

Reed Business  
Information®

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ASV's undercarriage



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Rawhide glitters  
with chrome



**72** World of  
Concrete peek  
at new products



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January 2006

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## Concrete Control

**Manufacturers feel push  
to put grade control  
technology to work  
on pavers**

**p. 64**





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Cover photo by George Lindblade®

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## EXCLUSIVE

### 15 Annual Report & Forecast

In reviewing *Construction Equipment's* Annual Report & Forecasts from past years, we realize just how much the renewal of the Federal transportation funding bill has affected the industry. Although the government reauthorized last year, 2005 also gave us destruction in New Orleans, tire and machine shortages, and escalating fuel costs. All told though, the industry enters 2006 on a firm foundation.

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### 44 What Speed Bump?

ASV's new SR-Series Posi-Track loaders — so freshly designed that they share just a handful of part numbers with the company's other models — feature a supple new undercarriage that soaks up obstacles in its path. ASV considers this Series its most significant product development in 20-plus years of building rubber-track loaders.



## PREVENTION ILLUSTRATED

### 54 How to Analyze Oil Analysis

It has been said that oil analysis is 85 percent science and 15 percent art. The science part applies to such things as viscosity, the property in fluid that causes it to resist flow. Laboratory tests identify the viscosity index number, and that number is a common measure of changes in viscosity with temperature. The art lies in the analysis of lab data and the interpretation of what it means.



## HANDS-ON TRUCKING

### 59 Chrome Glints from Mack's Rawhide Tractor

Rawhide is the latest iteration of Mack Trucks' CH highway tractor, available with two sleeper sizes and as a non-sleeper "work truck," which we have here. A Rawhide could drive straight from a dealer's lot to a truck beauty show and probably do well in the competition.



## COVER STORY: Buying File

### 64 High-Tech Grade Control Hits Slipform Pavers



the product-development process. The demand often comes from people who are using grade controls on other machines.

Meeting the challenges of moving a concrete paver frequently between projects and configuring it quickly to different paving widths remains a key to most paver manufacturers' value propositions. But high-tech grade-control technologies are also pushing their way into

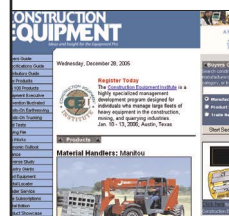
## SPECIAL REPORT

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## Fiscal Responsibility

Damage done by Hurricanes Katrina and Rita requires massive rebuilding, and the effort to accomplish these tasks has pulled equipment out of the North American distribution channel. Equipment managers in all the other regions of the country are feeling the pinch.

Additional pain may be coming from Washington, as lawmakers wrestle with the financial response. With little discussion on the merits or limits of the amount spent, Federal lawmakers have determined that hurricane relief may trump interstate commerce as a constitutional responsibility. A stretch? As the Federal government now looks for the cash to fund relief efforts, they are turning to a transportation bill recognized even by its supporters as pork-filled.

The transportation construction industry, which relies mightily on federal as well as state tax dollars, should reconsider how our representatives manage these funds. Our national transportation infrastructure needs are between three and four times more than what the recently passed bill earmarks. But instead of wisely allocating the money in a reduced spending bill, lawmakers packed the bill with pet projects, making it a prime target for reallocation efforts today.

The irony of these discussions may be difficult to discern, but consider the philosophy behind the platitudes. We now consider it a national responsibility to fix the damage caused by natural disasters, and by declaring a "disaster" we start the funds flowing. In the 50 years recorded by the Federal Emergency Management Agency, the annual number of declared disasters has jumped from about 15 to around 150. It would be interesting to analyze how the definition of "disaster" has evolved and track how disaster locations relate to Congressional representation.

Other areas of questionable federal financial responsibility exist, too, and every member of Congress is guilty of piling it on. The enormous financial drain caused by Katrina and Rita has only served to bring the moneygrubbing to light.

If we're going to allow the expansion of the financial role of the Federal government, we had better keep a closer eye on our representatives. The money spent by government belongs to its citizens. As citizens, it's our responsibility to make sure our money is spent wisely and fairly. It's time to stop grabbing for the pork.



Rod Sutton, Editor in Chief

*Rod*

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# MARKET WATCH

By KATIE WEILER, Managing Editor

*We're making it quicker for you to obtain more information on products by going to [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info). Once there, you'll be in our Buyer's Guide, where you can find manufacturer information as well as distributor listings.*



## ◀ Volvo

Models ECR28, ECR38, ECR58 and ECR88 excavators have a special swing system rear frame and counterweight design that allows high maneuverability and enhanced safety. New generation direct-injection Volvo diesels power the machines. An auto-idling system is also available. Operator compartments are said to be spacious and offer 360-degree visibility.

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## ▶ Manitou

With a rated operating capacity of 6,000 pounds, the MT 6034 telehandler has a lift height of 34 feet 3 inches. It has a welded box-section design boom and is available with either a 99- or 115-hp John Deere turbocharged diesel. Standard features include three-speed powershift transmission, three steering modes, and quick-attach mounting system. Price on the 99-hp version is \$70,950; \$73,150 on the 115-hp model, and they carry one-year/2,000-hour warranties.

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## ▶ Vermeer

RT950 and RT1250 trenchers feature upgrades including more horsepower. RT950 replaces Vermeer's V8550A and has a 99-hp Cummins B4.5T turbocharged engine. The trencher works to depths of 72 inches with widths up to 18 inches. RT1250 has a 120-hp Cummins turbocharged, charge-air-cooled engine. This trencher works to 72 inches deep with widths to 18 inches.

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## ▶ Genie

The GS-68 RT scissor lifts now have traction-control drive systems that allow each wheel to work independently of the others. If one tire loses contact, the unit maintains 75 percent of its power, the company says. Operators can tackle sites with 35- to 40-percent slope rating.

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# Market Watch

## ▼ **Champion**

Next-generation motor graders — C80 C and C86 C — offer a complete redesign of the front axle that provides 50 degrees of steering angle left and right, compared to 35 degrees on its predecessor. The straight frame turning radius is 25 feet and, when fully articulated, is now a radius of only 19 feet. The company says it has the tightest turning radius in its class. The machine also features a taller 21-inch moldboard.

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## ▲ **Gehl**

E-Series consists of six skid-steer loaders with rated operating loads from 1,175 to 2,900 pounds (when optional counterweights are used). Horsepower ranges from 46 to 82. On the 4640E and 4840E, Gehl offers a two-speed drive option to deliver top speeds over 11 mph. Lift height extends to more than 124 inches on the Model 6640E. Powerview lift arms provide optimal visibility and high breakout forces.

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## ▼ **Terex Roadbuilding**

Terex reentered the barrier, curb-and-gutter paver market with the Terex | CMI three-track BCG3303. Narrow transport width enables the unit to be quickly transported without disassembly. The modular curb forming system allows contractors to change profile mold inserts in a matter of minutes without removing the entire hopper and auger assembly.

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## ▲ Doosan Infracore

Daewoo's new Korean owner aims at lofty sales growth in North America with its new DX Series excavators branded Doosan Daewoo. Four models, spanning 66,000 to 105,000 pounds, are expected to be available in June. The Doosan Daewoo six-cylinder diesel is engineered to meet global environmental regulations with high-pressure common-rail fuel injection. All of the major structures have been re-designed.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

## ▼ Link-Belt

The RTC-8065 Series II rough-terrain crane was introduced earlier this year as a 60-ton-capacity model, but now has a base rating of 65 tons. It has a fully rigged and transport weight of less than 90,000 pounds and has a 38- to 115-foot, four-section, full-power telescopic boom. An optional 35- to 58-foot folding fly attachment extends tip height to 180 feet, and optional lattice-fly inserts can push that number to 211 feet.

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2006

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Construction Outlook

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Construction Contractors  
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# Firm Foundation

By **Rod Sutton**, Editor in Chief

In reviewing *Construction Equipment's* Annual Report & Forecasts from the past few years, we realize just how much the process of renewing the Federal transportation funding bill has affected the industry. Although the government finally reauthorized last year, 2005 also gave us destruction in New Orleans, tire and machine shortages, and escalating fuel costs.

The year certainly had its effect on equipment-owning fleets and their suppliers. Government agencies are still dealing with tighter budgets, and contractors and materials producers continue to be cautious even as construction markets exhibit positive signs. On the other hand, nonconstruction has rebounded solidly. And suppliers, both rental and distribution, report renewed strength.

All told, the industry enters 2006 on a firm foundation.

Welcome to *Construction Equipment/Case Construction Equipment's* 2006 Annual Report & Forecast. *Construction Equipment* has reported on the state of the economy and the industry with these annual reports for nearly 25 years.

Each year, the report has tapped the expertise of *Construction Equipment's* top construction economist for an overview of the nation's economic status. Then, we report on the largest exclusive survey in the industry of equipment owners and managers.

Finally, we turn to the distribution and rental dealer side of the equation. This year, we are again fortunate to have partnered with the two industry associations in those areas to poll their members: The American Rental Association and the Associated Equipment Distributors. Thanks to both of these fine organizations.

We mailed the 2005-06 questionnaires in September. More than 11,000 questionnaires were mailed, with about 2,200 usable questionnaires returned for an overall response rate of 20 percent.

As in past years, we promised those who received our questionnaires, and especially those who responded, that we would publish the results for the benefit of the entire industry. This special report contains those results. To those whose participation made the 2006 Annual Report & Forecast a success, we thank you.

We also thank Case Construction Equipment, sponsors of the Annual Report & Forecast for the fourth 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.



Rod Sutton,  
Editor in Chief





# Construction Expands, Project Mix Changes

By **Jim Haughey**, Director of Economics

**R**eal construction spending after inflation will grow about 3 percent in 2006, slightly slower than the overall economy for the second year in a row. Including inflation, spending will increase 6 percent in 2006 after an estimated 8.4-percent gain in 2005. As new-residential construction slows this year, growth shifts as nonresidential and heavy enter into a multi-year expansion.

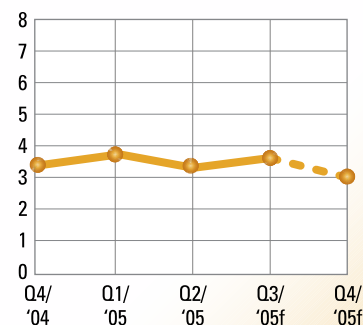
Construction inflation will be lower this year with only cement and concrete product prices certain to rise substantially. High materials prices were a serious problem for contractors last year. The abrupt price increases between the planning and construction phases changed project finances enough to cause the delay or cancellation of some tax- and bond-funded

projects as well as private projects built to be leased. Yet the timing of the price increases — a big burst early in 2004 during the world commodity shortage and a smaller burst late in 2005 after the hurricanes — means that 2006 began with the materials price index only about 3 percent above a year earlier compared to more than 12 percent at the beginning of 2005.

Materials prices are now perceived to be high, but there is no domestic or worldwide inflation driver that will cause another period of accelerated inflation. Energy-based prices will be declining slightly in 2006, although they remain very high. Plastics prices may be an exception, because the price of the natural gas feedstock for petrochemicals jumped 50 percent when one-third of the natural gas production

## Gross Domestic Product

(annual % change, inflation-adjusted)



**2005 Estimate: 3.7 %**

**2006 Forecast: 3.8 %**

Source: U.S. Commerce Department  
Forecasts: Reed Research Group

## Diesel Prices to Outpace Gasoline

Diesel supplies were reduced much more than gasoline by the hurricane damage to oil facilities in the Gulf of Mexico. Diesel prices were \$0.40 above gasoline prices two months after Hurricane Katrina and are likely to remain well above gasoline for most of 2006 because diesel inventories are much leaner than gasoline inventories.

Although gas consumption dropped about 4 percent immediately after the hurricanes when prices topped \$3 per gallon, there was no measurable decline in diesel consumption.

Diesel users are the victims of political pressure to limit the increase in consumer fuel prices. A disproportionate share of the available middle distillate was labeled heating oil instead of diesel even though this action pushed heating oil inventories much higher than they were at the same time last year.

Also, most of the immediately available tanker capacity was used to import gasoline rather than diesel. Gasoline imports increased nearly 1 million barrels a day for several weeks before small amounts of extra diesel imports arrived in the United States. Environmental regulations mandating a large variety of gasoline blends in different parts of the country were suspended to permit importing conventional blend gasoline from Europe and the Caribbean, but there was no similar action available to boost diesel supplies.

GDP growth will begin 2006 at more than a 4-percent annual pace, but it will quickly slip to nearly 3 percent by the end of the year. It may dip even lower in 2007. The four-year economic expansion will be tiring under pressure from rising inflation and credit rates. Business investment and exports become the key drivers of economic growth, replacing housing investment and consumer spending on durable goods. The hurricane-related disruption of normal activity and later rebuilding has no net impact on growth. Yet, the loss of energy supplies due to the hurricanes does shift some spending from late 2005 to early 2006. The economy and construction spending remain unusually vulnerable to energy-supply disruptions for the next few years.



## Nonresidential Construction Trends & Outlook

	\$ Bil. 2006	Annual % Change		
		2004	2005	2006
<b>Total Nonresidential</b>	<b>\$343.7</b>	<b>5.5%</b>	<b>5.9%</b>	<b>11.9%</b>
Education	\$88.5	3.0%	7.0%	14.8%
Commercial	\$72.9	6.9%	6.1%	3.4%
Office	\$54.8	7.6%	2.6%	18.9%
Health Care	\$41.8	10.4%	8.5%	13.1%
Amusement & Recreation	\$21.3	-1.4%	-3.6%	11.9%
Manufacturing	\$31.7	10.0%	20.1%	11.7%
Lodging	\$13.8	11.6%	-2.5%	15.6%
Public Safety	\$10.6	-3.9%	5.6%	11.0%
Religious	\$8.3	-5.6%	-4.7%	8.2%

Source: U.S. Commerce Department  
Forecasts: Reed Research Group

Spending will increase 11.9 percent in 2006. This is the largest after-inflation rise in activity since 2000. The volume of nonresidential building increased only marginally in 2004 and 2005. The number of projects under construction began rising late in 2005 after shrinking for five years. A brief spending pickup began early in 2004 but quickly subsided when rapidly rising materials cost made new construction less attractive in the commercial market and less affordable with fixed construction funds in the institutional market.

## Heavy Construction Trends & Outlook

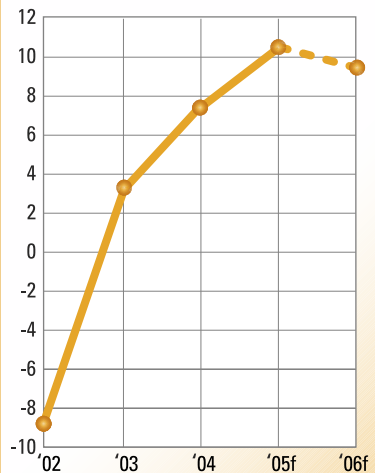
	\$ Bil. 2006	Annual % Change		
		2004	2005	2006
<b>Total Heavy Construction</b>	<b>\$198.8</b>	<b>-1.3%</b>	<b>7.4%</b>	<b>11.0%</b>
Highways & Streets	\$70.8	2.5%	9.4%	6.7%
Power	\$41.9	-12.8%	4.2%	16.4%
Transportation	\$30.3	-2.0%	0.9%	12.3%
Communication	\$16.1	4.3%	8.3%	10.8%
Water & Sewer	\$34.0	3.1%	12.9%	13.5%
Conservation & Development	\$5.7	14.0%	7.3%	7.9%

Source: U.S. Commerce Department  
Forecasts: Reed Research Group

Spending will increase 11 percent in 2006, the first substantial inflation-adjusted volume increase in five years. This gain is the result of an increase in federal highway funds, substantial improvement in government budget balances, and private capacity-addition needs in the fourth year of the economic expansion.

## Business Investment

(annual % change, inflation-adjusted)

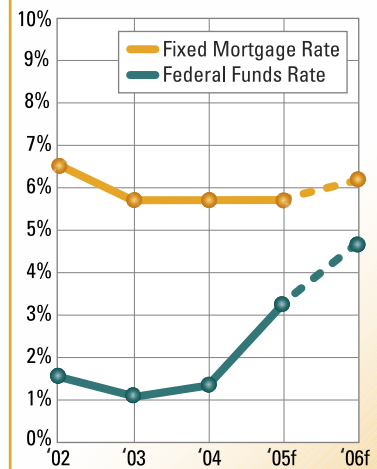


Source: U.S. Commerce Department  
Forecasts: Reed Research Group

Spending will continue growing at about a 10-percent annual pace in 2006. Principal growth drivers will be nonresidential construction as well as energy and transportation facilities. Manufacturing capacity utilization begins 2006 at about 80 percent, the usual threshold for a surge in capacity-expansion investment.

## Interest Rates

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



Source: Freddie Mac, Federal Reserve Board  
Forecasts: Reed Research Group

Thirty-year fixed mortgage rates rise to an annual average of more than 6.2 percent. Short-term interest rates increase from 4 to 5 percent over the year. Credit costs are being held down by the influx of foreign capital. Contractors will find credit-approval standards slightly easier in 2006 due to a brighter construction-spending outlook, but financially marginal homebuyers will face tougher approval standards with variable-rate mortgage rates noticeably higher.



in the Gulf of Mexico remained shut for two months after Hurricane Katrina. The adequacy of natural-gas supplies is precarious. A cold winter will quickly boost the already high prices of all plastics construction products.

Construction spending is forecast to strengthen over the course of the year and into 2007 because most of the expected decline in new-home construction spending will occur late in 2005 or early in 2006. The forecast rise in nonresidential and heavy construction spending will continue into at least 2008 as work continues on new projects started in 2006-07.

The strongest regional economies in 2006 will again be the Atlantic and Pacific states with the interior states lagging. The fastest-growth job and construction markets will be in the northeast from Norfolk to Boston, especially in Washington; south Florida; and southern California, spilling into Nevada and Arizona.

Houston and Baton Rouge have a

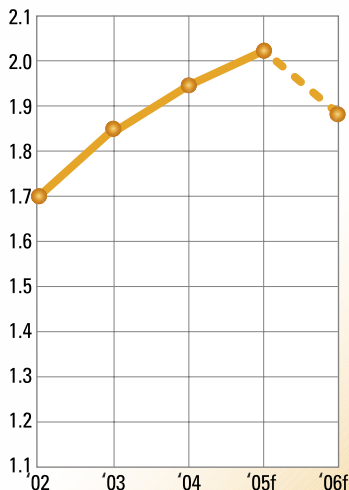
substantial boost from the influx of New Orleans evacuees. But the rebuilding of public and commercial facilities and homes in the New Orleans area will be slow and much less complete than the rebuilding of private energy and transportation facilities.

The favorable economic environment for construction continues through 2006. Growth in 2005 gross domestic product will be about 3.5 percent. Growth will be more than 4 percent early in 2006 as spending rebounds from the impact of the hurricanes. But it will slip to nearly 3 percent late in the year as the four-year economic expansion tires under pressure from rising inflation and credit costs.

The construction labor market will be slightly tighter for contractors as more than 3 million jobs are added across the economy. Expect wage rates to increase about 1 percent faster than in 2005, and expect more frequent skilled labor availability problems for nonresidential and heavy contractors.

## Housing Starts

(units, millions)



Source: U.S. Commerce Department  
Forecasts: Reed Research Group

Housing starts peaked early in 2005 and remained near the record level until late in the year. But homebuilders did not cut starts fast enough, so 2006 begins with a small surplus of new homes available for sale. Starts will decline from more than 2 million late in 2005 to 1.85 million by the end of 2006. The major depressants in the market are the surplus inventory, lowered expectations for home-price appreciation, slightly higher mortgage rates, and slightly tighter credit-approval standards. Starts may not decline in the Northeast, Florida and California.

## 2006 Construction Spending Outlook

### Spending to Grow 8.4%

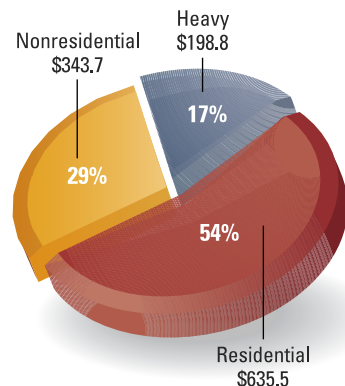
	\$ Bil. 2006	2004	Annual % Change 2005	2006
<b>Total Construction Spending</b>	<b>\$1,178.0</b>	<b>10.8</b>	<b>8.4</b>	<b>6.0</b>
Residential, New	\$455.5	19.9	9.8	-1.5
Residential Improvements	\$180.0	13.0	10.4	10.9
Nonresidential	\$343.7	5.5	5.9	11.9
Nonbuilding	\$198.8	-1.3	7.4	11.0

Source: U.S. Commerce Department  
Forecasts: Reed Research Group

Total construction spending will rise 6 percent in 2006. After inflation, real growth will be between 2.5 and 3 percent for the second consecutive year. The market mix changes significantly. The long housing boom ends but without a deep decline, yet the residential remodeling market continues to expand. Both the heavy and nonresidential markets will begin a multiyear expansion that will last into 2008. This turnaround will be fueled by strained capacity for private infrastructure, sharply improved state and local government finances for public infrastructure and buildings, and higher asset prices for commercial buildings that make new construction more attractive.

## Total Spending for 2006

(current \$, bil.)



Forecasts: Reed Research Group

The residential share of total construction spending remains above the long-term average in 2006 although it will be declining over the course of the year. Expect the residential share to decline from 56 percent in 2005 to 54 percent in 2006.



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# Ready to Go to Work

By **Rod Sutton**, Editor in Chief

Last year, we reported contractors' penchant for patience in forecasting business performance for 2005. A delayed Federal transportation bill and a contentious Presidential election were keeping a lid on expectations.

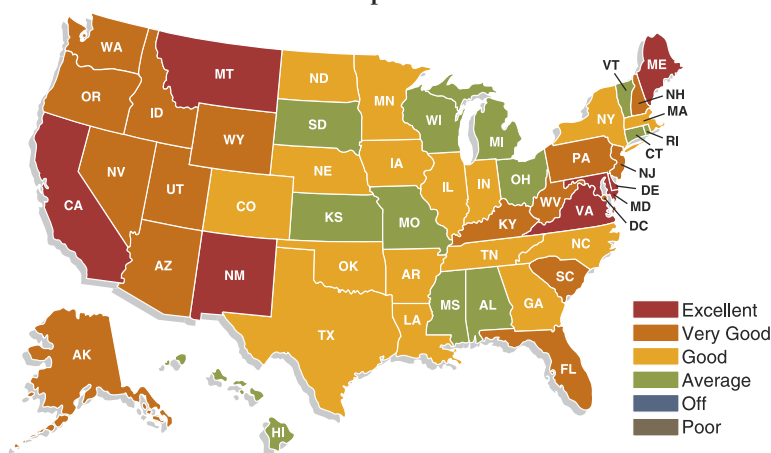
They were right, and the 2005 business year played out according to their forecast: "good."

Contractors remain cautious looking into 2006. The transportation bill passed, but late in the year; cleanup activities for Hurricanes Katrina and Rita are pulling new equipment out of the pipeline; and tire shortages and diesel fuel prices are playing havoc on machine costs. These factors are keeping contractors cautious, leading them to forecast 2006 as a "good" business year even as markets stay strong.

Highway/heavy contractors were and are slightly less optimistic than their building and diversified siblings. In fact, building and diversified contractors expect this year to be "very good."

Newly funded highway construction is certainly not going to come on line until late in 2006, maybe even 2007. Adding to that is continued strain on state transportation budgets that may delay or prevent much-needed highway work because states cannot allocate matching funds. Yet heavy construction markets show promise, as our economist, Jim Haughey, outlines in his overview. Of particular promise are transportation, power, and water and sewer work. Total heavy-construction spending is expected to rise 11 percent this year.

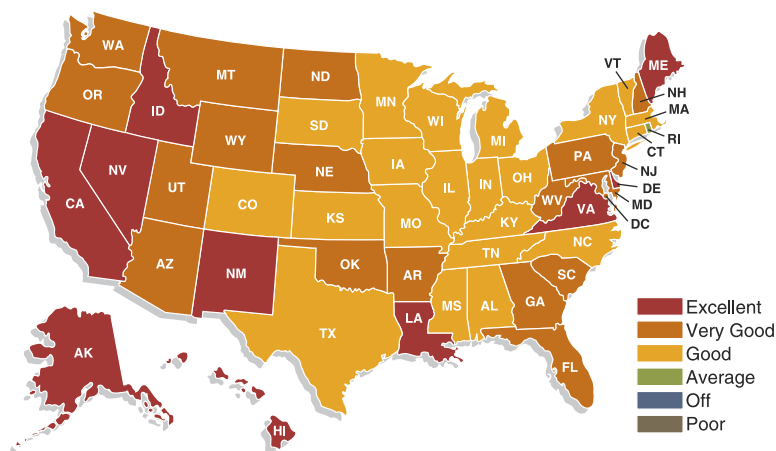
## 2005 Contractor Business Report



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

Last year turned out just as contractors had predicted nationally, but there were hot spots within regions. Only three states registered "excellent" expectations, yet seven recorded "excellent" years. On the other hand, 11 states said the year was below expectations, recording "average" business.

