

Joystick control for Cat M-Series motor graders

The main story behind **Caterpillar's** new seven-model lineup of M-Series motor graders is not that they meet U.S. **EPA** Tier 3 and EU Stage IIIa emissions regulations—which they do—but rather that they feature some “revolutionary” concepts in motor-grader design. Most notable is a pair of joysticks that replace as many as 15 levers and a steering wheel to control machine functions.

“What you’re seeing is probably the most significant change in the motor-grader industry since the introduction of the G-Series [which added hydraulics] 33 years ago,” said Don Stamberger, Product Manager for Caterpillar motor graders.

Motor graders have a reputation for being the most difficult of all earthmoving machines to operate because of the many control inputs required and the precision work they perform. Cat has addressed those difficulties by designing the new M-Series joystick-operated electrohydraulic control system to make the motor grader easier to learn and less fatiguing to operate.

Three motor-grader customers, with operating experience ranging from 9 to 36 years, attested to

how easy the system was to learn and operate at a press introduction for the M-Series at Cat’s Edwards Demonstration & Learning Center in Illinois. So easy, in fact, that members of the media took their turn at handling the machines—albeit at a far-from-expert level—after only about 30 min of training on a simulator.

“Customers need machines that practically operate themselves, or at least make it easy for an inexperienced operator to operate like the experienced pro—productively, efficiently, and safely,” said Bill Mayo, Vice President of Cat’s North American Commercial Division, addressing the issue of a pending shortage of skilled workers due to retirement.

The pair of three-axis joysticks are built for comfort and low-effort operation, featuring an intuitive control pattern (see table). According to Cat, the joystick control system reduces operator arm and hand movements by as much as 78%, helping operators sustain high efficiency levels throughout the work day.

The new control system opens up the interior and enables much-improved sight lines to all critical areas since the front of the cab’s width is no longer dictated by the width of all those levers. The cab doors are angled and the floor is tapered to provide an unobstructed view to the front tires, the heel and toe of the blade, and the DCM (drawbar, circle, and moldboard). The cab is also 5 in (127 mm) deeper for more legroom.

According to Howard Woolard, Commercial Manager for Cat motor graders, the joysticks did not add significant cost because a lot of the hardware components from the previous system—including the levers and rods—were not needed, so costs were “backed out.”

In addition to changes inside the cab, the sloping, tapered engine enclosure opens lines of sight to the ripper. To reduce glare, the M-Series machines have black paint on the top surfaces of the front frame, blade lift cylinders, and engine enclosure.

Development of the new M-Series motor graders began in early 2003. While the timeline was driven by emissions regulations, Cat engineers took the opportunity to rework a significant portion of the machines. The company applied for more than 100 new patents while developing the motor graders, which include about 30% new content.

The M-Series’ all-wheel drive (AWD)—optional on the 120M, 140M, and 160M—delivers 52% more torque than the H-Series system. The M-Series uses dedicated left and right pumps, which allow independent control of hydraulic flow to each front wheel hydrostatic motor. To compensate for hydraulic power demand, the engine automatically delivers additional power to provide constant net power to the ground.



Caterpillar's new M-Series motor graders meet U.S. EPA Tier 3 and EU Stage IIIa emissions regulations, and feature some “revolutionary” concepts in motor-grader design.



The M-Series’ joystick-operated electrohydraulic control system opens up the interior of the cab, enabling much-improved lines of sight. The cab doors are angled and the floor is tapered to provide an unobstructed view to the front tires, the heel and toe of the blade, and the DCM.

LOOKING FOR INNOVATIVE, CUSTOM-ENGINEERED AND STANDARD CAN/J1939 VEHICLE INSTRUMENTATION & CONTROLS?

Maxima's CAN/J1939 data-bus gauges make a direct connection to bus network—no instrument controller required



CAN-bus cluster-display integrates the vehicle's transmission controller, thus eliminating a costly part



Innovative cluster enabled customer to achieve substantial savings compared to conventional gauge panel assembly



CAN/J1939 and analog instrument clusters designed by Maxima as platforms allow customer to differentiate brands and achieve economies-of-scale

Call Maxima today at 717-581-1000, extension 306 and discover why global OEMs like **AGCO, CAT, CNH, Deere, Kubota** and **Harley-Davidson**, partner with us.

See Maxima at Booth #217 at the 2006 SAE Commercial Vehicle Congress: 10/31/06-11/2/06

sohe.hotims.com/11039-239X



MaximaTech.com

YOUR SIX-SIGMA INSTRUMENTATION & CONTROLS PARTNER™

Caterpillar's new control system was designed to make the motor grader easier to learn and less fatiguing to operate. After only about 30 min of training on a simulator, journalists took their turn at handling the real machines.



Through an electronic control module, front wheel speeds can be controlled automatically. The benefit of varying the outside and inside wheel speeds, known as steering compensation, is full torque through an entire turn. The speed of the outside front wheel can be automatically increased to 21% faster than the inside front wheel. In adverse underfoot conditions, this feature—which is said to be exclusive to Cat—allows a 12- to 15-ft (3.7- to 4.6-m) reduction in turning radius.

The AWD system also features a new front-wheel-only hydrostatic mode for precision low-speed performance. This mode provides infinite front-wheel speed control from 0 to 5 mph (0 to 8 km/h) for enhanced control when working in tight areas, such as cul-de-sacs.

Variable horsepower (VHP) is now standard on all M-Series models, and VHP Plus is optional. The power-management system delivers additional power in 5-hp (3.7-kW) increments as the transmission gear selection increases, resulting in a smooth power curve that allows M-Series machines to carry heavy loads while downshifting.

