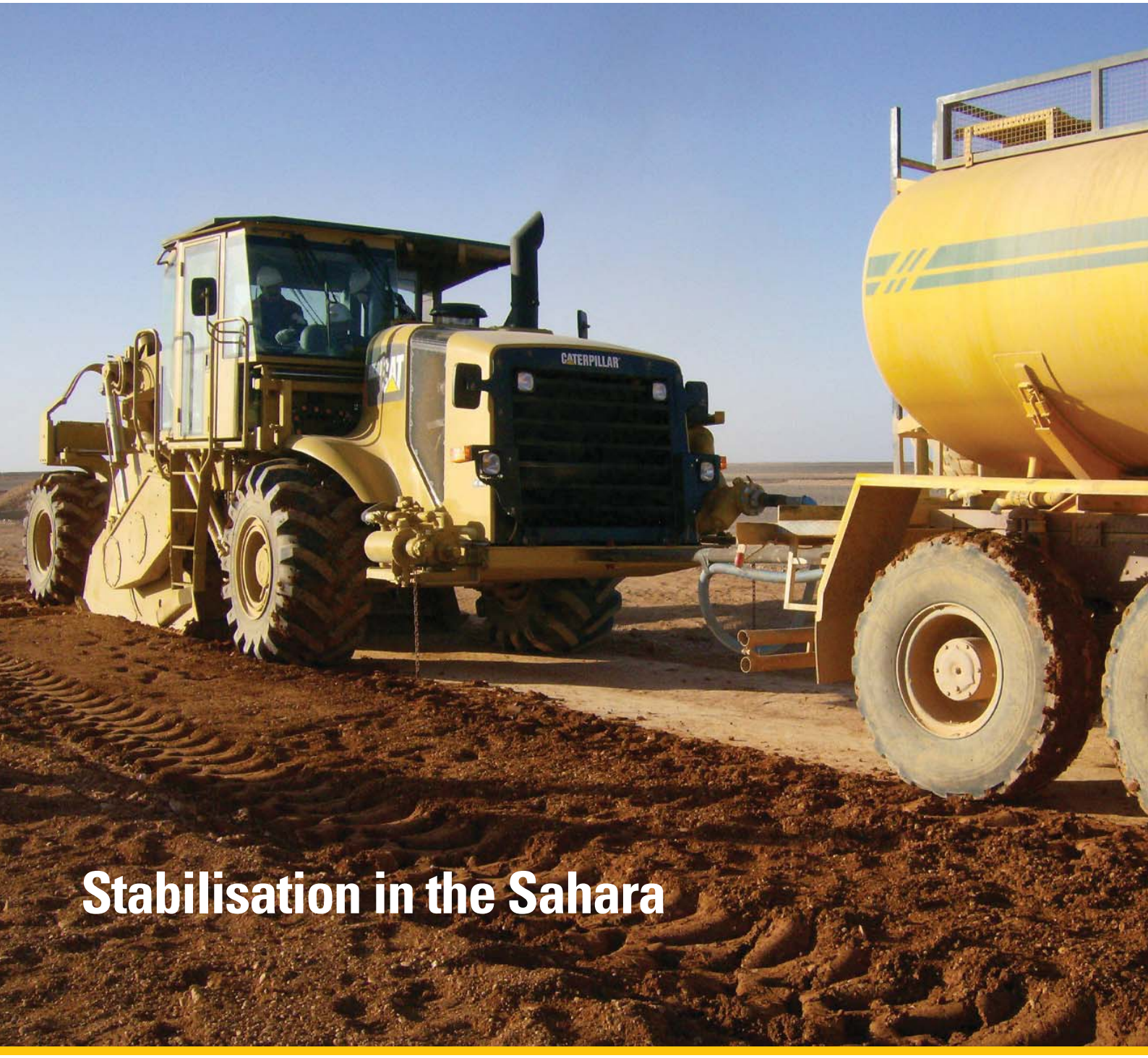
Issue 2 **2010**

PAVING NEWS

A Caterpillar publication serving the global paving industry



Stabilisation in the Sahara

New Cat® CD54 Asphalt Compactor

Shaft keeps split drums connected over extended period

CATERPILLAR®

The Drive to Sustainability

Lieven Van Broekhoven
Worldwide Sales
and Marketing Manager

This issue of *Paving News* brings into sharp focus the goal of global sustainability. The content illustrates how seemingly small steps can pay big dividends when it comes to reduction in consumption of natural resources and extending the usefulness of construction materials and construction equipment. Caterpillar, Cat® Dealers, and their customers are making decisions that include consideration of the impact on sustainability.

