PAUL OF CALE A Caterpillar® publication serving the global paving industry

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Wide drum leads to big production gains

New Cat[®] AP555E

Paver meets the needs of contractors and their customers







Lieven Van Broekhoven Worldwide Sales and Marketing Manager

Our Commitment to Transportation

elcome to the first global edition of Paving News. We hope you find this publication informative and useful as you continue to grow your business.

It's a changing world, to be sure. Today, an article like this can be sent electronically to just about anyone, anywhere, anytime. Of course transporting people and products isn't quite so simple. We still require a surface transportation system for those responsibilities.

Globally, we are more dependent on each other. We have more in common, too. Caterpillar recognizes that one such common need is a world-class transportation system that serves both emerging and established economies.

While investment in resource development, agriculture and manufacturing is needed for longterm, global economic growth, there must be simultaneous investment in transportation systems. What good is improving acreage production if crops spoil before reaching a processing center? Likewise, manufacturing expansion flows to areas where the supply chain can move raw materials in, and finished products out.

Historically, centers of commerce were located near natural transportation hubs such as rivers, ports, and mountain passes. Today, centers of commerce thrive where there are good highways—and wither where there aren't.

Caterpillar has long been associated with the transportation industry. We continue to support industry associations and invest in technology for better road building equipment. No one is better positioned than Caterpillar to support the global transportation industry. We think in terms of a "connected worksite" and produce technologically advanced equipment for every step of building and maintaining pavement structures.

Caterpillar Dealers bring the "connected worksite" to every corner of the world, and to every transportation system too. The commitment is obvious: financial solutions, rental services, superior equipment, local parts and service, local operator and technician training.

Anywhere there is a need for airports, ports, highways or even a rural road, you'll find a Caterpillar product ready for the job. Anywhere there is a need for problem solving on a transportation project, you'll find a Caterpillar worker with the knowledge to help.

That's our commitment to global surface transportation. That is Caterpillar.

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'Cat[®] Connected Worksite' to offer substantial improvements in productivity, safety.



∧ The 2200 mm (7' 2") drum enabled the crew to mill Motorway E78 in four passes instead of five.









Gian Giacomo Gellini Owner of Gellini Costruzioni

Wide drum leads to big production gains

Gellini Costruzioni annually mills thousands of tons of asphalt—and paves thousands tons more.

ellini Costruzioni annually mills thousands of tons of asphalt—and paves thousands tons more.

What's common to every facet of the process is the need for production. "We are always looking for ways to maximize the use of our equipment, to increase our fleet productivity," says Giampiero Gellini, owner of the firm, based in Arezzo, Italy.

Gellini Costruzioni recently found a key tool for maximizing production while on a cold planing job. The construction company tested a Cat[®] PM200 Cold Planer with a 2200 mm (7' 2") drum, compared with the standard width of 2000 mm (6' 5").

The results were impressive, to say the least. "We were able to complete the job in four passes, instead of five," said Gian Giacomo Gellini, son of Giacomo and owner of the firm. "That means a productivity gain of 20 percent. We not only saved time, but also saved fuel. We would have consumed the same amount per pass with the standard drum. The PM200 engine has more than enough power for the wider drum. We were able to increase production and reduce the amount of fuel consumed with one less pass, and reduce the emissions."

Project description

Motorway E78 called "Due Mari," or "Two Seas" Motorway, connects the Tyrrhenian and Adriatic seas. The road is a commerce thoroughfare; besides running between the seas, it also connects the key cities of Grossetto, the chief town of Tuscany's coastal area, and Fano, a coastal resort in the Marche region.

Gellini tested its wide drum on a portion of E78 in the Tuscany province of Arezzo. The 8.35 m (27' 3") wide road featured a driving lane and a passing lane. Problems in the subbase meant the road had to be rebuilt.

