Issue 3 **2010**

PAVING NEWS

A Caterpillar publication serving the global paving industry

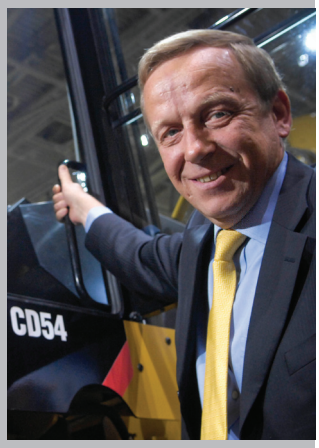
Firm Ready for Takeoff When Opportunity Arises

Cat® Grade and Slope Leads to Perfection

Intuitive system makes believers out of operators

CATERPILLAR®

Technology Backs up Training



Lieven Van Broekhoven
Worldwide Sales
and Marketing Manager

Over the years when we at Caterpillar Paving have asked customers what kind of technology they'd like to see on our new models, we've heard many ideas about new features. But the most consistent request isn't about the features themselves—it's about offering reliable, easy-to-use technology that doesn't require operators to re-learn their jobs. In other words, technology that provides an easy transition.

So, it was gratifying for me to read in this issue ("Not One Single Bump," page 16) comments from a customer about the newly released Cat® Grade and Slope system. When Superintendent Jeff Luce uses phrases like "simple to run," "intuitive," and "easy to understand," I know that we put in time listening to users before we launched this paver option. What good is cutting edge technology if operators don't trust it and won't use it?

I would be remiss, though, if I didn't point out that a lot of forward-looking paving contractors, like Asphalt Paving & Materials Co., are already producing very good work. No one paves a single lift for 21 lane miles without bump grinding unless they've made a commitment to quality and to crew training. That crew knows what they're doing and are able to take in new technology and to make it work for them immediately.

I imagine someone could learn a lot watching Jeff Luce's crew take off from a transverse joint. They must be pretty good at it, because transverse joints are the main targets for bump grinding. I wonder who trained them? Do you suppose they take off in manual depth control or do they use automatic grade and slope?

Their performance tells me one thing: They were trained and ready the first time they used the new Cat Grade and Slope system on that highway project. That's the correct way to use new technology, and the result speaks for itself. ■

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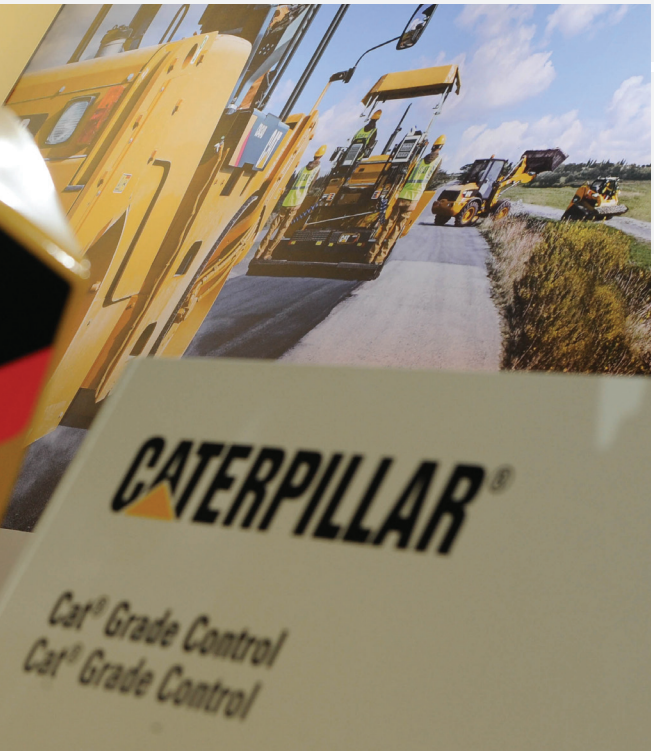

16 **'Not One Single Bump'**
Cat® Grade and Slope leads to perfection.

The paver moved at a consistent pace.

Peab Asfalt of Sweden primarily handles major road and highway projects in the inland portion of the country. But the company was willing and able to take on a new challenge when an airport runway needed to be paved in its own backyard.

"When you're working on a project like this, anything can happen," said Reijo Seppanen, project superintendent for the company. "You can have problems with the weather and there are always time pressures, deadlines to meet. We have to get off the runway one hour before the next airplane is arriving."

