that is heavy enough to tip a 200D over the side of the tracks, responding to hand signals, and placing a payload blind into a trench.

■ Pipe-movement is the seventh lesson, which requires handling a short pipe and placing it into a trench box, responding to hand signals, and working around people. This timed event measures efficiency.



An operator's performance is summarized in a profit/loss format based upon the mistakes made or time taken to complete each lesson.

Lesson four of Deere's simulator is the first productivity task whereby an operator has to load two ADTs from a bench in different positions — in a 7-minute time frame.

■ The last lesson is a timed exercise that requires driving the excavator onto a trailer while managing the crest point and resulting shifting that will occur, stowing the machine for travel, and then maneuvering the excavator back off the trailer and parking.

Each of the productivity tasks features a practice mode and an assessment mode. In practice mode, an operator can run through the same drill unlimited times and receive real-time feedback on each exercise. The program allows him to correct mistakes while also alerting him to any safety hazards. After an operator feels proficient in each task, he switches to the assessment mode and records a final score for the exercise. He only has one chance to take the test. If he fails, he has to get his instructor's approval to retake the test.

"There are two different user types — an instructor/administrator and a student/oper-

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ator," says Michael Hoeg, senior instructional designer and developer for Deere. "When you're logged in as an administrator, you have the ability to add as many jobsites as you want and also as many operator-users as you want. So you as an administrator can start to track all your operators' scores and usage and then do some jobsite planning. So if you have three locations, 10 operators each, you can start to run reports. You can go through all your virtual jobsites and see the different operators and see how they're doing.

"For example, I can pick 'dig a level trench' in the menu and it would bring up all my operators and how they've done in that exercise. So there are a lot of good reporting and jobsite planning tools in the simulator as well. It's not just sit down and play," Hoeg says.

What's interesting about the assessment mode is that an operator's performance is summarized in a profit/loss format based on the mistakes made or time taken to complete each lesson. According to Deere, the score is based upon a budget, and all lessons return either a monetary contribution toward or a deduction from the budget, in an itemized format. There is also a dollar amount attached to each safety violation. That presentation illustrates how an operator's accuracy, efficiency and safety on the jobsite translate into dollars and directly affects budget.

The cost for John Deere's excavator simulator runs just under $10,000 and includes simulator stand, replica foot pedals, joysticks and simulator software (a single license). That does not include a monitor. There is a lower-cost alternative of just under $5,000 for the software itself, and it can be used with gaming joysticks/pedals sold at electronics stores. The 4WD loader runs just under $16,000 (without monitor); software-only version is just under $7,000. For more details, visit www.JohnDeere.com/simulators.

A trainee learns truck loading from Simlog's Wheel Loader Personal Simulator.

Simlog/VISTA Training

Simlog, based in Montreal, Canada, is a pioneer in developing affordable, PC-based heavy-equipment operator training simulators. The company launched its first simulators for the logging industry about 10 years ago. In 2005, it entered the construction-equipment market and introduced its PC-based excavator simulator. Since then, Simlog has added wheel loaders, off-highway trucks, mining trucks, mobile cranes, tower cranes, electric rope shovels, and drill jumbos to its simulator equipment lineup.

Distributed by VISTA Training (Waterford, Wis.), Simlog simulators are an integral part of VISTA's training program. The company starts with computer-based training (CBT) consisting of 90 to 120 minutes of "e-learning" programs on CDs and DVDs designed for people who work in construction and mining industries. Users advance at their own pace, but are required to go through the course in a specific order and are scored at the end.

From there, VISTA recommends operators advance to Simlog's Personal Simulator training. The software allows users to turn their own PC into a professional training tool and puts them at the mock controls of an excavator, wheel loader, haul truck, or other piece of equipment, at a virtual construction site. It is available in three languages — English, Spanish or French — and with SAE or backhoe-loader joystick patterns.

An inside view from the excavator cab during Simlog's Trenching and Truck Loading module shows the dirt falling into the bed of the truck.

"Today's standard PCs have more power than there was 10 years ago in a large computer room," says Rick Longstaff, president of VISTA Training. "With the help of VISTA's equipment-industry training experience, the folks at Simlog have taken and harnessed that power and created the graphics, animation and custom simulation software that several years ago would not have run on a PC."

The most affordable simulator software on the market, Simlog/VISTA's excavator simulator costs $4,000, not including joysticks, foot pedals (expected in September 2009), chair or a

monitor. But the idea is for people to be able to use their own computer and office chair to make the training more affordable. Depending on your budget, there are three controls options for the excavator simulator: PC controls (the off-the-shelf variety), replica controls (USB-ready industrial components), and OEM controls (with parts from real excavator controls).

Here is an example of how a Simlog customer, Oklahoma College of Construction, builds its own operator chair.

"A total of 12 simulation lessons of increasing difficulty make this a much better training tool than a video game," says Rick Longstaff, president of VISTA Training. "It's basically a building-block approach. You learn only the things you need to know at the time you need to know them, and you keep building upon those things. That way, the operator gains proficiency slowly and doesn't feel the need to know everything at once."

The 12 modules of excavator simulator include: Controls Familiarization, Bucket Placement, Raking the Green, Over the Moon 1 and 2, Carrier Positioning, Carrier Positioning Reverse, Truck Loading, Trench Dumping, Single Pass Digging, Trenching, Trench and Load. Within those modules there are hundreds of different trials that are variations of the task. At the end of each exercise, the simulator records key performance indicators such as execution time, bucket-fill volume, bucket angles, time spent between digging and dumping, as well as safety violations such as bucket slams, collisions and wheel slippage.

"Our software incorporates 3D graphics, sounds, and physics-based motion to realistically simulate the functionality of real equipment," says Mike Keffer, director of sales and marketing at Simlog, "including detailed modeling of elements like the engine and drive train, a detailed dashboard display inside the operator cabin, and several options to change the operator's point of view. It's also the physics of the boom, bucket and terrain. I think it's really the skills transfer that's taking place as the student 'learns by doing' on the simulator — that's the breakthrough."

Most recently, Simlog/VISTA introduced haul truck and wheel loader Personal Simulators. Featuring an advancement over the excavator simulator, they both have built-in dynamic interaction with a companion piece of equipment, Keffer says. The new products also have a more extensive array of controls with steering wheels, gear shifters and pedals — all of which plug into the computer via USBs.

"Our Wheel Loader simulator has built-in interaction with a simulated off-highway truck that is used to teach 'truck spotting' — that is, to teach correct positioning of the wheel loader so that the truck can back-up under the wheel loader bucket for proper positioning before loading," Keffer says. "Here the student must place the wheel loader in the correct position and 'call' the truck. Whereas with our excavator simulator, the built-in articulated dump truck is already in the correct position, so the student just drives up to it.

"Conversely, our off-highway truck simulator has built-in interaction with a simulated wheel loader also to teach truck spotting. With our truck simulator, the student must back up the built-in wheel loader using the side mirrors, position the truck in the correct position, and then 'call' the wheel loader. This is a tricky maneuver in real life."

The wheel loader simulator consists of eight lessons of increasing difficulty beginning with controls familiarization and concluding with a complete cycle including maneuvering, spotting a truck and then loading it. The software uses dynamic-terrain-modeling technology, and all data is tracked to allow comparison to benchmarks, according to VISTA. The commercial software license costs $6,000.

Announced at the same time, Simlog/VISTA also offer an off-highway truck and a mining truck simulator. The first pairs an 85- to 100-ton heavy hauler with a simulated wheel loader; the second is a 240-ton truck interacting with a simulated shovel. The virtual sites are modeled after real quarries and mines, and a total of six lessons take an operator from controls familiarization to a complete haul cycle. The software licenses cost $6,000 to $11,000, respectively.

