



50 Diesel-electric hybrid
makes a run



19 Inside:
Exclusive Annual
Report & Forecast



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Conexpo-Con/Agg Product Preview

Have a look at 21 machines
slated to be on display
p. 42

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Cover photo supplied by GOMACO

FEATURES

RUNNING GREEN

32 Breathing Easier with Aftertreatment

Although engineers have been extremely successful at reducing the volume of particulate matter (PM) and oxides of nitrogen (NOx) that exit a diesel engine's cylinders, federal regulations continue to demand even cleaner exhaust stacks. To that end, most 2007-model, heavy-duty, on-highway diesels are equipped with a diesel particulate filter, which removes PM from exhaust gases exiting the cylinders. Cleaning the engine's exhaust after it leaves the cylinders is "aftertreatment," and it supplements the engine's "in-cylinder" pollution controls. The technique of aftertreatment likely will be used to meet future EPA regulations for NOx, and it holds promise, too, for reducing PM and NOx in the exhausts of older diesels. Senior Editor Walt Moore's report reviews the basics of aftertreatment, as it applies to new diesels — and to existing diesels as a retrofit possibility.



COVER STORY: SNEAK PEEK

42 Your Exclusive Preview of Conexpo-Con/Agg 2008 Innovations

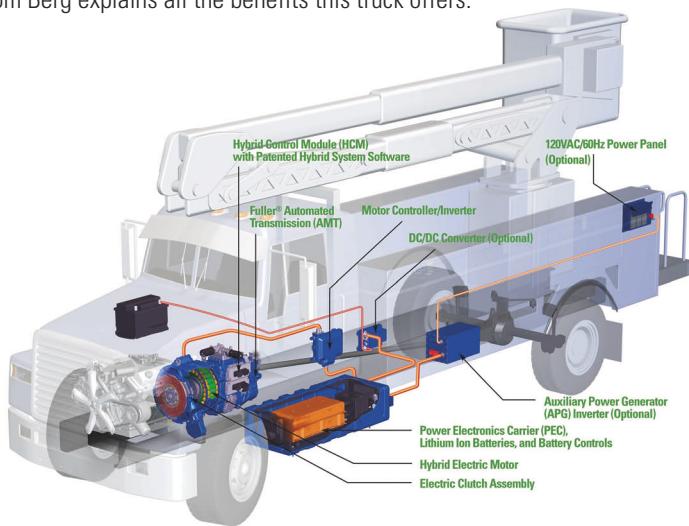
Enjoy the first look at some of the inventions, redesigns, upgrades, and fresh competitors that will fill nearly 50 acres at the Las Vegas Convention Center from March 11-15, 2008.

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HANDS-ON TRUCKING

50 Kenworth-Eaton Hybrid Makes Clean Deliveries

With diesel fuel costing around \$3.50 per gallon and probably going higher, is it time to be looking at hybrid-drive trucks? If a hybrid can cut 35 percent off your fuel bill, as this Kenworth-Eaton vehicle is doing for its owner in Seattle, Wash., is it something you'd consider? Sure, you might say — after somebody else wrings out the bugs, and the upfront cost of these contraptions comes down. Tom Berg explains all the benefits this truck offers.



BUYING FILE

56 Curb Your Enthusiasm?

Absolutely not, given the attention manufacturers are giving their curb-and-gutter machines. In what could be termed a maturation of the product type, the curb-and-gutter paving machine is being offered with more capabilities and options seemingly every time a new or updated model is introduced.



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front-steer only curb and gutter machine.

Bridge deck construction has been getting a lot of media attention and we have devoted 900 square feet (84 m²) of our booths to show you why more bridge builders are turning to GOMACO. You'll see what's new with our C-450, and the C-750 cylinder finisher that can pave up to 156 feet (47.5 meters) wide.

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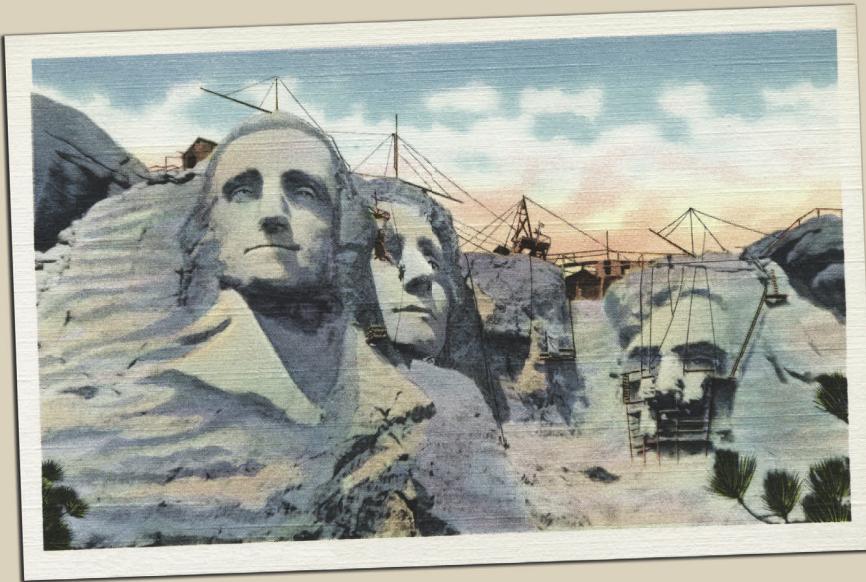
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Reign of Uncertainty

After we published our first installment of Running Green last year, the correspondence began. Readers recognize their world is about to change, and they are facing anxiety and uncertainty.

In fairness, the tone isn't entirely bleak. Some fleet managers have begun to modernize their fleets and improve overall emissions. As we've said, environmental stewardship is a noble and right goal; no one is arguing against clean air. Some fleets have anticipated where the Environmental Protection Agency and others were heading, and they've determined the financial burden of attaining emissions management needs to be spread out over time.

But such is not the norm. Most fleet managers are realizing they now have a new area of management over which they need to gain mastery.

One area of technology that fleet managers will need to master is aftertreatment devices. New on-highway trucks have been re-engineered to accommodate such aftertreatment devices. Off-road machines will face similar challenges in 2010.

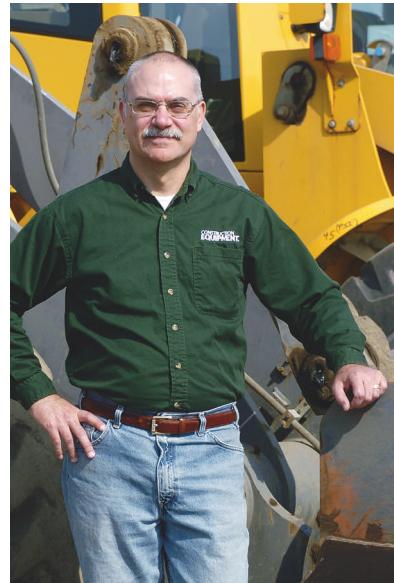
But retrofitting aftertreatment devices is also an option for reducing emissions in existing machines. As senior editor Walt Moore researched these devices for his article in this month's issue, it became clear there is much to understand. His primer on aftertreatment begins on page 32.

Those involved in this emerging endeavor of reducing overall fleet emissions, both on the supply and user side, acknowledge that no one-size-fits-all solutions exist. Each fleet, to some extent, will need to address emissions management individually. Each fleet will need to evaluate if and how aftertreatment will be implemented; each fleet will need to determine how and when to integrate new machines into their mix. The uncertainty will probably build some more before an equipment manager determines the best solutions for his or her fleet.

We at *Construction Equipment* intend to provide as much information as possible to enable equipment managers to make the best decisions. We produced a webinar in partnership with the Association of Equipment Management Professionals that addresses emissions management. If you weren't able to view it live earlier this month, it is archived for on-demand viewing. We encourage you to investigate.

We also welcome your continued conversation with this magazine. Let us know the challenges and the successes your fleet is experiencing in regards to emissions management.

Rod



Rod Sutton, Editor in Chief

We welcome your comments.

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MARKET WATCH

By KATIE WEILER, Managing Editor

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Volvo

Volvo offers purpose-built machines designed for handling pipe in such applications as the on-shore gas and oil industries. Models PL4611C, PL4608C, PL2904C, PL7015C and PL2102C range in lift capacity from 20 to 150 metric tons, provide boom lengths from 30 to 38 feet, and are said to provide 360-degree swing with full lifting performance and functionality at all radius positions.

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Wacker

CRT 36 ride-on trowel series is available in a 25- and 24-horsepower version. CRT 36-25 is powered by a Wacker engine; CRT 36-24A by a Honda. Also new to this series is an integrated wheel kit option, factory installed, that allows for easy transport around a jobsite. When the 36-inch machine is in operation, wheels tuck underneath and do not obstruct the operator's view. One person can raise and lower the wheels by a single jack. The series provides blade speeds from 20 to 165 rpm.

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Komatsu

The new vibrating grizzly feeder in the BR580JG-1 mobile jaw crusher moves material elliptically to separate and feed it evenly into the new KCJ4430 jaw, which features a load-pre-setting semiautomatic feeder. Komatsu says the two systems substantially increase the crushers output. The company also says that even with routine wear on both plates, adjusting the opening of the automatic discharge system's port is a one-touch operation. The unit weighs 108,000 to 112,440 pounds.

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Market Watch

IMT

IMT's largest mechanics truck can accommodate the new 8025 crane, rated at 80,000 foot-pounds. The Dominator IV features a patented inverted A-frame floor structure that reduces the weight of the body and allows the truck to haul more payload.

Other upgrades include three-point door latches, rain eaves over the compartment doors, shelf hanger bracket system, multi-task workbench bumper, and single-hand tailgate operation.



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New Holland Construction

New Holland has a new cab for its Super Boom skid-steer loaders (models L150 through L190) and for its compact track loaders (models C175, C185 and C190). Cab features include a back-lighted instrument panel, large contoured armrests, sound-absorbing trim material, and an optional sound-attenuating package. Enclosed versions of the cab feature a large convex-glass door that opens 90 degrees and easily removable side windows.



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Fontaine

Fontaine's new lowbed extendable trailer, the Renegade LXT40, expands up to 69 feet from its 48-foot closed position. Features include 100-ksi minimum-yield steel main beam flanges with 50,000-pound webs and fifth-wheel guide rollers on the gooseneck.

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► Case

Case now supplies for field installation two optional "weigh-on-the-lift" scale systems for its 521, 621, 721, 821 and 921 wheel loaders.

The two systems are the Load Log 800 and Load Log 8000 from Loup Electronics. According to Case, advantages of an on-board weighing system include consistent, proper loading of trucks; fewer visits to the weigh scale; greater safety resulting from eliminating unnecessary vehicle movements; and accurate recordkeeping.

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► Grove

The five-axle, all-terrain GMK5115 has maximum capacity of 115 tons and a 197-foot, seven-section main boom. It has Grove's Megaform boom and Twin-Lock pinning system. It can reach tip heights of 272 feet with its hydraulic luffing bi-fold swing-away jib. In "Taxi" mode, the crane has axle weights just over 13 tons, carries 15 tons of counterweight and a 33/56-foot swingaway jib when fitted with 16.00 R25 tires.

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► Link-Belt

The HTC-8675 Series II telescopic-boom truck crane has a rated lift capacity of 75 tons and is fitted with a 127-foot telescopic boom that employs Link-Belt's latching technology. The boom has four extension modes (EM1-EM4) that assist in best configuring the boom for specific lifts.

Available as options are a two-piece,

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Market Watch

► Bron

Described as an economical way to comply with local no-burn policies, the purpose-built Bron 400 self-propelled mulcher combines a Cat engine with hydrostatic drive to deliver the power and control required for seismic line, right-of-way maintenance, and land-clearing operations. Available in a wide range of models, mulcher units manufactured by RWF Bron come with a choice of cutting-head attachments to suit assorted applications.

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Astec

Model DD-9104 horizontal directional drill is targeted for the water and sewer market. Powered by a Tier III Caterpillar C6.6 diesel, the drill delivers 230 horsepower. Pinion and gear drive with infinitely variable torque provides 13,600 ft.-lbs. of rotary torque at a maximum speed of 150 rpm. Maximum thrust/pullback is 90,000 pounds, with a rack-and-pinion carriage system. Carriage speed is up to 120 fpm.

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► Caterpillar

The largest wheel dozer in the Caterpillar line, the 854, has been upgraded to the K-Series with a C32 engine, rated at 800 net horsepower with Cat's ACERT technology. The 12-cylinder engine has a V configuration with displacement of 1,960 cubic inches. Designed for mining and bulk materials handling, the 217,128-pound 854K boasts blade capacities from 33.1 to 58.2 cubic yards. A new modular radiator provides improved heat transfer capabilities, thanks to a copper core.

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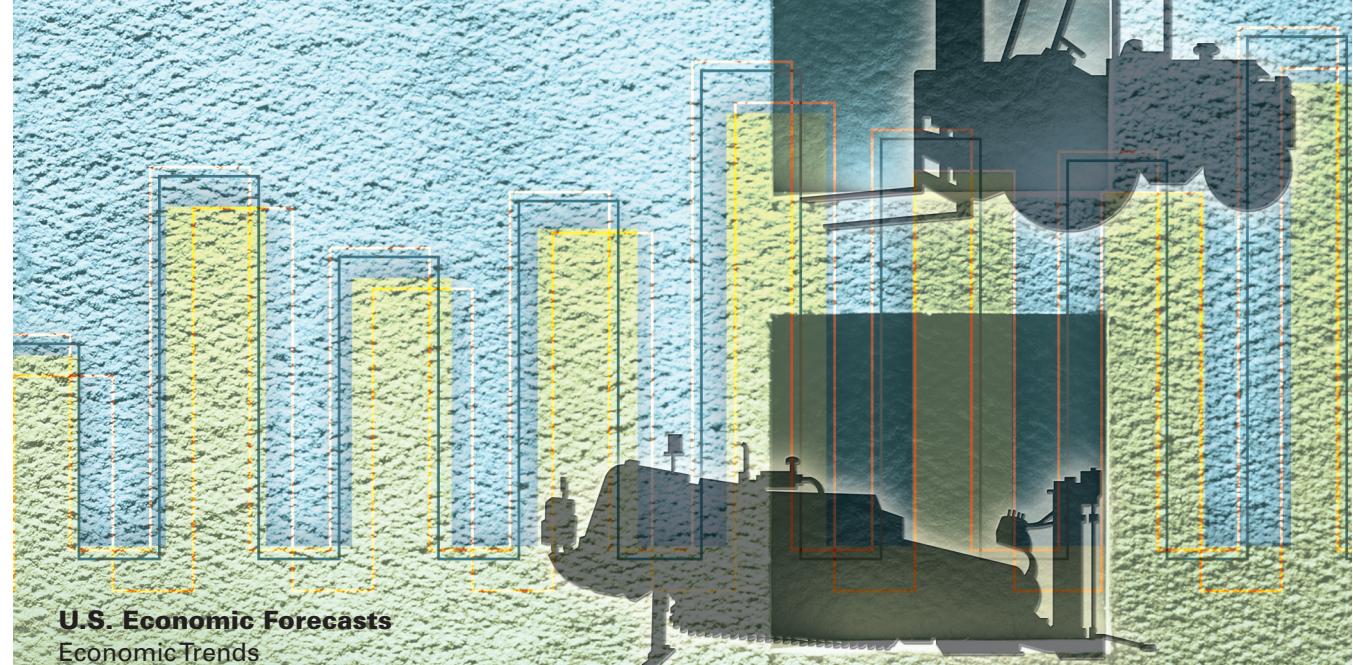
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2008 ANNUAL REPORT & FORECAST



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Our troops overseas are providing a vital service, so we're not only providing equipment that meets their needs – we're also providing moral support. We back multiple military activities throughout the year, and this past December, we supplied care packages to our troops to make their holidays just a little bit warmer.

At Case Construction Equipment, we build our business around much more than great equipment. We build it around great people and the ideals that help build a better world.

Mood Swing

By **ROD SUTTON**, Editor in Chief

The year was percolating along, adjusting to increasing concern about the housing market, when the sub-prime mortgage-lending mess broke. Although slight at first, concern within the housing market grew as time revealed a deeper problem. Housing markets became more pessimistic; by the end of the year, the quiet strength of the general economy was being called into question, too. How quickly the mood shifted.

Equipment managers in every vocation surveyed by *Construction Equipment* for this year's Annual Report & Forecast reflected the economic slowdown in their responses to our questionnaire on business conditions and fleet management. With continued uncertainty in the housing markets, managers' outlooks for 2008 are perhaps a bit more conservative than they might have been. Nonetheless, overall construction spending should grow this year and fuel a solid year for most vocations operating construction equipment.

Welcome to *Construction Equipment*/Case Construction Equipment's 2008 Annual Report & Forecast. *Construction Equipment* has reported on the state of the economy and the industry with these annual reports for 25 years.

As in previous years, we lead off this exclusive and in-depth report with an overview of the country's economic status by Reed Business Information's construction economist, Jim Haughey. He also

updates the prospects for the various construction markets that affect construction-equipment users.

Following Haughey's analysis, we report on the largest exclusive survey in the industry of equipment owners and managers, as well as those companies that supply construction equipment: the distributors and rental dealers.

We are pleased, once again, to partner with the industry associations serving those suppliers. The American Rental Association and the Associated Equipment Distributors provided access to their members, who were surveyed for this report. We are grateful for the assistance from both of these fine organizations.

We mailed the questionnaires in September 2007. About 10,000 were mailed, and we garnered a net response rate of 22 percent.

This special report contains the results from these surveys. *Construction Equipment* is pleased to publish it as a service to the industry. To those whose participation made the 2008 Annual Report & Forecast a success, we thank you.

We also thank Case Construction Equipment, sponsor of the Annual Report & Forecast for the fifth consecutive year. Case is a full-line manufacturer of earthmoving equipment, and its support of this project has allowed us to publish substantial amounts of data and analysis for your use.

This report is also available online at ConstructionEquipment.com.



New Residential Plummets, Plateaus

By **JIM HAUGHEY**, Director of Economics, Reed Business Information

Residential construction put the brakes on 2007, forcing a 1.8-percent drop in total construction spending that was forecast to grow 5.2 percent. The decline in housing starts was twice as large as expected before the year began, caused by underestimated fraud in the residential mortgage market and underestimated share of homes bought with little or no downpayment and initially discounted mortgage rates.

This year, the two-year housing recession will end and begin to recover. Spending for both heavy and nonresidential building projects will increase

more than 10 percent for the third consecutive year in 2008. The four-year acceleration of growth in public construction will begin to ebb, but private construction spending will resume growing after a steep two-year decline. All told, total construction spending should grow 7.1 percent this year.

Contractors and their suppliers will be operating in the second year of subpar economic growth in 2008, which means better pricing and availability for nonconstruction purchases such as office supplies. But supply conditions will tighten for specialized materials, labor and construction services during

the third year of strong growth in nonresidential construction. Economic growth and especially the expansion of construction spending will accelerate over the course of 2008.

The brief spike in interest rates for mortgages and other construction loans last summer is now largely reversed. Although rates will not be a major constraint on construction activity, most financially marginal jumbo home and commercial mortgage applicants will not obtain loans. Much of this would have happened anyway as lenders increase scrutiny of income statements and balance sheets late in the building

2008 Construction Spending Outlook

Spending to Grow 7.1%

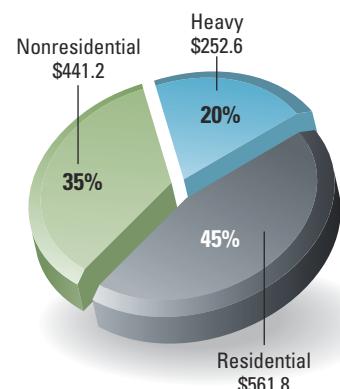
	\$ Bil. 2008	Annual % Change		
		2006	2007	2008
Total Construction Spending	\$1,255.6	5.6%	-1.8%	7.1%
Residential, new	\$376.3	-1.7%	-21.9%	4.0%
Residential improvements	\$185.5	7.4%	1.4%	5.8%
Nonresidential	\$441.2	12.7%	16.5%	10.7%
Nonbuilding	\$252.6	11.7%	11.6%	11.7%

Source: U.S. Commerce Department

Total construction spending will increase 7.1 percent in 2008 after a 1.8-percent fall in 2007, the first in more than a decade. The pace of growth will accelerate during the year. Subtracting expected project cost inflation, construction spending will expand slightly faster than the rest of the economy. Monthly construction spending fell 5 percent from a peak level in March 2006 to about the end of 2007, due entirely to the collapse of the housing market. Resumed growth in total construction begins at the end of 2007 when the slide in residential jobsite activity nears the end for this housing cycle.

Total Spending for 2008

(current \$, bil.)

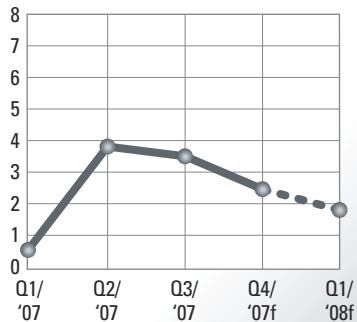


Forecasts: Reed Construction Data

The residential share of total construction spending will drop below 45 percent in 2008 from an unusually high peak share of 57 percent in 2005. The residential share will move back toward 50 percent in the following few years.

Gross Domestic Product

(annual % change, inflation-adjusted)



2007 Estimate: 2.1%

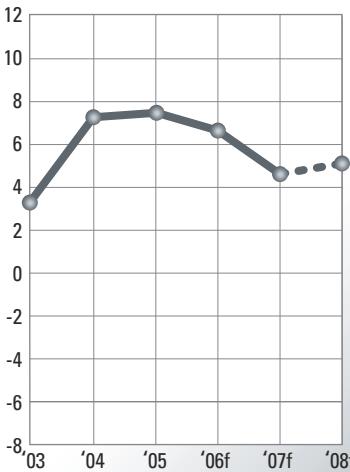
2008 Forecast: 2.6%

Source: U.S. Commerce Department

Forecasts: Reed Construction Data

Business Investment

(annual % change, inflation-adjusted)

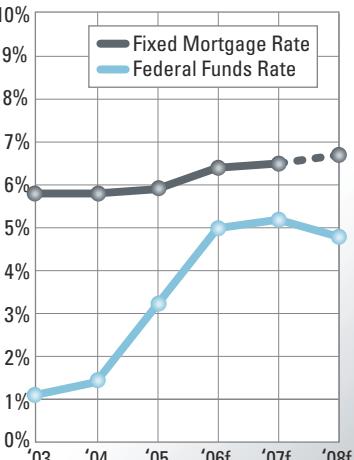


Source: U.S. Commerce Department

Forecasts: Reed Construction Data

Interest Rates

(Avg. annual rates, fixed mortgages and federal funds)



Sources: Freddie Mac, Federal Reserve Board

Forecasts: Reed Construction Data

U.S. gross domestic product is expected to increase 2.6 percent in 2008. Growth will increase progressively from around 2.5 percent in late 2007 to about 3 percent by the end of 2008. This will be the second year of subpar economic growth. As a result, expect unemployment to rise toward 5.0 percent and "core" inflation to stay near 2 percent. Exports and business investment will be the fastest-growing sectors with consumer spending slightly lagging overall GDP growth. Exports are being driven by the depreciating U.S. dollar and still-strong economic growth elsewhere in the world.

Business investment spending will expand 5.2 percent in 2008, about twice as fast as the whole economy. The pace of investment spending will increase over the year and continue into 2009. The 2008 increase will be two points less than in the 2004-06 period of above-average economic growth, but slightly above the 2007 gain. The leading growth areas will be commercial buildings; equipment for machinery and technology factories; private infrastructure, especially power, transportation and telecommunications; and possibly motor vehicles.

cycle, but they are still concerned about the quality of real estate assets: both the asset value if a sale is necessary and the borrowers' ability to repay the loan. Several brief episodes of credit-rate spikes and shortage of lendable funds are possible next year in the residential and commercial markets.

Short-term changes in financial markets do not impact public-construction spending. Public facility managers have their funding committed well before construction begins. Financial markets would affect public activity only if the problems spread to the broader economy. The Federal Reserve Board acted quickly enough to prevent that last summer.

The key funding sources for public construction are all now stronger than average, but they will slip back to average over the next two years. State budget

balances, including budget stabilization funds, were an above-average 8.2 percent of annual expenditures at the end of the fiscal year ending June 20, 2007. This was down from a very high 10.9 percent a year earlier. Slower growth in tax receipts and rising spending will cut the balance to an estimated 6.0 percent next June, which is about average. This is still high enough to support an above-average growth in state construction spending through 2008.

States are again underestimating tax receipts for the fiscal year ending in June. Initial spending plans incorporated only 1 percent real growth, after a 5.3-percent gain over the prior year. More spending, some for construction, will be added next spring when the revenue underestimate become apparent.

Similarly, key funding sources for in-

stitutional buildings are currently strong. Rapidly rising equity prices have boosted investment fund returns. In mid-October, the Dow Jones Industrial Average was 17 percent higher than a year earlier. Taxpayers are passing a larger share of bond issues in an economy with jobs and income still growing.