Many steps were taken to prevent segregation.

Paving firm ready for takeoff when opportunity arises

Time pressures, deadlines create challenges

The Project

The work was done at an airport in Jonkoping. It's a relatively small airport but still crucial to the inland area of Sweden. "We don't have many airports around here," Seppanen said.

Flights typically were rerouted during the project, with the exception of two per day in the later afternoon or evening. That enabled Peab Asfalt to make progress almost daily, and also kept outbound and inbound passengers and freight connecting to key hubs in Stockholm and Copenhagen.

"Even with the limited flights, we had to adjust paving schedules," Seppanen said. Paving often started in the middle of the night and extended into the late afternoon of the following day.

Another contractor handled the first phase of the project, which consisted of milling about 50mm (2") off the existing surface. "Then we put the asphalt down," Seppanen said.

The paving portion of the project took about three weeks.

Paving

Segregation is always on the mind of Seppanen and others at Peab Asfalt. The efforts start at the plant, with proper loading of the trucks. The trucks themselves have rounded, not flat, bed bottoms. This prevents sticking when the materials are end-dumped into the Cat® AP600D later in the process.

The trucks travelled about 70km (43 miles) from the plant to the airport. Traffic was light given the area and the fact much of the paving was done at night. Shorter truck cycle times, combined with other segregation fighting efforts, paid off.

"Our trucks are insulated, so the asphalt stays hot," Seppanen said. "The asphalt is covered as well. There was no problem keeping the asphalt in the trucks hot because the job took place in the middle of the summer."

"I really like the Cat® paver. It doesn't take a lot of diesel—it's very stingy with the fuel."

The mix left the plant at 170-180°C (338-356°F), and was dumped into the hopper at about 160-165°C (320-329°F). Plant production, paving speed and trucking were all calculated to keep the paver moving at a consistent pace. "We move continuously," Seppanen said. "That's one of the key efforts we make to prevent segregation."

Another segregation-fighting technique is allowing mix to collect in the sides of the hopper throughout the shift. "We don't close the (hopper) sides between lifts to loosen material," Seppanen said. "The asphalt on the sides is cold, and we don't want to shake it loose and mix it with the hotter material. When the work is done for the day, we clean the sides."

The AP600D was a newcomer to the site, with the company previously using a different manufacturer's product.

"I really like the Cat paver," Seppanen said. "It's silent compared to others." He also appreciated its fuel efficiency. "It doesn't take a lot of diesel—it's very stingy with the fuel." Crews also found the screed adjustments easy to make.

The paver worked at a pace of about 4-5 m (13-16') per minute, placing a single lift of 40mm (1.5"). The Cat paver worked at a width of 4.5m (14.8'). Ten passes were required to cover the entire width of the 45m (148') runway.

"The middle of the runway is the highest point because of drainage,"

Round truck bed bottoms prevented materials from sticking.

Seppanen said. “We started at one side, then made five passes until we reached the middle. Then we started at the opposite side, and worked our way back to the middle.”

The width of the project led to many longitudinal joints. Peab Asfalt crews placed the new, hot mat slightly higher than the adjacent cold mat. A breakdown compactor used a small side roller to compact the joint.

Compaction

Three heavy rollers handled compaction. All three were in the 11tonne (12 short tons) range.

The first roller made 6-7 passes, with a movement up being one pass, and the movement back counted as a second pass. “The operator was very tight to the paver, and worked as far back as 20-30m (65-98’),” Seppanen said.

The second roller worked about 50m (164’) from the paver. The number of passes varied based on that day’s conditions. The compactor was vibrating while making its passes.

The third roller had no set distance between it and the rest of the paving train. “He mostly worked to take the tracks out of the mat and make it smooth,” Seppanen said.

Core samples were taken along the way to ensure adequate compaction was being achieved.

The project had production and time demands, but Peab Asfalt was glad to take it on. “We don’t have many projects like that come up,” Seppanen said. “When there is an opportunity, you have to take advantage of it.”

Product support is very important to the company’s efforts to hit deadlines and overcome other obstacles, Seppanen said. “If we ever have a problem, I call the dealer and they help right away,” he said. “We try on the phone first, and usually can solve problems that way. If that doesn’t work quickly, they come to the jobsite right away.”

The combination of customer support commitment and parts availability helps keep the equipment up and running. “It’s important on time-sensitive jobs like this,” Seppanen said.