A great example is the extended service intervals that are increasingly available on Cat equipment. Due to advanced engineering technology, hydraulic oil change intervals for some Cat models have been extended to 3,000 hours compared to the industry standard of 1,000 hours. Let's say the hydraulic oil capacity is 200 litres (53 gallons). If you expect 7,000 hours of use from that machine, you'd change hydraulic oil twice on the Cat product and six times for the industry standard machine. You would reduce hydraulic oil consumption and disposal by 800 litres (212 gallons). That's just one machine. Think of the global impact of that one advance gained through a combination of quality Cat fluids and the integrity of the Caterpillar hydraulic system.

Caterpillar does not build disposable products. Cat equipment is not built to minimal engineering standards. They're purposely built to be re-built. Whether it's a transmission, an engine, or an entire machine, Caterpillar remanufacturing facilities and many Cat Dealers are experts at increasing the useful life cycle of Cat equipment and components.

What about operator training? Do we think of training as contributing to sustainability? Your investment in crew training pays you back in reduced re-work. When we do any job right the first time, we save not just money but also resources. That's why Caterpillar puts such emphasis on training programmes and project consulting.

In the asphalt paving industry, we're accustomed to thinking about the recycling of old asphalt structures. Let's get accustomed to considering sustainability whenever we make a decision. At Caterpillar, we believe that everything counts in the drive to sustainability. ■

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Feature Articles

Paving News: 2010 - Issue 2

The rotary mixer worked productively in the clay-based soil.

RM500 ROTARY MIXER

Engine:
Cat® C15 ACERT™

Gross power:
403kW (548hp)

Weight w/ Universal reclamation rotor:
28,145kg (62,049lb)

Maximum width:
2.98m (9.58')

Width at rear wheels:
2.82m (9.17')

Travel speed:
9.2km/h (5.7mph)

Universal rotor width:
2438mm (96")

Universal rotor diameter:
1,525mm (54")

Universal rotor max. depth:
457mm (8")

A special bonding agent was applied to strengthen the road.

Heavy Trucks and Sun Challenge Rural Road

Cat RM500 Rotary Mixer stabilises Sahara haul route

The bonding agent is environmentally friendly, as it is a natural fibre found in trees and plants.

Tamanrasset, Algeria, was established centuries ago along the trans-Saharan trade routes. The routes evolved into the Trans-Sahara Highway, and Tamanrasset remains a key outpost today. It is an oasis where citrus fruits, apricots, dates, figs and other produce are grown.

It's also a key oil centre, with several large facilities located nearby. A single clay road serves as a pipeline from the facilities, connecting them to the Trans-Sahara Highway.

The clay road was in need of repair. It came as no surprise given the pounding of both the heavy trucks that use the road, as well as the sun. Temperatures in the desert city of about 70,000 are among the highest ever recorded. Highs have hit 47.4º C (117º F) in both July and August. The average temperature in July is 35.9º C (97º F).

The baked clay can become brittle as the heavy trucks travel the roads. Yet the road also experiences extreme temperature changes over the course of the year, with average lows falling to 6.4º C (44º F) in January. Those on the jobsite believe that the temperature fluctuations likely had as much to do with the deterioration of the road as did the heat itself.

The Project

The soil road desperately needed repair. Cost was a key consideration, so the decision was made to go with stabilisation. A Cat® RM500 Rotary Mixer was the machine selected for the job by Chebli & Tellawi Corporation, the contractor handling the work.

The project called for all 50km (31 miles) of the connecting road to be stabilised by the RM500. The road was

to be stabilised at a width of 9m (30') and a depth of 20cm (7.9"). Plans also included the use of a special bonding material to strengthen the road that leads to the oil facilities.

Getting Started

The work began in February. Preparations had to be made before the RM500 could make a pass.

First, a dozer made a very rough grading pass. This work mostly required removal of large stones that had been brought to the surface by the heavy trucks and temperature fluctuations. The dozer also cleared larger chunks of broken clay.

A water truck then sprinkled the roughly graded surface. Next, the RM500 made a stabilising pass. Ahead of the RM500 was a truck containing the bonding material. A hose connected the rotary mixer and the truck that contained the binding agent. The emulsion was mixed with the soil in the mixing chamber of the RM500.

The bonding agent is made from calcium and lignin, a complex polymer extracted from paper pulp. Lignin is environmentally friendly, as it is a natural fibre found in trees and plants.