After passing all the simulator exercises, VISTA recommends instructor-led training on actual machines. But with training programs incorporating simulators, trainees typically have knowledge and skills well beyond the novice, allowing this very costly — and potentially dangerous — part of the training to be minimized. For more information, visit www.simlog.com or www.vista-training.com.

Although Caterpillar, John Deere and Simlog offer slightly different technologies, controls, reporting tools and prices, they all have the same basic goals: to provide an affordable, engaging training device and to attract young operators into a construction-equipment career. Those sophisticated training tools will equip operators with the skills they need to help contractors ensure profits in the competitive bidding wars to come.

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Optional equipment may be shown.

By TOM BERG, Truck Editor

Transit Connect

Is Bigger Than It Looks

Roomy, agile and quick, this new-to-America small van is the right size for many jobs, Ford execs say

Ford Motor Co. calls this compact van a "game changer" and it could be true. After all, the first American mini-vans in the early '60s caused the demise of "panel trucks" — conventional-cab pickups with full steel bodies — that had been around for more than 30 years. One mini-van was Ford's Econoline, which evolved into today's E-series full-size vans that are now best sellers.

Painfully high fuel prices in recent years prompted Ford executives to bring its European-style Transit Connect to America. They claim that since its introduction overseas in 2003, customers in 57 countries on four continents have bought more than 600,000 of them. The Great Recession has more recently pulled down petroleum and fuel prices, but they're edging up again, and sooner or later they're likely to go back to 3 bucks a gallon or more. Then this vehicle will make immense sense.

For now the Transit Connect merely makes good sense. The TC, as I'll call it, was designed in the Old World, where many streets are narrow and crooked and gasoline and diesel have been dear for decades. It's built in Turkey, a friendly Mideast country, and it has a power train familiar to any American who's owned a front-drive sedan with a transverse four-cylinder engine and an automatic transmission.

Peppy 2-liter Duratec engine and 4-speed auto-tranny promise 22 to 25 mpg.

A TC is roughly 2 feet shorter and weighs about 1,500 pounds less than an E-150 van. The TC's high roof makes it roomier than it might look in a photograph; its cargo area measures 59 inches high by 48 inches wide by 72 inches deep, for a volume of 135.3 cubic feet. Its floor sits less than 2 feet off the pavement for easy loading and unloading, and its rear and side doors allow excellent access. With a fold-down rear seat it can carry up to five people and still a goodly amount of cargo, for a total payload of 1,600 pounds.

The TC is nimble and quick on city streets and can more than keep up with freeway traffic, though I had to put my foot into it to properly merge from on-ramps. This was during a show-and-tell event for news reporters at the Royal Oak (Mich.) Farmers Market near Detroit, one of a series of events Ford was hosting across the country.

My assigned TC was set up for a tradesman, with shelves and cabinets along the walls of its roomy rear compartment. Ford has partnered with three upfitters so buyers can specify a wide array of shelving, drawers and boxes. Or buy it bare and arrange your stuff to suit yourself.

The TC's power train — a 2-liter Duratec inline-4 and 4-speed automatic transmission — delivers 22 to 25 mpg of gasoline, Ford says. That's maybe 5 to 10 mpg better than the hefty V-8s that propel most full-size vans. Most TCs sold in Europe have a small diesel and a 5-speed manual tranny, but Americans wouldn't want them, Ford says.

In researching the feasibility of the Transit Connect here, product planners visited hundreds of business people across the country and asked them what they thought about the TC and if they could use it. Many said they'd probably buy one to complement larger trucks in their fleets because it'd be just right to haul smaller loads, especially the make-up kind that are needed because somebody forgot to take something out to a job. If half of the hun-

Tall roof and near-6-foot cargo bed allows Transit Connect to carry a lot. It has a sporty feel, but is a commercial truck from the ground up, Ford says.

Tim Horton, a kitchen and bath remodeling contractor in Royal Oak, Mich., says the TC is "the right size" to haul products and supplies for his jobs and that it looks ecologically "green." He'd probably buy a window version with a folding rear seat.

SPECIFICATIONS

Truck: 2010 Ford Transit Connect, compact high-roof van, steel unibody with sub-frames, empty weight 3,405 lbs., GVWR 5,005 lbs., wheelbase 114.6 in., overall length 180.7 in.

Engine: Duratec 2-liter (121-cu-in.), double-overhead-cam inline 4-cylinder gasoline, aluminum block, head and pistons, 136 hp @ 6,300 rpm, 128 lbs.-ft. @ 4,750 rpm

Transmission: 4-speed automatic with 1:1 3rd and 0.73:1 4th-overdrive

Suspensions: McPherson independent front, leaf-spring rear

Steering: Power rack-and-pinion, 39-foot turning circle

Brakes: Power disc front, drum rear, w/ABS

Tires & wheels: P205/65R15 on steel discs

Fuel capacity: 15.4 gallons

dreds of thousands of small business owners in America buy just one Transit Connect, Ford'll have a huge hit.

Our press contingent convoyed over streets and expressways, scooting easily through traffic and turning tightly where we had to. This TC was quick, but carried only one other guy and no cargo. However, our hosts had loaded another TC with 1,200 pounds of bagged sand, and my driving buddy and I piled in with a Ford rep — maybe 600 pounds worth of people — and we took turns driving it around the block. Now about 200 pounds over its payload rating, the TC's ride was well settled and its acceleration adequate. On a freeway it would've been sluggish but workable.

A basic TC comes as a panel van with windowless sliding side doors and rear "barn" doors with darkened glass. A buyer can keep or delete the rear glass, and can spec windows in the side doors and rear-quarter panels. The customer can also choose a windowed wagon version with a rear seat that accommodates three people and folds up to expand cargo space.

Up front is a pair of bucket seats flanking a small console that houses the shift selector and rises to form an arm rest. A businesslike instrument panel includes a speedometer, tachometer, and the usual engine-temperature and fuel gauges. A handy package shelf above the windshield holds the wireless keyboard for an on-board PC, one of the Ford Work Solutions options — a whole 'nother subject.

The small van has a sporty feel and drives that way. But it's built from the bottom up as a truck. It feels very stout, and our near-new examples were rattle-free. Ford says the Transit Connect has been rigorously tested, successfully operated overseas, and will last many years here.

With its 15.4-gallon gas tank, a Transit Connect should go about 500 miles between fill-ups, Ford says. For operations that keep trucks closer to home, sometime next year Ford will have a battery-electric version that'll go 100 miles between plug-ins. Meanwhile, if you need a bigger, heavier truck of this sort, Ford will happily sell you one of its E-vans. But if not, and with the Transit Connect's starting price of $21,475, can you afford not to check one out? CE

By MIKE ANDERSON, Senior Editor

Motor-Grader Operators Remain in Control

Manufacturers offer different solutions on how best to operate graders, leaving the choice open for blade hands considered 'the finish carpenters' among earthmoving artists

When Buying File last focused on motor graders, the impact of Caterpillar's M-Series models and their joystick controls was up for debate. The steering-wheel-removed M-Series had just been unveiled, but had yet to hit market, and what was then the latest and most revolutionary of the sector's product developments had the grader world, at the minimum, watching and wondering.

Three years later, how best for an operator to work a grader remains at the core of product offerings from all industry players. And the answer depends on the player being asked.

Earlier this year, John Deere introduced the new G Series, offering its grader users for the first time a choice of industry-standard console-mounted controls or armrest-mounted fingertip controls. If fingertip controls are specified, the operator still has a choice between using lever steering or the ever-present steering wheel.