## 2006 Contractor Business Forecast



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

Contractors' expectations for this year range from "average" in Rhode Island to "excellent" in nine other states. Nineteen other states expect "very good," meaning more than half the country is predicting a busy year this year. Not surprisingly, Louisiana contractors expect 2006 business to jump to "excellent" from the "good" reported last year.



Building and diversified contractors can point to a resurgence of nonresidential sectors, specifically office and education projects. Haughey forecasts total nonresidential to increase by 11.9 percent in 2006.

Contract volume grew overall for contractors in 2005. Some 46 percent reported growth in volume over the previous year. Subtract from that the 20 percent that reported a decrease in contract volume, and the net is 26 percent. This is the highest net since 1999, when it was 27 percent, but it falls short of the expected net of 38 percent. For 2006, though, contractors' expected net for contract volume is 37 percent.

General building contractors expect even greater volume growth this year, with a net of 45 percent. Some regions, too, have higher expectations. Mountain volume forecast is a net of 56 percent; it is 52 percent for Southern Plains and 48 percent for South Atlantic.

Competition for these volume increases remains heated. Almost three-quarters of contractors describe competition in their construction markets "very" or "intensely" competitive. Only 4 percent labeled it "not very" or "not" competitive.

## Fleet trends

Fleet growth, measured in number of machines, is maintaining levels held since 2000. The net for fleet expansion was expected to be 30 percent in 2005; the net came in at 33 percent (39 percent reporting growth minus 6 percent reporting shrinking fleet sizes). For this year, the net is 27 percent for growth: 32 percent expect to expand minus 5 percent that see fleet size decreasing.

Last year, contractors replaced machines at the rate they forecast: 9.5 percent, up from 8.8 percent in 2004. Contractors have delayed fleet replacement in light of recent economic

uncertainty, but this increase in rate seems to indicate they are now ready to cycle less-productive machines out of their fleets. The current machine shortage may put a crimp in these plans, but the expected replacement rate for 2006 jumps a full percentage point, to 10.5 percent. Regions where even greater activity is expected are Mid-South, predicting a 12.5-percent rate of replacement, and Pacific, 12.8. Northern Plains fleets say they'll replace machines at an 8.7-percent rate.

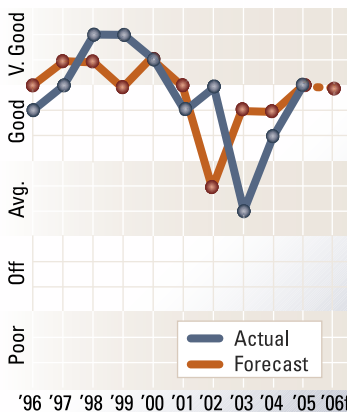
Fleet condition reports seem to support the rate resurgence. In 2001, 47 percent of contractors said their fleets were in "excellent" or "very good" condition and, in 2004, that had dropped to 40 percent. Last year, fleet conditions of "excellent" or "very good" were reported by 42 percent of contractors. One in 10 say fleets are in "fair" or "poor" shape.

Contractors favor the purchase strategy when acquiring major machines, those with a sticker price greater than \$25,000. Half of contractors cite outright purchase, and half use financed purchases as acquisition strategies. These preferences increase as estimated replacement value of the fleet increases: of the largest fleets (ERV greater than \$25 million), 81 percent report outright purchase as a strategy.

We continue to monitor the use of short-term rentals as an acquisition strategy and note that two-thirds of contractors used it last year. Among the largest fleets, usage jumps to 84 percent. One-fourth of contractors say they've increased their use of short-term rental, as did 40 percent of the large fleets.

Light earthmoving equipment is by far the most-often rented machine type, favored by 62 percent of contractors

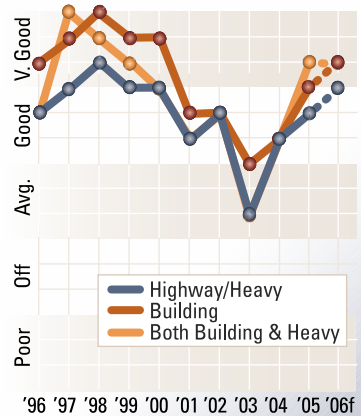
## Contractor Business Year Ratings (actual vs. forecast, all contractors)



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

*Putting 2003 securely in place as an off year, contractors recorded a second straight year of upward movement. Expectations indicate 2006 will be another "good" year for contractors.*

## Contractor Business Year Ratings, by Vocation



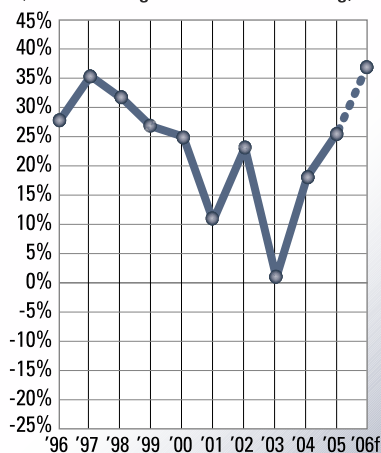
Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

*Diversified contractors recorded a "very good" 2005, expecting the same this year. Highway/heavy contractors lag slightly behind, with building contractors slightly more optimistic.*



## Contract Volume Trends, All Contractors

(% increasing minus % decreasing, net)

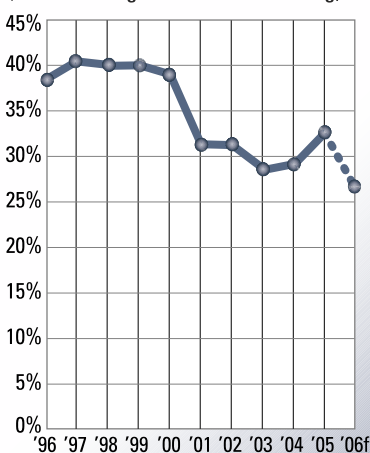


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Although volume trends fell short of expectations — for the third consecutive year — the trend continues strongly upward. Expectations for 2006: another optimistic outlook.

## Contractor Fleet Expansions

(% increasing minus % decreasing, net)

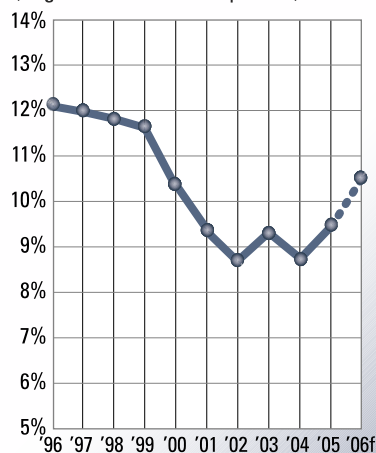


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Fleet expansion has become consistent, with 2005 numbers meeting expectations. For next year, contractors look to continue expansion, though at a slightly slower pace.

## Contractor Fleet Replacement Rates

(avg. % of machines replaced)



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

Fleet-replacement rates have hovered around 9 percent since 2001, with last year as one of the highest rates. Next year, contractors expect the replacement rate to go to double digits.

and 84 percent of the large fleets. Other machines, in order of preference: light equipment (47 percent), compaction equipment (39 percent), air compressors and generators (39 percent), heavy earthmoving machines (29 percent).

On the new-equipment side, 52 percent of contractors characterize competition among suppliers as “intense” or “very” intense. We defined competition in terms of pricing, model selection, and the number of quality brands available.

We also asked contractors to evaluate competition in the construction markets in which their firms operate. Some 72 percent described markets as “intensely” or “very” competitive.

Slightly more fleet managers rated their firm’s health as top-notch, or “very good,” in 2005: 26 percent vs. the 23 percent in 2004. Add the “good” ratings, and nearly three-fourths of contractors say their firms are healthy. Only

4 percent called firm health “weak” or “very weak.”

Half of contractors kept staffing levels stable, while 35 percent hired more and 17 percent reduced their staff. Service/maintenance staffs were expanded by 18 percent of contractors, reduced by 11 percent. And equipment operators were added by 23 percent of contractors, reduced by 11 percent.

Subtracting those who reduced their staff from those who expanded, the net is 18 percent. Not surprisingly, operator and mechanic availability is a major problem for about one in five contractors.

Labor is even more of a concern for contractors in the Mountain region.

## Contractor Acquisition Trends

(% using for major equipment)

Purchase Outright	52%
Purchase by Financing	49%
Rental/Purchase	20%
Short-term Rental	17%
Lease/Purchase	15%
Lease	7%

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

Contractors prefer to purchase, whether outright or through financing. As fleet size grows, so does the propensity to purchase. Among fleets with estimated replacement values from \$25 million on up, 81 percent cite outright purchase as an acquisition option.

Some 36 percent report operator availability as a major problem, and 32 percent say it’s a problem finding mechanics.



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# Even Better than Expected

**N**onconstruction firms outperformed expectations in 2005 and will carry forward these levels into 2006. Utilities and mining and energy fleets show the strongest performance, returning to the high levels of business not seen for several years.

## Materials producers

A consistent, though gentle, slope upward marks materials producers' business over the past few years. Last year was the highest mark since the recession, but it appears from the 2006 forecast that these equipment users will stay in the "good" business zone.

Most regions outperformed expectations last year, with bright spots in the

South Atlantic and Mountain regions with "excellent" reports. Those two regions lead expectations for 2006, too, joined by the Southern Plains and Pacific regions in anticipating a "very good" year. Mid-Atlantic and Northern Plains expect "average" business in 2006.

Contract volume is expected to drop off this year after missing expectations for last year. In 2005, the percent expecting increases outweighed decreases by a net of 33 percent; the actual net for 2005 was 25 percent (44 percent citing increases in volume minus 19 reporting decreases). Again, Mountain, Southern Plains, and South Atlantic outperformed the average. For 2006, 36 percent of materials producers

expect volume growth and 20 percent expect volume decline for a net of 16 percent.

For the second straight year, fleet growth has returned strong, posting the highest net this year since 1999. Four of every 10 fleets increased the number of machines in their fleets, and 3 percent decreased for a net of 37 percent. Expectation for 2006 is for growth, with a net of 23 percent (25 percent increasing minus 2 percent decreasing).

Replacement rates, though, fell short of forecast in 2005 and below the 8- and 9-percent levels in 2003 and 2004. After reporting a replacement rate of 7.7 percent last year, materials producers expect to replace 7.9 percent of their fleet this year.

Fleet conditions improved last year, with 47 percent calling themselves in "excellent" or "very good" shape, up from 40 percent in 2004. Still, 14 percent of materials-producing fleets are in "fair" or "poor" condition.

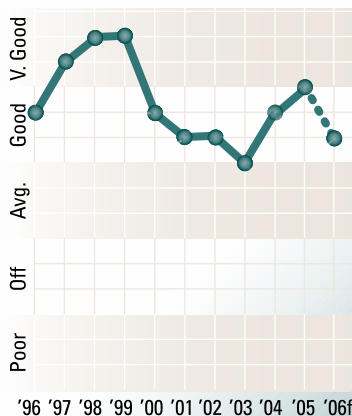
## Mining & energy

For the second consecutive year, business reports outshone expectations for mining and energy fleets. In fact, the "very good" of 2005 was the best report in 10 years for this industry. Expectations are slightly higher for 2006.

Great Lakes and Mid-South regions reported an "excellent" business year last year, and the Mid-South expects this year to be similar, joined by New England, Southern Plains, and South Atlantic regions.

Last year was also the best in 10 years for work volume, measured in total machine hours. In fact, the 2005 net (percent increasing volume minus percent decreasing) doubled the fore-

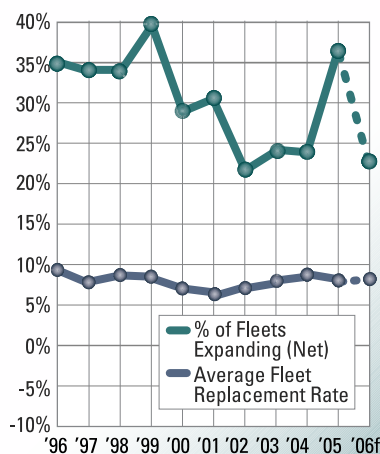
## Materials Producer Business Outlook



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

*Last year was the best since 1999, say materials producers. The outlook for this year drops a bit, but it still registers as "good."*

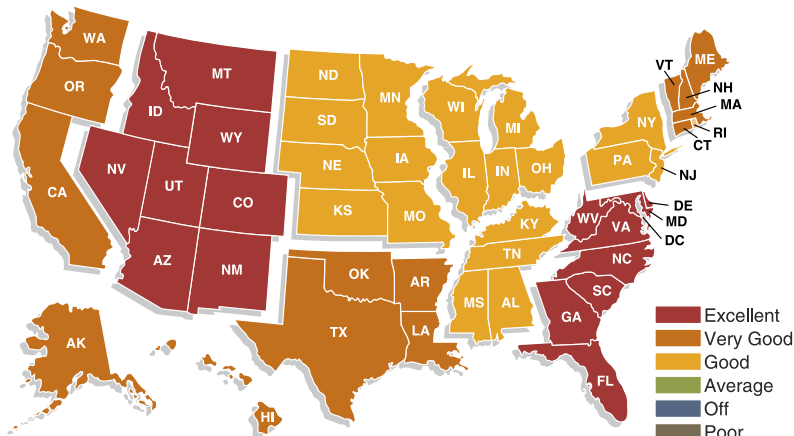
## Materials Producer Fleet Management Trends



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

*Fleet expansions recorded a solid uptick last year, but are expected to return to recent levels. Replacement rates, though, have turned conservative.*

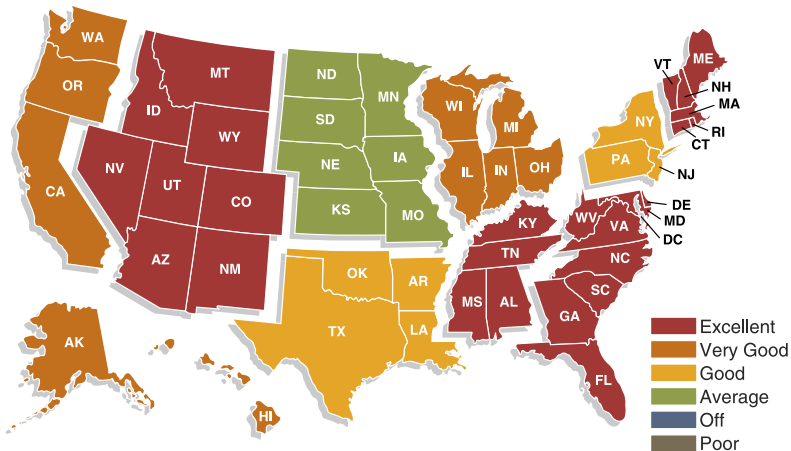
## 2006 Materials Producer Business Outlook



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

Materials producers expect a continued "good" level of business this year. South Atlantic, Mountain, Southern Plains, and Pacific regions expect to outperform that forecast, citing a "very good" year ahead.

## 2006 Mining & Energy Fleet Business Outlook



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

After recording the best year in the past 10, mining and energy fleets expect an even better 2006. Four of nine regions forecast "excellent." Only the Northern Plains shows signs of sluggishness.

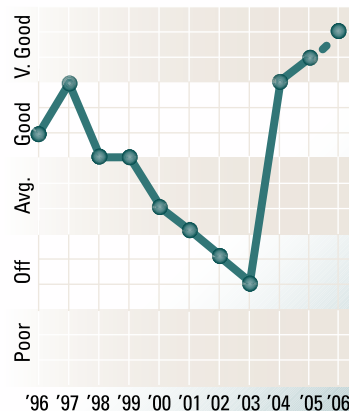
cast made at the end of 2004. Some 53 percent saw increases, 10 percent saw decreases, producing a net of 43 percent. This year, 49 percent expect work volume to increase and only 3 percent expect it to decrease for a net of 46 percent.

To handle the increase in machine hours, 47 percent of fleets expanded (measured in number of machines). Subtract the 8 percent who decreased fleet size, and growth of mining and

energy fleets shows a net of 39 percent. This, too, is the strongest fleet expansion in 10 years, and this year promises to continue that trend with a predicted net of 42 percent. Strong growth is expected in the South Atlantic and Mid-South.

On the other hand, fleet replacement rates fell short of expectations. Late in 2004, mining and energy fleet managers forecast a 2005 fleet-replacement rate of 9.6 percent. In actuality,

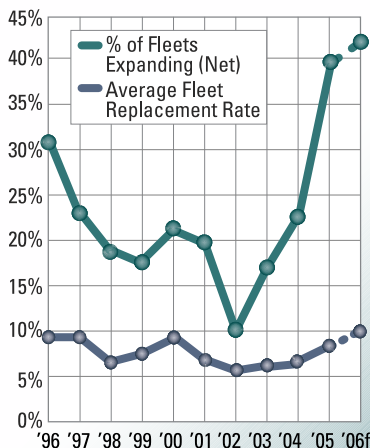
## Mining & Energy Business Outlook



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

Building on an impressive turnaround coming out of a six-year slide, these fleets see more positives ahead. Outlook for 2006 is "very good."

## Mining & Energy Fleet Management Trends



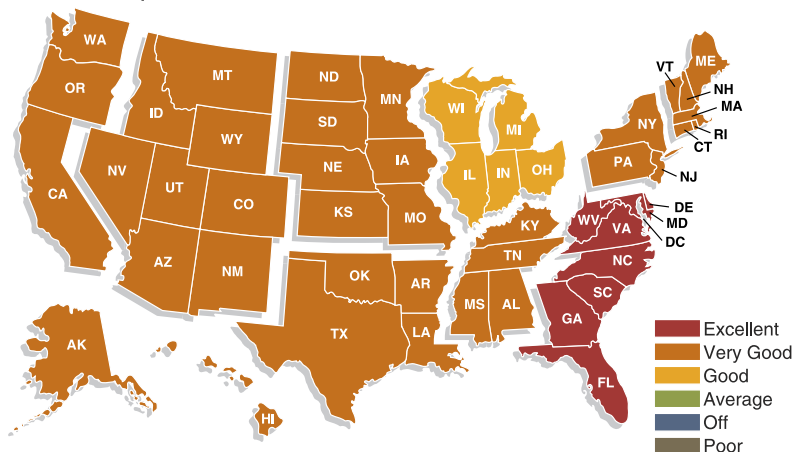
Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Fleets are expanding not only in number of machines but also in their rate of replacement. This year signals more of the same.





## 2006 Utility Fleet Business Outlook



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

Utility fleets expect this year to be similar to last year's "very good," with solid expectations for seven of nine regions. South Atlantic hopes for a better year, and Great Lakes expects only a "good" 2006.

that rate was only 7.6 percent last year. But fleet managers hope to replace fleet more aggressively this year, reporting an expected rate of 8.9 percent for 2006.

Even so, fleet condition is "excellent" or "very good" for 45 percent of mining and energy fleets, about the same as a year ago. On the other side, 14 percent of mining and energy fleets are reported to be in "fair" or "poor" condition.

### Utilities

Utilities returned to business levels of their heydays in the late 1990s, recording a "very good" 2005 after three years of "good" business. These fleets expect 2006 to be more of the same.

Mid-Atlantic region reported an "excellent" 2005, whereas New England and Great Lakes regions lagged with a "good" year. For 2006, South Atlantic expects "excellent," but Great Lakes predicts another "good" year.

Work-volume increases (by machine hours) were the highest since 1999, and expectations for 2006 are the highest recorded since 2000. Last year, 51 percent of utilities fleets reported increased volume. When the 8 percent

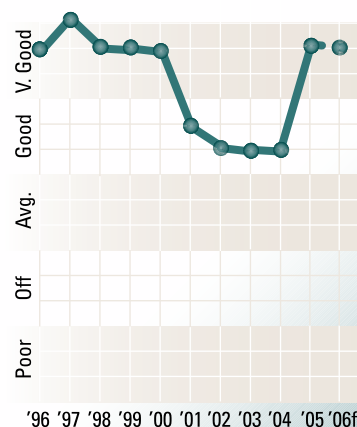
that reported decreased volume are subtracted, a net of 43 percent remains. This year, the net 42 percent for volume increases (47 percent increases minus 5 percent decreases).

Fleet expansion also returned to 2001 levels. One-third of utilities managers reported expanding their fleets in 2005, and 8 reported decreasing fleet size (in numbers of machines) for a net of 25 percent. Expectations for 2006 leave a similar net of 26 percent (29 percent expanding minus 3 percent shrinking fleet size).

As expansions grow, replacement rates are also edging up. In fact, the rate reported for 2005 was far beyond the rate utilities fleets expected to replace when making the forecast in 2004. The forecast was 8.5 percent, and the actual rate reported last year was 10.5 percent. This appears to be no aberration, as expectations for 2006 call for a similar replacement rate of 10.7 percent.

These expansion numbers and replacement rates may explain why utilities managers report high levels of quality in fleet condition. Some 52 percent say their fleets are in "excellent" or "very good" condition; only 5 percent report "fair" or "poor" fleets.

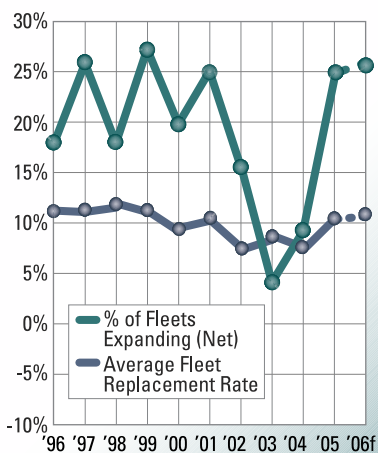
## Utilities Business Outlook



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

Utilities business returned to pre-2000 levels, bouncing back to "very good" last year and expecting the same type of year in 2006.

## Utility Fleet Management Trends



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

Having tapered off fleet-expansion plans, both in numbers of machines and rate, utilities fleets reported numbers similar to 2001. Next year is expected to mirror 2005.

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# Battered Fleet Budgets

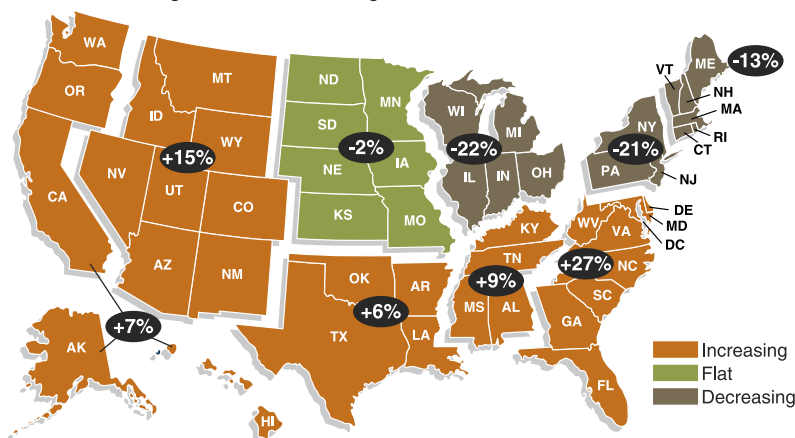
For the third consecutive year, fleet funding has plummeted for many government agencies. Although the total net (the percent reporting increases minus the percent reporting decreases) was flat in 2005, state fleets continue to fight decreasing budgets. Among local fleets, 23 percent reported funding increases minus 25 percent reporting decreases for a net of -2 percent; 12 percent of state fleets reported increases and 44 percent decreases for a net of -32 percent. This follows a 2004 net for states of -17 percent.

Clearly, state fleets face challenges, and this year bodes little better. Two of every 10 state fleets expect funding increases, but 48 percent see decreases for a net of -28 percent. Local fleets expect to move ever so slightly into positive territory: 27 percent expect increases and 23 expect decreases for a net of 4 percent.

Saving many fleets is flat growth in work volume. Last year, 60 percent reported no change in volume and 68 percent don't expect 2006 levels to change. Of the remaining, 24 percent of both state and local fleets predict more work against 8 percent and 9 percent, respectively, expecting less work. Nets are 16 percent for state and 15 percent for local fleets.

Fleet expansion, understandably, has not been a priority for either of these government agencies: 56 percent of states and 73 percent of locals didn't change fleet sizes last year, as measured in number of machines. For 2006, nearly three-quarters of fleets overall will stay at the same size. Among those changing fleet size, states report a net of 8 percent (24 percent increasing

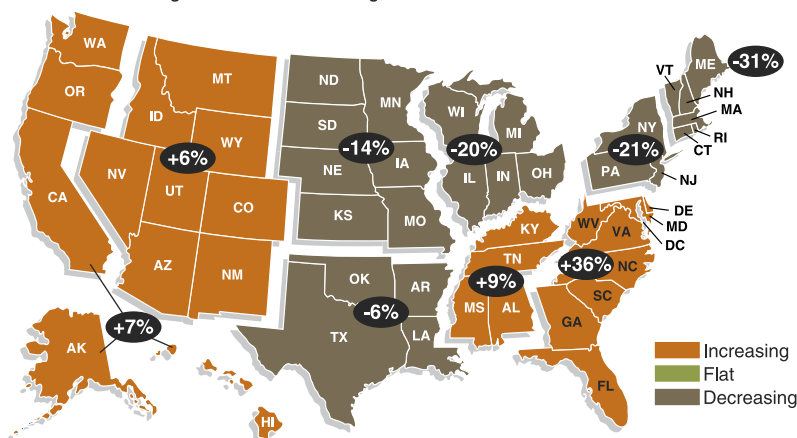
**2005 Public Fleet Funding Trends by Region**  
(% increasing minus % decreasing, net)



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

Government fleets were divided last year between those regions with positive funding growth and those whose funding continues to shrink. The Mountain region was the only one to meet expectations from last year, although the Northern Plains came close. The national net for 2005 was flat growth.

