

This month's editorial focus is on vehicles that support the global construction industry.

by David Alexander

Mercedes adds construction

Following the successful market launch of the new **Mercedes-Benz** Actros for long-distance operations in spring 2003, **DaimlerChrysler** has gradually been renewing the extensive range of construction and special-purpose vehicles in the Actros truck family. The new vehicles, including dump trucks, all-wheel-drive dump trucks, concrete mixers, semitrailer tractors, and other special-purpose chassis, are now available as two- and three-axle vehicles in seven output classes from 235 to 425 kW (315 hp to 570 hp). Four variants of the Actros line were exhibited at Bauma 2004.

The available drive configurations range from the 4 x 2 two-axle variant with rear-wheel drive to the 8 x 8/4, a four-axle variant with all-wheel drive and two steered front axles. In terms of gross vehicle weight the new Actros construction vehicles cater for all common variants, from the two-axle 18 t (20 ton) to the 41 t (45 ton) with four axles. Dump trucks in this category mainly carry out their transport tasks away from public roads.

The Actros is powered by the familiar V-engines of the 500-series, which now develop more output and, particularly, torque. Depending on the model, both the rated output and maximum torque of the V6 and V8 engines have increased by 5 kW to 20 kW (7 hp to 27 hp) and 150 N•m (110 lb•ft), respectively.

The new Actros construction vehicles are equipped with 16-speed transmissions in either direct ratio or overdrive versions, operated by the Telligent gearshift system. The new shift mechanism for the standard Telligent gearshift is now mounted on an extension arm attached to the driver's seat. The joystick is slightly angled to the right and follows the natural angle between the driver's hand and forearm, allowing gearshifts by wrist action. A hydraulic/pneumatic double-H gearshift is also available for those who still prefer to shift gears the old-fashioned way.

The transfer case transmissions VG 1700 and VG 2400 are used for the all-wheel-drive variants in the Actros construction family. A separate oil cooling system is not necessary for standard operations. Both engine- and transmission-driven PTOs are available, with a special elastic-clutch PTO for concrete mixers.

The Telligent braking system with its electronic control and shorter response times is a standard

feature. One technical highlight that has advantages in heavy short-radius and construction site operations is the hill holder. This feature makes "moving off" easier on gradients of all kinds as a result of electronically controlled extremely rapid operation of the pneumatic wheel brake valves. After every operation of the brake pedal when the vehicle is at a standstill, the brake pressure is maintained for approximately 1 s when the pedal is released to prevent the vehicle from rolling backwards. During this delay the driver is able to move off smoothly on gradients by pressing the accelerator.



The new Mercedes-Benz Actros for heavy-duty applications is available as a dump truck, concrete mixer, semitrailer tractor, or for special-purpose, heavy-duty chassis.

The braking system on Actros construction vehicles is configured for the particular operation. The dump trucks are equipped with disc brakes at the front and drum brakes at the rear, while the all-wheel-drive trucks, mainly used for heavy construction site operations, have drum brakes all around.

The active-warning function of the Telligent braking system alerts the driver to impending overloads in the tractor unit, prompting a change in style of driving for more efficient use of the auxiliary brakes (engine brake plus exhaust flap as standard, hydroretarder as an option). In the Actros the auxiliary brakes are an integral part of the Telligent braking system, so that when the driver depresses the brake pedal both the service brake and auxiliary brakes are activated. The purpose of combining all the braking systems available in the vehicle is to further reduce wear and tear to the service brake by letting wear-free auxiliary brakes contribute to the required deceleration.

The Actros-SLT (SLT is the German abbreviation for heavy-duty transporter) is the heaviest-duty truck in the Mercedes-Benz-Actros family. Designed for transporting abnormal loads, this special-purpose tractor unit is based on the three-axle Actros 3354 6 x 4 vehicle. Working together with **Titan**, a heavy-duty vehicle specialist firm, DaimlerChrysler engineers

transformed the standard Actros into a tractor unit with a choice of three or four axles and a gross combination weight of up to 250 t (275 ton).