The bonding agent was chosen because of its fit with the existing clay road. The agent helps make clay more elastic, preventing material from breaking loose. The organic binding agent also facilitates compaction.

A motor grader then made a finished grading pass, followed by a soil compactor.

The Challenges

Hitting the deadline was crucial to the project. Inefficiencies associated with the work would have cost the oil industries time and money. Once the work was started, it had to be completed in a hurry.

Weather also added time pressure. The project started in February, when the average temperatures range from 7.5-20.6º C (46-69º F). But the likelihood of a heat wave increased with every passing day.

Another challenge was that the operators had never previously worked on a rotary mixer. The speed of the project increased quickly as the crews grew in experience. At the beginning, the crew was stabilising 58m (190') per day. By the middle of the project,

the pace was 600m (1,968') per day. By the conclusion of the project, crews reached a working speed of 1200m (3,936') per day.

It was a substantial increase and showed how quickly operators can adjust to the new machine and bring productivity to the worksite.

The durability of the machine also impressed Chebli & Tellawi Corporation, as did the productivity. Operators, meanwhile, appreciated the sight lines around the machine. “We are impressed by the visibility,” said one operator. ■

BUILDING THE RELATIONSHIP

The Cat® RM500 Rotary Mixer used on the job was the first such machine sold in Algeria. Making sure operators and support crew from Chebli & Tellawi Corporation were able to maximise the potential of the machine was crucial to the success of the project.

This led to a week of training arranged through the local Cat Dealer. Trainers from Caterpillar and the dealership provided hands-on instruction a month before the oil road project began. The goal was to train two operators and one mechanic on operating the machine and making routine service checks to help prevent unplanned downtime.

Chebli & Tellawi chose the RM500 in part because of their relationship with the Cat Dealer. The application and service training provided by Bergerat Monnoyeur is an excellent example of the extra value a Cat Dealer can bring to the customer. Customer support and parts availability are also good reasons to choose Cat.

Support is crucial at any jobsite, but nowhere more than a remote jobsite such as Tamanrasset.

Cat® compactors achieve surface density while protecting base

The Transformation of Bird's Nest Stadium

The Race of Champions (ROC) went off smoothly in the Bird's Nest Stadium in Beijing. But to the paving contractors developing the track, the real race occurred a few days earlier.

"The project involved a major event with a lot of attention," noted Cao Ying, manager of Beijing Luyuantong Construction Equipment Rental Co. Ltd. "We couldn't afford any mistakes."

The fact that the results of the project would be viewed by thousands added pressure. The extremely tight timeframe added even more. Besides having only a few days to complete the work, the contractors also faced significant sustainability challenges as well.

Transformation

The race was held Nov. 3-5 in Beijing National Stadium, more commonly known as Bird's Nest Stadium, made famous during the 2008 Olympic Games. The requirements were for the stadium to be converted into an auto race track, and then be turned back into an athletic field immediately after the race.

Specs for the ROC called for a surface 1,160m (1,269yd) long, and covering 10,000m^2 (108,000ft^2) with each lane widened to 7m (23') as opposed to the previous 6.5m (21'). In addition, the start lane was lengthened to enable a maximum speed of 150km/h (93mph) throughout the course.

The tight timeframe and budget made equipment selection crucial. Productivity was a key motivation, but certainly not the only criteria. "Exceptional customer service also contributed to our selection of Cat equipment," noted Cao Ying, an

Photo courtesy of Eddie Fletcher

"The project involved a major event with a lot of attention."

engineer with more than a decade's experience in road paving and operations management.

The construction technique and capabilities also were significant factors. Those challenges could be met through Cat equipment and the expertise the contractors provided.

Other obstacles, such as time and protecting the existing facility, remained. "The difficulties were less about construction techniques and capabilities, but more about how to complete a quality project in a limited period of time, while also protecting the pre-existing facilities in the Bird's Nest," said Geng Jianguo, construction superintendent for the ROC race track and engineer from Beijing Construction Engineering Group.

To protect the turf, the green grass was temporarily relocated before the course was paved. The existing plastic track also required protection, as it would be used for future sporting events shortly after the ROC.

"Traditionally, 3cm (1.2") thick aluminium plates would be laid over the plastic track before placing the asphalt and base layers," explained Geng Jianguo. But, once again, time became an issue. "This method leads to a long construction period, followed by troublesome removal," Geng Jianguo said.