**2006 Public Fleet Funding Outlook by Region**  
(% increasing minus % decreasing, net)



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

A similar split is seen in the outlooks for 2006, and again the national trend is for flat growth. South Atlantic fleets lead the nation in expectations, and New England forecasts the most dire funding trend with a net of -31 following its 2005 net of -13.

minus 16 percent decreasing) and locals report a net of 13 percent (18 percent minus 5 percent).

State fleets continue to out-replace local fleets, although their 2005 rate of 9.6 percent fell below the expected level of 10.3 percent. Local fleets hit their estimate, replacing 6.1 percent in 2005.

This year, state fleet managers look to replace at a similar rate, 9.2 percent, and local fleets hope to boost their rate to 6.6 percent. State replacement rates wander historically, hovering around 10 percent. Local replacement rates, though, have been declining steadily from the 2000 peak of 8 percent.

Perhaps as a result of this replacement strategy, a far greater percentage of state fleets than local report "excellent" fleet condition: 28 percent vs. 3 percent. Overall, 47 percent of government fleet managers say their machines are in "very good" or "excellent" condition, and 13 percent report "fair" or "poor" fleet conditions.

To fill in some of the gaps in funding, about half of government fleets use short-term rental, and 21 percent of fleets have increased their use of rental.

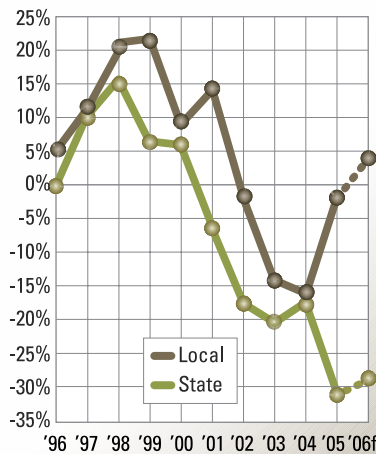
The most-often rented equipment is light earthmoving machines (51 percent of government agencies say they rent it), followed by compaction equipment (34 percent), light equipment (31 percent), and heavy earthmoving equipment (27 percent).

As an acquisition strategy for major machines (defined as carrying a purchase price higher than \$25,000), short-term rental is still second to the government fleet managers' goal of outright purchase. Some 83 percent report this acquisition strategy, 14 percent consider short-term rental, and 12 percent use lease-purchase.

Government workforce numbers also reflect the ongoing budget restraints. Seven of every 10 fleets

## Public Fleet Funding Trends

(% increasing minus % decreasing, net)

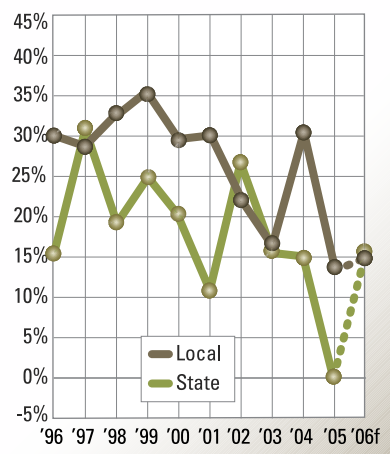


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

The trend is flat, with the net hovering around 0 for 2005 and 2006's forecast. A large disparity, however, shows up between state and local fleet expectations.

## Work Volume Trends: Public Fleets

(% increasing minus % decreasing, net)

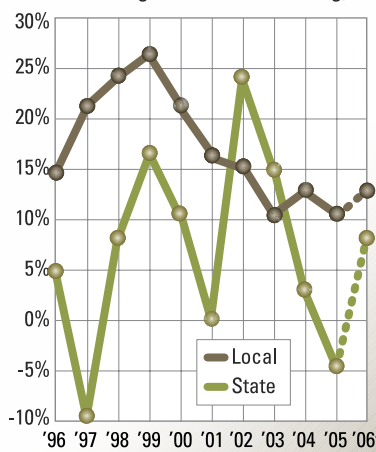


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Work volume will stay the same for some 60 percent of fleets, but for those expecting a change in volume, the net shows work load growth.

## Fleet Size Trends: Public Fleets

(% increasing minus % decreasing, net)



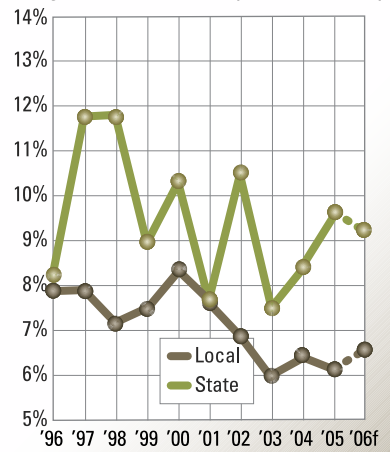
Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

State fleets saw flat growth last year and expect to see some positive movement in 2006. Local fleets continue to outgrow them, however.

report stagnant labor numbers, but among the rest the trend is toward downsizing. Net for total workforces is -7 percent (12 percent citing growth minus 19 reporting declines in workforce). Individual declines are most

## Public Fleet Replacement Rates

(avg. % of machines replaced annually)



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

State fleets are replacing machines at a higher rate than their local peers, revealing one of few positive machine trends. States expect to continue at this rate, too.

evident in the service/maintenance departments (8 percent minus 13 percent for a net of -5 percent) and among operators (10 percent minus 15 percent for a net of -5 percent).



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# All Cylinders Firing

Not only did rental dealers exceed their high expectations for 2005 and have an “excellent” year, but they also increased margins and rental rates.

In our survey of members of the American Rental Association, we found an enthusiastic report. Seven of nine regions reported that 2005 was an “excellent” year.

Sales volumes jumped last year, with the percentage of dealers reporting increases minus those reporting decreases netting out at 63 percent. Few dealers reported sales decreases at all.

Nearly half of the respondents reported significant increases in short-term rentals. Other significant gains were recorded in new-equipment sales, parts sales, and service volume.

The outlook for 2006 is just as enthusiastic. Business is expected to again be “excellent,” and continued growth in sale volume is anticipated. The net (percent expecting increases minus percent expecting decreases) is 45 percent.

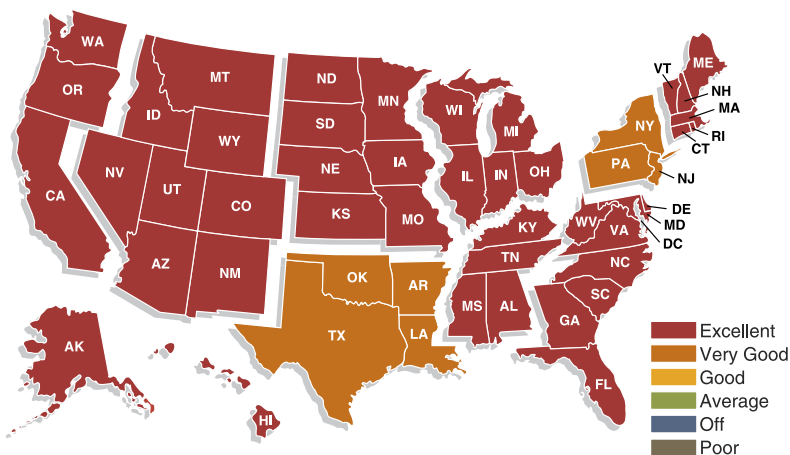
Dealers took advantage of the stellar year to boost margins with 39 percent citing higher margins for 2005.

Rates also rose in 2005, with 58 percent of dealers reporting higher rates. An astounding 70 percent expect to raise rental rates this year.

Of course, with this much rental activity to share, competitiveness waned a bit. Although six in 10 dealers say competition is “intense” or “very intense,” this is less than in 2004. Half of dealers say competition is a concern for 2006.

Financial and economic worries top the list of business concerns for this year. Interest rates are a concern for 63 percent of rental dealers; 50 percent cite inflation; and 46 percent worry about recession.

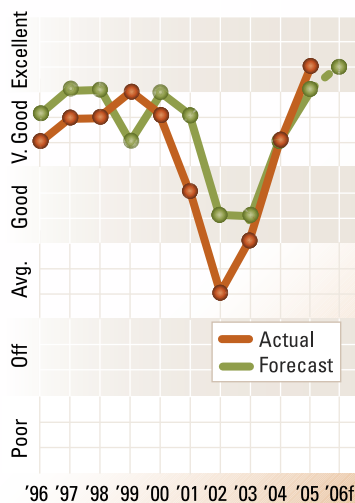
## 2006 Rental Dealer Business Outlook



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

*This will be an “excellent” year for seven of the nine regions if expectations play out for rental dealers. Only the Great Lakes and Southern Plains differ, although no one can argue with “very good.”*

## Rental Company Business Year Trends

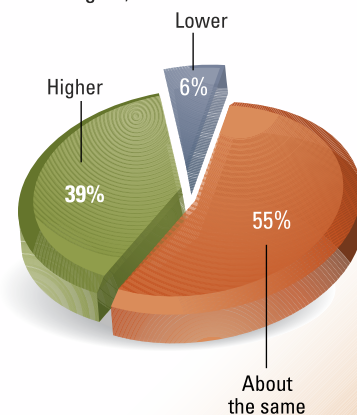


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

*Business hit the top in 2005, and there's no sign of falling back this year as trends return to pre-recession levels.*

## Margins on Rentals

(how '05 margins compare to '04 margins)



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

*Four of 10 dealers boosted margins last year, taking advantage of strong demand. Only 6 percent reported margins lower than in 2004.*





# Back at the Top?

A cursory glance at the business year trends for distributors shows a steep drop culminating in the lowest possible rating in 2002. But the recovery has been dramatic, with distributors' rating rebounding from "poor" in 2003 to "excellent" in 2005. Strong demand and slightly weaker supply contributed to margin growth last year, and distributors are optimistic about 2006.

The Associated Equipment Distributors (AED) again graciously allowed us to query their membership this year, and they reported overwhelming volume growth in 2005. Nearly seven of 10 reported increases, and when the small percentage reporting decreases in volume are subtracted, a net of 63 percent remains. In 2004, that net was 62 percent, showing just how strong the distribution business was last year. Expected volume increases for 2006 are greater than decreases by a net of 33 percent.

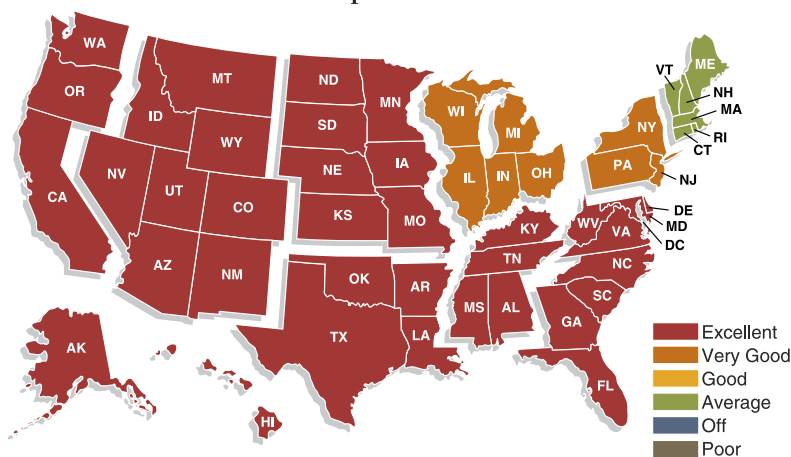
Significant volume increases were seen in new-equipment sales (59 percent reporting an increase), parts sales (58 percent) and service (54 percent). Rental business grew, too, with 47 percent showing increases in rent-to-rent and 41 percent in rent-to-buy.

Distributors turned volume increases into margin increases last year, continuing a trend of recovery from the 2001-03 doldrums. Although 20 percent are reporting margin decline, 37 percent are reporting "somewhat" or "much" higher margins in 2004.

"Intense" or "very" competitive markets face 85 percent of distributors, which could put downward pressure on margins, but machine shortages and increasing demand from Gulf States and overseas should override that.

Machine shortages were reported

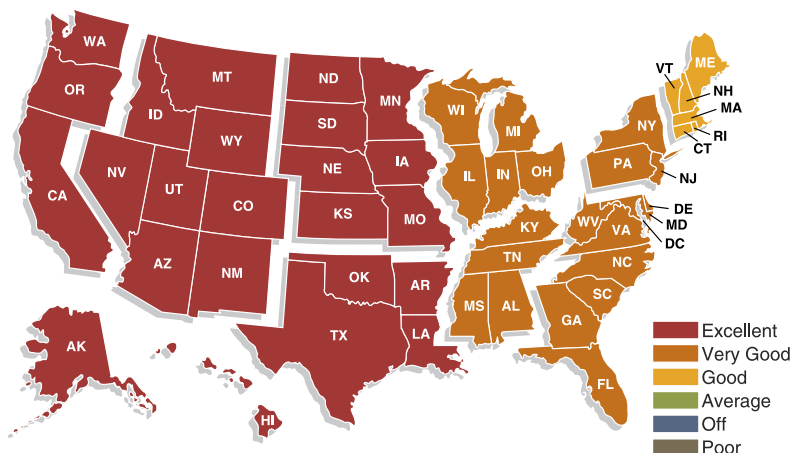
## 2005 Distributor Business Report



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

New England trailed the rest of the distributor nation last year, reporting an "average" business year after predicting an "excellent" one. The other regions met or exceeded expectations, with six of nine regions reporting last year as "excellent." Mid-Atlantic and Great Plains distributors said last year was "very good."

## 2006 Distributor Business Outlook



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

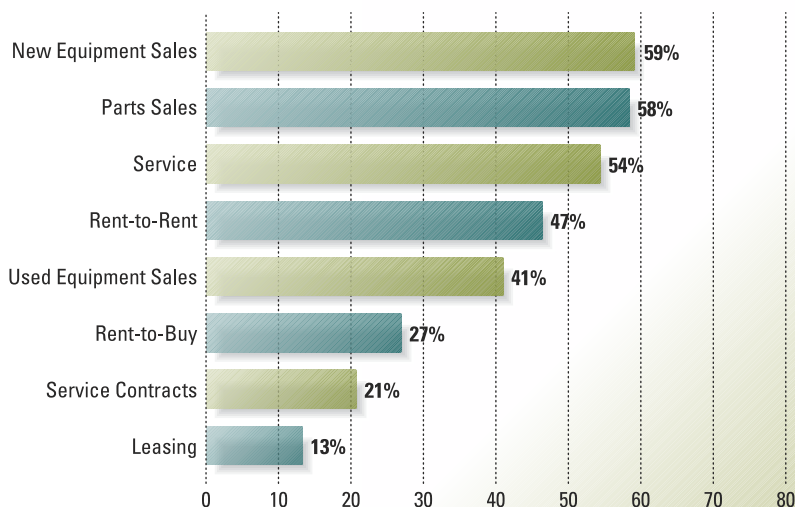
After 2005 proved to be an overall "excellent" year for distributors, they are paring back expectations for 2006. Four regions say they expect business to continue "excellent," but Mid-South and South Atlantic distributors are calling for a "very good" year. New England continues to lag, forecasting a "good" 2006.

as a business concern for about half of distributors, but as business continues to grow, they are also becoming con-

cerned about interest rates, both from a capitalization standpoint and as a customer-finance hindrance.

## Distributors' Growth Areas

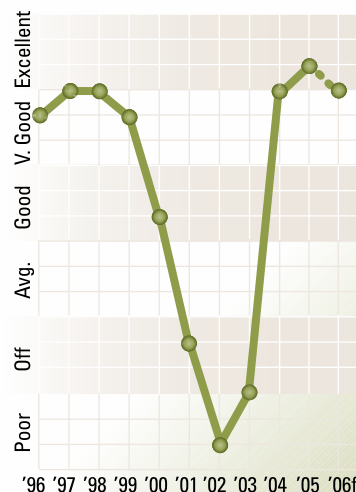
(% reporting significant increases)



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

New-equipment sales, parts sales, and service were primary growth areas for distributors last year. The percent of distributors reporting increases in equipment sales outpaced the percent reporting decreases by nearly 60 percentage points.

## Distributor Business Year Rating

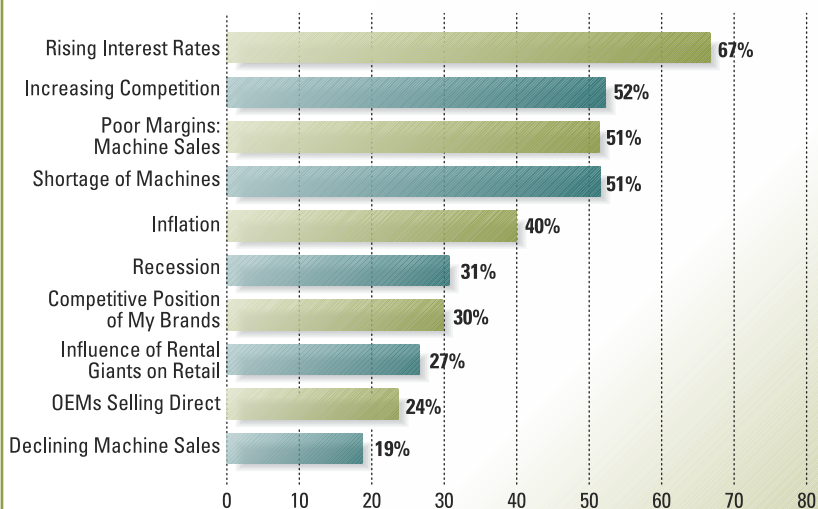


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

Distributors' business ratings topped the chart last year, making the drastic dip in the early 2000s a memory. Expectations remain high for 2006.

## Distributor Concerns for '06

(% indicating concern)

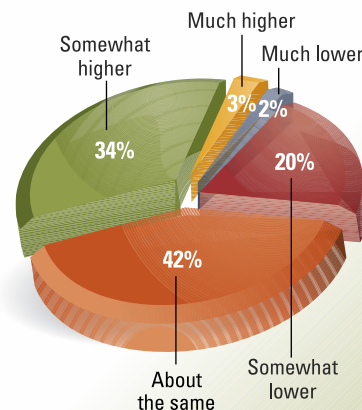


Source: Construction Equipment/Case Construction Equipment Annual Report & Forecast Survey

The top three concerns remain the same for distributors, although interest rates have moved to the top of the list for 2006. Two-thirds of distributors cite rates as the single most pressing concern. Recession has returned to the list after dropping off last year.

## Distributor Margins On New Equipment Sales

(trends, 2005 vs. 2004)



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

Nearly four of 10 distributors reported higher margins in 2005, a larger group than the previous year.



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## MANUFACTURER NEWS

### Volvo's 70-ton Excavators Set to Arrive in North American Market

Having introduced its 70-ton excavator last March during Conexpo/Con-Agg, Volvo Construction Equipment is ready to deliver the machine into North American markets.

Production of the machine began in

October 2005, with field follow around the world, where Volvo logged thousands of hours on the test machines. This is Volvo's largest excavator to date, and the company is marketing it to mass excavation and quarry

operations.

We visited Volvo's manufacturing facility in Pusan, South Korea, in December where we operated one of the company's EC700B LC excavators. The machine takes big bites, armed with a 5-cubic-



yard bucket, and exhibited good power at full-boom extension. Cycle times were quick, and the cab is roomy and comfortable.

## RENTAL NEWS

### Hertz Division Expands to Four More Locations

Hertz Equipment Rental's Power Generation Services provides portable power solutions and power-distribution products for rental or sale. Originally launched in 2004 at the Hertz Equipment Rental facility in Atlanta, the division has already expanded to four new markets — Nashville, Tenn., Raleigh, N.C., Charlotte, N.C., and Jacksonville, Fla. The generators Hertz offers are specialty units manufactured by leading brands and include high-capacity models ranging from 20kw to 2,000 kw.

"From the urgent needs customers experience for emergency response to general construction and special events, Hertz Equipment Rental is moving to the forefront of providing portable power and power-distribution products to the Southeast region," says David Scott, zone operations manager, Hertz Equipment Rental.

Editor's Note: *Construction Equipment* inaccurately reported in September's Industry Giants feature that Hertz was marketing jointly with another entity. *CE* regrets the error.

## TRAINING

### Smoother Roads on the Way

Roadtec has announced a series of workshops designed to increase the skill levels of employees of asphalt-paving companies — the very people responsible for the quality and smoothness of the country's pavements.

Both classroom and hands-on instruction will be offered by professionals from leading

companies in the road-construction industry, including Roadtec, Astec, Topcon, Laser Systems and Carlson Paving Products.

Among topics up for discussion are reviewing the function and control of the paver and screed, preventing mix segregation, achieving proper mat density with rollers, applying tack



coats and mat testing.

Workshops are scheduled for Jan. 18-19 and Feb. 22-23, 2006, at the Roadtec/Astec

training center in Chattanooga, Tenn. For information contact Carmen Mercer at Roadtec, 800-272-7100.

## ASSOCIATION NEWS

### AEM Elects New Officers

The Association of Equipment Manufacturers (AEM) has elected Gerald Shaheen (pictured), group president of Caterpillar, to be its 2006 Chairman.



Gerald Shaheen

Additional elected officers for 2006 include: First Vice Chairman Dennis Eagan, group president industrial/power equipment of Blount; Second Vice Chairman William Lasky, president and CEO of JLG Industries; Treasurer William Desmond, vice president distribution planning and development of Komatsu America; and Secretary Dennis Slater, AEM's president.





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# Managers Digest

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

## MAINTENANCE MANAGEMENT

### Eliminate Hose-Maintenance Guesswork

Goodyear Engineered Products has a new online tracking system (Goodyear Hose Trakker Online) that monitors hose assemblies from pre-installation through the life of the product. This Web-based tool is available only to Goodyear Star distributors and allows customers to access hose-assembly records with the click of a mouse.

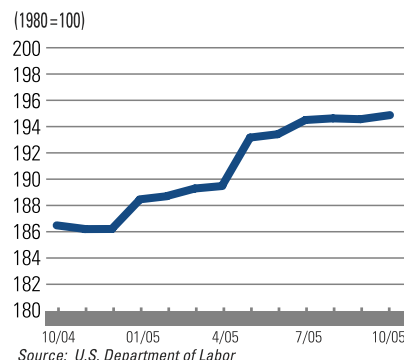
According to Keith Collett, Goodyear's industrial-hose marketing manager, the new program monitors inventories, product locations, maintenance schedules and test history of industrial hose assemblies.

The program, jointly developed with Wetaskiwin InfoChip Systems, initially uses serial-number tags installed by Star distributors that identify hose assemblies. Next-generation hoses will use radio-frequency identification microchips to further simplify the identification and tracking process.

## STATUS & FORECAST

### ↔ CONSTRUCTION-EQUIPMENT PRICE INDEX

Construction-equipment prices have been nearly steady after a 3-percent price increase last spring. Credit the end of the price spurt to steady to slightly lower steel prices due to the start up of substantial new capacity, largely in China, as well as much slower growth in equipment orders in the recent months following a doubling of orders in the previous two years. Expect smaller periodic price increases because manufacturing capacity is still strained.



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## INDUSTRY EVENTS

### World of Asphalt Growing Strong



The World of Asphalt 2006 Show and Conference set a new exhibit-space record, with more than 135 companies reserving more than 56,000 square feet of exhibit space. The show will be held March 13 through 16, 2006, at the Orange

County Convention Center in Orlando, Fla. Tradeshow Week, an exposition-industry publication, named World of Asphalt one of the 50 fastest growing trade shows in North America. The 2004 show was nearly double the size of the inaugural in 2001.