The torque converter and clutch unit consists of a hydrodynamic torque converter as a starting device, a standard friction clutch for interrupting the tractive power when changing gear using the standard-fit 16-speed G 240 transmission, and a primary retarder. Starting off is a feat in itself when such heavy loads are involved, so the presence of this converter, which multiplies the torque by a factor of 1.6, "is indispensable," according to the company.

Once the truck has started off and the torque converter has fulfilled its function, the torque converter lock-up clutch is engaged. Without any losses, the drive power is then sent via a second clutch—the main drive clutch—to the transmission, and from there to the two live axles. To make the best use of the engine's braking effect with a constantly open throttle and activated backpressure brake, the converter is equipped with a freewheel for establishing a fixed connection between the engine and transmission when the vehicle is decelerating. The high-speed primary retarder—a single-pipe, hydrodynamic auxiliary brake installed between the converter and clutch unit—enhances the braking power of the Actros SLT.

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Liebherr stretches out

Liebherr presented a wide range of new equipment at Bauma 2004. The new four-axle LTM 1090-4 mobile crane offers, in comparison with the previous LTM 1080/1, significantly increased lifting capacity values at the telescopic boom and fly jib, and also greater maximum lift height and outreach. Ready to travel with 6.7-t (7.4-ton) part-ballast, it has a mass of 48 t (53 ton). With the 50-m (164-ft), six-section telescopic boom, the 7-m (23-ft) telescopic extension, and the 19-m (62-ft) double folding fly jib, the LTM 1090-4 can lift loads to heights up to 76 m (249 ft).

The driveline, powered by a Liebherr turbocharged inline six-cylinder engine with a tried-and-tested CAN bus control system, has 338 kW (453 hp) and 2100 N•m (1550 lb•ft) available to propel the crane. The engine complies with the Euro 3 exhaust emissions limits. The LI-AS-DRIVE transmission is based on the ZF-12-speed AS-TRONIC gearbox with automated shift, and delivers good fuel consumption through the efficiency of the dry-plate clutch and the large number of discrete gear ratios.

The standard Intarder increases braking reliability and reduces brake-system wear. Cruise control and the Bremsomat automatic braking system ensure economical driving and convenient operation. An automatic antilock system and wheel-slip control are also standard. The two-stage transfer box permits low inching speeds in the maneuvering mode.

The new LTM 1090-4 has an active rear-wheel steering system for which Liebherr has applied for a patent. The driver has access to a total of six steering programs for different driving conditions. The advantages of this steering concept are very small turning-circle radii, lower tire wear, and increased driving convenience.

For fast and safe crane erecting, the LTM 1090-4 has fully automatic support leveling, an inclinometer, and standard all-round support-area lighting with four spotlights integrated into the bodywork.

The Liebherr diesel engine on the crane superstructure develops 149 kW (200 hp) and 891 N•m (657 lb•ft) for the hydraulics, with electric load-sensing control. The cab is noise-insulated from the diesel-hydraulic driveline.

The tilting crane cab has operating convenience provided by the pneumatically extending step, the winch and slewing gear signals in the control levers, and the precise crane control system. "Drive from above" and operation of the supports from the crane cab are standard equipment.

The telescopic boom, which is now 50 m (164 ft) instead of 48 m (157 ft) in length, is made from high-strength, fine-grain structural steel with an optimized, oval profile.

The 19-m (62-ft) double-folding fly jib is moved by remote control to the assembly position hydraulically, and can operate at an angle of 0, 20, or 40°. As an option, it can be

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The Liebherr LTM 1090-4 mobile crane features a separate 149-kW (200-hp) diesel engine on the crane superstructure to power the hydraulics.



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Circle 236

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As an option, a second lifting-gear assembly can be fitted to the LTM 1090-4. No auxiliary crane is necessary for this, since the ballasting equipment can be used. A modular ballast concept enables various amounts from 5.2 to 21 t (5.7 to 23 ton) to be installed for travel movements and crane operation. With 17 t (19 ton) ballast, the vehicle width is only 2.75 m (9 ft).

Curbing enthusiasm

Power Curbers has enhanced its 5700-B slipform paver for curb-and-gutter and barrier work. The re-engineered product, named the Power Curber 5700-SUPER-B, was introduced at Bauma 2004. The four-cylinder, 133-hp (99-kW) **Deutz** diesel engine provides a 50% increase in power over the previous model, which increases the machine's trimming and pouring capabilities in high-production curb-and-gutter applications.