Plans called for milling, recycling and placing new asphalt over a stretch of 1100 m (3,600'). The Cat PM200 cut at a depth of 23 cm (9") in the driving lane, and 5 cm (2") in the passing lane. The crews used cold recycling techniques to rebuild the subbase. A Cat AP600 Asphalt Paver then placed a

AT A GLANCE

Company: Gellini Costruzioni Started: 70 years ago, by Giovanni Gellini **Owners:** Gian Giacomo Gellini (Giovanni's son) and Giampiero Gellini (Giovanni's grandson) Headquarters: Indicatore, Italy **Business:** Routine and emergency milling and paving; also own recycling plants Area served: Northern and central Italy, though recent jobs have included Romania and Ghana Equipment: Includes a Cat PM200 Cold Planer, Cat AP600 Asphalt Paver, Cat CB434 Asphalt Compactor, and several Bitelli machines Firsts: Gellini Costruzioni was among the first to adopt milling in the 1980s, and "cold recycling" in 2000

The PM200 was able to keep the same pace > despite using a wider rotor



6 being able to count on a quick and skilled response from the after-sale service, ... enables us to focus on the work, and to achieve the best return on our equipment investment. **9 9** 5 cm (2") binder course, followed by a 5 cm (2") wearing course. A Cat CB434 Asphalt Compactor compacted the mat.

Milling

The PM200 with the wide drum was able to work at the same pace as when the machine had a standard drum. Breakout size was about 30 mm (1.2"). The millings were delivered via conveyor to trucks. A portion of the millings was hauled to Gellini's plant for recycling at a later date. A large amount of millings were temporarily stored on site and for use in the cold recycling process.

The rotor and pits performed well, the Gellinis said. Boart bits were used on the rotor. "They typically last about 40 hours on hard asphalt," said Gian Giacomo Gellini. "When a bit is worn out it can be easily replaced. However, every four to five days all the bits are replaced when working on mediumhard asphalt."

Operator Robert Zelli was impressed by the durability of the bits, as well as the drum's ability to add production given the added width. He also appreciated the easy operation of the PM200. Specifically, he was able to set the grade and slope controls and let them hold their positions. "I can simply set the depth and go from there," Zelli said.

All other PM200 components and systems were able to keep up despite the wider drum. The water spray system limited the dust and helped keep the bits cool, and the conveyors could easily handle the increased loads.

The wide drum

Gellini was approached about testing the drum in the field, and agreed



to do so. The cold planer was taken into the shop, and the standard 2 m (6' 5") drum was replaced with the 2200 mm (7' 2") version.

The first test was milling a 2300 m (7,544') long two-lane section on the Firenze-Siena Highway at a depth of 23 cm (9"). The work took a total of one week and the results were excellent: The drum improved productivity and reduced fuel utilization without requiring any additional cost or efforts.

"The benefits coming from the use of the 2200 mm drum are clearly highlighted when operating on big projects such as highways and airfields, where the cold planer never stops milling. In this case, you can achieve 20 percent more production."

Gellini Costruzioni had such a project coming up after E78: the milling of the Motorway E45 in Cesena,



Northern Italy. Giacomo Gellini planned to use the wide drum on the job, which will run non-stop for 20 days, and keep more than 20 trucks busy. He looks forward to the use of the wider drum given the results from the Motorway E78 job.

Gian Giacomo Gellini said he has consistent expectations from Cat machines. "We buy based on productivity, product reliability, after-sales Dealer service, and price," he said. "Being able to count on a quick and skilled response from the after-sale service, if needed, enables us to focus on the work, and to achieve the best return on our equipment investment."

The wide drum helped ensure they got the most out of the equipment on the E78 job.

