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FEATURES

COVER STORY: Field Test

34 On-Site Testing Reveals New Kobelco's Strengths

Kobelco's SK350LC Acera Mark 8 hydraulic excavator goes bucket-to-bucket with its predecessor. Senior editors Mike Anderson and Walt Moore report on the advantages the new machine offers, which include increases in net horsepower, hydraulic flow and fuel efficiency. Be sure to check out our exclusive video report in the online version of this story at ConstructionEquipment.com.



SPECIAL REPORT: COMMUNICATION PROTOCOL

45 Mixed Fleet, Mixed Signals



An equipment manager's life would be much easier if he could go to a single data collection point and extract data on the Caterpillar excavator he has at one work site, the John Deere unit at another location, and the Komatsu backhoe that has been working on a project just across the state line. The data needed from each machine are the same. The problem is that each manufacturer has proprietary systems unique to their machines that protect their intellectual property.



HANDS-ON TRUCKING

54 FLD-SD Has Old-School Style, Modern Mechanicals

Truck editor Tom Berg says if you like to drive, this truck is for you — especially if you've got some years and miles behind you, because Freightliner's FLD-SD daycab tractor is "old school." It's the last FLD the builder makes, and aside from its some traditional but still highly serviceable components, it was a pleasure to operate, with a powerful and strong-sounding Detroit engine and a smooth shifting Eaton Fuller 13-speed transmission. It was adorned with lots of chrome and polished metal, and it had a fancy interior. It turned out to be one of those trucks that Berg didn't want to return.

MANAGEMENT: PARTS

58 How to Keep the Right Parts on Hand

Parts management is a matter of balance: balancing parts inventory with shop needs, and balancing the need to reduce inventory costs with vehicle availability, for instance. As vehicle availability increases, inventory costs rise sharply. On the other hand, if large inventory is aimed at a high vehicle-availability rate, there won't be any cost reduction. As one fleet manager recently said, "it's like trying to focus on a moving target."



BUYING FILE

66 Production vs. Precision: No Longer A Choice

Traditionally, the worlds of finish and production dozers collide within the 100- to 200-horsepower range. While they may still, the proverbial line in the dirt is moving toward the upper part of that range, and growing much less discernible along the way. It's fuzzy, if not completely smudged. Crawler dozers, particularly in this size range, are increasingly less either a finish grading or a production machine, but rather both.

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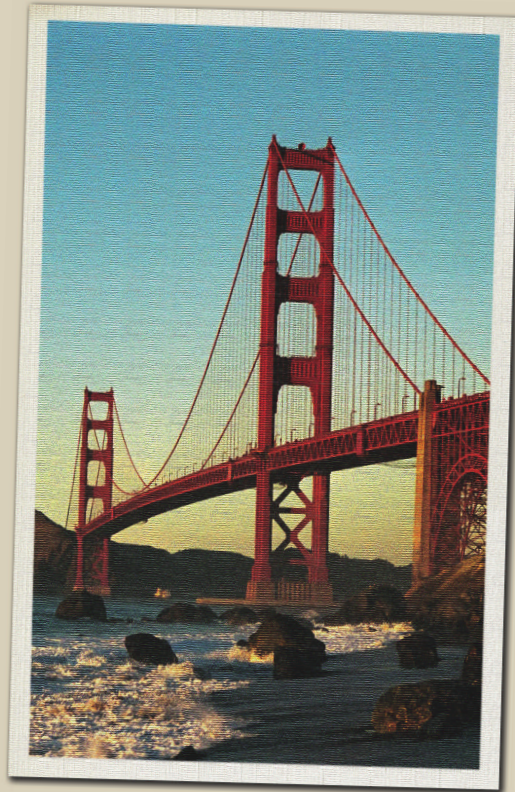
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Defeat Skepticism

On the drive into our office in suburban Chicago, pavers, cranes, excavators and myriad other machines line the tollway adding lanes in an industrious program slated to continue through 2009. It's funded without federal assistance.

That's not the scene in other parts of the country, though. In fact, states that rely heavily on federal transportation dollars face a 34-percent reduction in funding heading into fiscal year 2009, according to the American Road & Transportation Builders Association.

On Oct. 1, the Highway Trust Fund will be unable to cover the 2009 obligations under the current authorization, SAFETEA-LU. ARTBA is calling upon Congress to restore \$8 billion transferred from the Fund in 1998, which would cover the 2009 obligations.

But that's just the first step. The transportation authorization expires next year, and with November's change in administration, the contents of the next bill are unsure at best, seriously at risk at worst.

What concerns us, however, is more systemic than whether Congress can put together another highway bill. No, we're concerned with whether Congress can even act on the issue.

Partisanship and outright antagonism in Congress threaten to torpedo any cooperative effort that might lead to what's best for our infrastructure and we, the people. The levels of skepticism and frustration among voters are extremely high in regard to their belief that the nation's leaders are able to fix the problems of today.

But we cannot let that sideline our industry in its efforts to convince our congressional leaders to provide federal funding for transportation. Phone calls, visits and letters still matter. Jobs are at stake, transportation safety is at stake, interstate commerce is at stake.

Solutions exist. Instead of focusing on the president, who executes policy, we need to focus on our representatives, who create policy. Target your three congressional leaders. We each elect two senators and one representative. Find out where they stand on transportation policy. Let them know what's best for their constituents.

Convince them to act accordingly, or elect someone who represents your interests. It's your right, and your obligation.



Rod Sutton, Editor in Chief

We welcome your comments.
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Oak Brook, IL 60523

Rod

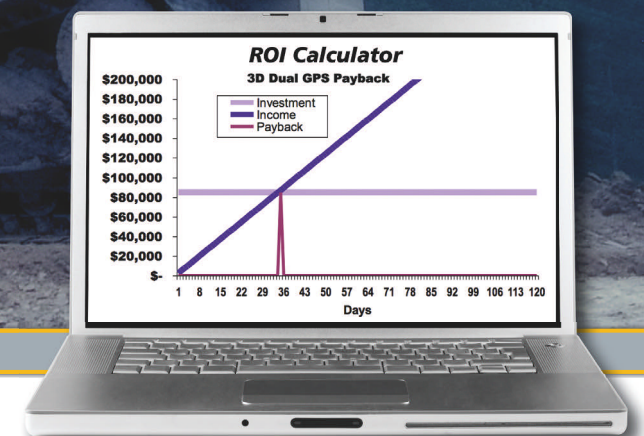
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CASE
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MARKET WATCH

By KATIE WEILER, Managing Editor

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◀ Atlas Copco

A down-the-hole, track-mounted drilling rig, the Mustang 4-F1 fills residential and tight industrial jobs requiring 4- to 6-inch holes drilled to depths of 300 feet. A complete range of Atlas Copco hammers can be used with the Mustang 4-F1, which incorporates a top-head rotary

design that works with Symmetrix drilling systems for casing advance and extraction. Utilized in both geotechnical and geothermal applications, the compact drilling rig features 12-inch pads for reduced ground pressure and high ground clearance.

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▶ Volvo

The EC35C and ECR48C compact excavators both use the D2.2D diesel engine rated at 36.3 horsepower. The 7,800-pound EC35C digs to 11 feet 10 inches from a conventionally designed upper structure, while the 10,700-pound ECR48C can dig more than 13 feet deep from a short-radius house that swings within the track width. Simultaneous control of swing and boom offset enables faster, precise performance, and float function on the backfill blade speeds leveling and finish work.

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◀ Terex

Powered by a 438-horsepower Caterpillar C13 engine, the Terex Pegson XV350 vertical-shaft impact crusher can manufacture sand up to 350 tons per hour. It features Terex Canica 2050 GD VSI crusher on Terex Pegson I-beam chassis with heavy-duty crawler undercarriage. Fitted with a shoe-and-anvil arrangement, six different crusher configurations can be used depending on application.

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▶ Roadtec

The 700-horsepower SX-7 soil stabilizer will cut to 21 inches deep, which Roadtec says is "the deepest in the industry by far." With its right-hand flush cut, the machine pulverizes or stabilizes all the way to the curb line. The cut is 8 feet 5 inches wide. The entire machine is steered with one steering wheel. Operators can choose from coordinated steer, crab steer, front wheels only, rear wheels only or ZTR (zero turn radius). Out of the cut, the machine can make a zero-radius turn.

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Market Watch



◀ Roadtec

Roadtec replaced the RP-150 and RP-155 pavers with two new 8-footers compliant with Tier 3 emissions standards: the RP-170 rubber-tired machine and RP-175 on rubber tracks. Caterpillar C6.6 engines increased horsepower 12 percent, and Roadtec added 40 percent more fuel capacity, putting 95 gallons on board the RP-175 and 90 gallons on the RP-170. New, hydraulically driven cooling fans reduce paver noise. New slide-out seat design and operator control layouts are on the machines.

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▼ Snorkel

As the Tanfield Group continues to integrate UpRight products into the Snorkel product line, a new Snorkel articulated self-propelled boom lift is being put to work in North America. Offered as either an electric two-wheel-drive or diesel-powered, four-wheel-drive unit, the AB46 combines a working height up to 52 feet 9 inches with a turning radius of less than 24 inches. With fully proportional controls operating all boom functions, the machine is hard-wired with a relay logic control system for simple troubleshooting.

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▶ Asphalt Drum Mixers

Milemaker Series asphalt plants use counter-flow technology, which operates separate drying and mixing zones to achieve the maximum level of heat transfer and fuel efficiency, says the manufacturer. Milemaker plants are available in portable or stationary versions and meet all federal and state specifications. Available related components include cold feed bins, hot-oil asphalt-cement tanks, direct-fired horizontal cement tanks, portable and stationary bag houses, mineral filler systems, recycled asphalt pavement systems and more.

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▶ Case

Weighing 65,600 pounds, the 1221E wheel loader offers a standard payload capacity of 7.6 cubic yards. It is powered by an electronic, six-cylinder Tier III Cummins engine that delivers 320 net horsepower. Isolation-mounted cab offers infinitely adjustable seat, armrests and control placement, as well as tilt/telescoping steering wheel. Floor-to-ceiling glass in the front coupled with a sloped rear engine compartment provides excellent visibility. Optional Ride Control is available.

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▼ Yanmar

Yanmar V4-6, V3-6 compact wheel loaders deliver 40.4 and 30.3 horsepower, respectively. V4-6 weighs 7,651 pounds and has fully automatic drive mode that allows it to change gears without operator input. Top speed is 11.8 mph. Rear-axle oscillation reduces operator fatigue and provides control over uneven surfaces. Lifting capacity is 7,451 pounds. The V3-6



weighs 6,750 pounds and has a lifting capacity of 5,760 pounds.

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Market Watch

John Deere

Deere's nine new K-Series wheel loaders from 2 to 8 cubic yards come with cab improvements, a new utility-sized loader, and Tier 3 emissions certification for the largest models. Joystick steering is now available in the 544K through 844K. An embedded payload weighing scale is powered by Loadrite. The 2.75-yard 524K is a utility-sized unit not previously offered.

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Rayco

Rayco C100 forestry mower has a 96-horsepower Kubota turbocharged engine and Super Flow hydraulics with 39 gpm and 5,500 psi, according to the company. Forestry cooling package provides long service intervals. Single grouser track pads measure 16 inches and provide traction and mobility in any terrain, the company says.

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width to 8 feet 6 inches. It will pave as narrow as 2 feet wide. Sprocket drive and automatic tensioning of the track are standard features on all Puckett Pavers. The 580 is powered by a 38-horsepower Kubota diesel.

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Puckett

Puckett added the 10,000-pound model 580 to its 500-Series asphalt pavers, using an 8-foot basic screed to deliver up to 13 feet of paving width while reducing the transport

Neal

Neal's 7,200-pound Model 5500 paver stands out from other path pavers in this size and capability range because the 5500 has slat-chain conveyors to carry material from the hopper to the screed, while others are gravity fed. Conveyors will run automatically, sensing the head of ma-



terial in front of the screed, or they can be adjusted manually. The 5500 paves widths from 5 feet 3 inches to 8 feet 3 inches. The manufacturer claims the machine can be bought at \$15,000 less than comparable pavers.

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Terex

The PR165 utility mill features 12-inch-wide by 36-inch-diameter tires, which reduce ground contact pressure and increase traction. To protect its hydrostatic rotor drive from accidental damage, it includes a built-in relief system. The machine has a 12-inch cutting depth, a "center-mount" design to boost cutting performance, and four-wheel steering with four steering modes.

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Eagle Crusher

The Hybrid Traxx combines diesel electrical power for the impactor and plant with hydraulic operation powering the tracks. Equipped with the next-generation UltraMax II 4144 impactor, the plant features an open loop hydraulic system and single pump operation with "virtually 100 percent" filtration of hydraulic fluid. It has a 42x32-inch feed opening and is equipped with a 42-inch by 40-foot conveyor fixed at a 10-foot discharge height for the direct loading of trucks.

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New Holland

New Holland D95B crawler dozer has a 99-horsepower FPT diesel. Easy tilt-over cab/platform allow quick service access to hydraulic pumps and power-train components. Three track configurations are available: LT/LXT, long track; WT, wide track; and LGP, low-ground pressure.

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WEB EXCLUSIVE

Online Video Showcases Kobelco Excavator

Weighing in a shade below 80,000 pounds, Kobelco's SK350 Acera Mark 8 hydraulic excavator is a Tier-3-compliance upgrade from the SK330LC Dynamic Acera. However, the new emissions-compliant Hino engine in place of the earlier model's Mitsubishi power source is not the only change.

To learn first-hand how much of an upgrade the manufacturer put into the new excavator, editors of *Construction Equipment* visited Calhoun, Ga., the home of

Kobelco Construction. Not only did they conduct an in-depth Field Test comparing the 264-horsepower SK350 Acera Mark 8 to its 247-horsepower predecessor (please see page 34), but they also returned with a video insight of the new excavator from product managers and independent users alike. To watch this in-depth video, please visit the ConstructionEquipment.com website.



INDUSTRY NEWS

Highway-Funding Cuts Threaten Construction Projects and Jobs

Highway construction projects across the United States could suffer as a result of a possible \$14 billion decrease in federal highway funding in 2009, according to the American Road & Transportation Builders Association (ARTBA).

Fueled by the struggling economy and rising energy prices, the Highway Trust Fund faces a multi-billion-dollar drop in revenues that could lead to highway funding cuts of 34 percent in each state, as well as more than 485,000 job losses beginning Oct. 1, 2008, says Matthew Jeanneret, senior vice president of communications and marketing at ARTBA.

To help fix this potential crisis, ARTBA is encouraging Senate to support the Baucus-Grassley-Murray Trust Fund Fix on the FAA Bill, which calls for the restoration of the \$8 billion transferred from the Highway Account to the General Fund in 1998, when Congress deemed that the Highway Account's \$16.5 billion balance that year was too large.

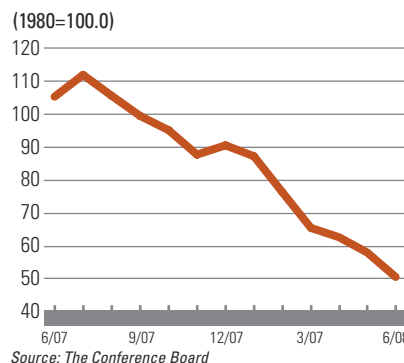
Adding \$8 billion to the Highway Account in 2009 would ensure sufficient funding for the highway program next year, according to Jeanneret. Several organizations, such as ARTBA and the National Surface Transportation Policy and Revenue Study Commission, are also calling for an increase in fuel taxes, a major source of funding for highway projects.

Congress recently rejected plans for a national-gas-tax holiday. The holiday would have suspended federal fuel taxes for 90 days during the summer, further reducing the amount of federal funds available to highway projects.

STATUS & FORECAST CONSUMER CONFIDENCE INDEX

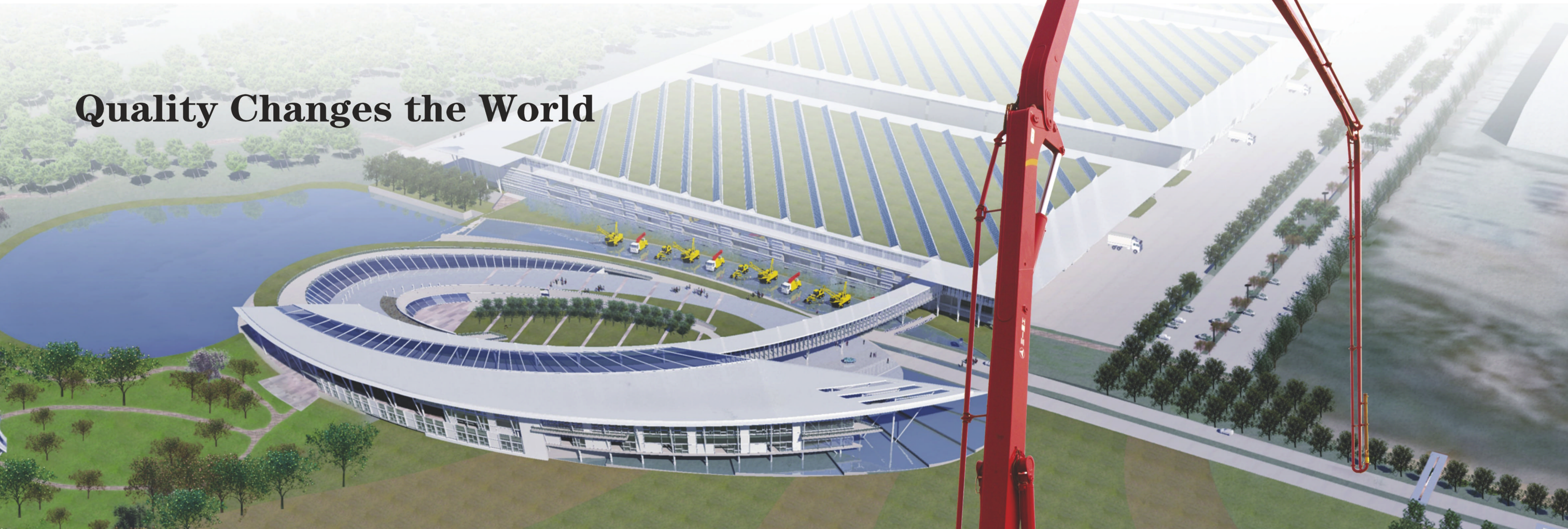
Consumer confidence has fallen to a deep recession level, closely tracking gas-pump prices. Steady gas prices for a month through mid-July suggest no further large drops in confidence soon ahead. The extremely low value overstates consumer concern about the economy because real consumer spending continues to expand. But the lack of buyer confidence does preclude any significant improvement in spending or the economy for the rest of the year. Business confidence remains more buoyant than consumer confidence.

For more analysis, visit [Economic Outlook at ConstructionEquipment.com](http://EconomicOutlook.atConstructionEquipment.com).