The previous system delivered an extra 20 hp (15 kW) in gears 4 through 8, and VHP Plus added another 20 hp (15 kW) in gears 7 and 8; however, operators prefer smaller increments throughout the gear range because it provides more-predictable power. With more rim pull available in all gears, M-Series machines are more productive than their H-Series predecessors, according to Cat.

Powering the new motor graders are the proven C-Series engines with ACERT Technology, which already have been used fairly extensively in highway truck applications. "There are enough similarities [between trucks and off-highway machines] that our engineers were able to capitalize on some of the requirements," said Mayo. "In fact, Cat engines with ACERT Technology for on-highway and off-highway applications are really composed of about 90% common core or

Joystick Control	
Left joystick	Right joystick
Fore/aft = Left blade lift	Fore/aft = Right blade lift
Detent = Left blade float	Detent = Right blade float
Side-to-side = Steering	Side-to-side = Blade shift
Twist = Articulation	Twist = Circle turn
Right yellow button = Automatic return to center	Hat switch fore/aft = Blade tip
Top black buttons = Wheel lean	Hat switch left/right = Drawbar shift
Trigger switch = Transmission direction	
Top yellow buttons = Gear selection	

identical core iron."

For the M-Series, power ranges from 125 hp (93 kW) for the 120M model up to 500 hp (373 kW) for the 24M.

The motor graders incorporate some new drivetrain features, including a bolt-on modular rear axle. The new axle module allows the axle and both tandem cases to be dropped down for servicing, which reduces service time.

All M-Series models except the 24M feature a direct-drive countershaft transmission. Electronic clutch pressure control makes gear-to-gear as well as forward/reverse shifts smoother and prolongs the life of all drivetrain components. Autoshift and overspeed protection are new features for the transmission, which has been isolation-mounted for reduced vibration and noise.

Top-accessible drawbar wear inserts and patented, easy-to-adjust, bidirectional moldboard slide rail wear strips make DCM adjustments more convenient and much faster—a 77% reduction in maintenance time compared to the H-Series.

By removing the access plates located on the top of the drawbar, a mechanic can maintain the circle by adding shims for wear strip adjustment or by replacing the wear strips when they are worn out. Changes to the moldboard retention system and the slide rail wear inserts make moldboard service easier by eliminating the need for shims. The new bidirectional slide rail shoes allow adjustment up and down as well as fore and aft, helping to eliminate moldboard chatter.

The M-Series motor graders will replace the 10 H-Series models as the new machines are released starting in the fourth quarter of this year and concluding in mid-year 2007. The new models include the 120M, 12M, 140M, 160M, 14M, 16M, and 24M.

Ryan Gehm

Vögele America gives a close pave

The new Super 700 paver from **Vögele America** is said to combine "highway-class technology" in a compact package suited for paving cart, bike, and walking paths, as well as confined areas. It can also be used for repair of milled areas and for conventional commercial applications.

Unique to the Super 700 is the ability to drive through an opening less than 4-ft (1.2-m) wide; drive in a footprint of 113 in (2870 mm); and pave within 2 in (50 mm) of boundaries, such as buildings, barriers, and other obstacles. It can also be operated with one person, and has two positions at which the operator can stand—either on the screed or on an elevated platform.

The Super 700 is powered by a liquid-cooled **Deutz** BF3 M 2011 diesel engine rated at 57 hp (43 kW) at 2300 rpm.

Vögele America says efficiency is designed into the paver with the unique ECO Mode, allowing the engine to provide sufficient power for all functions, but at a lower rpm for less fuel consumption, less noise, and reduced wear. The powerplant also includes an 8-kW tractor-mounted generator for screed heating and lighting.

Hopper capacity for the Super 700 is 5.5 ton (4.9 t). Unlike all other hydraulically operated hopper designs, claims Vögele America, the hopper sides are also equipped with hinges, allowing for many material-feed configurations.



Vansco.
»» Leading Multiplex Systems

Worth your
attention.

You can pour on the charm with the maintenance folks and stir up enthusiasm in IT. But when the CEO and the finance folks see how you can boost profits, your project will really fly. > Vansco's multiplex system is worth your attention. > Each one of our identical, patented modules contains the entire intelligence of your vehicle. The one part number system reduces your inventory cost. > Simple Windows-based ladder-logic programming lets you make changes efficiently and keep track of them easily, reducing time-to-market. Configuration is quick and easy. > The modules communicate using industry standard, J1939 protocol. Distributed in your vehicle, they effectively minimize wiring and reduce the use of fuses, breakers, and relays. And, service if ever needed, is as simple as plugging in a replacement and letting it program itself. > Vansco's advanced on board diagnostics system allows access to your entire vehicle's electrical system. For detailed technical specifications visit www.vansco.ca/jug

Intelligence for your competitive advantage. **VANSCO**

sohe.hotims.com/11039-241X

See us at **SAE Commercial Vehicle Booth #407**

Vansco Electronics LP 1305 Clarence Ave Winnipeg, MB Canada R3T 1T4 (204) 452-6776 info@vansco.ca www.vansco.ca



The new Super 700 compact paver from Vögele America is powered by a Deutz diesel and allows contractors to operate in confined areas.

Precise maneuverability is possible, with its ability to fold the hopper wings to the basic width of the paver, and its "fine tuning" steering function.

The feed system is equipped with two augers driven independently of the conveyor for optimal material flow. In addition, the augers and conveyors are reversible. The augers and conveyor are monitored by mechanical levers, and provide precise material handling. Optional sonic sensors are available for the augers.