MOTORWAY E78

- 1. Mill at a depth of 23 cm (9") with the Cat PM200 with 2200 mm (7' 2") drum
- 2. Mix the lime and cement into subbase
- 3. Add milling materials back to subbase
- 4. Make a pass at a depth of 14 cm (5.5") with a rotary mixer
- 5. Compact new subbase
- 6. Place a 5 cm (2") binder course with a Cat AP600
- 7. Place a 5 cm (2") wear course with a Cat AP600

THE 2.2 M ROTOR

Gellini Costruzioni used a 2.2 m (7' 2") rotor on a recent job. That compares with the typical rotor width of 2 m (6' 5"). Among the benefits and features of the wider rotor:

- Extra width means fewer passes are required
- Is fitted with 194 bits on three wraps for 15 mm (1/2") of cutting pitch
- Used 12 paddles for optimal discharge of milled material
- Overall width of the machine remains within 2.8 m (9' 2")
- Maximum cutting depth unchanged at 320 mm (12.5")
- Allows for improved cutting radius when milling in cul-de-sacs and roundabouts



Paver meets the needs of contractors and their customers

New Cat[®] AP555E

ommercial paving has unique requirements for both paving contractors and their customers. Customers demand productivity, because their business often is closed while the parking lot is paved. Appearance is important, too. Business owners want a mat with an appealing look because the parking lot is a reflection of their operation.

The new Cat[®] AP555E Asphalt Paver delivers in all these areas. It completes the job quickly and with minimal interruptions to the business. The paver also leaves behind a smooth mat, with a good appearance.

Paving contractors have requirements of their own. They need a paver that can handle a variety of work; not every job will be a parking lot.

They also need a paver that can adjust quickly, and work around obstacles. And

they require a commercial paver that is compact and easy to transport from one job to another. The AP555E meets these challenges as well.

Here are some key features of the new Cat AP555E Asphalt Paver:

Performance

• Quick adjustments are crucial to commercial work. Helping optimize performance and increase production are ratio control of the augers and conveyors; power screed controls; and remote switches on the extenders.

• The Cat C4.4 engine with ACERT[®] Technology offers power and fuel efficiency. An adjustable electronic speed control responds quickly to deliver fuel efficiency in neutral, and on-demand performance when in gear.

• Good visibility from the operator's station helps with efficiency, safety,

mobility and mat quality. The dual operating stations allow the operator to quickly move from side to side when working near obstacles and to communicate with screed operators and truck drivers. Helping make the switch seamless are controls that are automated, well labeled and grouped by function.

Precise Delivery

• The Cat[®] material handling system is the most advanced in the paving industry. The automated controls and well-designed components help reduce segregation.

• The mix delivery system utilizes four individual pumps to ensure the exact desired amount of mix is delivered to the screed.

• The left and right conveyors, and left and right augers, are controlled

PRODUCT FOCUS







independently to ensure mix demand is met when increasing or reducing paving widths.

• Ratio control dials and mechanical or sonic sensors signal the augers to run faster or slower when adjusting paving widths. The system automatically adjusts when paving around obstacles.

• Sloped hopper design, narrow chain guards and an optional folding front apron help keep mix moving.

• Conveyors have wide slats to deliver material without operating at full speed. The slower speed helps reduce the chances of segregation and component wear.

Powertrain

• The undercarriage provides mobility and high speed capability when moving around the jobsite.

• The four-cylinder C4.4 engine with ACERT Technology meets emission requirements. Quiet power and lower emissions is good for the environment, and especially important when working in residential and commercial developments.

• Excellent flotation limits disturbance on soft base materials, ensuring uniform mat thickness. Large oscillating bogies and hydraulic accumulators minimize the impact of obstacles such as curbs, mix piles and manholes.

• The paver features three steer modes. PAVE mode enables the automatics for mix delivery. TRAVEL maximizes speed. MANEUVER allows the paver to rotate within its own footprint for outstanding turning capabilities in tight quarters.

Operator Controls

• The advisor display provides access to a startup checklist, operator preferences and engine and machine parameters.

• The system lists fault codes for machine functions, making troubleshooting easy.

• The display includes operator friendly features such as automatic engine speed control adjustment, engine rpm and temperature monitoring, and calibration of machine components.