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FUNCTION:

- To implement the strategic goals and objectives of the organization
- With the chair, enable the Board to fulfill its governance function
- To give direction and leadership toward the achievement of the organization's philosophy, mission, strategy, and its annual goals and objectives

REPORTS TO: Board of Directors

MAJOR FUNCTIONS/ACCOUNTABILITIES:

1. Board Administration and Support – Supports operations and administration of Board by advising and informing Board members, interfacing between Board and staff, and supporting Board's evaluation of chief executive
2. Program, Product and Service Delivery – Oversees design, marketing, promotion, delivery and quality of programs, products and services
3. Financial, Tax, Risk and Facilities Management – Recommends yearly budget for Board approval and prudently manage organization's resources within those budget guidelines according to current laws and regulations
4. Human Resource Management – Effectively manages the human resources of the organization according to authorized personnel policies and procedures that fully conform to current laws and regulations
5. Community and Public Relations – Assures the organization and its mission, programs, products and services are consistently presented in strong, positive image to relevant stakeholders

REQUIREMENTS:

- Bachelor's degree or higher in Mechanical Engineering or related required 15 years in Mechanical Engineering.
- Minimum 5 years in management experience in a large mechanical engineering enterprise and has generated revenue in excess of 500 million.
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ANNUAL SALARY: Salary and benefits are very competitive.

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JOB TITLE: Chief Technology Officer

RESPONSIBILITIES:

- The Chief Technology Officer's role is to align technology vision with business strategy by integrating company processes with the appropriate technologies.
 - The Chief Technology Officer is also responsible for all aspects to developing and implementing technology initiatives within the organization.
 - This individual maintains existing enterprise systems, while providing direction in all technology related issues in support of information operations and core company values.
1. Responsible for establishing and managing the company's R&D and product development
 2. Build and manage a top-flight technology team and direct R & D and provide visible leadership for the company within the technology community

REQUIREMENTS:

- Education Background: Bachelor's degree or higher in mechanical ,hydraulic, electrical or related degree required
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ANNUAL SALARY: Salary and benefits are very competitive.

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JOB TITLE: Motor Grader Senior Product Manager

BASIC FUNCTIONS:

- Lead and manage Motor Grader Product Development Team.
- Serve as the Project Manager/ Team Leader for coordinating achievement of overall product deliverables and milestones for current and new motor grader product development projects.

RESPONSIBILITIES:

1. As the project manager, recruit new engineers as team members to build design team to achieve design goals
2. As the lead designer, generate super structural scheme of motor grader with incorporating inputs from mechanical, hydraulic, electrical engineers and peer products to meet requirements and preference of customers in North America, gain both quality and cost advantage over peer products; get the scheme approved by director of R&D Department SANY America and proceed with detail design.
3. Make the design/modification package of motor graders deliverable to production line.
4. Assist Sales and Marketing at SANY America and SANY China in evaluating engineering, manufacturing, and marketing information to develop motor grader product plans that are consistent with customer requirements and product line objectives.

5. Assist SANY America Services, SANY China Engineering and Service Departments in resolving current product issues with motor grader imported to the American market.

JOB REQUIREMENTS:

- Bachelor's Degree in Engineering required with emphasis in mechanical, hydraulic, or electrical disciplines.
- Minimum of 8 years of designing and project management experience. Successful candidate must have five (5) years direct experience in motor grader designing, ideally in mechanical and structural design.
- Demonstrated proficiency in completion of major projects from conception to product release.
- Must possess interpersonal skills to be able to work successfully in a strong cross-functional and multi-cultural team environment.
- Ability to work under minimal supervision.
- Ability to travel to other plants and supplier locations worldwide (especially China) as required to meet the demands of assigned programs.
- Ability to use and understand network diagrams and MS project to develop and manage projects through their life cycle is desired.
- Ability to use designing software (Pro/E, PDM, Winchell, etc).

Compensation for this position is very competitive and the benefits are company paid.

RUNNING GREEN

Komatsu to Produce Its First Hybrid Excavator

Komatsu launched a version of its flagship PC200-8 (right), which could be the world's first commercially available hybrid construction machine, according to Komatsu. The company claims an average 25 percent reduction in fuel consumption compared to the standard PC200-8 (43,500 pounds, 148 horsepower). A maximum reduction of 41 percent was recorded at a job where the machine's upper structure turns more frequently.

The hybrid uses a Komatsu-developed electric slewing motor that generates electric power when braking the excavator's upper structure. That power is stored in capacitors, and it assists the engine when the engine accelerates. All components of Komatsu's hybrid system, excluding the capacitor cells, are made by Komatsu.

The PC200-8 Hybrid will only be available in Japan in the near term and is expected to list for about \$253,000.



INDUSTRY NEWS

Crane Industry Demands New Safety Standards

Toppling cranes seem to have grabbed more construction-related headlines in 2008 than rampage backhoe-loaders in Jerusalem or diesel thefts from construction sites. Just when you think we've seen the last deadly crane accident of the year, another one comes tumbling down in New York, Las Vegas, or — the latest — Houston.

The epidemic has caused frustration

among already-furious crane experts who have long insisted that the Occupational Safety and Health Administration update its standards on crane safety, which hasn't seen a major revision since 1971.

In June, public policy mediator Susan Podziba wrote about OSHA's outdated regulations in a New York Times Op-Ed piece following a deadly crane accident in New York.

She says that OSHA hired her in 2003 to organize a team of crane manufacturers, operators, contractors, and

[Visit Construction Equipment.com for more on this story, and listen to experts talk about other problems plaguing the crane industry.](#)

other industry experts to revise the federal crane and derrick regulations.

"Everyone agreed that the current regulations are archaic and fail to address the daily hazards faced by construction workers," Podziba writes. In 2004 the group concurred on a set of revised standards which, according to an OSHA analysis, "would prevent 37 to 48 worker deaths per year."

Those rules have yet to be published. And unless the new crane standards make it into

the OSHA books before Nov. 1, it may be years before they can be amended. White House chief of staff John Bolton announced in March that no proposed rules are to be published after June 1, and no final regulations after Nov. 1 "except in extraordinary circumstances."

The National Commission for the Certification of Crane Operators has pressured OSHA throughout the year to publish the revised rules. In July, the Association of Equipment Manufacturers also called for timely completion of the standards.

The rules recently moved from the House Committee on Education and Labor to the Office of Management and Budget, which has 90 days to review them.

— ANDREW BALTAZAR

MANUFACTURER NEWS

Terex Stretches Paver-Wear-Parts Warranty

Terex Roadbuilding's new Super Paver Wear Guarantee for all asphalt pavers purchased in 2008 significantly extends the warranty period of critical wear components. The standard Terex warranty of one year, unlimited hours, applies to the rest of the paver's components, and the extended warranty covers:

- rubber track for three years or 3,000 hours;
- slat drive chains for three years or 3,000 hours;
- conveyor floor liners for five years or 5,000 hours; and
- slat bars for 10 years or 10,000 hours.

"This extended warranty is our way to show the confidence we have in these wear items and our willingness to stand behind the pavers," explains Mark Hunt, senior director — business development and paver operations for Terex Roadbuilding.

Managers Digest

For more headlines: ConstructionEquipment.com

INDUSTRY NEWS

Most Builders Raising Truck Prices

Most American heavy truck manufacturers say they are raising prices by about \$900 to \$1,600 per vehicle, and put the blame on steeply rising material costs. Price hikes and surcharges are going into effect this summer, according to Daimler Trucks North America, Navistar International, Mack Trucks and Volvo Truck North America.

Prices have soared for commodities essential to truck building, including petroleum, steel, aluminum, copper, and precious metals used in new emissions-compliant diesel engines, Navistar said in a statement. Since the beginning of 2008, steel has increased 100 percent, aluminum by 22 percent, platinum by 32 percent and copper by 23 percent. Crude oil prices have jumped by more than 40 percent. Some of the increases are due to demand for the materials by China and India, and by the weak U.S. dollar, experts say.

"We are acutely aware of the financial constraints that many truck customers are currently facing and have been working diligently to absorb as much of these costs as possible," says James L. Hebe, Navistar's senior vice president, North American dealer operations. "However, global commodity spikes are affecting all manufactur-

ing and we finally, regretfully, must now share those additional costs with the customer."

Price increases for International trucks will vary by model, and will top out at \$1,600, Hebe's statement said. These follow price increases of \$900 to \$1,200 that Navistar announced in January.

Mack spokesman John Walsh says higher materials costs caused it to add a \$900 surcharge in July. Volvo spokesman Jim McNamara says its surcharge is \$950. Mack and Volvo are sister companies. Daimler — which includes Freightliner, Sterling and Western Star trucks — says it was also forced to raise prices, but spokesperson Amy Sills didn't release specific numbers. Kenworth Truck and Peterbilt Motors, both owned by Paccar, declined to comment on their pricing.

Truck prices are up by 20 percent since last year, according to Steve Williams, chairman and CEO of Maverick USA, a hauler of steel, building supplies and other flatbed-carried commodities. He testified before a congressional subcommittee a week before the Navistar announcement.

AUCTION NEWS

IronPlanet Auctions Grow 42 Percent in 2007

IronPlanet (www.ironplanet.com), an online auction company for used construction and agricultural equipment, gained significant market momentum in 2007, with gross auction sales of \$231 million, an increase of more than 42 percent over 2006. Fourth quarter gross auction sales totaled \$84 million, up 75 percent over the third quarter and up 65 percent over the same period last year.

In 2007, IronPlanet strengthened its relationships with key OEM partners, dealers, contractors, rental companies and other equipment sellers, increasing the average auction size to more than \$10 million in gross auction sales in the fourth quarter, an improvement of more than 50 percent over the same period last year.

More expensive trucks add to the list of woes — principally less freight volume and higher fuel costs — that the trucking industry is facing.

"Even with these modest increases," Hebe says, "customers are receiving full value with International trucks that provide superior fuel efficiency, overall performance and exceptional dealer service."

— TOM BERG

JOB SOLUTIONS

Dump Trailers Replace CDLs

Tally Construction uses seven 14-foot Bri-Mar Dump Trailers to move demolition debris and materials without Commercial Drivers Licenses (CDLs). In Tally's Tenafly, N.J., market, moving typical roll-off dumpsters requires a CDL. But pickup-truck drivers with regular drivers licenses can tow the Bri-Mar dumps loaded to less than

10,000 pounds GVW.

"Eliminating the need for a CDL license means that any one of our 23 trucks is always available to pull a Bri-Mar for me," says Peter Jomides, project manager.

The trailer Tally orders has a GVW of 14,000 pounds and weighs 4,480 pounds empty. All have wireless remote controls as well as 44-inch-high sides

and split barn-door gates that extend the capacity to 12 cubic yards. Twin telescopic cylinders, electric brakes, Dexter EZ Lube axles, slipper spring suspension, radial tires and six-foot ladder ramps under the bed are all standard features.

Bri-Mar trailers have actually helped sell Tally Construc-

tion services in upscale neighborhoods near Manhattan. Drivers easily move and park Bri-Mar trailers without damaging paving stones, sprinkler systems or lawns.



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MANUFACTURER NEWS

Breaker Maker Earns High Marks

A leading manufacturer of breaker attachments and systems for the construction and mining industries has been recognized by the provincial government in Ontario, Canada, because of its commitment to apprenticeship training.

Breaker Technology Ltd. (BTI), an Astec company located in the small, rural town of Thornbury, was presented with the 2008 Minister's Apprenticeship Employer Recognition Award in a May 27

ceremony in Toronto. Each year, the Ontario government honors four employers, as selected by a provincial selection committee from a pool of 16 regional finalists.

Today, 20 of BTI's 75 shop employees either completed their training with the company or are current apprentices. Some former apprentices have been with the company for more than 25 years.

Formerly known as Tedyne Specialty Equipment CM Products, the 50-year-old

company pays apprentices during their in-school training and covers their books and tuition. BTI gives apprentices regular raises as their training progresses and annually presents cash awards to the top two graduating apprentices at Georgian College.

Among the companies also nominated for the Ontario government award was mining equipment manufacturer MacLean Engineering of Collingwood, about 10 miles east of BTI.

INDUSTRY EVENTS

AEM and NRWA Host ICUEE 2009



The National Rural Water Association (NRWA) and Association of Equipment Manufacturers (AEM) will host the co-located International Construction and Utility Equipment Exposition (ICUEE) and the H2O-XPO exhibition, scheduled for Oct. 6-8, 2009, at the Kentucky Exposition Center.

"This co-location illustrates the value of association cooperation for the benefit of both memberships," says Megan Tanel, AEM vice president of exhibitions and ICUEE show manager.

ICUEE 2009 and H2O-XPO together will cover more than one million square feet of outdoor/indoor exhibition space and are expected to attract 25,000 industry professionals. Participants will have the opportunity to operate and test both construction and off-road equipment at the two shows.

INDUSTRY NEWS

Never Buy a Stolen Machine

Check a used machine's product identification number (PIN) to find out if it is stolen before you buy it. For \$39.95 (or less, with volume discounts), you can use an e-mail service from the National Equipment Register (NER) to compare a machine's PIN to the nation's most comprehensive database of stolen construction equipment (85,000 machines), plus an ownership database containing 13 million registered machines. Access this service, plus keep up with equipment-theft news on ConstructionEquipment.com's new security site: www.constructionequipment.com/info/ca6568501.html.

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MANUFACTURER NEWS

Skyjack Buys Volvo's Telehandlers, Forklifts

Skyjack finalized its purchase of Volvo's Material Handling Equipment business — formerly the Ingersoll Rand telehandler and forklift lines based in Shippensburg, Penn. The Volvo Material Handling Equipment complements Skyjack's August 2007 acquisition of Carelift, expanding the new Skyjack Telehandler product offering, adding a vertical-mast, rough-terrain forklift, and providing additional manufacturing capacity.

AUCTION NEWS

Qualcomm Stops Selling Direct

Qualcomm, a provider of business-to-business wireless enterprise applications, is transitioning to deliver the GlobalTRACS Suite for fleet management via original equipment manufacturers (OEMs) and dealers only. The new business model is intended to give more equipment users access to benefits of telematics data and fleet management services through an expanded network of OEM and dealer resellers.

"Increased focus on channel distri-

bution can create more interest for telematics products by leveraging the direct relationships dealers and OEMs have with customers in the industry," says Bud Sims, director of business development for Qualcomm Enterprise Services.

Customers that currently have a direct purchasing relationship with Qualcomm for GlobalTRACS may continue to purchase directly from the company or begin to purchase through a Qualcomm channel partner OEM or dealer.

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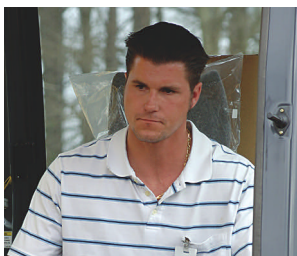
KOBELCO SK350LC

Cover Story: **FIELD TEST** FIELD TEST FIELD TEST FIELD TEST

By MIKE ANDERSON & WALT MOORE, Senior Editors

On-Site Testing Reveals *New Kobelco's Strengths*

Kobelco's SK350LC Acera Mark 8 hydraulic excavator goes bucket-to-bucket with its predecessor in a *Construction Equipment* field test



Michael Sager, a principal in **T. M. Sager Grading, Snellville, Ga.**, feels at home in the seat of a big hydraulic excavator. Sager's firm specializes in site preparation and utility installation.



Greg Bair, president of **Greg Bair Track Hoe Service** in **Overland Park, Kan.**, specializes in demolishing concrete bridges (using large excavators with breakers) in an ecologically sound manner — to the point of crushing debris to 1-inch minus and giving it away to save haul-away costs and to preserve landfill space.

Sometimes, after choosing the flattest spot around to refuel machines during an on-site fuel study, you then discover that the diesel bulk tank is half a mile away — or at least seems that far when lugging five-gallon cans from the tank, to the scale, then to the machine. But when *CE* editors worked with Kobelco to compare the performance and design of the new SK350LC hydraulic excavator with those of its predecessor, the SK330LC, we were more fortunate. The

bulk tank was adjacent to a large concrete pad (perfect for refueling), plus the pad was close to our test site. And as it turned out, the fuel study was among the most revealing of our comparative tests, which also included an analysis of trenching, truck-loading, lifting and swing-torque performance.

The site of our comparative study was Kobelco's Calhoun, Ga., manufacturing plant, where the company builds seven of its excavator models. Calhoun was chosen as the test



The test machines, both low-hour units that were checked for pertinent specifications before the comparisons, used standard digging arms (10 feet 10 inches) and identical heavy-duty, 48-inch-wide, 2-cubic-yard buckets.

Photos: George Proentner®

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TEST FIELD TEST FIELD TEST FIELD TEST

TEST SET

- New Model: SK350LC Acera Mark 8
- Type: Hydraulic Excavator
- Operating Weight: 79,600 lb.
- Max. Dig Depth (std. arm) 24 ft. 10 in.
- Horsepower (net) 264
- List Price (w/std. equip.) \$302,105*
- Replaces: SK330LC Dynamic Acera

*List price includes base machine with heavy-duty undercarriage, 21.3-foot heavy-duty boom, 10.8-foot heavy-duty digging arm, and 31.5-inch track shoes



The amazing power of hydraulic force is evident as the SK350LC, positioned on a 25-degree cross-slope, swings a nearly 20,000-pound test weight 90-degrees uphill during the swing-torque test.

site, because the two required machines were available there, and because a large open field adjacent to the factory allowed for long trenching runs.

To make testing as unbiased as possible, two independent operators ran the machines during the comparisons: Greg Bair, president of Greg Bair Track Hoe Service in Overland Park, Kan.; and Michael Sager, a principal in T. M. Sager Grading based in Snellville, Ga. The Kobelco crew on site included platform manager Reece Norwood;

eastern-region product specialist Troy Hitchcock; director of marketing Edgar Chavez; and brand marketing manager Paul Golevicz. We conducted the test during two days in early April (one day soggy and chilly; the other, fortunately, drier and pleasantly warm).

Results of the comparative tests and our procedures are detailed in sidebars throughout this report, but here's the thumbnail version of our findings: When trenching, the two machines basically worked to a draw, but the new model showed a significant advantage in fuel-efficiency. When loading trucks, the new model showed a modest advantage both in productivity and fuel-efficiency; over-side lifting was a draw, but the new model delivered better numbers for over-end lifting and for swing-torque.

New engine, heavier structures

When contemplating a replacement for the 77,800-pound SK330LC Dynamic Acera, Kobelco was obligated to equip the replacement model with a Tier-3-compliant engine. But along with meeting that obligation, says Kobelco's Norwood, the company also wanted the replacement model to exhibit enhanced "controllability, durability and maintainability."