The airport proved to be a challenge, but in this case, both crew and paver proved more than up to the task. ■

Two machines can accomplish the work of three

Conserve by Minimising Compaction Train

The compaction process generally consists of three phases: breakdown, intermediate and finish. However, you do not necessarily have to use three compactors to accomplish the three phases. In some cases where requirements and specifications permit, proper planning can allow two compactors to do the work normally assigned to three.

Cat® dealers and Cat paving industry consultants are experts at matching the compaction train to the laydown equipment and helping reduce your equipment investment and your energy consumption. Here's an actual project example of how Cat consultants go about the compaction planning process.

First, Cat consultants calculate the paving speed based on hourly tonnage, paving width and paving depth. On this project the contractor was laying down 250tonnes per hour (275tons per hour) at an uncompacted depth of 70mm (2.75") and a width of 3.66m (12') while using a material transfer vehicle. The paving speed was 7m per minute (23feet per minute/fpm).

Available for the project were two CB54 XW double-drum vibratory compactors. On the test strip, we determined that after three passes per panel the mat is brought to the breakdown density target of 92.5%

2m (79") Cat® compactor working in the hottest temperature zone staying ahead of the tender zone.

to 93.5% of maximum theoretical density. Based on 2m (79") drum width and frequency of 2,520 vibrations per minute (vpm) with 75% efficiency factor, the compactor will match the paver speed by working at 70mpm (229fpm).

The first CB54 XW did its work in approximately 8 minutes, staying ahead of a tender zone that begins 12 minutes behind the paver when the mat has cooled to about 110ºC (230ºF). Tenderness stops about 30 minutes later when the mat has cooled to about 90º C (190ºF). At that point, the second CB54 XW set in high frequency (3,800vpm) and low amplitude made two passes at 116mpm (380fpm), always staying behind the tender zone, and bringing the density up to 94.5% to 95% of maximum theoretical density.

Finally, when the mat had cooled below 60ºC (140ºF), the second CB54 XW completed two long, slow passes to clean up any marks left by previous rolling.

Higher hourly production or project specifications may dictate the use of another compactor, a pneumatic, for example. But why increase your equipment operating costs and burn more fuel if you don't have to? Look to your Cat Dealer for guidance to help match the laydown and compaction equipment on your projects. ■

The next haul unit must be held up and kept clear of the front of the paver while labourers are cleaning up spills.

Training Supports Safety Programmes

Most paving contractors have safety policies and programmers. Their employees are expected to follow the established guidelines. Companies pass out safety manuals and conduct annual safety certification classes. There are start-of-shift safety reviews. Rightfully so, workplace safety has the highest priority.

One way to supplement safety training is to continuously conduct operation and application training. Operators and labourers who are confident of their skills are in control and are less likely to make careless mistakes or create potentially hazardous situations.

Here are some good examples of how operator training can help to minimise exposure to workplace safety issues.

Train paver operators in the proper truck exchange procedures. During courses conducted by Cat Paving Products, operators are trained to avoid or minimise spills out of the front of the hopper during trucks exchanges. With fewer spills on the grade there is less chance that labourers will be working between the paver and the next truck backing in to the paver push rollers. Thus, a potentially hazardous zone is eliminated.

Compactor operators need training for rolling patterns that eliminate entry into the screed operators or labourers work zone.

The rolling pattern boundary should end at least two compactor lengths away from the screed. There is no need for the rolling pattern to be any closer. Remember, screed operators and labourers are almost always looking forward, not back at the compactor. They are usually unaware of the compactor's position.

Get the paving crew trained to set up grade and slope systems correctly at the start of the pull.

This is especially important if there is traffic along one side of the paver. Sensors and skis must be properly positioned so the operators do not have to make adjustments that would expose them to traffic once the paver is moving.

Safety is more than awareness. It's also about the confidence that comes from being well trained and alert to all aspects of the work zone. Include operation and application training whenever possible with safety training. Your Cat dealer has a wide range of operation training material available for this purpose. ■

Make Your Crew 'Exceptional'

Training programmes of all types available

Paving contractors today face more demands than ever. There are customer demands to meet and deadlines to hit. Productivity is always on the minds of owners and supervisors as they try to maximise the resources they have.

Crucial to all these efforts are crews. It takes exceptional crews to deliver all the requirements the industry now demands.