Crawlers have a heavier frame and increased torque for easier loading or



The Power Curber 5700-SUPER-B can pour a sidewalk up to 6 ft (1.8 m) wide in the offset position.

pouring on inclines, and working in soft grade conditions. The new hydrostatic direct-drive conveyor also has higher torque. Increasing or decreasing tension on the crawler track chain is easier than on previous models due to a new adjuster.

The auger is fully enclosed and holds enough concrete to get through a tight radius without delays caused by re-positioning the ready-mix truck. The auger's increased mixing power results in a strong, smooth product.

The hydraulic mold offset allows the operator to hydraulically adjust the mold vertically 16 in (406 mm) and horizontally 24 in (610 mm) for rehab curb work or pouring around catch basins. The machine stays on line while the mold moves, reducing work delays. Curb-and-gutter can be poured in a 3-ft (0.9-m) radius, and stand-up curb in a 2-ft (0.6-m) radius. Sidewalks up to 6 ft (1.8 m) wide can be poured in the offset position. The auger and trimmer can be removed to allow pouring of paths of up to 10 ft (3 m) wide in the center position.

Maximum travel speed is 110 ft/min (33.5 m/min) and pouring can be done at speeds up to 50 ft/min (15 m/min). For transporting, the overall length of the machine is 19.5 ft (6 m) and it is 8.5 ft (2.5 m) wide. Net mass is 23,500 lb (10,645 kg).

First 8 x 8 from Scania

Confident in the development of its first eight-wheel-drive vehicle, **Scania** opted to outsource vehicle testing—to the Dutch army. Two test vehicles were delivered and were subjected to a year of rigorous testing to simulate military use. The outcome was an order for 533 trucks, and a modified version is now available for the civilian market.

The new truck, shown at Bauma 2004, is a product of Scania's modular development process that uses a building block approach using standard components and new technology based on solutions that have already met with commercial success. The 8 x 8 chassis can be ordered with a wide choice of Scania cab and engine alternatives.

The Scania 8 x 8 has a wheelbase of 4700 mm (185 in), almost 1 m (3.3 ft) shorter than the military version, which has considerably improved

The operator's platform and console have been raised to increase visibility of the auger and chute man. The console has been redesigned to provide less motion for the operator. The work area is cooler, with hydraulic and engine coolant radiators relocated and mounted externally so that hot air circulates away from the operator's platform. Rotary controls allow fractional changes in ground or conveyor speeds, resulting in a smooth, consistent curb. A step extension adds two steps to the operator's platform access.

The new machine is also easier and faster to service than the older model, with filters for fuel, engine oil, air, and the high-pressure servo located at eye level and easy to reach. Servicing the radiator is also easier since it is now mounted externally and no longer an integral part of the engine. Access doors are removable, and the battery pivots out.

The optional quick-connect mold mount system allows molds to be changed in only a few minutes without heavy hand work, saving as much as 30 min per mold change.

the properties that are most highly prized in a good dump truck. The main benefit is better load distribution so that the front axles now share a larger proportion of the weight, and the truck turns more tightly, which is an advantage in the often congested conditions of construction sites.

The truck is equipped with Scania's new 835 axles with hub reduction that are part of Scania's new axle range. Despite a mass saving of 90 kg (198 lb), the new bogie has the same 30-t (33-ton) capacity as its predecessor, which in turn permits increased payload. If the RP835 is used as a single driven axle, disc brakes are available for even greater weight saving. The new axles provide higher ground clearance than the axles they replace and allow the fitting of single wheels for customers who prefer this configuration.

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The Scania 8x8 chassis was rigorously tested by the Dutch army.



The civilian version of the Scania 8x8 can be ordered with a variety of cabs and engines.

Differential locks are fitted as standard on the hub-reduction axles, and the front axle and two-speed transfer box also feature locks that can be activated individually. The new axle design features an integrated lubrication system for the entire axle including the hub gears. The oil is automatically filtered as it moves inside the axle, and the oil-change interval is now 80,000 km (50,000 mi) for construction operation.

The new truck can be specified with a high air intake to further extend the application area and permit operation even in extremely dusty conditions.