Thus, in the SK350LC's engine bay resides a new Tier-3-compliant, 7.7-liter Hino J08E-TM diesel engine, which develops 264 net horsepower. This engine replaces the SK330LC's 7.6-liter Mitsubishi engine, which was rated at 247 net horsepower. The new engine, unlike its electronically governed predecessor, uses a common-rail fuel system and a cooled-EGR (exhaust-gas recirculation) system. According to Kobelco's Hitchcock, Hino Heavy Industry Co. was established in 1942 and has been part of Toyota Motor Corp. since 1966, becoming a Toyota subsidiary in 2001.

An integral part of the new engine installation is a refined cooling package. The radiator, hydraulic-oil cooler, and the charge-air cooler are positioned side-by-side in the left-rear compartment and can be serviced individually if the need ever occurs. Similar coolers for the SK330LC were in the same location, but stacked one in front of the other and had to be swung out for cleaning. In addition, debris screens positioned in front of each new cooler can be easily lifted out from the top for cleaning. According to Kobelco, since all three coolers draw the same ambient air, they are actually smaller than those used for the SK330LC.

Along with more horsepower and a more efficient cooling package than its predecessor, the new SK350LC also reflects a more robust structural design. According to Norwood, the SK330LC offered a choice between a standard-duty and a heavy-duty boom and arm — the heavy-duty versions designed for severe-service applications, such as quarry loading and sustained hydraulic-breaker work. But the SK350LC no longer provides this option, using instead the heavy-duty components as standard equipment. To compensate for the added weight of these components, the SK350LC is fitted with a heavier counterweight.

Like its predecessor, though, the new model uses Kobelco's vertical-bar rock guard, which protects the backside of the stick from abrasive material, and it, too, offers an optional long stick (13 feet 7 inches), as well as mass-excavator and long-reach front ends. Buckets also remain the same for the two machines.

Also heavier and more robust for the new model are both its undercarriage, with beefier components throughout; and its carbody, which not only uses thicker material than its predecessor, but also has the ends of its support beams mounted farther toward the



The nearly 20,000-pound test weight (an excavator counterweight) provided a reasonable challenge for the test machines.

Lifting Comparison

With an 8.75-metric-ton (19,250-pound) counterweight chained to the lifting eye of the bucket, and with the machine in its heavy-lift mode, the operator slowly increased the machine's lift radius (the distance from the center of the load chain to the center of the swing bearing) until the machine's track rollers began to lift off the links (when lifting over the side), or until the rear-most roller began to lift off the link (when lifting over the end). We then compared maximum lift radii machine-to-machine. The 2-percent difference between the machines in over-side lifting we considered negligible; in over-end lifting, however, the SK350LC did exhibit nearly a 9-percent advantage.



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ends of the track frames. Says Kobelco's Golevicz, the redesigned carbody enhances fore/aft stability and further compensates for the heavier boom and stick. In total, the SK350LC weighs about 2,000 pounds more in standard trim than its predecessor.

Refined hydraulics

The SK350LC's hydraulic refinement includes the use of slightly larger main pumps that provide an extra 20-plus gallons of flow per minute (155 gpm, compared to the SK330LC's 134 gpm). The SK350LC, as did its predecessor, employs Kobelco's Intelligent Total Control System (ITCS), which, says Golevicz, coordinates engine and hydraulic functions for maximum efficiency.

The overall design of the hydraulic-control system for the machines, however, does differ. The SK330LC used Kobelco's NeuralNet Command System, which employed "fuzzy logic" that, according to Kobelco, allowed the system to recognize various tasks and to automatically respond by adjusting the machine's performance to the job at hand.

Basically, the SK330LC defaulted to its manual mode (which delivered maximum output), unless the operator pushed the "Assist" button to activate the NeuralNet system. When activated, the NeuralNet system used its fuzzy logic to analyze what task the operator was performing, then adjusted hydraulic and engine functions to help accomplish the task most efficiently and comfortably — whether digging, leveling, scattering stone or using the bucket for compacting. In addition, the SK330LC's breaker mode allowed for setting the hydraulic flow rate from in the cab to suit the



We estimated that the material on site weighed around 2,700 pounds.

Production Trenching

Equipped with standard digging arms (10 feet 10 inches) and identical heavy-duty, 48-inch-wide, 2-cubic-yard buckets, the test units dug to 10 feet and a bucket-width wide for 30 minutes in their heavy-digging mode. The operators then switched machines and repeated the process. Total trench opened exceeded 550 feet. Since both machines worked an hour, measuring the two respective trenches for each and calculating the excavated volume yielded a per-hour production number. Comparing these numbers, we noted an approximate 5-percent differential, which we consider too small for making judgments about machine productivity; variability in the particular machines used, in soil conditions and in operator performance could easily push the numbers in the opposite direction on another day. Thus, we concluded that the productivity of the two units was essentially equal.

To analyze fuel efficiency, we filled each machine's tank to the bottom of the debris screen before the test run, making certain that each machine, in turn, was in the identical position on the refueling pad. We also checked the temperature of the fuel in the freshly filled tank, then again immediately after the test runs. (Fuel heating — and subsequent expansion — occurs when that portion of the fuel supplied to the engine for cooling and lubricating fuel-system components returns to the tank). Our observation was that the SK350LC's fuel consistently showed a greater (but modest) rise in temperature, perhaps the result of the machine's common-rail fuel system. Using an industry formula, we calculated an approximate fuel-expansion differential between the two units, and that calculation, on average, resulted in our adding 0.42 of a gallon to the amount of fuel (weighed across an electronic scale) actually required to re-fill the new model's tank after a test run.

Even with this adjustment, however, our data indicated that the SK350LC exhibited an 18-percent advantage in fuel efficiency when trenching, that is, the machine moved 18 percent more material per gallon of fuel than did its predecessor.



The concern that common-rail fuel systems run hotter than conventional systems prompted our fuel-temperature checks, with both an infrared sensor and digital thermometer.

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breaker's requirements.

Working modes for the SK350LC, however, seem more straightforward: an H-mode for heavy digging; an S-mode for potential fuel savings when performing general earthmoving; a B-mode that provides one-way auxiliary flow for a breaker; and an A-mode (auxiliary) that allows two-way/two-pump flow for demolition tools. A standard-equipment auxiliary valve allows switching between the A and B modes from the cab, but the auxiliary piping and controls are optional (although tapped blocks to facilitate piping installation are provided on the boom and stick). In addition, an optional "independent-flow circuit" (using a dedicated gear pump) provides flow for multi-function attachments, such as thumbs and twist buckets.

The new model (as did its predecessor) also has no-time-limit, heavy-lift and power-boost functions. When activated, these functions provide an increase of 10 percent in main hydraulic pressure, and the heavy-lift system also reduces hydraulic flow by 10 percent for added control. Also retained from the predecessor machine's design is an operator-selected independent travel mode, which dedicates one of



The SK350LC's batteries are easily serviced from ground level, along with the air cleaner. The new side-by-side coolers are smaller than those of the predecessor model and can be individually serviced. The air-conditioning condenser is positioned some 5 inches away from the surface of the other coolers so as not to impede airflow.

the machine's two main pumps solely to the travel system in order to maintain constant travel speed even when another hydraulic function is activated.

Overall, says Golevicz, enhanced controllability was a key factor in the design of the SK350LC's hydraulic system. The new model, he says, builds on the already-precise system in the

SK330LC (by providing even tighter valve-spool tolerances, for example) to ensure that the new model performs its hydraulic functions smoothly. In fact, says Golevicz, a design goal for the SK350LC was to enable the machine to be equally adept at production earthmoving and fine grading, the latter ability including establishing both the trench bottom and surface contours.

Swing-Torque Comparison

With the machine positioned on a 25-degree cross-slope and the 19,250-pound weight chained to its bucket, the operator swung 90 degrees uphill, starting with the weight in front of the tracks. If the swing was successful, then the lift radius was increased and the process repeated until the machine could not swing the weight. By measuring and then comparing the maximum lift radii machine-to-machine, we determined that the SK350LC demonstrated a 7-percent advantage in swing torque, compared to the SK330LC's performance.

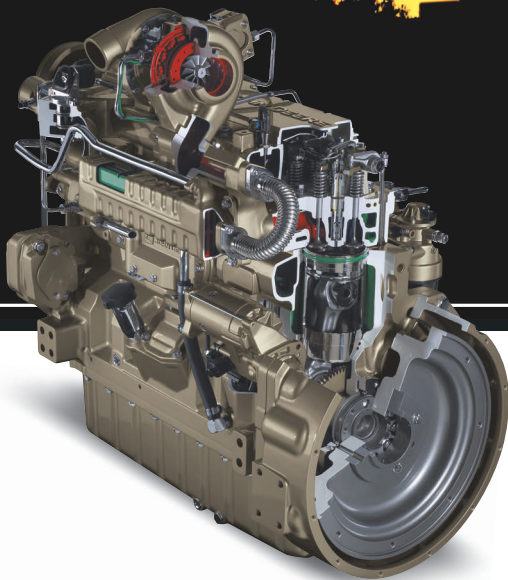


The SK350LC remained impressively flat-footed during the swing-torque test.

Simpler routine maintenance

Also high on the list of design objectives for the SK350LC was simplified, more convenient routine maintenance. To that end, Kobelco has designed in ground-level access to all routine service points, except for the engine-oil and swing-motor dipsticks and for the bank of five grease zerks on the boom. The batteries are located in a left-side compartment (with the air cleaner), and at the right-front corner, where the SK330LC housed its batteries, the new model has a conveniently accessed tool box.

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Refinement in the SK350LC's operator station includes relocation of all switches, throttle and engine-start to the right console; ergonomically redesigned joystick controllers; new monitor with sunshade; adjustable armrests (both vertical and incline); larger foot pedals; front glass that can be raised and stored overhead with one hand; and a removable (and washable) floor mat.

Also accessible from ground level are the new remote-mounted filters (in the right-rear compartment) for engine oil, fuel and pilot hydraulics. Greasing chores have been simplified as well, because, except for the bucket pins, all pivots in the digging mechanism require grease only at 500-hour intervals — the result of new bushings and a new grease-retention system. The hydraulic-oil-change interval, under typical operating conditions, is 5,000 hours if the system is maintained with factory-fill oil (Shell Tellus Premium).

Professional opinions

Both our guest operators own a number of late-model Kobelco excavators and are, therefore, probably more sensitive than most about picking up on refinement in the new SK350LC, compared with the SK330LC. Bair several times used the word “predictable” to describe the new machine’s hydraulic controllability (when swinging back to the trench or aiming for the truck body, for instance), saying that the new model’s hydraulic response was, overall, smoother and more pre-

cise. He quickly added, though, that the differences were subtle, because the SK330LC, in his opinion, remains an excellent performer. He did, however, give the edge to the new machine in the areas of stability and cab comfort.

For Sager, the standout qualities of the SK350LC focused mainly on the machine’s hydraulic power and speed. While he said that the differences in digging performance between the two machines don’t exactly jump out at you, the new machine, nonetheless, exhibits more arm-in power and, in his opinion, also digs faster than its predecessor. He noted, in particular, the SK350LC’s over-end lifting capability, saying that, in his opinion, the new machine definitely seems stronger in this application. And the numbers indicate that his perception is correct. **CE**



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Production Truck Loading

With the machines configured as for the trenching study, the operators dug from a shallow trench, then swung approximately 90 degrees to the truck. Each operator used each machine to load eight trucks. The trucks — tandem-axle Mack Granite rear-dumpers hired from Northwest Georgia Paving — required six passes to fill. We timed the machines as they worked, then the trucks were weighed on a certified off-site scale to determine payload. We checked fuel in the same fashion as for the trenching comparison. Our test data indicated that the SK350LC was, on average, about 8.5 percent more productive in this application, and that it exhibited a nearly 10-percent advantage in fuel efficiency.

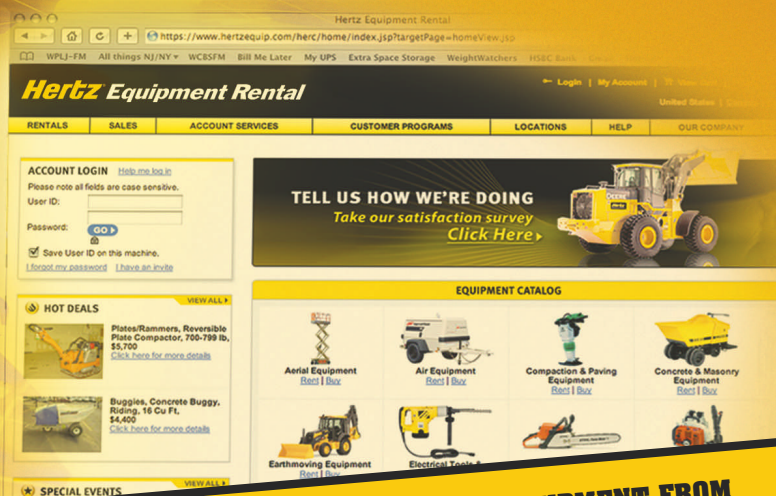


To keep the truck-loading comparison moving, we used four trucks, which traveled off-site to an official truck scale to determine payload.

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Mixed Fleet, Mixed Signals

Managers of heterogenous fleets with varying proprietary machine-management systems struggle to collect the data they need

An equipment manager's life would be much easier if he could go to a single data collection point and extract data on the Caterpillar excavator he has at one work site, the John Deere unit at another location, and the Komatsu backhoe that has been working on a pipe-laying project just across the state line.

The data needed from each machine are the same: it could be machine location, idle time vs. operational time, preventive maintenance schedule, and fuel consumption, for example. The prob-

lem is that each manufacturer has proprietary systems unique to their machines that protect their intellectual property. Simplified, that means Cats "talk" a different language than Deeres, which makes complications for humans.

The language machines use to transmit information is called communications protocol. When fleet managers have to scramble from one screen to another just to collect the same data from each OEM's piece of equipment, it becomes "very cumbersome," says Stan Orr, executive director of the Association of Equipment Management Profession-

Special Report: Communication Protocol

als (AEMP). “There are really good systems out there for tracking the health of a machine, hours, location and fuel consumption, but for an asset manager to collect that data, he almost has to manually transfer the data over to an Excel-type spreadsheet format and track it that way.”



Fleets must often rely on manually collected data that will later be input into the organization's asset-management system.

Boh Bros. does manually collect data, according to Chris Ryan, vice president of equipment. In order to obtain weekly hours, Ryan has fuel trucks that visit about 60 percent of the jobs, but for the others he relies on hour-meter readings reported by the jobsite.

“Are we in the space age? Not so much,” Ryan says. “We have a lot of things we would like to do better. We’ve had four different manufacturers of fuel distribution equipment try to capture hours off a machine and the gallons of fuel introduced into the machine. That has been a struggle to get something that is reliable and something that did, in fact, what it was purported to do.” One software-development company has a name for all the jumping around that goes on during the chase for data.

“We call it the swivel-chair technique,” says Will McFadyen, president of McFadyen & Associates. “The problem is that the same data

is needed by multiple systems at the contractor level. Most end-users face the difficulty of getting that information in a hands-off format that they can use routinely. Without aggregated data in a useable format, the contractor is at a disadvantage than he would be if that data was available.”

Multiple systems could include a homogeneous system that the contractor has built to provide equipment management or billing capacity, a third party application for a maintenance system, or a system to measure productivity.

Manufacturers, who have invested substantial funds in developing technology that make fleet managers more proficient at asset management, have come up with various products that managers of mixed fleets can use. For example, Caterpillar’s Product Link hardware can be retrofitted to either a Cat machine or installed on machines of other manufacturers. The hardware package includes an antenna, electronic radio, and connecting wiring that gathers and wirelessly transmits data. The software that is used with Product Link is available by subscription through Caterpillar dealers.

John Deere late last year expanded capabilities of its JDLink Machine Monitoring System by adding three new optional levels: Advanced, which gives all data from the JDLink standard level, plus percentage breakdown of idling hours vs. working hours and dashboard alerts, such as low fuel level warnings; Ultimate that captures machine pressure, temperature and speed that can be downloaded onto a spreadsheet for later analysis; and Direct level, which lets fleet managers download data directly from the machine rather than from the Internet.

“The trouble with that is that such products may or may not be able to capture all the data,” McFadyen says. “They can probably capture hours and location because that processing can be done on the telematics unit itself. They may not be able to read bus codes off a different make and model.”

It’s unrealistic for the off-road industry to create a universal bus format that would allow contractors to read data directly off the bus of

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Special Report: Communication Protocol



Even when aggregated into a turnkey system, an individual machine's data may have to be reformatted in order to be merged and evaluated with data from other data-collection systems.

any data system, he says. For telematics to come up with a common interface to the bus, he explained, would require substantial re-engineering of the products and the entire process could take years, literally, to get it done. "We all have to take baby steps to get where we want to go.

McFadyen suggests that manufacturers might extract information from their own brands via telematics, then make it available through their applications programming inter-

face, or API.

"API can be used to hook into that website/web service to get the data out," he says, "but the data may not be in the same format as it was when it came off the bus. The contractor can still consume the data he needs from that Cat equipment, and telematics provides the data; as opposed to the tethered solution, where you extrapolate the data off the bus."

Despite the latest data-capturing technology, what surprises many OEMs and telematic providers is the wide-sweeping array of data an equipment manager must have to operate his fleet efficiently and profitably, says Dick Branigan, equipment operations manager at John R. Jurgensen Co. Among those data needs are parts management, oil samples, emissions management database, asset management history, depreciation, and regulatory compliance — not to mention the basic machine data such as run time, idle time, unit location and fuel consumption.

The off-road industry may have a possible advantage to solving this communications problem: It does not have to reinvent the wheel. On-road trucking faced the same communications protocol issues years ago and solved the problem. The difference between trucking and the off-road industry, however, is

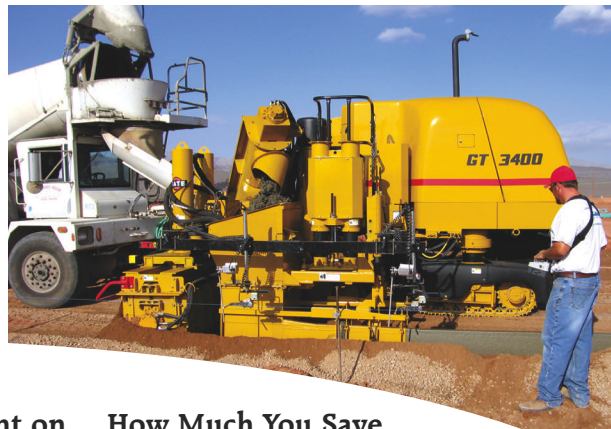
AEMP Hosts Technology Summit

The Association of Equipment Management Professionals met with several major equipment manufacturers earlier this month in its first Technology Summit in Chicago. Caterpillar, John Deere, Komatsu, Volvo and Manitowoc were invited to participate in order to begin a dialogue on how to integrate the various communications technologies. Future meetings will bring in software providers.