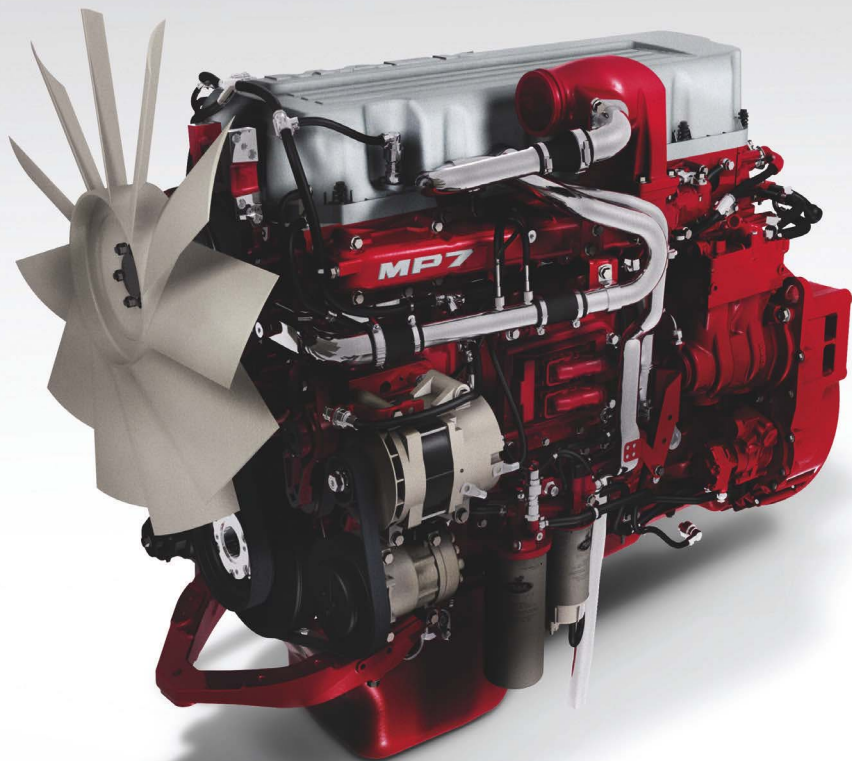
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ASV considers its SR-Series Posi-Track loaders the most significant product development in its 20-plus years of building rubber-track loaders. The SR-Series features a new chassis, new undercarriage and new operator's station, along with such design details as high-intensity working lights and a cab door that lifts vertically and stores in the roof.

Photos: George Pfoertner®

# What *Speed* Bump?

ASV's new SR-Series rubber-track loaders — so freshly designed that they share just a handful of part numbers with the company's other models — feature a supple new undercarriage that soaks up obstacles in its path



## SR-80 Specifications

Engine	Perkins 804C-33T
Horsepower (gross)	80.5
Displacement	3.3 liters
Travel speed (low/high)	7.0/12.5 mph
Loader type	Radial lift
Lift height	125 inches
Ground clearance	15 inches
Ground pressure	2.85 psi
Length w/o bucket	112.5 inches
Auxiliary pressure	3,000 psi
Auxiliary flow (low)	20 gpm
Auxiliary flow (high)	30 gpm
Attachment coupler	Hydraulic
Estimated rated operating capacity @ 50% tipping load	3,100 pounds
<b>Estimated list price w/bucket</b>	<b>\$47,000</b>

By WALT MOORE, Senior Editor

**O**n a chilly afternoon some six weeks ago, we watched Brad Lemke, director of product development for ASV, as he spared no horsepower in demonstrating the aggressive performance of the company's new SR-80 Posi-Track loader.

Working the new machine in a remote area of ASV's extensive proving grounds — near its Grand Rapids, Minn., factory, Lemke excavated deeply into the site's heavy sandy clay and ran the new tractor up, down and across the site's imposing grades and rutted surfaces. Then, on a concrete test pad, he repeatedly drove the new model at top speed over a 4x4 timber placed across one track's path. We were impressed at how calmly the SR-80's new four-bogie undercarriage rippled across this impediment.

"The SR-Series is the most significant model introduction in ASV's history," says Lemke. "Just about every idea, wish and want we as a manufacturer have had in 20-plus years of building rubber-track loaders is reflected in this new design. We've invested more in manufacturing tooling for these machines than we invested in all our previous models — combined. Not counting nuts and bolts, there are, literally, only five or so part numbers that are common with our existing models."

The new series, which includes the 80-hp flagship model, the SR-80, and a 70-hp companion model, the SR-70, was three years in development, says Lemke. And although the new machines don't replace any of the company's current nine models, the technology they embody, he says, eventually will work its way through the entire line. That transfer of technology likely will include the stellar feature of the SR-Series — its new "single-rail" undercarriage.

### The single-rail concept

ASV has been building rubber-track vehicles since the early-1980s, and the hallmark feature of its loaders has always been a suspended undercarriage that flexes as it encounters obstacles in its path. The new SR-Series undercarriage, which ASV calls a "single-rail" design, is the company's fourth-generation concept, and accord-

**ASV's director of product development, Brad Lemke, convincingly demonstrates the SR-80's aggressive digging power, traction and ability to negotiate rough terrain.**





# FIELD REPORT FIELD REPORT FIELD REPORT

ing to Lemke, the best yet.

Similar to the preceding undercarriage generations, the single-rail system retains the essentials of ASV's undercar-

riage design: proprietary rubber tracks that contain no steel; multiple wheels to spread the tractor's weight evenly over the tracks; torsion axles to provide the

desired suspension qualities; and a roller-cage sprocket.

That said, however, the new single-rail system represents a significant departure in overall design from its predecessors. We've included a couple of computer-generated illustrations from ASV's engineering files to help you understand the fundamentals of the single-rail design, which basically incorporates (on each side of the tractor) four independently suspended bogie assemblies. These assemblies, each having four wheels, are attached to a central longitudinal frame (rail) via torsion axles. A row of four larger idler wheels is attached to each end of the central rail, which, in turn, is attached to the tractor frame with two torsion axles.

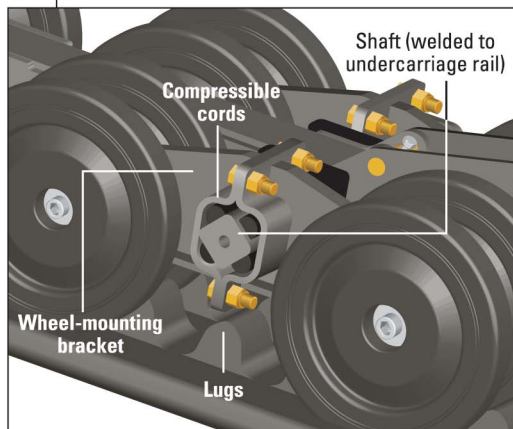
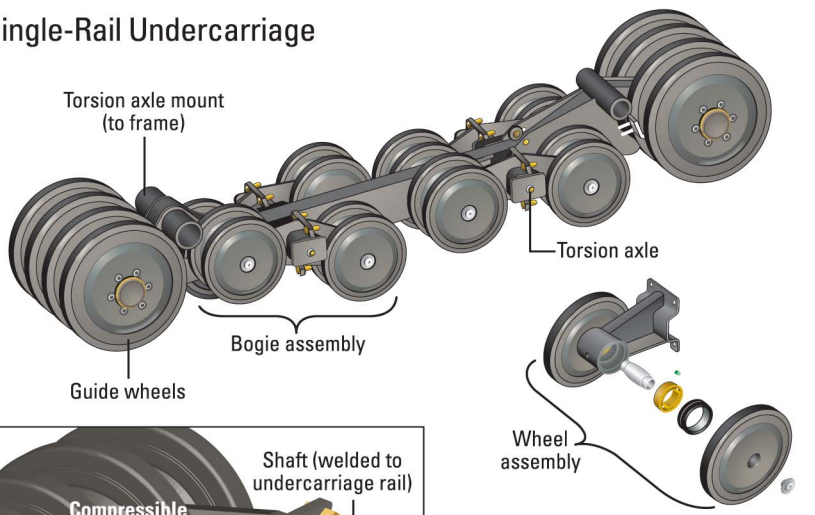
A torsion axle, as you may know, consists of a square tube, into which a square shaft is inserted (after being rotated 45 degrees), thus forming triangular spaces between the shaft's sides and the tube's corners. Compressible cords are placed in these triangular spaces, and when undercarriage forces try to rotate the shaft or the tube (whichever is not held stationary), the cords compress, allowing controlled movement of components and dissipation of shock loads.

According to Lemke, the single-rail system's six torsion axles (per side) make the SR-Series undercarriage more flexible than previous designs, and its use of wheels that are narrower in width than those used in previous designs helps keep the undercarriage virtually free of material buildup. Metal face seals are used with each wheel bearing to make the entire undercarriage maintenance-free, except for adjusting track tension, which is accomplished via a simple turnbuckle strut between the central rail and the sprocket support.

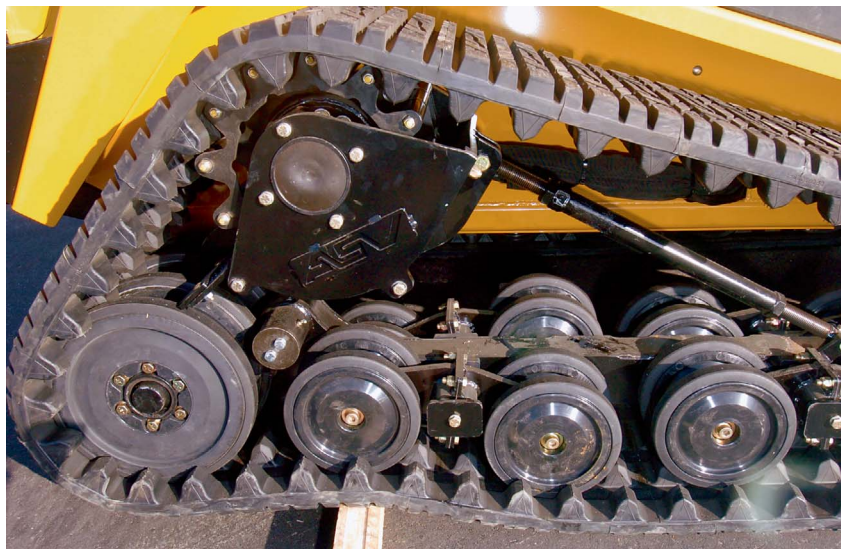
## Waste no space

The engineering objective for the SR-Series from the very start, says

### Single-Rail Undercarriage



**This photo illustrates the independent suspension of the four bogie assemblies. A timber under the rear wheels of the foreground bogie tilts the assembly toward the front of the machine. A timber (not visible) under the front wheels of the corresponding background bogie tilts the assembly rearward. Four rows of rubber lugs on the track's inner surface guide the wheels and provide engagement points for the roller-cage sprocket (upper left).**



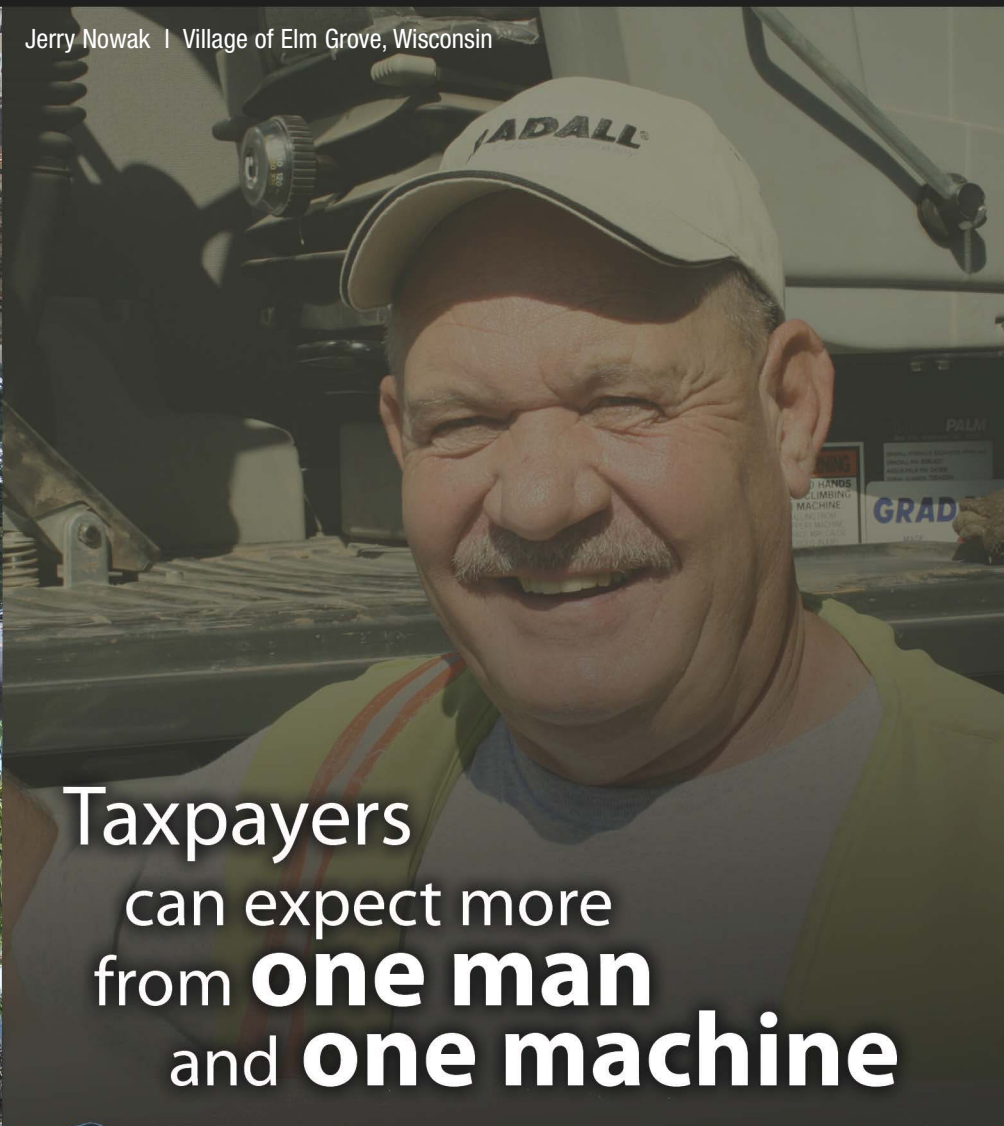




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# FIELD REPORT FIELD REPORT FIELD REPORT



**ASV's Brad Lemke tilts up the SR-80's cab, which can be raised with the loader in any position. Controls stay with the cab, making the cab far easier to seal, says ASV. Lift-cylinder plumbing (right side) is more robust in design. Hydraulic fittings on the left lift arm provide low-flow and high-flow auxiliary circuits and a case drain. An integral pressure-relief button dissipates residual pressure before installing attachments. Also included is an electrical-control connector.**



**The redesigned SR-Series chassis has loader towers that are an integral part of the structure. The rotational-molded fuel tank (black component) and hydraulic tank (white component within the chassis) make the most of available space. The fuel-tank sender is solid-state and has no moving parts.**

Lemke, was to make the design as efficient as possible. What that entailed, he says, was aiming for an optimum weight-to-horsepower ratio of 100 pounds per horsepower and making the tractor as compact as possible, while also maintaining an optimum area of track-on-ground.

Lemke quotes a few of the SR-80's specifications to illustrate how well those objectives were met. The 80-hp SR-80 weighs in around 8,000 pounds,

and with 71 inches of track-on-ground (longitudinally), its ground pressure is in the neighborhood of 2.8 psi. The machine's overall length is 6 inches less than the company's 100-hp RC-100, and its width across the tracks is 72 inches. Given that each of the SR-80's tracks is 20 inches wide, then 40 inches (or 55 percent) of the machine's total 72-inch width is track. The relatively narrow overall width, says Lemke, allows the machine to fit comfortably on trailers with 80 inches between the fenders.

The compact dimensions of the new models, says Lemke, resulted from a studied effort to use every fraction of space. For example, ASV engineers determined that they could move the 3.3-liter Perkins 800 Series engine well forward in the chassis (and thus conserve longitudinal space) by designing the hydraulic charge pump to be driven directly from the engine, not from the end of the pump stack. (The pump "stack" is that end-to-end assembly of the two hydrostatic-drive pumps and the implement pump that is connected to the rear of the engine).

Manufacturing technology also has assisted in streamlining the design, says Lemke. For example, existing ASV models, he says, use a conventional,

fabricated-steel hydraulic tank located between the machine's engine and cab. It's a good design, he says, but not as space-efficient as the horseshoe-shaped, rotational-molded plastic tank that nestles within the SR-Series chassis, exactly conforming to the space available. Likewise, the fuel tank is a rotational-molded piece that rests atop the fenders and across the nose of the chassis, forming a structural element in the design.

These two components, says Lemke, illustrate how ASV's investment in production tooling have both enhanced the SR-Series design and lowered manufacturing costs. Creating the two-piece rotational mold for the tanks was expensive, he says, but that expense will be quickly recouped, because the tanks now can be produced for about half the cost of conventional, steel versions.

(In the rotational-molding process, a type of granular plastic is poured into a two-piece mold, the halves of which are then bolted together. The mold is rotated simultaneously on its X and Y axes while being heated. As the plastic melts and adheres to the sides of the mold, a hollow "casting" is formed. Our understanding is that the amount of plastic used and the duration of rotation will determine the thickness of the casting.)

## Attention to detail

Yet another illustration of ASV's objective to make the SR-Series design efficient, even in detail, is the newly engineered fan shroud and brush ring.

"The more you can reduce the space between the tip of the fan blades and the shroud," says Lemke, "the more airflow you can create, and engine cooling becomes more efficient. But the engine is flexibly mounted, so you run the risk of putting the fan into the shroud if that annular space is small. We solved the problem by installing a brush



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**The brush ring between the shroud and fan blades closes up this annular space for more efficient airflow and protects the fan blades when the engine flexes. (This is not an actual installation.)**

ring on the shroud's circumference. The ring closes up the gap for more airflow, but if the fan moves, it simply deflects the bristles of the brush and does no harm."

Innovative design is reflected, too, in the auxiliary-hydraulic circuits. As with all larger ASV loaders, both low-flow and high-flow circuits are standard equipment on the SR-Series. But the new machines, instead of using multiple valves and related plumbing to control the circuits, simply use the variable-displacement implement pump to automatically limit flow to 20 gpm when low flow is selected. When high-flow is selected, the pump automatically increases flow to 30 gpm.

The high-flow system is bi-directional and has a continuous-operation switch for operator convenience. New for the ASV low-flow circuit, however, is variable (proportional) flow — a feature controlled by a joystick-mounted rocker switch. The low-flow circuit also provides continuous flow via a dash-mounted switch.

Like all ASV loaders, the new SR-Series machines feature a hydrostatic drive system (controlled by a single joystick) and a load-sensing implement hydraulic circuit (also controlled by a single joystick). Although ASV made no major changes in these systems for the

new models, the hydraulic pumps and two-speed motors in the systems were tweaked for enhanced performance.

## Am I in my pickup?

Attention to overall fit, finish, styling and operator amenities also were among the top priorities when designing the SR-Series, says Lemke, and he invited us to sit in the cab's new suspension seat while he explained a few of the SR-Series features.

The cab is brand new and it does, indeed, have a pleasant, comfortable automotive-like presence. The two-piece lap bar, for example, folds into position from the sides of the cab, and pulling down one bar brings the other with it. And it would be difficult not to keep tabs on how the machine is running, because the lap bar has a complete gauge package built in.

The joystick controllers are new (left for travel control, right for implement control), having soft-textured grips and integral buttons and switches for proportional low-flow control, two-speed travel control and control of electrical attachment functions. A new control for these machines is selectable bucket positioning, which, when activated, automatically keeps the bucket level as it rises and lowers. But if the operator prefers, the function can be switched off, as when running certain attachments, like a brush cutter, which benefits from an elevated angle of attack.

Other nifty cab features include a curved-glass door that opens vertically (with the assist of gas struts) and stores



**New features in the SR-Series operator's station include a two-piece lap bar with integral gauges, redesigned joystick controllers, new suspension seat, set-position foot throttle, variable low-flow control and selectable bucket positioning.**

in the roof with plenty of headroom, side windows that pop out from inside the cab for ventilation or cleaning, and a foot throttle that can be positioned either by your toe (accelerate) or heel (decelerate). And once positioned, the throttle stays put. In addition, ductwork for optional heating is already tucked neatly within the cab's interior, and a removable roof panel simplifies installation of a powerful, roof-mounted air conditioner that adds just 4 inches to the cab's height.

Lemke's enthusiasm about the SR-Series was readily apparent as he explained the features of the new models. We probably didn't realize just how enthusiastic, though, until he told us that he's buying the first SR-80 off the production line for use on his property. He did hedge a bit, however, when we asked if he was entitled to any special discounts. ☞





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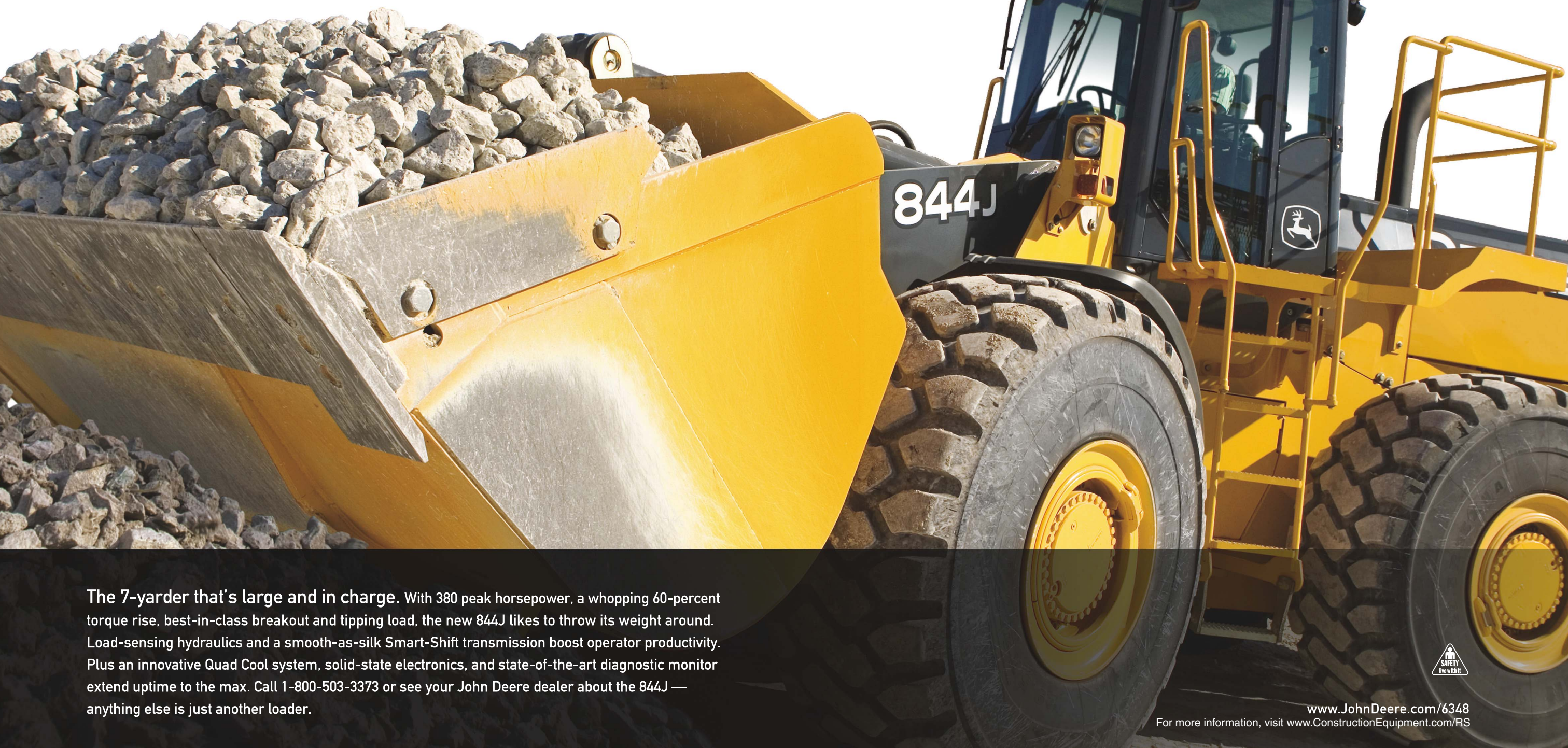
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## How to Analyze Oil Analysis

You have the report, but it's what you do with the information that keeps the machines operating

### QUICK TIPS

#### Prioritize Analysis Actions

1) Review highest severity reports first.

- If maintenance action is recommended, consider all other diagnostic information. Then decide whether to act on the recommendation or order more testing. If a lubricant change is recommended, do it immediately to ensure fluid integrity.

- If resampling is recommended, send a second sample immediately or at half normal sample intervals to verify results.

2) Review cautionary reports.

- As more data are acquired, trends will become easier to identify. Once identified, act on them.

- Borderline results should be flagged.

3) Review normal reports.

Understand normal, or benchmark, levels for each unit. Trends are much easier to recognize.

It has been said that oil analysis is 85 percent science and 15 percent art. The science part applies to such things as viscosity, the property in fluid that causes it to resist flow. Laboratory tests identify the viscosity index number, and that number is a common measure of changes in viscosity with temperature.

The art lies in the analysis of lab data and the interpretation of what it means.

Oil analysis is like a blood test. A blood test can tell what's wrong with you before the symptoms occur. Oil analysis can show you what's wrong with your equipment before the problem shuts it down. Yet there is one major difference. When the medical lab returns its results, the report goes to an intermediary — the doctor — who interprets the data and passes the information along to you.

Not so with oil analysis. Those reports come straight to the fleet manager, and he has to read them for himself.

It is at this point that many managers are overwhelmed by what they see — an array of codes and numbers, some of which are underlined by strange markings that look like rows of inverted “Vs.”