Hotels were the fastest-growing project type in 2007 with an estimated 61.6 percent increase in construction spending. Hotels will be the hottest project type again in 2008, although spending growth will fall to 21.8 percent. The value of new hotel starts rose 41 percent in the first eight months of 2007 compared to the same period in 2006, according to Reed Construction Data. One factor is the boost from the development of resort and casino hotels that are themselves destinations.



Heavy Construction Trends & Outlook

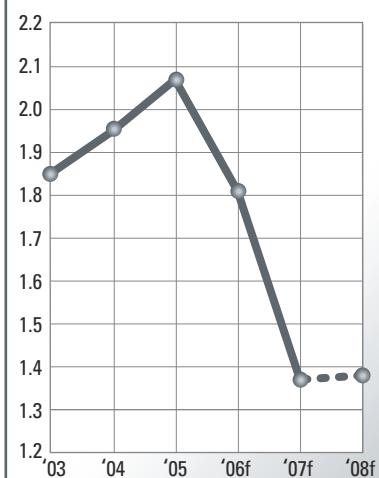
	\$ Bil. 2008	Annual % Change		
		2006	2007	2008
Total Heavy Construction	\$252.6	11.7%	11.6%	11.7%
Highways & Streets	\$82.4	12.2%	6.2%	8.3%
Power	\$56.7	10.9%	21.7%	18.5%
Transportation	\$36.2	8.1%	12.8%	19.0%
Communication	\$28.7	14.4%	20.0%	10.3%
Water & Sewer	\$42.7	12.4%	6.2%	6.0%
Conservation & Development	\$5.9	18.5%	5.4%	5.4%

Source: U.S. Commerce Department

Forecasts: Reed Construction Data

Heavy construction spending will increase 11.7 percent in 2008 — about the same as in the previous two years — but more than half of the gain will be due to higher cost, especially for cement, metals, energy-based products and, increasingly, skilled labor. Much of the added construction spending in 2008 will be for private power and transportation facilities financed by recent record high corporate profits.

Housing Starts (units, millions)



Source: U.S. Commerce Department

Forecasts: Reed Construction Data

Nonresidential Construction Trends & Outlook

	\$ Bil. 2008	Annual % Change		
		2006	2007	2008
Total Nonresidential	\$441.2	12.7%	16.5%	10.7%
Education	\$106.0	8.2%	13.7%	8.2%
Commercial	\$91.4	7.5%	14.1%	6.0%
Office	\$72.8	19.1%	19.3%	11.8%
Health Care	\$53.6	14.9%	15.7%	17.1%
Amusement & Recreation	\$23.0	19.3%	10.4%	14.5%
Manufacturing	\$39.3	14.5%	6.5%	7.4%
Lodging	\$35.5	40.6%	61.6%	21.8%
Public Safety	\$11.5	7.2%	28.3%	14.8%
Religious	\$8.2	-0.6%	-1.7%	8.7%

Source: U.S. Commerce Department

Forecasts: Reed Construction Data

Nonresidential construction spending will increase 10.7 percent in 2008 following the 13-percent rise in the value of new project starts in 2007. 2008 will be the fifth year of rising construction spending with a further rise likely in 2009. Casino and resort hotels, large shopping malls, and nursing homes/assisted-living facilities are the fastest-growing markets.

Construction spending for nursing home/assisted living facilities jumped 21 percent year-to-date through August. Expect a larger gain this year based on the 59-percent rise in the value of construction starts over the same period. Privatization and industry consolidation have opened up access to new sources of capital and set off a building boom.

Highway-construction spending increased only 6.2 percent in 2007 — about

half of the gain in 2006 — and not enough to cover project cost increases. Credit the weak spending to Highway Trust Fund problems. High prices cut the volume of fuel sales and thus cut tax receipts. The forecast for 2008 assumes that Congress and many state legislatures will add to their highway funds with higher fuel taxes or general-fund tax receipts. But they will not do this fast enough to prevent more project delays

Housing starts have been declining for more than 18 months but are now near the bottom. Expect a slow recovery to begin this winter, but the housing market will remain depressed for several more years. Only about 40 percent of the peak-to-trough decline will be recovered by the end of 2009. New home sales are being restrained by a surplus of two million existing homes for sale, the belief by prospective homebuyers that home prices will fall further, and the virtual shutdown of the adjustable rate, subprime mortgage market. Housing starts have already begun rising in local markets that missed the 2004-05 boom and the 2006-07 bust. The housing recovery will be delayed until late 2008 or into 2009 in the boom/bust markets in California, Arizona, Nevada and Florida.

and cancellations. Expect highway spending to increase 8.3 percent with most of the gain going to cover higher costs.

Regionally, heavy construction will expand rapidly in the West and the Northeast due to additional public funding. Growth in nonresidential building work will be weak in the Northeast, where project starts have already begun to slip lower. Precarious public finances in the industrial Great Lakes may force spending cuts. Large public budget reserves in the Northeastern, Plains and Southwestern states may permit supplemental spending appropriations.

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Let's Try Again

By **ROD SUTTON**, Editor in Chief

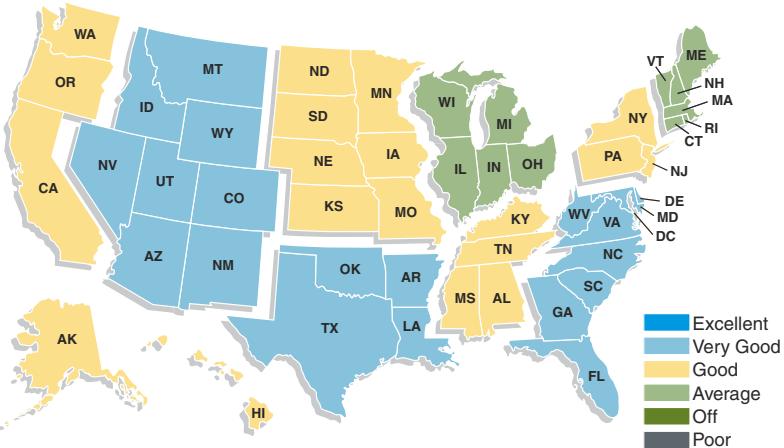
Contractors anticipated the slowing residential market last year, but nobody expected the scope of 2007's decline. Perhaps because of the history contractors have for being conservative in their forecasts, the business rating was right on forecast last year. Contractors reported a "good" year in 2007.

This year's forecast may reflect a degree of uncertainty as to how the sub-prime mess in residential housing will affect overall construction markets, as well as the economy as a whole. Although still forecasting a "good" business year for 2008, contractors are rating it slightly lower than 2007.

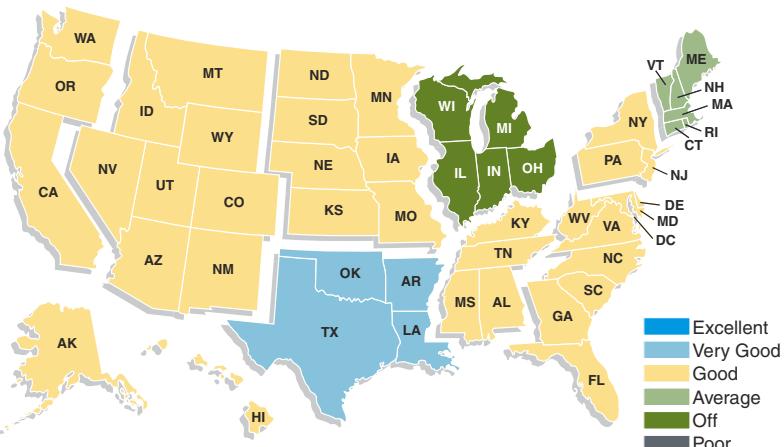
We ask contractors to identify themselves by vocation, whether highway/heavy, building or both (diversified). Each rated the 2007 business year about the same, with building contractors coming in slightly lower. Although we don't split building contractors into residential and nonresidential, there can be little doubt that the housing market had an impact. For 2008, diversified contractors forecast an "average" year, compared with their counterparts' forecast for a "good" year.

Reed Business Information economist Jim Haughey estimates that heavy and nonresidential construction will more than make up for the residential slide, with both contributing double-digit growth on the way to overall construction spending growth of 7 percent. Haughey expresses concern that highway spending will languish behind needs, as lack of initiative at both Fed-

2007 Contractor Business Report



2008 Contractor Business Forecast



eral and state levels will result in increases barely covering increases in project costs. In fact, 2007 spending growth was half of what we saw in 2006. Private spending, particularly on hotels, will show strong growth this year.

Going into 2007, contractors projected contract volume to grow similar to what was seen in 2006. Again, whether a direct result of the housing situation or not, actual reports fell short to a level not seen in five years. Subtracting the percentage of contractors reporting decreased volume (29 percent) from those saying volume grew (36 percent), provides a net of 8, off from the 2006 net of 18 and well below the projected net of 22. Contractors anticipate a rebound, however, with 37 percent expecting contract volume to grow and 18 percent expecting it to shrink, for a net of 19.

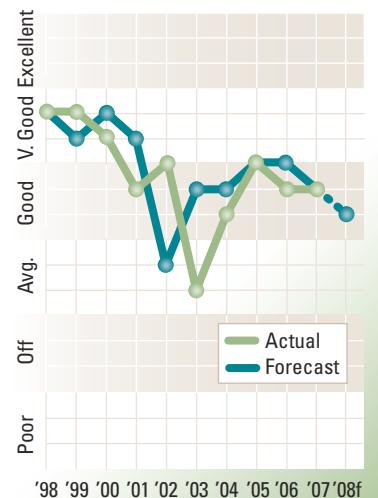
Again, diversified contractors lag in their projections, scoring a net of 13. About 36 percent of diversified contractors expect growth; 23 expect volume declines. Highway/heavy contractors report a net of 20 (38 percent forecasting increased volume minus 18 percent decreased), and building contractors forecast a net of 22 (39 percent forecasting increased volume minus 17 percent decreased).

More pronounced differences are evident across regions. Great Lakes and New England regions split between those increasing and those decreasing for nets of 1 and 2, respectively. On the other side, Southern Plains and Mid-South contractors scored nets of 26 and 20, respectively. This year's forecasts range from a net of 8 in New England (Great Lakes reports 15) to 41 and 40 in Mid-South and Southern Plains regions. Some 56 percent of Mid-South contractors expect contract volume to grow; 47 percent of Southern Plains contractors expect growth.

Highway/heavy contractors say com-

Contractor Business Year Ratings

(actual vs. forecast, all contractors)



Business followed expectations in 2007, with contractors reporting a "good" business year. This year should be comparable, although the forecast for 2008 dips slightly.

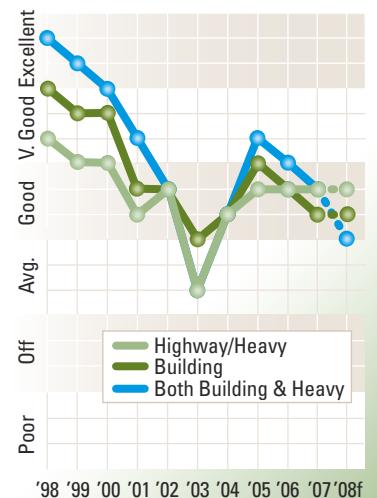
petition within their markets is intense, with 19 percent reporting markets that are "intensely competitive," and 61 percent saying they are "very competitive" markets. Other contractors face slightly lower levels, although 70 percent of building contractors and 68 percent of diversified contractors report competition in the "intense" or "very competitive" range.

Reports on company health vary, too. Highway/heavy contractors again rank themselves higher than their counterparts in the other vocations. Among these contractors, 77 percent say the overall health of their firm is "very good" or "good." With the other vocations, 69 percent of building contractors and 70 percent of diversified contractors report similar health ratings. About one in five contractors report their company is "okay": 21 percent highway/heavy, 19 percent building, 20 percent diversified.

Fleet trends

Perhaps taking advantage of continuing strength in various markets,

Contractor Business Year Ratings, by Vocation



Building contractors rated 2007 just slightly lower than their highway/heavy and generalist counterparts. Generalists, though, have the least-favorable outlook for this year.

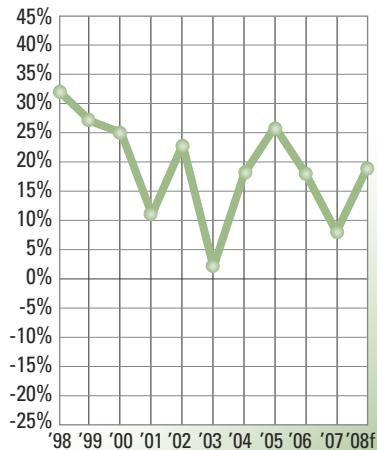
contractors grew their fleets at a rate higher than anticipated last year. At the end of 2006, contractors projected a net (difference between those projecting increases and those projecting decreases in fleet size) of 22. Actual 2007 reports provided a net of 29, with 37 percent of contractors increasing the number of machines in their fleets and only 8 percent decreasing that number. For 2008, contractors will pare back a bit. About 26 percent of contractors expect to increase fleet size and 6 percent expect to decrease size, leaving a net of 20. This is just slightly lower than what they projected for 2007.

Machine replacement rates will be cut back this year, too. Contractors expect to replace only 8.9 percent of their fleet in 2008. Last year, contractors replaced 9.7 percent of their fleet, below the 10.3 percent projected at the end of 2006. Again, Southern Plains and Mid-South contractors forecasts are higher than other regions, reporting a machine-replacement rate of 12.5 and 13.3, respectively. Mid-Atlantic contractors report a replacement rate of 12.0 percent.



Contract Volume Trends, All Contractors

(% increasing minus % decreasing, net)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

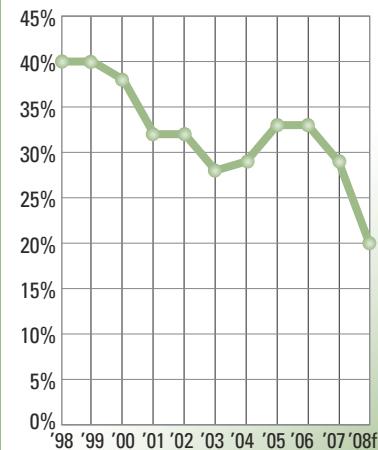
The trends for contract volume fell far short of expectations last year, with the net increase of 8 percent the lowest since 2003. The forecast for 2008 is also off from historical estimates, although still fairly positive in nature.

Great Lakes contractors again mark the low end, expecting to replace 7.3 percent of their machines this year.

Replacement rate is one indicator of fleet condition, as managers dispose of

Contractor Fleet Expansions

(% increasing minus % decreasing, net)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Contractors continued to expand fleet size in 2007, beating their forecast for the fourth consecutive year. They plan to continue to expand this year, although the net is lower.

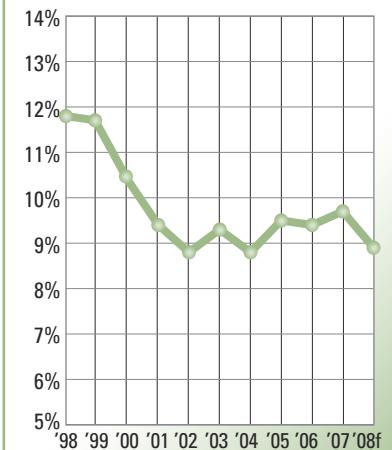
older machines and bring in more productive replacements. About four in 10 contractors reported that their fleets are in "excellent" or "very good" condition (6 percent and 36 percent, respectively). On the other end, 11 percent reported fleets in "fair" condition, and 1 percent said fleets are in "poor" shape.

Acquisition strategies remain historically constant, with purchasing being the preferred strategy for major machines, defined as those priced at \$25,000 or more. About 16 percent use short-term rental to meet needs for major machines.

Short-term rental overall continues to be a strong equipment-acquisition strategy, with 64 percent of contractors re-

Contractor Fleet Replacement Rates

(avg. % of machines replaced)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Last year, contractors replaced the highest percentage of their fleets since 2000, yet still fell a bit shy of projections. That trend to hang onto machines a bit longer will stretch into 2008, with the rate forecast to be even lower than this year.

porting its use. When asked to list the machines rented for a short period, contractors most often chose light-earthmoving equipment such as skid-steer loaders and backhoe-loaders. Heavy earthmoving machines were mentioned by 27 percent of contractors. Other machines were light equipment (42 percent), compaction equipment (37 percent), air compressors and generators (36 percent), work platforms (29 percent), and cranes (27 percent).

Of course, a contractor's fleet of machines is worthless without the staffing to support it. Thirty-one percent of contractors reported an increase in their total workforce, and 22 percent reported decreases for a net of 9. About half reported no change in workforce numbers. For one in five, though, the availability of skilled labor (operators, technicians, and other hourly workers) was a "major" problem in 2007.

Contractor Acquisition Trends

(% using for major equipment)

Purchase Outright	52%
Purchase by Financing	44%
Rental/Purchase	17%
Short-term Rental	16%
Lease/Purchase	13%
Lease	7%

Source: Construction Equipment/Case Annual Report & Forecast Survey

Regardless of fleet size, nearly all contractors purchase equipment, either financed or outright. Rental and lease options also provide contractors with acquisition choices. The use of short-term rental doesn't vary much by fleet size, but lease-purchase options are used often as the fleet-replacement value increases.

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Vocational Outlooks Vary

Materials producers continued to flounder in 2007, mining and energy fleets missed forecast, and utility fleets stayed strong. All three vocations tracked by *Construction Equipment* expect 2008 to be slower than 2007, but those actual ratings will stay diverse.

Here's how each of these nonconstruction vocations report on their fleets.

Materials producers

After finishing the 1990s with three consecutive "very good" years, materials producers have seen anything but since then. Last year fell short of the ex-

pected "average" year, instead coming in as "off." The outlook for this year is also "off."

The decline is evident in the work volume trends, both the numbers for 2007 and expectations for next year. About 21 percent of materials producers said volume increased last year, offset by 48 percent who reported volume decreased, leaving a net of -27. This is the first negative net reported since 2003, and the lowest in more than a decade. In addition, it was far below the net of 8 projected for 2007.

Materials producers do not expect much of a bounce-back this year, either. Although the number expecting

increased volume remains at 21 percent, there are still 31 percent expecting volume to decrease in 2008, leaving a net of -10. Competition is "intense" or "very competitive" for 80 percent of materials producers.

Fleet size continues to grow, with results last year above expectations. One-third of the fleets expanded in 2007, and 9 percent decreased fleet size for a net of 24. The forecast net for last year was 18. The outlook for 2008 fleet expansion is a net of 8: 15 percent expect to increase fleet size minus the 7 percent who forecast decreased fleet size.

The replacement rate, on the other hand, has shown dramatic reductions over the past several years. Although the 2007 rate of 6.2 percent was below the 6.8 percent forecast, it is the lowest rate of machine replacement reported since 2001. This year's forecast rate is even lower, with materials producers expecting to replace only 5.2 percent of their machines.

These data are indicators of overall fleet condition. Only 7 percent report it as being "excellent," with an additional 38 percent reporting their fleets in "very good" condition.

Mining and energy

Mining and energy fleets expected 2007 to continue in the "very good" range in which they had operated for three consecutive years. Reality was a "good" year, and expectations for 2008 are in the same range. Northern Plains and Pacific regions counter that forecast, going with a "very good" outlook, but the Mid-South region expects 2008 to be "off."

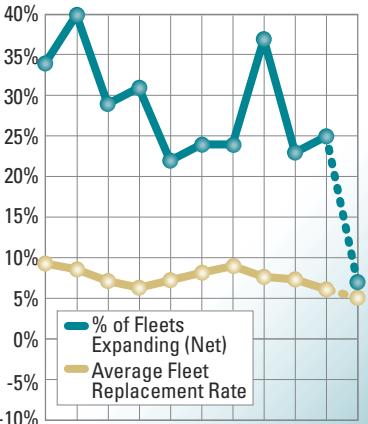
Contractor Business Year Ratings

(actual vs. forecast, all contractors)



Whatever caused materials producers to drop off their business-year expectations for 2007 continues as a concern for this year. They expected a year like 2006; instead, they predict 2008 to be more of the same.

Materials Producer Fleet Management Trends

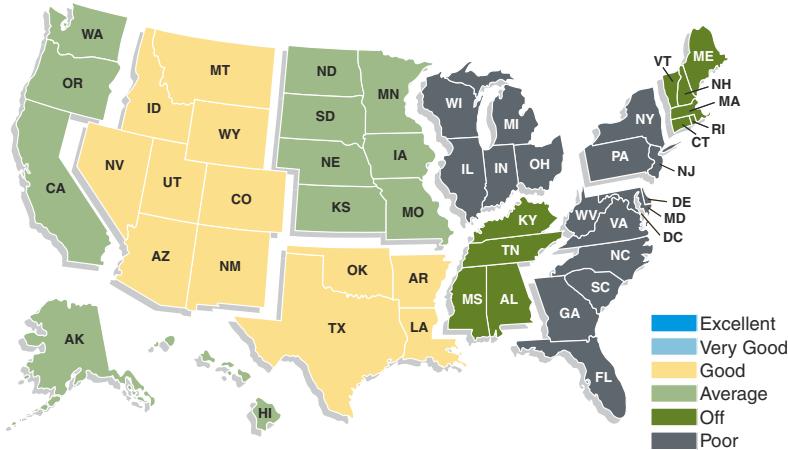


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Replacement rates fell to the lowest level in more than 10 years. Expectations for 2008 are even lower. This is offset by a higher level of fleet growth than expected, although expectations for next year drop off the table.

NONCONSTRUCTION

2008 Materials Producer Business Outlook

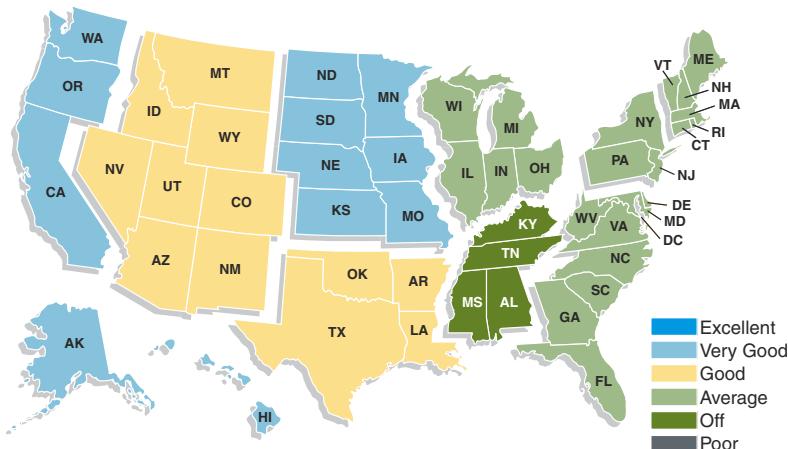


Mining and Energy Business Year Ratings

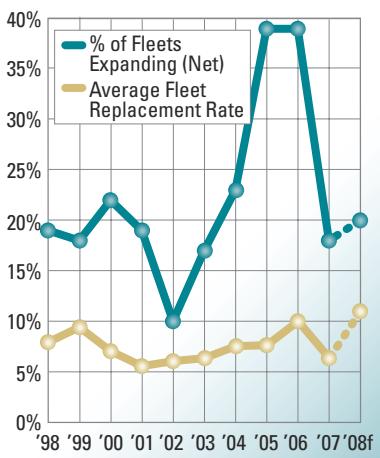


Business forecasts called for a fourth "very good" year in 2007, but it came in at "good" instead. Next year isn't expected to change.

2008 Mining & Energy Fleet Business Outlook



Mining and Energy Fleet Management Trends



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Managers replaced a smaller percentage of machines than forecast for 2007, but they expect to jump back in this year. Fleet expansions were also off, with little change this year.

Work volume indicators plummeted in 2007, and the forecast for 2008 is more conservative than recent years, too. Measured in total machine hours, work for these fleets increased for 40 percent and decreased for 22 percent, for a net of 18. Forecast for 2007 was a net of 35. For 2008, 36 percent of mining and energy fleets expect increased work minus 12

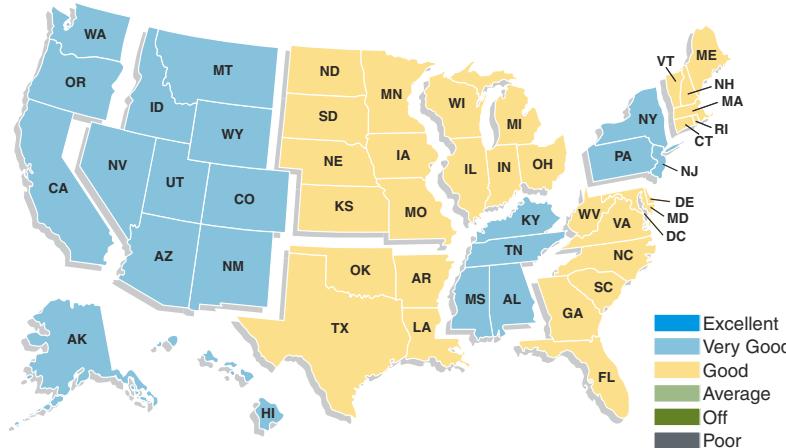
percent that expect decreased work, for a net of 24. Markets are competitive for these fleets, with 72 percent describing it as "intense" or "very competitive."