With the electronically controlled GradePro versions of the G-Series models, an electro-hydraulic control scheme minimizes the center console, allowing operators to adjust themselves into the best position to monitor the moldboard while remaining comfortable. This, says John Deere, reflects feedback from customer advocate groups who wanted clearer sightlines to the blade without the need to constantly move around in the cab. Arraying the electronic joysticks like conventional hydraulic levers means today's operators can quickly adapt to the new controls, too, says John Deere.

Looking ahead, the market for full-sized graders is anticipating the next wave of innovation from Volvo, and new grader-family announcements are anticipated in mere months from Komatsu. According to Komatsu America's Steve Moore, grader customers can look for improved weight and power from Komatsu, as well as all-wheel-drive among features, but there's one big thing that won't change.

As part of John Deere's G-Series motor grader family, Grade Pro models such as the 672GP feature industry-standard pattern fingertip controls, located on the armrest, but also offer lever steering and a steering wheel for operators who prefer traditional means.

"There's a merit to having a steering wheel in a motor grader, and Komatsu's of that philosophy," says Moore, Komatsu's product manager, motor graders and trucks. "Our studies indicate that the joystick is not the way to go on a motor grader.

"From what I'm seeing and from all of our testing that we're doing, we believe that the conventional type is the way to go. Whether you want to do it mechanical over hydraulic as we have, or you want to go electric over hydraulic because of forces, that's debatable."

Caterpillar's 2006 unveiling of the M-Series graders culminated more than 10 years of development, always under the intent of enhancing operator experience, not negatively impacting blade hands who are universally considered the senior statesmen among operators, says Phil Newberry, market development engineer, Caterpillar's motor grader commercial team.

"We were told that the older operators would never accept the machine," says Newberry, "and they're actually quicker to accept it than anyone, and that's due to the ergonomic improvements that we made. Many of them will tell you that, after they have been in the machine working all day, they're just not worn out; they have energy at the end of their day. The intuitiveness of the controls made it a pretty easy transition, and customer acceptance in the field is phenomenal. We took great pains in making sure our control efforts provide feedback to the operator.

"There's that initial resistance just when they look in the door, but once you put them in the machine and explain it, they take right off. They come back and go, 'Heyyyy . . . that's nice,'" says Newberry. "They first look in there, and it's, 'Oh, two joysticks, no steering wheel, I'm not sure about that,' but once they enter the machine, that simply just goes away."

Making the grade

The grader market in North America is, in essence, two markets: the full-size, mostly variable-horsepower main line primarily covered by such construction-equipment cornerstone brands as Caterpillar, Volvo, John Deere, Komatsu and Case, all offering various model sizes; and the lighter, usually compact offerings from such niche brands as LeeBoy, Champion and even single-model suppliers like NorAm, Huber and Basic.

With the joystick-operated electro-hydraulic control system, the interior of the cab on Caterpillar's M-Series graders is opened up for enhanced lines of sight to the drawbar, circle and moldboard area, as well as to snow wings on machines working in winter road maintenance.

For full-size graders 130 horsepower and up, list-price increases as gathered and reported by EquipmentWatch.com may be reflective of the acceleration of new technologies for this equipment type in recent years. When compared to list prices from the 2006 Buying File on motor graders, there are double-digit percentage increases in each of the three size ranges that collectively cover from 130 to 199 horsepower. According to the most recent figures, machines in the 170- to 199-horsepower range average $290,674 — an increase of $33,429 or 13 percent from 2006.

What has also transpired since Buying File last chronicled graders is the stepping back of the North American market by Terex and New Holland, although New Holland's sister Case products remain prominent with the 800 Series. Case machines feature an articulation point in front of the cab, which provides increased visibility to the moldboard

The Cost of Ownership

Size Class	List Price	*Hourly Rate
Up to 74 horsepower	$65,000	$34.11
75 - 114 horsepower	$96,397	$42.83
115 - 129 horsepower	$178,980	$49.89
130 - 144 horsepower	$204,918	$53.74
145 - 169 horsepower	$271,386	$66.94
170 - 199 horsepower	$290,674	$74.45
200 - 249 horsepower	$325,052	$83.20
250 horsepower and up	$474,978	$122.80

* Hourly rate is the monthly ownership costs divided by 176, plus operating costs. Unit prices used in this calculation are diesel fuel at $2.20 per gallon, mechanic's wage at $46.29 per hour, and money costs at 5.625 percent.

