

This month's editorial focus is on light-duty equipment.

by David Alexander

Cat adds compact telehandlers

The **Caterpillar** product line now includes two additional telehandlers, the TH210 and TH215, designed for customers who require a versatile material-handling machine in a small package. The new models are sized to work productively and cost-effectively in a variety of construction, landscape, and agricultural applications.

The TH210 has an operating mass of 12,450 lb (5650 kg) and a rated load capacity of 4850 lb (2200 kg). Maximum lift height is 17 ft (5.2 m). The larger TH215 has a mass of 12,670 lb (5750 kg) and can carry a 5500-lb (2500-kg) load. Its maximum lift height is 18.1 ft (5.5 m).

Both machines are equipped with a Cat 3054B direct-injection, naturally aspirated diesel engine, rated at 84 hp (63 kW) gross. The engine is designed to provide reliable performance and good fuel efficiency. It works in concert with a high-pressure, closed-circuit hydrostatic drive to deliver powerful, smooth acceleration and continuous torque through two speed ranges—up to 5 mph (8 km/h) and up to 20 mph (32 km/h). The engine is fully compliant with the latest round of worldwide emissions regulations.

The TH210 and TH215 are each equipped with a standard enclosed cab, certified to provide falling-object and rollover protection. The standard suspension seat and steering wheel are adjustable to accommodate operator preferences. An air-suspension seat is available as an option. Controls are easy to reach and highly responsive to reduce operator fatigue. A clear, comprehensive instrument panel and easy-to-read gauges keep the operator informed of vehicle data. Plenty of ventilation is available in the cab, and the upper portion of the door can be opened and secured for additional air flow. An optional air-conditioning system is also available.

A low-profile, side-mounted engine, and low boom pivot point allow the operator to carry loads in



Maximum lift height for Cat's TH210 is 17 ft (5.2 m). Both new models have three steering modes—circle, two-wheel, and crab.



The Cat TH215 telehandler can carry a 5500-lb (2500-kg) load. Its maximum lift height is 18.1 ft (5.5 m).

a low position without obstructing visibility to the right of the machine. The mid-mounted cab also improves the viewing area to the rear. A rounded front windshield extends over the operator's head to provide additional overhead visibility.

The low cab height and compact design make these machines suitable for working in tight spaces. The turning radii for the TH210 and TH215 are 9.8 ft (3 m) and 10.2 ft (3.1 m), respectively. Both models have three steering modes (circle, two-wheel, and crab) to further improve maneuverability.

The machines are equipped with a manual quick coupler for fast tool changes. The quick coupler uses the same interface as other Cat skid steer loaders. Although skid steer loader tools will fit on the coupler, tool use should be confined to those approved for compact telehandlers only. Approved tools available from Cat include a general-purpose and light-material bucket, plus several sizes of pallet forks.

Maintenance and service can be completed quickly on the TH210 and TH215. The engine is side mounted for easy access to major service points, and the oil cooler swings out for fast cleaning. Other key maintenance points are also readily accessible to reduce maintenance and service time.



The TH210 from Cat has an operating mass of 12,450 lb (5650 kg) and a rated load capacity of 4850 lb (2200 kg).

Bobcat goes off road

Bobcat, a business unit of **Ingersoll-Rand**, has launched its first 4x4 utility vehicle. The IntelliTrak drive system on the Bobcat 2200 is shared with the **Club Car** Carryall 294 (see *SAE Off-Highway Engineering*, September 2004).

"The IntelliTrak system provides power to all four wheels as needed, preventing one, two, or three wheels from spinning without the fourth, so all four wheels must spin together in low-traction conditions," said Brad Claus, Bobcat Utility Product Manager. "These traction characteristics give the 2200 exceptional climbing ability and off-road performance. Turning with the IntelliTrak system is also easy because of automatic locking differentials that not only engage when needed, but also disengage when turning," said Claus.

The 2200 turns lightly on turf and pavement without causing damage to the ground, tires, or drive components. Turning diameter is 23.5 ft (7.2 m).