After a comprehensive study, the contractor decided to overlay a dust-proof tarpaulin, topped by a layer of bamboo plywood. The plywood was highly flexible, which provided effective protection for the plastic track. It also was light, inexpensive, easy to install and environmentally friendly.

The project to pave the Bird's Nest race track officially began on

A UNIQUE, SUSTAINABLE PROJECT

Bird's Nest Stadium wasn't the first athletic field to be transformed into an auto racing track. But the Race of Champions project did set many precedents in terms of low costs and sustainability. Among them:

- Great efforts were made to protect the existing facilities. That included the use of bamboo plywood, an environmentally sensitive material.
- Also protecting the existing surfaces were Cat CB534D Vibratory Asphalt Compactors, as well as a CB14 Utility Compactor. The machines were able to achieve the required density without damaging existing base materials.
- Turf from the athletic field was removed before construction began. It was cared for during the construction and race, and later returned safely.
- At the conclusion of the ROC event, a Cat PM102 Cold Planer removed the asphalt and lime base. Those materials were returned to the supplier and recycled.
- Low emissions of the Cat equipment enabled safe work in the enclosed stadium

Oct. 22 with placement of the bamboo plywood. That took several days, and the plywood was quickly topped by a 15cm (6") lime fly ash base. Then it was time to pave.

"Paving began only after this 'double safety' protective layer was completed," stated Cao Ying. With the protection in place, the rest of the project was in the hands of the contractors. "The subsequent project depended on high-quality equipment and skilled operators," Cao Ying said.

Paving Begins

During the paving process, Luyuantong Construction Equipment Rental Co. Ltd. provided two Cat CB534D Vibratory Asphalt Compactors, one small double-drum asphalt compactor, and one Cat CB14 Utility Compactor. Two rented pavers working in tandem.

"The Cat CB534D Compactors gave not only higher precision, but also the advantage of dual frequency and dual amplitude," explained Cao Ying. "We were supposed to protect the plastic track in the Bird's Nest while delivering a sufficiently strong race track surface. The CB534D has enabled thin-lift application and fully satisfied the project requirements with its multi-amplitude and multi-frequency vibratory systems, as well as a superior control system."

On Oct. 30, the paving project in Bird's Nest Stadium was completed and moved to the test phase. Two days later, a huge race track was ready for the champions to step up and prove their mettle.

Turning it Back

The end of the race was the beginning of yet another round of work for Cao Ying as he and his crew had to return the race track to its earlier state as an athletic field. The major task in this phase was to remove the track within two days.

Cao Ying rented a Cat PM102 Cold Planer for the job. "The machine is powered by an eco-friendly, ultra-efficient engine," he said. "With high-precision controls and durability, the machine is suitable for a wide range of scenarios."

After the race track was removed, the scrapped asphalt and lime fly ash were returned to the original manufacturer for recycling.

Then, finally, the job was done. ■

Information and photos provided by Shi Hui, Highway Construction and Maintenance (HCM).

New CD54 Compactor

Shaft keeps split drums connected over extended period

The Cat® CD54 Drum Steer Asphalt Compactor offers a versatile vibratory system that produces desired results on all types of asphalt mixes, from tender to harsh.

Drum connections are a key feature of this new Cat compactor. The exclusive pod design utilises an axle-type connection with maintenance-free, tapered roller bearings that support each drum-half and eliminate any potential for contact or separation between the two halves. Most other manufacturers utilise large turntable-type bearings that lead to more wear and increased maintenance. Dual seals provide two layers of protection that prevent contamination and ensure long-term performance. Oil bath lubrication delivers continuous recirculation of oil inside the sealed housing, leading to longer service intervals and lower overall operating costs.

In addition, the CD54 can be used in all phases of asphalt compaction, thereby reducing the need for a variety of rollers. Here are the key features:

Four Steering Modes

The CD54 features four steering modes: front, rear, coordinated front and rear, and crab operation. When fully offset, coordinated steering produces a 2.8m (110") inside turning radius for maximum job site manoeuvrability.

Sensitive To The Touch Steering

The benefit of electronic steering is combined with the feel of hydraulic steering. When the drum encounters resistance, friction to the steering wheel increases, providing an intuitive feel that is extremely beneficial when operating adjacent to vertical barriers and curbs or when drum articulation reaches the end of travel during tight turns.

Tight Turning Without Tearing

The exclusive split drum propel system provides a tight turning radius without damaging the hot mat. When turning, the outside drum half rotates faster than the inside drum, eliminating the potential for shoving that occurs on standard vibratory drum designs.