• The Cat speed control dial provides a consistent speed and smooth mix delivery, which have a direct impact on mat quality.

Other Key Features

• The compact, lighter weight design allows contractors to easily transport the paver.

• Quick access is available to components and routine service points.

• The standard 500-hour engine oil change interval keeps service costs low.

• The paver promotes sustainability by meeting emissions requirements; implementing speed control to reduce fuel consumption and emissions; provide clean collection with remotemounted fluid drains; and developing durable components that preserve resources.

• Helping the crew's working environment is the fumes extraction system. It draws air from the conveyor tunnels and auger chamber and routes it through an exhaust stack away from the operator.

AP555E SPECIFICATIONS

Engine: Cat C4.4 Engine with ACERT[®] Technology.

Gross power (ISO 14396): 106 kW (142 hp)

Operating weights

With AS2252C Screed: 16 000 kg (35,280 lb)

With AS3251C Screed: 16 240 kg (35,810 lb)

* Approximate figures; weights vary based on machine configuration and fluids

Extendable Paving Widths

With AS2252C Screed: 2.5 m-4.39 m (8'2"-14'5")

With AS3251C Screed: 2.44 m-4.72 m (8'-15'6")

Maximum Paving Ranges With AS2252C Screed: 1.88 m-5.61 m (6'2"-18'5")

With AS3251C Screed: 1.83 m- 6.15 m (6'-20'2")

Efficiencies benefit more than the environment

'Sustainability' applies to business operations, too

S ustainability is on the minds of the world's leaders. It's also on the minds of Caterpillar, Cat[®] Dealers and Cat customers, too.

Cat products promote sustainability on many levels. They increasingly require fewer resources during the manufacturing process, and are built to be energy efficient when they get to the jobsite. Cat equipment also plays a key role in environmentally advantageous processes, such as recycling asphalt with a Cat Rotary Mixer.

The environment is the obvious beneficiary of these efforts, but paving contractors and other business owners also reap rewards.

• Cat paving equipment is built to be energy efficient. Consuming less fuel reduces emissions and operating costs, too.

• Technological products such as the paving calculator and Cat grade and slope control lead to increased efficiencies. The products also help reduce fuel consumption, emissions and operating costs.

• Components and service points on machines are convenient and easy to



reach, reducing the likelihood of spills during maintenance. The easy access also is a time-saver for technicians.

• Machines such as Cat Rotary Mixers are on-site asphalt recyclers. Re-using the materials in place takes the recycling process a step further: It saves contractors the purchase price of new aggregate, as well as the costs associated with hauling materials to and from the jobsite.

• Cat Reman products are built to like-new condition, with like-new

warranties, but the remanufacturing process requires fewer resources. Beneficiaries are the environment, and customers who purchase quality parts and components at a reduced price.

• Safety is at the center of Caterpillar sustainability efforts. Cat machines are designed to create safe, comfortable working environments, whether it's routing exhaust away from the operator, or reducing noise levels.



CAT.COM/Safety

Safety tips for cold planers

old planers have an abundance of size and power that helps make them productive on the jobsite. That size and power also means crews must be extra cautious before, during and after working with the machines.

How can crews stay safe? Proper training and following the steps in the owner's manual are the best places to start.

Here are some safety highlights:

• Make sure safety messages are properly displayed on the equipment, and that crews understand the meaning of the messages.

• Attach a "do not operate" tag to the start switch or controls before servicing or repairing a machine.

• Know the width of the equipment in order to maintain proper clearance near potential obstacles.

• Wear a hard hat, safety glasses and other protective equipment.

• Do not wear loose clothing or jewelry, which could get caught in the machinery or controls.

• Make sure all protective guards and covers are in place.

• Remove debris, oil, tools and other items from the deck, walkway and steps.

• Secure lunchboxes, tools and other loose items.

• Obey all regulations when discarding liquids.

• Use cleaning solutions with care.

