

Photo courtesy of Caterpillar, Inc.

Cat Mobil-Trac undercarriage delivers traction on heavily tacked surfaces, and the large ground contact area minimizes base disturbance on soft materials

Expo Engineering

Here's a sneak peak at the technologies behind exceptional equipment for roadbuilding at ConExpo-Con/Agg 2014

Hundreds of products new to ConExpo-Con/Agg 2014 will be on display at that triennial exposition this year, but some of them will be distinguished by the advanced science and engineering that has gone into perfecting them.

This month, Road Science takes a close look at noteworthy road construction equipment technology at ConExpo-Con/Agg. In our February issue next month, we'll examine the science and technology behind road construction materials to be exhibited there.

Plan now to attend ConExpo-Con/Agg 2014 in Las Vegas March 4 to 8. Visit conexpoconagg.com for more information.

Cat track, compaction control

Recent technological improvements that are engineered and built into Caterpillar's new paving, compaction and cold-planing products will be on display at ConExpo-Con/Agg 2014.

"Customers tell us they want technology with function — technology that helps them improve their productivity and their bottom lines," says Jim McReynolds, president, Caterpillar Paving Products. "Our ultimate goal is to provide customers with solutions that reduce their owning and operating costs."

The Mobil-Trac undercarriage, available on many new Cat pavers, provides best-in-class traction, with the high travel speeds and maneuverability, Caterpillar says. Work is completed quickly, and pavers can perform under varied and demanding conditions.

With this undercarriage, an oscillating bogie design provides multiple pivot points, so the undercarriage easily overcomes bumps and dips. The tow point is isolated from the deviations and ride quality is enhanced.

Friction-drive with automatic belt tensioning has always been part of the system, Cat says. Belts do not slip, while rubber-coated components prevent the build-up of asphalt that is common to other belt drive systems, and leads to

premature belt failure. Guide lugs keep the belt centered for maximum performance.

Mobil-Trac undercarriage delivers traction on heavily tacked surfaces, and the large ground contact area minimizes base disturbance on soft materials. The operator always has full control for steering and the ability to push trucks.

Cat Compaction Control is featured on new Cat soil compactors, tandem vibratory compactors and pneumatic rollers, and is one element of a suite of intelligent compaction technologies.

For soil compactors, the basic system provides compaction measurement using either Compaction Meter Value (CMV) or Machine Drive Power (MDP) technology, with the ability to boost the system with GPS mapping capability. For tandem vibratory rollers and pneumatic compactors, the system provides pass-count information and GPS mapping, enabling the operators to achieve more homogeneous and effective compaction by making sure the right number of passes is made.

Features beyond pass-count information are available, including infrared sensors on the front and rear to continuously measure asphalt temperatures. The accumulated data may be stored for later analysis so processes can be examined, adjusted and archived.

MDP, an exclusive technology, is available on new Cat B-Series soil compactors, and is unique in that it measures compaction with the vibe system on or off. MDP measures rolling resistance as an indication of soil stiffness. It measures closer to the depth that the machines are able to compact. It also measures closer to lift thickness. The measurements are less impacted by the dampening effect of cohesive soils, so it can be used on padfoot machines.

Cat Compaction Control, whether using CMV or MDP measurement, can also use a Global Navigation Satellite System – such as GPS – to provide positioning information to map pass count, coverage and compaction measurement details. This data can be stored for review at a later time.

Visit Caterpillar Inc. at its indoor booth No. 10915 in the North Hall and outdoor booth No. 1015 in the Gold Lot or at cat.com.

Federal Highway Administration (FHWA) offers intelligent compaction (IC) advice. Along these lines, the FHWA now offers IC phone and e-mail support as part of its national effort to deploy IC throughout the US.

The IC Technical Support Service Center (TSSC) will answer all IC-related questions, including those regarding specifications,

IC workshops/IC equipment demos, Veda data management software, pilot project selection and IC-related technical documents.

Phone and email support is available Monday through Friday from 8 a.m. to 5 p.m. CST. Call the IC Support Hotline at 512-659 1231, or send an e-mail to ICSupport@TheTrans-tecGroup.com.

In addition to phone and email support, the IC TSSC also provides local assistance, workshops, equipment demos, and an online library of technical documents and other resources. For more information, visit intelligentcompaction.com.