Fleet trends mirrored business trends for mining and energy fleets. Twenty-four percent increased fleet size in 2007, and 6 percent decreased the number of machines, leaving a net

of 18, half of the projected net of 36. This year, fleets are expected to increase by 25 percent and decrease by 5 percent, for an anticipated net of 20.



2008 Utility Fleet Business Outlook



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

After three years in the “very good” range, utility managers expect business to drop to “good” in 2008. Four regions will buck that trend, however, with expectations remaining that business will continue “very good.”

More worrisome is the trend in fleet replacement rates. Late in 2006, mining and energy fleets reported that they would replace nearly 11 percent of their machines in 2007. The reality was a replacement rate of only 6.3 percent. This follows a 10-year high of 10 percent replacement in 2006, but managers are still projecting to replace 11 percent in 2008.

Fleet condition improved over 2006, when 48 percent of mining and energy fleets reported their fleets being in either “excellent” or “very good” shape. In 2007, 6 percent described fleet condition as “excellent” and 49 percent called it “very good,” for a total of 55 percent.

Utilities

Fleets in this vocation have posted three straight years of “very good” business, and the outlook for 2008 dips into the “good” range. Five of nine regions reported “very good” in 2007, and that slides to four of nine for this year. All other regions estimate 2008 to be “good.”

Work volume, measured in total machine hours, declined in 2007 compared to 2006 and came in below forecasts. Forty-one percent of utilities fleets saw

machine hours increase minus 21 percent that saw it decrease for a net of 20. Fleets expected that net to be 32 last year. For 2008, 38 percent expect work to increase, but only 12 percent expect it to decrease for a net of 26. Utilities markets are “intensely” competitive for 5 percent of fleets and “very” competitive for another 42 percent.

Some 31 percent of utilities managers said their fleet size had increased in 2007. Subtracting the 3 percent whose fleets decreased in size, the net of 28 was above the projected net of 22 forecast for 2007. A similar forecast for 2008, a net of 24, results from deducting the 3 percent that anticipate a smaller fleet this year from the 27 percent that expect to grow their fleet size.

Replacement rates are also strong in the utilities vocation. In 2006, these managers suggested that they would replace 9.9 percent of their fleets in 2007 and instead replaced 10.5 percent. The trend will continue, with the replacement rate in 2008 forecast for 10.6 percent.

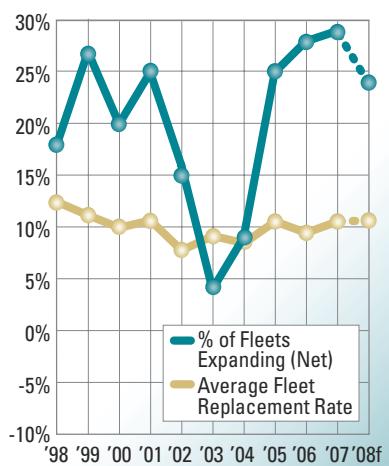
Overall fleet condition is “excellent” or “very good” for 57 percent of utilities, up from 54 percent in 2006.

Utility Business Year Ratings



Business is expected to drop into the “good” range this year. The previous three years were strong responses to four “good” years, so 2008 holds no serious reasons for concern.

Utility Fleet Management Trends



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Fleets expanded more than expected in 2007, so managers have scaled back forecasts for 2008. On the replacement side, though, managers were aggressive last year and say they will continue to replace machines at a rate above 10 percent in 2008.



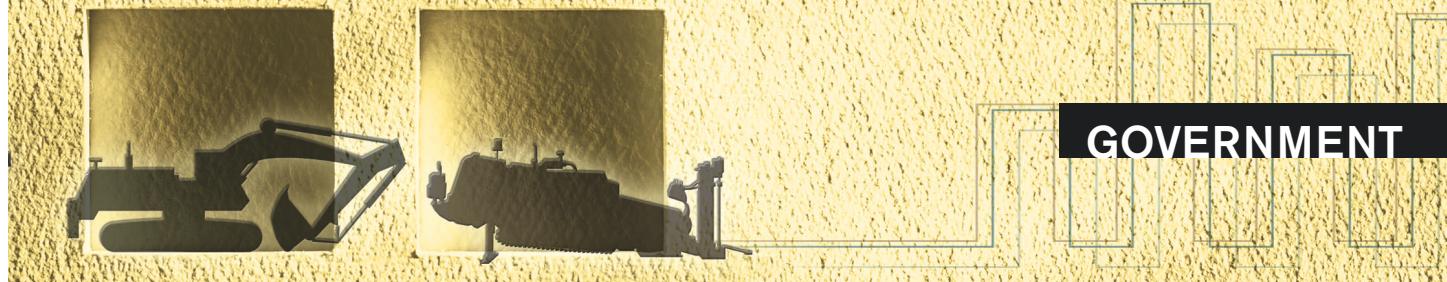
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Fleet Budgets Struggle

State fleets rebounded sharply in 2007 after a slight increase in 2006 funding. Local fleets, on the other hand, barely stayed at current funding levels. Overall, 27 percent of government fleets reported increased funding levels in 2007 against 23 percent who said funding decreased, for a net of 4. Although better than the 2006 net of 6, government fleets were hoping for better.

State fleets reported a net of 25, with 38 percent increasing funding levels and only 13 percent saying funding had decreased. On the local side, 26 percent reported increased funding levels minus 24 percent reporting decreased funding for a net of only 2.

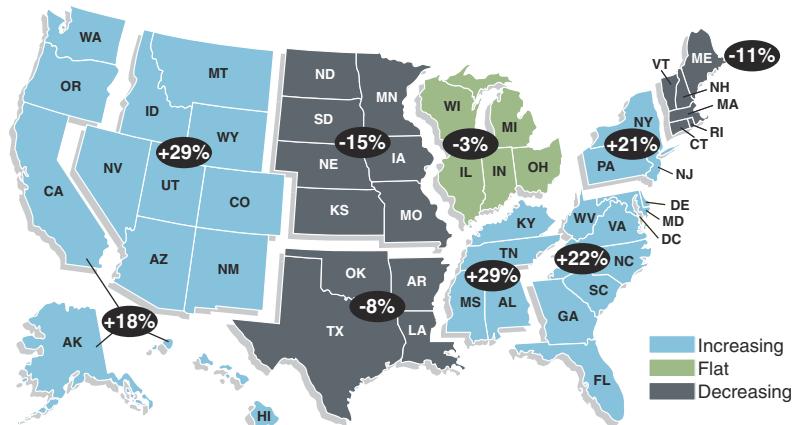
For this year, 35 percent of state government fleets expect funding to increase and 17 expect it to decrease, leaving a net of 18, the first double-digit net forecast since 2000. Locals, on the other hand, forecast a net of 7. Although 32 percent say funding should increase this year, 25 percent say it will decrease.

For local governments, work volume continues to outstrip funding. In 2007, 31 percent of local fleets reported volume, measured in total machine hours, increasing and 7 percent reported it decreasing for a net of 24. States reported a similar net, with 33 percent increasing minus 10 percent decreasing. This year, 36 percent of states and 32 percent of locals expect volume to grow; 8 percent of each expect volume to decrease. Nets, therefore, are 28 for state governments and 24 for locals.

Local fleets saw more growth activity than state fleets, as measured in number of machines in the fleet. On the local

2007 Public Fleet Funding Trends by Region

(% increasing minus % decreasing, net)

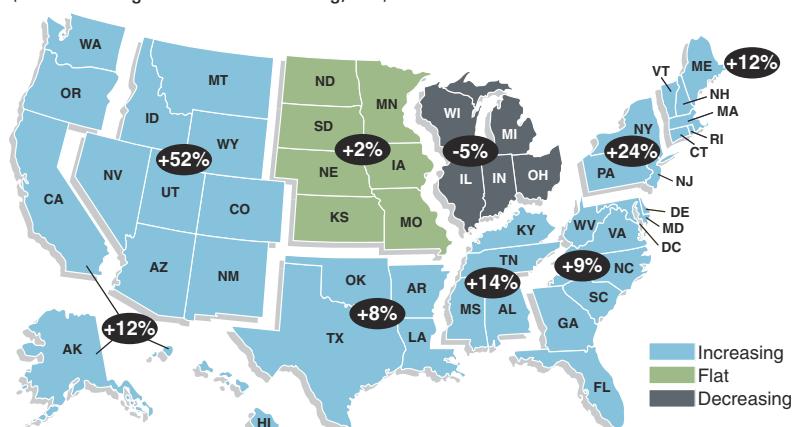


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Funding levels for government fleets varied across the nation last year, with five regions increasing and three decreasing. Big gainers were Mid-South and Mountain regions, and the Northern Plains reported the greatest decrease. As a group, governments did slightly better than expected.

2008 Public Fleet Funding Outlook by Region

(% increasing minus % decreasing, net)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

This year, every region except two, Great Lakes and Northern Plains, expect funding increases. The largest increases are anticipated in the Mid-Atlantic and Mountain regions. Overall, funding is forecast to increase a net of 9 for government fleets.



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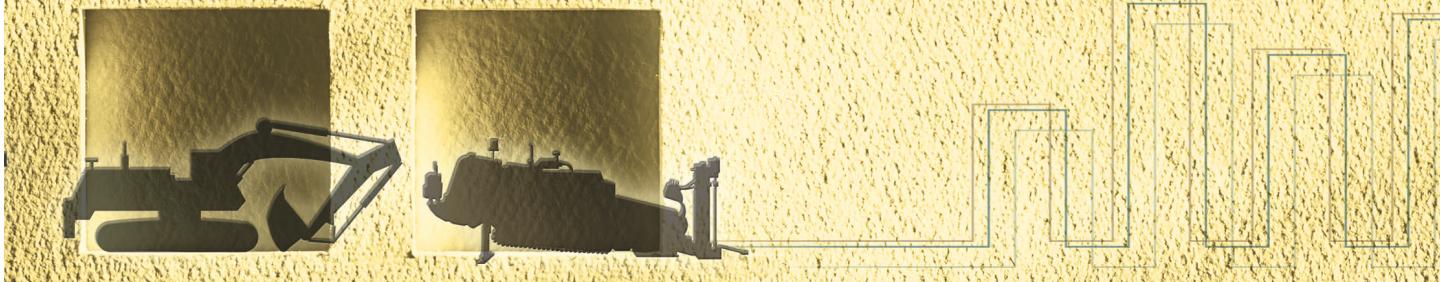
YOU DO THE MATH.

Make those long hours easier in a Case M Series 2 Loader/Backhoe. Our fully adjustable pilot controls and wrist rests provide the most fatigue-free fit available. An in-cab control pattern change switch gives you freedom to work your own style. And the exclusive Case Pro Control System makes all your rapid backhoe moves smoother and more precise—plus remarkably gentle around buried lines or pipe. For comfort and productivity in loader backhoes, see the people who invented them. **Want to get one in the dirt?**

Contact your Case dealer for details and an M Series 2 Loader/Backhoe demo!

WORLD-CLASS
BACKHOE LEADERSHIP





side, 29 percent of fleets grew while only 4 percent shrank, for a net of 25. This was double the net expected for 2007. State fleets expected a net of 2 this year, and were only able to beat that slightly with a net of 8. Twenty-five percent of state fleets increased in size; 18 percent decreased. For this year, states lag local fleets in expectations of fleet growth. Although 23 percent of state fleets say they expect to grow, 18 percent expect them to decrease for a net of 5. Local fleets, however, net out at 23. Twenty-eight percent say fleets will grow minus only 5 percent that say fleet size will decrease.

Fleet replacement rates, on the other hand, were nearly the same in 2007. States reported a rate of 8 percent; local government fleets replaced 7 percent. Next year, however, the two forecasts head in opposite directions. States expect to replace 10.7 percent of their fleets; locals expect to replace 5.8 percent.

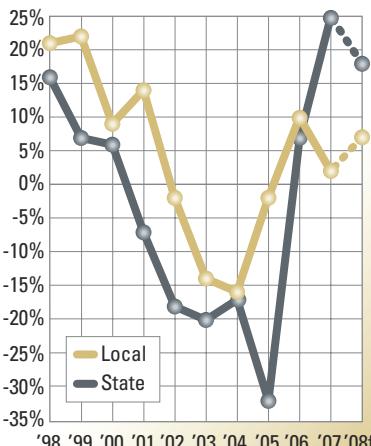
Both fleet growth and replacement rates affect the condition of the fleet. Government fleets are rated either “excellent” or “very good” by 49 percent of respondents. State fleets were rated slightly lower than locals.

Government fleets generally purchase outright when they acquire major machines valued at more than \$25,000, with 85 percent reporting usage of this option. Only 12 percent use financing, and 13 percent use short-term rental. Overall, however, 58 percent of government fleets use short-term rental to meet equipment needs.

Equipment-related workforce size stayed the same for the majority of government fleets. Total workforce decreased for 22 percent of fleets and increased for 17 percent for a net of -5. Service and maintenance personnel employment stayed the same for 83 percent of fleets, the number of machine operators stayed the same for 72 percent, and other hourly labor remained consistent for 73 percent.

Public Fleet Funding Trends

(% increasing minus % decreasing, net)

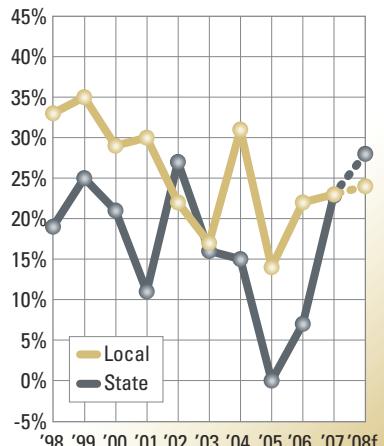


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

State government funding increased sharply last year, netting at 25 against a forecast of -4. Local government funding, however, met its meager forecast of net 2.

Work Volume Trends: Public Fleets

(% increasing minus % decreasing, net)

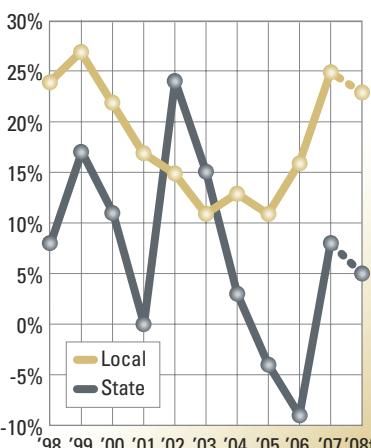


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Work volume for both segments of government exceeded expectations. Both groups netted at 23, with states having forecast -7 and locals 16. Both expect 2008 to be a bit higher than 2007.

Fleet Size Trends: Public Fleets

(% increasing minus % decreasing, net)

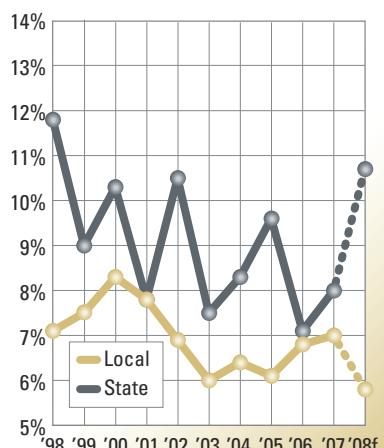


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

The number of states reporting expanded fleets outpaced slightly the forecast for last year, but local governments expanded at a far more aggressive pace. Expansion is expected for both in 2008.

Public Fleet Replacement Rates

(avg. % of machines replaced annually)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Fleets expanded at expected rates in 2007, in line with previous years. They go separate directions for this year, though, with states expecting a rate of 10.7 percent, locals 5.8 percent.

CX17B | CX27B | CX31B | CX36B | CX50B

ZERO TAIL SWING = MORE WORKSPACE

YOU DO THE MATH.

The B Series Compact Excavators from Case Construction Equipment deliver the precision, durability and confidence you need to work in tricky areas. Zero tail swing, a center-swing boom and narrower, durable rubber tracks let you focus on the dig when working alongside buildings or near obstacles. High engine and hydraulic horsepower means faster cycle times so you can tear through your toughest jobs. And easy-access panels make maintenance simpler. **Want to get one in the dirt?**

Contact your Case dealer for details and an B Series Compact Excavator demo!



420CT | 440CT | 445CT | 450CT

TOUGH TREAD = LESS EXPENSE

YOU DO THE MATH.

Get big-machine durability and low maintenance costs with our 420CT, 440CT, 445CT and 450CT Compact Track Loaders. Featuring proven Case undercarriage technologies, these mini-brutes deliver long component life, a comfortable ride and rigid-mount simplicity. Permanently sealed rollers and idlers assure reliable performance. Tapered track frames stay cleaner. Triple-flange rollers minimize wear and prevent de-tracking. From the heavy-duty chassis to the long-lasting radial piston-drive motor, these compacts give you a whole lot of loader. **Want to get one in the dirt?**

Contact your Case dealer for details and a 400CT Series Compact Track Loader demo!



Just a Stumble?

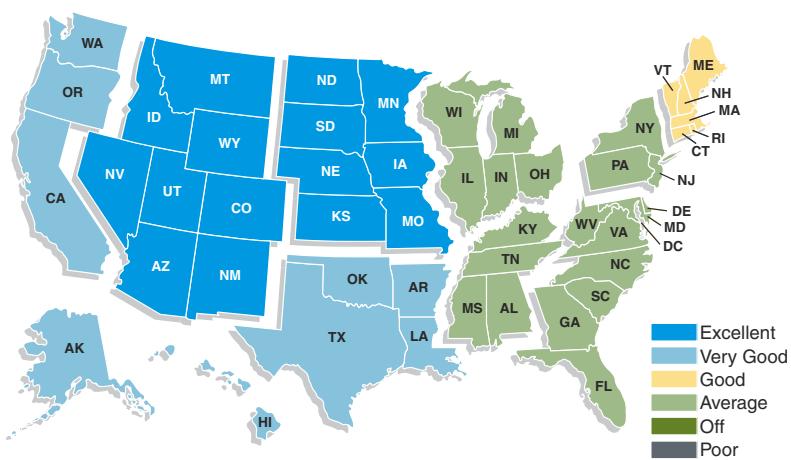
Although business ratings have declined over the past couple of years, the peak rental dealers had attained was the highest rating available. Rental dealers remain optimistic.

Our survey was done with the assistance of the American Rental Association and its members. Respondents reported a year that fell short of their expectations for 2007, having forecast that business would be "very good." Projections call for 2008 to be "very good" despite 2007 dipping to "good."

Sales volume increased significantly for 41 percent of rental dealers in 2007. About 16 percent reported significant sales decreases for a net of 25. For 2006, the net was 49. Six of 10 respondents say 2008 sales volume will stay steady; 32 percent say volume will increase and 7 percent say it will decrease for a net of 25.

The largest increases reported were

2008 Rental Dealer Business Outlook

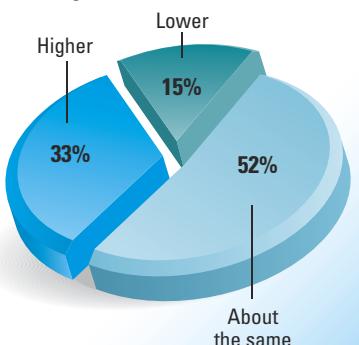


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey.

Overall, rental dealers expect a "very good" 2008. Northern Plains continues to report and expect the most positive business, joined by the Mountain region. Yet some softening is seen as four of the nine regions forecast "average" this year.

Margins on Rentals

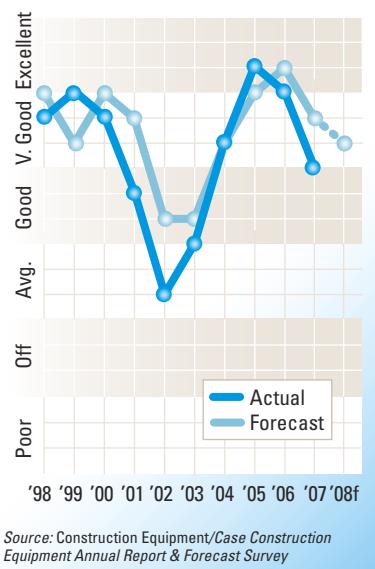
(how '07 margins compare to '06 margins)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Margins held for more than half of rental dealers last year, but the percentage who reported lower margins is up from only 9 percent in 2006 to 15 percent in 2007. Even so, one-third of dealers reported higher margins last year.

Rental Company Business Year Trends



Although the year turned out "good" instead of "very good," rental dealers' expectations are dampened only slightly. This year, "very good" is back in the forecast.



Back to the Middle

After strongly rebounding from the post-9/11 valley, distributors are starting to cycle down. Although forecasting a drop in 2007 business when asked late in 2006, actual business ratings for last year were worse than expected. Distributors forecast a “good” year for 2007, but instead registered “average.”

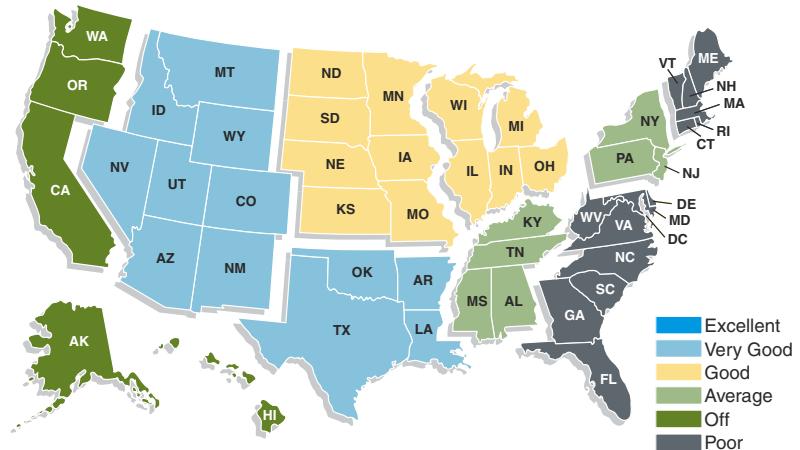
For 2008, distributors expect another “average” business year.

Members of the Associated Equipment Distributors, who partnered with *Construction Equipment* for this report, said 2007 sales volume was similar to that reported in 2006. About 45 percent reported volume increased in 2007 and 44 percent reported a decrease, for a net of 1 versus a forecast of 31. At the extremes, 23 percent said sales volume increased more than 5 percent in 2007, compared to 2006. On the other hand, 29 percent said volume decreased more than 5 percent for the year. For 2008, 52 percent expect sales to grow and 29 expect it to decline for a net forecast of 23.

Distributors reported "significant" increases in sales in several business areas, although the percentages were smaller than in previous years. Some 36 percent reported growth in parts sales, 32 percent said service volume grew, 31 percent each saw new-equipment sales and rent-to-rent volume increase.

Margins reflected a similar tightening, with 39 percent of distributors reporting lower margins on new-equipment sales in 2007 than in 2006. Some 16 percent, on the other hand, said margins grew last year. The net, though, is -23. Poor margins is the key concern for 2008, distributors report, as 65 percent identified this

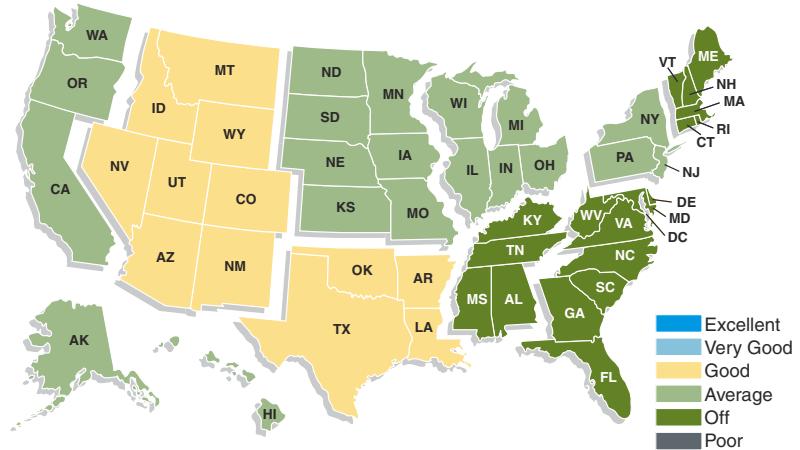
2007 Distributor Business Report



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Distributors said 2007 was an "average" year, down from their expectation for a "good" year. Two regions, New England and South Atlantic, were "off." On the other hand, Southern Plains and Mountain regions had better years, at "very good."

2008 Distributor Business Outlook



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Five regions forecast this year to be worse than 2007 and three see it being better, making 2008 another “average” year overall.

aspect of their business as a concern.

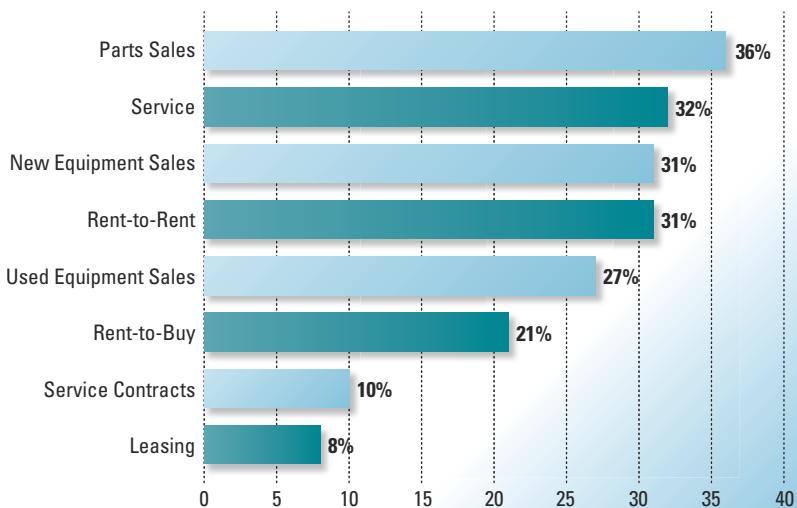
Rising interest rates, which last year concerned 71 percent of distributors, has fallen down the list for 2008; only

34 percent foresee it being an issue. Other concerns for 2008 include recession, declining machine sales, and increasing competition.