Scania's new 8 x 8 is equipped with Electronic Transmission Saver (ETS), which was introduced last year. In construction operations, the clutch can suffer damage even with the most experienced driver at the controls. Today's trend of high torque from low rpms, even on smaller engines, increases the risk of damage to transmission components. Scania ETS helps to protect the components fitted after the clutch in the power transmission system (such as the gearbox, propshaft, rear axle, and driveshafts). Below 18 km/h (11 mph) in low gear, torque is always limited to a safe level.

When the going gets tough

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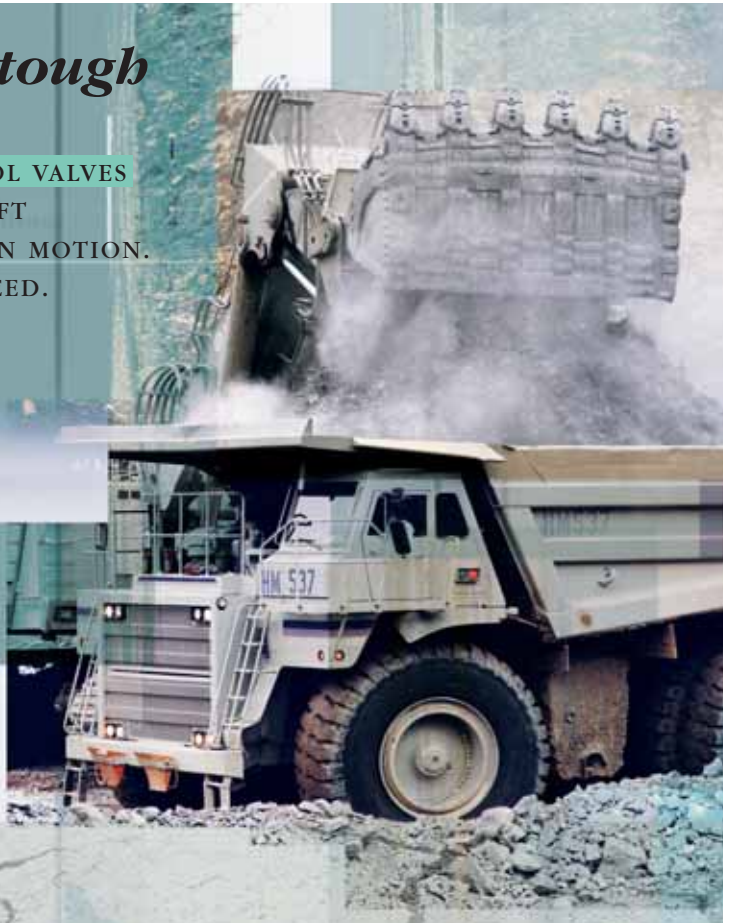
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Vögele speeds the feed

On large-scale job sites, such as highway construction, a continuous flow of mix is important because non-stop paving is required for good road quality. The MT 1000-1 Heavy-Duty Mobile Feeder from **Vögele** is designed to partner asphalt pavers on job sites where non-stop paving and high laydown rates are required. The high performance of the MT 1000-1 can continuously supply even large pavers like the Vögele Super 2500 with hot mix.



The Vögele MT 1000-1 Mobile Feeder does not come into contact with the paver, so shocks such as those from feed trucks docking the paver do not have an adverse effect on the quality of the pavement.

Feed vehicles typically discharge their loads into a paver's material hopper from the front, and loading can take a long time. The MT 1000-1 speeds up discharge through its belt conveyor dumping the mix from above into the paver's hopper, which also improves filling and uses the paver's storage capacity to the maximum. As it does not come into contact with the paver, shocks like those from feed trucks docking the paver do not have an adverse effect on the quality of the pavement.

