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TECHNOLOGY

FALL / WINTER 2003

Foamed Asphalt In L.A.



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FALL/WINTER 2003

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On the Cover: Mt. Lee Drive in Los Angeles is reclaimed and stabilized using foamed asphalt; see p 6. Photo by Sibylle Allgaier, Heiiphoto.

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The Costs Of Congestion

In early October, as a new report from the Texas Transportation Institute of Texas A&M University documented the costs of the extreme traffic congestion faced by this country, the foundation of our U.S. surface transportation program trembled a bit.

That's because on Oct. 1, TEA-21 — our existing federal surface transportation legislation — expired without a long-term replacement bill in place.

There's no need to panic, at least right now. With the clock ticking, both houses of Congress agreed on a short-term interim bill that continues flow of highway funds. This bill was signed by the president, and extends the needed spending authority for highway and transit programs for five months, through February 2004. With this extension our House and Senate surface transportation committees bought time to work out a mighty, new six-year bill — dubbed TEA-3 — that should boost spending above even TEA-21's increases.

How Congestion Hurts

But it's not like our senators and representatives didn't have a reason to pass TEA-3 when they were supposed to, because a new report documenting the real costs of congestion for drivers across the country gives reasons by the bucketful.

The TTI annual urban mobility report released Sept. 30 — TEA-21's final day — shows that commuters are spending more time in traffic, and that congestion is harming our economy big time.

The average annual delay for every person in the 75 urban areas studied by TTI rose from seven hours in 1982 to 26 hours in 2001. That's an increase of four hours in the last five years.

Even worse, the costs of congestion are growing fast and are sucking wealth from the U.S. economy. The total bill for congestion in those 75 areas in 2001 came to \$69.5 billion, which was the value of 3.5 billion hours of delay and 5.7 billion gallons of excess fuel consumed. From 1982 to 2001, in 75 urban areas studied, passenger miles of travel

increased over 91 percent on the freeways and major streets, TTI said.

Sponsored in part by a foundation of the American Road & Transportation Builders Association, the TTI report highlights the need for fast action on a good highway bill. "Since 1970, energy consumption has increased 42 percent, the U.S. population has increased 33 percent, vehicle miles traveled increased nearly 150 percent, but new highway capacity has only increased 6 percent," said ARTBA president Pete Ruane at the release of the report.

But Americans support higher taxes if they know where they're going. Pete said a new poll showed nearly 60 percent of Americans would support a gasoline tax increase of up to five cents per gallon, if the money was dedicated exclusively to road and transit improvements.

Industry Presses On

In the meantime, the leadership of the House surface transportation subcommittee is committed to a six-year, \$375 billion highway and transit reauthorization — which might require that gas tax increase — while the Senate is seeking a \$311 billion bill over six years.

Both compare favorably with the previous Transportation Equity Act for the 21st Century (TEA-21), which is saying a lot. Over TEA-3's lifetime, federal investment in highways and transit rose nearly 40 percent: highways were guaranteed at \$171 billion and transit at \$36 billion.

But we like the House version better, which can be justified on the basis of improved highway safety and its benefits to public health, congestion relief and its benefits to our economy, and economic growth made possible by long-term improvement to our transportation infrastructure.

Our lobbyists in Washington are working hard to help our legislators do the right thing. There, the Transportation Construction Coalition (TCC) brings together those groups in the industry that are most impacted by the highway program, and makes sure they're "singing from the same hymn book" while leveraging the strength that comes with numbers.

And the business community at-large is represented through a coalition headed by the U.S. Chamber of Commerce, Americans for Transportation Mobility (ATM). Among other things this group has been running full page ads in D.C. publications which are read by legislators and their staffs.

The next five months are critical to the effort, to say the least. As a road builder and user you have a big stake in how big the final law will be. I hope you will join me in supporting the efforts of our legislators to get the right bill passed, and this time for the long-term.

Stu Murray
President
Wirtgen America Inc.

As I see it...

Foamed Asphalt New Opportunity For L.A. Recycling

The City of Los Angeles broadened its options in recycling for street maintenance and reconstruction when it investigated foamed asphalt base recycling late this summer.

In a demonstration project in partnership with Wirtgen America Inc. and its distributor Nixon-Egli Equipment Co., the L.A. Department of Public Works, Bureau of Street Services reconstructed scenic Mt. Lee Drive high above Hollywood from its locked gate in a residential area, to its summit at 1,640 ft.

And because Mt. Lee Drive provides access to the world famous HOLLYWOOD sign above the City of Los Angeles, foamed asphalt and the Wirtgen WR 2500 now have a new and glamorous application for the record books.

Existing Mt. Lee Drive was a 1.4-mile crazy quilt of crumbled asphalt, heavily alligatored and patched over the years. Also, water coursing across the steep, twisting pavement was causing extensive erosion of the base material, leading to further failure.

As an alternative to an asphalt overlay, the City of Los Angeles chose *in-situ* recycling of the existing pavement, using foamed asphalt as the binding agent.

Recycling Matter Of Policy

Los Angeles strives to incorporate recycling as a matter of policy in its road and street program.

"We're committed to recycling throughout our entire operation," said Bureau of Street Services assistant director Thomas W. Thomas. "Asphalt recycling has been part of our streets program since the mid-1980s, and in addition to our asphalt recycling our Street Tree Division does green waste recycling."

Today, the bureau has retrofitted its two municipal asphalt plants to increase their capacities to incorporate 20 percent of reclaimed asphalt pavement (RAP) into the asphalt manufactured at these plants. The city also has a contract with a private sector supplier for a 50 percent RAP, 50 percent virgin plant mix, used in all phases of the city's resurfacing program.

But the full-depth, cold-in-place [CIP] foamed asphalt recycling as executed on Mt. Lee Drive represents a new direc-

tion for L.A. "Cold-in-place is not new, but it's new to the city," Thomas said. "We're always looking to expand our technology. We've been looking for a project that challenges us, and we have one here on Mt. Lee Drive."

Asphalt recycling as a Bureau of Street Services policy is more than just general environmental stewardship; it saves money and keeps residents happy. "It's a win:win proposition," Thomas said. "There are cost savings in trucking, in congestion relief because trucks stay off the road, and environmental benefits by keeping equipment out of residential areas. And with CIP, at the end of the day, you have a usable, rideable surface."

Extreme Test Of Utility

And for L.A., Mt. Lee Drive represents an extreme test of foamed asphalt's utility. "All of the engineering and customer service issues are found here," Thomas said. "We have a narrow roadway, only one way in and out, and restrictions on truck use. It's a place out of the public way in which we can observe foamed asphalt recycling and can establish our ground rules and how it works."

"A major aim was to avoid trucking materials in and out,



Hamm 3412 soil compactor follows recycling train up hairpin turns



Crew for The Learning Channel's Monster Machines program videotapes Hamm HD 120 double-drum vibratory compactor



Wirtgen America regional manager Marty Burks explains features of WR 2500 for The Learning Channel's Monster Machines profile

and bringing an excessive number of construction vehicles through a residential neighborhood," said Wirtgen recycling specialist Mike Marshall. "Conventional reconstruction would have required digging out surface and base, hauling it away, bringing in new base, and paving with asphalt. That would have been at least 30 to 40 trucks a day. With recycling, once the equipment is on-site, the only truck coming in would be the oil tank truck once a day."

Advance Material Testing

In summer 2003, a detailed pavement investigation and mix design was carried out in conjunction with the city's Department of General Services Standards Division, Materials Testing. Using a Wirtgen WLB 10 Foamed Asphalt Laboratory, road specimens were analyzed by mixing them with various percentages of foamed asphalt, to determine the optimum percentage of foamed asphalt to be added to meet the desired design requirement.

The outcome was a plan to recycle the existing pavement to a depth of 6 inches, while applying 3 percent foamed asphalt (by mass). The new, completed base then could cure for four days before application of a light tack coat, followed by surface brooming and application of microsurfacing.

A Collaborative Effort

The project was a collaborative, public/private sector effort. Bureau of Street Services employees operated the city-provided water and liquid asphalt tankers, and operated the grader and compactors, which were provided by equipment distributor Nixon-Egli Equipment Co. Water and liquid asphalt was provided by the city. The Wirtgen WR 2500 recycler and WLB 10 foam lab was provided by Wirtgen America Inc., which also supplied technical personnel. Lastly, the bureau provided the final microsurfacing driving course.

Initial compaction of the recycled material following the WR 2500 recycler was executed by a Hamm 3412 vibratory single drum compactor, followed by a motor grader which leveled the material. Additional compaction followed by a

Hamm HD 120 double-drum roller

and finish rolling by a Hamm GRW 18 pneumatic-tired roller.


The finished, compacted, recycled pavement then was lightly watered. After moisture was allowed to evaporate from the recycled pavement, the recycled surface was to be sealed by a microsurfacing process carried out by the City of Los Angeles. However, Mt. Lee Drive remained open to traffic the entire time.