DISTRIBUTORS

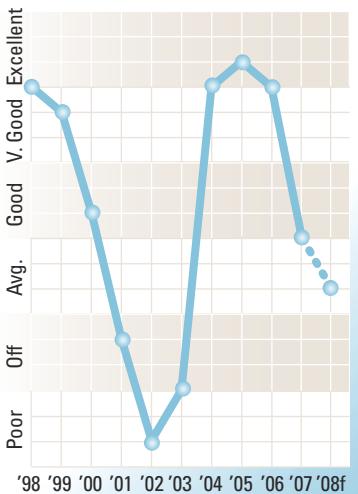
Distributors' Growth Areas

(% reporting significant increases)



In light of the falloff in business rating, smaller percentages of distributors reported "significant" growth last year in various areas of their businesses. Parts sales led all categories of growth, with 36 percent of distributors responding.

Distributor Business Year Ratings

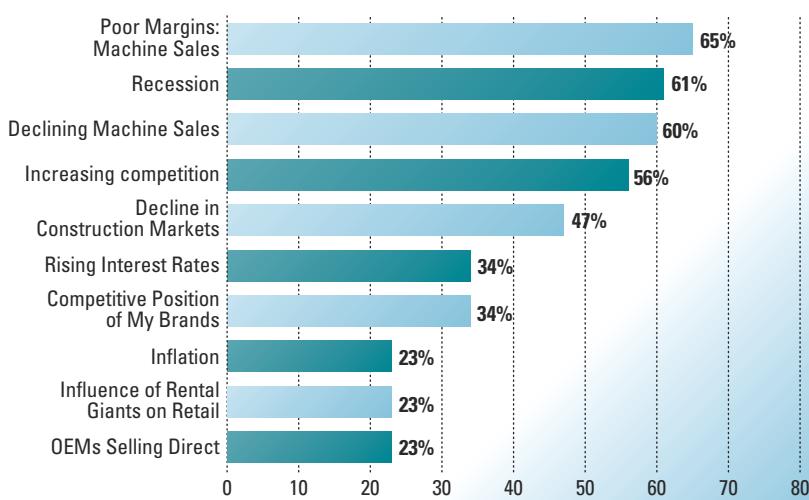


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Business year ratings dropped from "very good" to "average" in 2007, which is less than the "good" year forecast. Next year is expected to be "average," too.

Distributors' Concerns for '07

(% indicating concern)

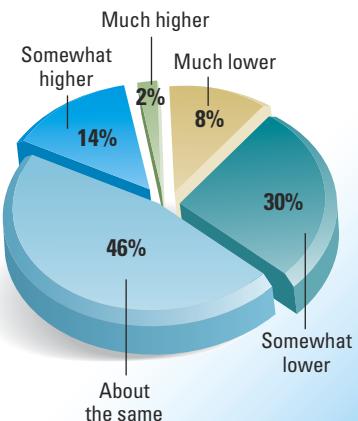


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Slipping margins on machine sales is the key concern for distributors heading into 2008. Others noted by more than 60 percent of respondents were possible recession and declining machine sales.

Distributor Margins On New Equipment Sales

(trends, 2006 vs. 2005)



Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Margins dropped for 38 percent of distributors last year, the most since 2003. Similarly, 16 percent said margins were higher in 2007 compared to 2006.



410 | 420 | 430 | 435 | 440 | 445 | 450 | 465

GREATER COMFORT = BETTER PRODUCTIVITY

YOU DO THE MATH.

Operator comfort and precise control are the keys to greater jobsite productivity. That's why Case 400 Series Skid Steers deliver more profits to your bottom line. Our low-effort servo-hydrostatic controls and optional pilot controls provide easy and precise maneuverability, while easy-to-read side-mounted instrumentation provides quick reference to system functions. Optional Ride Control cushions the load for smoother and more comfortable travel—and delivers more material with every cycle. And with options like a deluxe climate-controlled cab, suspension seating, 12V power plug and more, the Case 400 Series machines are as comfortable as they are tough. **Want to get one in the dirt?**

Contact your Case dealer for details and a 400 Series Skid Steer demo!

POWER PLAYER

“ Being from a smaller market and a specialty trade, CONEXPO-CON/AGG gives me the opportunity to see new ideas and technologies as they are introduced that I wouldn’t otherwise get the opportunity to see. We attend the show to stay at the forefront of the construction industry. CONEXPO-CON-AGG 2005 was my first show, and I definitely won’t be missing it in 2008. ”

ERIN BROWNLEE

Project Manager/Estimator

The Wakefield Corporation

Knoxville, TN

Member, Associated General Contractors of America



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Market Watch

► New Holland

M Series telehandlers are now available in North America. With lift capacities of 3,500 and 5,000 pounds, respectively, the M427 and M428 offer maximum lift height of 42 feet and forward reach of 29 feet. The M459, also with lift capacity of 5,000 pounds, extends lift height to 45 feet and forward reach to 31 feet. With operating weight ranging from 21,781 to 25,353 pounds, M Series telehandlers meet a variety of lift-and-place and carry applications.

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► Bronto Skylift

S-170 XDT truck-mounted aerial platform reaches to more than 115 feet, and it is capable of lifting up to 1,400 pounds to a 170-foot platform height. Stowed, the platform boom folds next to the main boom for a transport height of 13 feet, and the platform folds underneath the main boom for a transport length of 39 feet. Bronto +3 advanced-control system monitors outrigger settings and platform load, automatically keeping the platform within safe operating parameters.

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► Link-Belt

The 138 HSL Lattice-Boom Crawler Crane has a rated lift capacity of 80 tons and features a 40- to 200-foot tube boom or an optional 40- to 150-foot angle boom. Maximum tip height is 242 feet with the tube boom and jib, and 204 feet with the angle boom and jib. The jib can be offset to angles of 5, 15 and 25 degrees. Top sections are equipped with standard mounting lugs for the jib and feature an optional auxiliary tip and an optional pin-on pile-driving-lead adaptor.

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► Caterpillar

Caterpillar is now offering custom versions of its large wheel-loader models. With an operating weight of about

110,000 pounds, the 988H provides the platform for special application versions designed specifically to handle large blocks of stone in quarries, logs in mills, and slag in steel mills. The 988H Block Handler Arrangement, for example, features special application linkage, larger tilt and lift cylinders, additional counterweight, and modified third-valve hydraulics for quick-coupler operation.

Visit ConstructionEquipment.com/info and enter 191



The new range of John Deere 9030-Series scraper tractors (9430, 9530 and 9630) provide horsepower ratings from 425 to 530. All three models use a John Deere PowerTech Plus diesel engine, which features exhaust-gas recirculation, variable-geometry turbocharger, up to 38-percent torque rise, and a "10-per-

cent power bulge to bring more power and performance to the ground." The tractors feature an 18F/6R powershift transmission and an AutoLoad system.

Visit ConstructionEquipment.com/info and enter 192

► Komatsu

The 78,000-pound PC300LC-8 is powered by Komatsu's Tier-3-certified SAA6D114E-5 engine with 246 flywheel horsepower. The seven-inch LCD monitor can display data in 10 languages, offers control of the five operating modes, and presents images from the standard rearview-camera system. A one-touch Power Max Function increases digging force by 7 percent for 8 seconds. The new multi-layer viscous cab mounting system incorporates longer stroke and the addition of a spring.

Visit ConstructionEquipment.com/info and enter 193



CX160B | CX210B | CX210B LR | CX210B N | CX240B | CX240B LR | CX290B

**LESS FUEL
PER TON = MORE PROFIT
PER JOB**
YOU DO THE MATH.

Thanks to advanced design and engineering that delivers 17% more horsepower and uses 20% less fuel, the all-new Case B Series Excavators save you an *estimated \$10,000 per year from lower fuel costs and faster cycle times compared to similar models*. But that's just the start. The all-new cab design reduces noise levels and improves operator comfort and visibility. That means better productivity from both your operators and your equipment. Add multiple power modes to tailor response to any condition and Case's famous easy serviceability, and you've got an excavator that breaks new ground for the entire industry. **Want to get one in the dirt?**

Contact your Case dealer for details and a B Series Excavator demo!

“...Nine, Mississippi...

Ten, Mississippi... Sorry, just counting the seconds to the jobsite. Guess I'm just like everybody else at your Deere dealership -- always in a big hurry. When your machine goes down, we watch the clock just as closely as you do. And when we arrive, you know it's the right technician with the right tools and parts to make your problem go away. Now where was I? Eleven, Mississippi...”

What's a Deere Dealer have that others don't? Intense focus on response time measurement and improvement. Technician training and essential service tools in place before the first sale of a new model. And a powerful drive to beat your expectations.

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The chains depicted are for illustrative purposes only and are not intended to depict an approved method of machine tie down.

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JLG

TRUCKING NEWS

Old Bulldog/New Tricks

Mike Justice's B-61 Mack has been hauling logs since his father bought it in 1963. He and his son, Justin, still use the truck in their company, Justice Enterprise of West Green, Ga.



Forty-four years hauling logs in Georgia forests left their mark on Mike Justice's truck.



A week with CMT's Chrome-Shop Mafia gave the Mack B a new face and a new name: Sawtooth.

Despite faithful care and maintenance, 44 years of toil in Georgia forests had left their mark on the truck. So Justin got in touch with producers at CMT's (Country Music Television) show, "Trick My Truck." Justice's classic Mack was selected to be featured in an episode.

An icon of American truck history, the Mack B Model, became the first Mack the Chrome Shop Mafia, Trick My Truck's creative geniuses, worked over for the show. The episode aired on CMT in late August, but you can watch it by clicking on "Mike Justice's Sawtooth" on Trick My Truck's Web archives at http://www.cmt.com/shows/dyn/Trick_My_Truck/episode_list.jhtml.

Justin was well aware that his father enjoys the show when he called CMT.

"I always watch that show," Justice said. "I told my wife I'd love to have my old truck tricked up. It looks like a show truck now."

INDUSTRY EVENTS

ICUEE 2007 Breaks All Records

The 2007 International Construction and Utility Equipment Exposition (ICUEE) achieved all-time records for attendance, exhibitors and exhibit space, and education programming during its run Oct. 16-18, 2007, at the Kentucky Exposition Center in Louisville.

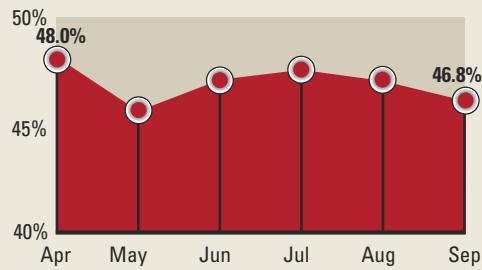
Known as The Demo Expo, ICUEE 2007 attracted 17,950 utility and construction industry professionals. Attendance tracked more than 9.5 percent over the last show. More than 845 exhibitors used 1.155 million net square feet (26.5 acres) of exhibit space. ICUEE 2007 educational programming sold 26 percent more tickets compared to the last show.

USED EQUIPMENT

Values Stay on a Downswing

The Rouse Value Index

(Avg. orderly liquidation value as % of cost)



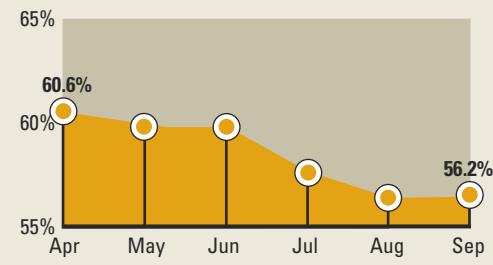
Note: Orderly liquidation value is expressed as a percentage of replacement cost (average cost paid for a new unit by large rental companies and dealers) for the average age of equipment within that category.

Includes 10 categories of equipment common to rental fleets.
Source: Rouse Asset Services

September saw values for used equipment continue to slide, dropping 1.6 percent from August and 1.3 percent since April. Seven of the 10 major rental categories tracked by Rouse declined in September, led by high-reach forklifts off 5.4 percent. After seven consecutive months of growth, values for wheel loaders also fell.

Skid-Steers Level

(Avg. orderly liquidation value as % of cost)



Skid-steer-loader values have declined for the past several months, flattening in September. Average selling age is about 70 months at an average value of 65.2 percent.

HEAVY EQUIPMENT FORUMS

Thirteen Qualities Of a Good Operator

A recent post at HeavyEquipmentForums.com discussed attributes members would like to see in equipment operators. This list is from that thread.

- 1) Natural aptitude for operating machinery.** He can "feel" as well as see and hear what is [happening] under and around him.
- 2) Good communicator.** He remembers his instructions and does not lose sight of the big picture.
- 3) Can interpret grade stakes and is able to calculate basic cuts and fills.**
- 4) Treats the machine as if he were making the payments on it.**
- 5) Has the ability to train a less-experienced operator.**
- 6) Understands the basic principles of soil compaction and has the skills to achieve it.**
- 7) Understands the importance of proper drainage of a jobsite.**
- 8) Able to properly choose the most efficient machine to do the job.** Understands the limits and capabilities of the machines he is expected to operate. Knows how to set up a work area, for example, loading trucks from a stockpile with an excavator. He can coordinate several machines working together.
- 9) Makes sure he and everybody he works around comes home upright and healthy each day.**
- 10) Will notify [his supervisor] or take corrective action if something is not working right or feels wrong.**
- 11) Recognizes his employment is provided by a profit margin.** He may not have bid the job, but it's his responsibility to give the maximum results for the resources he is given.
- 12) Tries to have a good working relationship with everyone he works with.**
- 13) Can perform minor repairs in the field.**

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

MANUFACTURER NEWS

Stretch Demo

A Liebherr R974 B HD-EW (heavy-duty, extra-wide) excavator took the first bites out of a Philip Morris Plant in Louisville, Ky., last August. With an operating height of 135 feet, the Liebherr demolition special can start from the top of the eight-story building and control demolition for safety.

Euro Dismantling Services (EDS) of Great Britain, one of



Demolition excavator can reach 135 feet high with a 5,700-pound attachment to control high demolition.

By the Numbers

Liebherr	R974 B HD-EW (as shown)
Operating Weight	270,800 lb.
Attachment	4,400-lb. LaBounty UP20SV concrete processor*
Horsepower	537
Demolition Stick	44'3"
Boom:	
Basic	15'7"
Demolition	55'9"
Intermediate	8'10"

*Planned tool for project is Demarec MQP-30-C "multi-quick processor" at a weight of 5,730 pounds.

the world's largest demolition companies, was contracted to help dismantle the Philip Morris buildings, and the excavator was imported from the manufacturing plant in France for primary demolition.

Built with D9G track components, the Liebherr machine has a solid stance for working with a 5,700-pound attachment 135 feet overhead.

Demolition of the plant should be completed before the end of the year.

INDUSTRY EDUCATION

Scholarships Now Available To Students and Professionals

Applications are now available at the ConstructMyFuture.com website for students and construction-industry professionals seeking education scholarships.

A workforce development initiative promoting construction as a rewarding career choice, ConstructMyFuture.com is a joint effort of the Associated Equipment Distributors Foundation (AEDF), the Association of Equipment Manufacturers (AEM), and the Associated General Contractors of America (AGC). The website is a major component of the associations' efforts to attract students and workers to an industry facing serious shortages of skilled tradespeople and technicians. Students, teachers, counselors and parents are able to access an online resource to explore benefits and opportunities for careers in construction.

The deadline to apply for the ConstructMyFuture.com scholarships is Feb. 4. Application details and entry forms are available at www.constructmyfuture.com.

Scholarship funds are to be used for higher-education tuition or the purchase of tools to improve worker productivity.

CONTROL YOUR WORLD



Success in the construction world is all about *control*.

From data collection to job site connection, Topcon has the solutions to make your world more productive. Our GPS+ continues to provide the most satellite reception for your machine control, and our exclusive Millimeter GPS™ now also controls your pavers. New graphic-driven 2D excavation systems bring easy, economical control to even the smallest operation. And the new Imaging Station brings unprecedented control to precision measurement and data capture, including remote operation on any connected job site anywhere in the world.

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GENTLEMEN, START YOUR BIDDING. Caterpillar® has donated the world-famous Cat® Chopper to the Victory Junction Gang Camp. The bike is going up for auction, with all proceeds going to benefit the kids. Bidding begins February 7, 2008, for 10 days only. Make the winning bid and the bike is yours. It's a win-win for everyone. To bid or donate, visit www.catchopperauction.com.



Founded in 2004 by Kyle and Pattie Petty in honor of their late son Adam, the Victory Junction Gang Camp is dedicated to enriching the lives of children with chronic medical conditions. The Camp is supported solely by contributions from corporations, foundations and individuals, such as NASCAR legend and grandfather Richard Petty. For more information about the Camp, go to www.victoryjunction.org.

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Managers Digest

MAINTENANCE MANAGEMENT

Cat Cuts 988H Fuel Use 15 Percent

Cat says its new 988H Wheel Loader Fuel Management System in balanced mode delivers fuel savings of as much as 15 percent in truck loading (more in load-and-carry operations) — while keeping production “within a few percent of maximum.” By lowering engine speed during all but the digging portion of each cycle, the system minimizes impact on productivity while gaining significant fuel savings. The system is available on new 988H loaders and can be retrofitted to 988H loaders already in the field.

Three operating modes — full power,



A retrofittable Fuel Management System can reduce the 475-horsepower 988H's consumption while producing "within a few percent of maximum."

balanced, and max fuel savings — allow the operator to quickly adjust to changing production demands with a switch in the cab. Max-fuel-savings mode lowers engine speed more during all segments of a cycle except digging, bringing greater fuel savings but

with a more substantial drop in productivity. Cat's own study in a quarry suggested that a 988H burns 17.7 gallons per hour in full-power mode, but consumption dropped to 13.8 gallons per hour in balanced mode.

MANUFACTURER NEWS

Caterpillar Acquiring Two Blount Forestry Facilities

Since 2003, Caterpillar and Blount have had an agreement to jointly produce and market forestry equipment products globally under the Caterpillar and Timberking brands. Three years later, Caterpillar permitted Blount to replace the Timberking brand with Cat.

Judging by a recent corporate acquisition announcement by Caterpillar, the equipment manufacturing giant clearly appreciated the manufacturing service provided by Blount.

Caterpillar announced it will acquire two Blount forestry equipment manufacturing facilities, including an assembly operation in Sweden. These operations will join Caterpillar's global facilities that produce and support forestry equipment.

“Cat Forest Products now offers the

broadest product line in the industry with a full range of products and services for logging, mill yard, roadbuilding and land management,” says John Carpenter, president of Caterpillar Forest Products. “In addition to better serving the needs of our traditional forestry customers, this acquisition will also enable Caterpillar to meet the increasing global demand for wood-based alternative fuels such as cellulosic ethanol.”

For more than 50 years, Blount's forestry division has manufactured timber harvesting and processing equipment, loaders and attachments. The acquisition of the forestry operations by Caterpillar does not affect Portland, Ore.-based Blount's outdoor products group, nor its other industrial and power-equipment businesses.

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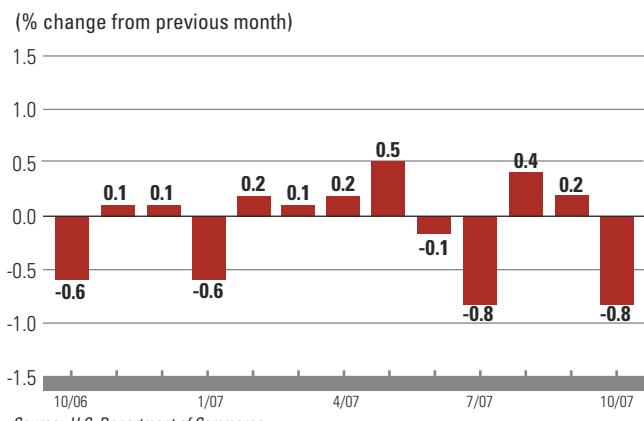
Founded for kids in honor of Adam Petty

Managers Digest Status & Forecast

By JIM HAUGHEY, Director of Economics

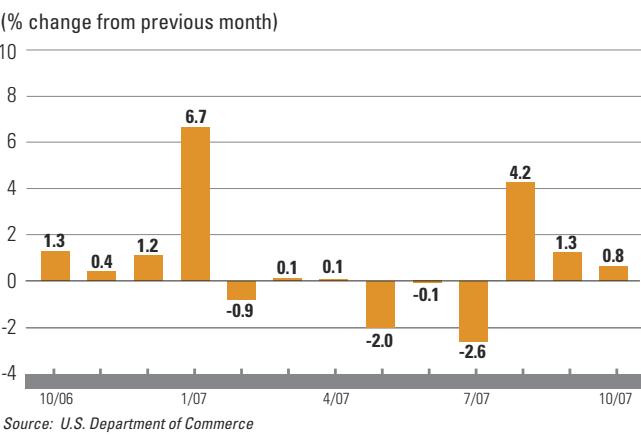
TOTAL CONSTRUCTION SPENDING

Total construction spending had, since the peak in February 2004, declined 5.6 percent through October, with further small declines expected to close out 2007. Resumed expansion is expected during the winter. Spending will increase 6 to 7 percent from December 2006 to the same month in 2007, but will drop 2.4 percent for the full year over the previous year. Subtracting project inflation, total construction spending will be below the October 2007 level until at least late spring.



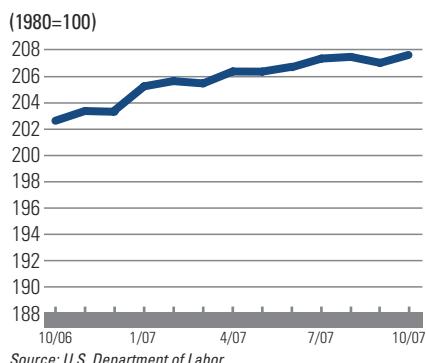
HIGHWAY CONSTRUCTION SPENDING

Highway construction spending has been steady since February while project costs increased 5 to 6 percent. The slowdown is due to federal funding delays, and state fuel tax collections that have not kept up with project cost increases. Reed Construction Data reports a sharp drop in highway construction starts in September and October, and this will restrain jobsite spending well into 2008. The expected 5.8-percent rise in 2008 spending reflects rising project costs.



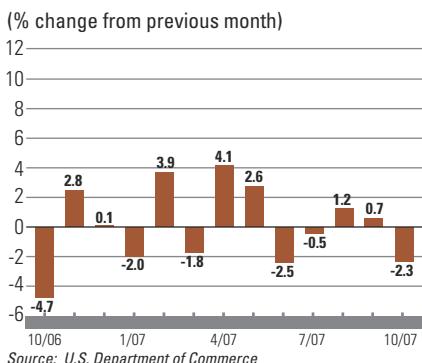
CONSTRUCTION EQUIPMENT PRICE INDEX

Construction-equipment prices and equipment rental rates increased 2.1 percent in the last year, in spite of a 40-percent-plus drop in U.S. equipment purchases, declining steel prices, and the rising prices for imported equipment. Manufacturers avoided price discounting, due to the \$600-million improvement in the U.S. equipment trade balance and the pass-through of higher energy, plastic and nonferrous prices.



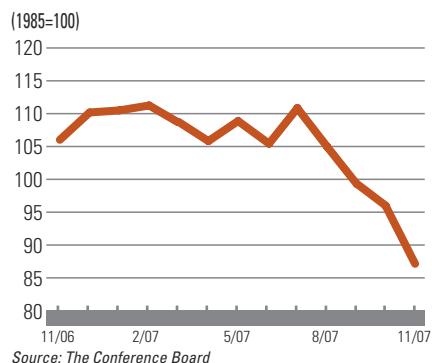
MANUFACTURING CONSTRUCTION SPENDING

Manufacturing construction spending measured after inflation peaked last summer has declined slightly since then, and is expected to be ebb slightly lower through 2009. Expected market share gains by U.S. manufacturers from a cheaper dollar will be offset by the negative impact on factory production from the projected subpar GDP growth rate. This will keep factory capacity utilization near 80 percent, and will be enough to almost maintain the current level of factory construction.



CONSUMER CONFIDENCE INDEX

Consumer confidence has been pushed lower by persistent high energy prices, falling home asset values, and a looser labor market. Business and investor confidence has weakened similarly. The result is a likely further small confidence decline. The current confidence level will reduce economic growth to near nil by midyear unless, as expected, the decline in energy and home prices eases. Confidence has weakened the most in the Great Lakes Region, the Southwest and Florida, and among low-income households.