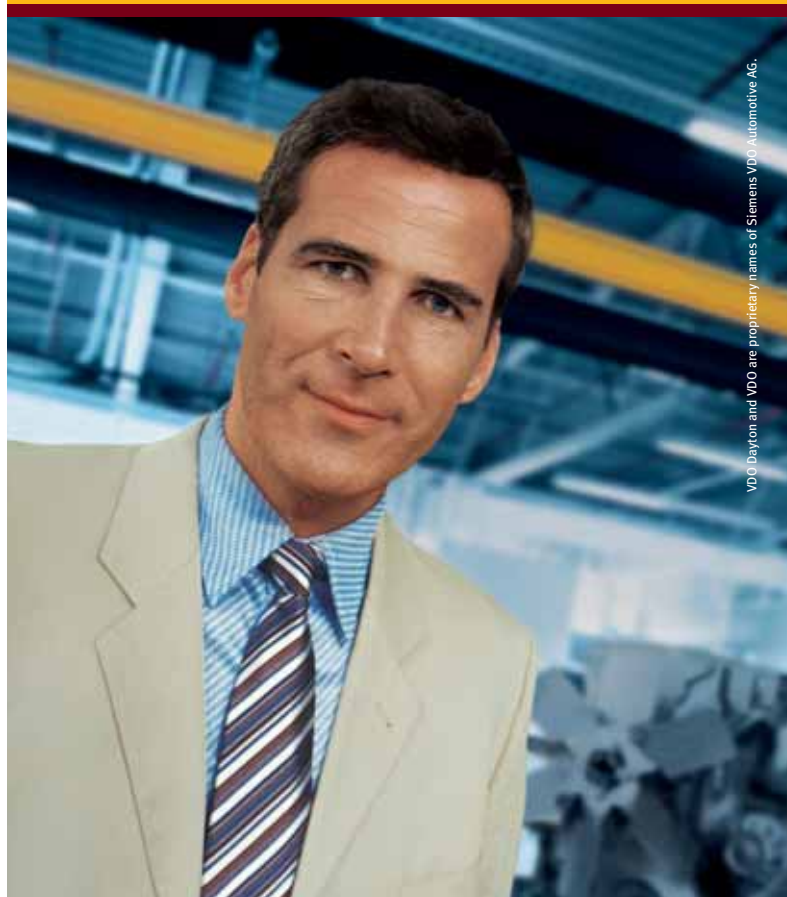
For the MT 1000-1 Mobile Feeder, Vögele offers an extra storage hopper that can be placed into the material hopper of the road paver. Special versions of the hopper are available to increase the paver's storage capacity up to 20 t (22 ton). A sonic sensor monitors the mix level in the hopper, and as soon as a preset limit is reached stops the supply, which prevents the drive drum of the Mobile Feeder from getting packed with mix.

The Mobile Feeder features a sensor system that monitors paving speed and provides for an optimum distance between Mobile Feeder and paver, thus allowing the paver operator to focus on the essentials of his job. A collision-protection system fitted to the Mobile Feeder offers extra safety. In the event of an imminent collision, this system resets the paver's traction main switch to neutral and stops the paver.

The control desk and operator's seat are positioned to allow the Feeder operator to have a clear view of the entire process, from discharge of mix from the feed vehicle into the Feeder's storage hopper through to filling of the paver's material hopper.

For all functions of the MT 1000-1 Mobile Feeder, hydraulic drives are provided. The machine is powered by a water-cooled **Deutz** engine rated at 106 kW (142 hp). For maneuvering in confined spaces, crawler track movements are reversible. Maximum operating speed is 16 m/min (52.5 ft/min) and maximum travel speed 2.4 km/h (1.5 mph), both infinitely variable.

The Mobile Feeder comes with a receiving hopper fitted with push-rollers for quick and easy discharge of mix by feed vehicles. Hopper sides extend hydraulically from the transport width of 3 m (9.8 ft) to the working width of 3.6 m (11.8 ft). Worm



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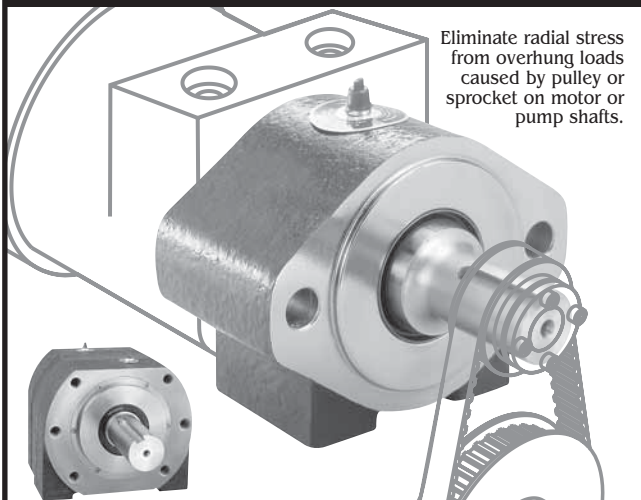