Even laboratory professionals admit that the uninitiated often find such reports impossible to read. But understanding the fundamentals for interpreting laboratory results and recommendations will convert the task from a confusing chore to a cost-saving management tool that has a direct impact on the bottom line.

To unravel the knots of reading oil analy-

sis reports, *Construction Equipment* examined the format used by Polaris Laboratories, which has four basic sections.

First is the general information that identifies the machine and, in the Polaris example, assigns a severity code based on the analysis. Polaris' codes range from 0 (normal) to 4 (most severe). If multiple elements, such as iron and chrome, are detected in an oil sample, for example, it indicates trouble. That would be classified as severity 3. However, if only iron is found, that would be a severity 2.


Second is a “comment” box that explains what's wrong with the oil and what can be done about it.

Third is an elemental analysis section that identifies, in parts per million (ppm), the amounts and type of wear particles, contamination and additives found in the oil, such as iron, lead, copper, tin, silicon and others.

Finally, the test data section lists test results according to age of the sample, oldest to most recent, top to bottom.

#### Equipment and sample information

One of the most important things that equipment managers should remember is that when sending in oil samples, there is no such thing as too much information. Review the maintenance history of the unit from which the sample is drawn and provide the laboratory with as many specific details as possible, including whether or not the oil was recently

EQUIP ID <b>7602 FRONT DIFF</b>				 <b>Polaris Laboratories, LLC</b>				<b>SEVERITY STATUS</b>			
ALT ID											
CUSTOMER											
LOCATION											
UNIT TYPE <b>DIFFERENTIAL</b>											
APPLICATION <b>CONSTRUCTION</b>											
MFR <b>MACK</b>											
MODEL <b>RD688S</b>											
LUBE/FLUID <b>SHELL</b>											
MFR											
LUBE TYPE <b>SPIRAX</b>		SUMP CAPACITY <b>5</b>		LUBE TIME <b>20000</b>		DATE SAMPLED <b>6/6/2005</b>					
GRADE <b>SAE 85W140</b>		HYD SYS PRESS		UNIT TIME <b>402653</b>		DATE RECEIVED <b>6/13/2005</b>		ACCT #			
FILTER TYPE		MICRON RATING		LUBE ADD <b>5</b>		DATE COMPLETED <b>6/14/2005</b>		LAB # <b>H 162303 JJP</b>			

The top section of an oil-analysis report should identify the equipment that's being tested by type, model and manufacturer. Lubricant type and grade appear beneath the equipment identification. Polaris includes a severity code, which appears on the top of its reports. Other pertinent information includes filter types and their micron rating; sump capacity; lube time, which indicates how long the oil has been used; dates sample was received, completed and returned; customer account number; the lab number assigned to the sample; and the lab and location where the test was done.

TEST REPORT																							
VALUES EXPRESSED IN PARTS PER MILLION (PPM) BY WEIGHT																							
WEAR METALS											CONTAMINANT ELEMENTS			MULTI-SOURCE ELEMENTS					ADDITIVE ELEMENTS				
IRON	CHROMIUM	NICKEL	ALUMINUM	COPPER	LEAD	TIN	CADMIUM	SILVER	TITANIUM	VANADIUM	SILICON	SODIUM	POTASSIUM	MOLYBDENUM	ANTIMONY	MANGANESE	LITHIUM	BORON	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC
21	0	0	4	52 AAAA	0	0	0	0	0	0	10	5	3	0	0	0	0	119	595	1311	0	991	1057
210	1	2	3	0	0	1	0	0	0	0	42 AAA	2	1	0	0	0	0	280	0	0	0	935	16
223	1	2	3	0	0	1	0	0	0	0	39 AAA	2	1	0	0	0	0	262	0	42	0	913	20
463	2	2	2	1	0	0	0	0	0	0	17	1	0	0	0	4	0	171	0	0	0	703	9
4410 AAAA	25 AAA	31 AAA	91 AAA	23 AAA	1 AAAA	0	0	0	6 AAA	0	723 AAA	10	27	7	0	38 AAAA	0	192	26	311 AAAA	71 AAAA	801	60

The elemental analysis section, labeled Test Report, pinpoints contaminants such as iron, copper, nickel, aluminum, chrome, lead and tin. Wear metals can identify components within the equipment that are wearing. Excessive levels are flagged by carrot symbols. This section also identifies additives such as calcium, magnesium, barium and boron.

changed or if it has been “sweetened” by adding oil.

The report will then include that information, such as engine type, unit the sample came from, and the equipment manufacturer's name, model number, and OEM standard maintenance guidelines. The report will also include the lubricant manufacturer, type and grade of the lube, filter types and their

micron ratings, sump capacity, type of environment in which the equipment operates, date sampled, date received and date returned. The report should also identify the lab location where the test was completed and the lab number assigned to the sample. These can be used as a reference number if the equipment manager has questions or concerns about the report.

The comment box contains explanations and, if necessary, recommendations from a data analyst at the lab. Recommendations could be as simple as an oil change. Or, the lab might suggest specific actions be taken, such as running a check on the source of significantly high levels of silicon and aluminum (dirt) found in the sample.

The elemental analysis section of the



# Prevention Illustrated

TEST DATA		LUBE CHANGED	FUEL % VOL.	SOOT % VOL.	H20% HOT PL	VIS 40 C CS.	VIS 100 C CS.	TAN TOTAL ACID #	TBN TOTAL BASE #	I-R OXID AP/CM	I-R NITR AP/CM	ISO CODE	4 MICR	6 MICR	10 MICR	14 MICR	21 MICR	38 MICR	70 MICR	100 MICR
SAMPLED RECEIVED	LUBE FLUID UNIT																			
3/14/02 3/26/02	289094	YES			< .1		22.0													
7/2/02 7/9/02	312455	UNK			< .1		23.8													
10/14/02 10/18/02	10000 322323	NO			< .1		23.1 ^^^													
12/26/02 1/14/03	338175	YES			< .1		24.1													
6/6/05 6/13/05	20000 402653	YES			< .1		24.0													

The bottom section of the Lab report depicts the actual test results. The dates in the left-hand column are the dates samples were received, oldest to most recent, top to bottom. Numbers that are underlined with carrot symbols are flagged because they exceed pre-set warning parameters. In addition to listing the samples by date received, they are also assigned a lab number (the column next to the dates at the left side of the page.) The third column from the left indicates whether the oil was recently changed or not. Viscosity, which measures lubricant resistance and oxidation and indicates the breakdown of lubricant, is also recorded here. Oxidation prevents additives from working and therefore promotes increased acid content. Although columns 9 and 10 (from the left) are blank in the report shown here, they represent the total acid number (TAN) that tells you the amount of acid present in the lubricant and the total base number (TBN) that measures the lube's ability to neutralize acid.

report identifies the type and amount of wear particles, contamination and oil additives found by the lab. Determining the metal content sounds an alarm as to the type and severity of wear occurring in the unit.

Test results are listed according to age of the sample, oldest to most recent, top to bottom. Significant changes are typically flagged (Polaris uses “^” symbols, or carrots) to identify trends with a particular piece of equipment. For example, a severe change in the levels of bearing metal suggests an inspection of the gear and/or bearing assembly for excessive wear.

If a fleet manager receives multiple reports, they should analyze the documents in order of importance, starting, of course, with the highest severity reports. If the report suggests that maintenance action be taken, consider all other available diagnostic information, such as vibration, in-line sensors and so forth. Then act on the recommendation or order more testing. If a lube change is suggested due to contamination, act on the recommendations to ensure field integrity.

If resampling is recommended, immediately send a second sample to the lab to verify results. If there are no recommendations or resampling suggested, monitor the unit and take oil samples at normal intervals.


After reviewing the highest severity

reports, review the cautionary reports. Pay particular attention to this data, because it becomes more useful as more data is required. Trends will become easier to identify and appropriate actions will become clearer.

Some sample results might be borderline. In that case, some wear and contamination results are flagged but they don't necessarily indicate failure mode or results are not significant enough to warrant action.

The best results, of course, are the reports that contain numerous zeros and few carrots, meaning that everything is normal. Equipment managers tend to ignore these reports and file them. But, as with severity and cautionary reports, normal reports should be reviewed as well. This enables managers to determine benchmarks for that particular equipment. When those numbers change suddenly, they will jump out.

As valuable as oil analysis is in heading off maintenance trouble, keep in mind that no test is perfect. Each one has its limitations. Never tear down an engine, for instance, based on one oil analysis. Run repeat tests, run more sophisticated tests, and track the trends before taking the unit apart.

Whether viewed as science or art, knowing how to read oil-analysis reports is essential for stopping machine failures before they occur. 

[Editor's note: Information and graphics for this article were provided by Polaris Laboratories and by Ray Thibault, president, LTC (Lubricants Training and Consultants).]



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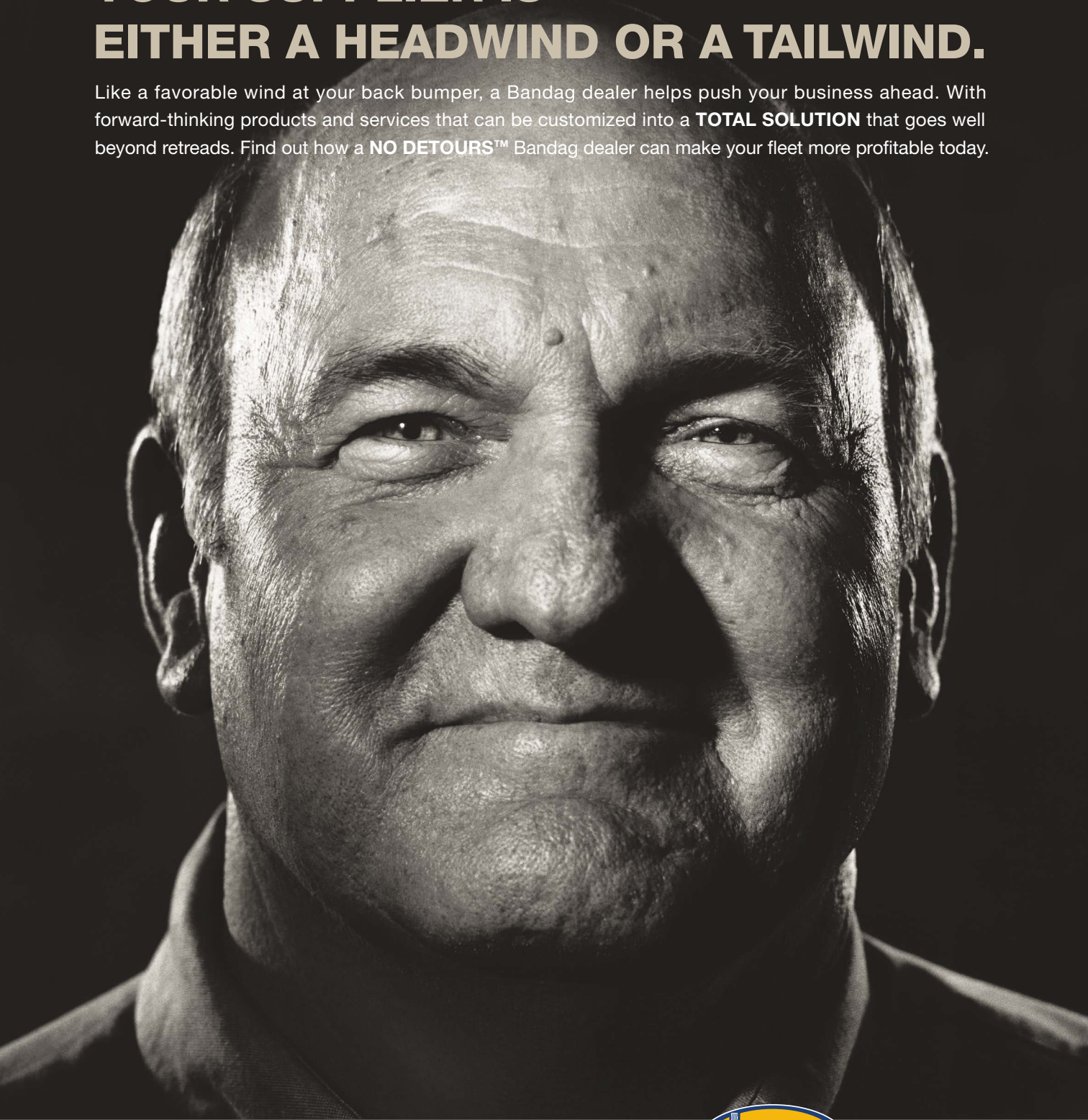


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## Chrome *Glints from* *Mack's Rawhide Tractor*

Attention-grabbing trim boosts egos but doesn't tarnish this rig's basic toughness

**C**an you say chrome? Here's another way: "Rawhide." That's the latest iteration of Mack Trucks' CH highway tractor, available with two sleeper sizes and as a non-sleeper "work truck," which we have here. A Rawhide could drive straight from a dealer's lot to a truck beauty show and probably do well in the competition.

Gobs of bright-metal trim adorn its nose, flanks and roof, and highlight details inside the cab. Most of it's actually polished stainless steel and aluminum, which is more durable and easier to care for. And it certainly catches the eye and grabs some attention for the driver, and builds the image of the owner, which is the point of the Rawhide. The package also includes extra noise-reduction insulation and

a spiffy interior.

But it's still a Mack, in this case set up for severe-service hauling with an extra-heavy frame that has rails 9.5 millimeters (0.374 inch) thick and 300 mm (11.8 inches) high, and severe-duty crossmembers. That would make it a good on/off-road tractor for pulling an end- or bottom-dump trailer.

Other components include a Meritor 14,600-pound front axle, Mack (made by Meritor) 44,000-pound rears on a Mack air-ride suspension (made by Hendrickson), and a Mack Maxitorque 18-speed transmission. Add in the 12-liter Mack ASET diesel, steel cab, fiberglass nose and a few gallons of fuel and the tractor scaled at 16,760 pounds at the factory, according to Tom Davis, Mack's highway prod-

**The Rawhide tractor drips with chrome — polished aluminum and stainless steel, actually — whose purpose is to attract attention for drivers and image-conscious buyers. It's now available as a daycab, like this one, or with sleeper boxes.**



## TEST SET

**Truck:** Mack CHN613 tractor, conventional daycab, BBC 112 inches with Rawhide trim package

**Engine:** Mack ASET (application-specific engine technology) AC-460, w/cooled exhaust-gas recirculation and PowerLeash brake, 460 hp @ 1,850 rpm (487 hp @ 1,600-1,700 rpm), 1,660 lbs.-ft. @ 1,200 rpm

**Clutch:** Spicer Solo 15.5-in. self-adjusting with air assist

**Transmission:** Mack MaxiTorque T318LR 18-speed

**Front axle:** 14,600-lb. Meritor FG941 on taperleafs

**Rear axle:** 44,000-lb. Mack S440 w/4.35 ratio, on Mack air-ride

**Tires & wheels:** Goodyear 11R24.5, G159 front, G362 rear, on Alcoa polished aluminum discs

**Wheelbase:** 202 inches

**Fuel tanks:** Twin 93-gal. polished aluminum

**Trailer:** 48-foot aluminum flatbed



A Texas square bumper, grill, headlamp visors and quad horns are among the glitz. Gold bulldog hood ornament denotes a "Pedigreed" power train, including Mack engine, transmission and axles.

ucts marketing manager.

It was well suited to pull the load that Davis had arranged, a 48-foot flatbed stacked with 4x6 timbers. He figured the rig's gross weight was close to 80,000 pounds. The rig was parked, ready to go, at the company's headquarters in Allentown, Pa., where he briefed me on the Rawhide's details.

The list of bright-metal trim includes the Texas square bumper, sun visor, headlight visors, quad air horns, cab skirt, grill surround, and trim around the windows and on the doors. Production versions will also come with a stainless-steel-and-woodgrain steering wheel and a chrome-and-woodgrain instrument panel, which weren't on this prototype tractor, but it did have optional stainless-steel quarter fenders.

Davis and John Walsh, Mack's public relations manager, had mapped out a looping trip to and from Interstate 80 to the north, and had programmed audio directions for replay on the stereo's CD. But it was nearly mid-afternoon

and I had to catch a plane by early evening, so I instead chose a shorter jaunt: east on I-78 to Route 33, then north to Stroudsburg. There I paused a bit at a truck stop, then returned to Allentown amid some minor rush-hour traffic. That covered only about 110 miles, but it was enough to get acquainted with the truck.

## Driving impressions

I immediately liked the 460-hp Mack ASET engine. It felt strong in every gear, and stronger than its 1,660-pound-foot rating might suggest. On upgrades, I could lug it down to and below its 1,200-rpm torque peak before it began fading. Only then did the pyrometer show any serious heat in the exhaust, about 600 degrees Fahrenheit; usually the needle seldom got above 300 degrees.





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# Hands-On Trucking



**Production Rawhides like this one get a fancy steering wheel and dashboard, plus attractively upscale upholstery.**



**The twelve-liter ASET engine pulled more strongly than its torque and horsepower numbers suggest, while its variable-geometry turbo whistled happily.**

On short but steep upgrades I could make half-gear changes, picking up a couple of hundred revs with a split and seldom needing to make full gear changes. With 4.35 rear-axle gears the tractor wasn't especially long-legged, but I cruised at 60 to 65 mph with the tachometer showing a reasonable 1,575 to 1,650 rpm in top gear (the 18th ratio). At 1,600 to 1,700 rpm the engine makes 487 horsepower, so this is definitely its sweet spot. On downgrades, the PowerLeash engine brake held speeds in check with almost no help needed from the service brakes.

When starting out, I used Low on a few


slight upgrades; but otherwise 1st was sufficient to get moving at engine-idle speed, and 2nd was fine if I was rolling at all. I did find it hard to upshift smoothly in Low range and seldom could make a decent downshift while rounding corners in town. An air-assisted clutch pedal made double-clutching otherwise easy. Davis said the hard shifting is common in brand-new Mack transmissions because their stout gears take about 50,000 miles to wear in. This truck had 45,000 to go.

## Interior amenities

The Rawhide's extra sound insulation was evident when cruising with the windows up. The truck is quiet, with little road noise and just enough engine sound. I couldn't leave my window buttoned up for long, though, because I couldn't get the air conditioner to work. It turns out you have to push the Max A/C button to activate it; a tiny sticker near the controls advises using that button, but I didn't notice that until later. Once going, the A/C worked fine, although there are only two dash vents and air flow seems limited.

This prototype tractor lacked the standard driver's side power window, and it took about a dozen twists of the handle to roll that window up or down. The passenger-side window was powered, but I didn't know that so it stayed up until I got back after a couple of hours on the road. Davis pointed out the switch on the dash (duh!), as well as the A/C operation.

While underway, the variable-geometry turbocharger whistled a delightful tune that I could hear and enjoy but not be annoyed by. The large side windows presented a good view to the outside world, and the West Coast-style mirrors showed clear pictures of what was happening behind. The windshield is big without being huge and the view through it and over the moderately sloped hood is fine, too.

Tuck-and-button upholstery graces the headliner and parts of sleeper interiors, making them classy places to live. In this daycab, the fine interior treatment, which includes rich fabric on the seats and a handsome instrument panel with easy-to-read gauges, makes it an almost fancy place to work. Mack fans should love it. 

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# Buying File: Concrete Slipform Pavers

By LARRY STEWART, Executive Editor

## High-Tech Grade Control Hits Slipform Pavers

Paver manufacturers haven't stopped selling easy transportation and width changes, but paving without stringline may become the next big market driver

**Head Inc., an Ohio paving firm, used automatic grade controls on the trimmer/placer and the GOMACO GHP-2800 paver to pave 3,760 feet of runway at the Baton Rouge Metropolitan Airport, easily meeting smoothness requirements.**

Meeting the challenges of moving a concrete paver frequently between projects and configuring it quickly to different paving widths remains a key to most paver manufacturers' value propositions. But high-tech grade-control technologies are also pushing their way into the product-development process. The demand often comes from people who are using grade controls on other machines.

"Our field people became interested in

stringless paving so we called GOMACO and Leica and sat down with them," says Paul Ondera, vice president of Head Inc. of Columbus, Ohio. "We went through the process and we became convinced that it would work. Our field people saw it as something they could use to become more efficient. It was their idea, and the attitude about instituting this change was really good company wide."

GOMACO rates its G21 electronics, and the gateway it represents to automatic three-



dimensional grade control with Leica total-station lasers, as its most significant product development of the past few years. The paver manufacturer says Leica stringless technology is “plug-and-play” when used with its G21 digital control system.

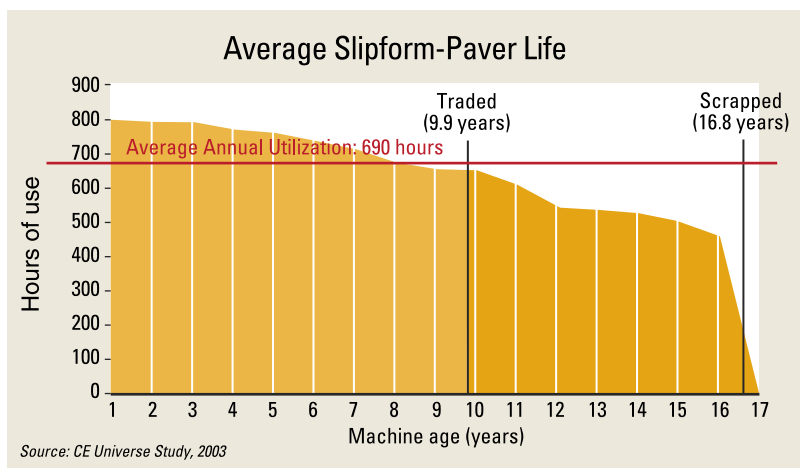
Survey information that contractors gather to set stringline and determine the profile of a new roadway to be slipformed can also be used for three-dimensional stringless paving. The paver needs front and rear slope sensors to measure machine position and any cross slope in the slab. Robotic total stations track the paver on site with laser shots to prisms mounted on the machine. Leica’s computer, loaded with latitudes, longitudes and elevations describing the desired grade for the pavement, is positioned next to the G21 controller on the paver and the two are interfaced.

When it’s time to start slipforming, the paver is moved into position and the total stations are set up and oriented on the site map by taking measurements off the project site’s pre-determined reference points. The total stations are then aimed at the prisms on the paver, and they start tracking. The stations send paver coordinates to the Leica computer, which immediately determines if the paver is positioned correctly. The G21 controller, set to the Leica steering and elevation modes, automatically brings the paver on line and to level.

GOMACO customers are discovering that the system delivers accurately. Head Inc., for example, used the 3D grade controls on a trimmer/placer to place cement-treated base and the GHP-2800 paver to pave 3,760 feet of full-depth runway at the Baton Rouge Metropolitan Airport.

“Our requirements on this project and on most of the projects we work on, is .25-inch deviation on a 16-foot straight edge, and we easily accomplished that,” says Ondera. “Tolerance-wise, with the stringless system, we’re the same as we are on what we refer to as ‘good stringline.’ When you set stringline, if you set it well, if you set it right, and if you set it accurately, we can achieve plus or minus .125 inch, and we’re able to get that with Leica.”

The set-up process for three total stations to cover a long project and the Leica command



center on the paver beats stringline setup.

“It’s taking us an hour and a half to two hours to set the stringline we need for each pour,” says Steve Melton, PCCP paving superintendent for another GOMACO customer, A.S. Horner. “It’s taking us 35 minutes to set up the stringless system.”

GOMACO uses the G21 controller and coordinating electric-over-hydraulic circuitry on its Commander III, GP-2600, and GHP-2800 slipform pavers. The GP-4000 also interfaces with stringless laser control systems.

Safety measures built into the automatic, 3D grade control system send an error signal to the computer and stop the measurement process if, for example, someone parks a truck in front of a total station and the laser can’t hit the prism on the paver. The computer receives the error signal and sends a stop signal to the G21. The controller puts the paver into standby mode, shutting off the vibrators and augers until the problem is corrected.

Paving without a stringline not only saves set-up time, but also eliminates the cost of maintaining stringline and stakes. The jobsite is opened up so truckers are free to come and go without concerns about rolling over stringline, and workers no longer have to worry about getting tangled up in it. If one section of the job isn’t completed on schedule, the paver can be moved to another part of the job to start paving without having to wait for stringline to be set.

Because there’s a digital model of the entire project with the desired elevation at every point on the finished pavement programmed into the Leica computer, checking the paver’s work becomes almost instantaneous.

“You can go anywhere behind the paver

**With average annual usage of less than 700 hours, slipform pavers don’t pile on hours, but they work about 10 years before being replaced or downgraded to a secondary role.**



# Buying File: Concrete Slipform Pavers

and set the rod with a prism, shoot at it with the total station, and the computer calculates what the elevation is supposed to be just as soon as it locates the prism,” says Head’s Ondera. “We can pave 10 feet and go back and check 10,000 different points on that piece of pavement. It’s a tremendous advantage having the location and elevation of every point on the slab.”