TanGO with BOMAG

BOMAG Americas Inc. will introduce technologically advanced oscillation technology at ConExpo-Con/Agg at booth No. 50675.

Oscillation compacts asphalt or soil with a horizontal effort, without introducing vertical vibrations into adjoining structures or bridge decks.

BOMAG's Tangential Oscillation, dubbed TanGO, will be shown on its new BW161ADO-4 tandem roller. BOMAG TanGO oscillation makes use of the physical laws of vibration generation to its best effect, the maker says. The careful coordination of exciter system to drum weight ratios is the basis for BOMAG's tangential oscillation. Target applications for this compaction technology are on bridge structures and for working in close proximity to buildings. Usage for intermediate and finish rolling are additional proven applications.

With tangential oscillation always applied horizontally, it maintains continuous ground contact, and efficient compaction results are often able to be seen immediately after a few roller passes. The interaction of TanGO oscillation from the



BOMAG TanGO oscillation makes use of the physical laws of vibration generation to its best effect

Photo courtesy of BOMAG AMERICAS



Detail of New Braunfels roller-compacted concrete pavement was grooved to provide a smooth riding surface.

rear drum and traditional vibration power from the front drum provides practical advantages on difficult-to-compact asphalt mixes. This directly leads to achieving desirable smoothness and density results, BOMAG says.

BOMAG is planning future TanGO introductions into other roller weight classes. For more information, visit go to No. 50675 in the Central Hall or BOMAG.com/us.

Case SCR Exhaust Technology

Case Construction Equipment introduced an innovative, low-maintenance, Tier 4 Interim emissions control system on a new line of dozers in October. The first selective catalytic reduction (SCR) technologies built into a dozer are part of the new M Series line of five dozers, which includes models ranging from 92 to 214 hp.

Case is the first heavy equipment manufacturer to build proven selective catalytic reduction engine technology into a dozer to meet Tier 4-interim standards. The engines on the four larger models are built by Fiat Powertrain Technologies and offer advantages in terms of maintenance (no regeneration or diesel particulate filter to maintain) and fuel efficiency (some models experience fuel savings up to 14 percent).

One of the greatest advantages of SCR in this application relates to machine performance, Case says. SCR is well-suited for dozers because it lets the engine run at peak performance under variable loads without compromising the power or drawbar pull that achieves the brute force required for earth-

moving, it adds.

In addition to the SCR technology, key features found on M Series dozers include best-in-class drawbar pull, increased horsepower ratings, fuel savings up to 14 percent, industry leading visibility, new versatile controls and a pressurized cab for optimal comfort, according to Case.

The smaller 750M, designed primarily for the rental market, features a cooled exhaust gas recirculation engine also produced by Fiat. This emissions treatment requires diesel particulate filter maintenance but no end-user involvement in filling diesel exhaust fluid.

See the line at Case's indoor exhibit at Booth No. 11722 in the North Hall and adjacent Booth No. 12012 or visit casece.com.

Volvo: Fuel Savings via ITS

Volvo Construction Equipment manufactures and markets equipment for the road construction industry, including wheel loaders, excavators, articulated haulers, motor graders, asphalt milling machines and pavers, soil and asphalt compactors, backhoe loaders, skid steer loaders, compact wheel loaders and compact excavators.

Coming to Volvo Construction Equipment will be Intelligent Transport Systems (ITS), which may reduce fuel consumption by up to 30 percent in certain applications while increasing safety.

Hundreds of engineers at Volvo CE are busy making equipment as fuel efficient as possible, the company says. One area of Volvo technological development is wireless machine-to-machine (M2M) and machine-to-infrastructure (M2I) communication.

Volvo CE has conducted tests to calculate the potential fuel savings M2M communication could bring to articulated haulers working in the quarry and aggregates segment.

The project monitored a hauler, loaded with rocks from an excavator, traveling to the crushing site. The machine was fitted with an internal measurement system to verify the fuel consumption. The hauler was operated by different drivers, at both constant and varied speeds, with different amounts of idle time and both with and without stops along the way. Tests showed that when the hauler traveled faster than necessary

to the crusher, and as a result had to wait before unloading, fuel consumption was up to 30 percent higher compared to when the hauler traveled at a constant speed and arrived at the optimum moment.

Thus, by using M2M communication the operator would know exactly when to arrive at the crusher and what speed to travel at to get there. Through reducing machine speed and idle time, fuel consumption and machine wear and tear are minimized, and an efficient flow of equipment is facilitated.