How can your crew become "exceptional?" It all starts with training. Crews need to know the proper techniques. They also must learn to leverage the technology and productivity that is built into today's machines.

Caterpillar and your Cat® dealer can supply the experts to help transform your crew. Here are some of the ways they can help.

Paving Operations Training

Paving Operations Training (P.O.T.), provided through Caterpillar, is a combination of classroom and hands-on training. It is offered at a Caterpillar facility.

P.O.T. is a "train the trainer" programme. That means those who attend the training are able to teach those same lessons to crew members back home. Each participating company receives a training kit that contains all the written materials, outlines, tests and evaluation forms to help the attendees share their newfound knowledge.

The daily routine includes time in a classroom and at a demo site. Topics range from fundamentals, to transverse and longitudinal joint construction, to critical screed adjustments.

P.O.T. courses are currently available for North American operations and will soon be available worldwide.

On-demand customised training classes

These sessions take place at a location of your choice, whether it's your dealership, a Caterpillar facility, or a facility of your own.

The programme is about more than convenience. It also is tailored to your specific needs. Tell your dealer the targeted areas of improvement for your crews and a curriculum will be designed to meet your needs.

Topics include equipment operation, as well as servicing.

On-the-job crew training

Experts from your dealership and Caterpillar will join your crew on the job to help them implement the proper techniques. They will help troubleshoot mat issues as well as compaction issues. Classroom sessions can be arranged to coincide with and complement the on-site lessons.

Call your Cat dealer today for more information on a training programme that can help your crews become "exceptional." ■

CAT.COM/Training

Golf Course Path Blends Into Surroundings

Hills and natural look key challenges

Italian paving contractor SIES routinely takes on street and road work that involves thousands of tonnes of asphalt. But the challenges were quite different during the paving of a cart and service path at Tuscany's first world-class golf course.

The path for the 18-hole championship course needed to blend perfectly with the Tuscan countryside. This led the course developer to specify a surface course that included native aggregate. It was combined with a resin that made the path look as if it was simply cut out of the hills.

"We had to achieve a natural, environmentally pleasing look," said Claudio Sanchi, operator of the paver. "The result is a pale ocher, which resembles the clay earth that has formed great gashes in the countryside."

There is another environmental element to the Tuscan countryside: hills."It was a job that required going up and down many hills during the paving process," Sanchi said.

Project Description

Designed by world-renowned golfer and British Open winner Tom Weiskopf, Drago Golf Club rests within one of Italy's largest contiguous estates, the Castiglion del Bosco. It is located 97km (60 miles) south of Florence, and 201km (125 miles) north of Rome, in the province of Siena. The vast estate spans nearly 10km (6 miles), comprising nearly 1,821 hectares (4,500 acres) of protected nature preserve.

The golf club is the vision of Massimo Ferragamo and Fred Green. It covers an area of 10,000m² (11,960yd²). A provincial dirt road separates it from a handful of original landowners' villas perched atop hills.

SIES, an Italian contractor

The Cat® AP300 places a surface course that includes native aggregate.

headquartered in Siena, was chosen to handle the work at the prestigious course. Specifically, SIES handled paving the golf cart path that winds through the hilly course. The path covers a length of 10km (6 miles) at a width of 2.4m (7' 10").

SIES was responsible for building the sub-base as well as placing the surface lift of gravel and resin mix.

Time was an issue, as the path had to be completed before other course improvements could be made. SIES started the job with another manufacturer's machine, but it wasn't productive enough to hit the deadlines.

"The machine can place any type of material without problems."

COMPANY INFORMATION

Company name:
SIES

Headquarters:
Siena, Italy

Employees:
18

Operations:
Asphalt plant, road-building operations

Clients served:
Municipalities and private concerns

Other equipment:
Cat AP600D asphalt paver; Bitelli BB670 asphalt paver; Bitelli cold planer

The paver's AS3173 Screed provides a smooth finish and initial compaction.

The rolling hills created the need for a paver with power.

The company turned to the Cat® AP300 asphalt paver and quickly got back on schedule.

On the Job

The rolling hills of the region are one of the most beautiful features of the new course. Those same hills also were challenges when laying the sub-base and surface materials. "The machine can climb hills very easily," Sanchi said.

Work began with a Cat excavator digging a trench at a depth of 20 cm (7.8"). The paver actually placed the sub-base, which included aggregate of 30mm (1.2") or smaller. The depth of the stabilised lift was 20cm (7.8"). A small dump truck delivered the materials to the paver, which placed it as it would a normal asphalt surface. It was compacted by a Bitelli roller.