AEMP has identified the following obstacles to be addressed:

- OEMs have invested considerable resources in their respective technologies. To ask OEMs to redesign their existing hardware and software is not a viable option.
- Currently, fragmented information from diverse sources provided by separate web-based servers or stand-alone software provide little or no provision to import data into end-users' fleet management software or enterprise system software.
- Asset managers have different needs for integration, and OEMs likely have varying opinions on what can be shared if compatibility issues were to be resolved. In order to look at the scope of the problem, an in-depth discussion of the data streams involved in modern fleet management is important.
- There is no standardized file format currently being used by the OEMs.
- There is no electronic data interchange (EDI) format standard. Widespread adoption of a standard file format would certainly help solve this problem.
- Asset managers use a variety of fleet management or enterprise software programs that are not often compatible with OEM software or difficult to integrate.

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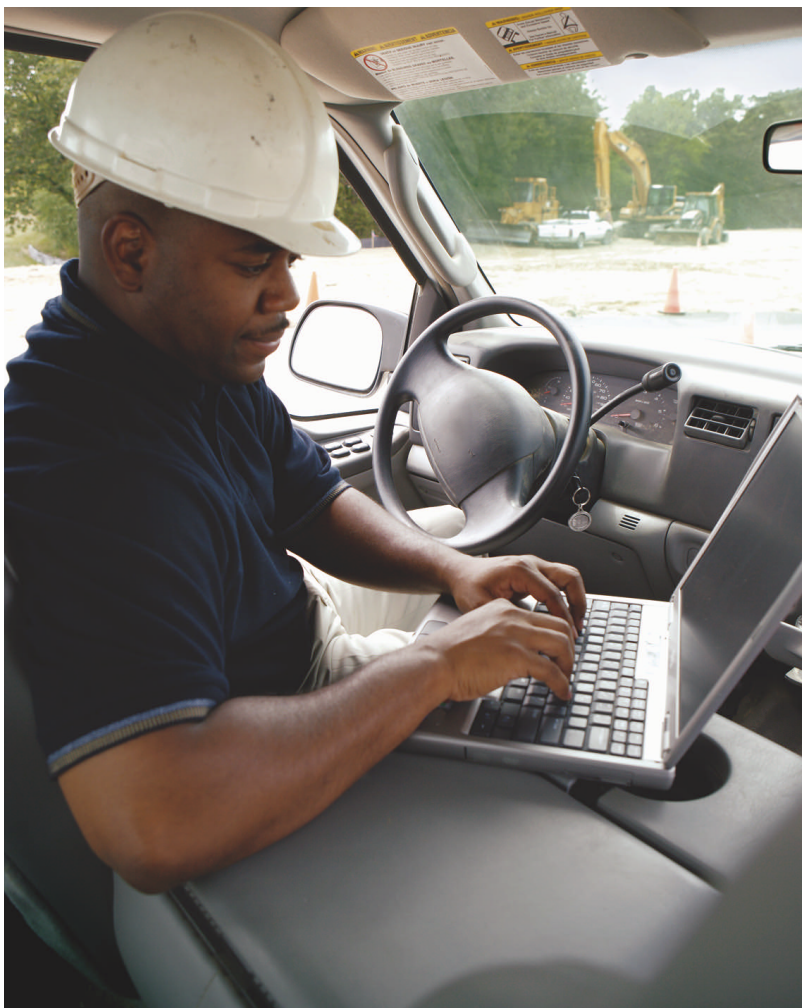
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The obvious benefit to a uniform protocol is the ability to quickly, easily — and remotely — access fleet data.

that trucking was under federal mandate to come up with a solution. The off-road industry is under no such requirement.

Reaching a solution that every off-road industry segment can accept (OEM, telematics providers, fleet owners, distributors) could take years, but some of that time could be whittled down if technology used in the trucking industry can be transferred to the off-road industry.

“The trucking industry standardized a bus technology,” McFadyen says. “They also use APIs to consume data provided by telematics. The telematic units have a common interface to the bus. It is a system that has a standard bus reader that enables it to plug into the bus. At some point, there might be opportunities for a common file format in the off-road industry. But right now I don’t think that is a realistic goal.”

The Maintenance Council of the American Trucking Association was one of the groups that led the trucking industry in resolving the communications protocol challenge.


“We have study groups that tackle different problems,” says Jack Poster, one of TMC’s service managers. “Those groups create a task force that brings in different parts of the trucking community from OEMs to fleets to suppliers and even owner operators.”

The diverse group succeeds, Poster says, because the members “put away their insig-nias” and do the work for the benefit of the entire industry.

After that, TMC publishes a Recommended Practice and sends it to TMC members. Nonmembers can use it as well, he says, because “the RPs are from the industry, not one particular company or organization.”

Poster suggests several communications protocol solutions that could be applied to off-road applications. One, 1201, was written with the Society of Automotive Engineers and deals with serial data communications between microcomputer systems in heavy-duty vehicle applications that is meant to promote serial data communications compatibility among microcomputer-based modules.

Another, 1214, provides guidelines on event data collection, storage and retrieval. This RP “delineates commercial vehicle event data collection, storage and retrieval to ensure compatible event data parameters are generated by all vehicles,” Postner says. A third possibility, 1212A, recommends PC-to-user interface for electronic engines. This provides a common foundation for service tools and software packages used to diagnose, program and repair electronic engines used in commercial vehicles.

Boh Bros.’ Ryan says he thinks the evolution of technology eventually will solve the problem for the off-road market segment. “It’s like water finding its natural level between two containers, he says. “I think there will be some common things that 90 percent of us (contractors) want. Once that common need has been identified, a solution can be found.” 

This article first appeared in Equipment Manager, the official publication of AEMP.

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FLD-SD Has Old-School Style, **Modern Mechanicals**

The last of Freightliner's long-running FLD series proves as pleasant to drive as anything our editor has handled

You like to drive? This is a truck for you, especially if you've got some years and miles behind you, because Freightliner's FLD-SD daycab tractor is "old school." It's the last FLD the builder makes, and aside from its some traditional but still highly serviceable components, it was a pleasure to operate, with a powerful and strong-sounding Detroit engine and a smooth shifting Eaton Fuller 13-speed transmission. It was adorned with lots of chrome and polished metal, and it had a fancy interior. It turned out to be one of those trucks that I didn't want to return.

The FLD-SD (for FreightLiner, D-series chassis, severe duty) uses an aluminum cab that dates to the 1980s, with squarish lines and an upright V-shaped windshield with two pieces of flat glass, the kind fleet managers used to favor because they were cheap to replace after being dinged and cracked. The high

cost of fuel has caused builders to go to curved aerodynamic surfaces, including windshield glass, but fuel economy is less important in many construction-oriented applications, so the old design can still make sense.

So does the forward-thrusting nose, which is emphasized by this tractor's setback front axle. There's plenty of room under there for the engine — a Detroit Diesel Series 60 — the radiator, and all other accessories needed to keep it and the truck working. The tens of thousands of FLD road tractors that once roamed North American highways (many still do) have flat grilles but sloped and rounded hoods, while the hood on the SD is higher and more squared in front, suggesting the tougher frame and other components that qualify it for rough service.

The interior is straight out of the highway-type FLD, with a high two-piece instrument panel whose right wing cants toward the driver.

It has an array of switches and gauges that complement the speedometer, tachometer, and engine-condition and air-pressure gauges directly ahead on the main panel. Yeah, the headlight switches are at the base of the wing panel, almost hidden behind the

Traditionally styled FLD-SD is a work tractor that's at home pulling a heavily laden trailer on pavement, gravel or dirt. Its setback steer axle aids maneuverability and causes the squarish hood to jut forward, almost proudly. The radiator core is 1,750 square inches for proper cooling.



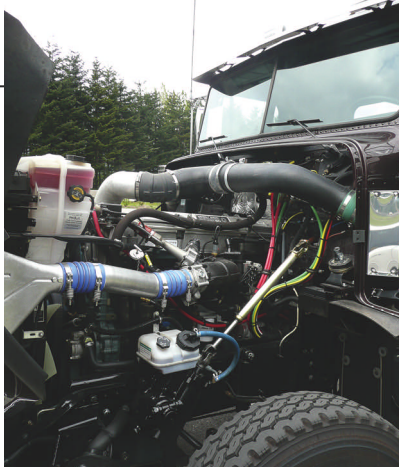
steering wheel, but they didn't bother me as they have in the past because it was a sunny day and I seldom needed to use them.

And the panels were laid over with a handsome faux-wood facing that contrasted nicely with the chrome bezels circling the gauges. I don't recall ever thinking of an FLD's instrument panel as attractive, but I immediately became fond of this one. Freightliner has long since built the more modern Century and Columbia, and even they have a replacement in the new Cascadia. All have wider, smoothly sculpted cabs and all come in non-sleeper day-cab versions. But for construction and other heavy vocational duties, the FLD-SD is still the main one Freightliner offers.

One reason it's still in production is that Freightliner builds them for the U.S. Army, which since 1989 has bought thousands of olive-drab and dessert-camo-colored tractors and dump trucks, and I wrote about them several years ago. All of those are powered by Detroit Series 60s, but with pre-'07 specs. Overseas, including war zones, the military feeds most trucks and aircraft with JP8 fuel, which is closer to kerosene and has too much sulfur for civilian trucks' diesel particulate filters. So military versions don't meet current emissions limits, but that becomes less important when bullets are flying and bombs are exploding.

The Series 60 in this black tractor was '07-legal, so its fuel and combustion systems were high-tech and its stack was dominated by the burly DPF. But meeting still tougher exhaust emissions limits in 2010 will require new approaches. So the Series 60 will be phased out by the end of '09 while the new "DD" series, starting with a DD15 that's now available, is phased in. But you won't see the DD in the FLD-SD, as its days are numbered, too (more on that later).

The Series 60 remains a capable engine, and in '07 form has a muted snarl that's pleasing to the ear. It's standard in this chassis, while the lighter Mercedes MBE 4000 and the heavier



Detroit Series 60 is powerful and snarls like no other EPA-'07-legal diesel. It and a smooth-shifting Fuller 13-speed transmission made the vehicle a joy to drive.

Caterpillar C15 are optional. This Detroit had 450 horsepower and 1,650 pounds-feet of torque seemingly eager to get to work.

In the back lot of Freightliner's test center in Portland, Ore., I fired it up and backed the tractor under the nose of a 48-foot Transcraft Eagle aluminum-and-steel flat-bed trailer. A crew had loaded it with big-old concrete blocks that weighed it down and gave us a gross combination weight of about 78,000 pounds.

I gave the rig a visual once-over and got on the road, or streets, as is the case in Portland's Swan Island industrial section, where Freightliner is headquartered. Leaving there involves a short but steep upgrade on Channel Avenue until the exit onto International Drive; the big Detroit pulled strongly in 6th and 7th gears, which I split to keep revs below 1,600 to 1,700. I watched the right-hand mirror while on the ramp to be sure I was keeping the trailer's tires away from the curb as I downshifted to 5th and again played with the splitter (what fun!). Then it was downhill on the four-lane street until the on-ramp to



A nicely appointed interior featured faux-wood-faced instrument panel with enough gauges, switches and controls to keep any driver fully informed and in complete control.

SPECIFICATIONS

Tractor: 2008 Freightliner FLD-SD, severe-duty conventional-cab non-sleeper, aluminum cab, fiberglass hood, 120-inch BBC

Engine: Detroit Diesel Series 60, 14 liters (854 cubic inches), 515 hp @ 1,800 rpm, 1,650 lbs.-ft. @ 1,200 rpm, w/Jacobs Engine Brake

Clutch: 15.5-in. Eaton Easy Pedal

Transmission: Eaton Fuller RTLO-19513A, 13-speed overdrive

Front axle: 14,600-lb. Meritor FG-941, on 14,600-lb. taperleaves

Rear axles: 40,000-lb. Meritor RT-40, w/locking differentials and 3.73 ratio, on 46,000-lb. Airliner air-ride

Wheelbase: 221 inches

Brakes: Meritor S-cam w/Meritor Wabco ABS

Tires and wheels: Bridgestone 11R24.5 on Alcoa polished aluminum discs

Fuel capacity: 140 gallons

Trailer: 48-ft. Transcraft Eagle aluminum-steel composite w/10-foot-1-inch spread tandem

Hands-On Trucking



A long wheelbase on this tractor would make the setback front axle legally workable even in some bridge-formula states, but a straight-truck version would need a forward-set axle. This one's a daycab, but several sleepers are available.



Diesel particulate filter snares minuscule pieces of soot and doubles as a muffler. Detroit had set up its engine controls so the DPF regenerated too often, using more fuel than necessary; programming has been rewritten for less aggressive activity.

I-405, and within a mile or so I swung eastward on I-84.

While making any appreciable amount of power, the Detroit emitted a mellow bellow that was reminiscent of the old, less muffled days. Its low-frequency growling makes it the nicest sounding engine you can buy right now; it's

the next best thing to a 4- or 5-inch-diameter straight pipe, if you could have one, which you legally cannot because that would require removing the particulate filter.

But most diesels built since October '02, when really tough EPA rules went into effect, have had more than their share of problems, according to fleet reports at industry maintenance meetings.


While many '07 models deliver better fuel economy than before, Detroit's use somewhat more. This is due to frequent active regenerations to clean out the DPFs, during which fuel is squirted into the exhaust stream to create needed heat. Testing has shown that fewer regens are needed, and Detroit says it has cut back on the "aggressive" programming of electronic controls that made them happen. This should improve economy by 2 percent or more.

An average driver might not be aware of such details unless he or she owns a truck, and ponders them while going down the road. By now I was eastbound on I-84, which follows some sweeping curves whose radii soon grow greater. As traffic thinned I went from 7th to 8th, the splitter box first in Direct and then in Overdrive as the Detroit willingly picked up the pace. I had noticed the speedometer needle seemed to be stuck down at 35 and 40 mph, but at an indicated 60 mph I was passing everything and it occurred to me that I was moving a lot faster than 60. Slow 'er down, boy, I told myself, and eased up on the accelerator to go with the traffic flow. Obviously the speedo was miscalibrated, and I wrote it up later.

On 84 I proceeded up the wide Columbia River Gorge — a masterpiece of scenery that everyone should see at least once — and after an enjoyable 40 miles I pulled into the Multnomah Falls rest area, which sits between the east- and westbound lanes. Here I have a routine: I proceed to a turn-around at the area's east end and put the tractor through a brief maneuvering test. If I can make the sharp left-hand turn without dragging the trailer's tires over the curb, the tractor "passes."

This time the tire sidewalls didn't even kiss the curb — pretty good, as the trailer had a wide-spread tandem whose second axle was at the vehicle's very rear. The tractor's setback steer axle allows room for the wheels to cut tightly toward the frame, making for a sharp cut leftward at the end of the maneuver. Weight laws in some states might require a forward-set steer axle, especially for straight trucks, but this tractor's long (for a daycab), 221-inch wheelbase makes this one usable even in bridge-formula states.

On the way back to Portland, I considered that although it's a "work truck," this FLD-SD was comfortable and smooth riding. And, notwithstanding the engine's guttural utterances and wind noise caused by old-style mirror brackets and flat sheet-metal surfaces, it was rather quiet. If pulling a lowboy or equipment trailer — a likely job for this tractor — such considerations are less important because much time would be spent at jobsites, loading or unloading machinery. There a driver might pause to admire this dated but still graceful conveyance.

If he or his boss wants to buy another, he'd better act within the next year and a half. Freightliner won't engineer any of the 2010-legal diesels into this model, so the FLD-SD will go out of production by the end of '09. It will be replaced by a new vocational model; Freightliner isn't saying what parts it will use, what it will look like or what it will be named. But it won't be based on the M2 series, because although that has heavy, V-for-vocational versions, some buyers perceive M2s as medium-duty trucks. The new model will be strictly Class 8, and here's hoping it'll drive as nicely as this one. 

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How to Keep the Right Parts on Hand

Managers must determine adequate inventory without sacrificing cash efficiency

Parts management is a matter of balance: balancing parts inventory with shop needs, and balancing the need to reduce inventory costs with vehicle availability, for instance. As vehicle availability increases, inventory costs rise sharply. On the other hand, if large inventory is aimed at a high vehicle-availability rate, there won't be any cost reduction.

As one fleet manager recently said, "it's like trying to focus on a moving target."

Fleet-management consultant Roger Thompson, vice president, management, fleet and facilities with Bucher, Willis & Ratliff Corp., has identified certain indicators that tell him how well parts inventory is being managed.

Among the numerous factors he considers, he has developed some generalities that can be applied to fleets across the board no matter what industry they serve.

"Among the first things we look at is the lion's share of the parts on hand," Thompson says. "It's really the dollar value of the parts issued from stock divided by the dollar value of all parts issued in a recent year. We typically see about 50 or 60 percent, so when I go to the parts counter, I expect 50 or 60 percent of the time to have the parts there. If we don't see that happening, then something is wrong. If the percentage is too high, say 98 percent, that indicates that too many parts are in stock."

Stock-movement rate is another indicator, he says. That is the number of stock lines with no movement for the past 12 months divided

by the number of stock lines. "We expect to see less than 5 percent of that happening," Thompson says.

And, of course, one of the biggest indicators of a well-managed parts operation is the inventory turn rate. Thompson arrives at that number by taking the value of all parts issued from stock and dividing it by the dollar amount of average annual inventory.

Inventory should be turning at a rate of four to eight times a year, he says. "If we see one or two turns, then something is very drastically wrong with that inventory. If you have inventory that has a low turn ratio, it could be caused by very old inventory."

And that's one of the most common problems he encounters. Fleet managers tend to let their inventory sit too long, Thompson says. "They may trade the vehicles off, but never get rid of the parts. What happens then is that the turn starts to decrease because you have all this old stuff sitting on the shelf."

To avoid this, fleet managers should dispose of the inventory when they dispose of the vehicle. "Either purge the inventory that supported that vehicle or send it back to the vendor," Thompson says. "You may be charged a restocking fee, but that's better than letting it sit, throwing it out, giving it away, or selling it at an auction where you get less than what it's worth."

The big mistake some municipal fleets make, he says, is when they conduct the annual physical audit, rather than determining what happened to the imbalance (what should be in



stock vs. what is really in stock), they zero balance it out and never correct the imbalance. “They act as if nothing ever happened and never determine where their parts actually went,” says Thompson.

There is one exception, however, to the rule of not having inventory parts sit too long. That involves parts that vendors won’t stock for you. “This is true in the municipal sector, especially when you get into snow-removal equipment, and it’s true with construction companies,” Thompson says. “The parts may just sit there, but when they’re needed, they’re needed immediately. If a high-production unit, for instance an excavator, goes down, it’s going to stop the operation. It’s all a real fine line of balance to keep the operation going.”

Among the most important things a fleet manager can do (and something many do not do) is track their inventory, bar code their inventory, and do annual audits to see what parts are moving and what parts aren’t. “Fleet

managers sort of miss that whole thing,” Thompson says.