Wide Drum Offset

The 1.3m (51") drum offset provides more coverage for higher production on thin mats while minimising heat loss prior to compaction. Ease of operation is provided through fingertip control at the propel lever, enabling one-handed operation. An audio alarm alerts the operator when the drums are aligned.

Balanced Torque

The split-drum drive system features an electronically actuated traction control feature that prevents unequal rotation of the drum halves and assures balanced torque when traveling straight. In order to avoid tearing the mat in tight turns, the drum halves rotate at different speeds. The system features speed sensing propel motors that allow additional flow to the outside drum drive, ensuring proportional speed between the drum halves. The split-drum drive system utilises maintenance-free tapered roller bearings, for excellent reliability. ■

Norway - Velde Aggregates' AP655D on a site close to Stavanger, Norway, with Cat dealer PON.

The Caterpillar manufactured high performance AP655D tracked paver is proving the ideal machine for contractors involved in projects across Europe, from Portugal, France and Spain to Germany and Norway. The possibility to equip the machine with a choice of conventional steel tracks, or the flexible rubber Mobil-tracTM System (MTS), offers customers a paver with exceptional manoeuvrability, high traction capabilities, rapid travel speeds and good flotation.

The machine provides three steering modes: one for paving, one for travel and a manoeuvring mode that permits the tracks to counter rotate, allowing the paver to turn within its own footprint. This Caterpillar designed system permits operators to rapidly reposition the machine when moving to a new start point. It also enables the machine to access restricted job sites, including narrow mountain roads.

Portuguese contractor Jose de Sousa Barra opted to take the machine on steel tracks. The company operates a number of Cat® machines, from excavators to compaction models so they were familiar with the high quality of build and confident in the support offered by local dealer STET.

The AP655D was put to work in the town of Vilamoura, repairing the Avenida Cupertino de Miranda, the main street in this busy town in the heart of the Algarve. The company had to complete 1.3km of paving work in a single day of operations.

That meant laying 1,200 tonnes of asphalt, with the AP655D working alongside a Bitelli BB651C, within a single eight-hour shift. The access to the jobsite was restricted due to the importance of keeping the street open for traffic through the town.

The operators were particularly impressed with the power of the AP655D and its ride over the ground.

Cat® AP655D Asphalt Paver

On the road across Europe

"The oscillating bogie design provides good traction and a smooth ride," said operator Alexandre Brito.

"The level of production, without having to stop working, was also very impressive," said Barra's Joao Feijao.

An AP655D was used by French contractor Braja on a narrow roadway in the Rhone-Alpes region of France. Working on a 7.1km section between Villepredix and Leoux, where the elevation of the road rises from 450-750m, the machine was able to lay 250 tonnes of bituminous concrete mixture in just 45 minutes.

The next day the same machine was utilised to pave an 8km stretch of road from Verclaus to Lemps, again covering a change in altitude of more than 200m.

Braja's road crews said that the AP655D, fitted with the MTS rubber track system, handled the jobs in one third of the time that it would have taken with a conventional steel track paver. The operators also claimed that the Mobil-trac system provided additional stability and security on the mountainous roads.

On the Braja contracts in France, the rubber track system was not only perfect for the actual paving work, it also proved an ideal solution to support transport difficulties as well. Due to the sharp mountainous turns and confined space available, it was not possible to transport the machine to the job site on a truck. However, with the excellent mobility provided by the MTS track design, the machine was able to make swift progress up the mountain roads without damage to existing paving.

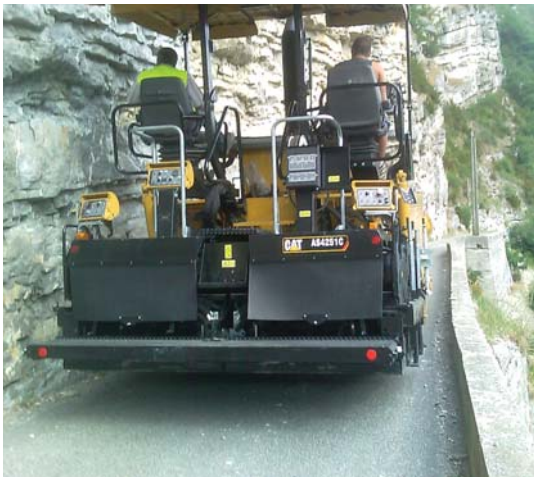
"The AP655D was easily able to ascend the mountain road on its own, thanks to its high travel speeds and Mobil-trac System undercarriage," said supplying dealer Bergerat Monnoyeur's Paving Product Specialist, Pierre Boully.