• Never put cleaning or maintenance solutions in glass containers. Drain all fluids into a suitable container.

• Do not allow unauthorized personnel on the machine.

• Be sure there is a fire extinguisher on the operator station, and that crew members know how to use it. • Stay clear of all rotating and moving parts.

• Make sure no one is near the machine before moving

it, or starting the engine.

• Test the horn, backup alarm and other warning devices before work begins.

• Do not allow anyone to stand or walk behind the machine; it could jump if the rotor hits an obstruction.

• Avoid any conditions that can lead to the tipping of the machine.

• Park on a level surface. If you must park on a grade, use blocks behind tires to prevent rolling.

The owner's manual has more guidelines that should be reviewed and understood before work begins. Please call our dealership for more information on training and other ways we can help to keep your crews safe.



O'HARE INTERNATIONAL AIRPORT

Watershed project

Controlled water injection key component of firm's success

'Hare International Airport in Chicago is one of the world's busiest. On a typical day, nearly 2,500 aircraft take off and land from the location.

The demands on the airport are only going to increase, which has led to the development of new runways. Handling the sub-base work for the runways, which one day will be pounded by jets weighing more than 45 360 kg (100,000 lbs.), is Rock Solid Stabilization, Ringwood, Ill.

"We're proud to be part of this high-profile project," said Jonathan Pease, owner of Rock Solid Stabilization. The project also builds on the lessons the company has learned since entering the soil stabilization business.

That entry came about almost by accident in early 2000, when a supplier invited Pease to witness a fly ash modification/stabilization demo. "I saw a demo with fly ash, and it was really interesting," Pease said. But that's about all it was. "I thought it was a neat process, but I didn't leave thinking, 'We're going to do this.""

But a week later the family firm, Pease Construction, was bidding on a job. The engineering plans called for removing wet soils and replacing them with stone and clay. Pease instead bid on modifying the soil, and guaranteed the subgrade. The firm landed the bid and took on the project, including the modification work.

Pease Construction continued to offer modification/stabilization work as part of its overall business. As time went on, it continued to add more and more of the work until Pease bid—and was awarded—a strictly soil modification/stabilization job.

"Handling the entire process was a natural progression," Pease said. He went all-in during 2007 with the formation of Rock Solid, and has been building his stabilization, modification and reclamation business ever since.

The O'Hare project

Rock Solid worked as a



subcontractor on the O'Hare job. They were hired to handle $585,000 \text{ m}^2$ (700,000 yd²) of lime stabilization. The work at the airport also included 36 280 metric tons (40,000 tons) of lime soil modification.

Handling the work was a Cat RM500 Rotary Mixer, but the job

"The amount of water is controlled with this project. Water injection is the best way to control the moisture."

started with a spreader that Pease purchased from a manufacturer, who added custom modifications especially for the challenges faced on the varied jobsites.

"We have three styles of spreaders that can handle site conditions from hard, solid ground to wet, soft conditions," said Jim Hegemann, Vice President of Rock Solid Stabilization. The spreaders provide precision as well, delivering spread rates that were measured to one-tenth of 1 percent on the O'Hare job.

Lime kiln dust was the additive used on the job. It is not as readily available as it once was for a variety of reasons, including the fact that it is a byproduct of a slowed manufacturing industry. On the O'Hare job, the supply issues led Rock Solid to purchase the additive from three sources. "Each source has its own spread rate," Pease said. "It adds to the complexity of the job."

The Rotary Mixer

After spreading is completed, a motor grader makes a single ripping pass. Next comes a water truck, which adds minimal moisture. "Just enough to help activate the lime," Pease said.

Next, a Cat RM500 Rotary Mixer makes a dry cut at a depth of 305 mm (12"). The machine works at a speed of 12-13.7 m (40-45') per minute on the O'Hare job, and covers strips 488 m (1,600') in length. It's tough going, with an operator saying the rotary mixer typically can dry cut at a rate of about 20 m (65') per minute.