But installing a bar-coding system or a parts-management system isn’t a cure all in itself, warns Thompson. “You have to use the data produced by those systems. Otherwise, what good is it?”

Another factor in tracking inventory is taking advantage of parts warranties. “People throw money away right and left simply because they don’t track parts they install on a vehicle,” Thompson says. “A mechanic may install an alternator, for instance, then six months later the part fails while it’s still under warranty. That’s the kind of thing you catch with a bar-coding system. When that happens, you can return the alternator to the vendor and get your money back.”

One fleet operation that practices state-of-the-art parts management and inventory control is Alyeska Pipeline Services. The organization is responsible for maintaining the

Among the most important things fleet managers can do is track their inventory, bar code their inventory, and do annual audits to see what parts are moving and what parts aren’t.

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trans-Alaska pipeline that runs 800 miles from the North Slope oil fields in Prudhoe Bay to the Valdez deep water port on Prince William Sound.

Three repair shops are located along the pipeline corridor, “that can do just about anything,” says fleet manager David Greenlee, CEM. “We have parts inventory and parts personnel at each.” In addition, there are seven different locations where parts are stocked, without parts personnel.

Greenlee says the dollar value of inventory five years ago was \$2 million; today it’s \$750,000.

“And that’s with the same number of facilities,” he says. “We’ve managed that down over a period of time. As for turn rates, we estimate that by the end of 2006, we will have a turn ratio of 4.35 percent. We were at 2.84 percent in 2004, so we’ve been steadily improving the last couple of years.”

One way Greenlee has been able to improve his parts management is by purging nonmoving parts from inventory. No item is allowed to sit with no movement longer than 12 months. He also manages inventory on a system-wide basis rather than just at one location, and

A Different Way to Reduce Costs

About a year and a half ago, David Greenlee, CEM, fleet manager for Alyeska Pipeline Services, commissioned a consultant to review his parts operation.

He told Greenlee, among other things, to obtain a vending machine — not for snacks and sandwiches — but for parts, mostly consumables such as batteries.

“Vending machines have been around a long time,” Greenlee says, “but this one goes beyond the typical dispenser, although it works on the same principle.”

Greenlee placed the machine, called Autocrib, in the middle of the shop floor for easy access by technicians. When a tech needs a part, he goes to the machine, uses an identification badge, makes a selection, and takes the part out. This saves time by eliminating trips to the parts department. Also, if a mechanic is working overtime and the parts department is closed, he still has access to parts.

The vending machine has a scanner that reads the ID badge. It also has a laptop, a keyboard and a screen. After identifying the user, the machine opens and the technician can either type the part he needs on the keyboard or push an icon on the screen.

“There is a section of circular trays divided into pie shapes, depending on the size of the item,” says Greenlee. “It turns around to the particular item, the door pops open, and you grab what you want and close the door. We also use a series of lockers for larger items. The lockers run off the same control system. The system will open the locker door and allow you to get the item out.”

Where the machine differs from a typical vending unit is in its ability to automatically deduct the item from the parts inventory. People in the parts area can see what has been issued either by personnel or by individual item and the date.

Another plus, according to Greenlee, is that stocked items are on consignment; he doesn’t have to pay for the part until it is issued. “We use several different vendors to stock the machine,”



The parts vending machine at Alyeska Pipeline Service Co. sits in the middle of the shop floor for easy access by technicians. The machine is equipped with a scanner, keyboard and screen.

he says. “When the machine reaches a minimum reorder point, it sends an e-mail to the vendor. Otherwise, a vendor can go in and look at his own inventory level and see what parts are moving and which ones aren’t.”

Major planning sessions were held with the vending-machine manufacturer to size the machine for parts Greenlee needed in the shop. There are several elements involved, such as control reporting, automatic vendor notification, and the ability to identify parts that are not moving and replace them with something that is being used.

“We wanted to have some flexibility, so we set it up to have 60 percent of the machine full,” he says. “That gives us room for expansion, adding new items or stocking larger quantities of an item.”

The vending machine also saves Greenlee on transaction costs. “When you buy something with a credit card, every time you call in an order that counts as a transaction,” he says. “If you can reduce those transactions, you’re saving money.” With the vending machine, he receives an invoice every two weeks from the vendor, and that includes servicing the machine.

he “leans on” vendors to carry Alyeska inventory on their shelves wherever possible. He also closely tracks parts warranties, with a full-time staff member assigned responsibility.

“We really work the warranty angle hard,” Greenlee says. “But you have to do the work. We have to have mechanics and parts people in step and working with our parts administrator.”

The effort is worth it, he says. “By keeping up with parts warranties, we’ve been able to cut costs there as well.”

Greenlee increased inventory turns by using data from his fleet-management system to “have the equipment at the right time at the right place and have the right part there as well,” he says.

Parts Discounts

Sometimes even the most seasoned fleet manager doesn’t know what parts discounts are out there:

1. Fleet discounts: If you have a small fleet, of five or fewer vehicles, this is about as good as it gets. These types of discounts shouldn’t be pursued unless your fleet is small and you don’t keep inventory.

2. Dealer discounts: This is a misleading term because prices are not much lower than fleet prices. If you have a moderate size fleet, this isn’t for you.

3. Jobber discounts: Smaller parts houses that do business in urban areas offer jobber discounts, which is the price they pay for stock. Most jobbers sell to the general public at a little less than list price, but if a fleet purchases its merchandise from a jobber, it will pay more than jobber prices. Such a fleet is better off using warehouse distributor discounts.

4. Warehouse distributor discounts: WD prices are paid by a warehouse operator who is authorized to buy directly from the manufacturer. Therefore, they can offer significant discounts. Fleets should evaluate warehouse distributor discounts during negotiations, but remember that some WDs may not be an authorized distributor for every piece of merchandise you use. That means less-than-jobber prices may not be available for every line. Do your homework and find out what lines the WD is authorized to sell and if he’s willing to sell other items at, or below, jobber prices. Also, find out if the distributor can service your fleet adequately. One indicator of the distributor’s reliability is the size of his delivery fleet. Discount parts prices are not much good if the parts are delivered late.

5. Manufacturer discounts: Buying direct from the manufacturer often is possible, particularly if the manufacturer is a small company. Take a look at the items you use frequently, such as filters, hoses or belts. Then, consider buying those items directly from the manufacturer.

“This is a challenge, but if you use the data you have, you might find that a particular location has a part that isn’t moving very much, but another location has a demand for that part. You transfer the part to the location where it’s needed and you don’t have to buy it.”

His parts management works so well that Greenlee built a new shop about a year and a half ago that has less parts space than the old shop. “We don’t want a lot of money tied up in inventory,” he says. “We don’t want a lot of parts on the shelf here. If they are on the vendor shelves and the vendor can get them to us in a timely manner, that’s what we want to do”

To serve remote locations where no vendor is available, Alyeska has its own courier service that comes to the Fairbanks shop every day, picks up parts tagged for different locations, and hand-carries them to their destinations.

Although the nature of his operation is somewhat different from most fleets, he says five basic principles are essential in this day and age for any fleet, regardless of where it operates.

- You must have some type of parts system. “It can be simple, but you have to have an electronic system to track everything.”
- Data has to be correct. Accuracy should be a minimum of 95 percent.
- You need skilled people experienced in the parts area.
- You must have a method to obtain parts on holidays and over the weekend.
- Planning is essential. If you know you have a certain type work to do, order parts in advance and try to order off-season. It saves money, and many times, off-season shipping is less expensive. “Avoid buying parts when everybody else is buying them.”

David Anderson, fleet manager for the County of Roanoke in Virginia stocks parts at two locations: the main garage and at a satellite shop, both located in Salem, Va.

Anderson has been able to reduce inventory costs by using Faster — management software that contains an automatic parts order system. The system enables Anderson to do obsolete reports on a regular basis. “None of my stock parts, with the exception of solid waste and off-road equipment, is over 120 days old,”

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Management: Parts



John Benton, who is with the parts department at Alyeska Pipeline Service, Fairbanks, uses computerized tracking to check inventory levels.

Anderson says. For example, he stocks 24 commonly used oil filters, and when the supply is down to six, he reorders. "We never run out of them," he says. "The system also lets us track slow-moving parts and allows us to set up certain parameters."

Anderson also puts a lot of responsibility on vendors. "Once a year, for instance, I'll check prices on brake pads and check the performance on the brake pads we use," he says. "We go out to bid and award contracts on an annual basis. We have vendors maintain the level of parts that we need. Another prime example of that are tires. Whoever is awarded the tire contract is given a list of what inventory we've used in the past 12 months, usually by quarter. That way, they are better equipped to fill our needs on time."


Due to the county's purchasing cycle,

Anderson reviews his inventory on a quarterly basis. "Once a year isn't good enough since our inventory changes quarterly," he says. "Most governments purchase in May or July when they see they have leftover money. This drives what we're doing and not doing."

On a yearly basis, he stocks about \$80,000 worth of parts with tires accounting for about \$35,000 of that total. With hydraulic hoses and fittings, he says, the county does its own hose fabrication. To have that done outside, he remarks, is even more pricy than in the private sector.

Inventory turns depend on the parameters set by the fleet manager, Anderson says. "It's a judgment call. For instance, we would stock more parts for a police car than for a dump truck. You can't have a police officer standing around waiting."

One of the challenges involved in parts management, Anderson says, is making sure the parts you buy are of good quality. "There are a lot of different quality parts out there," he remarks, "but do you want to put a cheap part on a police car four times, or do you want a more expensive, lifetime part?"

Parts management may be a balancing act, but Anderson says the key to good management is "finding out what works best for you." 

This article first appeared in Equipment Manager, the official publication of AEMP.

Cost of Inventory

Fleet managers who are familiar with inventory costs know that the cost of carrying inventory is slightly more than 20 percent of the inventory value. If you've ever wondered how that breaks out, here's a brief overview:

■ **Cost of storage space**, including rent or proportionate building depreciation, building maintenance and repair, utilities, janitorial and security guard pay, and benefits: 3 percent.

■ **Cost of inventory stores** and material-handling equipment, including depreciation of shelves and bins, maintenance of material-handling equipment, fuel, use of records and forms, and office equipment: 1 percent.

■ **Taxes**, including taxes on material-handling equipment, inventory, shelves, bins, record-processing equipment, and allo-

cated portions on land and buildings: 1 percent.

■ **Insurance**, including allocated portions on buildings, plus inventory material-handling equipment, bins, shelves, etc.: 2 percent.

■ **Obsolescence**, including damaged or non-returnable parts, pilferage, time spent filing warranty claims, and returning parts for credit: 2 percent.

And the two biggest costs of all:

■ **Inventory personnel costs**, including salaries and fringe benefits of full-time parts employees and allocated portions of part-time clerical or supervisory employees: 4 percent.

■ **Money cost**, or the lack of return on inventory and control investment that might otherwise produce income: 8 percent.

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Buying File: Mid-Sized Dozers

By MIKE ANDERSON, Senior Editor

Production vs. Precision **No Longer a Choice**

Crawler dozers once resigned as grunt production machines only may now find double duty as fine-grading finishers



Traditionally, the worlds of finish and production dozers collide within the 100- to 200-horsepower range. While they may still, the proverbial line in the dirt is moving toward the upper part of that range, and growing much less discernible along the way. It's fuzzy, if not completely smudged.

The players in this market — Caterpillar, Case, John Deere, Komatsu, Dressta and Liebherr — continue to offer a plethora of undercarriage options resulting in various versions of their assorted models. Regardless, crawler dozers, particularly in this size range, are increasingly less either a finish grading or a production machine, but rather both.

“What drives some of that is customers today want to have pieces of construction equipment that will serve multiple functions, as opposed to having one piece of equipment to do one thing and another piece of equipment to do another,” says Jim Hughes, marketing manager, Case Construction Equipment. “The machines don’t make money when they’re sitting there either idling or with the engines off, parked on the side of the jobsite.”

With list prices approaching \$300,000, machines positioned at the top end of the 100- to 200-horsepower range, once renowned primarily for their brawn, are proving to be crafty blade handlers as well. “We are definitely see-

Starting with the 115-horsepower 700J, John Deere offers three sizes in the 100- to 200-horsepower crawler dozer range boasting common features.

The Cost of Ownership

Size	List Price	*Hourly Rate
85 - 104 horsepower	\$113,975	\$56.86
105 - 129 horsepower	\$165,757	\$71.30
130 - 159 horsepower	\$235,480	\$88.36
160 - 189 horsepower	\$277,971	\$103.84
190 - 259 horsepower	\$343,426	\$124.15

* Hourly rate represents the monthly ownership costs divided by 176, plus operating cost. Adjusted operating unit prices used in the calculation are diesel fuel at \$3.96 per gallon, mechanic's wage at \$44.79 per hour, and money costs at 4.75 percent.

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

ing that more and more contractors are using larger dozers to do more finish grading," says Les Scott, Komatsu America's senior product manager, crawler tractors. The end-user's collective confidence in machine control and positioning technologies such as GPS, laser and electronic blade control is being manifested in earthmovers as precise as they are tough.

"I believe that's part of the reason why the demand has stayed really solid in the larger sizes," says Dan Drescher, John Deere's product marketing manager for crawlers. "As a good example, you see more 200-horsepower machines today with six-way or PAT blades."

Moving forward

John Deere provided one of the true head-turning moments at Conexpo-Con/Agg 2008 with the unveiling of the 764 High-Speed Dozer, an articulated-framed, quad-tracked, 200-horsepower tractor bringing together the motor grader and crawler dozer. The mass market won't see this revolutionary machine until 2009.

That hasn't prevented the company from continuing to refine its hydrostatic J-Series crawler dozers — the 700J, 750J and 850J in the 100- to 200-horsepower size class — with more operator preferences available for both transmission speeds and hydraulic speeds, yet without sacrificing fuel economy during Tier-3 engine upgrades. "The ability to make these adjustments makes a machine that much more versatile," says Drescher. "We also offer an extended-life undercarriage system on these tractors with our SC-2 (slurry coating) bushing technology. It's been out now for a number of years, but it's becoming a more popular option on this size-class tractor, again because it does lower owning-and-operating costs."

Deere's integrated grade control option is likewise available on all three of the company's



dozers in this range. "Again, that plays into that versatility," says Drescher, "to be able to take a machine from rough grade to finish grade." Dozers equipped with the option are shipped from the factory with the hardware, software and wiring needed to support the customer's electronic grade control system of choice. An open architecture enables the dozers to operate products from the top aftermarket laser system providers, "and because this system is not an add-on and the factory-sized hydraulic valves are tuned for the specific machine from the beginning, Deere products deliver faster response and enhanced performance," says Drescher. "There's no guesswork as to whether the crawler will work with your favorite system."

This goes to the Deere approach to its product line.

"We have a family of dozers here," says Drescher. "An operator can get on a 700 and jump right over onto an 850, and they basically operate identically. Within our product line, we've pretty well standardized on the way machines operate, and that is a plus to the contractor. They don't have to do a lot of cross-training. Once you get used to one John Deere machine, you're pretty much used to all of them, and it makes it easy to switch machines back and forth.

"There is no industry standardization yet,

While offering the ability to move earth, the 144-horsepower Case 1650L crawler dozer is also capable of nifty blade work, thanks to an electronic blade control feature that provides simultaneous multi-function application.

Buying File: Mid-Sized Dozers

Crawler-Dozer Specifications (100 to 200 horsepower)