The IntelliTrak drive system on the 2200 engages and disengages the 4x4 and differential lock automatically, so it requires no extra levers for the simplest operation possible. It also eliminates the need to stop the vehicle to shift mode, so it can stay in motion when mud or snow is encountered. IntelliTrak saves time by allowing transitions for off-highway, to pavement, to grass, without stopping or shifting.

The newest utility vehicle from Bobcat is made with a durable aluminum chassis. The non-corrosive, tubular frame makes the 2200 light yet strong—the gas model has a mass of 1361 lb (617 kg) and the diesel model is slightly heavier at 1433 lb (650 kg)—which keeps ground pressure low, making the 2200 compatible with tread-sensitive terrain. Four-point ROPS (rollover protective structure) and retractable seatbelts are standard, with a cab enclosure available as a dealer-installed accessory.

The 2200 utility vehicle has a 1200-lb (544-kg) vehicle load capacity. It comes standard with an 800-lb (363-kg) cargo box



Built with the IntelliTrak drive system, the new Bobcat 2200 has automatic locking differentials that engage immediately when a wheel loses traction. The IntelliTrak drive system engages and disengages the 4x4 and differential lock automatically without stopping so the 2200 can stay in motion, and also allow traveling from off-highway, to pavement, to grass without stopping or shifting.



Bobcat has rated the 2200 utility vehicle with a 1200-lb (544-kg) vehicle capacity, which may include a combination of the operator, passenger, cargo bed materials, and towing weight.



The Bobcat 2200 operator can select forward or reverse by simply pushing or pulling a lever. The four-wheel-drive system is completely automatic.

capacity that has a 33-in (840-mm) loading height, one of the lowest in its class according to Bobcat. An 1100-lb (500-kg) cargo box and electric box dump are available as options.

Designed for contractors, hobby farmers, ranchers, landowners, and outdoorsmen, the Bobcat 2200 has a travel speed of 25 mph (40 km/h) forward, 15 mph (24 km/h) in reverse, and comes standard with many comfort features, such as an adjustable driver's seat, tilt steering wheel, and plenty of leg room. Double A-arm front suspension and a swing-arm rear suspension help to smooth out the bumps.

The 2200 is available with a choice of 20-hp (15-kW) engines: an air-cooled 614-cm³ **Honda** gasoline engine, or a liquid-cooled 719-cm³ **Kubota** diesel engine. All-terrain tires are standard, with mud tires also available on both models. Four-wheel hydraulic disc brakes provide the stopping power.

New line from Hyster

Hyster's new S40-70FT Fortis FT line of lift trucks, with capacities ranging from 4000 to 7000 lb (1815 to 3175 kg), will offer lower cost of operations while exceeding the industry's highest standards for dependability, productivity, and ergonomics, it claims. Improved cost of operations results from matching the right engine with the proper transmission for specific application needs, along with other enhancements. Multi-tiered engine-transmission configurations create efficient powertrains that offer greater fuel economy than the previous models.

The increased dependability of the Fortis lift trucks comes in part from the redesigned hydraulic system. Simplified hydraulic components and routing away from heat sources like



The new line of Fortis lift trucks from Hyster have capacities ranging from 4000 to 7000 lb (1815 to 3175 kg).

the engine reduces the number of potential leak points. The electrical systems have also been upgraded for improved reliability. Solid-state magnetic Hall-effect sensors designed for the rigorous standards of the aerospace industry are magnetically operated, have no mechanical connection, and are 100% sealed from the environment, while sealed wiring connectors keep water and other contaminants from entering the system.

Several optional features for the new line of lift trucks are available. Electrohydraulic controls are integrated into the seat armrest to reduce driver fatigue, increase driver comfort, and enhance ability to operate the lifting functions. The user may choose optional joystick or fingertip hydraulic controls.

Ergonomic features such as a lowered step height that allows easier access and 20% more operator floor space improve driver comfort and create a more productive work environment. Other advances include a smaller steering wheel with standard steer knob, a storage compartment and cup holder integrated into the dash, and improved seat design for enhanced comfort when driving in reverse.