The steep inclines and drop-offs, hair-pin turns and tight working conditions made for a challenging work environment, but the WR 2500 more than made the grade, so to speak. "We're more confident when we work with the equipment that will do it, which is the WR 2500 used here and its successor, the WR 2500 S," Marshall said. "It's got the power and it's got the traction."

One of steepest sections was over 200 yards of 25 percent grade. "The WR 2500 still is strong enough to push the oil truck and pull the water, even though its rear wheels are working on loose material," Marshall said. "In these conditions all the advantages of the WR 2500 drive system are used."

These advantages include four-wheel drive, each wheel with its own motor and hydraulic pump, unlike competing machines with four motors but one pump. "If one wheel comes off the ground, you don't get any slippage or spinning, because the other three are still driven positively by their individual pumps," Marshall said.

Improving Customer Service

"The Office of Mayor James K. Hahn and our elected officials are interested in our infrastructure and how new technology can improve its condition while saving money," said Bureau of Street Services director William A. Robertson. "They were receptive to this partnered project in support of recycling, improving customer service and preserving our infrastructure. We couldn't have done it without their support." 

Virginia SMA Placement Requires Special Care, Specialized Paver



Twin high-vibration compactors bring mix to over 95 percent compaction in one or two passes, with additional passes in static mode if needed

95 and on U.S. 17 in the vicinity of Fredericksburg, Va., in September and October late in the 2003 season.

This classic mill-and-fill operation was being conducted at night, and involved cold milling of a lane by subcontractor Slurry Pavers Inc. using a Wirtgen 2100 DC, followed by sweeper and paver. Total volume was 666,000 sq yard/inches, including 26,000 tons of SMA and an additional 11,000 tons of 12.5 mm Superpave mix for the shoulders.

The contractors were milling and paving about a mile per night shift, depending on the time available due to potential lane closure restrictions. Virginia requires that the milling machine not move in advance of the paving operation by more than 2,500 ft.

While capable of working faster, Virginia Paving was more concerned with getting the mix down right. "We've placed SMA a number of ways here, and we know there is a point where you can put the mix down faster than you can do a good job," said Ron Burton, Stafford plant manager, Virginia Paving. "Our QC technicians let us know."

Following the milling, a tack coat was being placed on top of the swept, dry milled surface. Then, SMA was placed using

A major East Coast highway contractor has found that placement of stone matrix asphalt (SMA) is best done with special care, as well as a specialized paver.

Virginia Paving Company, division of The Lane Construction Corporation, was placing SMA on I-

a material transfer vehicle feeding an insert in the hopper of a Super 2100 paver from Jos. Vögele AG of Germany.

The Super 2100 was placing the SMA 12 ft wide and 2 in thick compacted, with compaction at the single-tamper-bar screed in the high 80s. It was immediately followed by two Hamm HD 120 HV (high-vibration) compactors which achieved final minimum compaction of well above 95 percent, as well as required ride smoothness.

"We found out that running a pair of identical rollers works best for us," Burton said. "A pair stays directly in back of the paver, which achieves the initial compaction. If the rollers have to do the bulk of the compaction, you're going to get inconsistent density and a chance of ruining the ride. This style of paver is going to get us better ride, especially on an SMA mix which requires so much extra compaction effort."

Virginia specs permit up to only three vibratory passes on the SMA. "If you can't get the density after two vibratory passes, our HD 120 rollers are of a sufficient size to achieve compaction within four static passes," he said.

SMA High-Performance Mix

SMA is a gap-graded (low medium-sized aggregate and fines) hot mix asphalt design which brings together robust, coarse aggregate and as much as 6 to 8 percent liquid asphalt. Its lack of medium-sized aggregate — and fines percentage less than 15 percent of the aggregate weight — results in a strong mix with a rut-resistant, stone-on-stone structure which develops internal friction and resistance to shear.



Existing pavement is milled 1.5 in deep by Wirtgen 2100 DC owned by sub Slurry Pavers, Inc., prior to SMA placement

But because the gap-graded SMA emphasizes large aggregate, the low-penetration grade asphalt conventionally used can drain out of the coarse aggregate structure. To keep the asphalt in place, cellulose fibers or other asphalt modifier are added at the plant to keep the binder in place.

Maryland has led the way in SMA research and adoption in the U.S. In its 2002 research paper, *Construction and Performance of Stone Matrix Asphalt Pavements in Maryland: An Update*, the Maryland State Highway Administration said the performance of SMA pavements in that state has been "outstanding".

"Very little rutting, increase in roughness, or decrease of friction has been observed, even for pavements that have been in service for as long as 10 years," the paper said, adding other advantages include attenuated pavement noise and lower pavement spray during rain.

SMA has challenges in production as well. "The difference between production of conventional and SMA mixes in the plant is as much or more than the difference between paving the mixes," Burton said. "Not everybody's plant is set up to make SMA, and not all the aggregate suppliers are prepared to produce the stone necessary for SMA."

Moreover, the Virginia Department of Transportation upgraded its SMA spec from 2002 to 2003, providing more stringent criteria. "We have to use different aggregates, from 70 miles away; it's more costly, but it works very well," Burton said.

The liquid asphalt for this SMA mix is a PG 76-22, a polymer modified asphalt. Cellulose fibers are introduced to the drum while the SMA is mixed. Coarse aggregates represent about 80 percent of the mix by weight. Liquid asphalt is about 6.8 percent and the remainder is fine aggregates — a combination of mineral filler, dust — and cellulose fibers.

German Mix Design, German Paver

SMA was originated in Germany and was introduced to the U.S. beginning in 1990, when the Federal Highway Administration undertook its first technology scanning tour of the European asphalt industry. "SMA" is derived from the German term *splittmastixasphalt*, which was changed in the U.S.A. to "stone matrix asphalt". The terms mean much the same thing.

Considering SMA's German heritage, little wonder that Virginia Paving found the mix was best placed using a German-made paver, the Super 2100 from Jos. Vögele AG. The paver is marketed in North America by Wirtgen America Inc.

"We really feel that the Vögele paver is an excellent paver to place 'ride' routes," Burton said. "When we first got the paver in for a demo, along with the Hamm rollers, we took it out on a primary road where we used it to put down a 12.5-



Virginia DOT requires night work for many interstate and primary route projects, Sunday through Thursday

mm D mix, which has a non-modified PG 70-22 liquid asphalt. Behind the screed we were getting 98 percent-plus density. It was almost at the point that we felt we might be getting too much density on the mix, so later we dialed-back the pressure bar settings."

For that test, Virginia paved half the road with a standard paver, and half with the Super 2100. Virginia Paving conducts its own ride smoothness testing with its own rideability van, and it did a comparison on the two pavements.

"There was a noticeable difference," Burton said. "We would not use the Vögele everywhere, but when we have 'ride' routes — projects on which we will be penalized or bonused according to the smoothness of ride we achieve — that's the type of paver to put out there."

Burton said Virginia Paving also has gotten superior results using the Super 2100 on Superpave mixes. "For dense-graded Superpave mixes, the results we've gotten behind the paver screed have been tremendous," he said. "You don't want to walk across a surface mix, because of the tracks that result. But our technician was walking across a Superpave mix to obtain density readings directly behind the paver screed, and did not leave a mark. You just don't see that with a conventional paver."



Vögele Super 2100 places SMA on U.S. 17 near Fredericksburg, Va.; compaction at screed is in the high 80s

MAC Construction Builds Business On Vögele Platform



New Vögele America 880 RTB in MAC colors paves new movie theater parking lot in Shallotte, N.C.

“In doing my homework I found that Wirtgen Group is a capable company with a good line of milling machines. Once I found that out — and saw everything which stands behind Vögele America — I had no problems.”

The years come and go, the hours of operation build and build, and paver model numbers come and go.

But one thing stays the same: MAC Construction's loyalty to the Vögele America Inc. paver platform.

MAC has been using an 880 T for nine years, and it now has over 21,000 hours on it. It acquired a 1110 T in 1996, which now has over 3,700 hours on it. And in May it took delivery of an 880 RTB produced by Vögele America, Inc.

And despite the changing ownership of what is now the Vögele America paver platform, MAC has stayed true to the performance, service and product support that the paver's design and support team has given him.

“MAC Construction has been in the paving business since 1986, when it acquired an asphalt plant,” says Earl Tharp, vice president and general manager, MAC Construction Company, Shallotte, N.C.

“I'm comfortable with our new machine produced under Vögele America, Inc.,” Tharp says. “In doing my homework I found that Wirtgen Group is a capable company with a good line of milling machines. Once I found that out — and saw everything which stands behind Vögele America — I had no problems.”

Service, Support Nets Sales

“We've bought the line because of their service,” Tharp says. “I started with those boys early on. Nearly all the people now with Vögele America were involved back then. I've stuck with them all along.”

That customer support was evident the first day of use for the new 880 RTB May 20. “Vögele America's Spurgeon Prescott and 'Nars' Narsingh were down here to make things right, and spent two days with our employees,” Tharp said. “We were on-board and going full blast from the first day.”

MAC knows that speedy service is critical to the contractor in the field. “When a paver goes down, everything else stops,” Tharp says. “When they know you have a problem, they have to get in and get you taken care of as soon as possible. Our dealer Mitchell Distributing Co. and the manufacturer always have kept our down time at a minimum. And that's what counts.”