Model	Operating Weight (lb.)	Net Power (HP)	Track Frame	Ground Pressure (psi)	Blade Type	Blade Width	Blade Capacity (cu. yd.)
Dressta TD-10M DD STD	19,395	101	Standard	5.6	6-way (PAT)	9'3"	2.66
Dressta TD-10M STD	19,395	101	Standard	5.6	6-way (PAT)	9'3"	2.66
Dressta TD-10M DD LGP	19,645	101	Low Ground Pressure	4.7	6-way (PAT)	9'3"	2.66
Dressta TD-10M LGP	19,645	101	Low Ground Pressure	4.7	6-way (PAT)	9'3"	2.66
Komatsu D39EX-22	20,834	105	Standard	6.19	7-way (VPAT)	8'11"	2.89
Komatsu D39PX-22	21,804	105	Low Ground Pressure	4.69	7-way (VPAT)	10'8"	3.0
Komatsu D41E-6C	24,140	110	Standard	4.98	6-way (PAT)	10'0"	3.4
Komatsu D41P-6C	25,400	110	Low Ground Pressure	3.41	6-way (PAT)	10'0"	3.4
John Deere 700J LT	26,102	115	Long Track	6.8	6-way (PAT)	10'0"	3.44
John Deere 700J XLT	27,125	115	Extra Long Track	5.9	6-way (PAT)	10'0"	3.44
John Deere 700J LGP	28,290	115	Low Ground Pressure	4.6	6-way (PAT)	11'0"	3.75
Case 1150K XLT	27,858	118	Extra Long Track	5.7	6-way (PAT)	10'0"	3.8
Case 1150K WT	28,665	118	Wide Track	5.0	6-way (PAT)	11'0"	4.2
Case 1150K LGP	29,365	118	Low Ground Pressure	4.23	6-way (PAT)	11'0"	4.2
Caterpillar D6K XL	28,409	125	Extra Long Track	6.16	7-way (VPAT)	10'1"	3.5
Caterpillar D6K LGP	29,690	125	Low Ground Pressure	4.74	7-way (VPAT)	11'0"	3.8
Komatsu D51EX-22	27,778	130	Standard	6.40	6-way (PAT)	10'0"	3.5
Komatsu D51PX-22	28,881	130	Low Ground Pressure	4.78	6-way (PAT)	11'0"	3.8
Dressta TD-12C-XP	32,866	142	Standard	6.8	6-way (PAT)	10'4.4"	3.6
Dressta TD-12C-XP DD	32,866	142	Standard	6.8	6-way (PAT)	10'4.4"	3.6
Dressta TD-12C-XP LGP	33,105	142	Low Ground Pressure	4.4	Straight	11'2"	3.5
Dressta TD-12C-XP DD LGP	33,105	142	Low Ground Pressure	4.43	Straight	11'2"	3.5
Case 1650L XLT	35,203	144	Extra Long Track	6.2	6-way (PAT)	10'6"	4.12
Case 1650L WT	36,691	144	Wide Track	5.62	6-way (PAT)	13'1"	4.12
Case 1650L LGP	37,578	144	Low Ground Pressure	4.63	6-way (PAT)	13'1"	4.2
John Deere 750J	32,585	145	Standard	7.24	6-way (PAT)	10'10"	4.23
John Deere 750J LT	34,395	145	Long Track	6.45	6-way (PAT)	10'10"	4.23
John Deere 750J WT	36,425	145	Wide Track	5.24	Semi-U	12'4"	5.9
Caterpillar D6N WH Waste Handler	38,224	145	Long Track	7.93	VPAT with Trash Rack	10'9"	8.4
Caterpillar D6N XL Tier 3	36,497	150	Extra Long Track	7.48	7-way (VPAT)	10'8.8"	4.16
Caterpillar D6N LGP Tier 3	39,112	150	Low Ground Pressure	4.8	7-way (VPAT)	13'4.6"	4.13
John Deere 750J LGP	36,725	155	Low Ground Pressure	4.45	6-way (PAT)	13'0"	4.98
Liebherr PR 724 L	36,768	160	Long Track	6.83	6-way (PAT)	10'6.1"	4.15
Liebherr PR 724 XL	38,003	160	Extra Long Track	6.26	6-way (PAT)	10'6.1"	4.15
Liebherr PR 724 LGP	41,230	160	Low Ground Pressure	4.41	6-way (PAT)	12'5.2"	4.43
Komatsu D61EX-15	36,839	168	Standard	7.68	6-way (PAT)	10'9"	4.5
Komatsu D61EX-15 Long Track	39,242	168	Long Track	6.54	6-way (PAT)	10'9"	4.5
Komatsu D61PX-15	41,248	168	Low Ground Pressure	4.83	6-way (PAT)	12'8"	5.0
Case 1850K LT Series 3	44,269	184	Long Track	9.46	Semi-U	11'2.6"	7.3
Case 1850K XLT Series 3	46,649	184	Extra Long Track	8.4	Semi-U	11'2.6"	7.3
John Deere 850J	40,165	185	Standard	7.61	Semi-U	10'8"	7.29
Caterpillar D6T	40,550	185	Standard	8.74	Semi-U	10'8.3"	7.34
John Deere 850J WT	41,285	185	Wide Track	6.26	Semi-U	11'8"	7.62
John Deere 850J LT	43,015	185	Long Track	6.87	6-way (PAT)	12'2"	5.15
John Deere 850J WLT	44,225	185	Wide, Long Track	5.65	6-way (PAT)	13'2"	5.57
John Deere 850J WT Waste Handler	44,665	185	Wide Track	6.83	Semi-U with Trash Rack	11'8"	14.5
John Deere 850J WLT Waste Handler	47,432	185	Wide, Long Track	6.11	PAT with Trash Rack	13'2"	12.7
Dressta TD-15M Extra	44,335	190	Standard	10.9	Semi-U	11'3"	7.45
Dressta TD-15M LT Extra	44,665	190	Long Track	9.5	Semi-U	11'3"	7.45
Dressta TD-15M WT Extra	45,779	190	Wide Track	6.5	6-way (PAT)	12'1"	5.0
Dressta TD-15M LGP Extra	46,451	190	Low Ground Pressure	5.4	Straight	12'8"	4.7
Dressta TD-15M LA Extra	51,764	190	Standard	12.4	Semi-U with Trash Rack	11'3"	14.3
Case 1850K LGP Series 3	49,450	199	Low Ground Pressure	5.4	Straight	12'10"	4.8
Caterpillar D6T XL	44,420	200	Extra Long Track	8.9	Semi-U	10'8.3"	7.34
Caterpillar D6T XW	45,723	200	Wide Track	6.72	Semi-U	11'8"	7.35
Caterpillar D6T XL VPAT	46,690	200	Extra Long Track	9.36	7-way (VPAT)	12'8.8"	6.19
Caterpillar D6T XW VPAT	47,276	200	Wide Track	7.45	7-way (VPAT)	13'7.8"	6.67
Caterpillar D6T LGP	48,024	200	Low Ground Pressure	5.15	Straight	13'4"	4.9
Caterpillar D6T LGP VPAT	50,968	200	Low Ground Pressure	6.35	7-way (VPAT)	13'7.8"	5.65
Liebherr PR 734 L	45,161	200	Long Track	10.1	Semi-U	11'0.8"	7.27
Liebherr PR 734 XL	46,290	200	Extra Long Track	9.1	Semi-U	11'0.8"	7.27
Liebherr PR 734 LGP	48,986	200	Low Ground Pressure	5.97	Straight	13'1.3"	5.36
John Deere 850J LGP	45,375	200	Low Ground Pressure	4.83	6-way (PAT)	14'0"	5.87
John Deere 850J LGP Waste Handler	48,906	200	Low Ground Pressure	5.15	PAT with Trash Rack	14'0"	12.9

Source: Spec-Check Expanded Specs (as of June / 08)

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Weldco-Beales' Six-Way Blade

It's not difficult to appreciate why six-way or PAT blades have become commonplace on the larger machines in the 100- to 200-horsepower range.

The design of the Weldco-Beales 6-Way Blade allows the dozer operator to hydraulically adjust and set the power angle/tilt (PAT) blade for grading, trimming, sloping or ditching, among a variety of tasks.

While durable trunnion ball connections and heavy-duty angling and tilting linkages provide enhanced blade reliability, a compact design promotes good tractor balance. Moldboard visibility further supports operator performance and worksite safety.

With headquarters in Edmonton, Alberta, Weldco-Beales designs and manufactures specialized heavy equipment attachments and cranes for the construction, forestry, mining and road maintenance industries.



but at least the way ours run, it's very, very common between tractors."

At Case, the new 144-horsepower 1650L offers the electronic blade control feature introduced two years ago on the 118-horsepower 1150K Series 3 model, providing simultaneous multi-function application. "That gives you precise control of that blade," says Hughes. "If you need to grade within that quarter-inch, you can adjust that blade accordingly with that electronic controller."

When Case undertakes product development, the three primary areas of concentration are productivity, operator comfort and serviceability, says Hughes. The electronic blade control feature, he says, arguably achieves all three: "It gives the operator much more control of that machine and can make him much more productive than, say, a mechanical controller. From an operator-comfort perspective, with an electronic controller you don't have to use as much lever effort, so that doesn't fatigue you. And from a serviceability perspective, because it's electronic, you don't have the adjustments that you typically would have with a mechanical-style control."

At Komatsu, the introduction of the 130-horsepower D51 to its Dash-22 finish dozer product line likewise reflects a muscling up of the fine work traditionally reserved for smaller dozers. The D51-22 models are upgrades from the 110-horsepower D41-6C machines, "and it's a night-and-day difference between the tractors," says Scott. "Our D41 was a direct-drive, clutch-brake-steering-system unit and it was relatively antiquated, whereas the D51 switched over to being totally hydrostatic, with our cab-forward design for unrivaled visibility."

Scott relates the feedback from customers through Komatsu America's internal field days at the Cartersville, Ga., demo site. "Since we introduced the 51, we've probably put 2,500 customers through there," he says, "and everybody who gets off of that machine just shakes their head and says they just can't believe the visibility of the blade, and how easy it is to operate and finish-grade. People who are not dozer operators get off it and say, 'I can cut a pretty good grade now.' It's just amazing."

When it comes to a single designation meaning many different things,

Caterpillar's D6 is king. Within the 100- to 200-horsepower range, three different D6 machines are offered, each with undercarriage configuration options. At one end, the 125-horsepower D6K is the first-ever hydrostatic-drive dozer in the D6 offering; at the other end, the D6T offers an earthmoving force at up to 200 horsepower; in between, the 150-horsepower D6N offers production for customers not requiring the horsepower of the D6T.


And, within the D6T product line alone, four configurations are available:

- Standard offers the shortest-length tracks with standard-width shoes for the lowest wear and cost;
- XL offers extended-length track for improved flotation and stability;
- XW offers a longer, wider undercarriage for good flotation and stability, without the accelerated wear associated with low-ground-pressure machines;
- and the low-ground-pressure LGP offers a long, wide undercarriage with very wide track shoes for best flotation and finish-grading capabilities.

The D6N and D6K are available in either XL or LGP configurations.

The industry has choices in the 100- to 200-horsepower crawler dozer range that reflect the coming together of two worlds — precision and power. With such recent product introductions as Deere's 764 High-Speed Dozer and Topcon's 3D-MC² machine-control system that can increase the smooth grading speed of dozers by 200 percent or more, it's become possible to not only connect but integrate the two worlds.

Look for larger dozers to increasingly do the work formerly dedicated to their smaller brothers.

"I believe so," says Komatsu's Scott, "especially with the innovation of 3D machine control. That will help push that end of the range up, because if the operator couldn't control the machine well enough, certainly the 3D machine control can do a pretty good job." 



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Gallery of Crawler Dozers

CASE

L-Series Model Has Single-Lever Control



The first Case crawler dozer above 100 horsepower to move to the L Series, the 1650L is powered by a six-cylinder, 6.7-liter, turbocharged Case Family IV engine with electronic fuel injection. Producing 144 net horsepower, the Tier-3-compliant

engine combines with an electronically controlled, variable-displacement, dual-path hydrostatic transmission to effectively manage 10 different speed settings for use in residential, commercial, road and utility applications. A new single-lever control provides infinitely adjustable steering for precise operation. An eight-roller undercarriage with a hunting tooth sprocket facilitates precise grading.

Number of base models: 4

New model: 1650L

Product-line features: To boost productivity, the 1650L provides low-effort electronic blade control for simultaneous multi-function control. The operator can pitch the blade to match the material being worked. The use of large hydraulic cylinders delivers speed and power to the blade for optimum control and force.

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KOMATSU

New Series Moves into 100- to 200-hp Range



As part of the new Dash-22 family of crawler dozers, Komatsu replaced the former D41-6 dozers with the 130-horsepower D51-22 models, available in both standard-track EX and low-ground-pressure PX configurations. To complement the D51-22's Tier-3-compliant, 6.69-liter Komatsu engine, an upgraded Komatsu-designed electronic-hydrostatic transmission provides automatic shifting. When the variable speed selection is selected, travel speed is adjustable through a 20-increment speed range. The operator can also utilize Quick-Shift to select three predetermined speed settings to match specific job conditions.

Number of base models: 3

New models: D39EX/PX-22, D51EX/PX-22

Product-line features: The design of the new Dash-22 dozers enhances operator visibility by moving the cab nearly 2 feet closer to the blade and incorporating a super-slant nose, courtesy a rear-mounted radiator. The newest Komtrax technology provides no-cost wireless remote machine monitoring of machine position, operating hours and abnormality codes, as well as tracking of such critical operational data as fuel consumption and load factors.

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CATERPILLAR

'D6' Covers Size and Configuration Gamut

All three D6 model sizes — each available in assorted undercarriage configurations — were updated or introduced by Caterpillar in 2007. The largest of the three crawler dozers, the D6T at up to 200 net horsepower, replaced the D6R and incorporates separate hydraulic pumps to supply power to steering and implements. The mid-sized D6N, at 150 horsepower, was updated with a C6.6 engine featuring ACERT Technology. The 125-horsepower D6K is the first Caterpillar crawler tractor in the D6 range to have hydrostatic drive and, at about 29,000 pounds, is roughly 8,000 pounds heavier than the previously largest Hystat machine, the D5K.



Number of base models: 3

New models: D6K, D6N, D6T

Product-line features: Each of the D6 models features the SystemOne undercarriage, which combines a bushing that rotates with a center-tread idler for high-speed operation in forward and reverse. The D6K and D6N are equipped for ready installation of the AccuGrade grade control system. The D6T offers the Multi Velocity Program — MVP — control system that provides the operator a selection of five speed ranges and automated speed control.

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Gallery of Crawler Dozers

JOHN DEERE

On Track to Meet Future Demands, Too



John Deere created the biggest buzz at Conexpo-Con/Agg 2008 with the head-turning unveiling of the 200-horsepower 764 High-Speed Dozer (HSD), featuring four 24-inch-wide rubber tracks designed to combine the low-ground-pressure advantages of

crawler dozers with the ground-speed blade work of motor graders. That machine won't be on the market until next year. In the meantime, Deere offers three base crawler dozers with 12 different configurations in the 100- to 200-horsepower range, all incorporating significant changes when updated to Tier-3-compliant Deere PowerTech engines. The 700J has an upsized 190-millimeter-pitch undercarriage system, and the 750J and 850J models have new high-capacity heating, ventilation and air-conditioning systems.

Number of base models: 4

New models: 700J, 750J, 850J Tier 3 Versions; 764 HSD

Product-line features: Deere's medium-sized crawler dozers are driven by dual-path hydrostatic-drive transmissions with speed-in-grip direction and steering control, automatic load compensation and full power-turn capability.

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DRESSTA

Updated Dozer Offers 'Extra' Choices

Boasting an increase in net horsepower from 175 to 190 with its Tier-3 Cummins QSC8.3 diesel engine, the Dressta TD-15M Extra crawler dozer is available in standard-track, wide-track, long-track and low-ground-pressure versions, all



standard with auto-shift. Depending on the version, there is a choice of semi-u, angle, six-way hydraulic and straight blade configurations. Two-speed steering provides the ability to simultaneously push and steer while providing fuel economy. The new 101-horsepower TD-10M model, also with single-lever steering, is offered in standard-track and low-ground-pressure versions.

Number of base models: 4

New models: TD-10M, TD-15M Extra

Product-line features: As established by Dressta in various size classes, a direct-drive (DD) version of the TD-10M is also available for drawbar-dependent applications. Looking ahead, new models will fill the gap between the TD-10M and TD-15M Extra. At 125 and 142 horsepower, respectively, the TD-12C and TD-12-XP are still available, says Dressta North America, but those models are slated to be replaced.

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LIEBHERR

Crawler Tractors Use Hydrostatic Drive

Working in combination with the Liebherr travel drive, the Tier-3-compliant Liebherr engines used on the PR 724 and PR 734 Litronic crawler dozers provide ample power in all situations. The hydrostatic travel drive enables the operator to easily define the optimal travel speed and drawbar pull. It does not require any gear shifting, which means engine power is transferred to the tracks without interruption, even when cornering. The entire front-end superstructure of the dozers is torsionally rigid and robust. This, in conjunction with the long track frames, ensures smooth blade operation at all times. Each model is available in three variations — with standard-long, extra-long and low-ground-pressure track configurations.

Number of base models: 2

New models: PR 724 Tier 3, PR 734 Tier 3

Product-line features: The Liebherr engine always runs at a steady speed — in the most economical range — regardless of travel speed. This ensures fuel-saving operation at all times. The low piston speed improves the filling of the cylinder chambers and, as a result, more efficient fuel combustion.

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Trailers

EAGER BEAVER

The latest trailer in the Easy Loader Series, the 25 XPL has an 8-degree loading angle for safe and simple loading. At a deck width of 8 feet 6 inches, length of 22 feet, and height of 34 inches, the trailer has a capacity of 50,000 pounds. Other features include lightweight wood ramps, hub-piloted disc wheels, all-wheel ABS, and LED lights. Aluminum extension ramps are optional.

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THE ADVANCE METALWORKING CO.

Able to be hydraulically raised or lowered while remaining level, the Lift-a-Load elevating-platform trailer can be safely loaded without the need of a slanted ramp. Its elevating-platform feature also can be used to avoid low-clearance doorways and other obstacles. When raised to transport position, the trailer provides a low center of gravity for safe towing. The Lift-a-Load trailers are available in single- or dual-axle models with capacities ranging from 4,400 to 15,000 pounds.

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TRAIL-EZE

With capacities of 100,000 and 120,000 pounds, and a frame composed of high tensile steel, the TE100DG and TE120DG detachable gooseneck trailers from Trail-Eze are ideal for hauling heavy equipment. Cranes, excavators and other large machines can be loaded onto the trailers' main deck, available in lengths from 22 feet to 26 feet 6 inches, with a width of 8 feet 6 inches. Front ramps facilitate the loading process, and the neck features hydraulic detach and an air-activated lock.

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DITCH WITCH

Built around structural steel frames and torsion axles, Ditch Witch's T7B tandem-axle trailers are tough, reliable and easy to maintain. The no-tilt feature adds to the T7B's stability; and the steel-mesh, skid-resistant ramps, and steel skid-resistant bar grating decks ensure that the cargo stays put. Designed to transport compact machinery, such as mini excavators and mini skid steers, the T7B also has enough room in its spacious front end to carry attachments, such as buckets, pallet forks, trenchers and augers.

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Spotlight

LANDOLL

Landoll's 835 model detachable lowboy line of trailers has a new ramp option, allowing asphalt pavers to be loaded to the lower deck. The 4-degree load angle allows for proper clearance under the paver and a safe transition from the ground to the trailer deck. One person can raise and lower the full-width steel ramp thanks to the 835's internal spring system. The lower deck has 30 feet of usable space with an 18.5-inch loaded deck height.

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BRI-MAR

With 20-inch fold-down sides, transporting anything from mulch to lumber is simple with Bri-Mar's new Deckover Dump Trailers. The DT610-DP, with a 6x10-foot bed, comes in either 7,000 or 10,000 GVWR, while the larger DT712-DP, which has a bed of 7x12 feet, comes in 10,000 or 12,000 GVWR. As with other Bri-Mar products, it uses a hydraulic system driven by a Monarch Power unit complete with corded remote control. Standard features include electric brakes on both axles, full-length tarp rail, and a seven-way RV plug. Optional features include a spare tire and mount, on-board battery charger, and wireless remote.

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KALYN SIEBERT

Boasting a four-beam design with machine-welded T-1 steel construction, the KHS-3-53T hydraulic sliding-axle trailer has a high strength-to-weight ratio. With an upper-deck length of 10 feet 8 inches and a lower-deck length of 37 feet 4 inches, the three-axle trailer can haul up to 106,000 pounds. Load angle is 7 degrees and dump angle is 16 degrees. The single-stage design with piggyback cylinders allows for easier maintenance and less costly repairs.

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REINKE

Available in sizes of up to 53x8.5 feet, Reinke's steel and aluminum drop-deck trailers are equipped with Reinke's "Super Floor" and S-shape neck design. Beam capacity is 50,000 pounds. A redesigned drop connection strengthens and adds support to the lower neck joint and helps maintain flexibility under heavy loads. Options include multiple axles, tool-boxes, winches and in-floor chain tie downs. Reinke also recently added a full line of shelf-storing ramp options.

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SIDE DUMP

Designed for general contractors, home builders, farmers and more, the Contractors Series trailers can haul loads of up to 4 cubic yards. It can be tilted to 45 degrees for dumping, and the nylon pivot blocks mean the trailer pivots smoothly when tilted. The standard 2 5/16-inch adjustable ball hitch ensures easy connection to hitches of varying heights. This trailer can be used for water-tight applications, as well, with its sealed tub and 1.5-inch drain plug.

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TEREX

With a 7-degree loading angle and a self-contained power unit, Load King 503 DFP folding gooseneck trailers are designed for easy loading and transportation of low-ground-clearance equipment. The 503 DFP has a 100,000-pound capacity, gooseneck length of 9 feet 8 inches, and a platform size of 24 feet by 102 inches. Options include built-in railroad rails for loading railroad equipment.

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TOWMASTER

Ideal for hauling multiple pieces of construction equipment, the 2009 Towmaster T-70PFHTH and T-70PFHTL perimeter frame trailers are available in lengths of 48 and 53 feet. Getting equipment to the 10-foot top deck is made easy with the hydraulically operated ramp. The hydraulically loading folding tail has both traction aid and a low loading angle, perfect for loading scissor lifts, rollers and forklifts. These sturdy trailers are built on a T1 steel-flange outer-frame design with the axles attached to a sub-frame.