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

Buying File: Motor Graders

Motor Grader Specifications*

Operating Model	Moldboard Weight (lb.)	Blade Side Length	Net Engine Shift (R / L)	Transmission Output (hp)	Max. Travel (Gears F / R)	Min. Turn Speeds (mph)	Radius
Laser-Grader 106-6WD	3,200	6′	n/a	22.5	Hydrostatic (1 / 1)	10 / 10	9′0″
LeeBoy 635B	7,880	8′	12″ / 12″	48	Hydrostatic (2 / 2)	8 / 8	n/a
Basic 601	6,400	8′	12″ / 12″	49.5	Hydrostatic (2 / n/a)	8 / n/a	n/a
Mauldin M406XT	7,620	8′	36″ / 36″	65	Hydrostatic (1 / 1)	10 / 10	8′3″
Huber M-850-D	9,380	9′	19.25″ / 19.25″	80	Hydrostatic (2 / 2)	16 / 16	19′6″
H-Mach FG110C Cross Blade	13,000	10′	19″ / 19″	100	Hydrostatic (2 / 2)	16 / 16	8′6″
LeeBoy 685B	15,200	10′	18″ / 18″	100	Hydrostatic (2 / 2)	n/a	n/a
Champion C60 C	12,800	10′	n/a	110	Hydrostatic (2 / 2)	20 / 20	17′6″
Champion C66 C	13,400	10′	n/a	110	Hydrostatic (2 / 2)	20 / 20	17′6″
Champion C70 C	13,050	10′	n/a	110	Hydrostatic (2 / 2)	20 / 20	21′0″
Champion C80 C	15,000	10′	n/a	110	Hydrostatic (2 / 2)	20 / 20	19′0″
Champion C86 C	15,500	10′	n/a	110	Hydrostatic (2 / 2)	20 / 20	19′0″
NorAm 65E Turbo	16,800	10′	n/a	110	Powershift (6 / 2)	24 / 9	18′9″
Champion C110 C	23,000	12′	n/a	120	Powershift (8 / 4)	27 / 20	n/a
Champion C116 C	24,000	12′	n/a	120	Powershift (8 / 4)	27 / 20	n/a
LeeBoy 785	25,300	12′	30″ / 30″	127	Powershift (6 / 3)	21 / n/a	n/a
Mauldin M413XT	13,220	10′	36″ / 36″	133	Hydrostatic (2 / 2)	17 / 17	n/a
Mauldin MG618	18,590	10′	36″ / 36″	133	Hydrostatic (2 / 2)	17 / 17	18′0″
Mauldin MG622	22,840	12′	26.75″ / 31.25″	133	Hydrostatic (2 / 2)	22 / 22	20′6″
Caterpillar 120M**	31,069	12′	26″ / 20.1″	138 - 153	Powershift (8 / 6)	27.7 / 23.5	24′6″
Case 845 DHP	29,777	12′	27″ / 21″	140 - 160	Powershift (8 / 4)	26.6 / 17.7	23′9″
New Holland G140	29,918	12′	28″ / 21″	140 - 160	Powershift (8 / 4)	26.6 / 17.7	23′9″
Komatsu GD555-3 Tier 2	30,950	12′	32.3″ / 32.3″	140 - 160	Powershift (8 / 4)	26.7 / 24.3	22′4″
John Deere 670G	33,820	12′	26.9″ / 26.9″	155 - 195	Powershift (8 / 8)	28.1 / 28.1	23′8″
Volvo G930***	34,830	12′	26.5″ / 26.5″	155 - 204	Powershift (8 / 4)	28.4 / 20	23′10″
Caterpillar 12M	32,016	12′	26″ / 20.1″	158 - 173	Powershift (8 / 6)	27.7 / 23.5	24′6″
John Deere 770G	34,730	12′	26.9″ / 26.9″	165 - 230	Powershift (8 / 8)	28.1 / 28.1	23′8″
John Deere 672G	36,060	12′	26.9″ / 26.9″	170 - 195	Powershift (8 / 8)	28.1 / 28.1	23′8″
Sany PQ160 III A	34,392	12′	n/a	173	Automatic / Hydrostatic (4 / 4)	19.6 / 19.6	25′11″
Volvo G940***	36,150	12′	26.5″ / 26.5″	175 - 225	Powershift (8 / 4)	28.4 / 20	23′10″
Komatsu GD655-3 Tier 3	33,951	12′	32.3″ / 32.3″	180 - 200	Powershift (8 / 4)	26.2 / 23.8	22′8″
Komatsu GD675-3 Tier 3	34,855	12′	32.3″ / 32.3″	180 - 200	Powershift (8 / 4)	26.2 / 23.8	22′8″
Case 865 VHP	32,265	14′	27″ / 21″	180 - 205	Powershift (8 / 4)	26.6 / 17.7	23′9″
New Holland G170	32,077	14′	28″ / 21″	180 - 205	Powershift (8 / 4)	26.6 / 17.7	23′11″
John Deere 870G	36,120	14′	26.9″ / 26.9″	180 - 255	Powershift (8 / 8)	27.7 / 27.7	23′8″
Caterpillar 140M**	33,356	12′	26″ / 20.1″	183 - 198	Powershift (8 / 6)	29 / 22.9	25′6″
Intensus GR180	33,951	13′	n/a	193	Powershift (6 / 3)	23.6 / 8.1	23′11.4″
Sany PQ190 III A	35,383	12′	n/a	193	Automatic / Hydrostatic (4 / 4)	19.6 / 19.6	25′11″
John Deere 772G	36,920	12′	26.9″ / 26.9″	194 - 245	Powershift (8 / 8)	28.1 / 28.1	23′8″
Volvo G946***	38,140	12′	26.5″ / 26.5″	195 - 242	Powershift (8 / 4)	28.4 / 20	23′10″
Volvo G960***	38,690	12′	26.5″ / 26.5″	195 - 242	Powershift (8 / 4)	28.4 / 20	23′10″
Case 885	37,950	14′	27″ / 21″	205	Powershift (8 / 4)	26.7 / 19	23′11″
New Holland G200	37,738	14′	28″ / 21″	205	Powershift (8 / 4)	26.7 / 19	23′11″
Volvo G970***	41,660	12′	26.5″ / 26.5″	210 - 250	Powershift (8 / 4)	27.4 / 19.3	25′3″
Volvo G976***	43,650	12′	26.5″ / 26.5″	210 - 265	Powershift (8 / 4)	27.4 / 19.3	25′1″
Caterpillar 160M**	35,060	14′	37.4″ / 32.2″	213 - 228	Powershift (8 / 6)	29.5 / 23.3	24′11″
John Deere 872G	38,240	14′	26.9″ / 26.9″	214 - 265	Powershift (8 / 8)	27.7 / 27.7	23′8″
Intensus GR215	36,376	14′	n/a	220	Powershift (6 / 3)	23.6 / 8.1	23′11.4″
Volvo G990***	48,720	14′	26.5″ / 26.5″	225 - 265	Powershift (8 / 4)	28.1 / 19.8	26′9″
Caterpillar 14M	47,133	14′	31.1″ / 29.1″	259 - 274	Powershift (8 / 6)	31 / 24.5	25′11″
Caterpillar 16M	57,452	16′	43.1″ / 25.6″	297 - 312	Powershift (8 / 6)	33.5 / 26.5	29′3″
Caterpillar 24M	137,692	24′	49″ / 34.3″	533	Automatic / Powershift (6 / 3)	26.7 / 25.6	40′9″

* Models listed by base horsepower, smallest to largest; ** Heavier AWD all-wheel-drive version also available; ***Automatic 11-speed version also available.
Source: Spec-Check.com Xpanded Specs (as of June / 09)

and tires. Visibility to the rear is enhanced with the slope design of the flip-up rear hood.

Volvo's current G900 Series, first rolled out in 2006, features the industry's first 11-speed transmission, providing more precise control in all speed ranges. The autoshifting feature eliminates the need for a clutch to change gears.

Komatsu has differentiated its established product offering with a dual-model transmission that allows the grader to work in direct drive, or in torque-converter mode for better control in slow travel, says Moore. "The advantage is when an operator is going into a very-slow-speed grading application where he might be under a lot of power," he says. "Say he's into a cul-de-sac where he has to go very slow; he's making a tight turn and he's got a pretty good load on his blade. Or, if he's in snowplowing, where he's got a pretty good load on the blade and he's got to slow it right down. All he has to do is lift his foot. He can control the speed with the throttle pedal, just by lifting the foot up and down rather than trying to set the right gear all the time and use the inching pedal. It's less effort and it's more control."

Their respective company's technological solutions may differ, but Caterpillar's Newberry and Komatsu's Moore agree the feel that grader operators have with the ground below them remains paramount.

"Our cab improvements greatly enhance visibility down to the working tool of the machine," says Newberry. "But even though visibility has been greatly improved, the operator feel is still such a huge issue.

"Every phase of our development, we would bring additional operators in and run them through a series of applications and download their feedback to make sure that operator input was the highest priority on our schedule. But nobody could operate the machine well with the seat-mounted controls because you lost the feedback of what the machine's attitude was. We went back to the rigid mount, which is the same as your levers would be, and that all went away."

The grader's blade hand, says Moore, is "the finishing carpenter" of equipment operators. "He's a lot more particular about his controls than I think a wheel-loader operator or anybody else is."

Volvo's G900 Series motor-grader line features a new front axle that, according to the company, helps provide the tightest-in-class turning radius for maneuverability in close quarters. In addition to 8-speed powershift models, 11-speed automatic versions are available.

With a pair of joysticks replacing as many as 15 levers and the steering wheel, Caterpillar grader operators enjoy a reduction of 78 percent in hand and wrist movement, says Newberry, adding that direct feedback he receives is consistent with the independent third-party studies that determined the number cited.

While a company grader product line update is anticipated, Komatsu continues to leverage its traditional steering-wheel-equipped offering with a unique dual-mode transmission that allows Komatsu graders to be operated in either direct-drive or torque-converter format.

"The motor grader is considered a pretty sacred machine. The complexity of the grader makes it definitely the hugest challenge to go to joystick controls," says Newberry, referring to the grader's multiple operational functions, on top of steering, directional changes, gear changes, electronic speed control and differential lock. "We've definitely demonstrated that the market will adapt and appreciate the improvements in ergonomics and, by removing all of the obstruction in front of you, it does give you a great opportunity to improve their visibility.

"I think you'll see more machines transition." We'll see. CE

JOHN DEERE

Offering Not 'One Size Fits All'

With the new six-model G-Series lineup rolled out in March, John Deere offers grader users for the first time a choice of industry-standard console-mounted controls or industry-standard armrest-mounted fingertip controls. If fingertip controls are specified, the operator still has a choice between using lever steering or the ever-present steering wheel. Other new G-Series features are cross slope control, automatic differential lock and a rearview camera. A choice of ground-engaging tools includes a front- or mid-mount scarifier, or a rear ripper/scarifier.