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

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RUNNING GREEN

By WALT MOORE, Senior Editor

Breathing Easier with Aftertreatment

The basics about exhaust aftertreatment systems for original equipment and for retrofit

SECOND
In A Series

Engineers have been meticulously refining the diesel engine's combustion process during the past decade or so, and the result has been a spectacular reduction in the volume of pollutants exiting the exhaust stack. The design of the combustion chamber itself has been overhauled; electronic, high-pressure fuel-injection systems have evolved; variable-geometry turbochargers and charge-air coolers precisely regulate and condition intake air; and exhaust-gas recirculation retards pollutant formation at the point of combustion.

The two diesel-exhaust pollutants that engineers have had chiefly in their sights, as you may well know by now, are particulate matter (PM), which is soot resulting from incomplete combustion, and oxides of nitrogen (NOx), primarily NO (nitrogen oxide) and NO₂ (nitrogen dioxide), which have a poisoning effect on the air around us.

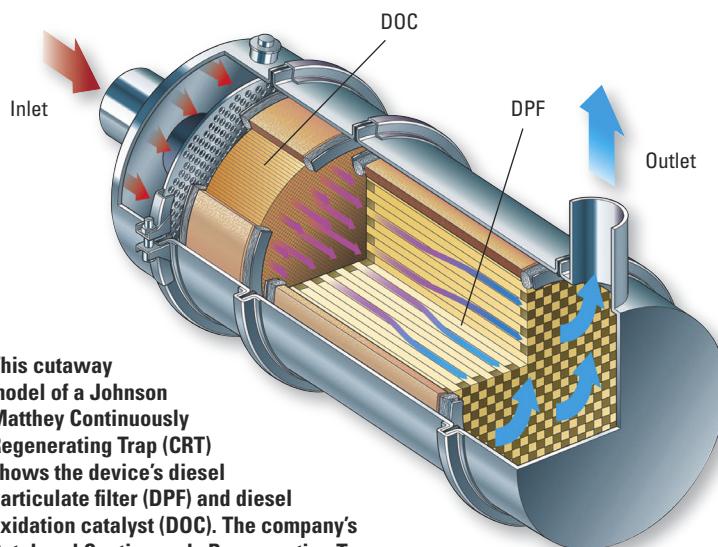
For the most part, when bringing 2007-model, heavy-duty, on-highway diesels into compliance with the ever-tightening regulations of the Environmental Protection Agency (EPA), engineers had to look beyond the combustion process in the cylinders and to the diesel's exhaust stream — that rush of hot gases from the exhaust valves — for ways to further reduce PM at the stack. The technique of cleaning the exhaust stream (versus controlling pollutants within the cylinders) is termed "aftertreatment." Thus, to diminish PM, most 2007-model, heavy-duty, on-highway diesels are operating with a diesel particulate filter (DPF) in the exhaust stream.

Looking ahead, as NOx regulations become even more stringent, many engines in this category, by year 2010, will likely also be fitted with a NOx aftertreatment system. And it's possible, of course, that as off-highway diesels become subject to the EPA's Tier-4 Interim and Tier-4 Final regulations, they, too, may be equipped with similar PM and NOx aftertreatment systems.

DPFs, DOCs and regeneration

The typical diesel particulate filter is a ceramic-like cylinder — perhaps 12 inches in diameter and up to 15 inches long — encased in a metal sleeve. The cylinder has row upon row

Johnson Matthey Continuously Regenerating Trap



This cutaway model of a Johnson Matthey Continuously Regenerating Trap (CRT) shows the device's diesel particulate filter (DPF) and diesel oxidation catalyst (DOC). The company's Catalyzed Continuously Regenerating Trap (CCRT) adds a catalyst to the DPF in order to promote enhanced passive regeneration.

of small square channels running between its two faces. Because the channels are plugged at alternate ends, exhaust gases must pass through the channel walls (where soot is deposited) and into adjacent channels to find outlet at the other face. The DPF usually is fitted with clamp-on inlet and outlet sections, which give the assembly the appearance (and typically also the function) of a large muffler.

Quite often, another piece of hardware, a diesel oxidation catalyst (DOC), is clamped into the DPF assembly between the inlet section and the filter section. The DOC is a flow-through, honeycombed, stainless-steel or ceramic structure coated with a catalyst to promote chemical reactions. When used in conjunction with a DPF, the DOC's main job is to keep the filter clean by burning away accumulated soot — a process called "regeneration."

DPF regeneration can be either "passive" or "active." Passive regeneration, which is used primarily with DPFs in retrofit situations, occurs continuously and automatically — assuming that the exhaust stream meets certain requirements. In the passive process, the DOC oxidizes a portion of the NO in the exhaust gases to NO₂. The NO₂, an extremely reactive gas, burns away the soot and leaves primarily NO and CO₂ (carbon dioxide).

The effectiveness of passive regeneration depends on exhaust temperatures being around 500 F for a significant portion of the engine's operating time, and also on the ratio of NO_x-to-PM being in a suitable range. On the latter point, if the engine is efficient at limiting its production of NO_x, then its exhaust stream may not support passive regeneration effectively.



In some instances, as with Johnson Matthey's Catalyzed Continuously Regenerating Trap (CCRT), the particulate filter itself has a catalyst that promotes further production of NO₂, thus supplementing the action of the DOC and potentially allowing regeneration at lower temperatures. The Donaldson Emissions Group has passively regenerated DPF units that use no DOC, only a catalyst on the filter.

Active regeneration, on the other hand, uses the DOC primarily to raise exhaust temperature. When, at the proper time, diesel fuel

The conventional muffler on this Caterpillar motor grader has been replaced (retrofitted) with a Longview System from Cleaire Advanced Emission Controls. In separate but integrated processes, the Longview reduces oxides of nitrogen, and then removes nearly all particulate matter, carbon monoxide and hydrocarbons.



RUNNING GREEN

is injected into the exhaust stream ahead of the DOC, the catalyst becomes a "flameless heater," says Fred Schmidt, director for Donaldson's Emissions Group, and boosts exhaust temperature to around 1,300 F. At that temperature, oxygen in the hot gases combusts the soot, leaving primarily CO₂ and water. Some passive soot burning occurs in an active system, says Schmidt, but that's not the primary purpose.

Most heavy-duty trucks rolling out of the factory today are equipped with an active regeneration system for the DPF. Even though

the active system requires electronic intelligence to control the fuel-injection process and to decide when conditions are right for regeneration, it is the more reliable of the two methods, and its efficiency is not influenced by the NOx/PM ratio. Truck manufacturers have built safeguards into the process to ensure that the vehicle and its surroundings are protected when regeneration occurs, a process that typically cleans soot from the DPF in 15 minutes or so.

Just to keep the record straight, not all active-regeneration systems employ a diesel oxidation catalyst. Notable among these non-DOC systems is that used by Caterpillar. It's our understanding that the Caterpillar system uses a separate diesel-fired burner to elevate exhaust temperatures for regeneration.

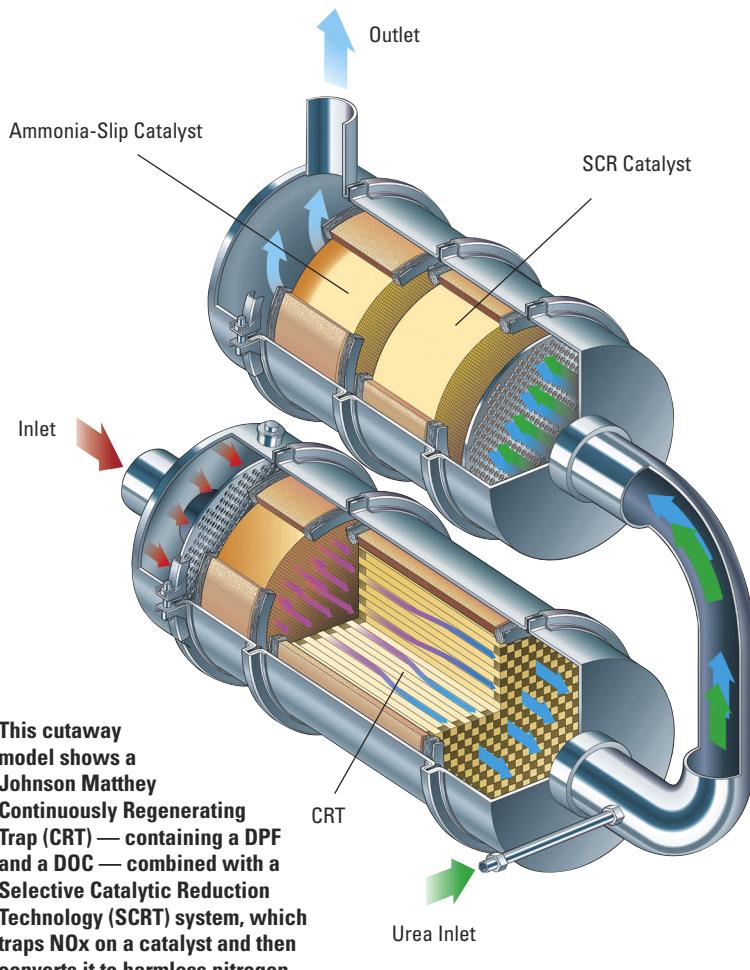
In addition to soot, however, the DPF also collects "ash," which is primarily the residue of additives in the engine's lubricating oil. Because ash does not burn away during regeneration, the DPF must be periodically cleaned of this substance. Unclamping the DPF assembly's sections allows relatively easy removal of the filter for cleaning.

A number of companies have developed proprietary equipment for cleaning the DPF of accumulated ash. Systems from SPX, Donaldson and Cleaire, for example, use patented techniques involving compressed air, vacuuming and ash collection. Cleaning ash from the DPF may be required at intervals ranging from 150,000 to 300,000 miles, and the process likely will take about the same time as an oil change.

Future NOx encounters

When meeting the EPA's NOx regulations for 2010-model heavy-duty, on-highway diesels, engine manufacturers may opt to comply with varying technologies. For example, according to *Construction Equipment's* truck editor, Tom Berg, Cummins will use more sophisticated in-cylinder techniques to meet 2010 NOx standards in its larger on- and off-highway diesels. The company's medium diesels, however, likely will be made compliant with a NOx aftertreatment system. (See CE's November 2007 issue.)

Johnson Matthey CRT and SCRT System



This cutaway model shows a Johnson Matthey Continuously Regenerating Trap (CRT) — containing a DPF and a DOC — combined with a Selective Catalytic Reduction Technology (SCRT) system, which traps NOx on a catalyst and then converts it to harmless nitrogen when urea is added to the exhaust stream. An ammonia-slip catalyst reduces ammonia that gets by the SCR catalyst.

For those engine manufacturers opting to meet the EPA's 2010 NOx regulations with an aftertreatment system, then vehicles using these engines may be equipped with a NOx adsorber or a selective catalytic reduction (SCR) system — most likely the latter.

The NOx adsorber uses a catalyst to initially trap and hold harmful compounds of nitrogen. Some have likened the catalyst to a "molecular sponge." But like a sponge, it can only hold so much before it must be emptied — or regenerated. Regeneration is initiated with periodic injections of diesel fuel, which reacts over the catalysts involved to first liberate the NOx, then to convert it to benign nitrogen gas (N₂). But this process is not simple, and poses technical challenges.

Although the NOx adsorber is extremely efficient at trapping NOx, it is finicky about its regeneration environment, requiring an oxygen-deficient exhaust stream that is difficult to achieve, thus posing a technical barrier to the NOx adsorber's practicality. In addition, the NOx adsorber is susceptible to fuel-sulfur poisoning (even with ultra-low sulfur fuels), and the temperature at which it regenerates is higher than that required by the DPF, a situation that might make the two systems incompatible.

So, at the moment, says Donaldson's Schmidt, SCR seems to be the winning technology.

The SCR process, like the NOx adsorber, uses a catalyst to trap NOx. But instead of diesel fuel as the "reductant," SCR employs ammonia (NH₃), which reacts with captured NOx in the presence of a catalyst to form N₂. The favored source of ammonia at present is an aqueous solution of urea, which decomposes, when periodically injected into the exhaust stream, to form ammonia and carbon dioxide. In addition, a DOC may be used after the SCR system to neutralize excess ammonia that might slip past when exhaust temperature is too low for regeneration or when too much urea is injected.

In Europe, SCR is accepted technology. But in the United States, the EPA has expressed concerns — not about the effectiveness of the technology itself — but about the possible lack



of infrastructure to distribute urea and about the possibility of operating the engine without urea. Recently, the EPA issued guidelines that address the design of SCR systems to mitigate the latter concern.

Retrofitting for cleaner air

More and more governmental bodies in "non-attainment areas" (geographical regions that fall short of the EPA's standards for clean air) are including the reduction of pollutants from older diesel engines in their clean-up

In addition to this patented system that uses compressed air to remove ash from the diesel particulate filter, Donaldson also manufactures a thermal-cleaning unit for restoring a DPF that has become plugged with soot, the result perhaps of a faulty turbocharger or faulty injector allowing over-fueling.

DPF Passive Regeneration and NO₂ Concerns

Some emissions experts are questioning the level of NO₂ emitted from the stack when using a highly catalyzed or "low-temperature" DPF in retrofit situations. These devices can regenerate at lower temperatures by converting more NO in the exhaust stream to NO₂, which reacts with soot to clean the DPF. According to Cleaire Advanced Emission Controls' Tom Swenson, California will not permit more than a 30-percent increase in NO₂ at the stack, compared to the level coming from the engine's cylinders, and that number will soon drop to 20 percent. Total engine-out NOx does not change during passive regeneration, but the ratio of NO to NO₂ changes, and NO₂ is a worse offender.



RUNNING GREEN



Cummins Emission Solutions operates a manufacturing facility in Mineral Point, Wis., to manufacture diesel particulate filters, and company facilities in the United Kingdom and South Africa produce selective catalytic reduction (SCR) systems for European truck makers.

strategies. Some jurisdictions, in fact, might require that machines used on public works projects meet specific emissions standards.

In some instances, incentives, such as tax credits or grants, may be offered for cleaning up an older diesel's exhaust; and qualifying measures might include re-powering with emissions-compliant engines, rebuilding engines to include emissions controls, using ultra-low-sulfur fuel, and installing exhaust aftertreatment systems. Our scope here is to look briefly at retrofit aftertreatment systems.

When considering any type of aftertreatment for retrofit, first make sure that the system is on either the EPA's Verified Technologies List (<http://www.epa.gov/otaq/retrofit/index.htm>), then click on "Verified Technologies List," or on a similar list from the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/vt.htm>), then click on



This Donaldson diesel particulate filter, manufactured for retrofit applications, illustrates how the assembly's sections are clamped together.

"Currently Verified Technologies."

Remember, too, that before installing a retrofit device, a qualified supplier might have to instrument and monitor your machine's operation for several days in order to competently recommend (or not recommend) a particular system. For example, does the machine's duty cycle allow exhaust temperatures to remain high enough for sufficient periods to passively regenerate a catalyzed DPF?

According to Schmidt, three basic retrofit technologies ("good, better and best," he says) typically are available for particulate control on older diesels: the DOC, the partial filter, and the DPF.

When the diesel oxidation catalyst is used alone (not in conjunction with a DPF) as a means for reducing particulates, it uses a different catalyst than when its function is to clean the DPF. The catalyst used in the stand-alone DOC basically strips off the "soluble organic fraction" (SOF) portion of PM. The SOF consists essentially of unburned portions of diesel fuel and lubricating oil that condense on the sponge-like carbon particles.

Compared to the DPF, the stand-alone D O C is perhaps 20 to 30 percent effective at reducing total PM, but does little to reduce the volume of solid carbon particles. Reducing the SOF is a plus, however, and the stand-alone DOC does not require ultra-low-sulfur fuel. The price for a retrofit DOC might be in the neighborhood of \$2,000 to \$4,000, maybe more if a dual system is required or if installation is difficult.

Partial filters are 40 to 70 percent effective at capturing soot and may use filtering material such as metallic fleece that is laminated between layers of corrugated steel. The filter traps a portion of the carbon particles present in the exhaust stream, but usually does not trap ash. Partial filters are passively regenerated, either by using a catalyst on the filter or by employ-

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Certain Volvo and Mack truck models use a compact DPF that resides behind the right front wheel.

ing a diesel oxidation catalyst, thus requiring ultra-low-sulfur fuel to protect the catalyst from sulfur poisoning. The partial filter might cost between \$5,000 and \$6,000.

(According to some aftertreatment specialists, particulate filters that use passive catalyzed regeneration systems are limited to 1994 and newer non-EGR [exhaust-gas-recirculation] engines. Pre-1994 engines might overwhelm a passively regenerated soot-filtering system, and [to add a twist of irony here] cooled-EGR engines may not produce enough NOx for a passive system to convert NO to sufficient quantities of NO₂ for combusting the soot.)

Older diesels also can be fitted with a full DPF, usually at a cost (depending on engine horsepower) between \$7,000 and \$10,000.

But costs can vary dramatically. Some large engines, for instance, may require dual systems to handle high exhaust flows, driving the cost to perhaps \$20,000 or more.

Retrofit DPFs typically require higher exhaust temperatures to passively regenerate, compared with temperatures required for partial filters. If temperatures are insufficient, then an active system is required, such as an integral electrical heater plugged in overnight. In theory, non-catalyzed, actively regenerated particulate filters could be retrofitted to any diesel.

“Low temperature” DPFs, which employ more catalyst to produce more NO₂, can passively regenerate at temperatures below those required for a standard DPF. But the possibility of this process resulting in excess NO₂ at the stack has the EPA and CARB concerned. (The sidebar, “DPF Passive Regeneration and NO₂ Concerns,” addresses this issue.)

For older trucks and machines that might require both particulate and NOx control, the “lean NOx catalyst” combined with a catalyzed DPF may be a retrofit possibility. Cleaire Advanced Emission Controls, for example, manufactures a retrofit system (the Longview) that combines these two technologies.

According to Tom Swenson, director of sales and verification for Cleaire, the lean NOx catalyst uses continual injection of a small volume of diesel fuel into the exhaust stream to reduce NOx over a proprietary platinum catalyst, producing benign nitrogen gas and oxygen. Unlike the NOx adsorber, the lean-NOx catalyst works well in an oxygen-rich environment, but it is not nearly as effective at reducing NOx as the adsorber, and thus is not considered for use on new engines.

With ultra-low-sulfur fuel, the Longview has a stated NOx-reduction capability of at least 25 percent, but, says Swenson, that number might be closer to 35 to 40 percent in off-road applications, where exhaust temperatures generally are higher. Minimum particulate reduction is rated at 85 percent. The proprietary catalyst that coats the Longview’s particulate filter promotes oxidation of collected soot and also converts CO and hydrocarbons into benign gases and water.



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Cover Story: Sneak Peek

By LARRY STEWART, Executive Editor



Your Exclusive Preview of **Conexpo-Con/Agg 2008 Innovations**

Enjoy the first look at some of the inventions, redesigns, upgrades and fresh competitors that will fill nearly 50 acres at the Las Vegas Convention Center on March 11-15, 2008



Terraquip HX Crawler Dozers

The elevated drive and undercarriage configuration of two HX tractor dozers from Terraquip makes the 270-horsepower HX SD7 and 425-horsepower HX SD9 the first and only high-drive alternative to Caterpillar's dozers. The units are Cummins powered (QSM11 and QSX15, respectively), employing power-shift transmissions and oil-cooled clutches. Operating weight of the HX SD7 is 59,500 pounds and the HX SD9 works at 106,925 pounds. Suggested retail prices are \$350,000 and \$575,000, respectively. The tractors are manufactured by the Chinese Changlin Co., and distributed by Terraquip, headquartered in Toronto.

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▲ **John Deere 313 and 315 Skid Steer Loaders**

John Deere added the 313 and 315 — with rated operating capacities of 1,300 and 1,500 pounds — to its 300-Series skid steer family. Both are equipped with Deere's PowerTech 4024T 2.4-liter engine rated at 2,400 rpm. Heavy-duty drive chains never need adjusting. Deere prides itself on 360-degree visibility, pointing out that the operator can see the tires and ground around the machine with the boom in the rest position. The radial-lift boom allows the bucket to rest close to the machine, but it swings forward for more reach when raised to what Deere calls the work zone, 4 to 5 feet high.

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▲ **Bradco Magnum Wood Chipping Attachments**

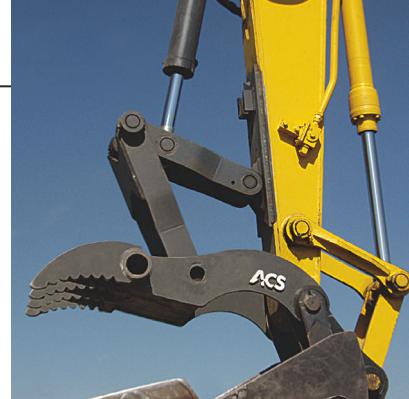
Bradco's Magnum Mulcher brush-cutter heads are available in five sizes ranging from 165 to 500 horsepower for skid-steers, loaders and excavators. The fixed-tooth cutter/mulcher head uses a patented hammer design. The attachments are configured to mount close to base machines with a low profile to improve operators' visibility to the work and balance the carrier for less damage to the site. The Bradco brand is owned by Paladin.

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▲ **ACS Progressive EZLink Thumb**

ACS moved the thumb-linkage pivot point to a bracket welded on the face of the machine stick eliminating the need for custom linkage designs for each machine model. The Progressive EZLink Thumb uses the same linkage for all machines in a carrier size range. The result is substantially decreased installation time (ACS estimates 3.5 to 4 hours), and better parts availability.

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▲ **GOMACO Commander III**

The Commander III machine, featuring GOMACO's G21 digital operating system, is designed for slipforming such structures as curbs and gutters, monolithic sidewalks, barrier walls, bridge parapets, irrigation canals, and 20-foot-wide slabs. Its All-Track Steering system gives the machine added maneuverability, and its All-Track Positioning system (with each leg individually adjustable) provides more latitude for accommodating jobsite obstacles.

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▲ **Intensus GR135 Motor Grader**

Powered by a Tier-3-certified, 135-horsepower Cummins QSB5.9 diesel, the 11-metric-ton Intensus GR135 motor grader pushes a 12-foot moldboard. With an available ripper/scarifier, it can tackle big jobs, while retaining the agility to handle smaller work. The Chinese manufacturer offers a GPS grade-control system to improve grade precision.

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► Hypac C766D Tandem Roller

Along with fitting a Tier-3-certified 130-horsepower QSB 4.5 Cummins diesel, Bomag also completely redesigned the operator's station of its Hypac C766D tandem vibratory roller with a sliding and swiveling seat and direction/speed-control joystick with a thumb-tip vibration switch. The top of the infinitely variable vibration-frequency range is 4,000 vibrations per minute. All daily greasing requirements on the 24,300-pound Hypac have been eliminated.

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► Komatsu PC270LC-8 Crawler Excavator

The 66,500-pound PC270LC-8 excavator is improved with Komatsu's 187-horsepower SAA6D107E-1 engine. Komatsu says the multi-staged fuel injection is Tier-3 certified without sacrificing power. An improved-flow merge/divide valve and high-efficiency hydraulic components reduce pressure loss, and the new arm quick-return circuit reduces overall cycle times.

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► Ashland CS18-HD Towed Scraper

Weighing nearly 25,000 pounds, Ashland says its CS18-HD pull-type scraper is the heaviest-duty offering in the 18-cubic-yard class. The CS18-HD matches tractors with 325 or more horsepower, and transfers load to the tractor for improved traction. Lift cylinders are mounted higher to keep out of dirt and rocks. Its four 23.5x25 tires are set back from the bowl, allowing dirt to fall through to the ground without plugging. And the 16-inch-diameter, 7/8-inch-thick walled front pipe is elevated to allow a 22-inch clearance between the front section and the ground.

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► Ingersoll Rand Vibratory Plate Compactors

At 150 pounds, the BXR-60H reversible vibratory plate compactor offers 3,417 pounds of centrifugal force at 5,600 vibrations per minute. The BXR-200H weighs 518 pounds and provides 7,053 pounds centrifugal force at 4,200 vpm. Both are powered by

Honda four-cycle gas engines with recoil start. The BXR-60H's 14x19-inch plate can cover 4,500 square feet per hour, compacting to a depth of 13 inches. With an 18x29-inch plate, the BXR-200H can cover 5,231 square feet/hour, compacting down to 18 inches.