The S40-70FT Fortis FT line of lift trucks reduces service time requirements by up to 12% with an electronic monitoring and in-dash warning system that reduces daily service task requirements. In addition, engine components are easier to access due to a one-piece hood and lift-out floor plates that require no tools for removal, and a cleaner and more accessible under-hood layout of wire and hydraulic hose routings.

Yanmar's backhoe loader

Planned for launch in fall 2005, **Yanmar's** new model CBL40 compact backhoe loader is designed with a heavy-duty frame intended for professional customers. The backhoe boom, arm, and loader arm are reinforced for durability and reliable operation.

The CBL40 is powered by a three-cylinder, 37.2-hp (27.7-kW) turbocharged diesel engine that is Tier II compliant. A hydromechanical transmission makes optimum use of the engine power. The hydraulic system is the same as that used in Yanmar excavators, giving the backhoe smooth and precise control.

Backhoe digging force is 5800 lb (25.8 kN) at the bucket and 3600 lb (16 kN) at the arm. Digging depth is 10 ft (3 m) with a backhoe reach of 13.2 ft (4 m).

Loader lifting capacity is 2960 lb (1343 kg) with a breakout force of 4375 lb (19.5 kN). Loader lift height is 9.5 ft (2.9 m). The loader bucket is self-leveling and equipped with a standard quick coupler.



The Yanmar CBL40 compact backhoe loader is powered by a three-cylinder, 37.2-hp (27.7-kW) turbocharged diesel engine.

Operators have a reversible swivel seat for easy access to all controls without having to stand up to make adjustments. A four-post ROPS/FOPS (rollover protective structure/falling-object protective structure) canopy is standard.

JLG launches a new Lull

The **Lull Model 1044C Series II** from **JLG Industries** features 80 in (2032 mm) of horizontal boom travel for accurate load placement. The Model 1044C Series II has a 10,000-lb (4535-kg) maximum lift capacity with a maximum lift height of 54 ft (16.5 m), and a 3000-lb (1360-kg) maximum lift capacity with a maximum forward reach of 38.5 ft (11.7 m) with the transaction retracted. It has a top speed of 20 mph (32 km/h) and 10° of frame tilt, for improved productivity.

A key feature of the Model 1044C Series II includes a steel-frame design that incorporates a patented twin-rail box construction for an overall strong structure and high load capacity. The unit is powered by Tier II-compliant John **Deere** diesel engine rated at 115 hp (86 kW). The transmission is a modulated power shift featuring four-speed forward and three-speed reverse. The engine air-filtration system is designed to deliver good uptime rates and reduced maintenance requirements for low overall costs.



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The Lull Model 1044C Series II from JLG Industries is powered by a Tier II-compliant Deere diesel engine rated at 115 hp (86 kW).

Multifunction hydraulic-over-hydraulic joystick controls deliver a high level of responsiveness for precise load placement and faster cycle times, helped by the automatic fork-leveling system. The four-section telescopic boom features welded box construction with replaceable high-density wear pads with wear indicators.

A rear axle stabilization system with a free, slow-pivot, or locked rear axle provides stability during operation. A turning radius of 13.7 ft (4.2 m), wheelbase of 124 in (3150 mm), and ground clearance of 16 in (406 mm), combined with all-wheel round, two-wheel front, and crab steering options, provide productivity and easy maneuvering around crowded job sites. Full-time planetary four-wheel drive delivers constant traction, and is coupled with inboard mounted internal wet disc brakes for good braking performance.

The Lull Model 1044C Series II has a maximum overall height of 97 in (2465 mm) for using the machine in low-clearance settings.

Deere upgrades Gators

John Deere has a decade of experience producing utility vehicles, which is why the company has dubbed the newest addition to its Gator utility vehicle lineup the Traditional, or T-



The John Deere Gator TS features a 286-cm³, 10-hp (7.5-kW), Kawasaki FE290 engine.

Series, Gator.