Guntert & Zimmerman remains focused on easy mobility and paving-width changes. It’s an industry-wide preoccupation, with GOMACO’s pivoting track arms, Terex | CMI’s hydraulic variable width machines, Power Pavers’ hy-

draulic loading legs, and other manufacturers’ approaches to loading a concrete paver on a trailer as quickly as possible.


Guntert & Zimmerman’s most recent product introduction aims to put its Quadra telescoping frame system in the hands of more cost-sensitive buyers. The S850ST (for single telescoping) starts with the center tractor module and two Quadra Bolsters, which allow the tracks to telescope fore and aft. But rather than telescoping laterally to change paving width from both sides of the center module, the less-costly ST model telescopes from only one side of the tractor.

Paving widths range from 12 to 19 feet. Adding a pair of bolt-in Fixed Frame Extensions to the non-telescopic side of the center module creates a paving-width range of 18 to 25 feet. Additional extensions will take the maximum paving width out as far as 37½ feet.

The S850 with Quadra Bolsters self-loads on a trailer in one piece, including the paving kit, at a width of less than 12 feet. Load length is the paving width plus 12 feet. Guntert & Zimmerman’s Compact Dowel Bar Inserter (CDBI) is also self-loading, without need for a crane, on a single truckload at less than 12 feet wide. The CDBI module mounts to a standard S850 paver without need for a crane.

Terex Roadbuilding continues to refine the paving results of what they call the industry’s first field-proven slipform paver to adjust widths hydraulically, the SF2204B Hydraulic Variable Width, a machine initially designed and built by CMI. A modular paving kit mounted to the paver’s sub-frame uses the mainframe’s telescoping action to position dual tandem paving molds laterally to change widths.

“The SF2204B HVW goes from its minimum paving width of 8 feet to its maximum 20-foot paving width in minutes, rather than hours,” according to the Terex Roadbuilding release.

Concrete-pan profile length on the B Series HVW machine doubled to 48 inches to help “maintain quality paving results when using commercial ready-mix concrete.” 

## Web Resources

### Specifications

### ConstructionEquipment.com

Allen	<a href="http://www.allenpavers.com">www.allenpavers.com</a>
GOMACO	<a href="http://www.gomaco.com">www.gomaco.com</a>
Guntert & Zimmerman	<a href="http://www.guntert.com">www.guntert.com</a>
HEM	<a href="http://www.heavyequipmentmfg.com">www.heavyequipmentmfg.com</a>
Power Pavers	<a href="http://www.powerpavers.com">www.powerpavers.com</a>
RexCon	<a href="http://www.rexcon.com">www.rexcon.com</a>
Terex Roadbuilding	<a href="http://www.terexrb.com">www.terexrb.com</a>

## Slipform Paver Specs (by maximum paving width)

Model	Number of Tracks	Operating Weight (lbs.)	Max. Paving Width	Gross HP
Allen ASF 1600 HP	2	44,000	16' 0"	200
HEM 8-16	2	33,100	16' 0"	179
GOMACO Commander III	4	33,400	20' 0"	200
GOMACO GT-6300	4	28,500	20' 0"	155
Terex   CMI SF-2204 HVW	4	58,500	20' 0"	240
Allen ASF 2700 LP	2	48,000	27' 0"	265
HEM 12-27	2	59,000	27' 0"	240
Allen ASF 3200 HP	2	52,000	32' 0"	325
GOMACO GP-2600	4	79,000	32' 0"	275
GOMACO GHP-2800	4	80,000	32' 0"	335
Power Pavers SF-2700	2	48,000	32' 0"	215
Power Pavers SF-3000	2	65,000	32' 0"	250
Guntert & Zimmerman S850 Quadra	4	90,200	34' 0"	335
Guntert & Zimmerman S850(ST) 12'	4	90,200	34' 0"	335
RexCon T&C I	2	60,000	34' 0"	325
HEM 14-37	2	82,850	37' 0"	325
Guntert & Zimmerman S1000	4	95,500	44' 0"	335
Terex   CMI SF-6004	4	115,000	44' 0"	400
GOMACO GP-4000	4	115,000	50' 0"	450
Guntert & Zimmerman S1500	4	106,500	56' 0"	425

**There are two-track models available of GOMACO's four-track GP2600, GHP2800 and GP4000 listed here. To compare specifications on the full range of slipform concrete pavers, go to the Specifications Guide at [ConstructionEquipment.com](http://ConstructionEquipment.com).**

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# Gallery of Concrete Slipform Pavers

## GOMACO

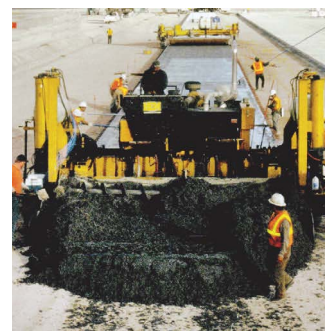
### Wired for Stringless Paving

GOMACO combines its G21 electronic controller and the Leica three-dimensional grading system to control a paver's direction and grade without stringline. Stringless control is plug-and-play. GOMACO's digital operating system is compatible with the J1939 CAN network, and the G21 processor has 20 times more program memory to process more complex program code and control multiple functions. Leica's computer, loaded with the project coordinates, is interfaced with the G21 controller, and robotic total stations track paver position with laser shots to prisms mounted on the machine.

**Number of models:** 4

**Product-line features:** Control systems on GOMACO's Commander III, GP-2600, and GHP-2800 slipform pavers use the G21 electronics. The GP-4000 also interfaces with stringless laser control systems from Leica.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



## HEM

### Hydraulic Frame Squeezes to 8 Feet

HEM reintroduced the 8-16 slipform paver with a hydraulic sliding frame replacing bolt-in sections. The model will pave widths from an 8-foot bike path to 16-foot lanes, and an optional extension kit stretches it up to 22 feet. All three HEM slipform pavers are now available as four-track machines. Control systems are all hydraulic.

**Number of models:** 3

**New models:** 8-16

**Product-line features:** New options on the Cat-powered paver line include four-point vertical lift for loading. The units are designed so that a lowboy trailer can be backed under them for easy transport.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

## GUNTERT & ZIMMERMAN

### Single-Telescoping Paver Cuts Cost

Guntert & Zimmerman created the S850ST paver to offer a lower-cost, single-telescopic version of its S850 double-telescoping slipformer. The Quadra pavers' frame telescopes from both sides of the tractor's main frame for paving-width changes. The ST version telescopes from one side only, offering paving widths from 12 to 19 feet. Frame extensions can be bolted into the non-telescoping side of the tractor frame for a width range from 18 to 25 feet. A kit has been developed to extend the S850's maximum working width, without a dowel bar inserter, to 37½ feet — 34 feet with a DBI.

**Number of models:** 4

**New models:** S850ST

**Product-line features:** Guntert & Zimmerman's S850 Quadra paver, including paving kit, self-loads on a trailer at less than 12 feet wide. The mod-

ular Compact Dowel Bar Inserter mounts to an S850 with no need for a crane, and also self-loads on a single truckload at less than 12 feet wide.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



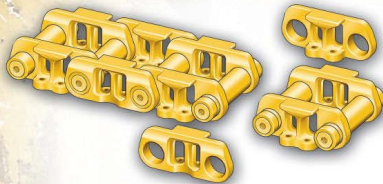




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# Gallery of Concrete Slipform Pavers



## TEREX ROADBUILDING

### Pan Profile Doubled for Smoother Slabs

Terex Roadbuilding doubled the pan profile length on the B-Series SF-2204B HWV (hydraulic variable width) concrete slipform paver from 24 to 48 inches to help maintain quality paving results. Other design changes aim to improve performance and reliability. For example, modified track frames enhance support, even in marginal trackline conditions. Two-speed, variable-displacement drive motors increase travel speed 73 percent to 90 feet/minute. The B Series is also available with an optional 2-foot extension kit for 22-foot-wide paving.

**Number of models:** 8

**New models:** SF-2204B HWV

**Product-line features:** Terex Roadbuilding is expected to introduce two more Terex | CMI slipform pavers, Models SF-3502 and SF-3504, early this year.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

## POWER PAVERS

### Rebalanced for Float

Power Pavers moved the front posts of its SF-2700 two-track paver forward two feet to rebalance the slipformer and allow the use of an automatic float. The move also improves the operator's view to the front of the machine. Both Power Pavers — the SF-2700 and SF-3000 — can be equipped with a belt finisher as well.

**Number of models:** 2

**Product-line features:** Power Pavers slipformers come with an auger strike-off as standard equipment. It helps present a consistent head of material to the metering point. Single-speed track motors reduce the amount of side clearance necessary to pave through developed sites.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



## REXCON

### New Engine and Hydraulic Power

Rexcon repowered the Town and Country paver with a new Caterpillar C9 diesel rated at 325 gross horsepower and the next generation of Sauer-Danfoss hydraulic pumps. Hydraulic sensors and hydraulic cylinders have replaced grade sensors and jack screws. The Town and Country is one of the most powerful two-tracked concrete pavers available.

**Number of models:** 1

**Product-line features:** Rexcon changed the Town and Country's steering system to a Sauer Danfoss Proportional Rotary Position Controller, doing away with control boards in the electrical system. Electrical control replaces the cable for controlling tamper-bar speed, and torque output for the tamper-bar motor is increased.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)





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## What's New In Concrete?

You'll find out in the following equipment round-up from World of Concrete exhibitors



### Case

K Series crawler dozers offer a quiet, high-visibility cab, powerful dual-path hydrostatic drive and single-lever control. The 650K, 750K and 850K XLT models deliver from 75 to 96 net horsepower and net torque from 265 to 318 lbs.-ft. Blade capacities range from 2.0 to 2.73 cubic yards. The 650K has 88 inches of track on ground, the 750K has 89 inches, and the 850K XLT has 93 inches. Larger hydrostatic pumps and motors increase the power to each track.

See Booth **C6269**

### Atlas Copco

Suitable for 12- to 20-metric-ton excavators, the MB 1000 hydraulic breaker is designed for rock mining (secondary breaking), demolition, tunnel construction, trenching and foundation work. The unit features Krupp percussion technology and hydraulic flow of up to 34 gallons per minute at 2,610 psi of pressure, delivering up to 720 blows per minute. Proprietary features include AutoControl monitoring system, StartSelect to adjust to changing conditions, VibroSilenced damping system, Contilube II automatic lubrication, and DustProtector.

See Booth **C4057**



### CE Attachments

The EDGE GT3000 grabbing tool allows construction crews to pull posts or move large boulders with ease. Features include T-1 steel on the jaws and a 1 1/4-inch steel backplate. Heavy-duty, guarded cylinders provide clamping pressure to lift up to 3,000 pounds, and the jaws open up to 36 inches to handle large items.

See Booth **C7615**







## ▲ Power Pavers

Designed for primary and secondary road construction, the SF 2700 two-track paving machine paves roads up to 32 feet wide with integral curbs on one or both sides. The paver can pave depths to 16 inches with no changes required to the machine or interruptions to the paving process. With 27 inches of track clearance, the machine provides a narrow profile and accepts all standard attachments.

See Booth **C5829**

## ▶ Stanley-LaBounty

Interchangeable jaw sets for the UPSV Series universal processor include concrete pulverizer jaw with Swift Lock pin-on teeth for crushing concrete and separating rebar; shear jaw for cutting structural steel, rebar, pipe, etc.; concrete cracking jaw for breaking oversized concrete; and plate shear jaw for cutting storage tanks and other steel plate products. Features include 360-degree powered rotation, Speed Valve for faster cycle times, and slotted pivot for efficient changeout.

Models fit excavators ranging up to 175,000 pounds.

See Booths **C4237** and **O20418**



## ◀ Topcon

Satellite positioning systems use new G3 technology, developed to provide access to 30 Galileo satellites planned for launch by the European Space Agency, and new signals that will result from the modernization of the GPS constellation. When all systems are fully operational, the company's positioning systems, which currently provide access to U.S. GPS and Russian GLONASS satellite systems, will have access to more than 80 positioning satellites.

See Booths **C4889** and **O21801**

## ◀ Liebherr

For use with the company's LRS, LRT, or other standard concrete-reclaiming systems, the LDP buffer discharges returned concrete at a controlled rate into the reclaimer. The LDP accommodates up to six mixer trucks, allowing all to discharge at the same time, and provides a uniform flow of material into the reclaimer.

See Booth **N1037**



## ▲ Bobcat

New K-Series compact loaders offer the SmartFAN cooling system, which senses operating temperatures and rotates only as fast as it needs to. The machines have a strengthened chain case design and increased loading heights on large-frame, vertical lift path units. For jobs that require lifting/loading materials into trucks, an additional two feet of reach is available with models S250, S300, T300 and A300.

See Booth **C5481**





## Trimble

The GCS900 3D control system places the site plan — design surfaces, grades and alignments — inside the cab. Featuring the MS980 Smart Antenna, a fully integrated GPS receiver and antenna, the system uses a dual-antenna design to calculate the position of each end of the blade for no-stake grading. The GCS900 can be configured for different machine types and can be purchased as a stand-alone system or as an upgrade.

See Booth **C4847**

## JLG

New G5-19A compact telehandler has a lifting height up to 23 feet with a maximum capacity of 6,600 pounds and forward reach of 12.8 feet. Cab design offers wide operator vision and 140-degree carriage rotation. Mechanical quick switch facilitates quick attachment changes. For maneuverability on crowded sites, four-wheel steering can be used for circle steer or crab steer, or the machine can be steered with the front wheels alone. Also introduced is a smaller telehandler offering 5,700-pound lifting capacity and 19-foot lifting height.

See Booth **C6655**



## Gehl

New E-Series skid-steer loader line includes six models, from the compact 3640E with 1,175-pound rated operating load to the 6640E with 2,900-pounds rated operating load when equipped with optional counterweights. Model 6640E provides a lift height of more than 124 inches. The machines feature All-Tach universal quick-attachment system, Powerview lift arm for enhanced visibility and easy access for service. Advanced acoustical materials and engine compartment components lower sound levels in the cab, according to the manufacturer.

See Booth **C6829**



## GOMACO

The Commander III curb-and-gutter machine, featuring the G21 digital operating system, is suitable for projects such as slipforming curbs and gutters, monolithic sidewalks, barrier walls, bridge parapets, irrigation canals and 20-foot-wide paving. All-Track Steering (ATS) allows the machine to be maneuvered around the jobsite and put on line faster and easier than single-track steer. All-Track Positioning (ATP) provides more options for handling jobsite obstacles. Each leg can be positioned to accommodate different applications.

See Booth **C5168**



## Multiquip

Whitman HTX hydraulic ride-on trowel simplifies steering and operation while improving operator control, according to the manufacturer. Powered by a 44-hp Kubota engine, the HTX features simultaneous blade pitch control, removable steps for easy engine access, adjustable steering pressure and rotor speed control.

See Booth **O20645**

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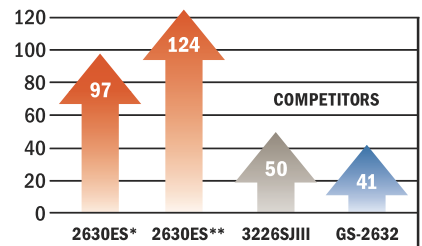
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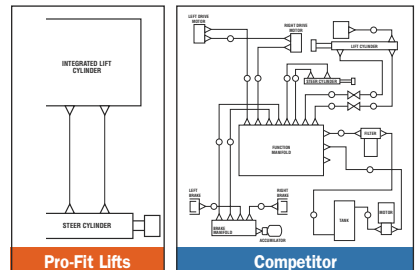


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# Sneak Peek



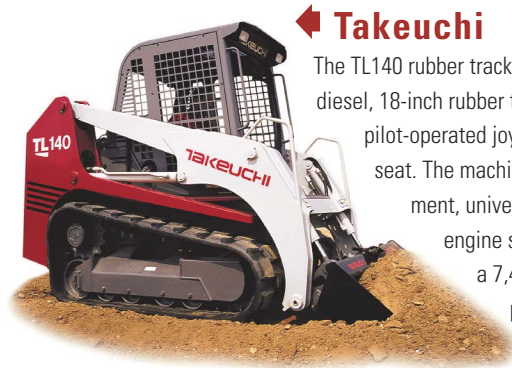
## ▲ Komatsu

The compact hydraulic excavator line includes the PC35MR-2 with digging height to 16 feet 5 inches and depth to 10 feet 5 inches; the PC50MR-2 with digging height to 19 feet 6 inches and depth to 12 feet 6 inches; and the PC78MR-6 with digging height to 21 feet 7 inches and depth to 13 feet 8 inches. The PC78MR-6 has an operating weight of 17,625 pounds and width of 11 feet 3 inches (with boom swing). See Booth **C6889**



## ▲ Mack Trucks

Built on the company's Cornerstone vocational chassis, Granite and Granite Axle Back construction vehicles feature a 116-inch BBC dimension. Improved cab design offers a 4-inch increase in depth and a wrap-around cockpit-style dash with a new primary gauge cluster. It also offers the V-MAC IV Vehicle Management and Control system. See Booth **C5469**



## ◀ Takeuchi

The TL140 rubber track loader features an 81-hp Yanmar turbocharged diesel, 18-inch rubber tracks, double reduction planetary final drives, pilot-operated joystick controls and six-way adjustable suspension seat. The machine also includes a tilt-back operator's compartment, universal quick-attach mounting bracket, and emergency engine shutdown system. The 9,590-pound loader delivers a 7,403-pound bucket breakout force, 5,952-pound tipping load and 11,250-pound traction force.

See Booth **C7487**

## ▶ New Holland

With a rated operating capacity of 2,400 pounds, the C185 compact track loader offers the lift capacity and reach of the company's Super Boom vertical lift linkage. Standard two-speed transmission provides travel speeds up to 8 mph. Optional hydraulic mount plate allows the operator to securely attach or remove buckets and attachments without leaving the seat. High-visibility design uses no rear frame towers to block the operator's view.

See Booth **C5869**



## ◀ Caterpillar

The 302.5C mini hydraulic excavator provides more power and greater digging forces than the previous model, according to the manufacturer. Variable displacement hydraulic pump eliminates stalling. Operating weight is 6,283 pounds when equipped with a cab and 6,052 pounds with a canopy. Two-speed travel system is controlled by a switch on the dozer lever. Dozer float function simplifies grading tasks. Independent swing boom enables the machine to work next to a wall. Other benefits include 200-degree bucket rotation and 500-hour oil and filter change interval.

See Booth **C6069**



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## ↓ Bomag

Suitable for work on granular, cohesive and mixed soils, the BPR45/55D reversible plate compactor features an 8.9-hp air-cooled diesel engine that delivers nearly 50 percent more horsepower than the previous model. Working speed is 89 feet per minute; maximum centrifugal force is 10,125 pounds; gradeability is 35 percent; and maximum vibration frequency is 4,200 vibrations per minute. Vibration frequency and centrifugal force are easily adjusted using the throttle control. Hinged hood swings forward for easy maintenance.

See Booth **N1917**



## ↓ Power Curbers

The 5700-SUPER-B features a 133-hp engine for high-production curb-and-gutter applications. Design enhancements include raised operator's platform to increase visibility; hydrostatic direct-drive conveyor offering higher torque; heavier crawler frame with increased torque for easier loading, pouring on inclines and working in soft grade conditions; rotary controls allowing fractional changes in ground or conveyor speeds; and cooler work area with externally mounted hydraulic and engine coolant radiators. Enclosed auger holds enough concrete to get through a tight radius without repositioning the ready-mix truck.

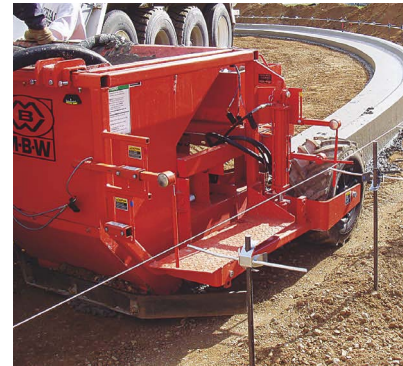
See Booth **C5829**



## ↓ Ingersoll-Rand

Portable rotary-screw compressors feature corrosion-resistant construction; lockable, lightweight, aerodynamic modular canopy; and compact size of 67 inches wide by 59 inches high. Cool-box design keeps cool internal temperatures low, prolonging component life. Remote separator element eliminates the need to enter the separator tank and prevents spillage during oil changes. AirSource model, 160 cfm at 100 psi, weighs 1,850 pounds and allows for two-tool use. AirSource Plus, 185 cfm at 100 psi, is for higher-demand applications.

See Booth **C5681**



## ↑ MBW

Small physical size enables this all-hydraulic slipform paver to slipform curb-and-gutter configurations up to 18 inches high by 48 inches wide. The machine can be operated in two-wheel drive on foam-filled tires in curb-only mode and three-wheel drive in curb-and-gutter mode. Grade adjustment and steering can be controlled automatically or manually from the control panel. Features include four-cycle 26.5-hp diesel engine and manual and automatic height controls; no belts, chains, clutches or gearboxes.

See Booth **C4345**

## → International

A new lightweight mixer package will be introduced at the World of Concrete. International says because of the innovative design, some of the components in the mixer package are built with lighter weight in mind so customers can haul more and still stay within weight regulations. The trucks feature a standard Cummins ISL engine with 330 horsepower, 2,100 rpm and 1,150 lbs.-ft. of torque.

See Booth **C4667**





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## Sneak Peek



### ▲ **Thomas Equipment**

Model 35DT tracked mini skid-steer loader provides breakout force of 2,200 pounds, 11.5-gpm hydraulic output, up to 600-pound lift capacity and multispeed travel settings to 4.4 mph. A power selector valve lets operator direct power to the traction drive or hydraulic system as needed. Other features include one-hand steering, single-joystick control of boom and bucket, universal attachment mounting, 9-inch rubber track, self-leveling system and two boom-mounted auxiliary hydraulic circuits, one with a motor spool.

See Booth **C5190**

### ► **Stellar Industries**

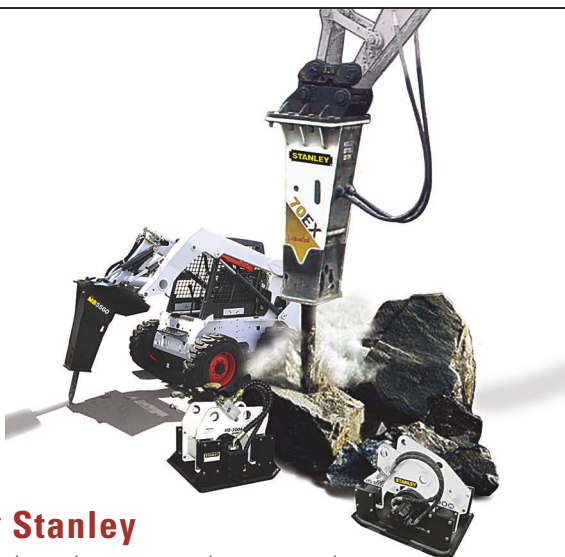
American Eagle heavy-duty drawer sets use a 300-pound slide across the entire size range of 16-gauge drawers.

Drawer fronts feature a powder-coated finish and other components are manufactured with galvanized steel. The metal edges of the drawers are hemmed for added strength. All drawers use a key locking "T" handle that allows one-handed operation while concealing the latch mechanism.

See Booth **N3049**







## ► Stanley

Breaker and compactor tools are mounted to skid-steer loaders, backhoe-loaders and excavators. More than 20 breaker models are available ranging from 175-foot-pound blow for mini-excavators and small loaders to 12,000-foot-pound blow for excavators weighing up to 130,000 pounds. Mounted compactors range from 2,500 to 22,000 pounds of centrifugal force.

See Booths **C4237** and **O20418**



## ▲ John Deere

Model 844J wheel loader marks the company's entry into the seven-yard class. Electronically controlled, 12.5-liter PowerTech diesel engine features wet-sleeve cylinder liners and Quad-Cool system with proportional fan drive for optimum cooling performance. "Smart" Powershift transmission continuously senses speeds and loads, adjusting clutch pressures accordingly. Braking system uses outboard wet multi-disc brakes that self-adjust for wear. Boom kick-out and return-to-carry are electronically adjusted from a sealed-switch module in the cab.

See Booth **C6469**

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## Pressure Washers

### BRIGGS & STRATTON

Briggs & Stratton's new gasoline-powered 2200 pressure washer delivers a flow volume of 2.2 gpm at 2,200 psi maximum pressure. The unit is equipped with four nozzles, which are designed to automatically adjust pressure and flow to best suit the application. An additional "turbo" nozzle speeds up the cleaning process, says B & S, by as much as 40 percent. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



### LANDA

The gasoline-powered, diesel-heated PGHW Series from Landa includes four models with flow volumes from 3.5 to 4.8 gpm and pressures from 3,000 to 4,000 psi. All four models are skid-mounted and encased in a steel cage for protection, and all have the capacity to draw water from a storage tank for uninterrupted operation.