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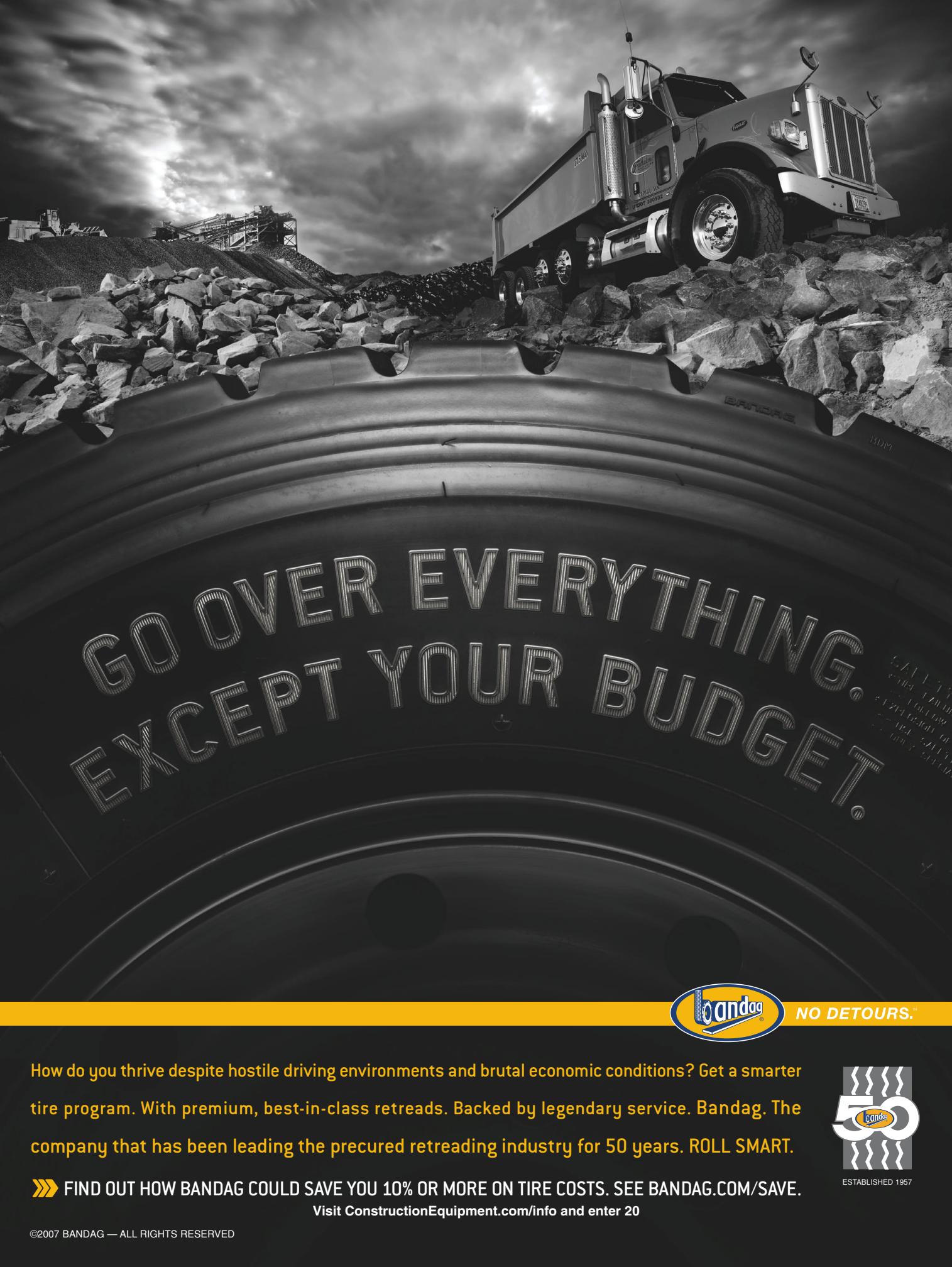


► Shindaiwa Simul-Phase Portable Generator

Shindaiwa Construction Products has patented what it calls Simul-Phase Technology, with an alternator that allows simultaneous use of dual-voltage single-phase and three-phase current from a mobile generator. Users will have 120- and 240-volt power for lights, air conditioners and electric tools, and at the same time supply three-phase 240/480-volt power for motors driving compressors, pumps, and such from the same generator. Simul-Phase will be introduced on the new kWiet Power model DGK250, a 20-kilowatt generator, and the technology will eventually be rolled into the entire kWiet Power lineup from 20 to 120 kilowatts.

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ESTABLISHED 1957



▲ Vögele Vision 5200-2 Asphalt Pavers

Vögele will launch its next-generation asphalt pavers — the Vision Series — in North America starting with the 10-foot, tracked Vision 5200-2 and the wheeled 5203-2. Flow gates are eliminated in favor of independent conveyor and auger drives. The pavers are powered by a 240-horsepower Cummins diesel. Three electric screeds will be available for these machines, including the Carlson EZ-III 1017 and EZ-IV 1019 screeds with front-mounted extensions and HR 500 E rear-mounted screed.

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▲ Allmand SIS 1250-Watt Lighting System

Allmand's SIS 1250 system combines fixture, lamp and ballast for greater illumination of outdoor sites. At 150,000 lumens (compared to 110,000 lumens with a standard 1,000-watt lamp), the system provides a 30-percent increase in light output and a 20-percent increase in area lit to one-half footcandle or higher. The 1250-watt lamps and ballasts are designed for use in Allmand's SHO parallel lamp fixture. They produce whiter light, with a color index number of 3954.

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▲ Pettibone T10056 Telehandler

Pettibone will stretch the capabilities of its T10056, adding 1,000 pounds of capacity to make it an 11,000-pound machine and six inches of vertical reach to a working height of 57 feet. The unit also features 70 inches of horizontal boom travel at every lift height, which allows operators to load and unload the forks more easily.

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► Wacker WL-Series Compact Wheel Loaders

Wacker enters the loader market with three articulated compact wheel loaders positioned as alternatives to skid-steers. The 3.3-ton WL 30 has a straight load capacity of 4,437 pounds and fully articulated tipping capacity of 3,647 pounds using a standard 0.59-cubic-yard bucket. The 2.75-ton WL 25 manages a fully articulated tipping capacity more than 2,950 pounds with a standard 0.46-cubic-yard bucket. The WL 18, weighing just under 2 tons, will lift 1,640 pounds at full articulation. Perkins power ranges from 25 to 48 horsepower. Wacker claims the loaders can perform the same tasks as higher-powered skid-steers at up to 30-percent fuel savings, and that they are faster on the jobsite, easier to transport and should have greater resale values.

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► Atlas Copco HB 10000 Hydraulic Breaker

Atlas Copco says its 11-ton HB 10000 hydraulic breaker will become not only the largest model in its breaker line, but also the largest and most powerful hydraulic breaker in the world and a major step toward a true alternative to drilling and blasting. AutoControl adapts breaker frequency and power output to match operating conditions, reducing excess shock to the equipment; and PowerAdapt automatically shuts down the breaker if it receives excessive oil pressure from the carrier.

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Case 1650L Crawler Dozer

A new single-lever control on Case's 1650L crawler dozer commands the PowerStat hydrostatic drive. The operator can also adjust the sensitivity of the steering and the forward/reverse modulation to match personal preference or application conditions. Drive motors deliver power independently to each track. A 144-horsepower, 6.7-liter Case Family IV diesel is connected to the hydrostatic pumps by a drive shaft, reducing machine vibration. Operating weight of the 1650L LGP is 37,578 pounds.

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Terex Reedly R30C HYDRA-TRAC Rock Drill

The Terex Reedly R30C replaces the 345C with enhancements to the operators' station such as armchair joystick controls, hydraulic valves moved further away, improved visibility, pressurized cab, and standard automotive power outlet for cell-phone chargers or other portable electrical devices. The boom extension is 5 feet longer, and the RC30's pattern coverage is more than twice that of the 345C. Terex Reedly's SmartDrill drilling system uses anti-jam, anti-plug and anti-plunge features to

lengthen drill-string life and increase production. The R30C is powered by Caterpillar's Tier-3-certified C-9 diesel rated at 300 horsepower.

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Caterpillar 992K Wheel Loader

The Caterpillar 992K wheel loader is a 21-ton-capacity loader matched to Cat's 777 and 775 trucks. The 801-horsepower C32 ACERT engine delivers more power and improved fuel efficiency than the 3508B used in the 992G. Cat exclusive sleeve bearing pins eliminate the need for daily greasing of the front linkage. Electronically controlled lift and bucket tilt detents can be set from the operator seat. Rearview camera is optional.

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Wirtgen W 120 F Milling Machine

Wirtgen will replace the W 1200 F/T milling machine with its new W 120 F — what the company says is the first 1-m to 1.30-m front loader in North America with a 4-foot drum. The W 120 F can be equipped with Wirtgen's Flexible Cutter System (FCS) and the new Wirtgen Level Pro leveling system.



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JCB Robot 180 Skid Steer

The Robot 180 is JCB's first 1,800-pound-capacity skid-steer. The 60-horsepower loader weighs 5,445 pounds. New multi-function controls built into the servo levers offer control of auxiliary hydraulics. A Series-II cab expands the operator's view to the work area, and the door hinge (JCB remains the only skid-steer with a side door for operator access) has been moved to the cab's B pillar. The left-hand servo pod of the mini-excavator-style seat lifts up to enlarge the entry.

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Kenworth-Eaton Hybrid Makes Clean Deliveries

“Diesel-electric” truck saves about 35 percent in fuel for its owner, a building supply chain located in hilly Seattle, Washington

With diesel fuel costing around \$3.50 per gallon and probably going higher, is it time to be looking at hybrid-drive trucks? If a hybrid can cut 35 percent off your fuel bill, as this Kenworth-Eaton vehicle is doing for its owner in Seattle, Wash., is it something you'd consider? Sure, you might say — after somebody else wrings out the bugs, and the upfront cost of these contraptions comes down.



One of those somebodies is Robert Dunn, chief executive officer of Dunn Lumber Co., a building supply retailer in the Seattle area. He has previously approved the purchase of progressive componentry in his fleet of delivery trucks, including automated mechanical transmissions in heavy road tractors, and was excited about the prospect of buying the hybrid.

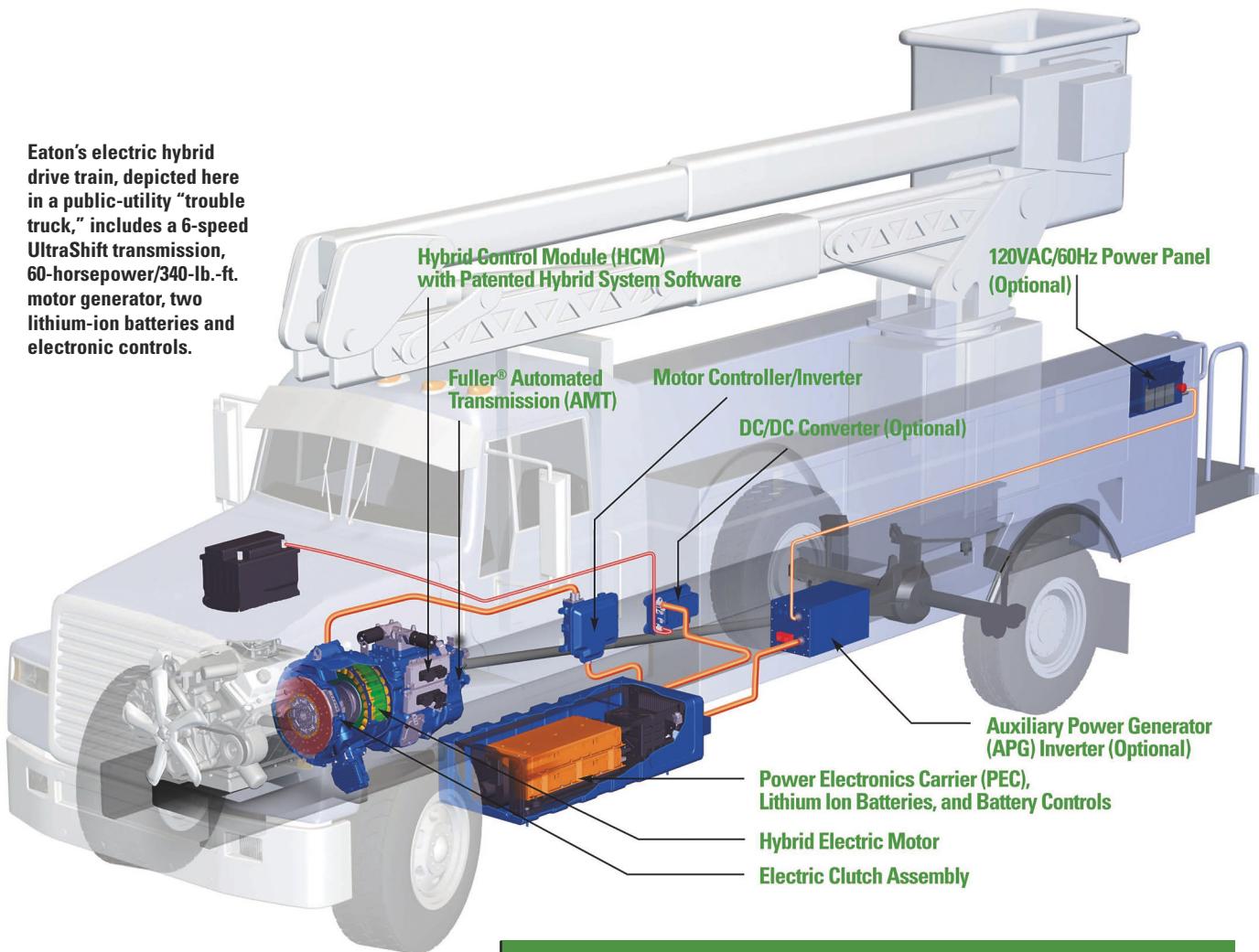
Partly through its fleet of well-maintained delivery trucks, Dunn tries to foster an image of quality, and the hybrid would add some “green” to the new truck’s handsome blue paint.

“Let’s do it,” he told his fleet manager, Mark Geyer, and they got the special T300 last summer. They’ve labeled it “diesel electric” to call the public’s attention to its unusual power train. Kenworth wanted to display it at the annual meeting of the Hybrid Truck Users Forum (HTUF) in September, but Dunn kept it out so I could drive it — pretty nice, I thought.

A special label on the hood suggests what it is, but otherwise you’d have to look closely to see any special equipment on the KW T300 hybrid. It looks like other KW mediums in the Dunn Lumber fleet.



Eaton's electric hybrid drive train, depicted here in a public-utility "trouble truck," includes a 6-speed UltraShift transmission, 60-horsepower/340-lb.-ft. motor generator, two lithium-ion batteries and electronic controls.



On the price front, Eaton Corp. announced that it was putting its electric hybrid systems into production, and several truck builders, including Kenworth, said they'd begin assembling hybrids starting later in '08.

Regular production lowers asking prices and tempts orders, leading to higher volumes that bring prices down further. Hybrids are becoming affordable, and the pre-production vehicles already out there and working are showing that, after some teething problems, they are reliable, too.

HTUF members, acting as a consortium, have obtained three types of diesel-electric vehicles now at work: public utility trucks, whose crews use man buckets, booms and power tools to fix downed lines and other damage to electric power grids; walk-in vans, operated by large package delivery fleets (many acquired independent of HTUF coordination); and medium-duty delivery trucks, run by a smattering

TEST SET

Truck: Kenworth T300 conventional-cab 4x2 w/10-5/8- x 5/16-in. steel main rails; GVW 32,000 pounds

Engine: Paccar PX 6 (Cummins ISB), 240 hp @ 2,300 rpm, 560 lb.-ft. @1,600 rpm

Transmission: Eaton electric hybrid system

Front Axle: 12,000-lb. Dana Spicer E-12021 on 12,000-lb. taperleafs

Rear Axle: 21,000-lb. Dana Spicer 21060S on 20,000-lb. Reyco 79KB taperleafs, w/5.57:1 ratio

Wheelbase: 236 inches

Brakes: Bendix S-cam air w/Bendix ABS

Body: Northend 20-ft. tilt-up steel flatbed

of private fleets. Dunn's T300 falls in the third category, and is the first hybrid sold by Kenworth, based in nearby Kirkland, Wash.

The Class 7 T300 hybrid is a pre-production vehicle. Kenworth has split its midrange T series into several weight-based models, including a Class 6 T270 and Class 7 T370,

Hands-On Trucking



Cummins-made Paccar PX 6 supplies diesel power, as it will in future Kenworth and Peterbilt medium-duty hybrids.



Electronic controls (in aluminum box) sit atop cooling system, both hung on the frame behind the cab. Lithium-ion batteries are in a nearby box.

branded Cummins ISB. The engine has EPA-'07 specs, so exhales through a particulate filter; that and many other advances over '06 diesels means this engine emits absolutely no smoke or odor. It and a PX 8/ISC are now the only engines available in Kenworth and Peterbilt midrange trucks, as Paccar (which owns the two companies) has dropped the Caterpillar C7. The hybrid is Dunn's first Cummins-powered T300, and so far it's worked well, says

which will have hybrid drive as an option. They will use Eaton Corp.'s electric propulsion system, which includes a 6-speed Fuller UltraShift AMT linked to a 60-horsepower electric motor-generator and two lithium-ion batteries operating at 340 volts.

Sophisticated electronic controls coordinate the workings of the hybrid components with a 240-horsepower Paccar PX 6 diesel, a private-

Geyer, who previously had spec'd Cat diesels. The "two-pedal" UltraShift is Dunn's first.

For this short trip, Geyer directed me into Seattle's hilly Queen Anne area, a neighborhood of million-dollar views and equally pricey old homes, some under rehabilitation. Dunn sells a lot of lumber and supplies to owners up there and, of course, delivers them. Streets are narrow, and access to some of the properties is somewhat cramped, so many runs there are made by smaller Isuzu low-cabovers that he inherited when he took this job.

But larger trucks also go there, and one thing Dunn drivers are used to, and I was not, is where to place the truck on the slim streets. Long mirror arms extend from the sides of the T300's narrow (by today's standards) cab, and it seemed like I would whack trees and poles with the right-side mirror. Gradually I learned to judge the truck, and in the meantime didn't clip anything.

Hilly streets in Queen Anne are a good test of any power train, as I found about a year and a half earlier, when Geyer let me drive a then-new T3 equipped with a smooth-working C7-Allison duo. We made a real delivery on that run, but with the hybrid, we just passed through, carting a 2,400-pound pallet of 2x4s for ballast.

While I like AMTs for their solid, no-mushiness feel, I observed that the self-shifting Eaton in the hybrid was occasionally a little awkward. It upshifted on one or two uphill gradients where it should have stayed in a lower gear, and caused the engine to bog a bit. But it recovered by quickly downshifting. If Allison people were along they'd laugh their tails off, I commented to Geyer, because this is exactly what they're talking about when they preach about the advantages of "continuous power." Engine power flows through the driveline even as the fully automatic transmission is shifting up or down. He nodded, because Allisons in other Dunn trucks are good performers.

As with a full manual, the engine pauses as the Eaton AMT changes gears. It "float shifts"

with the clutch engaged by carefully modulating throttle and the gear-changing mechanisms. Unlike medium-duty manual trannies, the UltraShift 6-speed has no synchronizers, so clutchless shifting doesn't hurt it if done properly. Eaton engineers have gotten the software so finely tuned that it never misses.

From a standstill, each of the automatic clutch engagements was flawless — smooth, sure and with absolutely no chatter, even when starting out on a hill in 2nd or 3rd gear. As with other UltraShifts, this one has no clutch pedal, so you just move your right foot from the brake pedal to the accelerator, and the rest is automatic. If a driver thinks he can do better, he can punch Manual and control the up- and downshifting. But using the Manual mode is not really a necessity, and actually I pretty much left the selector alone and we went up, down and around all those Queen Anne Streets just fine.

Electric launch occurred a few times, and regeneration happened often because downhill sections required frequent braking. That's when the motor on the driveline becomes a generator, sending voltage to the lithium-ion batteries in a box along a frame rail. You can feel the drag when you take your foot off the accelerator and, if that's not enough braking force for a situation, touch the air-brake pedal. The engine also had a Jake Brake that provided more retarding power, and we used it while we drifted down a long hill toward the end of our jaunt.

A liquid crystal display hung on the dash showed what was happening in the system — engine power, hybrid power, or braking regeneration. It also showed the extent of charge in the batteries. The LCD was a little hard to read, but production trucks will get a color display that's larger and brighter. Next to the LCD was a Garmin 7200 GPS navigation system, which Geyer has installed on most of the Dunn trucks. We didn't use it this day, but on regular runs it helps drivers find new addresses and saves "huge amounts of time," he said.

Between hybrid and Jake retarding, the service brakes on this truck won't be working hard, and Geyer expects savings in brake wear. It's too soon to know how much, because as of



a month ago, the truck had accumulated only 6,000 miles. But the 32,000-pound-gross-weight hybrid got 6.85 miles per gallon in mostly urban delivery service in one recent month, versus 5.06 mpg for other trucks of the same weight. But fuel savings alone will take about 10 years to pay back the hybrid's premium of \$20,000 against the T300's chassis price of about \$75,000. Kenworth is working to qualify the hybrid for federal tax credits, which would quicken a return on investment.

Up until now, most hybrid trucks I've heard of cost half again to twice as much as a straight diesel vehicle, so maybe Dunn got a good deal, or maybe component prices are already coming down, or both.

Except for a couple of dump trucks that Mack assembled for the U.S. Air Force using a Volvo electric hybrid drive train (CE March '07), no manufacturer has developed hybrids strictly for construction duties. Eaton and Peterbilt are readying a diesel-hydraulic hybrid for trash pickup service, and I've got to think that a hydraulic system would have a place in dump or mixer trucks, but we'll see as development continues. **CE**

To the left of the transmission selector is the LCD readout that tells what the hybrid system is doing. At far right is a time-saving Garmin GPS street-navigation unit.



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Buying File: Curb-and-Gutter Pavers

By MIKE ANDERSON, Senior Editor



Curb Your Enthusiasm?

Absolutely not, given the attention manufacturers are giving their curb-and-gutter machines

In what could be termed a maturation of the product type, the curb-and-gutter paving machine is being offered with more capabilities and options seemingly every time a new or updated model is introduced.

A manager with one leading equipment manufacturer has a theory as to why this specialized type of machine has developed rapidly of late.

"With so many of the contractors I talk to, the labor shortage is becoming a bigger and bigger and bigger concern," says Steve Milam,

regional sales manager with Power Curbers. "With the housing downturn, that may not seem to be as big an issue today as it was even two months ago. But in any case, I think in general the lack of people willing to go to work seems to be a big issue out there."

The industry leaders are, indeed, out in front in dealing with this.

Introduced by GOMACO exactly one year ago at the World of Concrete show, the 27,500-pound GT-3400 is the first curb-and-gutter machine controlled by remote control. The

With the fourth-generation model of the 5700 curb-and-gutter machine, Power Curbers offers a choice of control systems. The 5700-C's new electronic system offers the simplicity of an analog system with the features of a digital machine.

model's all-new three-track footprint features the all-track, five-mode steering system also available on the company's GT-3600 and Commander III models.

"The curb-and-gutter machine has definitely matured with the digital control systems providing simple setup and operation," says Kent Godbersen, GOMACO's vice president of worldwide sales and marketing. "The machine-poured curb has nearly eliminated the hand-poured process, basically because of production."

"We have a GOMACO customer in Alabama who poured over 16,000 feet of 30-inch-wide valley curb in nine hours."

The GOMACO curb-and-gutter line features the exclusive G21 digital operating system, which provides push-button steering setup and trainable track steering when interfaced with GOMACO's "smart" cylinders. The new G22 system, now an option on some models including the GT-3400, has a graphical display with colored pictograms depicting the machine's functions, as well as a second language feature.

With the "hook-and-go" mold system on the GT-3400 and GT-3600 models, contractors simply drive the machine up to the mold and hook the mount to a special attachment plate, avoiding the use of pins or latches. The operator hydraulically lifts the mold and goes right back to slipforming on the job.

Power Curbers has introduced a fourth-generation version of its top-of-the-line 5700 model, first introduced in 1985. The 23,600-pound 5700-C replaces the 5700-Super-B, and offers such labor-saving features and options as a choice of control systems, left/right pour capability, increased water and fuel capacity, a mold misting kit, a barrier mold lift kit, a post-hole digger, and a driveway knife.

"If you go back, especially 20 years or so, these machines were very manual-adjusted. Over the years, more and more of that manual adjustment has been replaced by hydraulic-adjustable features," says Power Curbers' Milam.

The 5700-C, he points out, is arriving on

jobsites more often with the optional quick-connect mold mounting system that was formerly available, but not at all mainstream.

"The standard mold mounting is fairly quick in and of itself, but for guys who are looking for something even quicker, we have this hydraulic mounting system that cuts it down to about five minutes or less. And there is very limited manual intervention; it's more or less a hydraulic process, so one guy can easily do it by himself," says Milam. "Some people over the years, due to the additional cost, may have said, 'No, I don't need that.' But as labor becomes more and more critical, I think we can see more people looking at that as a definite option that they need to get."

Huron Manufacturing continues to extend its background in large mining technology to the curb-and-gutter paving market, as evidenced in the Easi-Pour 880 Compact that competes as either a tracked or tired model in the 20,000- to 25,000-pound market.

"We've got a customer who's pouring foot-and-a-half radius with a new machine that's legs are turned with actuators rather than the standard steering cylinder setup," says Randy Sondreal, company president. "It came from a piece that we used to turn a conveyor on a 150,000-pound mining machine. We said, 'Look, can we get something smaller to put on a curb-and-gutter machine that will do the same thing?'

"There have been 10 people who have seen the machine, and of the 10, I bet six are going to buy . . . and they don't even need to buy now. They just liked so much what they saw that they're interested in trying something different."

The Easi-Pour has a 2-cubic-yard hopper capacity, "so while we're waiting for the next ready-mix truck, we just slowly inch along, never disturbing the quality of the curb. We're slowing production while we're waiting for the ready mix, but the curb looks like we never skipped a beat," says Sondreal.