The Super 700 is capable of paving a 6-in (152-mm) depth mat at a laydown rate of 220 ton/h (200 t/h). Paving speed is up to 98 ft/min (30 m/min), and the transport speed is 2.2 mph (3.5 km/h).

An electrically heated AB 200 V screed comes with the Super 700. It has a basic paving width of 3.6 to 6.5 ft (1.1 to 1.9 m). With cut-off shoes and bolt-on extensions, the paving width is 1.64 to 10.5 ft (0.5 to 3.2 m). A high-density screed, the AB 200 TV, also is available.

It is equipped with hydraulic crown capable of -2.5 and +4.5%. Unlike most commercial paving screeds, the AB 200 is equipped with full-depth, hydraulically extended sections that are equipped with heat and vibration. This design provides consistent mat texture, higher density, and maximum rigidity. Bolt-on extensions are also full-depth and full-function.

Jean L. Broge

Volvo CE recycles wheeled excavator for waste applications

There has been a growth in recent years of preliminary sorting yards, where waste material such as wood, steel, paper, general waste, etc. are segregated. These yards are often in urban or even inner-city locations, and sometimes indoors. Intended for use in such areas, a specially designed 16.8- to 18.5-t (18.5- to 20.4-ton) version of the EW160B wheeled excavator from **Volvo Construction Equipment** offers a tight turning circle and short swing radius of 2150 mm (85 in).

The maximum working range on ground level is about 8.2 m (27 ft) and maximum height is 9 m (30 ft) with two-piece boom and material-handling arm. The machine is also available with mono boom.

Engineers adapted the undercarriage with bigger axles, a stronger platform, and bigger outriggers for enhanced stability and increased lifting performance. Its maximum lifting capacity is 2.9 t (3.2 ton) at full reach (excluding attachment) with material-handling arm. To prevent dust clogging, separate, well-placed, and easy-to-clean coolers help ensure maximum uptime and long life for the machine and its components. The EW160B can travel at a top speed of 35 km/h (22 mph).

The EW160B features a cab that can be hydraulically elevated to raise the operator's line of sight by a maximum of 5600 mm (220 in). The advantage of this system over the more usual higher waste handling cabs (that are permanently fixed on a raised platform) is that the operator can set the optimum

height for any task, and in its lowest setting entry to the cab is both easy and safe. Other than the control to operate the elevation of the cab, the operator's work environment remains largely the same as on the standard EW160B.

Fitted with a Volvo D6D engine that has been developed especially for wheeled excavator use, its maximum power output is 148 hp (110 kW) and maximum torque of 595 N·m (440 lb·ft) at just 1500 rpm. The turbocharged, four-stroke diesel engine features water cooling, direct injection, and charged air cooling. An automatic idling system is also incorporated that reduces engine speed when the levers and pedals are dormant. Centrally positioned fuel pumps deliver high injection pressures.

Volvo's Contronics electrical system allows the operator to receive data on machine functions (available in 13 languages) such as fuel consumption, oil levels, fluid levels, and temperatures. These data are also recorded for later diagnostic download. The advantages of this system include highlighting existing problems early on and forecasting potential failures before they occur, allowing preventive maintenance to be conducted for minimized downtime.

Load-sensing hydraulics allows for simultaneous commands to be performed by directing flow only to those areas where power is needed. The demands of differing attachments can also be accommodated via an adjustable hydraulic flow facility,

*At the heart of tomorrow's
mobile machinery*

ATER TOTAL EFFICIENCY | DESIGNED FOR QUALITY AND RELIABILITY | INSTALLATION AND PACKAGING BENEFITS | OPTIMIZED FOR ELECTRICAL

H1 – the new generation of hydrostatics

AGING BENEFITS | OPTIMIZED FOR ELECTRICAL CONTROL | EXPANDED FUNCTIONALITY | GREATER TOTAL EFFICIENCY | DESIGNED FOR QUAL

H1 is a range of servo-controlled hydrostatic single and tandem pumps, developed with a clear vision of tomorrow's world. Built around an advanced electrical control, every member of the H1 generation offers supreme functionality and performance – and is fully Sauer-Danfoss PLUS+1™ compliant.

The H1 pumps are designed for quality and reliability. This key benefit has been achieved through a significantly reduced part count and a robust, yet streamlined design. Other benefits include installation and packaging benefits, expanded functionality and greater total efficiency. H1 – at the heart of tomorrow's mobile machinery – will improve overall system performance.

**For more details please visit
www.sauer-danfoss.com/H1**



For a free video about Sauer-Danfoss hydraulic system solutions and an H1 brochure, call 515-956-5750 or contact Nadvertising@sauer-danfoss.com

**SAUER
DANFOSS**

What really matters is inside®

 COMPLIANT

sohe.hotims.com/11039-243X

www.sauer-danfoss.com/H1

>> PROFESSIONAL
J1939 AND ISO 11783
DEVELOPMENT



The launch of an EW160B from Volvo Construction Equipment that was adapted for waste applications is representative of the company's focus on providing application-specific products that provide tailored customer solutions. It is envisaged that sales will initially come mainly from Europe, where waste legislation is compelling a more efficient approach to recycling.

- > Analyze your networks with **CANalyzer**
- > Cover the entire development process with **CANoe**

vector 

Vector CANtech, Inc.
39500 Orchard Hill Place, Suite 550
Novi, MI 48375 USA
(248) 449-9290

www.vector-cantech.com

which the operator can determine from inside the cab.