The next stage of the project will be to provide the operator with information – such as target speed and arrival time – inside the cab. This live information will support and guide operators to the most fuel efficient operation and could be presented in future concepts like heads-up displays and other innovative approaches.

Volvo will exhibit its line of construction equipment at booths No. 1300 in the Gold Lot (outdoor), and 10951 in the North Hall, or visit volvoce.com.

Bergkamp Melds Patchers, Software

Bergkamp Inc.'s new spray injection pothole patchers incorporate exclusive engineering technology and will be introduced at ConExpo-Con/Agg 2014 at Bergkamp's booth No. 8202 in the Platinum Lot.

Three new spray injection patchers complement Bergkamp's all-in-one FP5 flameless pothole patcher, and may be used with the intelligent InPave pothole patching management system to provide users with a technologically advanced patching program.

In Pave helps a user monitor and manage pothole-patching performance. Multiple data reporting sensors are strategically placed throughout the patcher that log production, performance and locations of pothole patcher and crew, the maker says.

As potholes are repaired, InPave automatically gathers and reports data such as quantity of potholes repaired, location, time and material used for each repair, and material levels and temperatures. Retrieved from any computer with internet access, the data can then be turned into easy-to-read reports that assist managers and owners in evaluating current and historic production. They can also use these data to verify patching performance and material usage, troubleshoot potential pothole problems and help reduce inefficiencies. There is no software to download, and the InPave data

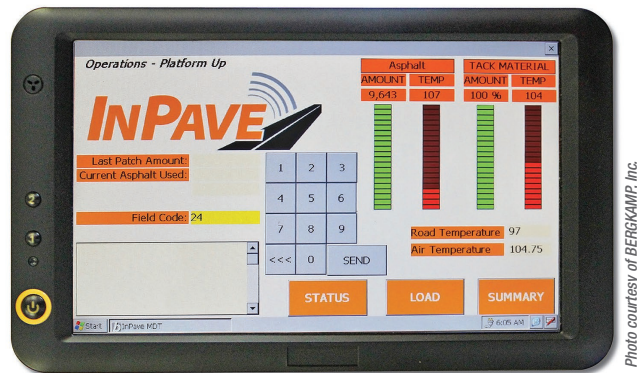


Photo courtesy of BERGKAMP, Inc.

Bergkamp's InPave pothole patching management system provides users with a technologically advanced patching program

can be downloaded into multiple file types for transfer into a pavement management system.

An in-cab, 7-inch color touch screen mobile data terminal allows the operator to quickly enter the quantity of material loaded when filling at the asphalt plant for recording purposes.

Spray injection is a less invasive patching technique that allows the damaged pavement to be blown out and repaired in minutes. The truck-mounted SP5 and SP8 spray injection patchers are equipped with an exclusive dual chamber (60/40) aggregate hopper that allows the distribution of two different gradations of aggregate for more efficient repair of deeper potholes. A version with automatic operations from the cab is available in addition to manual operations from the ground in front of the truck.

From Dirt Roller to Breaker

At ConExpo-Con/Agg, Hamm will introduce a one-of-a-kind product, a Tier 4 Interim dirt roller that has been transformed into a concrete breaker by the addition of specially designed bits or teeth to the single drum.

The highly engineered new H 25i VC is a single-drum vibrating compactor outfitted with teeth that will shatter concrete more effectively – and at lower cost – than special-purpose guillotine, “finger” or ultrasonic concrete breakers.

The teeth or tools on the H 25i VC drum allow the compactor to simultaneously crush and compact a whole variety of construction materials and minerals. A patented quick-change toolholder system makes it possible to use very



Web Extra:

Read “Roller-Compacted Concrete Field Demos” at betterroads.com/rcc-demos.

different tools.

These specially developed point-attack cutting tools are ideal for crushing or relieving stress from stone, as well as for preparing tracks through rock. But they also can be fitted with special padfoot shells, which transform the VC compactor into a padfoot roller.

The design of the quick-change toolholders is both sophisticated and ergonomically functional. It ensures that tools can be replaced quickly, minimizes the tendency to retain debris, and can be cleaned without difficulty, Hamm says.

See it at Wirtgen America's booth No. 51021 in the Central Hall, or visit wirtgenamerica.com. ❖