"That's a huge plus. When you're going

The Cost of Ownership

Operating Weight (lb.)	List Price	Hourly Rate
Up to 12,500	\$67,901	\$36.11
12,501-23,999	\$152,973	\$75.89
24,000 and up	\$224,168	\$115.63

* Hourly rate is the monthly ownership costs divided by 176, plus operating costs. Unit rates used are diesel at \$2.83 per gallon, mechanic's wage at \$43.07 per hour, and money costs at 5.75 percent.

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

Buying File: Curb-and-Gutter Pavers



GOMACO's GT-3600, GT-3400 and Commander III curb-and-gutter machines feature all-track steering, for quick setting to line. The operator simply crab-steers the machine sideways to get on the stringline, then flips the switch to forward-steer and takes off slipforming.

around the radius, you don't have to have the ready-mix truck live with you. The ready-mix truck can't go around a 2-foot radius — he's got to pull forward and back up, pull forward and back up. With our machine, he doesn't have to. He fills it up at one end and we meet him about 40 feet later."

A new player

At the same time that established players from Lil' Bubba up to Miller Formless are enhancing their small and large products, emerging onto the North American curb-and-gutter scene is a new participant, albeit one firmly ensconced in the general paving business.

Visitors to Terex Roadbuilding's King of the Road dealer and customer event in late 2007 caught a glimpse of what will be that company's full-fledged entry into the market. Among the equipment on display was the three-track SF2003B, which has been marketed outside North America as Terex's only true curb-and-gutter machine, says Tom Dev-

onshire, Terex Roadbuilding's sales engineer, concrete mobile products. The roughly-20,000-pound machine has been established in Europe since 2003, and the hope is that, with upgrades and testing, it will be ready for marketing in North America at or near the start of 2008.

The upgrades represent the enhanced wants and needs of contractors in North America, says Devonshire.

"We offered a screw conveyor with a larger hopper because contractors want to have enough mud in the hopper to keep the paver moving," he says. "Just like any other piece of paving equipment, you have to keep the thing moving, because every time you stop, you create a bump. Curb-and-gutter is no different. Stopping creates a bump, which requires more hand finishing."

"Actually, in the curb-and-gutter market, tolerances are becoming tighter and they're starting to hold the paving contractor accountable for the curb-and-gutter work. It's just like mainline paving is — there are tolerances and ride specifications you have to meet."

As well, the addition of two-speed track motors "gives you that little better control at slower speeds."

As part of Terex, the former CMI operation in Oklahoma City is able to leverage being part of a worldwide company, says Larry Jack, Terex Roadbuilding's director of marketing and sales support.

"We have a lot of opportunity partnering up with some of our engineering groups and product development elsewhere," says Jack, "and looking at what's going on in other parts of the world."

Terex Roadbuilding also announced recently the offering of a new curb-and-gutter side kit for the Terex CMI SF2204B HVW, the company's "utility-sized" hydraulic-variable-width slipform paver.

"If you look at how the legs can swing on a parallelogram and maintain the pour position on the track, that's the same feature we have on the smaller SF2003," says Devonshire, who adds that the 360-degree visibility the SF2204B HVW provides operators will also lend itself to curb-and-gutter work. "You can see directly into the hopper — it's right there. If the opera-



tor's starting to overload his hopper, then he can shut his conveyor down or have the truck stop pouring mud into the hopper.

"When you're doing a lot of curb-and-gutter, you can run into obstacles. One of the other nice features about this is the actual frame can shift laterally. You can shift to the side, go around an obstacle, and then get back in place."

While larger than the horsepower and weight needs of most curb-and-gutter jobs, a side-kit-equipped SF2204B HVW unit offers an equipment utilization alternative for contractors.

"You spend the money on a paver, and you want to be working it to make the money, so you can configure it as a curb-and-gutter

machine also," Devonshire explains. "That way, you don't have to buy a second machine and run it."

"And, actually, the conversion's pretty quick. You take the existing tandem mold off, and the same sub-frame structure that supports the tandem mold will actually retract and extend out, and it'll attach to the I-beam underneath the tractor. Then we just equip it with a conveyor belt . . . and we're ready to go."

Ready to go join the curb-and-gutter game, that is. 

MBW offers slipform pavers at a size and price level that encourages replacement of hand forming. MBW pavers can pour to a radius of 18 inches in the vertical curb mode and 24 inches in the curb-and-gutter mode. The all-hydraulic pavers can be operated in two-wheel drive on foam-filled tires in curb-only mode and three-wheel drive in the curb-and-gutter mode.

Curb-and-Gutter Pavers (1,000 pounds and up)

Model	Drive Type (No. of Units)	Operating Weight (lb.)	Max. Mold Height (in.)	Max. Paving Width	Turn Radius	Gross Power (hp)
Power Curbers 440-XL	Wheel (4)	1,170	12	1'6"	4'0"	25
Messinger Curb Fox 2000	Tire (3)	2,000	14	1'6"	1'6"	18
MBW C101	Tire (3)	2,590	18	1'0"	1'6"	26.5
GOMACO Curb Cadet	Track + Wheel (1+8)	2,650	14	1'0"	2'0"	24
MBW C101-18	Tire (3)	2,725	18	1'6"	1'6"	26.5
MBW CG200	Tire (4)	3,395	18	4'0"	2'0"	26.5
Messinger Curb Fox 3000	Tire (3)	3,400	24	2'10"	2'0"	28
Miller Spreader MC1050 Curbilder	Tire (6)	4,800	18	4'0"	n/a	35
Messinger Curb Fox 5000	Tire (3)	5,000	24	5'0"	2'0"	28
LeeBoy LBC-24W	Tire (n/a)	7,500	24	4'0"	2'0"	44
Huron 650B	Tire (3)	9,900	48	n/a	n/a	80
GOMACO GT-6000-78	Track (2)	11,700	18	4'0"	n/a	92
GOMACO GT-6000-90	Track (2)	12,500	18	5'0"	n/a	92
GOMACO GT-3200	Track (3)	15,000	36	5'0"	2'0"	92
Miller Formless M-1000	Track (4)	18,800	32	5'0"	2'0"	115
GOMACO Commander II	Track (2)	20,000	32	5'0"	n/a	92
Huron 880 Tire	Tire (4)	21,900	42	8'0"	9'0"	118
Power Curber 5700-C	Track (3)	23,600	50	10'0"	1'8"	130
Huron 880 Track	Track (4)	24,000	42	8'0"	9'0"	118
GOMACO GT-6300	Track (3)	24,400	n/a	12'0"	n/a	155
Miller Formless M-8100	Track (4)	25,000	84	16'0"	18'0"	156
GOMACO GT-3600	Track (3)	25,670	24	2'0"	2'0"	99
GOMACO GT-3400	Track (3)	27,500	n/a	6'0"	2'0"	127
GOMACO Commander III-3T	Track (3)	29,300	n/a	3'0"	n/a	185
Huron 1000	Track (4)	31,000	84	16'6"	15'0"	185
Miller Formless M-8800	Track (4)	36,600	96	20'0"	30'0"	185

Source: Spec-Check.com Xpanded Specs (as of November / 07)

Gallery of Curb-and-Gutter Pavers

GOMACO

Three-Track Machine Controlled Remotely

Introduced at World of Concrete 2007, GOMACO's GT-3400 is the first curb-and-gutter machine to be controlled by remote control. Capable of either right- or left-side pouring, the GT-3400 was built to operate in tight-radius conditions with



an all-new three-track footprint featuring all-track steering. This also facilitates getting on and off the stringline fast, and minimizes machine length. Powered by a 136-horsepower electronically controlled Caterpillar engine, the two-track-speed GT-3400 can travel up to 125 fpm.

Number of models: 8

New model: GT-3400

Product-line features: The GT-3400 features the GOMACO G21 digital controller, but also offers the option of the new G22. Incorporating a dual-language feature, the G22 has an easy-to-understand graphical display with colored pictograms depicting the machine's functions.

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POWER CURBERS

New Control System for Updated 5700

In what is now the fourth generation in Power Curbers's 5700 Series of curb-and-gutter machines launched in 1985, the new 5700-C model is available with a choice of control systems. A new electronic system offers the simplicity of an analog system with the features of a digital machine, providing the operator greater flexibility for sensor adjustment. By looking at screens on his panel, the operator can determine if there is a cord, sensor or amplifier problem, and adjust before the curb is adversely affected. With the 23,600-pound 5700-C, Power Curbers switched to a 130-horsepower Cummins engine from the Deutz engine used in the 5700-Super-B model.

Number of models: 3

New model: 5700-C

Product-line features: The 5700-C offers a right-hand pour, in addition to the left-side pour traditional in North America. A standard swivel chute allows trucks to be lined up in front of the machine, instead of to the side, allowing for single-lane pouring.

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MILLER FORMLESS

Model Tackles Tight-Radius Applications

As part of a three-model product line topped by the market's largest unit, the M-8800 barrier wall machine at 36,600 pounds, Miller Formless offers a unique tight-radius four-track curb-and-gutter machine, the 18,800-pound M-1000. While all four tracks steer all the time for increased maneuverability, the M-1000's longer auger carries enough concrete to get the machine around tight-radius jobs as the mixer truck repositions. Each of the four-track M-1000, M-8100 and M-8800 models have new Tier 3 engines and new higher-capacity cooling systems.

Number of models: 3

Product-line features: As a solution for pouring wet/dry curb and gutter, the M-1000 has a mold with a variable gutter section that can be adjusted on the fly. This method keeps the face of the curb batter, the top of curb grade, and the offset correct while pouring transitions.

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Gallery of Curb-and-Gutter Pavers



HURON

'Compact' Available with Tires or Tracks

Available with a fine grade trimmer in various widths and diameters to facilitate simultaneous pouring and trimming, the Easi-Pour 880 Compact is Huron Manufacturing's most versatile and popular slipform paver model. The "Compact" can handle a radius as tight as 2 feet, pour barriers up to 42 inches high, pave widths up to 8 feet, and still be able to pour up to a mile a day. Just like the big-brother Easi-Pour 1000 model, the 880 Compact can be ordered with either large-diameter rubber tires or 12-inch-wide tracks.

Number of models: 4

Product-line features: Powered predominately by John Deere 4045T diesel engines, Easi-Pour 880 Compact slipform pavers use up-front conveyors to deliver concrete to the hopper. The hopper auger feeds concrete into the mouth of the slipform, which helps reduce the concrete pressure that can cause irregular curb and gutter.

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MESSINGER

Options Added to Largest Curb Fox

Messinger extended its compact curb-and-gutter product line upward into the 5,000-pound market with the 2005 introduction of the Curb Fox 5000. A new belt conveyor option was added in 2007 to allow the CF5000 to work at different grade levels in relation to the concrete truck. At a length of 6 feet and width of 24 inches, the hydraulically powered conveyor provides the paver with a steady supply of mix within a wide slump range. The Curb Fox 5000 joined the smaller CF3000 introduced in 2000 and the CF2000 introduced in 1996.

Number of models: 3

Product-line features: The Curb Fox 5000's new optional belt conveyor allows the concrete mixer to work to the side of prepared grade, instead of on it. When equipped with the conveyor, the CF5000 is still within legal transport width.

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LEEBOY

Control System for All-Wheel-Drive Unit

With its LBC-24W model, LeeBoy offers contractors a highly maneuverable, compact curb-and-gutter designed to provide productivity in an economical package. Measuring 12 feet in length, 4 feet in height, and 8 feet 6 inches in width when equipped with the mold, the LBC-24W moves efficiently around the jobsite and is easy to transport in and out. Powered by a 44-horsepower Kubota engine, the all-wheel-drive LBC-24W is designed to easily and accurately make curbing on grade or tight turns. The operator can control direction and steering from the front or rear.

Number of models: 1

Product-line features: For accurate curb placement, the LBC-24W is guided by Topcon System V Plus 1 electronic grade and steering control. The receiving hopper's gravity flow and two hydraulic vibrators assist in the delivery of concrete to the mold without augers.

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Gallery of Curb-and-Gutter Pavers

MBW

Company Offers Step up from Hand Work

With three model variations, MBW offers slipform pavers at a size and price level that encourages the replacement of hand forming. MBW pavers can pour to a radius of 18 inches in the vertical curb mode and 24 inches in the curb-and-gutter mode. The all-hydraulic pavers can be operated in two-wheel drive on foam-filled tires in curb-only mode and three-wheel drive in the curb-and-gutter mode.

Number of models: 3

Product-line features: From purchase price to transport via a trailer-equipped pick-up truck, the cost savings are described as significant. The crew size can be held to 2 or 3 people.

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TEREX

Big Player Eases into Market

Contractors were in for a pleasant surprise at Terex Roadbuilding's recent King of the Road event. Among the equipment on display was the Terex CMI SF2204B HVW hydraulic-variable-width slipform paver, for which a new curb or curb-and-gutter side kit is available. But also there was the SF2003B, Terex's only "true curb-and-gutter machine." The three-track unit had yet to be formally introduced in North America.

Number of models: Soon-to-be 2

Product-line features: The optional side kit for the SF2204B HVW allows the use of a heavier four-track paver for curb and barrier work. This can counteract the draft coefficient of concrete that can lift lighter curb-and-gutter machines when slipforming walls.

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LIL' BUBBA

Features Added to Tack-Down' Machines

As part of its Lil' Bubba product line, The Concrete Edge Co. offers four machines that will lay ribbon or "tack-down" curb. In the past 18 months, the manufacturer has added a cable feeder and rebar adapter to allow cable and/or rebar to be extruded into the curb. The Lil' Bubba EP and EPC extruders have a patented "non-bridging" drive mechanism that improves efficiency in this most compact class of curb machines.

Number of models: 4

Product-line features: The Lil' Bubba plunger drive creates a consistent flow of concrete with each revolution. The motion of the plunger scores the concrete as it packs into the mold, preventing the flat spots and weak areas every couple of inches that can cause cracking.

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MILLER SPREADER

Curb-and-Gutter Model Tops Offering

Designed for contractors looking for a cost-effective way to place curb or curb and gutter, the six-wheel MC1050 extends Miller Spreader's compact landscaping and tack-down "Curbilder" product line into the 5,000-pound slipform market. In addition to placing stand-alone curb up to 18 inches high and offset curb and gutter up to 24 inches wide, the MC1050 can also place tack-down curb over pins and place sidewalks up to 48 inches wide. At its weight, the MC1050 can be transported on a twin-axle trailer.

Number of models: 7

Product-line features: A modular frame design allows the MC1050's conveyor to be placed on either side of the machine, which is available with a laser grade control option. Additionally, the form can be located either straddle at a width of 48 inches or offset to the right or left.

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Specifically formulated for use in new low-emission, ultra-low-sulfur-diesel engines, Chevron's Delo 400 LE 15W-40 oil is fully compatible with previous API oil service categories and engine models. Keeping rings clean and free for better combustion pressure and minimal wear, the "super-premium-quality" Delo 400 LE is made with Isosyn base stocks, which rival synthetics in critical engine tests, says Chevron. Delo 400 LE is recommended for use in Caterpillar engines in off-highway or construction applications requiring an API CJ-4 service category as of Jan. 1, 2007.

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CITGO

Citgard SynDurance 5W-40 synthetic oil is designed for year-round use in heavy-duty engines regularly subjected to a wide range of operating temperatures. The high- and low-temperature properties of the Citgo product offer a solution from having to switch between SAE 10W-30 in winter and 15W-40 during summer. Advanced additives help exceed the evolving performance requirements of low-emission engines, including Exhaust Gas Recirculation (EGR) systems. SynDurance 5W-40 is designed to exceed the requirements of all API CJ-4 engine manufacturers' specifications.

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CONOCOPHILLIPS

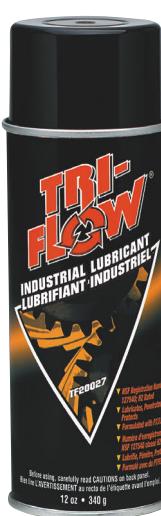
A new tri-branded product from ConocoPhillips, Triton 75W-90 synthetic gear lube is certified for 500,000-mile drain service in Dana heavy-duty final drive axles under extended warranty. Triton 75W-90 and 80W-140 lubes meet similar standards for Arvin-Meritor heavy-duty axles, as does the 75W-90 for Mack axles. Triton Synthetic Gear Lube will replace products from three ConocoPhillips brands: 76 Triton 75W-90 and 80W-140; Conoco Syncron HP 75W-90 and 80W-140; and Phillips 66 Philguard 75W-90.



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KRYLON

Penetrating hard-to-reach areas to free up ball and socket joints, bearings, cables, conveyors, drive chains and gears, Krylon Products Group's Tri-Flow industrial lubricant is a formula of premium oils, micron-sized synthetic particles, polytetrafluoroethylene (PTFE) and additives. Non-staining Tri-Flow is appropriate for use on metal, wood, plastic and rubber components, and can withstand both high humidity and temperatures ranging from minus-60 to 475 degrees Fahrenheit.



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Spotlight

Shell

New packaging for Shell's Rotella T with Triple Protection heavy-duty motor oil is not only easier to handle, but more environmentally friendly. The bottle and case use less plastic in the closure and less corrugate, for easy recycling. The ergonomically designed bottles themselves are easier to pour and, with only three one-gallon bottles per case, the lifting and moving of the product becomes lighter and easier. Rotella T with Triple Protection provides on average 50-percent greater wear protection than the previous formulation in industry-standard tests, says Shell.

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AMSOIL

A new "severe-duty" synthetic gear lube from Amsoil fills the gap between the 75W-90 and 75W-140 viscosity lubes that customers are accustomed to using. A blend of high viscosity, shear stable synthetic base oils and high-performance additives, Amsoil's new 75W-110 is designed to provide protection for elevated operating temperatures without sacrificing fuel efficiency. In the past, 75W-140 was used to obtain extra film protection beyond what the 75W-90 viscosity grade offered for differentials, but customers found they sacrificed fuel economy.

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An advertisement for Kano Aero Kroil. It features a spray can of 'NEW KING SIZE 30% More KROIL' and two rusty bolts. The text 'FREEZES RUSTED PARTS' is written in a large, stylized font. The Kano Laboratories logo is at the bottom.

Kano

Described as "a scientific discovery" by Kano Laboratories that will loosen frozen metal parts, Kroil will creep into millionth-inch spaces to dissolve rust and lubricate the surface. According to Kano, the Kroil product has been used by 480 of Fortune 500 companies since 1939. Kroil is sold direct in aerosol or bulk for industrial use, and there is no minimum order.

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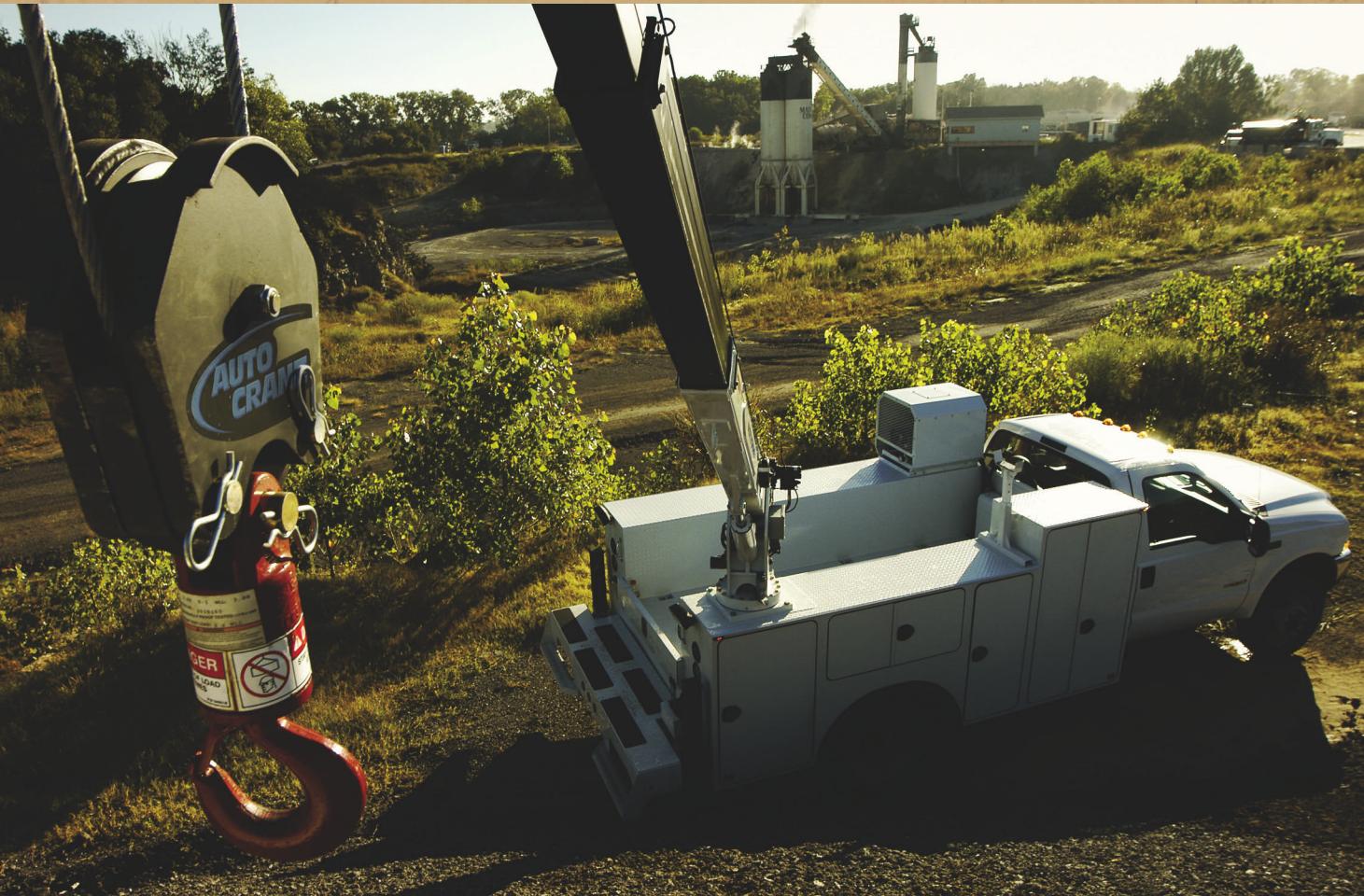


Cenex

Having "racked up millions of testing hours," Cenex offers a family of lubricants providing protection to engines, transmissions and hydraulic systems used in equipment ranging from skid-steers to dozers. Cenex's power transmission fluid, Superlube TMS engine oil and Qwiklift HTB hydraulic fluid are manufactured with leading lube oil base stocks and additives, says the company. Innovative ingredients such as vegetable-oil-based hydraulic fluid exceed standards required by equipment manufacturers for a variety of uses.

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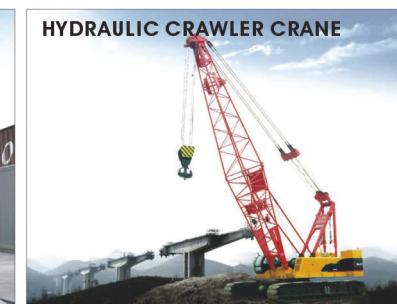
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ROTARY DRILLING RIG

By MIKE VORSTER, Contributing Editor

A Question of Profitability

Equipment departments do not make profits. They are set up to recover costs — nothing more and nothing less



Mike Vorster

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

Lifecycle-cost recovery rate is calculated by totaling all the costs we expect to experience and dividing it by the number of hours or days we expect the machine to work.

Equipment managers wrestle with whether or not their departments should be profit centers, that is, should money be left over at the end of the year. In order to address the issue, we must look carefully at how money flows through the organization. First, we must understand two important concepts.

The difference between costs and charges. A cost is a payment made to a person or entity outside

the organization to distinguish a liability. The process is managed through standard current accounts such as payables and payroll. A charge is different. It is a journal entry raised as a debit in one internal account and a credit in another to recognize the fact that one part of the organization receives a benefit while another carries the responsibility of providing and paying for the true cost of the benefit.

The need for internal equipment charges. Equipment costs have two vexing characteristics: Many occur in discrete large amounts, and these amounts occur at varying intervals of time. This makes it difficult to determine a cost for owning and operating a machine over a short period. To overcome the problem, we calculate a lifecycle-cost recovery rate for the full expected life of the machine by adding up all the costs we expect to experience and dividing this by the number of hours we expect the machine to work.

The lifecycle-cost recovery rate becomes the basis for our internal equipment charges and plays a critical role in the following areas. It is used in estimating, and errors in the rate can cause us to over- or under-bid a job. It is used in the job-costing system, where a consistent rate helps develop uniform measures of performance. It is used as a cost-recovery

and budgeting mechanism in fleet management, where we seek a routine and systematic way of charging for the actual costs that we expect to occur at various intervals throughout the lifecycle of the machine.

The diagram on the following page illustrates how funds flow through a business. Inflow starts at the job account side, from the payments received as a result of completing construction. It flows into the job account for each and every job we build.