The EW160B has either four outriggers or two outriggers and a dozer blade. The outrigger spread is almost 4 m (13 ft) wide for enhanced stability. They are independently controlled and fold in tight to the body of the machine when not needed. Where it is not practical to use outriggers, optional drum brakes can be deployed to ensure controlled material handling or sorting. The frame is an all-welded torsion steel box and there is a choice of single or twin wheels with different dimensions available. Solid tires for heavy ground conditions such as scrap yards are also available as an option. The front axle is configured with an automatic or operator-controlled front axle oscillation lock, improving safety when lifting.

The drivetrain comes in the form of a large variable axial-piston motor on the two-step Power Shift gearbox, providing power to the (larger) front and rear axles. Service brakes are servo-hydraulic self-adjusting wet multidiscs in two circuits. The superstructure is slewed by means of an axial piston motor with a planetary reduction gear. Automatic slew holding brake and anti-rebound valve are standard.

The operator's cab is supported on hydraulic damping mounts that absorb shock and vibration, and is fitted with a sound-absorbing lining that reduces noise levels. Good all-round visibility is provided by large glass screens and thin pillars. The front windshield can also slide up out of the way into the ceiling void, and the lower front glass can be removed and stored in the door. The pressurized and filtered cab air is supplied by an automatically controlled fan, distributed via 13 vents. The operator's seat has nine different adjustments to accommodate a range of operator seating preferences.

An I-ECU (instrument-electronic central unit) provides the operator with all relevant information about machine status in what Volvo CE describes as a simple and logical manner. Coolant temperature and fuel level are visible, as is information on engine speed, engine hours, and system voltage. Warning lights and an audible alarm signal alert the operator in the event of a malfunction.

Jean L. Broge

sohe.hotims.com/11039-244X

See us at SAE Commercial Vehicle Booth #817

John Deere touts new engines in enhanced utility tractors

John Deere's newly enhanced 6030 Premium Series tractors come with two new 4.5-L engines to provide more power than the engines they replace. Coupled with this increase in power is an increase in the utility tractor's versatility, the company says.

The 6230 delivers 94 hp (70 kW) at the engine and 75 hp (56 kW) at the PTO. The PTO power increase is 3 hp (2 kW). The specifics for the 6330 are 105 hp (78 kW), 85 hp (63 kW), and 5 hp (4 kW), respectively. For the 6430, the specifics are 115 hp (86 kW), 95 hp (71 kW), and 5 hp (4 kW).

The PowerTech E engine, offered as an option, has two valves and a standard, nonadjustable turbocharger, and high-pressure, common-rail fuel delivery. Designed with low-hour-use and/or light-duty applications—such as medium PTO work and light cultivation and spraying—in mind, the engine is “ideal for rental and governmental agencies looking for an economical tractor to be used in light work situations,” said Al Mennenga, Product Manager, John Deere Waterloo Works.

The standard four-valve PowerTech Plus engine features state-of-the-art technology such as a variable-geometry turbocharger; cooled exhaust-gas recirculation; and high-pressure, common-rail fuel delivery. These features help provide faster torque rise, increased lugging power, and better fuel economy than the engines it replaces.

“This new technology, tested and used in larger-horsepower tractors, will perform for long hours in heavy-duty applications and is designed to deliver efficient performance in tillage, heavy PTO work, and transport,” said Mennenga.

An additional 10 hp (7.5 kW) is available when the PowerTech Plus is ordered with Intelligent Power Management, which delivers the extra power on demand when used in non-stationary PTO and transport applications.

The gearbox lineup consists of the PowrQuad Plus, the AutoQuad Plus, and the Infinitely Variable Transmission (IVT). The PowrQuad Plus, which fea-

Horizontal Integration



From Hydraulic Controls to Brakes to Friction... Carlisle's Got More Brake Solutions Than Ever

If you're responsible for designing or upgrading the brake system for your next generation off-highway vehicle/equipment, see what Carlisle can do for you. Carlisle offers extensive design experience and the widest range of brake system products in the off-highway market. We call it Horizontal Integration. To our customers, it means we can help you design and source the brake system from actuation to the brakes to the friction material.

We've designed brake systems for mining trucks, construction equipment, fork lifts, ag tractors and their tow-behind scrapers and carts, go-karts, military vehicles, motorhomes and much more. Recent expansion has added **drum brakes**, **master cylinders** and **ball-on ramp brakes** to our offering. You give us the requirements for your off-highway braking system and we'll design, prototype, test, and supply it.

Horizontal Integration ... only from Carlisle.

Download our *Mission Possible Brake Solutions*
@ www.carlislebrake.com/possible



Find out what *Horizontal Integration*
can do for you, call **800-873-6361**
or visit www.carlislebrake.com/integrate



CARLISLE
Industrial Brake & Friction



In addition to more power, John Deere's 6030 Series tractors features a "premium" cab and other enhancements.

tures 16 forward and 16 reverse speeds for a transport speed of 19 mph (31 km/h), can be used with either the PowerTech E or PowerTech Plus engines.

Available only on models using the Powertech Plus engine are the AutoQuad Plus and IVT. The AutoQuad Plus features 24 forward and 24 reverse speeds with a 25 mph (40 km/h) transport speed. There is no clutching between ranges and the transmission automatically shifts up or down according to load requirements. Deere says the IVT transmission is designed with infinite speeds to perfectly match speed and performance with ground and operational conditions.