Thus quick Vögele America paver parts availability is a big plus for this paving contractor. “Parts availability has been real good,” Tharp says. “Normally we get parts overnight, especially if we know about the need before lunch. For the most part, we can get parts out of Pennsylvania overnight straight into here if they're not available in Raleigh or Charlotte.”

Vögele America staff showed MAC just how far they'd go even before he

purchased his new 880 RTB, when they repaired a long-standing problem with his older 1110 T while setting up the new machine.

"Prior to my buying the 880 RTB, I told them I was having steering problems with the 1110 T," Tharp says. "Bear in mind I bought the machine in 1996. They were not technically responsible, but said they weren't going to allow any problems. So while they were down here setting up the 880 RTB, they made the adjustments, ran the machine, and got it working like it was supposed to work before. It's good to know you've got people like that to rely on. That's the kind of thing a contractor is looking for when it comes to product support."

Access Means Success

Despite Tharp's experience, prior to his purchase of the 880 RTB, Tharp took a very close look at how the new ownership was improving the pavers from what he had experienced.

"I wanted to see major improvements over what the 880 T had," Tharp says. "That 880 RTB has major improvements which make it more user-friendly. Access to wear items has been improved. But in particular, access to pumps and drive motors for track has been improved, so they can be changed without having to crawl under the machine."

Tharp identifies these features of value:

- **Accessible pumps and motors.** The fact that the motors are so accessible is a tremendous benefit, Tharp says. "They're not in-board any more, they're out-board," he says. "That is a key thing for maintaining uptime. If a pump or track motor goes out, and you have a hopper full of asphalt, it's a lot easier to change from the outside instead of having to block the machine up and crawl under it in 100 deg F outside temperature, and 400 deg F in the hopper."
- **Steering wheel, not joystick.** Steering on the 880 RTB gives the owner confidence, he says. "This paver has a steering wheel, not a joystick," Tharp says. "Every time an operator would shift sides on a machine, he'd have to shift hands for steering, from left to right for example. I feel more comfortable with the steering wheel."
- **Compatible control consoles.** Also, MAC's 1110 T was already set up with controls that were compatible with the new 880 RTB. "The controls and console on the 1110 T were basically the same as on the new 880 RTB," Tharp says. "That means a lot when training or moving operators from machine to machine. And we do a considerable amount of switching of crews, depending on the application and who is available."
- **More-forgiving rubber tracks.** The rubber tracks of the 880 RTB also are of great value. "I like the 'rubber band' track," Tharp says. "I think it will give us more service and at the same time, perform better in a lot of areas that are environmentally sensitive along the sea coast. The 880 RTB will get in

and out with the least damage to the environment."

This also is of value when paving thinly surfaced areas such as parking lots, he says. "When you tie into a parking lot, you see worn asphalt where you begin work," Tharp says. "If you get in there with a heavier-tracked machine you will bust the existing pavement all to pieces, winding up with damage and liability. We get less of that with the rubber tracks."


For the new 880 RTB, MAC bought the standard [ES 814] Vögele America screed, hydraulically extendable from 8 to 14 feet. "We have top-of-the-line sonic controls," he says.

Helped Refine Today's Product

MAC helped fine-tune the paver line to create the B-Series pavers of today. "We helped them develop and troubleshoot the pavers as they came along," Tharp says. "When I bought the 880 T prior to our new paver, we traveled to Chambersburg, Pa., went through the factory, and showed them different points where we were having trouble in the field. We helped them refine their product and build a better paver."

Now, that 880 T bought in 1994 is MAC's oldest paver. "It's pushing 21,000 hours and we're still using it," Tharp says. "We changed one engine, and all else has been wear items and a few pumps."

Tharp notes additional technical improvements from the 880 T to 880 RTB, including fume exhaust system, and improved electronics. "It's a good technical update," Tharp says. "There are more bells and whistles that speed things up. There are more feed sensors and the sonics are upgraded to the point that the automatics are more effective. It takes a lot of worry out of what the operator and superintendent are doing."

MAC also uses the 1110 T. In June it had 3,700 hours of service. "It's a main-line, 10-to-20 [-foot screed] paver, which is why it has fewer hours on it. I use it primarily on roadway projects, and big resurfacings." 



Older MAC 1110 T places Superpave on private community golf course roadway north of Myrtle Beach



Wirtgen 2100s Speed Work, Bring Bonuses



Older 2100 DC mills deteriorated pavement in unincorporated Harris County

A major Houston-area road contractor is using its big Wirtgen W 2100 and 2100 DC cold milling machines to bring home the bacon and leverage bonus payments for early completion.

Angel Brothers Enterprises, Ltd., paves hot mix asphalt (HMA) and portland cement concrete (PCC), in addition to other business in the petrochemical industry. But it looks to its rugged W 2100 and older 2100 DC to cold mill tons of aged asphalt off Texas streets and highways, keeping critical projects moving and the firm in the black.

Most recently, for the Texas Department of Transportation (TexDOT), Angel Brothers executed a night project, the Katy Freeway (I-10 between Beltway 8 and I-610 West). Angel Brothers used both machines to tandem-mill 4 in. deep.

"The hours we could work were limited," said Glenn Angel, president, Angel Brothers Enterprises, Ltd., Baytown, Tex. "We could only close the freeway from 9 p.m. to 5 a.m., but we had both machines out at night and we finished the project ahead of schedule by 29 days." As a result, Angel Brothers enjoyed a substantial bonus payment for early completion.

A Diversified Contractor

Angel Brothers began in 1972, serving the oil industry. The firm diversified into fuels and construction and now is a major concrete and asphalt paver. "Today we own three asphalt plants, in Baytown, downtown Houston and one in Katy on the west side," Angel said. The firm has four asphalt pavers and employs about 250.

In addition to Glenn Angel, the firm is owned and operated by his brothers Greg and Gary Angel. "Our family name is associated with each project, and we make sure that the name 'Angel' means quality craftsmanship," Angel said.



Despite its size, W 2100 mills close to curb

"A big advantage of the Wirtgen machines is being able to replace tooth holders without a welder on the project... Now, changing tooth holders as often as you want is no longer a problem."



The majority of all work is done by Angel Brothers' own staff and equipment. "By minimizing the amount of subcontracting on a project, we remove many of the unknown elements that might prevent a project from being completed correctly and on time," he said.

Angel got into cold milling of asphalt in the early 1980s, Angel said. "The market changed in 81-82," Angel said. "Back in the 1970s, when we first started, cold mills weren't used that often. As they improved the market progressed."

In doing so they changed the way work was undertaken. "In Harris County [Tex.] we do a lot of reconstruction of two-lane asphalt roads and making them into boulevards," Angel said. "Digging them up with a backhoe did not cut it. Now we can mill them up and salvage the material."

Stable Four-Track Design

In the milder Houston climate Angel Brothers works the year around, so productivity and uptime are paramount. And one key to the W 2100's productivity is its four-track design.

"The W 2100 is a four-leg machine," Angel said. "We prefer four legs to the three-leg machines. In the areas in which we use them the four-legged machines serve our purposes better. We don't have to worry about them tipping over in unconsolidated soils."

"I've seen too many three-legged machines laid over," said George Jordan, Angel Brothers general superintendent. "But Wirtgen's been good in that regard."

The current machines are only the latest in a series of Wirtgens that Angel Brothers has purchased after moving from a competing brand. "Our first machine was a 40-inch mill, a VC 1000," Jordan said. "The Wirtgen was brought down for a demo and I fell in love with the machine. Despite the power it had, it was as quiet as it could be. Its production and horsepower was so much superior to what we had. And after we decided on the Wirtgen, all the other contractors started contacting me and now some of them have Wirtgens as well."

The DC has a 6 1/2-foot drum, and the WC 2100 has a 7 1/2-foot drum. "When you run a machine down the


highway, we can get a 12-foot lane in two passes," Jordan said. "If you have a shoulder to mill you can get the lane and the shoulder, too. That's why we want to run a little-bit wider machine for that. And if you put them both together, you can cut 14 feet at once. On several occasions we run them in tandem."

Keep Welder Off Job Sites

To keep their machines productive, Angel Brothers sticks with Wirtgen replacement teeth from Rhino Parts. "A big advantage of the Wirtgen machines is being able to replace tooth holders without a welder on the project," Jordan said. "When tooth holders were welded-in we tended to leave them in a little bit too long. Now, changing tooth holders as often as you want is no longer a problem."

"Any time you put a machine to chewing rock, you're going to need maintenance," Angel said. "But the maintenance required on both our Wirtgens is minimal compared to what we did with our previous machines. Also, when we need parts, Wirtgen is very good in terms of parts and product support. But very seldom do we have to send a mechanic out in the field for one of these mills."

But there's another part of it too, Angel said. "We do extensive preventive maintenance," he said. "When we get caught up with the mills, we will bring them into the shop to keep them in first class shape. That's why the oldest mill we have runs just as good as the newest."