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TRAIL KING

Wind tower sections can be lifted onto this gargantuan trailer without the need of a crane. Trail King's 13-axle Hydraulic Schnable System uses hydraulic cylinders to connect the gooseneck to a wind tower's inner flange. The cylinders then lift the wind tower off the ground and into transport position. To pass obstacles at wind tower sites, the cylinders can also be used to shift the ground clearance of the load. Its adjustable six-axle steering dolly adjusts to meet the wind tower's turning-radius requirements.

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Financial Ratios That Matter

Relationships derived from the balance sheet help managers understand how their decisions affect financial performance

A balance sheet is one of two standardized financial reports produced on a regular basis. It provides information used by professionals in the financial community to analyze company performance and see how the company uses its available financial resources. Equipment plays an important part in the company's financial structure, so equipment managers must understand how their decisions affect the balance sheet. Various financial ratios measure performance in areas such as liquidity, profitability, leverage and financial efficiency.

Although financial jargon encompasses these ratios, it is more straightforward than it appears. We covered the basic concepts, the language used, and the way equipment-related transactions impact the balance sheet in February 2005 ("Balance-Sheet Basics"). We'll recap that discussion and then work through an example that shows how a number of standard and well-understood ratios are calculated and used.

A balance sheet is a concise document that provides a snapshot of the capital structure of the company at a certain point in time. The left side lists the assets the company owns and uses in its business. These are listed in order of the speed with which they can be liquidated or turned into cash. Cash, receivables and the like are listed at the top; non-current or long-term assets are listed at the bottom. Of particular interest are the fixed assets or the property, plant and equipment owned, listed and included on the balance sheet. These are given at their original purchase price less the depreciation accumulated to date on the listed assets. If property, plant and equipment is mostly the equipment fleet, then the net value quoted in the balance sheet is equal to the accounting book value of the fleet.

The right side of the balance sheet lists li-

abilities and net worth. Liabilities (what the company owes others) are listed in order of their immediacy. Short-term liabilities such as payables are at the top; long-term liabilities such as loans and debt are at the bottom. Net worth or owners equity is also on the left side. This lists the original investment and paid-in capital as well as the retained earnings that have been accumulated as a result of successful operations. Our net worth is the difference between what the company owns and what it owes others; thus the left side of the balance sheet (assets) must equal the right side (the sum of liabilities and net worth).

The accompanying table shows an abbreviated balance sheet for our example company. The numbers are close to the values quoted by the Construction Financial Management Association (CFMA) for a large, best-in-class heavy/highway contractor. To complete the analysis, we need to know the contract revenue and net earnings before tax, found in the annual statement of earnings. Using CFMA numbers of \$171,000,000 and



Mike Vorster

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

Abbreviated Balance Sheet

(\$000)

Assets: What we own			Liabilities: What we owe others	
Current assets		\$52,000	Current liabilities	\$35,500
Property, plant and equipment			Noncurrent liabilities	\$9,100
At purchase price	\$42,100		Total liabilities	\$44,600
Less depreciation	-\$24,800		Net worth: What we are worth	
Net		\$17,300	Stock and paid in capital	\$6,500
Long-term investments		\$800	Retained earnings	\$23,100
Other noncurrent assets		\$4,100	Total net worth	\$29,600
Total assets		\$74,200	Total liabilities & net worth	\$74,200

This sample balance sheet uses values quoted by Construction Financial Management Association for a large highway/heavy construction firm.

Equipment Executive

Key Ratios

Ratio	Definition	Example	Value
Liquidity			
Working Capital	Current Assets - Current Liabilities	\$52,000 - \$35,500	\$16,500
Current Ratio	Current Assets ÷ Current Liabilities	\$52,500 ÷ \$35,500	1.46
Profitability			
Return on Assets	Net Earnings ÷ Total Assets	\$6,300 ÷ \$74,200	8.5%
Return on Equity	Net Earnings ÷ Total Net Worth	\$6,300 ÷ \$29,600	21.3%
Leverage			
Debt to Equity	Total Liabilities ÷ Total Net Worth	\$44,600 ÷ \$29,600	1.51
Fixed Asset Ratio	Net Fixed Assets ÷ Total Net Worth	\$17,300 ÷ \$29,600	58.5%
Efficiency			
Asset Turnover	Contract Revenue ÷ Total Assets	\$171,000 ÷ \$74,200	2.3
Fixed Asset Turnover	Contract Revenue ÷ Net Fixed Assets	\$171,000 ÷ \$17,300	9.8
Equipment-Specific			
Equipment to Assets	Net Fixed Assets ÷ Total Assets	\$17,300 ÷ \$74,200	23%
Book Value Ratio	Net fixed assets ÷ Purchase price	\$17,300 ÷ \$42,100	41%

Key ratios indicate commonly tracked financial performance measures, and equipment-specific ratios help managers make decisions.

\$6,300,000, respectively, for the same class of business, the analysis should indicate values expected from a well-run business.

Any number of ratios can be calculated based on the data given in a balance sheet and statement of earnings. Some are exotic and are used for special purposes; others have stood the test of time and are in common usage. Good practice categorizes the well-used ratios into four performance areas: liquidity, profitability, leverage and efficiency. Let's look at two commonly used ratios for each area and then propose two additional measures of particular interest to equipment specialists.

Liquidity: Both measures indicate the degree to which the company can meet its immediate short-term commitments (current liabilities) using current liquid assets. A current ratio of 1.0 indicates that current assets at least equal current liabilities. These measures are important from an equipment point of view because purchasing a machine with cash reduces current assets and severely strains both working capital and the current ratio.


Profitability: Return on assets evaluates profitability relative to the sum of all the assets used. Return on equity measures profitability relative to what

the owners have at stake in the business. The ratios behave differently from an equipment point of view. Increasing the size of the fleet, especially using debt, increases total assets and makes it difficult to achieve a good return on assets. It does not affect return on equity, though.

Leverage: Debt to equity indicates the relationship between the creditors who provide the debt that makes up current or long-term liabilities and the owners who own the total net worth. CFMA reports that a value of 3 or lower is considered acceptable. In many cases, this limits the amount that can be borrowed to finance equipment. The fixed asset ratio measures how much of the owner's equity is invested in the book value of the equipment. This is clearly an important ratio from an equipment point of view. All classes of heavy and highway companies reported by CFMA show values well in excess of 50 percent with some categories of medium-sized companies showing values close to 70 percent. Not surprisingly, industrial contractors show ratios in the low 20-percent range.

Efficiency: These measure the efficiency with which assets are used to generate contract revenue. Both are important from an equipment point of view as equipment is a key player in generating the numerator — contract revenue — as well as a large component of the denominators — total assets and net fixed assets.

Equipment-Specific: The equipment-to-assets ratio measures the size of the fleet as a percentage of the total assets used by the company. Heavily equipment-intensive operations have high numbers that are frequently brought down by leases or outside rentals. The book value ratio is a good measure for the average age of the fleet. In this case, all but 41 percent of the purchase price of the fleet has been written off, indicating that the average age of the fleet is close to 60 percent of the period used to calculate the accounting depreciation. A low value is a strong indicator that the fleet is becoming old and not being replaced at the required rate.

Information contained in the balance sheet can be used to measure performance in a number of ways. Because equipment plays an important part in each case, equipment managers absolutely must understand what is involved and do their part in achieving the desired results. 

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Skid Steers Draw 25 Percent of First Cost At Resale

Managers spend only about 40 percent of a skid steer's original purchase price on repair parts and labor before replacing them

Fleet managers spend only about 40 percent of a skid-steer loader's original purchase price on repair parts and labor before replacing these ubiquitous utility machines. In fact, more than 21 percent of owners of 1,600- to 2,200-pound-capacity machines and 2,200-pound-and-larger skid steers will spend only up to 25 percent of first cost on skid steers, according to *Construction Equipment's* Reader Advisory Board.

When time comes to replace these skid steers, they draw about 25 percent of original purchase price in resale value. In fact, though, a third of owners of 1,600- to 2,200-pound machines nets 35 to 64 percent of purchase price, and a quarter of 2,200-pound and larger skid steers draw that much at resale.

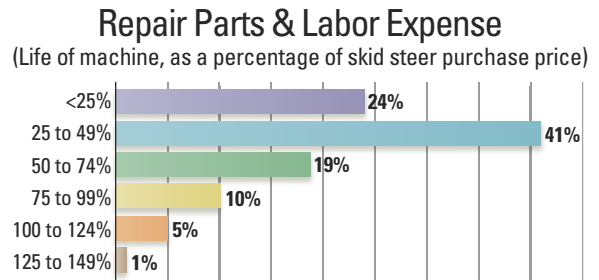
Skid steers in the fleets of *Construction Equipment's* Reader Advisory Board — a hand-picked group of firms — work 35 percent of the time on asphalt and/or concrete — significantly more than any other type of surface. More than half works on rocky soil, and nearly a third works in demolition debris.

Despite the mean underfoot conditions, less than half of *CE* Advisors — 44 percent — invest in radial tires for their skid steers. Among those who do buy radials, about a quarter use radial tires on 75 percent or more of their skid steers, and more than 10 percent demand radials for virtually all of their skid steers.

Radial tires are significantly more common on the largest skid steers, with nearly 35 percent of owners of machines rated at 2,200 pounds reporting that half or more of their units ride on radials. Less than 20 percent of owners of 1,600- to 2,200-pound machines say they use radials on half or more of their fleets.

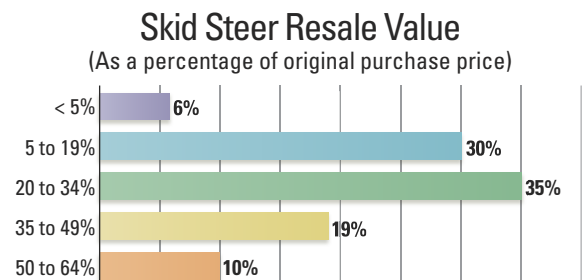
Half of skid-steer managers make sure tire inflation pressure is checked at least daily (20 percent) or weekly (30 percent). Eighteen percent of these *CE* Advisors admit that tire pressure is checked only at engine-oil changes, and 10 percent do not know when inflation pressure is checked.

Half of the *CE* Advisors who responded to the Skid Steer Survey characterize themselves as highway-and-heavy contractors, and 16 percent said they are general contractors engaged in both highway/heavy and general building work. Fleet values managed ranged from \$5 million to over \$100



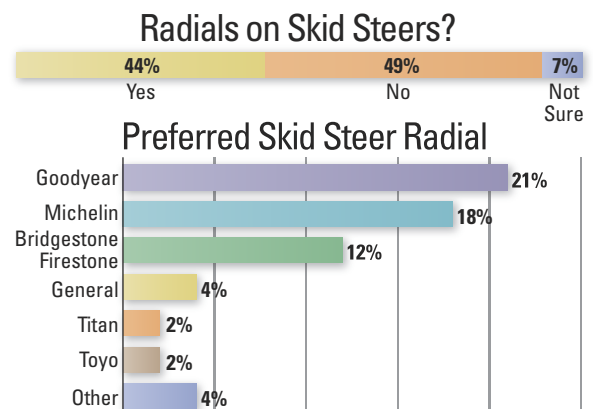
Source: Construction Equipment Reader Advisory Board Skid Steer Survey 2008

Twenty-five percent of owners of the largest skid steers (capacities of 2,200 pounds or more) will spend more than 75 percent of a machine's purchase price on repairs.



Source: Construction Equipment Reader Advisory Board Skid Steer Survey 2008

A third of owners of 1,600- to 2,200-pound skid steers recoup 35 to 64 percent of their original purchase price when they sell their skid steers.



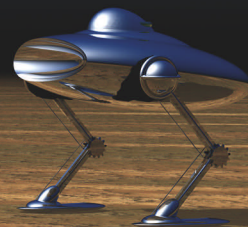
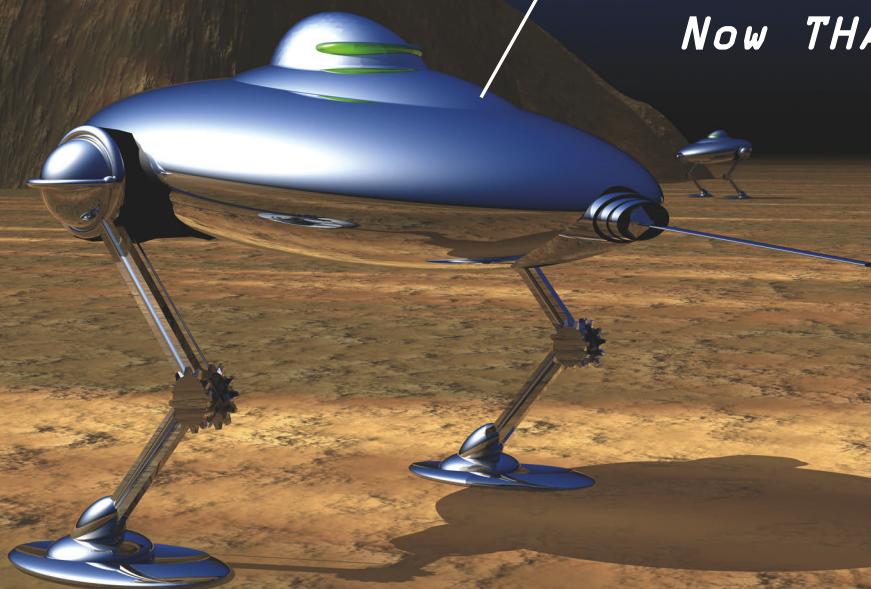
Source: Construction Equipment Reader Advisory Board Skid Steer Survey 2008

Managers who use radial tires put them on 77 percent of their skid steers.

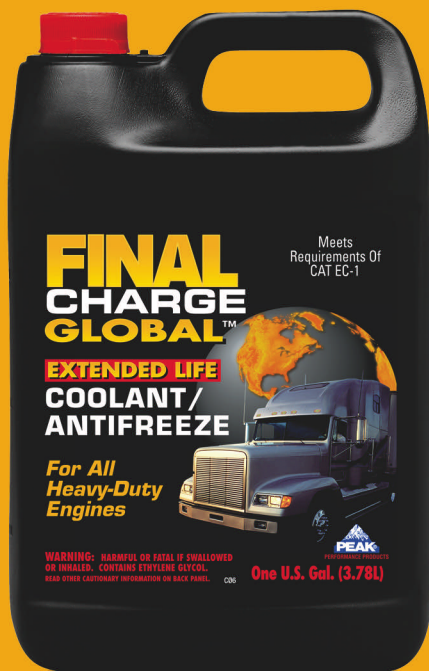
million, with nearly half of the responses coming from firms with \$25 million to \$100 million worth of equipment.

Reader Advisory Board research is co-sponsored by Case Construction Equipment.

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Project Stakeholders Stay Connected

Trimble's Connected Community brings together established product 'pillars' via fully integrated, two-way data transfer and real-time communications

Providing respective stakeholders with the tools to work efficiently on a construction job is the core principle behind the established products of Trimble Navigation Ltd. Bringing those systems together is the newest frontier.

Trimble Connected Community is a Web-based set of networking tools that allows heavy and highway contractors to continually be in sync with job partners and clients, be they from within the same organization or beyond. With the building of information portals, Connected Community provides a cross between the site positioning, grade control and asset management "pillars" to allow head office management, site office teams, field crews, subcontractors, engineers, clients and even suppliers to both share information and collaborate.

"We've had the tools in each of the pillars in the past, but we haven't connected them or crossed the boundaries of the pillars per se like we have now," says Paul Thomas, Trimble's Southeast regional sales manager, heavy and highway division. "This is getting far beyond just bolting iron on a piece of machinery or using a GPS rover pole for one task on a job."

As a collaborative environment, Connected Community leverages information resources, promotes efficiencies, and reduces delays associated with communicating and sharing information with multiple stakeholders on the construction site, according to Sunnyvale, Calif.-based Trimble. In grade control, Trimble offers an intelligent live link between on-site

earthmoving machines and the office that enables contractors to send updated design information directly to the machine cab, both eliminating time-wasting trips and reducing costly errors caused by different people not working from the same plans. Now with Connected Community, that goes a step further, integrating the information flow to other site stakeholders.

"It's able to give people access to information that they need, whereas you would have had to pick up the phone and call 10 different phone numbers," says Thomas. "Now, as soon as I make a change to something, it's populated and everybody gets notified who needs to be notified."

The amount of feedback following the product's Conexpo-Con/Agg launch was "astounding," says Thomas. "You would think that, with the high technology, it would just be the bigger companies out there, but it's not. It's the small- and mid-sized all the way up through the large companies that are calling and saying, 'Hey, I saw this at your booth. I saw this working both inside and outside. Come to my jobsite, and show me how and what we need to do to get this running.'"

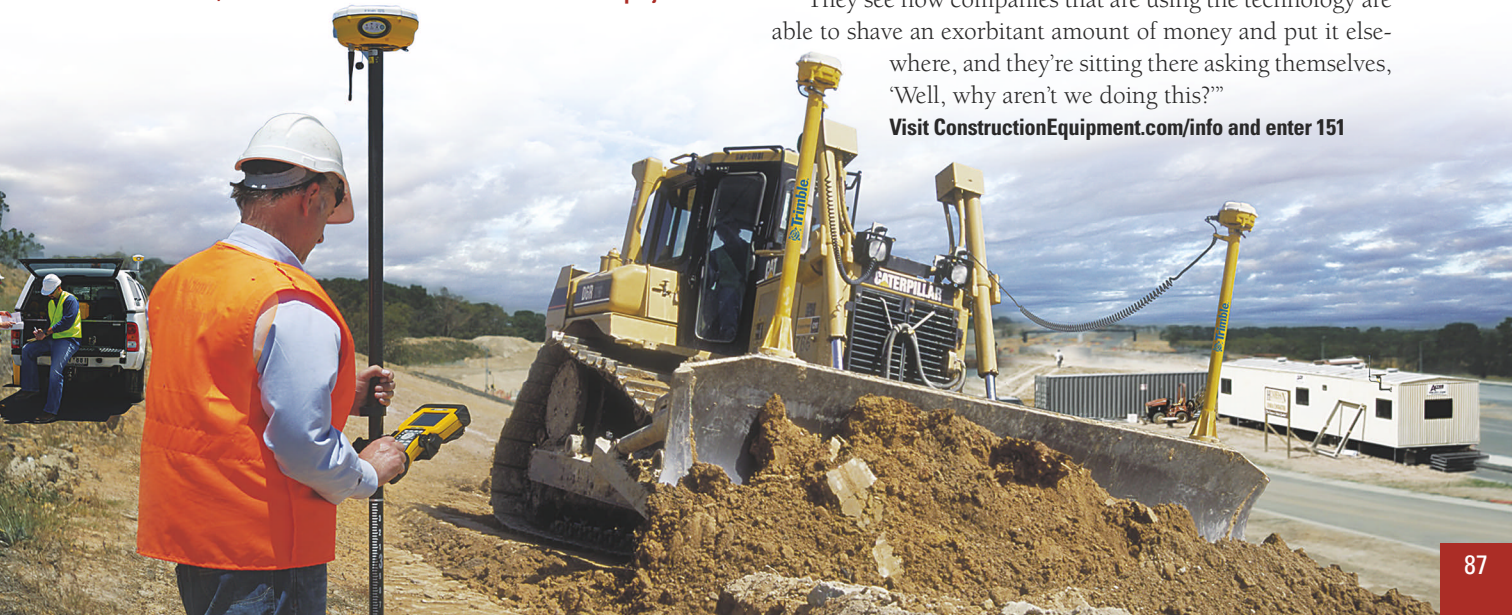
And the appeal is hitting beyond customers of Trimble site positioning, grade control and asset management products.