Another highlight of the new tractors is what Mennenga describes as a "new, premium cab." It features a high-tech dash, operation symbols, and controls, and it has improved visibility in all directions, he said. Space has been added for a field office computer or refrigerator in the lighter-colored interior.

There are three console configurations available depending on the rear selective control valve specifications. The new console, with ergonomically repositioned controls, features the CommandCenter, a one-stop location to manage tractor functions such as hitch adjustment, lights, and hydraulics. A new Super Comfort Air Suspension Seat includes a heated seat cushion and enhanced control.

Tractor improvements extend to the hydraulic system. Oil flow is up 4 gal/min (15 L/min) to 29 gal/min (110 L/min) for faster cycle times of larger implements. Rear selective control valves are now available in mechanical or electronic configurations and are equipped with self-scouring dust covers. An optional hydraulic adjustable center link and hydraulic stabilizer bars allow the operator to adjust such implements as scrapers and box blades on-the-go from the cab. Hydraulic levels can be easily checked in a sight glass "to eliminate guess work when making these adjustments," said Mennenga.

Available is a new power-assisted shiftable PTO, which allows operation of a 540E PTO function at 450 rpm lower than the standard 540 setting for fuel savings. The feature is useful for mid-power settings and light applications such as mowing, spraying, and spreading fertilizer.

Other changes include a new 48-gal (180-L) fuel tank and specially designed loader-ready packages that are factory-installed to truly integrate tractor performance with the new 563 and 673 Loaders.

Made in Germany, the tractors are slated to go on sale in January.

Patrick Ponticel

Caterpillar keeps an eye on its integrated toolcarrier

Caterpillar's medium wheel-loader-based IT38G Series II integrated toolcarrier has been redesigned with the operator in mind, with improved lines of sight to the quick coupler and work tools, as well as an increased number of work tools available for the machine. Cat says the machine also maintains previous key features, including its 180-net-hp (134-kW) engine, parallel lift linkages, and integral quick couplers to handle a wide range of material-handling and digging tasks.

By evaluating component placement and rerouting hydraulic lines, Caterpillar has increased the operator viewing area substantially, making attachment changes easier and enabling material to be moved more quickly and safely. The line of buckets offered for the IT38G II has also expanded to sizes of



Caterpillar's IT38G Series II integrated toolcarrier has been redesigned to improve the operator's line of sight to the quick coupler and work tools, while maintaining a number of other features.

IT38G Series II Basic Specifications	
Engine	Cat 3126B with ATAC
Net power, hp (kW)	160 (119)
Gross power, hp (k)	180 (134)
Bucket capacities, y ³ (m ³)	2.75 to 3.5 (2.1 to 2.7)
Operating mass, lb (kg)	32,156 (14,586)
Static straight tipping load, lb (kg)	22,116 (10,032)
Static full-turn tipping load, lb (kg)	19,106 (8666)
Breakout force, lb (kN)	24,750 (110)

2.75 to 3.5 yd³ (2.1 to 2.7 m³), as compared to the previous offering of 3.0 to 3.5 yd³ (2.3 to 2.7 m³).

Prior to the update, the IT38G Series II had the quick-coupler pins actuated by a third lever and delivered pressure to move the coupler pins through a third valve. The machine now has an electrohydraulic system for the quick coupler. The new system is electrically actuated with a switch in the cab and it delivers pressure to the coupler through the brake system. This change expands work tool capabilities, because the third lever and valve are now available for additional work tool functionality, such as a top clamp or a rollout bucket. Additionally, a fourth function switch, located next to the quick-coupler switch on the implement pod, can be added for work tools having multiple functions, such as rollout buckets with thumbs.

Strategic structural changes have increased full turn static tipping load by 14% to 19,106 lb (8666 kg). The effects are improved stability and greater work capabilities without a reduction in responsiveness.

Jean L. Broge

The utility of Club Car vehicles

Club Car, part of the Compact Vehicle Technologies Sector of **Ingersoll Rand**, says it has combined safety and comfort with power and agility to create the XRT1550 series utility vehicles that it hopes will please outdoor enthusiasts as well as those with demanding outdoor chores. The XRT1550 series—including the XRT1550 two-seater, XRT1550 SE four-seater, and XRT1550 with IntelliTach—is all new and replaces the XRT1500/XRT1500 SE models.

With its stylized grille, rounded hood, and heavy-duty side panels, the XRT1550's body was designed by a variety of Club Car engineers that formerly worked for what used to be termed "The Big 3" in the automotive industry, and "the result is an exciting departure from traditional design standards," says the company. Club Car also consulted with Michigan-based **Neutech Associates** on the external design.



The all-wheel-drive, four-seat XRT1550 SE from Club Car offers a choice of bench or bucket seats, standard or heavy-duty suspension, mud or all-terrain tires, and Honda gas or Kubota diesel engines, well as underhood storage.

The XRT1550 series features the exclusive IntelliTrak technology with the "industry's only" fully automatic, all-wheel-drive (AWD) system. By continually sensing driving conditions, IntelliTrak automatically engages and disengages AWD without requiring the driver to stop, shift gears, push buttons, or lock differentials.

Club Car claims the XRT1550 series offers more feature options than any other utility vehicle, including the choice of bench or bucket seats, standard or heavy-duty suspension, mud or all-terrain tires, and **Honda** gas or **Kubota** diesel engines. For enhanced riding comfort, the XRT1550 series offers both a two- and four-seat vehicle. Each seat is equipped with a retractable seatbelt, and the entire passenger area is protected by a ROPS (rollover protective structure).