The new Vögele MT 1000-1 Mobile Feeder speeds up discharge through its belt conveyor dumping the mix from above into the paver's hopper.

conveyors move the mix to the rear of the receiving hopper. A belt conveyor then transfers the hot mix to the road paver. Conveying capacity is up to 900 t/h (992 ton/h).

The MT 1000-1 comes with a trough-shaped belt. The belt's precise guidance in the lateral areas assures positive sealing to prevent spilling of mix and accumulating on the belt rollers. Hydraulics that slacken the conveyor belt and operate the scraper beneath the belt reduce the time required for maintenance and cleaning. Because the return drum is a non-enclosed design, coarse grains cannot get stuck between the return drum and the belt or sealing components and service life of the conveyor is thus prolonged. The conveyor tunnel is covered up and provided with infrared heaters for preheating the rubber belt, to help keep the mix from sticking to it.

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Extended reach from Grove

The 50- to 60-t (55- to 66-ton) sector of the mobile crane market is an important one for **Grove**. Shown for the first time at Bauma 2004, on the **Manitowoc Crane Group's** stand was Grove's new three-axle, 55-t (60-ton) long-boom model GMK3055 mobile crane.

The GMK3055 features a new six-section, 43-m (141-ft) MEGAFORM (U-shaped) main boom with Grove's patented TWIN-LOCK single-cylinder extension system. This boom is the longest on any three-axle all-terrain crane and gives it a 5-m (16.4-ft) reach advantage over the previous model. It can also carry an 8.7- to 15.0-m (28.5- to 49.2-ft) hydraulic-luffing or manual offset swing-away jib, which provides a maximum possible tip height of 60 m (197 ft).

Even with its long boom, this new crane, at just 8.7-m (28.5-ft) overall chassis length, is still the most compact and



The Grove GMK3055 features a new six-section, 43 m (141 ft) MEGAFORM main boom.

most maneuverable carrier in the 45 to 60 t (50 to 66 ton) class, according to Grove, and can be driven on the road within European weight restrictions.

The GMK3055 comes with the MEGATRAK all-wheel drive/steer and independent suspension system, and the full range of other GMK features such as the ECOS electronic crane operating system with in-cab graphic display and EKS5 (light) electronic load-moment monitoring system.

Because of the continuing strong demand for the model GMK3050, Grove will continue to produce it. An additional upgraded 50-t (55-ton) model, designated GMK3050-1, will also be added to the range, featuring the same carrier, cab, and controls of the new GMK3055, but with a full-power 38-m (124.7-ft) main boom similar to the GMK3050. The GMK3050-1 gives users the option of faster boom cycling and repositioning, for jobs such as steel erection.

All GMK cranes are now distinguishable by a new carrier-cab front-grille design. More than 100 orders have already been received for the GMK3055, and deliveries have begun to Europe, Australia, and the U.S.

Circle 240

Bomag gets rolling

The third generation of **Bomag** single drum rollers was replaced at Bauma 2004 by a new and completely revised Dash 4 product series. The exterior styling of these machines has changed dramatically, notably the shape of the front frame and the design of the scrapers. The advantage of the curved front frame is that there is no longer any build-up of material when compacting cohesive soils with pad foot drums. There is now better access to the scrapers for maintenance, inspection, and repair work. Wear-resistant steel is incorporated for the scrapers on pad foot drums for longer life.

The composite hood is made from DCPD (dicyclopentadiene), a reactive polyolefin that has an impact resistance four times higher than the fiberglass reinforced plastic widely used on construction equipment.

Common to all models is the large cab, an operator's platform that is tailored to the needs of the operator, and a sliding swivel seat. Two travel levers are placed with integrated operating controls for vibration, crab walk, and edge compactor. There is a good view to the surfaces and edges of both drums.