To keep his mechanics on top of their game, he sends them to Wirtgen classroom training at Wirtgen Group North American headquarters in Nashville as needed. 



Angel's W 2100 mills Waugh Drive just west of downtown Houston



Separately steered 'legs' help W 2100 mill around concrete islands, enhance stability

About the W 2100

The new Model W 2100 surpasses its predecessor, the 2100 DC, in performance and profitability. The powerful 6-cylinder diesel engine with its impressive output of 630 hp allows the operator to steer easily. The W 2100 uses joysticks which are identical in design to the W 2000 and W 2200 machine models. The W 2100 has a cut width of 87 in and cut depth of 13 in. It has an operating speed of 180 fpm and operating weight of 78,945 lb.

Aggressive Paving Program Boosts San Antonio Streets

With a pavement management program as its guide, the City of San Antonio is improving streets and satisfying its citizen customers at an increasing pace.

San Antonio has "ramped up" its street maintenance and reconstruction program to a high level and is using its own fleet of asphalt pavers from Vögele America Inc. to expand its overlay program. As such it has one of the largest municipally owned paving programs in the country.

Keeping streets smooth and performing well is the city's fleet of three 1110 WB and two 1110 W asphalt pavers from Vögele America Inc., its WR 2500 reclaimer from Wirtgen America for full-depth base reclaiming, some cold milling machines, and eight 36-foot Etnyre Falcon live bottom trailers used to serve the pavers. This year the city has budgeted for another dozen trailers.

"By doing our own asphalt paving we can provide better customer service to our residents," said Frank Ramirez Jr., San Antonio Streets Superintendent. "It's a customer-related process that also helps ensure better quality in the actual placement of asphalt."

Program Seven Years Old

The City of San Antonio began its program in earnest about seven years ago, Ramirez said. "As more money became available for transportation infrastructure work, we were able to rise to the level where we are now," he said.

The city does this work on three levels: complete reconstruction, including removal and replacement of base and rebuilding of curbs; reclaiming and stabilization of streets with base failures; and conventional mill-and-overlays using city forces.

Much of the driving force for this ambitious program has not come from the "top down", so to speak, even as city executives have fully supported the street reconstruction effort. Instead, it came from the citizens themselves.

"The citizens have been the driving force," Ramirez said.

"The No. 1 request to their elected councilmen has been better streets, better sidewalks, better curbs, better infrastructure. And that's why we've escalated to where we are now, with the number of miles improved increasing each year."

Keeping this momentum going is the response the city gets from its citizens. "The citizens have come to prefer that the city rebuilds their streets," Ramirez said. "We are better able to cater to their needs. We work with the citizens, with disabled citizens, and with neighborhood associations to plan street improvements and prepare residents for the work. We work very closely with the community."

The key is communications. "Residents can pick up the phone and talk directly to me or my supervisors who are working in the field," he said. "It's a better communications structure."

Support At Executive Level

Support for this extensive force work program rises from citizen to elected representative, and thence to the executive office of Mayor Ed Garza, but also through the city Public Works Department headed by Tom Wendorf, P.E., streets operations manager Rocky Arranda, and assistant manager Robert Galindo.



San Antonio's WR 2500 reclaims residential street



Eighty percent of work is maintenance, including mill and overlay

"The support has always been there," Ramirez said. "But now our budget for street maintenance has been increasing yearly and we hope it will continue to rise."

About 80 percent of Ramirez' department's work is maintenance, including mill and overlay. "We also have a very strong reclamation program, where we go in to streets with poor profiles with our WR 2500 and reclaim the asphalt and base that is there while injecting asphalt emulsion," he said. "We put the street to line-and-grade and come back and pave. We reutilize everything that is there and bring very little in, eliminating hauling. We reclaim an average of 42 to 45 miles a year."

The city's procedure of street maintenance in previous decades all but forced the city's hand into the mill-and-overlay process. The city's former habit of "level-up and seal coat" left miles of streets with hidden curbs and poor drainage.

"We are working hard to maintain curb exposure," Ramirez said. This is even more important as the city does not have below-grade storm sewers for every street. Rain water may travel as many as three blocks before it will encounter a below-grade trunk line. "Our streets serve as the first part of our drainage system," Ramirez said.

Pavement Management System

A detailed pavement inventory and management system helps San Antonio plan its program years ahead and determine where the money can be best spent to preserve existing pavements.

"Our pavement management system grades our streets in condition between 100 and zero," Ramirez said. "Streets targeted for full-depth reclamation are those rated between 30 and 50 and sometimes look like a roller-coaster, with standing water and base failures." For significant base failures, the city will excavate and fill with asphalt millings before reclamation takes place.

Contractors Work, Too


Despite the city's active force work paving program, contractors are not shut out of the action. The city puts out at least \$9 million worth of resurfacing contracts each year, and also buys all of its asphalt from the private sector.

"It's impossible for us to do all of it," Ramirez said. "Right now we're almost maxed out as to the number of miles we can do, 351 lane miles each year, and we need our contractors to help out."

Serving San Antonio's paving needs is Cooper Equipment Company. "Cooper has done an outstanding job in keeping our pavers running," Ramirez said.

"They go out of the way to help

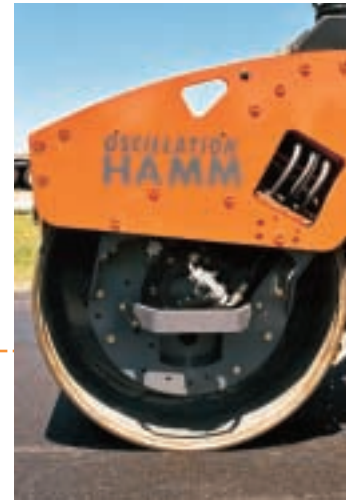
us. We maintain a contract with them to rent a machine if one of our five pavers goes down. And because we maintain the same line of Vögele America pavers, our operators are already trained to run that machine."

The city sticks with Vögele America pavers because they work well for them. "They're very durable and they're simple to run," Ramirez said. "Believe me, they're durable because we run the heck out of them. In San Antonio we can pave the year around and we run a lot of mix through those machines. Each machine will pave between 500 to a 1,000 tons per day. And our insulated live bottom pavers will help us pave on marginally cool days." 



San Antonio has five 1110 series pavers from Vögele America

Oscillation Compaction Boosts HMA For Bridge Decks



Oscillation technology now is available in North America only through the Hamm HD O90V

Nonaggressive oscillation compaction made possible the hot mix asphalt (HMA) overlays of two major bridges last year in Norway.

Asphalt contractors have long coveted the bridge resurfacing market, but have been stymied by specs which preclude use of vibratory compaction and its fast rate of compaction.

Now, oscillation compaction technology — new to North America and offered only on these shores in the new Hamm HD O90V — makes this market feasible for asphalt contractors.

The roller's oscillatory movement is generated inside the drum by two eccentric shafts. The result is a nonaggressive, horizontal, alternating shear force that helps achieve compaction up to 62 percent faster than with traditional vibratory compactors.

Not only do tests show that oscillation technology compacts faster, but it compacts more gently. That's of great use for compaction on bridge decks, concrete floors, as well as for hot mix asphalt mats on previously compacted subbase or asphalt mats.

Vibration Compaction Outlawed

To avoid structural damage to bridge structures and base courses, Norwegian law forbids the use of vibratory compaction on bridge surfaces. Traditionally, this is a job that has been charged to static or dead weight rollers.

But last year, a 20,591-lb. Hamm oscillatory tandem roller spearheaded the renovation of two bridges damaged by severe weather and ice in Tromso, Norway, north of the Arctic Circle, and 1,110 miles north of Oslo.

There, subzero temperatures, severe frosts, ice and the widespread use of spiked tires on cars and motor vehicles can reduce the life expectancy of even the most well-constructed road to a matter of months.

With temperatures regularly falling below -22 deg F in winter, bridge wearing courses generally last for just two years before they need to be renovated or replaced.

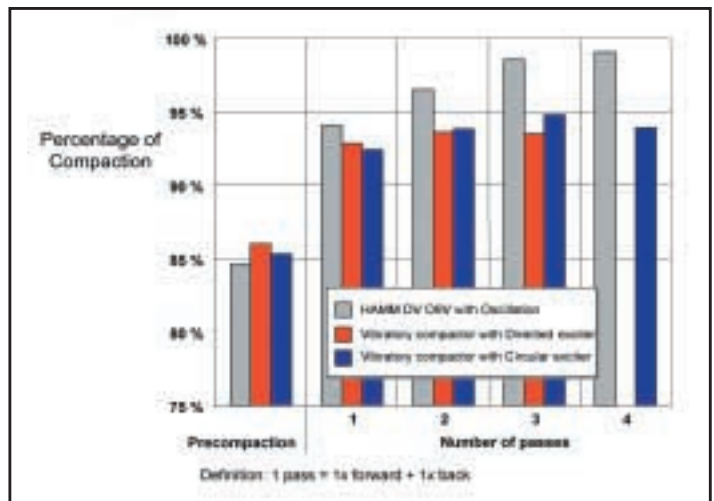
Last year contractor Kolo Veidekke worked on two individual contracts: the 0.75-mile-long Sandesundet Bridge that links Tromso to Kvaloya; and the 0.62-mile-long Tromso Bridge linking Tromso with neighboring Tromsdalen.