Both the 20-hp (15-kW), 614-cm³ Honda V Twin gas engine or 20-hp (15-kW), 719-cm³ Kubota diesel engine offer the strength and durability necessary to handle any jobs ranging from transporting hunters with gear through mountainous terrain to hauling riders and equipment across the farm.

Designed for maximum strength and long life, XRT1550 features a rust-proof, aircraft-grade frame and a total payload capacity of more than 0.75 ton (0.68 t). A fully independent front suspension, swing arm rear suspension, and four-wheel hydraulic disc brakes contribute to the vehicle's overall durability.

The XRT1550 IntelliTach, available only with the Kubota engine, features a fully automatic hydraulic-powered attachment system, which Club Car claims is a breakthrough in the utility-vehicle market. The new system enables the XRT1550 IntelliTach—which the company describes as "one vehicle that does the work of six"—to tackle work in farm and ranch operations, commercial and residential developments, and government and military installations.

The IntelliTach system is mounted to the frame of the XRT1550 and has arms that extend forward beyond the front cowl. Attached to the arms is a mounting plate that can connect either a bucket, a pallet fork, a push broom, a blade, or a 60-in (1524-mm) deck mower. The bucket is standard equipment; all other attachments are optional. The IntelliTach mounting plate interfaces with the corresponding plate on each attachment, and the driver uses a quick-release handle to lock and unlock the attachment. Each attachment, when in use, is controlled by a joystick located next to the driver's seat.

When attachments are not being used, the mounting plate can be removed by pulling four clevis pins, and the mounting arms can then be folded back into the

More Integration



Ball-On Ramp Brake

- Wet or dry for service or park applications
- Hydraulic or mechanical actuation
- Diameters from 4 to 9"
- Ramp angles 15 to 38 degrees
- Packages include friction and separator plates, up to 6 per brake



Master & Boosted Master Cylinders

- Optimize pedal feel
- Single and dual circuit systems
- Pressure equalization in dual pedal operation
- 36mm stroke and bore sizes from 5/8" to 1-1/4"
- Robust construction for long life

Our ball-on ramp brakes and master or boosted master cylinders are designed for a range of smaller utility vehicles, agriculture tractors and combine harvesters.

Find out more by calling 800-873-6361 or visit www.carlislebrake.com

CARLISLE
Industrial Brake & Friction



Connect Transportation Systems



ModICE™

**Need a sealed
electronics package?**

That's a Cinch!

With our new Modular Integrated Connector Enclosures (ModICE™), you've got a rugged enclosure system, heat sink and ferrite-filter options, plus simple assembly. Cinch's ModICE offers up to 60 I/O and meets IP-65, 66, 67 and 69 standards. Heat sinking is integrated into the system. The header accommodates inductive filtering. You mount the header to your board, process the board, slide it into the enclosure, and snap it shut. What could be easier? Call Cinch, today, and meet your connector-enclosure needs, tomorrow.

www.modice.info

Phone: (630) 705-6031

E-mail: transportation@cinch.com

The XRT1550 with IntelliTach is equipped with an automatic hydraulic attachment system that Club Car says redefines multitasking by enabling the vehicle to tackle the work once performed by multiple vehicles.



grille of the vehicle. One person can connect or disconnect any of the attachments, and can also detach the mounting plate from the vehicle itself.

Additional features of the XRT1550 utility vehicles include 800- to 1050-lb (360- to 475-kg) bed load capacity, based upon standard or heavy-duty suspension, an adjustable tilt steering column, 25-in mud tires, and a 12-in (305-mm) floor-to-ground clearance.

Jean L. Broge

Gehl puts power in small places

The new 7810E skid loader from **Gehl** is the ultimate "muscle machine," it says, loaded with all the power, strength, and speed needed for any agriculture or construction job site.

It is powered by a **Cummins** 99-hp (74-kW) turbocharged diesel with 305-lb-ft (414-N·m) torque. It has an increased **SAE**-rated load capacity of 3850 lb (1746 kg), which it claims is the highest in the industry. From breaking, hauling, and grinding concrete, to digging and moving materials and loading trucks, Gehl says the 7810E has the power and hydraulic capabilities to make it one of the most productive pieces of equipment on the work site.

Features include true vertical-lift linkage, which provides consistent forward reach throughout the entire lift cycle. A lift height of nearly 12 ft (3.7 m) is the highest in the industry, says Gehl.

With a 3300-psi (228-bar) hydraulic system relief pressure, the 7810E delivers a bucket breakout force of 8340 lb (37,100 N). The auxiliary hydraulic system, which provides standard 29-gal/min (110 L/min) adjustable flow and up to 41 gal/min (155 L/min) with optional high flow, contributes to enhanced hydraulic attachment performance.

Additionally, a two-speed drive is available, which offers ground speeds up to 12.5 mph (20 km/h). The 55-in (1397-mm) wheelbase, combined with the optional Hydraglide ride control system—with a special lift arm suspension system that allows the lift arm to "float"—provides a smooth ride at high ground speeds.

Comfort is enhanced via the cab, which provides ample head, shoulder, and leg



The skid loader is powered by a 99-hp (74-kW) Cummins turbocharged diesel with 305 lb-ft (414 N·m) of torque and features a 3300-psi (228-bar) hydraulic system relief pressure.



The cab of Gehl's new 7810E can be pivoted up and out of the way for maintenance via a built-in hydraulic pump or with an optional electric pump.