There are three models in the new T-Series—the Gator TS, Gator TX, and Gator TH 6x4. All of the new models are faster—with a top ground speed of 20 mph (32 km/h)—and more powerful than the previous generation of Gators, while also offering improved braking capabilities, increased payload, and enhanced operator comfort. All three feature a continuously variable transmission; hand-operated differential lock; rack-and-pinion steering; and independent, spring-over-shock, sin-

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The Gator TX has all-wheel suspension—including a parabolic spring with dampers at the rear—and all-wheel hydraulic disc brakes.

gle A-arm front suspension.

The Gator TS features a 286-cm³, 10-hp (7.5-kW), **Kawasaki** FE290 engine that delivers 13.7 lb-ft (18.6 N·m) at 3600 rpm. The transmission is geared toward more low-end torque for increased drawbar pull. The cargo box is 40 in (1015 mm) long and has a 500-lb (227-kg) capacity. Total payload/towing capacity is 900 lb (408 kg). Braking is via wet disc in the transaxle.

Next in the new lineup is the Gator TX, which is equipped with a new 401-cm³, 13-hp (9.7-kW) **Kawasaki** FJ400 engine. The all-wheel suspension—with a parabolic spring with dampers at the rear—and a 3 in (75 mm) longer wheelbase enhance



Deere's Gator TH 6x4 is powered by a 19-hp (14-kW) **Kawasaki** FH601 engine. All four rear wheels are driven, and braking is via wet disc in the transaxle.

ride quality, while all-wheel hydraulic disc brakes provide stopping power. The Gator TX cargo box is 44 in (1118 mm) long, with a 600-lb (272-kg) capacity, and an overall payload/towing capacity of 1000 lb (454 kg).

Largest of the new T-series is the Gator TH 6x4, powered by the new 675-cm³, 19-hp (14-kW) **Kawasaki** FH601 engine. The transmission is geared for increased power and low-end torque, increasing drawbar-pull by at least 25%. The Gator TH 6x4 comes with a 44-in (1118-mm) cargo box featuring a 25-in (635-mm) load height that is best-in-class according to Deere. Box capacity is 1000 lb (454 kg), and the total payload/towing capacity is 1400 lb (635 kg). All four rear wheels are driven, and braking is via wet disc in the transaxle.

The alternator on the Gator TS is regulated to put out 13 A at 3600 rpm, while the two larger machines get an alternator that produces 16.6 A at 3700 rpm.

Komatsu rolls out new skid steer loader

Komatsu's newest entry into the skid steer loader market, the SK714-5, features APC, the company's automatic power control technology. This system allows the operator to work with full power on any phase of the job without worrying about engine stall. In addition, these units have proportional pressure control joysticks for low effort and fine hydraulic control, and Komatsu's HydraMind hydraulic system that lets the operator perform multiple functions at peak performance.

Six individual optional weights are easy to install, tailoring the machines' operating and pallet fork capacity to meet application requirements. A universal quick coupler enables common attachments to be changed quickly and with little effort. Auxiliary hydraulics with flat-faced connectors are standard. Most competitors' attachments can be used on Komatsu's skid steer loaders.

Standard top and rear shatter-resistant windows, with a large side screen area as well as a good view of the bucket, cutting edge, and corners, give the operator a 360° view of the job site. Komatsu has enhanced operator productivity and efficiency with the operator restraint bar that incorporates an LCD gauge panel and warning-light system. A loader arm float function control can be engaged on the joystick for enhanced



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The Komatsu SK714-5 skid steer loader has proportional pressure control joysticks for low effort and fine hydraulic control.



The ROPS/FOPS (rollover protective structure/falling-object protective structure) on the Komatsu SK714-5 skid steer loader tilts forward for easy maintenance access.

back dragging or attachment applications.

To improve load-and-carry cycle times and travel times between job sites, the SK714-5 allows for low impact shift-on-the-go speed changes between the 6.5-mph (10.5-km/h) work range and the 10-mph (16-km/h) travel range.

The hydraulic self leveling (up only) bucket with 3950 lb (17.6 kN) breakout force enhances the productivity of the operator on the job site. The 45° dump and 30° rollback angles

of the bucket allow for fast dump cycle and load retention over rough terrain.