Three of the PGHW-Series models use Honda engines, which range from 11 to 20 horsepower, and the fourth uses a Briggs & Stratton Vanguard rated at 16 horsepower. All feature electric start. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

### MI-T-M

Mi-T-M manufactures a wide range of pressure washers, including gasoline-powered direct-drive and belt-drive models, electric direct-drive and belt-drive models, diesel-powered belt-drive models, gasoline/diesel belt-drive models and natural-gas units. Shown is the Mi-T-M 3504, a gasoline-powered, belt-drive model that uses a 13-hp Honda engine and produces a flow volume of 3.7 gpm and pressures to 3,500 psi. The 3504 features a "triplex piston" pump with ceramic plungers and 50 feet of non-marking hose with quick-connect fittings, swivel and bend restrictors. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



### CAMPBELL HAUSFELD

A gas-powered, 9-hp Robin Subaru engine allows the Maxus PW3005 pressure washer from Campbell Hausfeld to deliver 4.0 gpm at 3,000 psi. The PW3005 features fully adjustable pressure settings and quick-connect fittings at the water hose-to-pump port and at the pressure hose-to-gun connection. Five quick-connect tips for the gun permit selection of the appropriate spray pattern. The PW3005 is mounted on a heavy-duty cart with pneumatic tires for enhanced portability. The unit lists for \$1,010. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



# Spotlight

## SIoux

The Dakota Series from Sioux Steam Cleaner features hot pressure washers and steam cleaner models designed for the construction industry. Model H4D2000 delivers 4 gpm of 200F water at 2,000 psi, and can be optionally equipped to deliver 320F steam.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



## GRACO

Graco's G-Force selection of pressure washers includes nine gasoline-powered models, which range in horsepower from 6.5 to 16, in flow volumes from 2.7

to 6 gpm, and in pressure from 2,700 to 4,000 psi. The G-Force 3030, for example, is powered by a 9-hp Honda engine, has a rated operating pressure of 3,000 psi and delivers 3.0 gpm. The 135-pound unit features a "triplex piston" pump with ceramic plungers.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



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## DELCO

The RK-43 hot, high-pressure washer from Delco Cleaning Systems of Ft. Worth features an 18-hp Briggs & Stratton Vanguard engine with a 16-gallon fuel tank, and also a 16-gallon diesel tank for the hot-water burner, which automatically shuts down when the gun trigger is released. The RK-43 produces 200-degree water and delivers it at a rated 5.6 gpm at 3,000 psi. The ceramic-plunger, oil-bath pump is belt driven, a feature that extends pump life and simplifies maintenance, says Delco. The unit is supplied with four nozzles and employs a detergent-injection system ahead of the pump. The RK-43 has a list price of about \$4,600.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



## KARCHER

Karcher's range of pressure washers includes 12 models – eight gasoline-powered and four diesel-powered – with cleaning power ranging from 3.9 to 5.6 gpm at pressures from 3,000 to 3,500 psi. The model HDS 4.8/30 (pictured) is a 16-hp, hot-water unit available with either a 12-volt or 120-volt burner and delivering 4.8 gpm at 3,000 psi. The

engine and belt-driven pumping system are isolated on a shock-mounted sub-frame, and the pump features a tri-plunger configuration.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

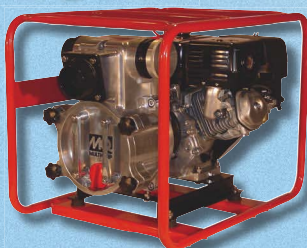


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## Spotlight

### HYDRO TEK

The HX Series models, says Hydro Tek, "combine the cleaning power of high-pressure with the grease-cutting effectiveness of hot water." The HX Series uses a high-output diesel-fired burner and features the company's Instant Trigger Start system, which automatically turns on the machine when the spray-gun trigger is depressed, and shuts down when the trigger is released.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



### HOTSY

The Hotsy 1200-Series includes eight models of self-contained, gasoline-powered (either Honda or Briggs & Stratton Vanguard), hot-water pressure washers that feature an integral roll cage that secures the heating coil and helps protect the machine. All models use a diesel-fueled burner to heat water, and flow volumes and operating pressures range from 4.3 to 5.6 gpm, and from 3,000 to 4,000 psi. The 1200-Series models are designed for mounting in a pickup truck or on a trailer to work in conjunction with a water tank for added portability.

For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)

### COLEMAN

The extensive line of Coleman pressure washers includes the model PW0933501, which can operate at 3,500 psi and supply a flow of 4 gpm. The machine is powered by a commercial-grade EH41 Robin engine rated at 13.5 horsepower. This model features a 50-foot hose and quick-connect tips, along with a chemical injection system.

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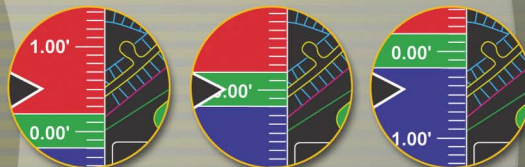
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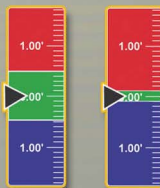
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## Rewarding Teamwork Turns a Shop Around

Incentives and recognition programs motivate shop employees to balance a budget that had been running at \$1.5-million deficits

**M**arilyn Rawlings was senior budget analyst with the Lee County Administration Office of Management and Budget when she was assigned to prepare the county's fleet-services department for privatization. After her investigation, though, the county decided to retain the office of Lee County Fleet Management.

That was 11 years ago and Rawlings, a schoolteacher and guidance counselor by education, stepped into the fleet-manager role. Since then, she has encouraged and developed and rewarded her employees until they delivered a complete reversal of the fleet-department's fortunes, transforming a \$1.5 million annual budget deficit into a neatly balanced budget complete with a fully funded vehicle-replacement program.

"When I started this job, the extent of my knowledge of vehicles was that the big pedal makes it go, and the small pedal makes it stop," Rawlings admits. "I clearly did not possess the technical knowledge to run an equipment shop, so I knew that I needed people who did possess that knowledge on my side."

Lee County is one of the fastest-growing areas of the country and the fleet has more than doubled in size in 10 years. Rawlings has had to find and hire technicians, but she says hiring good people is not the hardest task.

"If I can get somebody to jump ship for 25 cents more per hour, they will leave me just as easily if somebody else offers them 25 cents more than I'm paying," Rawlings explains. "It takes more than money to keep the really good technicians."

"Equipment managers think they have to pay the most and give the best benefits to get and keep the best people," she adds. "Nobody has a better reputation for that than the government. But I'm here to tell you, people won't lay everything they've got on the line just for a paycheck."

Rawlings has motivated technicians to help improve fleet processes and meet county goals by, as she says, "making people feel like they're part of a team that's accomplishing big things."

"I want to equip my people with the best skills that they can get," Rawlings says.

For example, the shop needed one more technician certified by the National Institute for Automotive Service Excellence (ASE) to earn the ASE Blue Seal of Excellence. Only two technicians weren't yet certified. Rawlings asked them why they hadn't tried to get the certification, and each told her that he is "not very good at taking tests."

Rawlings encouraged both of the techs to take a chance for the good of the Fleet Management team in a simple way. She went to them individually and said, "do you want to be the fleet hero?"

### PROFILE



**Marilyn Rawlings,**  
Fleet Manager

### Lee County Fleet Management

**Headquarters:**  
Fort Myers, Florida

**Specialties:**  
County fleet-management division

**Fleet Value:**  
\$68 million

**Fleet Makeup:**  
1,850 total pieces — about 50 percent cars, light- and medium-duty trucks — including fire and rescue vehicles, excavators, refuse-hauling and landfill-maintenance fleet

**Facilities:**  
3 shop locations and 6 fueling sites

**Employees:**  
34

**Market Range:**  
811 square miles, population 550,000



Photos: Bob Thompson®

**Having come to Fleet Management as a business analyst, Rawlings relies heavily on the technical expertise of all Lee County's technicians, and Fleet Supervisor Andy Carmichael's oversight to guide daily shop operations.**

# Great Managers



**Rawlings meets weekly with a leadership team selected from throughout the organization to evaluate work flow. Team members include (from left) Carmichael; Deborah Roan, office manager; Janet Sherman, parts manager; Rawlings; and Randy Painter, PM shop supervisor.**

"I explained that we have this goal to be an ASE Blue Seal shop and we need just one more technician to get ASE certified in order to make it," Rawlings says. "I told them, 'when we make it, we're going to have a big barbecue here at the shop and get a big cake made. On the top, in the frosting, it's going to say 'thank you' and then it's going to have the name of the guy whose certification made us eligible for the Blue Seal.'"

Both of the test-averse techs took the test and were certified by ASE. The shop earned ASE's Blue Seal, and two of Rawlings' people achieved something that they thought was out of reach.

Rawlings encourages her employees to develop a personal-growth plan. She provides a form that describes what the plan should include. A major part of the plan is setting goals.

"I tell them to bring me one goal that is so far out that they're not sure they can do it," Rawlings says. She works hard to help people attain those goals. "I want people to see that they can accomplish things that they don't think they can do."

Of course there's selfish motivation — she wants people to shake off preconceptions and do extraordinary work. It was probably wise to tie a financial incentive to her first big challenge.

Based on fleet expenses during the privatization evaluation, she figured out how many billable hours the shop would have to work to balance the budget. They were falling considerably short.

"I told them how many hours they needed to work and told them they had to get there, but that didn't

help much," Rawlings remembers. "Then we instituted a bonus program for each work team if all the people on the team met their hours deadline.

"People started to come up with ideas to bring their hours up . . . started working as a team."

Eventually the department met its goal. Rawlings had already begun inventing additional ways to reward employees for doing a great job.

She created an Employee of the Month program that rewards the recipient with a \$100 bonus and recognition throughout the organization.

"A person has to have taken no vacation or sick time during the month, had no reworks, and 100-percent customer satisfaction," Rawlings says. "I make the final decision, but the person's co-workers or supervisor have to nominate them."

The person that submits the nomination is recognized, and the nomination form is circulated.


There is also what's called the "ABCD Award" (Above and Beyond the Call of Duty Award), which is a simple way to acknowledge people's extra efforts. Once again, it's an employee-nominated award, but the recipient can be from anywhere in Lee County, including the public. The winner gets a bright yellow golf shirt embroidered with "ABCD," and recognition of exemplary service from co-workers and county management.

The Lee County Fleet Management is a non-union shop, which makes incentive and bonus programs easier to administer. Florida is a right to work state, though, and Rawlings credits the team atmosphere and sharing the benefits of diligent work with helping keep the shop open.

"In my time here we've had two votes on whether or not to unionize," she says, "And both times the union was soundly defeated."

But being a government agency tinges what could be construed as subjective rewards programs with a touch of risk. Rawlings says the key to awarding formal employee recognition without accusations of unfairness is simple.

"You do have to have written, measurable criteria for all recognition programs," she says. "You should not have problems as long as everyone knows the criteria and you follow them."

The Lee County experience supports the idea that rewarding excellent performance, no matter how simple the prize, will truly motivate friendly competition as long as the people understand they're working together to achieve a team goal. 





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## Three Ways to Account for Undercarriage Costs

Track maintenance is infrequent, yet expensive, so the budget process must be well considered

**U**ndercarriage costs deserve special attention for two reasons. First, advances in crawler-tractor design have extended machine life and caused undercarriage cost to become the largest single component of hourly operating cost. Second, undercarriage expenditures occur in large amounts at relatively infrequent points in time, which makes budgeting and cost control extremely difficult.

Many operating costs occur at discrete intervals in time, and the recovery rate is nothing more than a simple mechanism for converting large payments into an hourly rate. If a 500-hour service costs \$2,500, then it is easy to charge the machine \$5 per hour and accrue the funds needed to cover the cost.

The system works well if the amount is small and if it does not need to be carried forward into another accounting period. This is not the case when it comes to undercarriage

costs: The amount involved is large, and the interval between accrual and expenditure invariably spans more than one accounting period.

Let's use some sample data to illustrate the problem.

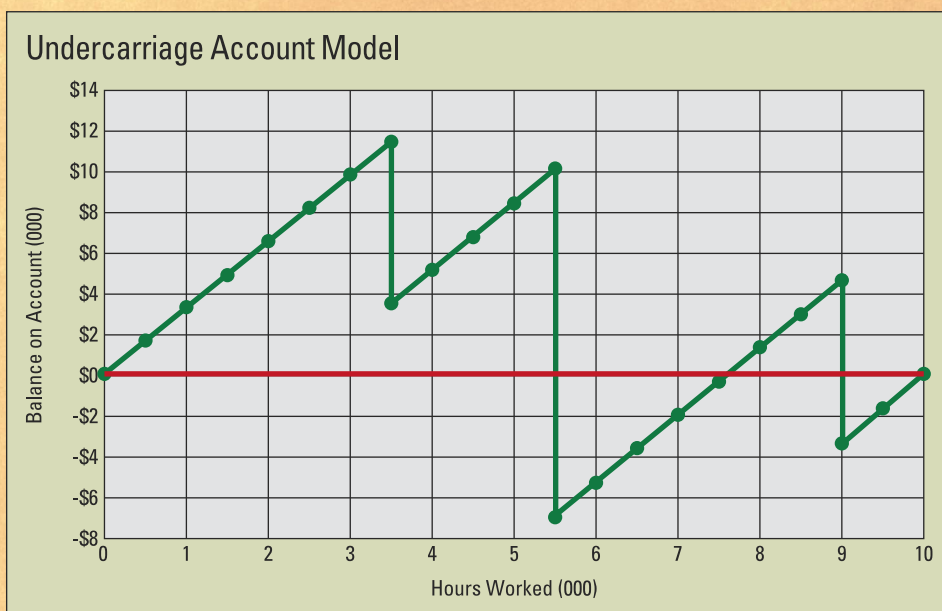
The undercarriage cost for our example machine will come to \$3.30 per hour on the assumption that we will do a turn and reseat for \$8,000 at 3,500 hours, a total replacement for \$17,000 at 5,500 hours, another turn and reseat for \$8,000 at 9,000 hours, and leave some life on the undercarriage when the machine is sold at 10,000 hours (\$33,000/10,000).

If the \$3.30 is credited to an undercarriage account, and if the actual undercarriage costs are debited against this account, then the balance on the account will exhibit the saw-tooth pattern shown in the chart below. The sys-



**Mike Vorster**

David H. Burrows Professor of Construction Engineering and Management at Virginia Tech.



The saw-tooth pattern shows how accruals for undercarriage maintenance build up until spent on repair.



# Equipment Executive

tematic accrual of \$3.30 per hour has provided for the three large expenditures on the undercarriage, and the account balances out in the end.

The problem occurs if at the end of the year, the \$6,600 positive balance (\$3.30 per hour accrual for 2,000 hours annual use with no expenditure) is seen as a "profit" to take out and drop to the bottom line. The undercarriage account will now run negative for most of the remaining life of the machine. We will soon forget about the accrual, and things will look bad when it comes to the first replacement or the second turn and reseal.

Three possible solutions exist for this problem. First, company policy can recognize and permit the carryover of accruals for major component replacement. This appears to be a simple solution, but it can become difficult to implement with large fleets. Calculations become confusing, and many believe that this approach adds too much uncertainty and room to maneuver in the cost accounting system.

The second possible solution is a simpler system of accruals. Set up a single undercarriage account that is managed as a distinct cost center covering all crawler tractors in the fleet. Each machine contributes to the account at a fixed estimated hourly rate, and all undercarriage costs for the fleet are charged against the account. Each machine's account would see a steady constant rate with no major


charges occurring when undercarriage work is done. The undercarriage account would also run evenly as the saw-tooth patterns from multiple machines would combine.

Managers of large fleets could create the account as a separate responsibility center with individuals accountable to manage undercarriage costs across the fleet as a whole. Or, a third-party specialist organization could contract to maintain, renew and replace undercarriages for the fleet at a fixed hourly rate for each machine category.

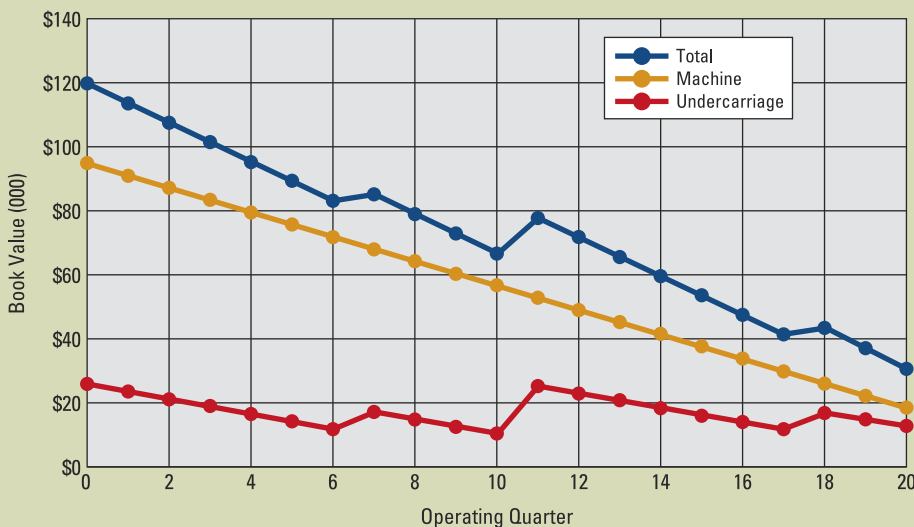
The third possible solution involves more complex accounting but is probably the easiest to implement. It uses component depreciation and is justified on the basis that undercarriages are discrete and distinct components that depreciate over periods different from the rest of the machine.

Using our example, we would identify the undercarriage as a \$25,000 component (\$8,000 plus \$17,000) that is depreciated to zero over 2.75 years (3,500 hours plus 2,000 hours at 2,000 hours per year). This would leave the machine as a \$95,000 asset (\$120,000 purchase price minus \$25,000) that can be depreciated on a straight-line basis to a residual value of 20 percent over five years. Splitting the machine into these two components enables us to capitalize the cost of major undercarriage work when it occurs and produces the book value curves shown in the chart on this page.

This approach requires that estimated undercarriage costs be taken out of the operating-cost recovery rate calculation and included as a component in the depreciation rate calculation. Actual undercarriage costs would be capitalized when they occur to replenish the book value of the rapidly deteriorating component.

Undercarriages are a major component of crawler-tractor costs. Budgeting for their maintenance, renewal and replacement merits special consideration. Any of these approaches will be better than one that includes undercarriages in the operating cost and does not permit the carryover of accruals for major component replacement. 

## Undercarriage Depreciation Model



**When undercarriages are depreciated separately from the machine, operating costs are more easily recovered.**





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## New “Double Barrel” Is Cat’s Big Gun

The 657G scraper provides fast cycle times, ease of service and operator comfort

Caterpillar’s 657G waits on the sprawling shore of the Pacific. Operated by Sukut Construction, one of California’s largest contractors, this machine is one of four pre-production units Cat has working in the United States. Its current job: to move dirt on the future site of high-value homes in California. Industry editors and contractors look on.

The largest of the company’s eight G Series scrapers, the 657G rolls down an incline and loads dirt around a steep corner. Seconds later, it turns and glides back up the hill to dump the load. After several trips, it’s hard not to notice how quickly the machine moves dirt. In this instance, loading takes about a minute. Loading and cycle times vary, of course, depending on ground conditions, material, and operator skill, among other conditions.

After completing the demonstration, the machine parks for its audience to have a kick at the tires. First stop: the scraper bowl. Capable of cutting to 16.7 inches deep with a maximum spread depth of 26.8 inches, the bowl holds a 104,058-pound load. Heaped bowl capacity is 44 cubic yards.

The machine’s rear engine is a Tier III-compliant C15 ACERT, rated at 451/410 horsepower. With dual horsepower capabilities, the engine can produce more power in higher gear ranges for optimum gradeability and reduced cycle times, says Caterpillar.

The rear engine is a 6-cylinder, as opposed to the previous 657E model, which used 8- and 12-cylinder engines for the scraper and tractor, respectively. Caterpillar claims that providing more room in the engine compartment allows easier servicing.



**Caterpillar’s latest and largest G Series scraper — the 657G — features Tier III-compliant ACERT engines. Dual horsepower capabilities of 451/410 at the rear and 600/564 at the tractor produce more power in higher gear ranges for fast cycle times.**

Moving to the other end of the machine, the tractor uses a Tier III-compliant ACERT engine. The C18 is rated at 600/564 horsepower and has six cylinders.

Like the ACERT engines, the radiators occupy less space, thus providing increased space for service access. Both the tractor and scraper feature the company’s Next Generation Modular Radiator (NGMR). NGMR increases spacing by lowering fins per inch from 33 (in the previous 657E model) to 9. With this increased spacing, Caterpillar aims to reduce radiator clogging in severe applications.

Additional serviceability improvements include a hinged tractor grill and two side panels that open to the radiator core. Two side doors on the right side of the machine provide access to service points. To get to the engine bay, the operator opens a hinged hood with support from spring struts.

Caterpillar has improved ease of operation as well. First, the G Series cab is more comfortable. An air-suspension seat features four swivel-lock positions for proper positioning in relation to the controls. Second, the three levers for bowl, apron and ejector are combined into one joystick to simplify operation. The joystick has a rocker switch for the push-pull bail or auger activation, and a combination grab handle and hand rest is located near the joystick to help steady the operator’s arm. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



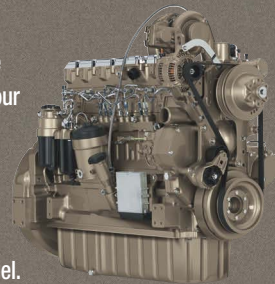


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## Excavator Makeover Reshapes Doosan Daewoo's Value

21st-Century engines, electronics and structure designs transform a price leader into a technology contender

**D**aewoo's new owner, Doosan Infracore, aims at lofty sales growth in North America with its completely new DX Series excavators branded Doosan Daewoo. Four models, spanning 66,000 to 105,000 pounds, should ship from Korea in April for availability in May and June.

Research and development had slowed during the years of Daewoo's restructuring. Doosan bought 51 percent of Daewoo stock early this year, bringing fresh resources to complete development and launch new excavator and wheel loader lines.

Technologies introduced to the Daewoo line with the new excavators will most certainly be necessary to draw the increase in sales the new owners have projected for the world's largest construction-equipment market. Doosan expects to take its \$11-billion global construction business to \$40 billion in revenue by 2010, and will focus on North American sales growth to lead the charge.

The DX Series excavators are new throughout, starting with a six-cylinder Doosan Daewoo diesel engineered to meet global environmental regulations with high-pressure common-rail fuel injection. On some models, the operator can now reverse the direction of the variable-speed, hydraulically driven radiator fan to simplify clearing debris from the cooler.

Daewoo's e-EPOS computer has been updated, and now communicates with the engine control unit and hydraulic system via a controller area network (CAN). This state-of-the-art electronic system coordinates engine and hydraulic efforts for maximum efficiency.

Operators see the information from the electronic system on a color LCD display in the cab, accessible in 14 languages. On-screen diagnostics track machine performance and help pinpoint problems. Operators can use the monitor to select auxiliary hydraulic flow rate and one-way or two-way flow to the attachment.

All of the frame structures — track frames, carbody and upper frame — have been redesigned. And the boom, stick and buckets have also been redesigned. One-piece castings reinforce the base of the boom and the center bosses where lift cylinders mount to the boom.

Preliminary specifications indicate two important things. First, each DX-Series excavator hits dig depths and lift capacity numbers very much like competitive machines of similar



**Doosan Daewoo DX300LC shown to global dealers in Seoul South Korea is a sample of a DX Series sporting a new look, new engines, redesigned structures, and state-of-the-art electronics.**

### Doosan Daewoo DX Series Excavators

Model	Operating weight (lbs.)	Max. dig depth	Standard bucket* (cu. yds.)	Net HP
DX300LC	64,594	24' 2"	1.66	197
DX340LC	75,177	24' 8"	1.94	247
DX420LC	90,170	25' 4"	2.4	293
DX480LC	104,718	25' 7"	2.8	329

\* PCSA, heaped

**These four models are expected to be available in North America by June.**

size. And second, Doosan Daewoo dropped right into some gaps in the competition. There are virtually no Caterpillars, Komatsus, Deeres or Hitachis within 1,500 pounds of any of the new DX machines.

The DX Series machines, plus what will likely be an enhanced factory warranty, are expected to cost dealers around 5 percent more than the Daewoo Solar machines they replace. For more information, visit [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info)



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## Mack Announces New MP Engines, Roomier Granite

A new engine family will replace current ASET engines by January '07; an extra 4 inches in Granite cab provides more leg and belly room

**M**ack Trucks says its anticipated new engine family will begin production in early 2006 with an 11-liter model, to be followed by a 13-liter version in '07. Both MP (for Mack Power) diesels will come in Maxidyne, MaxiCruise and Econodyne versions and will replace current ASET engines by January 2007.