"It's a combination of both," says Thomas. "It's customers who have had the suite of products, have been using it, have gained tremendous strides in their efficiencies on the jobsite, and now want to take it to the next level. And then, just last week, I went to a company in Alabama that has nothing and is getting involved just now in the technology, and they were real keen on the Connected Site/Connected Community aspect of it."

"They see how companies that are using the technology are able to shave an exorbitant amount of money and put it elsewhere, and they're sitting there asking themselves, 'Well, why aren't we doing this?'"

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By linking site-positioning, grade-control and asset-management "pillars" already established in the company's product line, Trimble's Connected Community allows contractors to build information portals, share information, and collaborate between all stakeholders on a project.





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Volvo Swings at Pipelayers with an Excavator

Crane-like load management, long booms, and 360-degree load positioning suggest production advantages over tractors with side booms

Volvo Construction Equipment challenges pipe-laying convention — fitting a bulldozer with a side boom for lowering pipe into trenches — with its excavator-based PL4611 and PL4608 pipelayers. The 360-degree swing capability suggests significant pipe-handling advantages including keeping the operator facing the pipe, and Volvo claims better stability with wider track gauge and lower center of gravity than tractor pipelayers. Longer booms and the ability to be converted to a conventional excavator and back are features that further distinguish the first models in Volvo's PL line.

The PL4608 has a maximum tipping capacity of 176,400 pounds and the Volvo PL4611's tipping load is 242,500 pounds. The two form the center of what Volvo plans to be a four-machine line. The largest pipelayer, the PL7015, is expected to have a 330,700-pound maximum tipping load.

Positioning a load with tractor side booms often requires jockeying the whole machine. Each Volvo pipelayer model offers full lifting performance and functionality at all radius positions around its 360-degree swing.

In addition to wider gauge and lower center of gravity, the Volvo pipelayer's boom is mounted inboard of the track frame, closer to the machine's centerline than tractor pipelayers with the boom mounted on one track frame. The resulting improvement in lift capacity and stability allows the Volvo pipelayers to wield longer booms than tractor side booms. Boom lengths range from 30 to 38 feet, depending on model, compared to typical dozer side-based booms of 20 to 28 feet. This allows higher hook height or working further away from the trench to avoid caving in trench walls.

An electronic Load Management System (LMS) constantly computes load charts for 360-degree rotation and infinite machine geometries up to a 35-degree grade. The operator inter-



Volvo's PL4608 pipe-layer, with rated tipping load of 176,400 pounds, has hydraulically variable track gauge for stability at work and easy transport.

acts with the system via a graphic display on a monitor in the cab. Load-indicating lights on the boom tip warn the operator and ground personnel if the load exceeds the pipelayer's tipping capacity. A standard anti-two-block device is designed with auto kick-out at full winch-up.

Visibility is substantially improved thanks to elevated cabs and an asymmetric boom design. Because the operator is always facing the load, there is little visibility disadvantage to operating from an enclosed cab.

The larger pipelayers have variable track gauge or easily removed track frames, counterweights and booms. Volvo says these models can either self-disassemble or reassemble in less than one hour without the need for assistance from another lifting machine.

Volvo patented several combinations of excavator design and lifting technology in the new pipelayers. Prototypes of the Volvo PL4611 and the PL4608 have been in the field this spring and summer, and the company expects production units to be available before October 2008.

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Volvo PL4611 Specifications

Boom Length	Track Gauge	Operating Weight	Counterweight	Engine (Volvo)	Horsepower
30' 3"	15' 6"	150,220 lb.	20,260 lb.	D12D EAE3	315

Source: Volvo Construction Equipment

The PL4611 and PL4608 are the core of Volvo's pipelayer line, which is expected to top out at the PL7015 with a 330,700-pound tipping load — 40 percent higher than the largest tractor side boom.

A man's profile is shown in a three-quarter view, looking upwards and to the left. On top of his head, a small yellow excavator and a grey skid steer loader are balanced. The background is white.

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Market Watch Lite

By KATIE WEILER, Managing Editor

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◀ Nye

With a cutting blade made from hardened QT100 steel, hard faced on the cutting edge, the XSH4 stump harvester attachment is designed to slice through the toughest of stumps, grubbing out all the roots along the way. It can also split large hardwood logs, both lengthwise and crosswise. Customers have a choice of teeth for ripping, prying and digging.

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▶ Multiquip

Rammax Viper trench rollers include articulation and oscillation joint, Straight Compaction Technology (SCT), internal drum scrapers, and an easy-access exciter system. SCT allows the exciter system to supply equal amplitude to all four drums. RX1510C has a cabled remote, and the RX1510CI has infrared remote. Viper delivers 2,460 vpm with centrifugal forces up to 15,543 pounds.

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◀ Atlas Copco

The MB 1500 is suited to carriers in the 17- to 29-metric-ton weight range, accepting hydraulic input flow of 32 to 41 gpm at operating pressures of 2,320 to 2,610 psi. The AutoControl monitoring system allows the 3,310-pound breaker to adapt its frequency and power output to match operating conditions, first by firing a stroke at half-power to create a pilot notch to center the working tool and prevent unnecessary tool slippage. StartSelect allows breaker start-up and shut-off to be adjusted to fit job-site conditions, while the VibroSilenced damping system helps to alleviate excess noise and vibration.

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▶ Construction Lifters

The new leveling pipe lifter, with a laser target holder, is designed to facilitate the placement of concrete pipe. The leveling bail allows for adjustment for varying pipe lengths, and the adjustable bail block facilitates repetitive lifts. Available in standard capacities of 1.5 to 15 tons, custom sizes are available upon request.

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Market Watch Lite



Tramac

The SC-42 fits excavators, backhoe loaders and skid steers ranging 5 to 12 metric tons in weight. With an operating pressure of 1,812 psi, the SC-42 has a flow range of 14.5 to 26.4 gpm and is rated at an impact energy class of 1,250 foot-pounds with an impact frequency range of 550 to 1,450 bpm. Handling tools measuring up to 3.31 inches in diameter, the 967-pound breaker attachment has many of the SC-Series features, including an automatic pressure regulator.

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Atlas Copco Construction Tools

The BP 2900 bulk pulverizer attachment provides 399 tons of maximum cutting force and 125 tons of crushing force at the jaw tip. With a service weight of 6,460 pounds, it operates at a maximum pressure of 5,075 psi, accepts a maximum hydraulic flow of 92 gpm, and is suitable for carriers in the 25- to 35-metric-ton weight class. The tool has an angular design with a 37.4-inch jaw opening and an 18.9-inch working width.

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Allen Engineering

With their low-friction vibrator heads, the hand-held Power Vibe and Power Vibe Pro concrete vibrators are capable of extended runtimes outside of concrete without burning up. Power Vibe has flexible shaft lengths ranging 2 to 10 feet and head sizes of 1 to 2 inches in diameter. Power Vibe Pro comes with a rigid frame extension to the shaft, along with a standard head of 2 inches in diameter.

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Graco

Hydra-Clean air-operated pressure washers can be used with cold or hot water, up to 200 degrees, as well as with detergent or chemical solutions. Supporting multiple guns each, three model sizes are available, offering a choice of 12:1, 23:1 and 30:1 ratio units with maximum fluid pressures of 1,250, 2,275 and 3,065 psi, respectively. Flow rates of the three sprayers range from 6.8 to 9.2 gpm. Both wall- and cart-mounted configurations are available.

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Stone Construction Equipment

Stone adds the WBR650 walk-behind roller with 25.5-inch drums and a 10-horsepower Lombardini diesel engine to its lineup. The vibratory system delivers compaction force of 2,925 pounds, and the hydrostatic transmission with twin-drum drive will make a maximum travel speed of 2.5 miles per hour.

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Market Watch Lite



▲ Nye

Designed primarily for demolition work, the XCG2 is the latest in the "Contractor Grapple" product line. With tips made of AR400 steel with improved geometry for better penetration, the grapple's tines are made from QT100 steel plate, serrated on the sides for improved gripping/pulling of material. Stringers extend all the way from the tips to the bridge, forming an individual T1 box section for each tine.

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▼ Thermal Dynamics

Designed for increased portability, the Cutmaster 102 and Cutmaster 152 round out the Cutmaster True Series line of portable, manual plasma cutting systems. The 102 and 152 have a maximum cut of 1.75 inches and 2 inches, respectively. Standard features include a rugged roll bar for more durability and protection, front-panel status LEDs, and a 60-amp drag cutting tip.

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Market Watch Lite

▶ Loup Electronics

An advanced weighing mode newly offered with the Loadlog 800PSi and 8000PSi on-board wheel loader scales is designed to reduce the impact that external influences such as vehicle bounce, changes in direction and engine/lift speed have on weighing accuracy. Loup also redesigned the displays, making them more intuitive for the operator. Other product features include automatic speed-compensated dynamic weighing, live last bucket tip-off, multiple attachment calibration, and an internal database.

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▶ PulseTech Products



PulseTech says its Xtreme Charge 12-volt battery chargers bring years of development for the U.S. military to increase the average life of any 12-volt lead-acid battery by two to five times. Testing circuitry integrates a computer to evaluate voltage and amperage simultaneously — claimed to be an industry first — and deliver the appropriate amount of charge from 0.1 to 2.5 amps depending on the battery's condition. Patented pulse technology minimizes sulfation buildup on battery plates.

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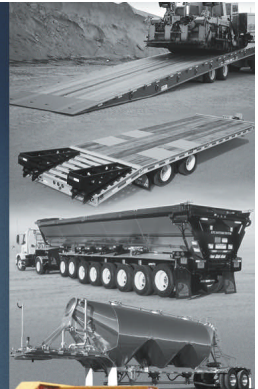
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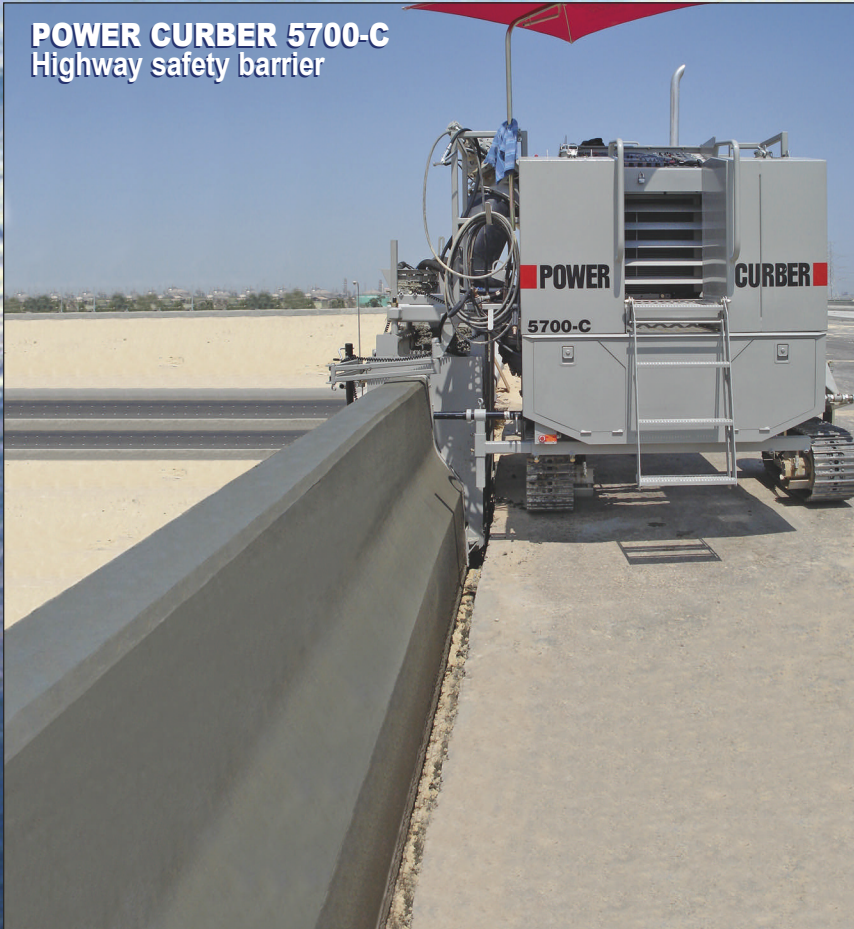


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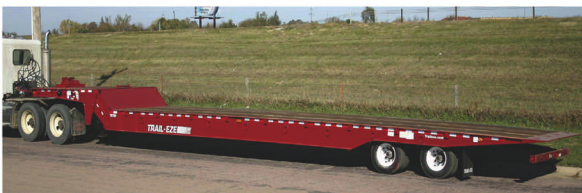
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Thermal Dynamics

At 29 pounds, the new AirCut 15C manual plasma cutting system from Thermal Dynamics is both portable and self-contained. It has a recommended cut of 1/8 inch, but can cut up to 3/16 inch. The internal air compressor and the 120-volt, 15-amp plug ensure that the unit can easily be moved from place to place.



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ACS Industries

ACS offers grapple buckets for wheel loaders, including a scrap grapple and trash grapple. Buckets come with bolt-in edges, rubber edges or metal grating. Standard pin-on or coupler mounting is available.

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Thermal Dynamics

Able to cut and gouge at 200 amps, the PAK 200 manual plasma cutting system has a maximum cut capacity of 2.75 inches on mild steel. It has a liquid-cooled torch that extends the life of the parts, as well as dual-gas capability for added cut quality and control. The PAK 200 can remove up to 25 pounds of carbon steel per hour.



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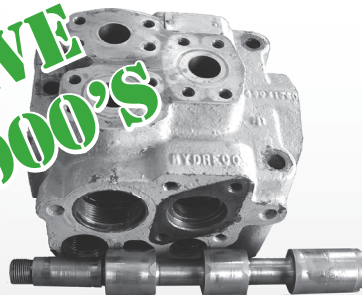
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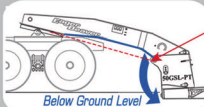
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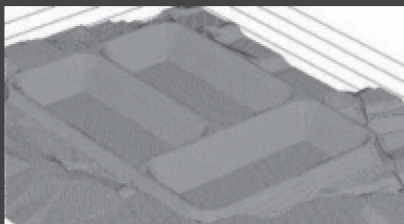
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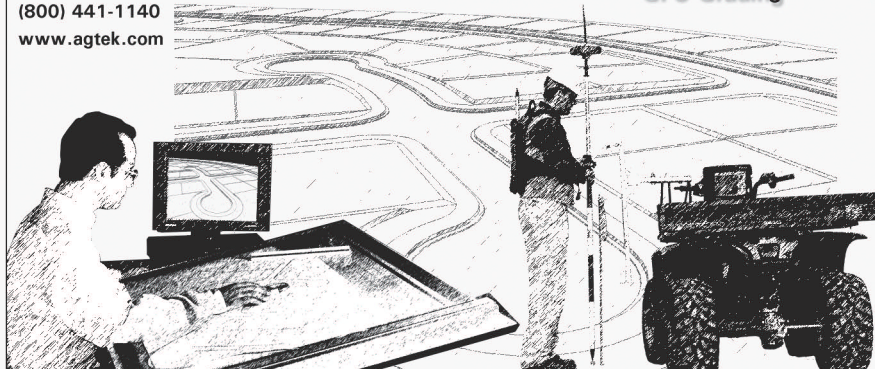
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Gorman-Rupp Pumping Water for 75 Years

Small company started by two Ohio entrepreneurs during the Great Depression became a world leader in pump manufacturing — this year celebrates 75 years in business

Back in 1933, two Ohio businessmen, struggling to find a way out of the Great Depression, shook hands on a deal to establish a small manufacturing business. J.C. Gorman and H.E. Rupp pooled together \$1,500 and a prototype self-priming centrifugal trash pump developed by Rupp. With a shared vision, they began The Gorman-Rupp Co. in a barn on the outskirts of Mansfield, Ohio. The founders' innovative talents and business aptitude have grown the company to be a world leader today, with manufacturing and warehousing operations in the United States, Canada, Asia and Europe.

Throughout the past 75 years, The Gorman-Rupp Co. has introduced a long list of innovations to the pumping world. The self-priming centrifugal pump with end plate valves was the first product to establish the company's reputation as an innovator and manufacturer of quality products. The "removable cover plate" was a breakthrough that changed the industry when Gorman-Rupp created it because of one customer's need for a pump that could withstand the demands of pumping out septic tanks, cesspools and outhouses.

One of the more unusual pump innovations was the Aquamatic K-Pad pump for hot and cool medical therapy, and in the late 1950s, Gorman-Rupp designed and developed a specially powered pump for use by home heating and fuel oil delivery services. Further enhancement of this technology eventually led to high-speed aircraft refueling pumps.

In 1961 Gorman-Rupp announced the Model 3VS1 submersible pump and, with the advent of new technology, became the first American manufacturer to offer a wide line of submersible pumps. Further innovations included a small, self-priming centrifugal pump specifically designed for residential sewage, and the Gorman-Rupp patented double-floating mechanical seal with titanium rotating and stationary elements.

The original T-series self-priming centrifugal pumps were developed in the 1960s and targeted for industrial and sew-



**Gorman-Rupp
80 Series pump
working in the
1950s.**

age markets. These solids-handling pumps evolved into today's Super T Series in sizes from 4 to 10 inches and 140-foot maximum head. They incorporate an external shimless wear plate and impeller adjustment system to prolong component life. Built upon the foundation of the Super T Series, Gorman-Rupp announced the Ultra V Series in 2005, offering greater heads and flows than were possible with traditional self-priming pumps.

The latest innovation, helping to celebrate the company's 75th anniversary, is the sound-attenuated pump enclosure, an environmentally engineered, acoustically treated box to reduce noise levels to as low as 63 dB(A). Meanwhile the company is proud to look back on its growth from that original barn in Mansfield, Ohio, to its worldwide operations today with over one million square feet of manufacturing and warehousing space, and a vast line of pumps serving many industries.

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