"It easily covered the required distance of 5km in one hour. This demonstrates the versatility of the rubber track undercarriage and as a result the AP655D is able to match the high transfer speeds and manoeuvrability of most wheeled pavers."

In western Spain, contractor Oviga has had similar experience with the manoeuvrable AP655D. On its first contract for the company, the paver was used to repair a worn-out stretch of village road near Palais de Rei. Cat dealer Finanzauto, with help from Cat Commissioning Engineer, Davide Dalla, commissioned the machine on the site, allowing Oviga to get straight to work with the new AP655D.

In Germany, road construction firm Steffes-Mies, a subsidiary of KH Gaul from Sprendlingen, has been putting its first AP655D to good use too. The company saw the machine at the bauma exhibition in Munich, and was immediately impressed with the build

Germany - KH Gaul's subsidiary Steffes-Mies bought the AP655D after seeing it at the bauma exhibition in Munich



quality and specifications of the paver, resulting in an order for the Cat machine.

In Norway, the arrival of the first AP655D has been the cause of much interest among road building companies. Traditionally, Norwegian contractors have opted for wheeled machines due to the greater mobility of the rubber-tyred models. However, the rubber tracks of the MTS-equipped AP655D have contractor Velde Aggregates keen to try this new technology.

Velde's pioneering AP655D was put to work first on a site close to Stavanger, laying 1km of roadway with widths of 4m to 8m. Norwegian Cat dealer, PON Norway, was on hand to ensure that the work progressed smoothly.

Velde reports that the machine has a good transport speed, as high as a wheeled paver at 16km/h. The company was also impressed by the low noise output, both from the rubber tracks and from the engine that was running at just 1,280rpm. A secondary benefit of this lower operating speed was impressively low fuel consumption. The machine's superior stability was also noted, resulting in a smooth finished surface.

The AP655D is one of a range of crawler and wheeled asphalt pavers available from Caterpillar. In addition to machines, your local Cat dealer and Caterpillar can offer project consulting services, technical and application training, and full machine support.

Working around the clock to meet the needs of road construction contractors throughout Europe, Africa and the Middle East, Caterpillar offers an unbeatable range of options to tailor the machine to your individual requirements. In the AP655D, Caterpillar offers a highly manoeuvrable paver that delivers exceptional mat quality, excellent mobility and precise control on confined job sites, wherever they may be.

AP655D Specification

The AP655D is powered by a Cat C6.6 diesel engine with ACERT Technology. This electronically-controlled 6.6 litre motor offers a strong 129.5kW (176hp), with derating not required up to an altitude of 3000m, making it an ideal machine for use on mountainous roads.

The standard high capacity cooling system provides efficient operation in warmer climates, while the airflow drawn across the engine is vented towards the hopper, rather than back towards the operator station. A hydraulically-driven cooling fan provides cooling on demand, reducing fuel consumption and sound levels, both of which are important considerations for the customer, particularly in urban sites.

Dual operator stations incorporate fully equipped control consoles, with ground speed indicators, adjustable suspension seats and retractable seat belts for operator security. Each station can be positioned in one of four locations, to provide maximum visibility of the working area. In addition the control consoles can be tilted to improve operator comfort wherever the seat is located.

The left hand console includes a display for the Advisor Monitoring System (AMS). This provides the operator with a start-up check list, where they can set operational preferences along with engine and machine operating parameters, such as automatic engine speed control and friction steering tension.

As mentioned, the AP655D can be equipped with the Mobil-trac undercarriage. Designed to provide the flotation and traction of a crawler machine with the mobility and ride-quality of a wheeled paver, the MTS track can be supplied with either a tread-bar style belt or a smooth belt. While both belts provide similar levels of performance, the smooth belt provides reduced disturbance on soft base materials.

At the front end of the machine, the AP655D offers a gateless handling system that allows hands-free operation with independent control of each auger and conveyor. This provides precise mix delivery with minimal operator monitoring required. The ratio of the conveyor speed to the maximum auger speed is automatically maintained when changing paving speed by the controller. This is particularly useful when the paving is wider or thicker on one side of the machine.

A high capacity single-phase AC generator provides 25kW of power for the electric screed heaters and the auxiliary power panel. The generator can be belt or hydraulically-driven, with the hydraulic generator providing a fixed 60Hz frequency when the engine is above 1275rpm, while the belt-driven generator has a variable frequency as the revs rise above 1275rpm.