The Sandesundet Bridge is 23 feet wide and carries two lanes of traffic. To ensure minimum disruption, the renovation contract was carried out at night, although the 24 hours per day of "sunlight" made night work less difficult.

Oscillation Ideal For Job

The oscillatory compaction offered by the Hamm roller used on this job is ideally suited to this application.

Traditional vibratory compactors get compaction by "bouncing" on the ground. But the unique oscillatory system ensures that the roller drums maintain constant contact with the ground for faster compaction.



Comparative North American tests of oscillatory and vibratory compactors showed oscillatory machine achieved relative density in fewer passes than other machines



Nonaggressive oscillation compaction was used to place hot mix asphalt decks on major bridges in northern Norway; conventional vibration compaction not permitted on bridges by federal law

Utilizing two eccentric weights moving in the same direction, the unit produces a gentle kneading action that is transmitted downwards into the mat and also forwards and backwards for a wider compaction. The result is better compaction in fewer passes, with less vibration-related wear and tear on operators and surroundings.

Contractor supervisor Hans Henrik Hellandsjo said the oscillation compaction roller performed well on this testing contract.

“The Hamm machine has been achieving a density of 97 percent in four passes,” he said. “Thanks to the oscillatory system, compaction is achieved faster using less fuel while safeguarding the structure of the bridge.”

Hellandsjo also made special mention of the roller’s water spray system that performed well, despite the high winds on the bridge.

“The oscillation technology makes work easier and faster,” Hellandsjo said. “Because of the oscillatory compaction, it produces less vibration, eliminating damage to the bridge, reducing fuel consumption and extending the life of the machine itself.”

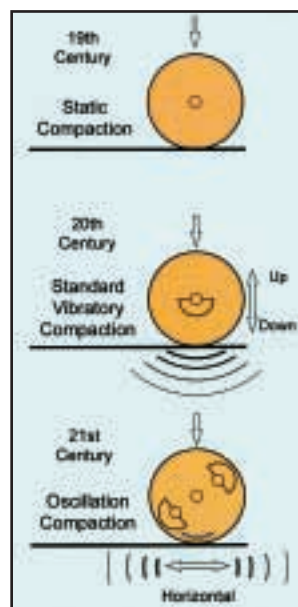
Oscillation Now In North America

On this side of the Atlantic, the new Hamm HD O90V oscillatory/vibratory roller makes this nonaggressive, exclusive compaction technology available to all of North America. More information about the HD O90V and Oscillation compaction will be found

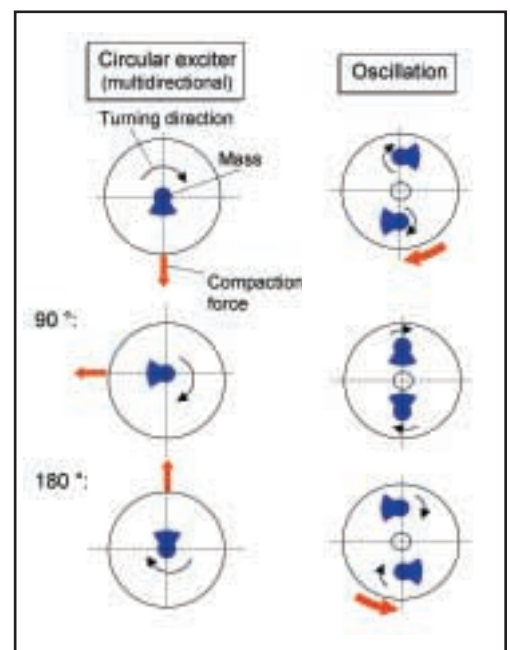
in the following article (pp 18-19).

In addition to its nonaggressive nature being ideal for compaction of HMA on bridge decks and around delicate or historic structures, oscillation compaction also can help contractors achieve optimal density without overcompaction.

Above all, as the Norway bridge contractor knows, the oscillatory compaction system provides the machine operator with total control over the type and degree of compaction.



Unique oscillatory compaction system keeps drums in constant contact with surface for faster, more effective compaction



Traditional vibratory compactors use an eccentric drive within drum

Kansas Contractors View Oscillation Compaction Of Superpave Mix

Kansas asphalt contractors got a glimpse of new, non-aggressive Superpave compaction technology when they visited a job site demonstration in Wichita in mid-May.

There, the Kansas Asphalt Pavement Association (KAPA) joined with its cosponsors Ritchie Paving & Construction Inc., and Hamm Compaction Div., Wirtgen America, Inc., to demonstrate new Oscillation compaction technology now being introduced to North America.

The machine — a Hamm HD O90V dual oscillation/vibration compactor — compacted a Superpave leveling course on an on-ramp to eastbound Kansas 96 at Ridge Road at the northwestern corner of Wichita on May 14.

"It is well established that increased compaction is of paramount importance in the longevity of HMA [hot mix asphalt] pavements," KAPA said. "This new-type compaction equipment is reported to be effective when used as an intermediate or finish roller in achieving increased compaction above that typically reached by use of vibrating and pneumatic compactors."

Kansas 96 is a high-level, dual-lane expressway built to Interstate standards. This project was an overlay of an existing pavement, on which a PG binder had been sprayed as a "scratch" course.

On it, a 45-mm (1.7-inch) Superpave leveling course, with PG 70-28 polymer-modified liquid asphalt binder with 1-inch top-sized aggregate was being placed. This intermediate course ultimately would be topped with a 25 mm PG-graded wearing course.

Breakdown compaction was being accomplished by a 24,910 lb., double-drum articulated roller, intermediate compaction by a pneumatic roller, and finish compaction with another 24,910-lb artic roller.

New Roller Does Work Of Two

However, on this project, the non-aggressive Oscillation compaction was achieving better compaction numbers, faster,

than the pneumatic and finish rollers combined. That prompted one contractor to observe that the one compactor could take the place of two.

"I've seen a significant difference in the [compaction] numbers," he said. "They're much higher than with the breakdown/pneumatic/finish rollers. We're getting better compaction with the breakdown and the Oscillation roller."

Compaction numbers were being checked with a Troxler 3411B density gauge. Numbers attained with the conventional, three-unit compaction train were 91 to 92.5 percent maximum. But with the HD O90V, compaction from 91 to 94.5 percent was being achieved with just two rollers.

"Non-aggressive, oscillatory compaction can achieve improved densities without breaking aggregate in the mix," said Mark Blessen, Wirtgen America regional sales manager. "It results in a smoother ride surface, because the drum never leaves the mat. Improved centerline and edge joint densities are obtained with Oscillatory compaction. And one roller can eliminate two on this job."

How Oscillation Compaction Works

The HD O90V has a conventional vibratory drum up front, while the rear uses the revolutionary Oscillation technology. Unlike traditional vibratory compactors that achieve compaction by "bouncing" the drum on the ground, the Oscillatory system uses a rocking motion that creates vertical and horizontal shear forces. The drum maintains constant contact with the surface for faster, more effective compaction.

The result is better compaction in fewer passes, with less



Hamm HD O90V compacts Superpave mix on ramp to Kansas 96 north of Wichita



Kansas contractors observe HD O90V at work



Density gauge indicated non-aggressive Oscillation compaction was achieving better compaction numbers, faster, than existing pneumatic and finish rollers combined

vibration-related wear and tear on operators and surroundings. Benefits also include an ability to compact at lower temperatures, improved operator comfort, and significantly longer machine life.

Our Hamm Compaction Division is the only manufacturer offering Oscillatory compaction in its rollers.

Optimal Density Levels

Achieving the optimal designed density level in HMA lifts requires precise control in the target density range, for example 95 to 96 percent. On many occasions conventional eccentric/vibratory machines will

“break-over” or “over-compact” in this critical target area, Hamm said. Control over the compaction process may be nearly impossible to achieve with the use of conventional vibrating machines in the intermediate and finish position.

Vibratory compactors now account for the majority of all compaction equipment sold worldwide, and for good reason. The vibratory system first developed in the late 1950s provides excellent results in both soil and asphalt applications.

Traditional vibratory compactors utilize an eccentric drive within the drum. Rotated at high speed, this causes the drum to vibrate, generating centrifugal forces from the drum to be passed down into the ground.

Oscillatory Much Different


The Oscillatory system is much different. In the oscillation drum, two masses turning in the same direction cause a movement around the drum axle. The movement changes its direction of effect during one turn so that it generates an oscillating or rocking movement of

the drum. On this occasion horizontal forces are transmitted from the drum into the pavement.

In recent North American comparative tests of an oscillation compactor against a vibratory compactor with conventional circular (multidirectional) exciter system, the Hamm Oscillatory machine achieved the required relative density in fewer passes than the other machines.

Working on asphalt, this Oscillatory technology can deliver more than 95 percent relative density, compared to less than 95 percent achieved by a traditional vibratory roller.