"The ground is so hard out there," Pease said. "We usually move at a faster rate, but on this job the hard soil conditions dictated that speed."

A second RM500 then makes a "wet cut." Leading the train is a water truck, which is pushed by the Cat Rotary Mixer. Water from the truck is pumped and precisely sprayed into the mixing chamber, where it is mixed with the soil and lime. A second water truck replenishes the first truck so the mixing train can keep moving.

The case for water injection

Running water directly into the drum is a key process for Rock Solid. "The amount of water is controlled



 A key benefit of the RM500, crew members said, is the gradation on reclamation jobs, and the level of mixing on stabilization work.

A view of the soil after the ripping and before the dry cut.





A Cat[®] CP-563C Soil Compactor makes 6-8 vibratory passes.



Jonathan Pease Owner, Rock Solid Stabilization

AT A GLANCE

Company: Rock Solid Stabilization & Reclamation

Headquarters: Ringwood, III.

Services: Full-depth reclamation, soil stabilization and soil modification; asphalt pulverization

Going green: Rock Solid customers have saved thousands of dollars and utilized natural resources by stabilizing or modifying soils with recycled additives such as Class C fly ash, lime kiln dust or cement kiln dust. The process can help customers earn valuable LEED credits for green building projects.

On the web: RockSolidStabilization.com Davin Heikkinen agrees. "The controlled method is better than mass flooding," said Heikkinen, who handles quality control for Walsh Construction, one of the firms on the job. On a

typical job, a water tanker "floods" the area and leaves it to the stabilization team to achieve the proper moisture content. "We can stabilize 20,000 yd² (16 700 m²) per day or better with the two reclaimers one wet and one dry."

adjustments. That can add a lot of extra time."

Heikkinen is a believer in the controlled system, too. "It's the first time I've seen it," he said. "It's working excellent." With the controlled system, the operator is able to look behind him and make a fairly informed

> judgment based on sight. With a flooded system, more passes—and speculation are required. "With the water injection, the operator can tell if the material is consistent,"

"The controlled flow saves money because you don't waste water," Pease said. "You also get the right amount of moisture the first time, meaning you don't have to go back and make Heikkinen said. It's Heikkinen's job to confirm that it is. "I follow him with a nuke gauge and test, and it's been right on target," he said. "We haven't had to make any after-the-fact adjustments."

"We usually move at a faster rate, but on this job the hard soil conditions dictated that speed."



CUSTOMER STORY

Production is still good. "We can stabilize 20,000 yd² (16,700 m²) per day or better with the two reclaimers—one wet and one dry," Pease said.

Following the wet cut is a Cat CP-563C Soil Compactor. Its front blade helps even material, while the vibratory drum compacts the freshly mixed soil in 6-8 passes.

The motor grader—which earlier ripped—makes a shaping pass. Next a smooth drum roller makes 1-2 static passes to seal the surface. The general contractor applies an emulsion, and the surface then cures for five to seven days.

"It's a big job, but it's one that's been made easier by the equipment, and the precision of the material spreading and the water control," Pease said.







WHY THE RM500?

Jonathan Pease, owner of Rock Solid Stabilization, says there's much to like about the Cat® RM500 Rotary Mixer.

Among the attributes:

- The ease of use. "It's user friendly," said Jim Hegemann, Vice President of Rock Solid Stabilization. "It's easy for an operator to learn how to run the machine with minimal training. It's more user friendly than other machines we've operated in the past."
- The power at all depths.
- The gradation achieved after a single pass.

"Really, it all adds up to production," Pease said.

Operator Joe Armbrust agrees with Pease, but adds another benefit. "You can't beat the visibility on the Cat Reclaimer," Armbrust said.

The sliding cab is a key feature in terms of both safety and productivity when working around light poles, manholes and other obstructions in parking lots, Armbrust said. It also works well in the city. "You can get right up against the curb," he said.