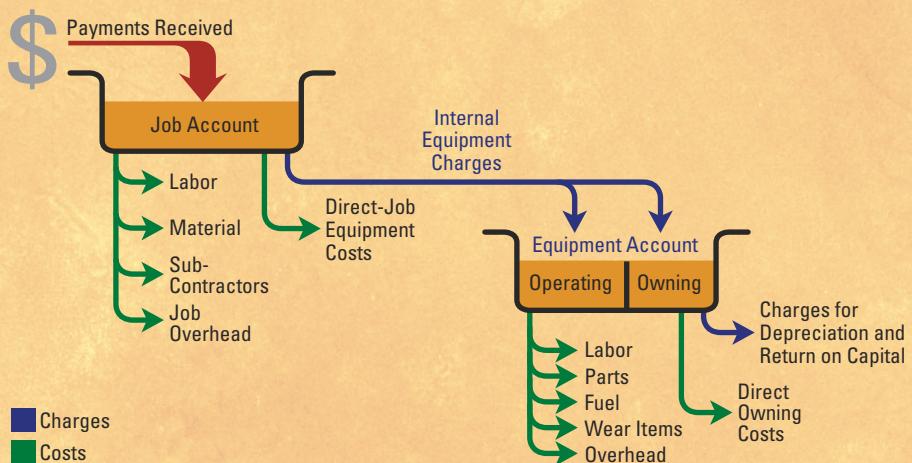
The costs associated with building the work flow out of the job account. These are classically divided into labor, material, subcontractors, overhead and equipment. Equipment falls into two categories: direct-job equipment costs, shown in green, and internal equipment charges in blue. Direct-job equipment costs include items such as short-term rentals, tools, supplies, and small or specialized equipment that does not flow through the equipment account. Internal equipment charges are a debit against the job account to allow for the cost of the equipment assets used to build the work. These are based on the lifecycle-cost recovery rate.

The balance between direct-job equipment costs and internal equipment charges varies. Some companies include everything in the internal charge rate; others consider regularly occurring and relatively predictable costs, such as fuel and routine maintenance, as direct-job costs. Invoices or back charges paid for abuse or wear and tear not included in the rate also form part of the direct-job equipment costs.

Should the job account make a profit? Of course it should. All the estimates of inflows from payments and outflows to cover costs and charges are made assuming the job account will reach a target margin.

On the right side of the diagram is the equipment account. Internal equipment

The Flow of Funds



charges are the primary inflow to this account. Although some inflows from external rentals or back charges for abuse may occur, these are a small part of the business. Inflow to the account is divided into two: one to match against the actual operating-cost outflows and another to match against the sum of direct-owning costs such as licenses, insurance, leases, loans and interest payments, and the charges we raise to recognize depreciation and return on capital for equipment purchased using our own funds.

The operating side of the equipment account is relatively easy. Internal charges, based on our best estimate of lifecycle costs, come in as a credit; true costs go out as a debit. Both charges and costs accrue largely on an hourly basis, and problems in this account arise because the cost-recovery rates are too low or the true costs are too high. The lower you make true costs, the lower you can make the cost-recovery rate, and high costs mandate high recovery rates. Neither equipment nor operations has sole responsibility, and performance can only be improved if both recognize their ability to impact true costs.

The owning side of the equipment account is more complex. The outflows accrue on an annual basis and are more or less certain. The cost-recovery rate is calculated by dividing these predictable annual outflows by an assumed utilization. The balance in this portion of the equipment account is, therefore, sensitive to the actual annual utilization achieved. If more hours are worked, there will be a substantial over-recovery of annual costs, while low utilization produces immediate and significant under-recoveries.

Understanding the diagram helps us frame the question of whether or not the equipment group is a profit center. In fact, the equipment account does not make a "profit." It is a cost-recovery process rather than a money-making process. Gains show that you have over-recovered costs, and losses show that you have under-recovered costs.

The question can be restated, however: Should the equipment division over- or under-recover costs? The answer is no. Equipment managers should seek to recover the costs experienced, nothing more and nothing less.

Clearly defining the equipment account as a cost-recovery account and setting internal equipment charges at a level where we expect neither gains nor losses means we must accept two hard facts.

First, gains and losses in the equipment account will occur. We accept and understand margin growth and margin erosion in job accounts; we must also accept and understand them in the equipment account. If the equipment account is set to break even, then a swing from 0 to -3 percent in the equipment account is as likely to happen as a swing from 12 to 9 percent is in a job account. Going from 0 to -3 percent is perceived differently, however, and carries with it the agony of "losing money." Going from 12 to 9 percent carries only the pain of margin erosion.

Second, gains and losses in the equipment account occur because actual costs are higher than expected. You do not make them go away by pointing fingers, however. You reduce them by taking action to reduce actual costs. The skill and diligence of your people are essential to improving the operating side of the equipment account. Achieving or exceeding target levels of utilization is essential to improving the owning side of the equipment account.

With insurance, if you want a low premium, you need to lower your claims. The equipment cost-recovery process is no different. We need to manage our fleet as efficiently as we can. But in the final analysis, the only way we can have low rates is to have low true costs. 

Funds flow into an organization through payments received for work completed. They flow out into various areas, including internal equipment charges. This account can be viewed as having its own flow of funds.

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A New Concept in Ride-on Trenchers

New line of articulated trenchers splits the working end from the power end, and 4WD versions provide additional versatility and productivity

Zahn series of ride-on, articulated, rubber-tired trenchers from Ditch Witch steer easier and move quicker than the company's other compact trenchers. "Today, users manhandle a pedestrian trencher to turn it," says Kevin Smith, Ditch Witch product manager of compact utility. "How often do they dig straight?"

Models R150, R230 and R300 are 15-, 23- and 30-horsepower, dedicated two-wheel-drive trenchers, respectively. Each trencher is designed to focus the weight and power on the front end of the machine, so the digging chain is able to work more efficiently, Smith says.

Models R230 and R300 have four-wheel-drive versions that incorporate an interchange connection on the "power unit" that accepts seven different "front ends." The 2WD versions power two types of trenchers; the 4WD version can power a trencher, plow, dumper, tiller, backhoe, stump grinder or a tool carrier, which can use more than 40 quick-change attachments such as those for the SK350.

Steerability and visibility are key benefits, Smith says. "With the elevated platform, the operator can see into the ditch and also behind the machine," he says. The console is designed with soft-touch, color-coded controls and includes an integrated cargo tray. With the cruise-control function, the

Basic Specs: Zahn Trenchers

	R150	R230	R300
Mobile length (in.)	43	70	70
Mobile height (in.)	53.5	53.5	53.5
Width (in.)	36	36	36
Max. speed (mph)	3.3	5.9	5.9
Engine (hp)	15	23	30
Auxiliary hydraulics			
flow (gpm)	7.4	12	12
psi	3,000	3,000	3,000

operator can set power-unit and front-end speed and focus on steering.

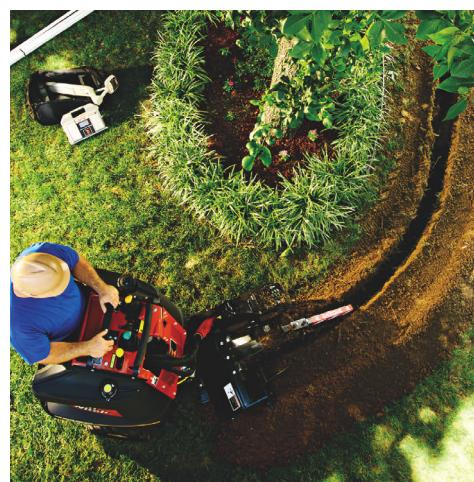
The various front ends affix to the power unit via an interchange connection, which Smith likens to a fifth-wheel. A self-aligning pin guides the connection, and two bolts rotate up and tighten down to secure the connection. Color-coded plug-in hoses allow for quick and accurate connections, and the complete assembly takes less than 5 minutes.

We videotaped our interview with Smith and saw a demonstration of the Zahn during ICUEE 2007. Go to ConstructionEquipment.com to see our report.

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The dumper "front end" is one of seven designed to complement the 4WD versions of the R230 and R300 trenchers.



Zahn's articulation allows it to maneuver easily around obstacles.



Concrete proof.

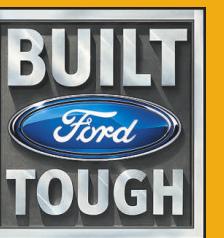
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New Scraper-Pulling Brutes from Deere

Three new tractors provide horsepower ratings to 530 and operating weights to 50,000 pounds

John Deere's new 9030 Series scraper-pulling tractors (models 9430, 9530, and 9630) provide horsepower ratings of 425, 475 and 530, respectively, and net peak-torque ratings of 1,497, 1,671 and 1,848 pounds-feet, respectively, at 1,600 rpm. Each is powered by a Tier-3-compliant, 13.5-liter John Deere PowerTech Plus engine that produces a 38-percent torque rise at 1,800 rpm and features four valves per cylinder, exhaust gas recirculation and variable-geometry turbocharging. Without ballast, these three new brutes weigh in at about 35,500, 36,100 and 37,300 pounds, respectively, but can range from 44,000 to 50,000 pounds when fully ballasted with optional wheel weights and frame weights.

Engine efficiency is enhanced, says Deere, with a new cooling package, which includes the patented Vari-Cool fan drive — a mechanical-type fan that runs only at the speed necessary to meet cooling requirements. Cooling air also is expelled up and away from the hood — and away from the ground — to provide less airflow disturbance at the ground and, subsequently, less dust.

Drive-train power flow is through an 18F/6R powershift transmission, which, says Deere, is "designed with enhanced, event-based shifting logic to provide best-in-class shift quality and to accommodate increased power levels." The new models provide transport speeds of up to 25 mph. Final-drive configuration is inboard planetary for the 9430 and double-reduction inboard planetary for the two larger models. All models use wet-disc brakes, and the axle-lubrication system employs pressurized oil that is cooled and filtered. Standard tires are eight metric flotation (710/70 R38) types, each having an approximate width of 28 inches and a section height of 19.5 inches. Optional tires are four super-wide single types.

These "Scraper Specials," as Deere calls them, differ from their conventional counterparts by incorporating reinforced frames, front and rear axle supports, heavy-duty axles, larger



John Deere's new 9030 Series Scraper Specials use a three-section frame, provide 15 degrees of oscillation at the articulation joint and are fitted with a 350-gallon fuel tank.

articulation pins and bearings (two 7-inch tapered rollers), a heavy-duty drawbar support, and a 350-gallon fuel tank. The Scraper Specials are equipped with a pressure- and flow-compensated hydraulic system that has a rated standard-pump output of 48 gpm. An optional high-flow hydraulic system provides 75 gpm. Both systems operate at 2,900 psi and have four standard remote-located control valves.

The 9030 Series models also use Deere's AutoLoad system, which, when used with Deere scrapers, automates the scraper's hydraulic lift functions during the loading cycle. Once activated, the system automatically adjusts the scraper's cutting-edge height based on draft loads, wheel slippage and soil conditions. The system is activated by the finger-tip-controlled Selective Control Valve, which also allows the operator to override the system and to control the scraper manually. A TouchSet hydraulic control permits the operator to customize transport height and dump height, and the scraper returns to these preset positions at the touch of the control.

In the cab of 9030 Series models, an ActiveSeat communicates with the tractor 200 times per second to remove as much as 90 percent of vertical input for a smoother ride. Also in the cab, the CommandARM console allows finger-tip control of most functions, and an illuminated corner-post display places pertinent information in a convenient spot for the operator.

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Komatsu Puts Operators at Ease

In-cab enhancements highlight the Dash-8 version of PC400LC excavator

With emissions requirements and other machine operation upgrades taken care of with the early 2006 introduction of the Dash-7 model, Komatsu was able to turn its focus clearly to the operator with the latest update to the PC400LC excavator.

The PC400LC-8, introduced in late 2007, is positioned as a workhorse heavyweight within the 40-metric-ton excavator class, boasting an operating weight of up to 103,834 pounds.

"From the previous series, the enhancements that have been made on the Dash-8 are really geared toward the value drivers of comfort, in-cab technology and overall operator environment," says Doug Morris, Komatsu America product marketing manager, excavators.

As with previously introduced Dash-8 models such as the smaller 200-, 220- and 270-class-size entries, the PC400LC-8 has a new wide-cab design, featuring a high-back operator's seat, console-mounted armrests, and a new 7-inch LCD

Basic Specs: Komatsu PC400LC-8

Engine Make/Model	Komatsu SAA6D125E-5
Net Output	345 hp
Operating Weight	97,148-103,834 lb.
Bucket Capacity	1.47-3.75 cu. yd.
Maximum Digging Height*	37'8"
Maximum Digging Depth*	30'0"
Minimum Swing Radius*	16'0"

* Equipped with 15'9" arm

multi-color monitor. Through the monitor display, the operator can select from five modes of operation — power, economy, lifting, breaker and attachment modes — as well as access the automatic air conditioner, machine-maintenance tracking, and the image from the standard counterweight-mounted rearview camera system.

The monitor panel is a real eye-catcher for even longtime Komatsu operators when they first climb into the new cab, says Morris.

"In this monitor panel, you have improved attachment flow control from the prior series," he says. "It's much easier to adjust your flow-rate settings, and also have the ability to adapt

the machine to be capable of carrying multiple attachments."

Enhancing excavator operator comfort, the multi-layer viscous cab-mounting system incorporates longer stroke and the addition of a spring. Combined with a high-rigidity deck, the new cab damper mounting reduces both vibration and noise levels at the seat. The highly pressurized cab additionally keeps dust from entering the operator's workspace.

The Dash-8 version of the PC400LC continues to be powered by Komatsu SAA6D125E-5 engine, generating 345 flywheel horsepower. An electronically controlled, high-pressure, common-rail fuel injection system, as used in this engine, is established for providing improved combustion and meeting stricter emissions regulations.

As the operator can observe via the LCD monitor, Komatsu's Equipment Management Monitoring System (EMMS) performs three main functions. Primarily, the system continually monitors critical excavator systems, alerting the operator should an abnormality occur. Secondly, EMMS tracks the preventative-maintenance schedule, provides on-board tracking, and advises current required maintenance. Thirdly, when a problem does occur, the system will provide error codes and troubleshooting assistance to mechanics.

The PC400LC-8 is equipped with the latest Level 3 version of the Komtrax fleet-monitoring system, which wirelessly sends machine operating information to a secure website.

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Komatsu's PC400LC-8 excavator comes equipped with two boom mode settings, five working modes and Power Max control. The one-touch Power Max increases digging force by 7 percent for 8 seconds.



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Market Watch Lite

By KATIE WEILER, Managing Editor

Access our online reader response form at ConstructionEquipment.com/info. Just key in the issue date and make your selections. Subscribe to our monthly eNewsletter at ConstructionEquipment.com/subscribe.asp.

Toro

The grapple rake for use with Toro's Dingo compact utility loaders is designed for rugged use with two hydraulic cylinders that generate 3,000 pounds of clamping force. Teeth of AR400 steel are nearly four times stronger and three times harder than regular steel — strong enough to dig up roots and rocks, Toro says. The attachment is 34½ inches wide and weighs 270 pounds.

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Topcon

GPT-7500 and the GTS-750 total station series feature rugged, small, light units with increased performance at the same price as older models.



The total stations have a 400MHz Intel processor running Windows CE and a 2,000-meter non-prism range (GPT-7500). According to Topcon, the instrument can operate efficiently at 2,000 meters (6,562 feet).

The instruments are available in 1-, 3- or 5-inch accuracy models; the 1- and 3-inch versions have dual displays, and the 5-inch has a single display.

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Mr. Manhole

It only takes five minutes for the 800-pound cutter head to dry-cut through asphalt or concrete using any auger drive mounted on a skid-steer, then lock on to the manhole casting and lift it out of the street, according to the company. The adjustable cutter head fits a range of casting sizes. The maker says its unit works best on a compact track loader with auxiliary hydraulic flow of 20 gpm.

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Intended for mobile crane applications, the new iVISOR mentor QGVA load moment indicator provides the operator with a graphic display of the crane as well as current load and geometric information. This includes the actual and allowable load, boom length, boom angle and load radius. The system's central processing unit and operator's console are integrated into one compact unit, making for easy installation.

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Wyco Tool

Portable, gas-powered, backpack-type concrete vibrators are designed for remote and hard-to-reach jobs, and also for emergency use if power fails at the jobsite. The vibrator maintains constant vibration in the mix via operator control of the vibration speed with the engine throttle, the company says. A speed increaser reduces engine speed for longer life and less noise. It is available with a choice of shaft lengths and head sizes.



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Toyo

Toyo has a new 425/65R22.5 size for its M320 wide-base single tire for dump trucks, concrete mixers and other on/off-road applications. The M320 features large tread blocks with functional sipes and three wide zigzag grooves to improve traction on and off pavement. It claims a long life due to an optimized casing profile, which minimizes growth of the tread area while maintaining a more uniform and flatter tread radius.

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Topcon

Two new G Series digital design models offer affordable options to the HiPer receiver product platform. Utilizing a fully integrated, cable-free base and rover design from previous HiPer systems, the new Ga and Gb models can run all day in either the base or rover configuration on a single battery charge. In the Ga, Topcon's 40-channel Paragon dual-frequency chip technology will track up to 20 GPS and GLONASS satellites in any combination; the Gb version receives GPS-only signals.



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Market Watch Lite

► Lincoln Electric

The LN-25 PRO Wire Feeder is available in both a standard and extra-torque version, including a gas solenoid and flow meter to run both flux-core and MIG wire. The extra-torque model uses additional gearing for feeding larger-diameter

flux-core wire. According to Lincoln Electric, the machine uses the MAXTRAC wire-drive system, which features "tool-less" wire guides that eliminate "bird nesting" and set-up variability.

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► Indeco North America

IRC Series rotary cutting head may find use, says Indeco, for loosening hard or frozen soil prior to digging, cutting small trenches in rock, tearing down buildings, underwater demolition, road work, tunneling and wall profiling. The IRC 800, IRC 1000 and IRC 2000 are designed for excavators weighing between 15 and 50 tons. Cutting width ranges from 33.5 to 47 inches, and tool weight from 2,900 to 5,900 pounds.



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► Baldor

The TSLM35T kit adds a light tower to the 30-kilowatt Baldor TS35T towed diesel generators, and with all four lights burning, provides 25 kilowatts of auxiliary power. Baldor says fitting the light kit to the generator takes about two hours. Special brackets and ballast box can be installed on the generator with no drilling. The mast can raise the lights 30 feet high and rotate 360 degrees. Four 1,000-watt metal halide lamps are enclosed in cast aluminum fixtures.



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Market Watch Lite



Oasis

A new forced-air motor and compressor cooling system is designed to provide the Oasis XD4000 Series air compressor with 100-percent duty-cycle at 200 psi. A new on-board air compressor built for off-road vehicles, commercial trucks and air suspension systems, the 12-volt direct-current XD4000 air compressor features a deep-finned head, and a fan housing shroud into which a 100-cubic-feet-per-minute fan is built to cool the modified 5-horsepower motor.

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Superior

Strobe guards are now available for all Meteorlite 2200 Series Class 1 and 2 strobe lights used on construction, utility, highway and emergency vehicles. Available in two styles — for low- and high-profile strobes — the guards are constructed of durable polished steel. They easily attach to the base of the light to provide optimum lens protection.

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Cummins Power Generation

A 1000 kW Rental Power unit provides temporary power for construction and emergency situations. Certified to meet Tier 2 emissions, the system's enhanced performance features, says CPG, include low emissions, increased running time, selectable voltages, and easy operator access for maintainability. The system, contained in a 30-foot trailer, features a model that allows quick voltage changes from 208 VAC to 480 VAC. Running time at 75 percent load is 30 hours.

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Arsenault

Version 4.4 of Dossier fleet-maintenance-management software includes a new invoice data import feature and the latest revisions and updates for VMRS. Invoice Data Import enables users to import outside vendors' invoices and repair orders directly into the system, which eliminates manual re-entry. Vendors can send invoices electronically in data files, and Dossier creates a history for each transaction. The data import also updates equipment data such as mileage and cost per mile.

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Kaeser Compressors

M50 Mobilair portable air compressor delivers 185 cfm at 100 psig. It uses the company's rotary-screw "air-end" and is powered with a Kubota diesel engine. The galvanized-steel canopy is designed to give easy access to routine service points, while also reducing sound levels. The unit comes equipped with a high-capacity, cold-start battery, and a large fuel tank is designed to allow extended operation. The compressor's undercarriage uses torsion-bar suspension, large tires and height-adjustable tow bar.

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Glacier

The Magnum is a sealed computer designed for construction use with no fans or vents. A gloved hand can make inputs to the high-bright touch-screen display. The unit operates in spite of extreme temperature, shock, vibration and moisture. An Intel-based PC, all units accept and run traditional Windows software applications. There are a variety of processor, DRAM, and rotating and solid-state hard-drive options.

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Genesis

Two new additions to Logix Processor product line, the LXP 200 and LXP 400 are designed to bring third-member versatility to excavators in the 50,000- and 100,000-pound classes, respectively. The Logix Processor allows quick, safe changeover between shear, pulverizer and concrete cracker jaw sets, with a boost in power over other multi-jaw attachments. The shear jaws feature the same piercing tip and blades as Genesis' GXP mobile shears.



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Cummins Power Generation

A new series of 100-, 125- and 150-kW generator sets feature new sound-attenuated enclosure systems and Tier-3 QSB7 Cummins diesel engine. Available in steel or aluminum with two levels of sound attenuation, the generator sets and enclosure packages are intended for all-weather outdoor use where local ordinances or circumstances require sound abatement. In addition to sound-attenuated enclosures, the company also offers weather-protective generator set enclosures. The quieter sound-attenuation package features an enhanced exhaust silencer and steel construction with sound-absorbing material.

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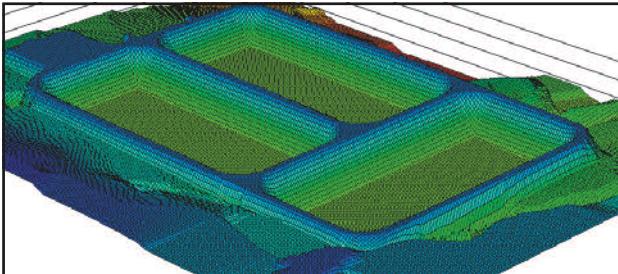
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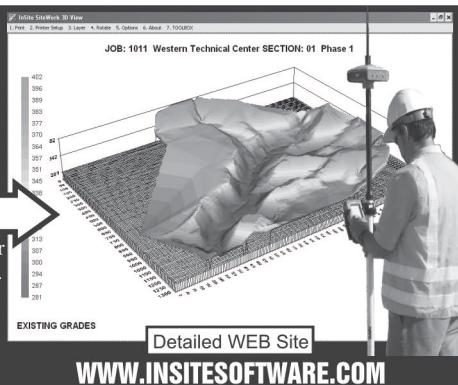
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The Vulcan “Little Giant” Shovel

Railroad construction in the 19th Century spawned the first steam-powered digging machines to operate on land. The Vulcan Iron Works was one of the first to build steam shovels on a commercial basis.

The cable-operated excavator is the earliest documented self-powered machine ever used to move earth. Its earliest form, the steam shovel, has roots going back to the very first mechanical excavator, the Otis Steam Shovel of 1835. From this machine, the half-swinging “railroad shovel” was developed, its name derived from the fact that the early shovels were mounted on standard-gauge rail tracks, and most of the early shovel work was in railroad construction.

During the first 40 years after its invention, very few steam shovels were built. Labor was plentiful and the shovel patents were strictly held by the Otis family, who built them to gain advantage over competitors in their contracting business. When the Otis patents finally expired in the 1870s, several other companies began building steam shovels, one of which was the Vulcan Iron Works Co. of Toledo, Ohio, established in 1870. From the early 1880s, this company contracted to build steam shovels to the designs of Mr. H.T. Stock, an old-time shovel operator and designer, but in 1986 began building its own line of steam shovels branded with the name “Giant.”

One of the most popular Vulcan steam shovels was the “Little Giant.” Usually mounted on traction wheels as shown in the illustration, it was used for generally lighter duties than the larger rail-mounted models. Its 7-inch-bore by 11-inch-stroke main engines provided 40 horsepower, and operating weight was quoted at 35 tons. Its vertical steam boiler was 48 inches in diameter and 7 feet 6 inches in height. Dipper capacity was 1 1/4 cubic yards, and its 17-foot boom provided a dumping height of 10 feet. The car on which it was mounted measured 23 feet long by 7 feet wide.

The Vulcan Little Giant shovel was typical of early railroad shovels, consisting of a steel or wooden house mounted on a rail car which supported the draw works, boiler, and swinging boom. The boom, mounted on one end of the car, was capable of swinging approximately 180 degrees.



Usually mounted on traction wheels as shown in the illustration, “Little Giant” was used for lighter duties than the larger rail-mounted models.

It took a sizable crew to keep those old shovels running. As well as operator, cranesman and fireman, a two or three-man ground crew looked after the supporting timbers or rails on which those heavy machines moved. The cranesman’s duties included operating the clutch and brake for the boom-mounted crowd engine, and opening the dipper door at the correct moment by pulling on a rope. He stood on a platform on the boom, and absolute coordination was demanded by the operator who controlled the shovel hoisting and swinging functions.

The Vulcan line successfully expanded, and by 1909, covered shovels ranging from 15 to 120 tons including some of the largest at the time. In 1911, shovel manufacturer Bucyrus Co. took over manufacturing rights and shovel patents of the Vulcan Steam Shovel Co. Within a few years, the Vulcan designs were incorporated into the Bucyrus machines.

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