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CATERPILLAR

Product Line M-Braces Joysticks

In a development considered revolutionary for the motor-grader market, Caterpillar introduced the joystick-controlled M-Series family in 2006. A pair of joysticks replaces as many as 15 levers and a steering wheel, reducing hand and wrist movement of operators by 78 percent, says Caterpillar. The 10-model H-Series grader family, with conventional controls and a steering wheel, is no longer offered in North America. Six M-Series models range from the 125-horsepower 120M to the 500-horsepower 24M mining behemoth.

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VOLVO

Tight Turning Leads to Productivity

The seven-model G900 Series motor grader line boasts a new front axle that, according to Volvo, helps provide the tightest turning radius in class for improved maneuverability in close quarters. Also up front, Volvo's large bolt-on wheel spindles and large, high-capacity tapered roller bearings offer long service life. With autoshifting, no clutch is required to shift gears on the 8- and 11-speed graders, topped off by the 48,720-pound G990 with a maximum 198 horsepower. Newly available is a two-person cab option.

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KOMATSU AMERICA

Dual-Mode Transmission Drives Family

A new grader product announcement is anticipated from Komatsu later this year. Currently, the long-time participant in the grader market offers three conventional steering-wheel-equipped models: the GD555-3 at 140 to 160 horsepower; and the GD655-3 and heavier GD675-3 each at 180 to 200 horsepower. Dual-mode transmission allows Komatsu graders to be operated in either direct-drive or torque-converter format. All are available with the Komtrax fleet monitoring system, ready for either Topcon or Trimble GPS systems.

Visit ConstructionEquipment.com/info and enter 163

CASE

800 Series Boasts Visibility Features

With a new product announcement "forthcoming," Case Construction Equipment will leverage its existing three-model 800 Series motor grader line. With base output ranging 140 to 205 horsepower, the Case 845 DHP, 865 VHP and 885 graders feature an articulation point in front of the cab, which provides increased visibility to the moldboard and tires. Visibility to the rear is enhanced with the slope design of the flip-up rear hood, offering ground-level access for all major components and service points.

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CHAMPION

Compact Product Line Growing Up

Building upon a five-model offering of compact motor graders, Champion has recently added its two largest models yet — the C110 C Series and C116 C Series models at 23,500 and 24,000 pounds, respectively. The "production-class" graders fill a gap between true compact and full-size machines, says Champion's Bryan Abernathy. Powered by Cummins 6.7-liter Tier-3 engines, the new models offer the power and torque of full-size graders, he says, but retain the nimbleness of compact machines.

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VT LEEBOY

Three-Model Family Holds Its Place

Now under the VT LeeBoy corporate structure, the LeeBoy product line continues to offer two compact hydrostatically driven motor graders, the 635B and 685B with 8- and 10-foot moldboards, respectively, as well as the larger, powershift 785 with a 12-foot moldboard. Weighing in at just over 25,000 pounds, the LeeBoy 785 has 20 degrees of frame articulation. Blade side shift, up to 30 inches either way for the 785, is also available in lesser amounts on the two compact hydrostatic models.

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NORAM

Smaller Unit Offers Power Choice

The latest version of the NorAm compact motor grader, the 65E offers a 114-horsepower Caterpillar engine option in addition to the standard and likewise-Tier-3-compliant, 110-horsepower Cummins engine. The newly introduced digital electronic display and diagnostics system monitor operating systems for the powershift 65E, which weighs in at about 16,800 pounds equipped with a standard 10-foot moldboard. A blade side-shift feature provides 20 inches of movement right and 17 inches left. A 12-foot "rollaway" moldboard is optional.

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HUBER

'Simplistic Approach' Behind Grader

Described by Huber as "six machines in one," the M-850-D compact grader is available with optional attachments that transform the 9,380-pound base unit into a bulldozer, front-end loader, scarifier, side dozer and berm leveler. Featuring a 9-foot moldboard with power side-shift of 19-plus inches right and left, the diesel-powered Maintainer incorporates a "simplistic approach," says Huber. Easy to operate, the M-850-D "does not have any components that require costly, specialized equipment to diagnose and repair."

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BASIC

Solo Model Has Loader Option

As part of the Basic Equipment family of road-building equipment, Shannon Chastain Enterprises offers the compact Model 601 hydrostatic articulating grader. Driven by a 49.5-horsepower Kubota diesel engine, the Basic 601 weighs 6,400 pounds, measures 16 feet 9 inches in length and 5 feet 8 inches in width, and comes equipped with a moldboard 8 feet wide and 16 inches in height. An optional loader system, with a universal quick-attach toolbar, provides lift height of 9 feet 6 inches.

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By ANDREW BALTAZAR, Associate Editor

Light Equipment

GENIE

Genie's TM-4000 light tower, with its 30-gallon fuel tank, provides up to 60 hours of run time per tank. Steadied by quick-deploy outriggers, setting up the light tower on unlevel surfaces is straightforward, Genie says. The TM-4000 features a durable Kubota engine, galvanized mast, and standard 120V and 240V outlets. When stowed, the light tower measures 54 inches wide and 171 inches long.

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DOOSAN INFRACORE PORTABLE POWER

Equipped with a 32-horsepower Mitsubishi diesel engine and 20-kilowatt generator, Doosan's Ingersoll Rand L20 light tower, which doubles as a mobile generator, has enough power to light a wide area while simultaneously providing up to 16 kilowatts of energy to power jobsite trailers, power tools, heaters and more. The light tower consists of four 1,000-watt metal-halide lamps mounted to a telescoping mast with 360-degree rotation and a 12- to 30-foot extension. When the lighting system is not in use, the generator can output up to 80 amps at 240 volts or 160 amps at 120 volts.

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WACKER NEUSON

Wacker Neuson added the 180-kVA (prime) G 180 and 240-kVA (prime) G 240 sizes to its mobile generator line, mating Tier-3 John Deere diesels to Mecc Alte alternators. The switchable G 180 offers simple and safe selection of either three-phase or single-phase power, and its 300-gallon fuel tank provides 28 hours of runtime. The G 240, with a 400-gallon fuel tank for a runtime of 30 hours, provides three-phase power by utilizing a unique board that ensures proper voltage connection, eliminating wiring errors. Selected voltage is displayed in a sight window on the control panel.

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HONDA

The EB Series of industrial generators from Honda offers a wide range of runtimes, AC outputs, and unit sizes. The EB3000c model, which has a run time of six hours at rated load, features Honda's CycloConverter technology, which helps reduce the generator's size and weight while maintaining power. The EB3800, EB5000 and EB6500 models, with runtimes of 10.4, 8.3 and 5.3 hours, respectively, feature a 6.6-gallon fuel tank, easy-access outlet panel and an additional duplex outlet. Honda's automatic voltage regulator and auto throttle also help deliver consistent and reliable power even for sensitive equipment.

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SAVING LIVES BY DESIGN®

By MIKE ANDERSON, Senior Editor

Bobcat M-Boldens Compact Loader

Cab-forward design provides more comfort and visibility as part of smaller, more powerful equipment package

More power delivered in a smaller package, yet one that feels roomier for the operator. A dream? If so, it's one come true with the next generation of Bobcat compact loaders.

The first of Bobcat's new M-Series loaders, the 74.3-horsepower, radius-lift-path S630 skid steer and T630 compact track loader were unveiled recently in Bismarck, N.D. The vertical-lift-path S650 and T650 models follow to market later this summer.