Improvement in compaction efficiency is only part of the story. When utilizing a circular or directed exciter system in an asphalt compaction application, over-compaction can result in the grain fragmentation of the stone. This does not happen with Oscillatory compaction.

The reduction in transmitted vibration also helps reduce wear on the machine and improves the working environment for the operator. Machine noise levels, both externally and at the operator’s station, are significantly reduced, as are the vibration levels felt within the operator’s working area. 

About the HD O90V Compactor

Hamm Compaction Division, Wirtgen America Inc., is introducing Oscillation compaction technology to North America via the HD O90V. The non-aggressive compaction technology was introduced at World of Asphalt ‘02 in Nashville.

The designation HD O90V signifies a hybrid roller of the Hamm HD 90 platform, in which the front has a conventional vibratory drum, and the rear incorporates the revolutionary Oscillatory technology.

With an operating weight of 20,172 lbs., this 66-inch, double-drum, articulated machine offers benefits in addition to its unique Oscillation technology.

The HD O90V features a hydrostatic dual-drum drive which is infinitely variable, front and rear visibility of 3 X 3 feet, and a full 150-degree swing-around and swiveling operator’s seat in an ergonomically designed operator’s compartment.

The intermittent spray system has manual override and is served by dual pumps and non-corroding polyethylene water tanks. All spray nozzles are clearly visible from the operator’s seat.

Its 3.5-inch drum offset to either side permits pinching of joints and increased rolling width. Service features include tiltable operator’s compartment for easy service access. There is excellent visibility to both drums as well as all spray nozzles, an emergency braking system, and a maintenance-free articulated steering system.

Kits, Dealer Programs Ease Compactor Maintenance Programming

Prepackaged preventive maintenance kits — or, alternatively, dealer service programs — can go a long way in providing needed preventive maintenance for your asphalt rollers.

Asphalt compactors operate in an extreme, abusive climate and often work long hours at odd times of the day. Often the only times they are available for servicing is when work has ceased for the day and employees have gone home.

Many times rollers are not serviced or inspected until they fail, and expensive repairs are needed. Then, equipment downtime is faced at exactly the wrong time. Lack of maintenance also can shorten the longevity of these valuable assets and impact resale value.

But purchase and maintenance of lube and repair trucks, and hiring of the personnel who run them, can be a significant expense that impacts a contractor's bottom line.

Fortunately, a number of options are available to asphalt contractors who find it difficult to program roller maintenance.

- Prepackaged preventive maintenance kits for use at 50-, 250-, 500-, 750- and 1,000-hour intervals — like those available from Hamm Compaction Division of Wirtgen America, Inc. — can greatly simplify periodic roller maintenance.
- And dealer-implemented preventive maintenance plans — like the Hamm Power Plus Preventive Maintenance Program — can alleviate a great deal of these expenditures while putting periodic maintenance in the hands of trained technicians.

Kits Simplify Maintenance

Contractors are finding prepackaged kits are solving problems because they take a lot of the guesswork out of what hardware and materials are needed at a specific maintenance interval.

For example, the Hamm kit provided after the first 50

hours replaces extremely fine fluid filters that collect abrasive material accumulated during the initial break-in.

Later, kits used at 250-hour intervals include engine and air filter replacement parts. Kits for the 500-hour service interval include engine, air, steering and hydraulic filter parts. Another 250-hour kit would be used at 750 hours. Hamm's 1,000-hour kits include the preceding, plus belt replacement parts. Of course, fluids must be replaced at each interval as well.

Filters are an important part of the kits. Compactor work is done in a very dirty environment. "Contractors need to replace the air filters regularly, not just blow them out with an air hose," said Kenny Mitchell, customer service manager, Hamm Compaction Division.

"Blowing them out loosens particles inside the canister, which can fall into the air intake of the engine and dust it,"



Hamm HD 130 is serviced easily using prepackaged preventive maintenance kit

Mitchell said. "Blasting them with an air hose also can tear the fabric, which also allows particles to get through. Saving a couple of dollars on air filters can significantly shorten the life of their machine."

Fuel filters also are critical maintenance items, because they remove water and contaminants from fuel which could damage fuel injectors. "If injectors are damaged, sometimes they will let too much fuel in, which will burn a hole in the top of the piston," Mitchell said. "Bypassing the two hours it takes to perform a standard service can risk shutting the machine down for weeks, or forever. The amount of time of service is minute compared to the potential time of repairs."

Dealer Maintenance Programs

But kits and filters may not be the answer for contractors without the personnel or the capability of performing self-maintenance. Instead, they can rely on dealer personnel to provide periodic maintenance on a scheduled basis.


"Most contractors don't have time to take their machines out of a job site and take it in to a distributor for maintenance service, as we would do for our car," Mitchell said. "That's why most dealers have lube trucks they send out with trained technicians to perform services."

Hamm has refined its Power Plus Preventive Maintenance Program to help dealership maintenance programs match the individual needs of its specific contractor customers. "Dealers put together a maintenance plan that is tailor-made for a contractor's service needs," Mitchell said. "These plans are formulated for any length of time and can be arranged at time of purchase, or for existing rollers in the fleet."

Maintain Lesser-Used Machines, Too

Periodic maintenance of compactors is important even when machines aren't used so frequently, such as with soil compactors.

"A machine might have been used only a couple of hundred hours in a year, and an owner may decide it hasn't been used enough to bring it to 250 hours, or whatever the service interval is," Mitchell said. "But compactors that sit a lot get condensation built up in the hydraulic tanks, and this can go through the system and create a lot of damage to the components.

"The condensation will break down the viscosity of the oil," Mitchell said. "Also, the tolerances and clearances of the components is so small that water can cause damage such as cavitation in pumps and motors. This can be a major problem when machines are started up in spring without having been serviced." 



Kit for 250-hour interval include engine and air filter replacement parts



Engine, air, steering and hydraulic filters are part of the 500-hour kit



Hamm's 1,000-hour kit includes 500-hour parts plus belt replacement parts

Smaller Mill Keeps Water Rolling In St. Pete



St. Petersburg's W 1000 L keeps water flowing and neighborhoods drained

A municipally owned Wirtgen W 1000 L is helping a Florida city optimize stormwater drainage, as well as improve pavements.

Situated on the west coast of Tampa Bay, St. Petersburg, Fla. is subject to the onslaught of thunderstorms that strike the area each year. The Tampa Bay area annually logs more thunderstorms and lightning strikes than any other metro area, to the point that the local National Hockey League team is named the Tampa Bay Lightning.

As a result, storm water control in this flat, coastal terrain is a critical issue, but the city's W 1000 L helps keep water flowing and neighborhoods drained.

"Our motto is to give excellent customer service and to help city agencies preserve their budgets through finding new ways to get the work done," said Jerry Fortney, supervisor, engineering/stormwater/pavement maintenance, City of St. Petersburg, Fla.

With its 40-in-wide cut, the W 1000 L is used extensively to shape drainage areas and improve streetside drainage




Here, St. Pete's mill removes compacted RAP from city-owned stockpile area under overpass

through curb reveal. "We profile our runoff areas," Fortney said. "We set up grades for conveyance of water along the streets. It's very critical because with our high water table and excessive rains, we need to do everything we can to keep the water moving."

Also, when it comes to utility work, St. Pete prefers to use the W 1000 L ahead of time and preclude the chance of a utility's not working up to city standards. "With the W 1000 L we have been able to profile utility cuts," Fortney said. "Rather than the utility go in with a backhoe that's going to tear the asphalt out in big chunks, we will go in and physically mill the area out for them down to the base, then recycle the asphalt."

St. Pete retains the millings and uses them as base and for maintenance of its approximately 3,000 unimproved alleys, where the millings knit together and suppress dust while standing up to refuse trucks. "Asphalt millings are very precious to us," he said.

"Wirtgen was the only manufacturer who met the specs in the price range we needed," Fortney said. "Our unit can load trucks as fast as a big machine can, and travels as fast as a big machine can. It lets us go out and do a lot of the work that you can't get local contractors to bid for. In order to serve customer needs and support our other departments we've had to increase our equipment capabilities. And our Wirtgen mill is part of that." 

Tight Urban Quarters No Straitjacket For Ontario's Gazzola



Gazzola's W 2100 mills Wellesley St. in downtown Toronto

"In an urban environment, the safety and the stability of the four-leg machine far outweighs its lack of maneuverability on very tight cul-de-sacs."

Jammed traffic, gesturing policemen, gaping pedestrians, bicyclists, rumbling streetcars, tight quarters, and in the middle of it all, a big 36-tonne (78,945 lb) asphalt cold milling machine with a 2.1-meter (6 ft, 7 in) drum.

No problem, that's what we like, says long-time Toronto-area road contractor Gazzola Paving Limited, Etobicoke, Ontario.

Gazzola specializes in cold milling the busy urban streets of Toronto, and quick placement of asphalt overlay. In early May, as

the construction season began, it was doing just that on Wellesley St. between Church and Yonge Sts. in downtown Toronto. "It's a perfect example of 80 percent of the work we do," said Vern Gazzola, vice president.