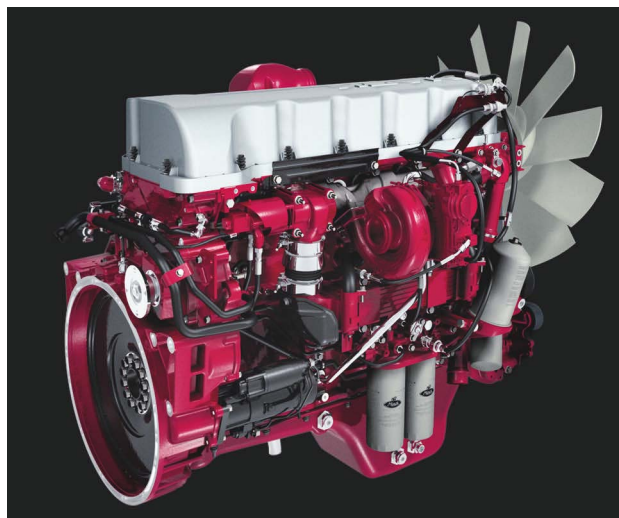
The builder also announced new Granite vocational trucks with roomier cabs and updated interiors, as well as a new Pinnacle highway tractor with similar features. As now, the new Granite will come with forward and rearward steer-axle settings and in a lightweight Bridge Formula model. Most will use only the new MP engines.

The 11-liter MP7, with ratings from 325 to 405 horsepower and torque of 1,260 to 1,560 pounds-feet, will be offered in certain truck models and meet current exhaust emissions regulations. For '07, the MP7 will be fitted with a diesel particulate filter to meet stricter emissions limits. In '07, Mack will add a 13-liter MP8, with 415 to 485 horsepower and 1,540 to 1,700 lbs.-ft. And in '08 it's scheduling the introduction of a high-horsepower 16-liter MP10, based on the D16 diesel now offered by its sister company, Volvo Trucks.

Maxidyne MP engines, designed for construction and other vocational trucks, will have better low-end torque than current engines and get "substantially" better fuel economy. That's because the MPs will use cooled exhaust-gas recirculation instead of the simpler but less efficient internal EGR on the current Maxidyne, executives explained. MP MaxiCruise and Econodyne highway diesels will get 2 to 3 percent better economy than ASET engines.

MP design includes a single overhead camshaft with four valves per cylinder, "high performance" cooled EGR, variable-geometry turbocharger, wet sleeve cylinders with steel pistons, rear gear train with a rear-engine power take-off option, and advanced VMAC-IV electronic controls. Mack's PowerLeash engine brake will be optional on the MP engines.

The MP family will have unique mechanical parts, electronic controls and operating characteristics to differentiate them from a similar family to be offered by Volvo Trucks. Cam profiles, piston crowns, injector settings and some turbochargers will differ from those on Volvo engines, Mack executives said. Both families will be built in Hagerstown, Md., in a retooled



**An 11-liter MP7 is the first of the new Mack Power diesels. An '06 version will meet current federal exhaust limits, and a particulate filter will be added to comply with stricter rules in January '07. Deep red is the color for the MP family, which will later include 13- and 16-liter models.**

former Mack plant now operated by Volvo Powertrain.

The Volvo Powertrain factory now produces Mack's ASET engines, which will continue in 2006 but will be phased out by the end of the year. The MPs and similar Volvo engines are designed to meet new federal exhaust-emissions limits that take effect in January '07.

2007-model engines and the trucks they're installed in will be more expensive than current models, but Mack executives say they have not yet determined how much higher their '07 heavy-duty trucks will be priced. Most competitors say the same thing.

### Roomier Granites

A cab 4 inches longer than now adds belly and leg room to Mack's Granite severe-service model, built for construction, trash and other vocational uses. The longer cab also allows seat backs to recline more than 20 degrees, executives said, and results in a bumper-to-back-of-cab dimension of 116 inches vs. 112 inches for current Granites.

The cab's interior has been redesigned for greater driver



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# Truck Report



**A chromed grill from the Vision highway tractor will appear on the new Granite CTP, which also has a longer cab and new interior features. For '06, three Granite models will use the new MP7 diesel; Cummins' lightweight ISL will be an option in the Bridge Formula version.**

comfort and convenience. Included are a wrap-around instrument panel with a new primary gauge cluster and space for up to 25 switches. The standard driver information display has a new CoolBlue back lighting for easy viewing day or night; this also illuminates the optional CoPilot expanded info display.

The heater and air conditioning are improved, and controls for them are easier to use, executives said. Better floor mats muffle outside noise. Ceiling-mounted lighting is like those in highway models to give drivers more reading ability. Storage compartments include a large pocket with litter-bag hooks on the rear wall, in-dash recesses, a cell phone holder, and cup holders with "snuggers" to grab cups/bottles of various sizes.

As with current Granite CT models, the new models will come in 600 and 700 series, indicating heavy- and extra-heavy-duty frames, axles and suspensions. Designation for the new series is CTP, with AF indicating steer axle forward and AB meaning axle back. Also as now, BF means bridge formula, a lightweight version produced mostly for California, whose laws require wide axle spacing but allow only one auxiliary axle.

The Granite Bridge Formula offers Cummins' 8.8-liter ISL diesel as a lightweight alternative to the standard Mack engine. The ISL will continue as an option in the new Granite BF, but the others will come only with Mack's MP7. Cummins' ISX remains the only engine for Mack's long-nose CL truck and tractor, and is expected to continue into '07. Current Granites with ASET (application-specific engine technology) engines will be phased out at the end of 2006.

The new Pinnacle highway tractors are available as a day-cab and with several sleeper sizes. The Pinnacle will have the cab interior features of the new Granite, plus upgraded sleeper interiors, and will use only MP engines. The Pinnacle will replace current Vision and CH tractors by the end of 2006.

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# Market Watch Lite

By HEATHER BURLINGAME, Senior Production Editor

*We're making it quicker for you to obtain more information on products by going to [ConstructionEquipment.com/info](http://ConstructionEquipment.com/info). Once there, you'll be in our Buyer's Guide, where you can find manufacturer information as well as distributor listings.*



## Atlas Copco

The HB4200 breaker has a service weight of more than 4 tons. It accepts a maximum hydraulic flow of 84 gpm at 2,610 psi of pressure and delivers an impact rate to 530 bpm. Auto-Control monitors the hammer's frequency and power output to match operating conditions.

StartSelect allows start-up and shut-off to be adjusted to fit jobsite conditions.

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## Dynamic Power Source

Two new versions of the PowerBox 3-in-1 welder/generator/compressor are available. The PowerBox 280MP features an 18-hp gasoline engine. A 20-cfm compressor and 200-amp/5,500-watt generator/welder combination deliver optimum performance. The PowerBox 280HD (Hydraulically Driven) is designed for vehicle applications that use a power-take-off system. It provides 200 amps of welding power; 5,500 watts of power; and 20 cfm of air. The unit is self-contained and offers a weather-resistant, easy-to-access control panel.

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## Toro



The Dingo 323 mini-skid-steer now offers 10.8 gallons per minute of hydraulic flow at 3,250 psi. Independent four-wheel-drive system directs hydraulic flow and pressure to all four wheels for optimum power and traction, the company says. A 23-hp Kohler gasoline engine powers the machine, which has zero-turn capability and a 40.5-inch operating width.

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## TrynEx

The SnowEx Vee Pro 3000 bulk spreader has a corrosion-resistant hopper and fits intermediate/import trucks and heavy-duty utility vehicles. The inverted V-style hopper carries a 0.5-cubic-yard capacity of salt or salt-sand mixture. The 285-pound spreader can be loaded or unloaded without special equipment, and a quick-release pin allows the user to quickly remove the spinner assembly. A separate spinner/auger controller is powered by independent 12-volt DC motors, making it low maintenance and user-friendly, says the company. The spreader comes with a two-year guarantee on parts and labor from the day of purchase.

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## Lincoln Electric

Housed in a compact, corrosion-resistant, stainless-steel case, the Vantage 400 welder/generator features Lincoln Chopper Technology that delivers

great starts and a smooth arc for stick, downhill pipe, TIG or wire welding, as well as arc gouging. The unit's quiet 1,800-rpm four-cylinder Perkins engine delivers 400 amps, 36 volts, and up to 450 amps, 32 volts of rated DC welding output at 100 percent duty cycle. It also generates 19,000 watts (peak) of 3-phase 240V AC generator power for industrial equipment.

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- C.J. Thoutt, Fleet Maintenance Supervisor, Thoutt Brothers Concrete Contractors, Inc.

Thoutt Brothers is one of Colorado's largest concrete contractors. With so much equipment out there – and so much risk of loss, damage or theft – C.J. realized he needed a better management system. He found QUALCOMM's GlobalTRACS® equipment management solution. GlobalTRACS constantly monitors location and engine usage on every machine, and then sends the information directly to the company's computer system.

"We've built our entire maintenance program around GlobalTRACS," C.J. says. "It provides us both engine usage hours and GPS information, which we can easily share online with our maintenance partner. On any given day, they can tell us which machines need service, and scheduling is a breeze. Before GlobalTRACS, our preventive maintenance program was really ineffective – we spent most of our time just fixing whatever machines weren't working."

GlobalTRACS also helps C.J. operate his fleet more efficiently. Every night, GlobalTRACS "pings" each machine to

make sure it's where it's supposed to be, and logs how many hours it has been used. "I found one tractor that had been on a jobsite three weeks without being used at all," he says. "In just a few hours, I was able to put that machine to work, instead of it just sitting idle and costing us money."

C.J. also likes working with QUALCOMM. "You know they're here for the long haul," he says, "and they're very good at answering my questions and providing the support I need."

"GlobalTRACS has really improved our operations. It's an excellent system and a great investment."



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## Lite



### Weldcraft

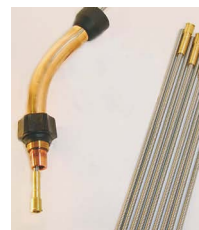
WP-20 and WP-20P water-cooled TIG torches have compact, light-weight designs and provide 250 and 225 amps, respectively. Around-the-head cooling design reduces weld discontinuities caused by overheated components. They are available with 12.5- or 25-foot rubber or vinyl power cables. Standard price with the 25-foot torch is \$243 and \$205, respectively, with a standard one-year warranty.

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### Bernard

Compatible with the company's Q-gun for MIG welding, Jump Liners connect with standard liners at the base of the Q-gun's rotating neck, then run through the most common wear points to the contact tip. When a Jump Liner becomes worn or contaminated, operators detach the Q-gun's neck from the handle, replace only the Jump Liner, and reattach the neck.

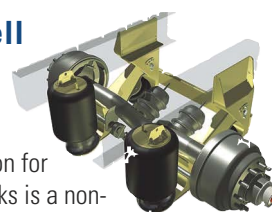
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### Ridewell

The RCA-215 Flex-Mount Auxiliary Axle Suspension for vocational trucks is a non-steerable, air-ride/air-lift unit that offers weight savings of 50 to 72 pounds compared to Ridewell's Model 225. The RCA-215 will carry 22,500 pounds. The Flex-Mount system is designed to accept axle drop of up to 8 inches. It has 10 1/4-inch total travel, with as much as 7 inches of lift. The suspension has axle alignment adjustment of 3/8 inch at each hanger.

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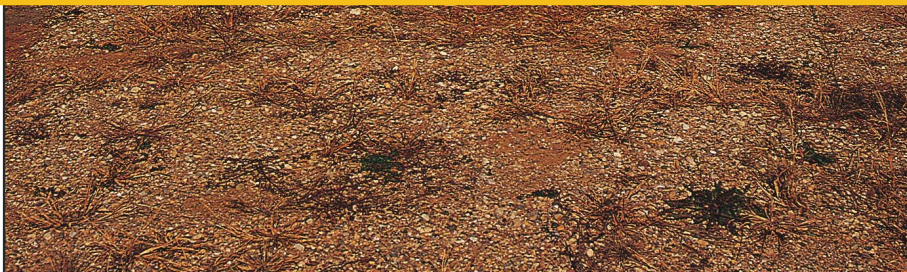






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# Market Watch Lite



## Bomag

The ProTack TW500 tack wagon features a heavy-duty 12-gpm direct-drive asphalt pump powered by a 5.5-hp Honda engine. An adjustable relief valve allows maximum control of pressure and volume, the company says. The wagon holds 500 gallons, and it has a 10-inch fill spout. A 40-foot-long, 1/2-inch-diameter hose allows for spraying in an 80-foot work area. List price for the basic unit is \$11,340 with a parts-and-labor warranty of one year or 1,000 hours.

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## TransTech Systems

The Shoulder Wedge Maker (SWM) shapes the edge of an HMA mat on shoulderless roads. It mounts on the screed extension face against the end gate of any asphalt paver and develops a 30-degree slope off the edge of the mat to help drivers maintain control of the vehicle and safely return to the driving lane.

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## Multiquip

Single-speed CDM-1H core drill is for wet-drilling applications up to 3 inches in diameter, or it can be used with Multiquip's Cobra dry-drilling bits up to 5 inches. The 11-amp, 115-v hand-held drill operates at 0-1,800 rpm. It weighs 9 pounds.

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## Michelin

Two new tires are available: XZSL Stabil'X for skid-steers and the XM37 for backhoe-loaders and material handlers. XZSL steel-belted radial has a steel casing and special rubber compounds to increase resistance to cuts and abrasions. An aggressive, non-directional tread helps keep marking down on pavement. XM37 is for use in difficult jobsite conditions. It's reinforced and fortified using rubber compounds that enhance its performance in hard-surface conditions.

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# Market Watch Lite



## ◀ Miller Electric

The Bobcat 250 welding generator is driven by a Kubota diesel that produces 19 hp at 3,600 rpm. Fully enclosed, the generator provides 10,000 watts of useable peak power and 9,500 watts of continuous power. New meters for maintenance monitor and display engine shutdown conditions, engine hours and oil change interval. Thanks to low-fuel shutdown, the diesel engine will shut down before the machine runs out of fuel. The generator has

a three-year factory warranty; engine covered separately by Kubota's two-year warranty. List price is \$7,757.

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## ConocoPhillips

Kendall Super Three Star Synthetic Gear Lubricant and 76 Triton SynLube LDO are formulated for extended-drain service in automotive differentials, such as line-haul trucks and other commercial vehicles with hypoid axles. According to ConocoPhillips, the gear oils feature excellent low-temperature properties, enhanced thermal stability at elevated temperatures and high load-carrying capacity to protect against scuffing and wear. The Kendall synthetic is available in viscosity grades of 75W-90 and 80W-140.

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## ▶ Parker Hannifin

Designed to replace the existing 301 Series hose, Parker Hannifin's 302/301 hose features a universal two-wire construction hose to meet global customer requirements. The new



hose offers higher working pressures than the 301 hose. A nitrile core inner tube provides optimal fluid compatibility across a broader array of hydraulic fluids — including biodegradable ones. It fits hose sized -4 to -32 and approved for use with 30 Series and 43 Series fittings. Warranty: 1 year or 2,000 hours.

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# Market Watch Lite



## ▲ Mechanical Advantage

The Drum Doctor reshapes damaged traffic barrels onsite or offsite. It accommodates all standard makes of round channelizer drums. No heating is required for repair. The Drum Doctor can be operated by one worker, is easily portable and mounts quickly to any 2-inch hitch receiver, says the company.

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## ▶ Bernard

The Q-Gun line of MIG guns have upgraded back end assemblies. Models range from 150- to 600-amp units with five handle designs, multiple trigger options, and a rotating or fixed neck.

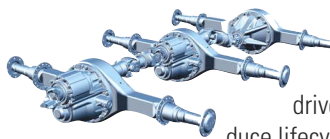
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## ▼ Fecon

Ideal for clearing brush and removing debris and logs, the HD60 Root Grapple for skid-steer loaders is designed with a ridged frame and serrated front tines for ripping and grabbing. The 41-inch depth, 60-inch length, and 37-inch open-clamp height allow the unit to grab oddly shaped materials.

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## ◀ Dana

Three Dana Spicer tridem drive axles are designed to reduce lifecycle costs and improve reliability. The T69-170HP Series is rated to 200,000 pounds GCWR and is ideal for construction, heavy-haul and logging applications. For mining applications, the T78-190P Series is rated to 240,000 pounds GCWR. The T78-590P Series is rated to 240,000 pounds GCWR and is suited for vocational applications that require high gross-weight capacities in combination with high numerical-ratio availability. The models carry a 3-year/350,000-mile warranty for most vocational applications.

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## Trimble

The Spectra Precision HV401 Horizontal Vertical Laser features one-button self-leveling and long-range remote control. The new dustproof, waterproof laser is designed for temperature-calibrated high accuracy and consistent performance, says Trimble, and can tolerate a tripod tip-over or accidental drop from 3 feet onto concrete. Power options include NiMN batteries, alkaline batteries or direct power. The new HV401 also provides a bright beam, a range of rotation speeds and scanning functions.

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## Weldcraft

WP17 and WP17V 150-amp TIG torches are air-cooled. Torches measure 7.75 inches and weigh 6 ounces. Ribbed handles allow for cool operation and operator comfort. They are available with 12.5- or 25-foot single or two-piece power cable assemblies.

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## Multiquip

The DLW-300ES welder/generator delivers premium productivity at half the rpm, the company says, while using half the fuel of its predecessor. The unit is a mid-size 300-amp welder and 10kW generator with a 100-percent duty cycle at 280 amps. It operates at idle up to 160 amps and uses 0.39 gallons of fuel per hour at 120 amps. Measuring 50x27x32 inches, the unit weighs 842 pounds. Price is \$11,580, and the unit carries a parts and labor warranty of three years or 30,000-hours, whichever comes first.

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## Subaru Robin

The 2-inch PKX201T trash pump is rated at 6 horsepower and offers a delivery volume of 185 gpm. The 3-inch PTV305T trash pump features an 8.5-hp engine and a delivery volume of 343 gpm. At 11 horsepower, the PTV405T trash pump delivers 528 gpm. The 2-inch model handles solid debris to 3/4 inch, and the 3- and 4-inch models handle solid debris to 1 1/4 inches.

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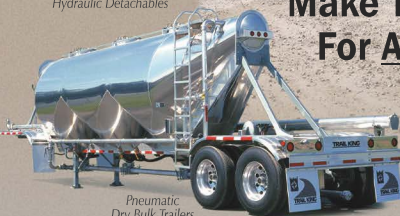
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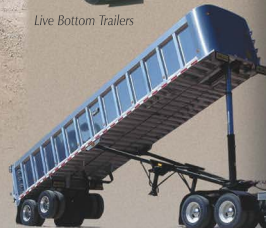
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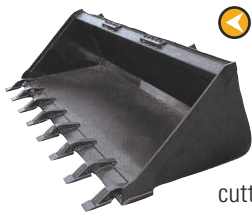
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# Market Watch Lite



## AIM Attachments

The company has introduced a new line of skid-steer-loader attachments that includes a low-profile bucket. The buckets have a durable, compact design for visibility of the cutting edge. A low center of gravity utilizes the breakout force of the skid-steer loader. Buckets are also available in a long-bottom configuration. Optional features include large pin-on teeth (shown), small crimp-on teeth or add-on toothbars. Widths are available from 60 to 84 inches.

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## PWCE

An 8-foot jib attachment for the bucket end of wheel loaders features a 36-inch magnet for unloading materials.



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## Drill Doctor

The upgraded 750X drill-bit sharpener features a more streamlined profile for easier handling and durability. The user can create a custom variable-point angle between 115 and 140 degrees. The sharpener has double the number of relief angles and sharpens high-speed steel, black oxide, carbide, tin-coated, cobalt and masonry bits.

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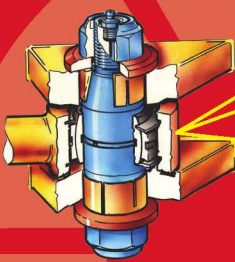
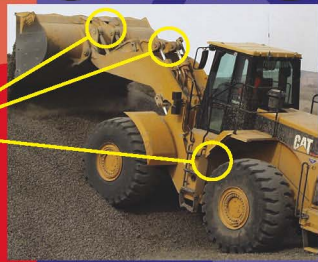
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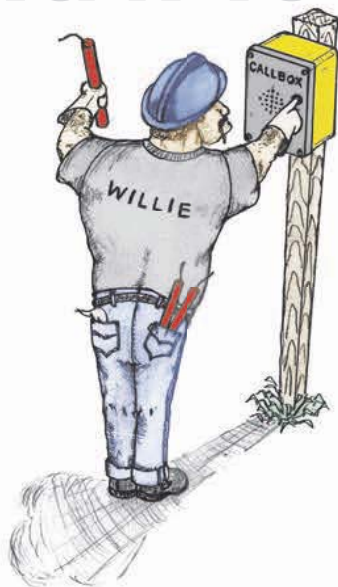
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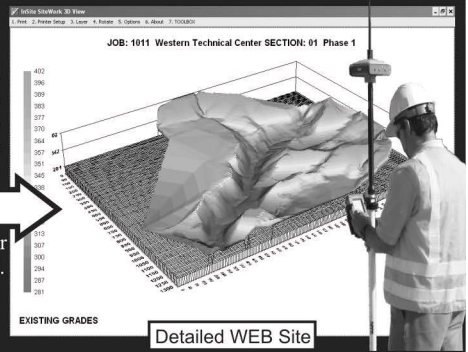
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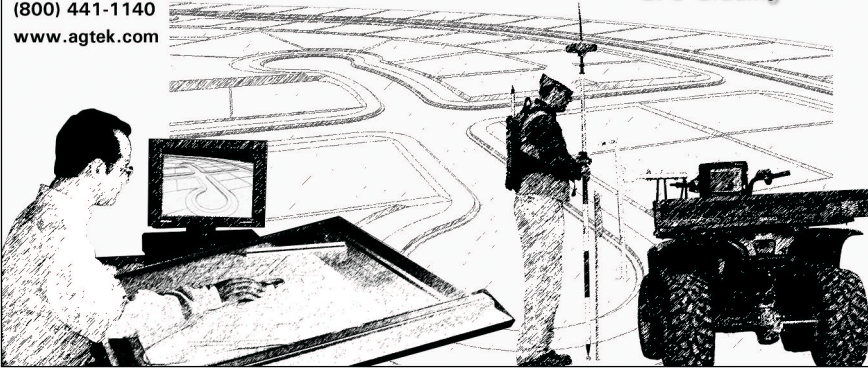
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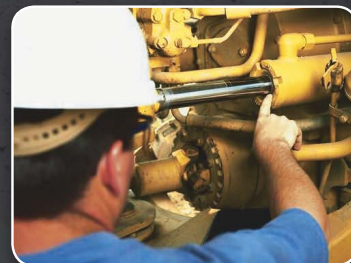
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# Iron Works

By KEITH HADDOCK, Contributing Editor

## Koehring's Answer To Wheel Loaders

**Skooper attachment to cable excavator increases dipper capacity four-fold**

In the late 1950s and early 1960s, cable-shovel manufacturers began to feel threatened by developments in competitive types of equipment. The trend to hydraulic excavators had begun, and improved wheel loaders were claiming higher productivity with lower initial capital cost. Increasing sales of hydraulic excavators and wheel loaders were cutting into traditional cable-excavator markets.

Many shovel manufacturers developed their own hydraulic excavators, some with greater success than others. Koehring designed attachments that promised greater productivity from the traditional cable excavator.

Before developing its successful line of hydraulic excavators in the 1960s, Koehring launched the Skooper attachment for its 1/2-yard model 205 cable excavator in 1957. This hybrid machine was part cable and part hydraulic and carried a loader bucket that quadrupled the capacity of the standard shovel to two cubic yards.

With the Skooper attachment, the Koehring 205 retained its draw works (cable drums) as it could be readily converted to a standard crane, dragline, hoe or shovel. When operating



**In 1963, Koehring introduced its first full-hydraulic excavator, the 505 Skooper, which was a 40-ton machine.**

as a Skooper, the hoisting action was provided by the cable hoist drum while the crowd motion was provided by a pair of double-acting hydraulic cylinders. Another hydraulic cylinder tilted or dumped the bucket.

The Skooper's increased capacity was derived from a light front end with no heavy boom to swing, and the high break-out force of the hydraulic cylinders. The machine boasted a 7-foot ground level crowding action and a choice of rock, general purpose and rehandling buckets. The 15-ton machine was powered by a 64-hp diesel engine.

Koehring designed the Skooper to compete with wheel loaders at the quarry face or in stockpile work. It was advertised as "a stand-still loader resulting in economy of motion. With ability to revolve 360 degrees, it digs, swings and loads from a stand-still position without the usual drive-in, back-out inefficient motion of front-end loaders."

In 1963, Koehring applied the Skooper principle to its first full-hydraulic excavator, the 4-yard 505. Instead of hoist cables, this 40-ton machine utilized an additional pair of single-acting hydraulic cylinders to raise the entire front-end assembly through a pantograph-styled linkage. Koehring offered Skoopers in its excavator line for well over a decade until improved front shovel geometry and more sophisticated hydraulic systems rendered them obsolete.



**The first Skooper was used on the hybrid Koehring 205 in 1957 and quadrupled the bucket capacity.**

*You can read more about the evolution of construction equipment in Keith Haddock's illustrated book "The Earthmover Encyclopedia" available in most bookstores. Also, consider a membership in the Historical Construction Equipment Association, [www.hcea.net](http://www.hcea.net). Be sure to visit [ConstructionEquipment.com](http://ConstructionEquipment.com) for past Iron Works features.*





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