Plenty of head, shoulder, and leg room is available in the 7810E's cab, as well as plenty of control choices, including joystick, dual-hand, hand-foot, and T-bar.

room for the operator. An optional deluxe suspension seat adjusts to fight fatigue, and a choice of servo-controlled low-effort controls delivers precise response for top productivity. Four choices of controls are available including joystick, dual-hand, hand-foot, and T-bar "hands-only." An optional factory-installed air-conditioning and heating system add to comfort, while 360° visibility makes working in cramped environments safer and easier.

The Power-A-Tach universal-type quick-attach system option makes changing attachments fast and easy. Users can quickly

connect and disconnect attachments without leaving the operator's seat.

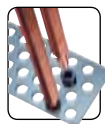
The engine cover has a gas-spring assist for easy lifting, and the rear door, radiator, and oil cooler swing out for easy access. The ROPS and FOPS (rollover protective structure and falling object protective structure) cab is easily pivoted up and out of the way with a built-in hydraulic pump, or with a new optional electric pump. A newly designed fan has been incorporated for more airflow, improved cooling ability, and quieter sound levels. Improved fuel tank design with increased capacity of 30.5 gal (115L) has been incorporated to accommodate long operating days.

In addition to the 7810E, Gehl offers a complete line of E-Series skid loader models with **SAE** operating load ratings from 1050 to 3850 lb (476 to 1746 kg).

Jean L. Broge

Be specific about radiator reliability.

Specify MESABI.



NO SOLDERED SEAMS

Individual cooling tubes are held in headers with rubber seals to absorb stresses that can cause soldered seams to crack and leak.

EASY TO CLEAN

With optional V-tube Core™ tubes are designed to create open passages so dirt and debris can pass through the radiator.

FIELD REPAIRABLE

Seals allow damaged tubes to be removed and replaced in the field, often without removing the radiator from equipment.



Manufactured by L&M Radiator, Inc.

mesabi.com TIER II DESIGNS AVAILABLE

MESABI® is a registered trademark of L&M Radiator, Inc.
V-Tube Core™ is a trademark of L&M Radiator, Inc. © 2006



1414 East 37th Street, Hibbing, MN 55746 USA • 218-263-8993
Toll Free in USA and Canada 800-346-3500

Hamm on a roll with dual-drum compactors

Wirtgen America's Hamm Compaction division has rolled out two new small articulated asphalt compactors—the 1.6-ton (1.5-t) HD 8 VV and the 1.73-ton (1.7-t) HD 10C VV—that offer vibration in both the front and rear drums. VV stands for “vibration front, vibration rear,” in which both drums offer vibration, with the capability of vibration running in the front drum only, both drums, or with no vibration. Hamm says these articulated tandem rollers offer “big-time compactive effort in

a small package,” equally at home for commercial or road-building applications.

These brand-new models are the first Hamm products in the 30- to 35-in (762- to 889-mm) wide drum size. The HD 8 VV has a drum width of 31.5 in (800 mm) and a working width of 33.7 in (855 mm). The HD 10C VV has a drum width of 39 in (1000 mm) and a working width of 41.7 in (1059 mm). As they share the same platform, both models have a total length of 83.5 in (2120 mm) and total height of 84.8 in (2154 mm).

The compactors share a unique “cantilevered” drum suspension system with a single-drum support leg on each side of the machine—right leg only on front, left leg only on rear—that permits compaction right up against an obstruction such as a wall or curb.

Both rollers offer hydrostatic dual-drum drive, automatic/manual vibration system, hydrostatic articulated steering, and improved maneuverability. Their cab features operator-friendly features that include a low noise level, a low driver's platform, and modern instrument panel.

They feature three braking systems with an emergency stop button, a plastic water tank serving a pressurized water system, hand-serviceable, plastic spray nozzles, and a fixed 2.2-in (56 mm) offset.

Both models share a **Hatz** 3W35, three-cylinder, **SAE**-rated 21-hp (16-kW) engine.

Jean L. Broge

Both the HD 8 VV and HD 10C VV (shown) rollers offer hydrostatic dual-drum drive, automatic/manual vibration system, hydrostatic articulated steering, and improved maneuverability. Their cab features include low noise levels, a low driver's platform, and an updated instrument panel.



WHICH ROAD WOULD YOU CHOOSE?

You're not out for a Sunday drive. You want a development cycle that's short and straight. Filtertek can help. Our expertise in the science of filtration—together with our unique plastics molding capabilities and complete range of services including 3-D design, tooling, rapid prototyping, testing, automated manufacturing, assembly, and packaging—can accelerate your design process, shorten your supply chain, and boost product performance.

Plus, only Filtertek can provide filtration for all automotive and commercial vehicles systems, including fuel, transmission, power steering, braking, suspension and hydraulics. From our global, TS 16949-certified manufacturing centers, we deliver custom-designed fluid control products for virtually every need.

So whether you're designing for luxury vehicles or ATVs, take the direct route. Learn how at www.filtertek.com/accelerate.

Toyota has a handle on electric straddle stacker

Toyota Material Handling recently unveiled its new 7-Series electric walkie straddle stacker lift truck with adjustable base-legs. Available in both 2000- and 2500-lb (907- and 1134-kg) capacity models, Toyota says these lift trucks provide a cost-effective material-handling solution for a variety of pedestrian truck applications—from manufacturing environments to retail store operations.

The new models bear a family resemblance to Toyota's 4500-lb (2040-kg) walkie pallet truck and share many of the same internal components. Both trucks boast a MOSFET (met-

codes. Handgrips are angled to fit the hand's natural contour and reduce fatigue. A high-visibility mast with a safety glass mast guard provides the operator with a clear view of the fork tips and a wider view of the work area for increased safety, load-handling confidence, and efficiency.