Celebrated Golden Anniversary

A year ago July, the firm's president Mark Gazzola joined with Vern Gazzola to celebrate the firm's golden anniversary. Friends and families were invited to a big outdoor celebration, including static equipment display, live music and rides for children.

Its founder, Virginio Gazzola, came to these shores in 1925 as part of the great Italian immigration to Toronto. What is now Gazzola Paving began in 1952 as a landscaping business that quickly evolved into a paving business as customers asked for asphalt drive-

ways to complement their new landscaping designs.

More recently, Gazzola constructed the Front Street pavements and streetscaping around Toronto's Metro Convention Centre; roads and streetscapes around the Toronto Skydome; and the massive runway 15L-33R at Toronto's Lester B. Pearson International Airport.

And during the winter Gazzola Paving keeps operators and equipment busy by undertaking urban street snow removal for various local governments.

Urban Milling Bread And Butter

But urban cold milling and asphalt



W 2100 is Gazzola's second 2100

overlays remain Gazzola Paving's bread and butter. "You could not work any deeper into the city than we do," Gazzola said.

"We had to have our own milling machine as part of our paving operations," he said. "If we don't have the milling, we can't do the paving." The firm's current W 2100 from Wirtgen America, Inc. is its second 2100; the first was traded in on the current model with more than 7,000 hours on the drum, and at least 9,000 hours on the unit altogether.

Owning its own cold milling machine — instead of relying on a milling sub — permits Gazzola Paving to respond on short notice to jobs that come up.

One such sudden, quick project in May was work on two day's notice for milling and paving on the Don Valley Parkway and Gardiner Expressway in metro Toronto. "We were able to do it on short notice because we had our own milling machine," Gazzola said. "They needed the answer in an hour. We were able to give it to them over the phone."

The firm does a lot of subcontract work for prime contractors, including bridge contractors. "We provide the total package to a prime, both milling and paving," Gazzola said. These projects may not be big packages, only 60 to 600 tonnes, and may come on very short notice. "With the availability of our milling machine, we have complete control over the project," he said.

Wellesley Street Renewal

The featured project on Wellesley St. was one such subcontract. "We are subcontractors to a concrete general contractor, Pav-Tar Construction Co. Ltd.," Gazzola said. "It's a 40 mm mill, and they will adjust the catch basins before placing 47 mm surface course. It's among high-rise buildings, with steady traffic, right downtown, an arterial that is very narrow, with two driving lanes and two parking lanes."

Typically Gazzola will be able to do an average of 4,000 to 6,000 m³ on less cluttered city streets, and 10,000 to 12,000 on high-volume expressway applications.

The firm can average 600 mt per day of paving on tight urban streets, and up to 2,000 mt per day on highway work, using a shuttle buggy material transfer vehicle (MTV) and two pavers. However, the tight urban quarters sometimes restricts use of the MTV on those projects. "If we use it, sometimes we have to leave the machine down on Front Street and drive it up to the job site," Gazzola said.

For this project, up to 900 mt of hot mix asphalt were to be placed. The mix contains 3/8-inch trap rock aggregate with manufactured and natural sand. "It's a conventional surface course, but with a high-quality, durable stone," Gazzola said.

Big Machine At Home In City

While other contractors balk at the size of the W 2100 for tight quarters urban work — it is Wirtgen Group's second-largest cold milling machine — Gazzola feels it's just right for its mission, so much so that the current machine is their second model owned.

Its power and stability on four tracks make it the machine of choice over smaller machines for time-pressed urban work, Gazzola said. Only in very tight cul-de-sacs would he consid-

er a different machine.

"But that's the least of our worries," he said. "In an urban environment, the safety and the stability of the four-leg machine far outweighs its lack of maneuverability on very tight cul-de-sacs. And that's the only place we see any difference."

The new W 2100 design has a 2.2-meter (7-ft, 2-in) -wide drum in lieu of Gazzola's 2.1 meters, and this has solved the tight cul-de-sac problem, Wirtgen reports.

Gazzola also has a Wirtgen W 500, the second-smallest cold milling machine in that line. This is used for close quarters work, cutting around manholes, and cutting longitudinal rumble strips to enhance traffic safety.

Finding Reuse Of RAP

An ongoing challenge to Gazzola is how to market its reclaimed asphalt pavement (RAP). Stringent guidelines on materials restrict its use from high-stability, high-performance asphalt mixes, such as the Superpave mix designs being applied to arterial and expressways in the region.

However, municipalities outside metro Toronto accept RAP in a variety of mixes. Despite that, the RAP still accumulates in large stockpiles. "It's a major problem," Gazzola said. "Only a maximum 30 percent RAP is going back into mixes, so we have a 70 percent surplus. We are able to sell some of it to homeowners for use with landscaping."

In-place foamed or expanded asphalt offers an option for in-place recycling of RAP without its extraction, he said, but the process is just now receiving exposure in southern Ontario.

About the Wirtgen W 2100

The Wirtgen Model W 2100 is the successor to the venerable 2100 DC. Its powerful 6-cylinder diesel engine, with its impressive output of 630 hp, allows the operator to easily steer during milling operations.

The W 2100 uses control joysticks which are identical in design to the W 2000 and W 2200 machine models. A maximum milling depth of up to 32 cm (12.6 inches) provides deep cuts.

In 2003, a cutter width of 2.2 meters (7 ft, 2 in) is standard in North America, but optional cutter widths of 2.5 meters (8 ft, 4 in) and 2.8 meters (9 ft, 2 in) make high production milling possible in only one pass.

The 2.2-meter cutter drum allows for a right-hand side cutter offset that gives the W 2100 the ability to cut around any cul-de-sac.



W 2100 is stable, productive and maneuverable in urban environment

Easy-Change FCS Cutters Give Speed, Versatility To Milling Contractors

A new concept of interchangeable, different-width cutter drums for asphalt cold milling machines is providing road contractors and government agencies tremendous versatility in undertaking different milling projects with one machine.

The Flexible Cutter System (FCS) from Wirtgen America, Inc. was introduced to North America at last year's Conexpo/ConAgg '02, and is providing North American contractors with enhanced cold milling machine performance. The unique system permits operators to change drums of different working widths — with tool holders fitted — in less than four hours on the job site.

Flexibility in choosing between different working widths while milling has been a desire of every milling machine operator. This is now possible via the new FCS, which permits relatively fast drum changes for not only Wirtgen Group cold milling machines of the 1 meter-wide class, but also the largest Wirtgen cold milling machines.

The "heart" of the FCS is a drum assembly which can be equipped with milling drums of different working widths. As with the standard machines, the FCS milling drum is driven via a mechanical belt drive.

To change, a hinged side plate covering the drum housing is removed, revealing the existing drum, which is then removed by means of an extraction device. The existing drum is placed on a mounting trolley and pulled out of the housing.



FCS with drum width of 24 inches at work on W 1200 F

A different width drum is then wheeled into place using a trolley, the adjustable scraper blade is reconfigured, and the machine is ready to go.

The customer benefits

from the increased flexibility offered by the modular concept of the FCS. The individual milling drums can be used in six machine models, provided their milling width is suitable for the machine in question. Regardless of the working width of the individual milling drum installed, the "zero clearance" side is always on the right side of the machine. All FCS milling drums are equipped with the patented and convenient Wirtgen fast-change tool holder system HT3, designed to minimize wear and tear of cutting tools and tool holders.

Benefits Small To Large Models

FCS milling drums with working widths from 1 to 4 ft. for models W 1000 F and W 1200 F are available, as are drums in widths from 2 to 6.6 ft. for the new W 1500, W 1900 and the existing W 2000. A variety of smaller FCS drums for the W 600DC is available.

And for 2003, the Flexible Cutter System is available on Wirtgen's largest machine, the W 2200. The high-horsepower, high-production W 2200 lets contractors or government agencies mill large projects in surprisingly short periods of time.

Wirtgen's design engineers have produced a machine with a standard cutting width of 86.6 in. (7 ft., 2 in.), four large D-6 crawler tracks, a milling drum with a high-efficiency mechanical belt drive, and a reclaimed asphalt pavement (RAP) front-loading system on a unit that is both compact and easy to operate.

But the 7-ft.-2 drum is only the start of cutter options for this machine. The FCS provides the widest drum available on the market at 14 ft., 2 in. For the W 2200, in addition to those minimum and maximum drum sizes, drums are available in 8-ft.-2, 9-ft.-8, 11-ft.-5, and 12-ft.-5-in. sizes. Its maximum milling depth of 13.7 inches (350 mm) means that entire pavements can be removed at a single pass.

Cutter Drum Critical

Because the cutter drum is the critical part of a cold milling machine, versatility and durability there will enhance the bottom line of a contractor's or government agency's balance sheet.

"The definition of a first-class milling machine is an extremely well designed cutter, mounted to something that propels it," said Stu Murray, president, Wirtgen America, Inc.

"When you get beyond the cutter, all cold milling machine makers provide tracks, conveyors, grade control and diesel engines," Murray said. "Over the last 30 years we've continually built and refined the design of our cutters and today Wirtgen is the only manufacturer who designs and builds 100 percent of its cutter components."