The AP300 then made a second pass, placing a 3cm (1.2") lift on the sub-base. The surface material included a mix of small native stone and a transparent resin that provided the look of a natural color and grain, but with long-term durability.

"The machine can place any type of material without problems: asphalt, cement, gravel, sand, polymers," said Sanchi.

The plant providing the materials was about 35km (22 miles) away. A large truck delivered the materials to the jobsite. The surface materials than were loaded to a mini-dump, which transported them directly to the paver.

"The haul truck delivered the materials to different locations so the mini-dump would only have to travel a maximum of 500m (1,640')," Sanchi said.

Material segregation wasn't a concern because of the independent augers on the machine, Sanchi said. There were no specifications for density, given the use of the path. Still, the mat had to be compacted. "The sub-base and surface were built to handle some fairly heavy weights," he said. "The path can be traveled on by vehicles exceeding 9tonnes (10 US short tons) without a problem."

The compaction process started with the Cat AS3173 Screed. "The screed lays material to the desired width and depth while providing a smooth finish with initial compaction," Sanchi said. A Bitelli mini-roller, in vibratory mode, completed the compaction process with two or three passes, depending on the conditions.

Production was good, with the paver placing the surface course at a pace of better than 1km (0.6 miles) per day.

"It was a great job," Sanchi said. "It's a beautiful, prestigious course that we're honoured to be part of. We're also thrilled to do our part to contribute to the course: to create a path that fits so naturally into its surroundings.

"The hills and curves were a challenge, but nothing that couldn't be overcome." ■

SURVIVING THE STEEP AND NARROW

The winding path was one of the big challenges that had to be overcome while paving at the Drago Golf Club. Steep hills were another.

"The gradient varied from about 5 percent to as much as 30 percent," said Claudio Sanchi, operator of the paver.

What makes the AP300 a good fit for the winding, hilly work? Sanchi offered these observations.

- Optimum power-to-weight ratio for hill work.
- A powerful 52kW (71hp) engine.
- Standard paving width of 1.7m (5'7") that makes the machine maneuverable and easy to transport.
- Four speeds that ensure high traction.
- A differential gear that can be locked manually to prevent sliding.
- Hydraulic brakes that function properly, even when going downhill with an asphalt-filled hopper.
- A proportional servo-control that provides machine stopping and starting, when necessary, during loading.
- A sliding dashboard that enables better operator control.
- A dual operator's station that provides optimum visibility of hoppers, augers, frame edges, as well as a meandering path, during operation.

Cat® Grade and Slope leads to perfection

‘Not One Single Bump’

Jeff Luce and others at Asphalt Paving & Materials Co have a simple goal that is shared by many paving contractors.

“We focus on doing very good work,” said Luce, project superintendent for the Huron, South Dakota-based company. “We try to pave a smooth road. It sounds simple, but that’s our focus.”

While the goal is straightforward, it’s still challenging. “It’s easy to say you’re going to do really good work, but it’s tougher to back up,” he said.

Keeping the “good work” promise just became easier thanks to Cat® Grade and Slope.

Asphalt Paving & Materials is one of the first companies in the world to

The system enables operators to place an exact amount of mix.

integrate the new system, and it has delivered unprecedented success.
"We just finished a state highway project with Cat Grade and Slope," Luce said. "It's the smoothest one-opportunity job the state has seen. We paved 21 road miles without a bump - not one single bump."
The key to the success, Luce said, is believing in the system. "As an operator, you have to realise the automation is smarter than you are. It's telling you how to do the job the right way, at the proper settings.
"You want success? Set up the Cat Grade and Slope, and let it do its job."

The decision

Why did Asphalt Paving & Materials switch to Cat Grade and Slope?
"We bought a new paver, and our dealer sales representative convinced us to try it," Luce said. "He's always had great input in the past and has helped us make the right choices. So we tried it."
The company is also continually looking toward the future, particularly ways to leverage new technology.
"This industry is changing so fast electronically," Luce said. "We really liked the fact this system will be compatible with other Caterpillar products to be introduced in the future."
It will be easy to update the existing system as new stringless and GPS technologies become available.
"We wanted something that would be on the cutting edge of what Caterpillar has coming down the road," Luce said. "We've seen the positive impact its technologies can make on paving performance, and we want to continue to benefit from those improvements."