And, like Pease, Armbrust also appreciates the productivity—particularly when it comes to water injection.

"It means a steady flow of water, instead of mass dumping," he said. "It's good for water conservation."

The benefits go beyond the environmental. Water purchase and transport costs are eliminated, and productivity gets a boost as well, Armbrust said. "It's more controlled in terms of delivery, too," he said. "There is less waste, so the water is there when I need it. With this approach, I never wait on water trucks."



Training programs of all types available

Developing exceptional crews

sphalt paving contractors face tremendous challenges. Because of the nature of hot mix asphalt, installation of the product must be done correctly in a time frame that is only minutes long. Mistakes roughness, inadequate density, improper yield, and segregation—are so costly that their occurrence often eliminates any chance of profitability.

Most of these mistakes are manmade and avoidable. The plain fact is that when we put the placement and compaction of hot mix asphalt in the hands of inadequately trained crews, we invite costly errors in workmanship.

In order to minimize quality problems, crew members must

understand both the equipment they are using and the techniques required to meet all the particular specifications of a project. Cat Paving Products understands this training requirement and has created training programs and training materials that help develop exceptional crews that deliver professional, high-quality work.

Cat training, or more properly called Solutions & Services, consists of a wide variety of options. There are standard training classes with a fixed curriculum and set of objectives. But, because Caterpillar understands that organizations have different needs, we also offer customized training tailored for unique objectives. Caterpillar employs professional instructors who have hands-on experience. Crew members appreciate instruction that is realistic and presented by people who know equipment and who have application knowledge.

All training is coordinated by Cat Dealers. Dealers can help enroll students in scheduled classes or can organize local training that is specific to one organization. The training can be classroom seminar instruction, handson training in lab sessions, on-the-job training, or some combination of all these elements.



Caterpillar instructors offer hands-on training.

CAT.COM/Training



66 It takes exceptional crews to deliver all the requirements the industry now demands.

Paving Operations Training

Paving Operations Training is one of Caterpillar's most popular courses. The 40-hour curriculum consists of about 25 percent classroom explanation and 75 percent hands-on practice of paving skills. The curriculum starts with the fundamentals of asphalt paving and asphalt paver setup. In each session, new skills and techniques are introduced. At the end of the course, students complete both a written and hands-on examination.

There is particular emphasis on the construction of smooth transverse joints, on the adjustment of the material feed system, and on all aspects of the paving under automatic grade and slope control.

Attendees of all experience levels benefit. Graduates are prepared to return to the job site and help train other crew members.

Scheduled Paving Operations Training courses are held at Cat training facilities or at Cat Dealer locations. The course can also be conducted at a contractor location if logistical considerations can be met. Paving Operations Training courses are currently available for North American operations and soon to be available worldwide.

Paving Operations Seminars

Caterpillar schedules Paving Operations Seminars at a variety of locations. These classroom events are attractive to organizations that want to send large groups to training activities. Seminars can also be arranged on-demand.

Typically, the seminar is a two-day event. Day One covers aspects of asphalt paving and Day Two covers asphalt compaction. The curriculum includes fundamentals, best practices, and project studies. Paving and compaction can be combined in a

one-day seminar. Paving Operations Seminars are currently available for North American operations and soon to be available worldwide.

Product Support Training

Technical, or service, training is scheduled at Cat training centers, at Dealer training centers or at customer locations. Service training covers in-depth systems operation, testing and adjusting, and troubleshooting on Cat Paving Products models. The curriculum is approximately 50 percent classroom and 50 percent hands-on lab sessions. What the student reviews in the classroom is immediately reinforced in lab sessions. Length of training varies by model. You can schedule on-demand training through your Cat Dealer. Product Support Training is available worldwide.

Machine Commissioning

Cat instructors perform machine commissioning in the field for both dealers and product users when new models are first put to work. Instruction covers basic machine operation and machine maintenance with both classroom and hands-on sessions. Machine Commissioning is available worldwide.