Serviceability features include, a 250-h pin greasing interval, removable polyvinyl fuel tank, O-ring face seal connectors, side-by-side radiator and oil cooler, hinged top engine cover and rear door panel, and loader arm maintenance support strut. Tilt-forward ROPS/FOPS (rollover protective structure/falling-object protective structure), top engine cover, and floor plate provide convenient access. Multi-viscosity oil can be used for all fluid requirements.



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Raymond goes to 24 V

Raymond has introduced a 24-V model to its family of Reach-Fork trucks equipped with the ACR System. Raymond's exclusive ACR System uses ac technology to deliver more truck up-time, fewer battery changes, and lower maintenance costs, while enabling users to move more loads faster, it claims.

More runtime-per-battery charge is the main benefit of the system, with significantly less reduction in truck performance as the battery discharges. This feature extends the truck's peak performance longer into the shift. The ACR System provides ease of maintenance with fewer component parts to service and replace when compared to dc-motor based systems, for lower maintenance costs and less downtime.

"The ACR System became so popular when it was introduced with our 36-V Reach-Fork truck that customers asked for those same benefits in a 24-V truck application," said John Colborn, Reach Truck Marketing Director for Raymond.

The 24-V truck has a 14-in (356-mm) battery compartment, and uses an ac-drive motor to maintain full performance longer. It uses fewer amps per cycle, so users will save on batteries, chargers, and downtime. By eliminating the requirement for drive motor brushes, ac technology also reduces service requirements and parts costs.

Ergonomic features include a "Universal Stance" design to improve operator performance and productivity. With Universal Stance, the driver can face forward with a clear view when handling and storing pallets, and face the direction of travel when moving "tractor first." By always facing the direction of the work, operators have greater control over their truck, keeping



The 24-V Reach-Fork truck from Raymond is powered by a 24-V ac-drive motor and is available in lift heights up to 270 in (6860 mm).

them more alert and productive in busy, high-traffic warehouses. And with today's trend towards higher racks, the Universal Stance allows operators to comfortably look straight up when storing and retrieving loads—without twisting their necks, as in side-stance trucks.

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Kubota's all-new KX71-3

The all-new KX71-3 compact excavator from **Kubota** runs on rubber tracks. Power to take on tough excavating jobs comes from a Kubota V1505, liquid-cooled, four-cylinder, overhead-valve diesel engine rated at 27.5 hp (20.5 kW) at 2300 rpm.

A long arm provides the operator with the deepest digging depth of any excavator in its category, according to Kubota—9.75 ft (3 m). The arm breakout force is 3285 lb (14.6 kN), and the bucket generates a breakout force of 6350 lb (28.2 kN).

One of the greatest user benefits of the KX71-3 excavator is that it is able to fit into narrow spaces. The 2-ton (1.8-t) compact excavator has an overall width less than 5 ft (1.52 m), and the tail swing overhang is only 18 in (460 mm), allowing it to avoid obstacles and be productive on smaller job sites. Operating mass is 6305 lb (2860 kg) with machine and track shoe widths being 61 and 12 in (1550 and 305 mm), respectively, giving it low ground pressure and good stability.

Hydraulic hoses are routed inside the swing bracket to protect against damage. Bucket cylinder hoses are also protected by routing them through the arm. For enhanced durability, bushings have been implemented throughout the pivot points along the swing bracket, boom, arm, and bucket.

Variable-displacement pumps automatically adjust the oil flow and pressure according to the workload. This feature decreases vibration and noise and reduces the required engine power, enabling greater fuel economy. The KX71-3's fuel-efficiency is such that one full tank enables the operator to work 10 continuous hours, according to the company.



Kubota's KX71-3 compact excavator can fit into narrow spaces. The 2-ton (1.8-t) machine has an overall width less than 5 ft (1.52 m), and tail swing overhang is only 18 in (460 mm).

The KX71-3 is equipped with an all-new LCD instrument panel. Kubota's Intelligent Control System displays easy-to-understand diagnostic readings on the digital panel. The system alerts the operator as to when routine maintenance is due, and the refueling assistant informs the operator when the tank is nearly full to avoid spills.