With the M-Series loaders, a cab-forward design brings the operator closer to the attachment, providing increased visibility to the work area and beyond. A larger cab door with a lower threshold and 40-percent additional surface further enhances visibility, and makes it easier for operators to enter and exit. The new cab design, pressurized with a new one-piece seal, also features larger rear, top and side windows. New engine mounts improve isolation, decreasing vibration and sound levels, the latter cut by more than 60 percent, says Bobcat. "I don't know why you'd want to get out of the machine," says Rob Gilles, marketing manager.

The first skid steer introduced as part of Bobcat's new M-Series loaders, the S630 features the new cab-forward design that both brings the operator closer to the work area and provides the operator with better overall visibility.

In comparison to a model in Bobcat's existing K-Series family, the S630 is 6 inches shorter, yet at 2,180 pounds offers essentially the same rated operating capacity as the S220 at 2,200 pounds. The S630 weighs 7,707 pounds, compared to the S220's 7,483 pounds.

The M-Series uses a numbering system new to the Bobcat product offering. After the S and T designations for skid steers and track loaders, respectively, the first number designates the frame size, and the remaining numbers indicate performance based on a cross-section of factors. For instance, an S630 and S650 have similar frame sizes and horsepower, but the S650 has higher weight and rated operating capacity due to its vertical-lift-arm path arrangement.

With the M-Series loaders, hydraulic horsepower has been increased more than 15 percent, says Bobcat. Standard auxiliary flow on the debut machines is 23 gallons per minute; optional high flow reaches 30.5 gallons per minute. A new removable hose guide correctly routes hydraulic hoses, preventing hose wear and facilitating easier attachment changing. Other enhancements include:

- 15 to 20 percent more tractive effort for pushing and digging power;
- 50 percent more lighting output for night work;
- and built-in holes for frame-mounted counterweights to increase lifting capacity.

Selectable joystick controls are available on each of the new skid steer and compact track loader models. The T630 and T650 track models have available, as an option, the Roller Suspension system for additional operator comfort and simplified maintenance.

Powered by Kubota V3307 direct-injection, turbocharged engines, the 74.3-horsepower skid steer and track loaders are only the beginning, says Mike Fitzgerald, Bobcat loader product specialist. "The M-Series machines will be throughout the entire product line over the next two years."

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Basic Specs: Bobcat M-Series Loaders

	S630	T630	S650	T650
Operating Weight (lb.)	7,707	9,015	8,327	9,440
ROC (lb.)	2,180	2,230	2,690	2,570
Tipping Load (lb.)	4,360	6,371	5,380	7,343
Gross Engine Output (hp)	74.3	74.3	74.3	74.3
Dimensions*	6'9" (h) x 11'4" (l) x 6'2" (w)			

* Equipped with bucket

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By LARRY STEWART, Executive Editor

Grove GSK55 Hits the Highway

All-terrain crane mounted on a highway trailer promises to save money and moves fast

Manitowoc revived a long-gone crane form with the introduction of the Grove GSK55, which is basically a GMK3055 all-terrain-crane upper mounted on a specially designed on-road trailer chassis. Customers can use the road tractor of their choice to haul the 60-ton crane.

"The GSK is a more affordable option for our customers that want Grove all-terrain performance from their cranes but do not necessarily need the off-road ability that the GMK range offers," says Michael Preikschas, Manitowoc's senior product manager for all-terrain cranes. The combined cost of a GSK55 and standard tractor to pull it is expected to be about 15 percent less than a 60-ton all-terrain crane.

The crane's lifting specifications match the GMK3055, with 141 feet of main boom and swing-away jib options that extend maximum tip height to 190 feet. Outrigger footprint is virtually identical, and the working envelope of the cranes is the same. A 139.5-horsepower Iveco diesel powers the crane and outriggers.

The truck and trailer's 45-foot coupled length is a bit longer than the GMK3055, but the articulated combination has a significantly smaller turning radius to help compensate for any loss of maneuverability on site.

Gross vehicle weight for the combination is less than 46 tons if the crane is counterweighted to 12.75 tons. Counterweight can be carried in three locations on the trailer. With two tractor axles and three axles on the trailer, loadings do not exceed 10 tons on any axle.

Towing the crane with a commercial tractor has advantages, not the least of which is highway speeds faster than typical all-terrain cranes. Not only is the overall acquisition cost of the crane and tractor lower than an AT, but the commercial tires are less expensive as well. Rebuilding axles and drive components is far less costly than rebuilding all-terrain running gear. And when the transport end of the combination is worn out, it can easily be replaced with another tractor.

Of course, the GSK55 is not an all-terrain crane. The only drive axles are those on the tractor, and it rides on on-road undercarriage. It will have to be dispatched to more developed sites.

"But when the customer has the choice to send this crane, the GSK55, or an all-terrain crane, it's a good opportunity to save some money," says Preikschas.

Some users may find value in being able to drop the crane in working position on a site and use the tractor for other tasks. In that case, however, the crane will be stationary until it can be hooked up and towed again. One potential downside: The transportable nature of trailers could make the GSK55 quite desirable targets for thieves.

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Basic GSK55 Specs

Capacity	60 tons
Boom height	141 feet
Max. tip height	190 feet
Gross vehicle weight	46 tons

By LARRY STEWART, Executive Editor

World's First Hybrid Bulldozer Commands 20-Percent Premium

Green image could help keep enough work in front of the diesel-electric D7E to earn that back in less than three years

At the D7E crawler dozer's official introduction, Caterpillar representatives spoke for the first time of the electrically driven tractor as a "hybrid" bulldozer and candidly discussed the 20-percent premium it is expected to draw over the price of the D7RII it will soon replace. They promised 10 percent better hourly production at 10 to 30 percent lower fuel consumption, but it looks like owners will have to be able to book more billable hours per year with the green machine to justify its roughly $600,000 price tag.

A Cat C9.3 diesel engine (5 horsepower smaller than the 3176 in the D7RII) drives a three-phase electric generator that powers two AC-induction electric motors. Power is delivered to oval tracks through conventional differential steering and gear reductions. Key to the fuel savings is the smaller engine being rated at 1,700 rpm and restrained within a 1,450-to-1,800-rpm speed range. Total emissions reductions per hour, based on fuel efficiency and increased productivity, are estimated at 10 percent for carbon monoxide, 20 percent for oxides of nitrogen and hydrocarbons, 51 percent for particulate matter and 23 percent for carbon dioxide.

When Cat showed a D7E crawler-dozer prototype at Conexpo 2008, spokesmen stopped short of calling it a hybrid because it doesn't actually store electrical energy onboard. But an EPA Clean Air Excellence Award for the tractor, and a political climate promoting hybrid tax advantages, broadened Peoria's definition of "hybrid."

Dozers typically see little opportunity to benefit from stored electrical energy, as is used in most hybrid vehicles, but the D7E does take advantage of its duty cycle. When drive torque drops off during a direction change, fuel stops injecting into the cylinders and the motors actually drive the generator, powering all of the tractor's electrical accessories — hydraulic pumps, water pump, air conditioning, lights, etc. Engine speed is allowed to increase.

"For that brief moment, it stores energy in the flywheel," says Mike Betz, engineering manager for Caterpillar's medium tractor line. "As the machine accelerates in the opposite direction, it takes the energy back out. That is the most efficient way of storing energy for a short time."

Indeed the dozer scarcely seems to lose speed in direction changes, as Caterpillar demonstrated at the introduction event, working the D7E side-by-side with the D7RII. Control algorithms allow the electric motors to lock one track in hard turns, making them crisp with no free-wheeling on hills. And the tracks can counter rotate.