On-the-job crew training

Cat instructors work with your crew on the job to help them meet both production and quality goals. Caterpillar offers simultaneous classroom sessions to complement the on-site lessons. Before the training starts, we develop specific goals and bring to the project the necessary tools and information to complete the assignment. On-the-job crew training is available worldwide.

A look at the future of the paving industry



'Cat[®] Connected Worksite' to offer substantial improvements in productivity, safety

I magine if your paving team could calculate final smoothness numbers while the mat was still hot. These and other possibilities are all closer to becoming reality thanks to the "connected worksite," a proven portfolio of products and technologies from Caterpillar.

Applying lessons learned

The connected worksite is well-known in several industries, particularly mining and earthmoving. In mining, among other improvements, these technologies increased productivity by measuring loads and monitoring productivity and machine health. On construction sites, a connected worksite technology's GPS system helped eliminate the need for survey stakes.

Paving products will benefit from both applications. Using GPS will

help keep pavers working at the proper grade and slope. The machines also will take a lesson from mining and "talk" about workloads, productivity, and even potential equipment failures.

The Cat[®] AP555E Asphalt Paver is the first piece of paving equipment to feature the factory-installed grade and slope control. The software, wiring and displays are installed at the factory.

"It's tied into the machine's electrical system," said Bob Ringwelski, Business Development Manager for Caterpillar Connected Worksite Products & Services. "There are no extra wires. It's seamless, all integral with the machine."

The advantages go beyond the organization of wires. "You can plug a computer into the machine, and the default codes will tell you if there are issues with the system," Ringwelski said. Tying to the machine's electronic control module means grade and slope settings and offsets only need to be downloaded once, while aftermarket products typically require daily installation. In addition, the factory-installed systems have durable clamshell boxes that prevent damage and theft. The display screens also are more user friendly.

Down the road

Cat Cold Planers will have a Cat grade and slope system installed at the factory later this year or early next year. Cat Asphalt Compactors likely will follow with a compaction and positioning system in the future. Eventually all the equipment will be integrated and communicate with each other.

"A milling machine will know exactly where the road is," Ringwelski



are user friendly and include information to make troubleshooting easy.

said. "It will set the paving train on a precise course."

The paver will more precisely calculate slope and grade and know the road's precise center. Compactors will monitor the number of passes, mat temperature and final mat thickness.

"Sometimes crews place too much asphalt when trying to reach the desired final mat thickness," Ringwelski said. "With a GPS-enabled product, the compactor will communicate the exact thickness of the compacted mat. The paver operator then can make adjustments. That can save a lot of money in terms of materials if a crew is placing a mat that is too thick."

Smoothness also could be measured immediately. "There will be no coming back later and making a final determination about mat smoothness," Ringwelski said. "Crews will know if they are on target. If they're not, they can correct the problem immediately."

Additional benefits

The owners and operators of paving equipment who use connected worksite technologies will see other benefits in the future. Among them:

Health monitoring. Productivity gains will be significant in terms of downtime avoided through health monitoring. "The machines will be able to monitor themselves," Ringwelski said. "We want to know ahead of time if there will be a problem. For example, maybe the exhaust temperature on one side of the engine is higher than the other. That could indicate a potential problem."

The machine will electronically communicate data to the Dealer service department. The Dealer technician then will discuss maintenance plans with the customer and solve the problem before a breakdown occurs.

Payload monitoring. The systems will be able to monitor performance much more closely. "You could learn exactly how much you milled, or how much asphalt went through a paver," Ringwelski said.

The productivity of crews could be monitored as well. "You could use the data to determine what areas of the process require more training," Ringwelski said.

He expects the discovery of additional benefits as the technology becomes more widely used. "As those in the paving industry start to work with it, they'll find uses we didn't even consider," Ringwelski said. "There will be benefits we aren't yet aware of."

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