In the cab, large window areas create safe viewing conditions. All DH/DPH models are equipped with an LCD that has transreflective glass for better legibility in direct sunlight. A powerful heater is provided in the footwell (optional heating/climate control), which ensures comfortable temperatures in the cab and a clear view out in cold weather.

The step to the operator's platform is integrated into the rear frame and provides access to a lower, safer platform. The operator's seat has more legroom than the previous model, and the controls are within easy reach. The view to the front and particularly to the drum edges is better than ever. An optional combination of twin-levers and a sliding seat offers even more comfort, claims the company.

The internal components have all been the subject of a thorough upgrade. All DH/DPH single drum rollers are powered by electronically controlled engines with load-dependent speed regulation to

reduce fuel consumption and noise levels. The vibration frequency can be infinitely adjusted to suit the soil conditions.

The new-generation BW 100/120 AD tandem rollers and the BW 100/120 AC combination models have also been technically improved and completely restyled. The limits for both noise and vibration for the operator meet or fall below the requirements for 2006.

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The new BOMAG Dash 4 single drum rollers have a curved front frame so that there is no longer any buildup of material when compacting cohesive soils with pad foot drums.

Under the impact-resistant DCPD hood is a **Kubota** three-cylinder engine that produces 25 kW (33 hp) at 2600 rpm. The 40-L (10.6-gal) fuel tank is sufficient for a 10-h non-stop shift. The high speed range goes up to 12 km/h (7.5 mph). Vibration frequency is over 66 Hz (70 Hz optional). Travel and vibration bearings and articulated joints require no maintenance. All service points are accessed easily through the wide-angle engine hood opening.



The noise and vibration levels for the operator of both the new-generation tandem rollers and the combination models meet or fall below the requirements for the year 2006.



Water-cooled Deutz engines power the new BOMAG heavy articulated tandem rollers.

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Circle 240

The Bomag heavy articulated tandem roller series is now rounded off with new BW 141/151 AD 8 to 9 t (8.8 to 9.9 ton) class models with 1500- or 1680-mm (59- or 66-in) working widths. The new models are also available with Asphalt Manager for automatic optimization of compaction performance, and the EVIB-display that shows asphalt stiffness.

A new exciter system has been developed with a frequency of 60 Hz and matching amplitudes. Higher frequencies and the related higher rolling speeds enable greater area output when paving.

The new models are powered by series 2012 water-cooled **Deutz** engines with a rated power of 60 kW (80 hp).

Renault's newest truck

Another debutant at Bauma 2004 was the latest product in the **Renault Trucks** portfolio. Filling the gap between specialist building vehicles and long-distance trucks, the Renault Premium Lander has been optimized for construction use.

The new truck is based on the Premium Route and Premium Distribution series, sharing the compact driver's cab and three length options. Special features that are standard on the Lander include a twin-transmission drive axle with differential lock, a front axle with a load-bearing capacity of 8 t (8.8 ton), and a reinforced chassis with a 290-mm (11.4-in) frame. Larger tires and stronger springs provide higher ground clearance, which in conjunction with the lockable drive axle delivers off-highway mobility without any reduction in payload. Maximum ground clearance under the front axle is 320 mm (12.6 in), and under the drive axle 250 mm (10 in)

The Renault Premium Lander is available as a chassis with two or three axles, or as a semitrailer tractor. The semitrailer tractor has 3650 and 3815 mm (144 and 150 in) wheelbase options. Two- or three-axle models have a selection of seven sizes, from 3815 to 5960 mm (150 to 235 in). The three-axle model can also be equipped with a trailing or lead axle.

Power comes from a choice of two Renault straight-six, direct-injection diesel engines. The dCi 6 has a 6.2-L capacity and delivers 195 kW (261 hp). The dCi 11 has a capacity of 11.1 L and the three power options available are 229, 266, and 303 kW (307, 357, and 406 hp). Transmissions are supplied by



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ZF and offer nine speeds with direct gears or overdrive option, or 16 gears with overdrive.

Drive axles for the Lander include seven gear-ratio options in the axle housing ranging from 2.41: to 1.76:1. Gear ratio in the wheel hubs can be 2.0: or 2.26:1.

The Lander can tow standard 13.6-m (44.6-ft) long semitrailers without exceeding maximum legal length.

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