"It's really a nimble tractor," says V.J. Ropollo, loading supervisor with Dolet Hills Lignite,

Using Caterpillar's efficiency estimates, hourly costs for the D7E crawler dozer should be within about 7 percent of the D7RII's. Contractor users say it can work on much less fuel than advertised, though.

in Mansfield, La. The open-cut mine has been using one of 18 D7E pre-production units since early this year. "It maneuvers almost like a D4 or D5."

Other beta testers chalk up amazing efficiencies to the tractor's lightness of foot.

"We parked a D8T to use this D7E," says Dan Plote, president of Plote Construction from Hoffman Estates, Ill. "It's amazingly keeping up (with the D8T's production) pound for pound. And with the fuel economy, it's incredible. We're saving over 30 percent doing the exact same work — pushing the same amount of dirt every day. The operator's extremely comfortable; very happy with it compared to the D8T."

"We've had fuel efficiencies that are much higher than what they're [Caterpillar] advertising here," says Curtis Valencia, field supervisor with Crossfire LLC, a diversified heavy contractor based in Ignacio, Colo. "We've had 50-percent savings in certain applications — not heavy trench pushing. We've had much higher fuel efficiencies in reclamation and cleanup work."

Cat claims 25 percent better "dozing efficiency" — defined as volume of material moved per gallon of fuel. Assuming diesel costs $2 per gallon, Cat expects the D7E will recoup its 20-percent price premium in two and a half years, on average. Of course, that's also assuming there will be unlimited material for the D7E to move — that it will run productively at least 10 percent more hours per year than a D7RII.

The intangible that even Caterpillar may have underestimated is the importance of the word "hybrid" to customers.

"The reasons we were interested in this dozer were, one, the economics and versatility of the machine, but also its value from a marketing standpoint," Ezra Lee, president of Crossfire, said. "Our clients are the major oil companies — your Exxons, your Conocos, your Chevrons, your BPs (a sustainability oriented group). The D7E has been a great marketing tool. We have been able to sell that — we were the first in our industry to have a hybrid-technology dozer."

Cat dealers are currently taking orders for the D7E, and production is expected to begin ramping up in East Peoria in October. Production of the D7RII is planned to end in the middle of next year.

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By KATIE WEILER, Managing Editor

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H. Barber & Sons

With the ability to remove stones as small as a half-inch in diameter, the towed Turf Rake is designed for single-pass aeration and grading. The low-profile, wide-framed unit features a moldboard to first level the ground, which is then raked by spring tines mounted in offset rows. Stones and other debris are deposited onto an elevating conveyor, and then into a hopper capable of holding up to 3,800 pounds of material.

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Engineous USA

By lowering the friction in bearings and other sliding metal surfaces within internal combustion engines, the GO-15 metal-surface conditioning treatment not only improves fuel consumption for construction equipment and trucks, but reduces their carbon footprint and lowers emissions, says the manufacturer. When added to lube oil in engines, manual transmissions, differentials, hubs and power-steering systems, GO-15 bonds with the metal to create a smooth surface. It can be used with all petroleum-based and synthetic oils, and works with diesel or gas engines.

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GOMACO

IDBI dowel bar inserter is available for GOMACO's Commander III four-track concrete slipform paver. Next-generation attachment is an independent unit that allows for insertion of dowel bars behind that paver. It is powered by a 91-horsepower Cat C4.4 Tier 3 diesel, which means no power is needed from the Commander engine. Bolted to the frame, the attachment's only connection to the paver is the CAN cable for machine automation, which allows the two systems to communicate.

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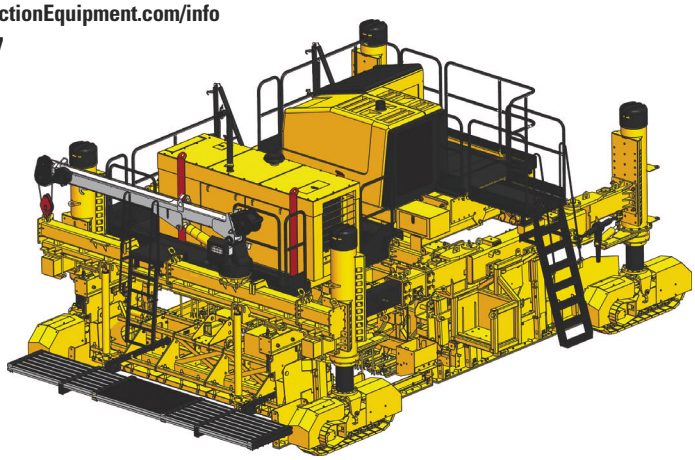

Nye Manufacturing

Originally conceived for ripping shale in a non-blasting region of the Canadian Maritimes, MOAR excavator attachments are built with additional steel plates, from which the found weight adds to the carrier's downward force for increased material penetration. MOAR models, in both quick-coupler and pin-grabber designs, are available for excavators ranging 15 to 100 metric tons in operating weight.

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Paladin

Available with digging depths of 30 or 36 inches as measured at a working angle of 65 degrees, the three-point, rear-mounted Bradco 330 trencher attachment from Paladin is built for hydrostatic tractors with PTO ratings ranging 15 to 30 horsepower. The PTO shaft drive has an automatic slip clutch for overload protection. The Category-1 trencher attachment is compatible with Model 615 chains to support a variety of soil types and conditions.

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Honda

New generation V-Twin general-purpose diesel includes six models: GX630, GX660, GX690 (shown), GXV630, GXV660 and GXV690. All are available in horizontal or vertical shaft configurations. All will meet the 2011 EPA regulations for emissions without a catalyst, the company says. Cooling has been improved with a 36-blade, low-noise cooling fan and an integrated cylinder and head, which eliminates the head gasket.

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Miller Electric

New Wildcat 200 welder/generator from Miller Electric produces 6,500 watts of peak generator power and 200-amp DC stick and TIG welding output. Fully enclosed case protects the engine and internal welding components. Miller positions the unit as lighter and smaller than competitors, which it says increases work-truck storage space. It is powered by a 14-horsepower Subaru engine that carries a three-year warranty. The unit has a three-year warranty on the generator and welder, too.

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Paladin

Paladin's WSP24 walk-behind sweeper features a 24-inch-wide by 14-inch-deep brush for quick cleaning in large areas. The sweeper's self-propelling functionality facilitates operation, and the 350-rpm brush speed sweeps large accumulations of dirt. According to Paladin, the WSP24 is ideal for sidewalk sweeping, snow removal, turf cleanup, barn cleaning, in addition to other applications.

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Intergis

Kuva configurable wireless asset-tracking device from Intergis uses GPS/GSM system technology. Easily attached to a machine, the device provides location, time/date, and motion data transmitted to a remote server. Users track transmissions via a web-based mapping or satellite imagery application. Data can be integrated into logistics-management technologies. Proprietary software allows users to select reporting frequency.

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Double D Mfg.

Available in widths of 6 or 8 feet for attachment to a wide range of skid steers, the SS Series box scraper from Double D comes standard with GPS or laser mounting brackets to accommodate the use of a single- or dual-mast electronic grading system. The box scraper features two Prince hydraulic cylinders, adjustable and replaceable side cutter blades, and rear stabilizing wheels. The rear-facing grade blade allows the skid steer operator to perform finish grading tasks in reverse.

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Doosan Infracore Portable Power

Blackhawk MVS-6 Mobile Video Surveillance allows remote monitoring of jobsites or other outdoor areas. The self-powered unit combines solar and diesel technology into a hybrid power system that provides up to six months of uninterrupted operation. Blackhawk can be remotely operated, using software that connects the user to the system's day-or-night-imaging camera and a 40 gigabyte DVR via a wireless connection.