The specifics

What has Luce noticed about Cat Grade and Slope in the field? "How user-friendly it is," he said. "It has a lot of features that we really like.
"With the dual screens, you can see both sides of your paver. You can see what your slope is doing, or you can make corrections to your slope from the opposite side. Let's say you don't want to leave one side because you're

passing over a super-elevated curve. You can hit a button on the right side of the paver and make a correction to the left. It's not something that happens a lot, but when it does, it's a great feature."

The system is intuitive. "This is very, very simple to run. It is quick and easy to learn to operate. The displays are very clear. It's easy to understand, 'If I push this button, this will happen.' The displays walk you through what you're doing."

Asphalt Paving & Materials handles a variety of jobs, including airports, highways and parking lots. It has earned numerous paving awards. "Our company name and reputation speaks for itself," Luce said, and he's willing to put that reputation on the line in recommending Cat Grade and Slope. "I would tell somebody, 'Go buy it today,'" Luce said. "I'm saying it because it's true. With Cat Grade and Slope we've not once said, 'I wish we could have stuck with the old (non-Caterpillar) system.' Not once." ■

PERFORMANCE-BOOSTING FEATURES

What separates the Cat® Grade and Slope system from others? Like so many Cat products, it comes down to performance, reliability and product support.

Intuitive Displays
The straightforward LCD display enables the operator to easily configure the system and make necessary adjustments.

Highly Reliable
The sealed components provide durability and withstand heat, moisture and vibration. The factory-installed system ensures that consistent routing and component locations optimise performance.

Single-Source Supplier
Caterpillar offers complete support of the entire system. That includes training, consulting and parts support. There is no need to utilise outside suppliers and risk improper set-up.

Precise Control
The Cat Grade and Slope system enables operators to place the exact amount of mix on the surface. Controlling thickness maximises material usage and optimises compaction performance while saving money for contractors.

The System
- Is available in multiple languages and stored on the Electronic Control Module (ECM), making the LCDs interchangeable from side to side.
- Can provide elevation to one or both sides of the system; cross-slope; or elevation and cross-slope.
- References existing surfaces, curbs and string lines.
- Provides automatic calibration of tow-point valves.
- Is factory installed to ensure proper set-up and routing.
- Features sealed components to prevent contamination.
- Enables the operator to change the 'deadband' settings for grade, slope and two-point valves.
- Provides visual and audio warnings in the event of a fault condition.
- Stores fault history on the ECM.

The LCD Display
- Can operate both sides from a single display.
- Large displays and familiar icons make interpretation easy.
- Text-based menus require minimal training, making setup quick and easy.

- Fault code diagnostics feature easy-to-read explanations. No need to reference a manual.
- Offers brightness and contrast controls that are effective during day or night paving.
- Adjustment keys function as visual grade indicators for easy reference.
- Are sealed to withstand moisture and prevent contamination.
- A lockout feature prevents unauthorised access.
- The Cat grade sensor provides a wide reference range that makes following a stringline easier.
- A directional arrow advising the operator how to stay centred when using a string line.
- An audible alarm alerts the operator to an off-grade condition or diagnostic message.
- Features a swivel that enables the operator to view the screen from the walkway and side of the screed.
- Is protected with an enclosure to prevent theft and vandalism.

Grade and Slope Sensors

- The system can utilise up to three grade sensors on the averaging beam. Each sensor sends out five sonic pulses for a total of 15 readings. Six signals are discarded, while the remaining nine are averaged. The tow-point will adjust by one-third of the total deviation: true averaging for smoother transitions.
- Each sonic grade sensor features five ceramic transducers. Three signals are averaged, while two are discarded.
- Sonic grade sensors provide a reference range of 200-1,000 mm (8" to 39").
- Grade sensors account for rapid air temperature changes.
- Contacting grade sensors are available with a shoe- or wand-type sensor.
- Slope sensors measure the cross-slope of the screed and provide an angle range of +/-10° or +/-17.6%.
- A cross-coupling feature enables the side slope to immediately react if the grade side makes an adjustment.
- The slope sensor requires a single calibration, and does not drift due to temperature variation.
- The sonic averaging beam reduces grade deviations in the paved surface.
- When utilising the averaging beam, the system provides on-the-go selection of one, two or three sensors. Switching between sensors does not require recalibration.

CATERPILLAR®