The auxiliary power panel provides additional electrical power for lighting and work tools, and comes with either two 120V or two 240V connections.

The AP655D is fitted with the AS4251C double width power extending screed. Customers can choose from either electric or LPG heating system with variable frequency tamper and vibrators, to suit their job site requirements. The AS4251C screed features heavy duty supports that provide stability for high quality results on highways and streets, as well as in urban applications.

The standard paving range is 2.55m-5.00m, while maximum paving widths of 8.00m can be achieved with bolt-on mechanical extensions. ■

QUICK SPECIFICATION BOX

Operating weight (with AS4251C):
19,165kg

Maximum paving width:
8.00m

Basic screed width:
2.55m

Engine output:
129.5kW (176hp)

Hopper capacity:
14.1 tonnes (6.5m^3)

Track options:
Tread-bar or smooth belt Mobil-trac System, or steel track undercarriage options

Travel speed (Mobil-trac):
25m/min paving, 14.8km/h travel

Travel speed (steel track):
25m/min paving, 5.3km/h travel

Fuel tank capacity:
290 litres

Spain - the AP655D paves a narrow village street

The best improvements often go unnoticed

Sustainable Technology, Built Right In

New technology often draws attention. But the key question we always ask: “Is the technology practical?” Often, it is difficult to consider a new feature a “technological advance” if an operator can’t interface with it on the jobsite. Out of sight, out of mind.

In fact, some of the best technology on Cat® machines works behind the scenes. Some of the most significant developments are so inconspicuous that those in the field don’t notice - but the accountants back at the office do. And other technologies that interface with the operator are designed to be so intuitive that they hardly appear to be technological at all—they have seamlessly integrated operator input with machine response.

That’s the goal of Caterpillar: To build technology into the machines. Such technology requires no training, yet it reduces wear and helps components, machines and even fluids last longer.

The benefit of this technology to your bottom line is obvious. Longer life also has some significant sustainability implications as well.

Here are a few examples of built-in technology, as well as more visible technologies, that benefit your business and the environment.

Robust Machines

The robust design of Cat machines is a perfect example of the “practical” approach. Cat machines and components are thick, strong and well protected. Wear and tear is reduced because of the engineering and manufacturing processes utilised by Caterpillar. The result is not only longer component life, but extended

mainframe life as well. This enables remanufacturing of the machine to original OEM specs at a fraction of the cost of purchasing a new machine.

Robust Engines

Engines in Cat machines are properly sized for the task. They don't operate at peak load, but rather in a middle range. This means operation at a lower temperature, which reduces wear and helps extend component life.

The engine, too, can be rebuilt to original OEM specifications at a fraction of the cost of purchasing a new engine. Remanufactured parts cost less but are as good as new, and come with same-as-new warranties.

ACERT™ Technology, meanwhile, reduces emissions while continuing to deliver the power you need.

Service Intervals

Technology has led to longer service intervals for Cat machines. These extended timeframes contribute to sustainability and reduce your costs.

For example, Cat HYDO™ Advanced 10 hydraulic oil offers better protection than off-the-shelf hydraulic fluids. New Cat CS44 and CP44 Soil Compactors come with a factory fill. Utilising the Cat oil enables customers to extend service intervals for the CS44 and CP44 to 3 years/3,000 hours—the longest available in the industry. (Most other manufacturers offer a maximum of 1 year/1,000 hours.)

In a typical lifetime of about 6,000 hours, the owner of a Cat machine could change hydraulic fluid once or twice, compared with five to six times for owners of equipment built by other manufacturers. The resulting benefits are financial and environmental. Much less fluid and fewer filters will require disposal, benefiting both the business and the environment.

Caterpillar also offers sustainable fluids. Many Cat Paving machines can be used with Bio HYDO Advanced hydraulic fluid as an option. Bio HYDO Advanced is a fully biodegradable product that offers the performance of premium mineral-based oils with a minimal impact on the environment.

Ecology Drains

These drains allow service personnel to conduct maintenance with less risk of a spill. An ecology drain is a device that controls how and when the fluid is drained, preventing the accidental release or the splashing surge created upon the removal of a drain plug. As a technician engages the drain, fluid is slowly released in a controlled manner, allowing the technician to position collection containers before fully engaging the drain for maximum flow.