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Double D

A remote-controlled seeder attachment is now available as an add-on to Double D Mfg.'s Tuff Man leveling scrapers. This allows the machine operator to control both power to the towed implement itself and the seeding width of 6 to 18 feet. In a single pass, a single operator can now scarify the soil up to 6 inches deep, level the work area, and both spread and incorporate the seed.

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Trimble

The Spectra Precision Laser LR20 receiver for elevation and depth grade control was designed for small construction equipment, such as mini excavators, backhoe loaders, and small dozers. Without the need for a grade checker, small equipment equipped with the LR20 receiver can achieve tighter tolerances, enabling them to dig simple ditches to sloping trenches. The receiver can be easily moved from machine to machine, making it ideal for a variety of applications.

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Michelin

Michelin expanded its line of wide, single tires to include on- and off-road applications with the Michelin X One XZY3 tire. It is an all-position radial designed for weight and fuel savings in vocational operations. The maker says the rubber compound for the XZY3 was selected to maximize chip and cut resistance and complement the long-life tread design and its 23/32 original tread depth. Michelin made the tire's contact patch flat and stable to reduce irregular wear.

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Stone

The Stone Screed Bull hand-held vibrating power screed is powered by a four-cycle Honda engine, which drives a patented extruded aluminum screed board with equilateral triangle geometry. The geometry of the board generates dual horizontal and vertical vibration, allowing the operator to compact and cut concrete at once working in 2- to 9-inch slumps. The VSB80 model handles boards to 16 feet, yet only weighs 32 pounds.

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Toro

Toro offers a 4-foot trencher boom attachment for the TRX-19 dedicated trencher or any Toro Dingo compact utility loader that has one of two trencher attachments. The boom option enables operators to install utility lines at depths of more than 42 inches. Several chain types are available for the 4-foot boom in four-pitch soil or combo tooth combinations. Depending on which chain type, a 4- or 6-inch-wide trench can be made.

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Leica Geosystems

PowerGrade grade control system can be move from machine to machine, simply by lifting the control panel off one machine and snapping into place on another. The unit uses the PowerSnap docking station, which retains machine-specific settings. Fully waterproof and designed for construction environments, the sealed unit has an intuitive color graphic display with flexible system configurations, says the company.

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Jump Start Operators With Virtual Training

Despite today's economy and unemployment in the construction industry, a labor shortage of trained operators and technicians lurks around the corner. The American Recovery and Reinvestment Act promises $787 billion for making improvements to our infrastructure and roads, but do we have the manpower and expertise to run and maintain the equipment necessary to build those projects?

The answer remains to be seen. But manufacturers are investing a lot of money to ensure that we do. Caterpillar, John Deere and Simlog have developed PC-based equipment simulators for operator-training purposes. Programs are designed for excavators, wheel loaders, haul trucks, motor graders, scrapers and more.

Watch demonstrations from Caterpillar, John Deere and Simlog's virtual-training programs at ConstructionEquipment.com/Digest.

Latest Big Iron Posts by CE Editors

- Rod Sutton lists five tips on how to produce in-house diesel.
- Larry Stewart asks: "Is Caterpillar's D7E hybrid bulldozer worth 20% more?"
- Mike Anderson shares his experience of being interviewed by an NBC affiliate at a recent Bobcat event.

Bobcat Demos M-Series Machines

At a media event in early June, Bobcat took the wraps off its new M-Series loaders and excavators, and *Construction Equipment* senior editor Mike Anderson was there to get a first look at the S650 skid steer loader, E60 excavator, and E35 mini excavator.

Watch Bobcat's new machines at ConstructionEquipment.com/Digest.

Transformers Villain Merges Heavy Equipment

What do you get when you combine a hydraulic mining excavator, wheel loader, dump truck, cement mixer, truss crane and bulldozer? His name is Devastator, the largest and most powerful robot in this summer's blockbuster movie Transformers: Revenge of the Fallen.

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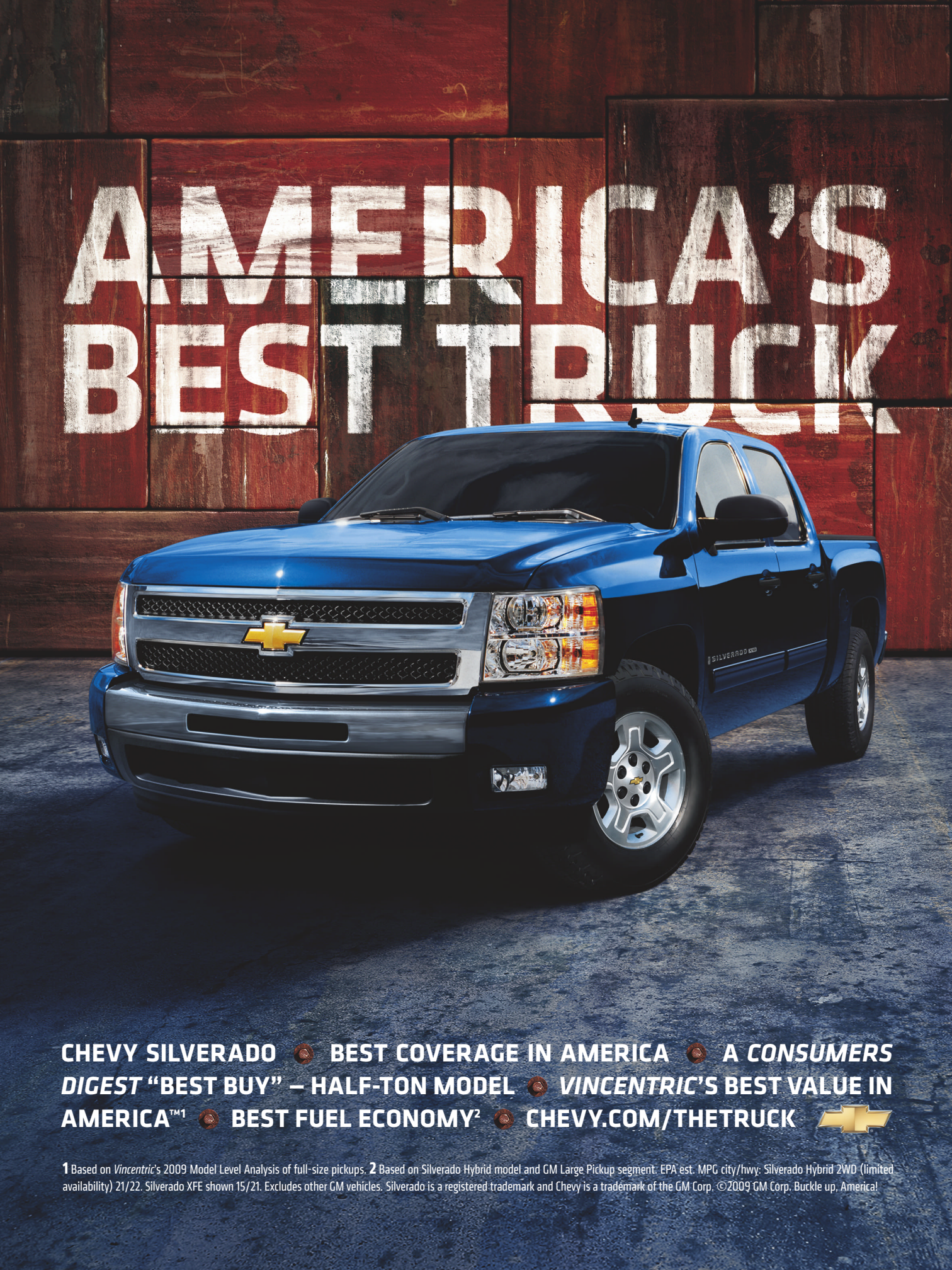

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