The KX71-3 is equipped with a spacious ROPS/FOPS (roll-over protective structure/falling-object protective structure) certified canopy or cab that offers plenty of legroom and comes standard with an adjustable suspension seat with headrest. Other comfort features include adjustable wrist rests to help reduce arm movement for increased efficiency,



Power for the KX71-3 comes from the Kubota V1505 four-cylinder diesel engine rated at 27.5 hp (20.5 kW) at 2300 rpm.

two-speed travel switch mounted on the dozer lever to increase floor space, and a short-stroke operating lever that requires less arm movement yet delivers control with only the slightest movement of the wrist.

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Club Car drives into Europe

Club Car has announced that the Carryall 294 4x4 is European road-ready. According to the company, it is the only vehicle in its class that ensures users are in compliance with all European health and safety standards, off road and on. The Carryall 294 4x4 conforms to the pan-European Agricultural Tractor homologation standards 74/150/EEC, as amended by 2001/3/EC. Compliance with this directive allows the vehicle to be used on any public roads without minimum speed limits throughout all European Union member nations.

Primary markets the road-legal Carryall 294 4x4 will serve include agriculture, equestrian, municipalities, parks, construction, plantations, forestry, and electric utilities. Power is from a 20-hp (15-kW), 719-cm³ **Kubota** D722 diesel engine. All-terrain or mud tires are available, with standard four-wheel hydraulic disc brakes. Double A-arm front suspension is designed to handle challenging terrain.

Engineered with the IntelliTrak system (see *SAE Off-Highway Engineering*, September 2004), the Carryall 294 has no levers, buttons, or switches for 4x4 engagement, front/rear differential, or high-low range. The fully mechanical system automatically transfers power to the wheel or wheels where traction is needed. By continually sensing driving conditions, it automatically engages and disengages four-wheel drive without requiring the driver to stop and shift gears or lock differentials. IntelliTrak also eliminates steering feedback and reduces tire wear and turf damage.

The Carryall 294 has two bed load capacity options so customers can choose a vehicle to meet their specific needs. A



The Carryall 294 4x4 from Club Car is the first pan-European road-legal utility vehicle, and it comes from the factory with headlights, brake lights, taillights, front and rear turn signals, and a horn.

363-kg (800-lb) bed load capacity is standard, and a 476-kg (1050-lb) high-capacity option is available. Four-wheel independent suspension ensures the vehicle is sure-footed in even the most difficult conditions, allowing users to take it over varying terrain. Carryall 294 4x4 owners can also customize their vehicles to meet their specific needs with Club Car accessories or through Club Car's Custom Solutions department.

In addition to the benefits of IntelliTrak, the Carryall 294 is the industry's first 4x4 that comes standard with tilt steering and a fully adjustable (front, back, up, and down) driver's-side suspension seat.

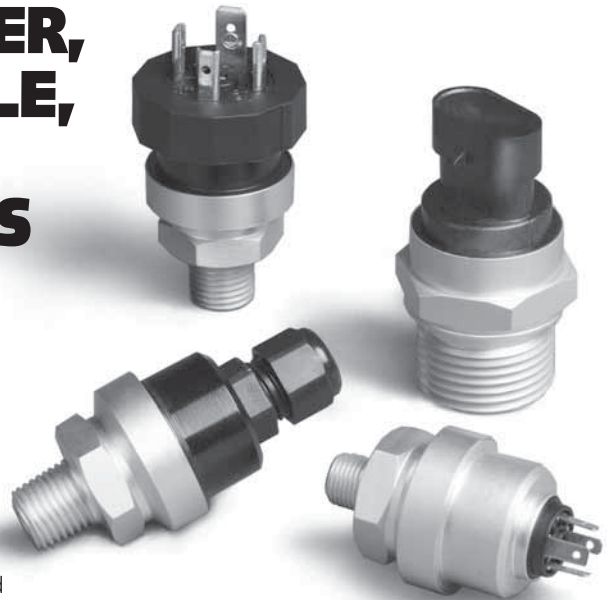
The Carryall 294 road-legal rough-terrain vehicle comes standard with headlights, brake lights, taillights, front and rear turn signals, and a horn. Front recovery hitch and rear trailer coupling are also included.

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