The sustainability benefits are obvious, but there also is a financial gain. By preventing spills there is no time loss for cleanup, allowing maintenance work to proceed with maximum efficiency. And, because the process is relatively clean and easy, it is less likely that service will be delayed. This protects your machine investment and maximises the life of components.

AccuGrade™ Technology

Like most of the other technological features, AccuGrade technology has an impact on both profit and sustainability. Jobsite efficiencies can be significant, frequently eliminating extra passes. The benefit to you is reduced labor costs, equipment wear/usage, and fuel consumption. Sustainability efforts are realised as well when less fuel is burned, and fewer emissions are created. Reduced equipment wear also has a positive impact on sustainability as well, as fewer components end up as waste, and there is less need for newly manufactured parts. ■

Wear and tear is reduced because of the engineering and manufacturing process utilised by Caterpillar.

Using fewer resources benefits paving contractors

Training boosts sustainability and profits

What does training have to do with sustainability? Everything. And what does sustainability have to do with your business? The answer, again, is everything.

Sustainability is about accomplishing the job with as few resources and as little impact on the environment as possible. It's also about extending pavement life.

Training helps you accomplish both goals. Doing so—in other words, having a sustainable focus—also helps your business. Using fewer resources lowers your costs and improves your bottom line. It also helps you win more bids. Longer pavement life, meanwhile, helps you increase value to your customers, and gives them a reason to use you in the future and spread the word about your capabilities.

Extending life

Training helps paving crews achieve exceptional mat density and smoothness. This has implications beyond hitting specs, said Terry Humphrey, Training Consultant with Caterpillar Global Paving.

"If we achieve the correct smoothness and density, the life cycle of that pavement structure is longer," Humphrey said. "The life cycle of a

'great' road can be 15 percent longer than a 'good' road. That's a significant improvement."

A heavily travelled urban highway might need repaving to repair cracks and ruts every seven years. That timeframe could be increased to eight or nine years if the crew has been properly trained, resulting in a "great" project, Humphrey said.

"If the road lasts longer, we gain an extra year or two where we don't have to set up traffic control," he said. "We don't have to slow down traffic, which creates a great deal of emissions. We reduce our carbon footprint because we've lengthened the interval. That's a big difference."

The training also makes a difference in ways that initially appear small—but aren't, Humphrey said.

Transverse joints

A specific example is having crews properly trained to create longitudinal and transverse joints.

"If the crew has created good transverse joints when starting the paver, you don't need a grinding machine to make that transition flat," Humphrey said. The grinding is inefficient in many ways: It requires transport and use of a machine, which both burn fuel. It requires traffic to be reduced to a single lane, which can lead to traffic jams—and wasted fuel and increased emissions.

"Think of how many thousands of gallons of diesel fuel wouldn't be used if we eliminated all the grinding that takes place on highways," Humphrey said. "Traffic wouldn't have to slow down, either, which would be another advantage."

The transverse joints are also an example of how working toward sustainability has economic benefits for the paving crew. "Think of the cost savings for that firm if they don't have to return and grind the transverse joints," Humphrey said. There are savings in labour, fuel to get to the jobsite, fuel burned at the jobsite, and wear on the machine. In some cases, bonus pay also could be at stake.

Longitudinal joints

If placed properly, longitudinal joints won't need to be crack-sealed. "Again, it's not just the construction vehicles themselves, it's how much we delay traffic when we do the work," Humphrey said. "An idling car creates a lot more emissions than a car going the speed limit."

Training is about more than educating crew leaders and operators, Humphrey said. "We need to train and encourage engineers to come up with innovative ideas to do more asphalt recycling," Humphrey said. "We need to find ways to do more reclaiming, to do the work in-place instead of hauling old materials away and bringing new materials in."

Such innovations will also reduce costs, while delivering a similar and perhaps improved product. Firms that can accomplish such feats will be rewarded with additional business.

"If everyone is trained, we don't do rework, and the road lasts longer," Humphrey said. "If everyone is trained, we can fully take advantage of all available efficiencies.

"Those efforts lead to sustainability, which is the right thing for everyone on this. Doing the right thing in terms of sustainability is easy, because it also helps businesses succeed." ■

TRAINING'S ROLE

- Enables crews to work more quickly, which reduces both fuel consumption on the jobsite and inefficient traffic delays.
- Helps crews avoid rework and all the associated equipment, traffic delays and fuel consumption that goes with that rework.
- Keeps crews safer.
- Enables crews to reach compaction goals in fewer passes, requiring less fuel and even less machinery.

Classroom lessons are later tested in the field as part of the training.

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