A fully programmable drive system offers precise control of the vehicle and reduces the potential for load damage. Electric lift and lower controls are equipped with a pressure-compensated valve for constant lowering under all conditions, enhancing safety and further reducing the risk of product damage.




The 7-Series uses CAN bus communications to provide quicker, more reliable control from the operator to the drive motor with fewer components. The trucks feature a 24-V electrical system and regenerative braking.

al-oxide semiconductor field-effect transistor) controller and Separately Excited (SepEx) drive motor technology. The SepEx drive motor and transistor control system offer improved acceleration and loaded or unloaded travel speed, as well as smooth speed control. This combination maximizes battery and operator efficiency.

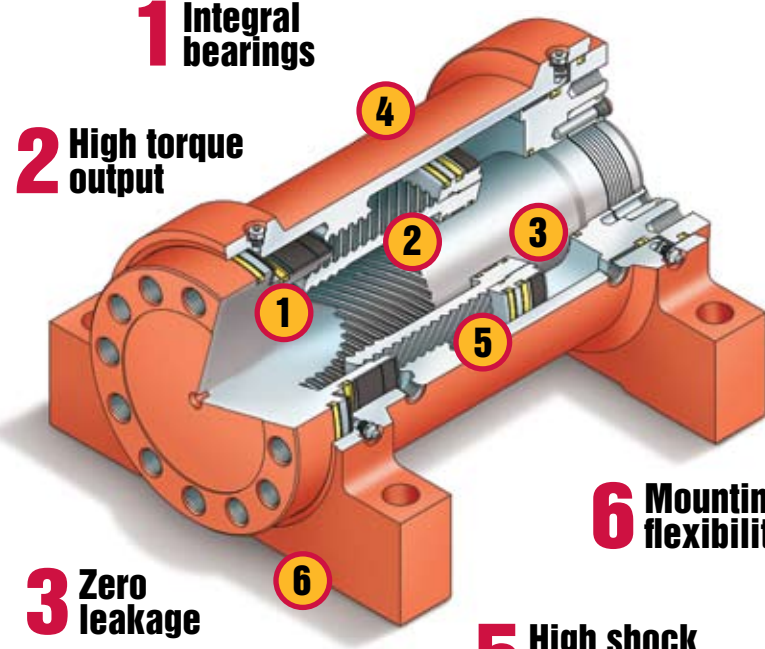
Toyota's new lift trucks feature a 24-V electrical system, regenerative braking, interlocking mast channel construction, and a spring-loaded control handle that automatically applies the parking brake when the handle is released. It also features CAN-bus communication technology for quicker, more reliable control from the operator to the drive motor with fewer components.

Lift truck operators have easy access to a multifunction control handle with large dual thumb wheels and lift, lower, and horn buttons that can be operated with either hand. These new models also feature a password-protected keyless entry pad with capacity for up to 10 different operator access



AN INSIDE LOOK

at the unique features of our helical rotary actuators.



1 Integral bearings

2 High torque output

3 Zero leakage

4 Compact configurations

5 High shock load resilience

6 Mounting flexibility

Call us today at
800.327.2589

© 2006 Helac Corporation

www.helac.com



The 7-Series electric walkie straddle stacker lift trucks from Toyota Material Handling feature a MOSFET controller and SepEx drive motor for improved acceleration and travel speed. A one-piece, lift-off service cover provides convenient access to all major components for inspection and maintenance.

Customers can set the adjustable baselegs to meet their exact specifications, and can use the same lift truck for multiple aisle widths. This versatility enables customers to reconfigure their operations and change aisle widths without necessitating major changes to their lift truck fleets.

To streamline maintenance and minimize downtime, the trucks incorporate several ease-of-service features, including a one-piece, lift-off service cover for access to all major components for inspection and maintenance. With the MOSFET con-



Multifunction control handles contribute to ease of use via large dual thumb wheels. Lift, lower, and horn buttons can be operated with either hand.

trol system, routine service requirements are reduced and battery life is extended. A programmable service indicator notifies operators of planned maintenance and service needs through the onboard display.

Maintenance personnel may easily access self-diagnostics through the digital display without the use of an external handheld analyzer to quickly identify service needs.

Jean L. Broge

FROM A SOLID-STATE SENSOR TO A COMPLETE TRANSDUCER, WE'LL GIVE YOU STABLE, ACCURATE PRESSURE MEASUREMENT THAT'S PACKAGED THE WAY YOU NEED IT.

AMETEK's state-of-the-art technology provides extremely accurate pressure sensors that are fully compensated for temperature and pressure to give you very stable operation with complete sensor interchangeability. We can meet your OEM needs with sensors, subassemblies, or completely packaged transducers with a variety of pressure ranges and outputs. Digitally compensated transducers are also now available.



AMETEK U.S. Gauge PMT Products
Tel: 888-625-5895 • 215-355-6900
Fax: 215-354-1801
www.ametekusg.com

AMETEK[®]
U.S. GAUGE
PMT PRODUCTS

Are you comparing all the differences?

Comparing a brake by wire system to a manual fluid power braking system is like comparing apples to oranges. Brake by wire systems offer you much more than braking.

With all the features and benefits that brake by wire has to offer, you owe it to yourself, your company, and your customers to explore it further.

Some advantages of brake by wire:

Enhances vehicle performance

Additional safety features

Flexible system designs

Redundant systems

Programmability

Improved vehicle control



Innovative Braking and Controls Worldwide

Give us a call at 1.800.477.6426
or visit www.mico.com.