That's important because cutter maintenance is the most costly element of owning a milling machine during the typical five- to seven-year period.

Now, the unique FCS is the next permutation of cutter technology. "The Flexible Cutter System takes cutter engineering to a higher plateau for the W 600, W 1000, W 1200, W 1500, W 1900, W 2000 and W 2200 platforms," Murray said. "The W 2200 is the biggest, heaviest full-lane milling machine on the market today."

Moreover, the drums can be interchanged among larger-sized machines. "The fact that these cutters interchange between a W 1200, W 1900 and W 2000 gives an owner the greatest amount of flexibility, unknown in the rest of the industry," Murray said. "He or she can own different size machines and interchange the same cutter drums."

Evolved From Combo Cutter

While the technology for the existing FCS was developed for the wider line of milling machines by Wirtgen GmbH in Germany, the concept originated right here in the United States. It's an adapta-

tion to a higher level of the original Combo Cutter developed by Wirtgen America and its partners, and introduced in 1993.

The original Combo Cutter was available for the venerable Wirtgen Model 1900 DC. While the Combo Cutter was available only on the 1900, the new FCS is available on six different models.

Challenged by the need for a drum that would allow it to quickly change widths as the projects required, BOCA Construction, Norwalk, Ohio, worked with Wirtgen America, Inc., who in turn worked with a local fabricator to develop the 1900 Combo as it was later known.

BOCA purchased its 1900 DC in the early 1990s as it sought to get into the road widening business. "At that time the machines — including Wirtgen — had heads set up for individual widths," said Michael J. Bockrath, BOCA president. "And in order to go from one width to the other you had to physically remove the whole head or housing, and put a new head and housing back in."

This was not acceptable to BOCA,

which needed something which could be changed in the field, whether bolt-on or not. "We purchased the 1900 with a 30-inch head, and Wirtgen pledged that it would work with us to provide a bolt-on, or quick-change system, that would allow fast head changes in the field," Bockrath said.

BOCA worked with Wirtgen and its fabricator, Fabriweld, to develop the Combo head as it's called today, with bolt-on sections that can be easily removed in the field.

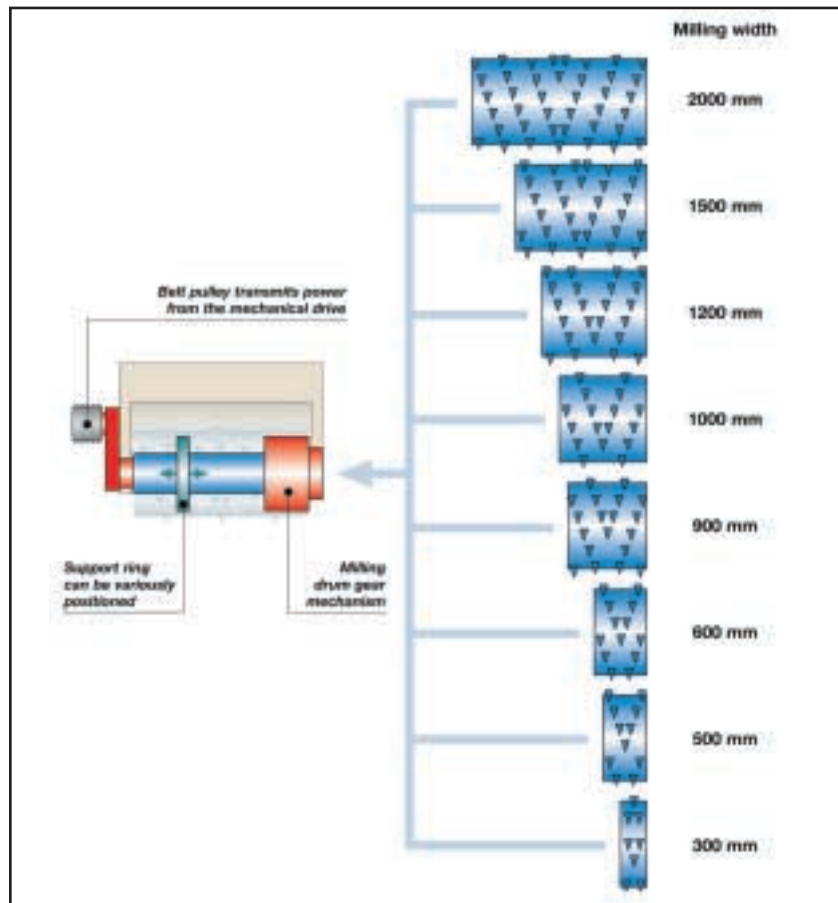
Scraper Blade Integral Part

All Flexible Cutter System milling drum units are equipped with a special scraper blade to ensure that all of the milled material is loaded onto the conveyor system, even at a milling depth of up to 1 ft.

The right section of the patented two-piece scraper blade is located behind the milling drum, sealing off the working area in a conventional way. During the milling operation, the left section simply slides on the existing pavement.

When a different FCS drum is installed, the scraper blade is simply adjusted to the new working width. The scraper blade is designed so that each of its sections can be lifted hydraulically and independent from the other, making sure that all of the milled material is loaded at all times, regardless of milling width and depth.

For the contractor, fast milling drum exchange means increased profitability when using milling drums with different working widths. The design of the FCS permits qualified personnel to exchange the milling drum, with tool holders fitted, within 3 to 5 hours' time.



The FCS drum assembly can be equipped with milling drums of different working widths; The "zero clearance" side is always on the right side of the machine



FCS Speeds Shoulder Cuts For Edge Drain



Charbon's 12-in FCS drum gets quick tooth change in field



"The W 1200 F with tracks has very low ground pressure and you can do full depth repairs without making a bigger mess than you started with."

A Flexible Cutter System (FCS) is providing new flexibility to a major Midsouth road and bridge contractor.

Among its other machines, Madisonville, Ky.-based Charbon Contracting owns three Wirtgen cold milling machines, a big W 2200, a W 600 DC with Rumbler II used for rumble strip installation, and his W 1200 F with FCS installed. "We build bridges, culverts and heavy concrete construction within 60 miles of our headquarters," said Steve McCoy, Charbon president.


And this summer, on the scenic West Kentucky Parkway, just west of Beaver Dam, Ky., Charbon was using his W 1200 F with FCS to rapidly cut a 12-in-wide trench, 10 in deep.

"We'll do 355,000 feet and are averaging over four miles a day in a 10-hour day," McCoy said. "We're going to do outside shoulders for four days, and the prime contractor will finish his work on the outside. He'll switch and close the inside lanes, and we'll come back and do four miles of the inside."

The FCS 12-in drum was cutting asphalt right along the existing concrete pavement, which had a 4-in asphalt overlay. "We're exposing the edge of the concrete prior to placement of a new edge drain," he said.

Charbon's existing machines could not cut 1-ft deep, he said, which made the W 1200 F attractive. "We knew there was a market for it, and we bought the machine with 4-ft drum and the 1-ft drum," McCoy said. "The boys all love it. We use the 4-ft mode when cutting bridge ends, and this is our second job in the 1-ft mode."

Changing the drums takes about three hours, McCoy said. "That's acceptable to me," he said. "It's pretty quick, although we like the machine back in the yard for the change. It would take too long to do in the field."

McCoy also uses the W 1200 F for parking lot repair where a bigger machine might do damage, he said. "The W 1200 F with tracks has very low ground pressure and you can do full depth repairs without making a bigger mess than you started with." 



W 1200 F of Charbon Contracting uses 12-in FCS drum to cut edge drain trench

Cement Integral Part Of Foamed Asphalt Mix



Dry portland cement is added to pavement in advance of in-place cold recycling using foamed asphalt at Canyon de Chelly National Monument



Existing deep crack is repaired by in-place stabilization, all the way to road foundation

Portland cement was an integral part of an in-place, cold-recycled road project in scenic Canyon de Chelly National Monument in Arizona last March.

This environmentally sensitive project rehabilitated in-place sections of the Lodge Access Road, and from the North Rim Drive, access roads to Ledge Ruin, Antelope House, Massacre Cave and Mummy Cave overlooks, and from the South Rim Road, access road to Sliding House Overlook.

In this recycling, 1 percent cement complemented 3 percent foamed asphalt (also called foamed bitumen) to further strengthen the recycled base, reducing the depth of costly hot mix asphalt (HMA) overlay that otherwise would have been required, or eliminating its need altogether.

Of a total of about 17.6 lane miles, approximately 29,550 sq yds were recycled to a depth of 5 inches, and 79,350 sq yds were recycled to a depth of 8 inches.

Canyon de Chelly National Monument (pronounced “dee-shay”) includes a staggering variety of precipitous red sandstone cliffs, which form a labyrinth of canyons leading to the central Canyon de Chelly. The canyon is under the authority of the Navajo Tribe and falls within the Navajo Reservation. It also contains ruins from other native American tribes.

Because the monument falls under federal management, the Federal Highway Administration (FHWA) Central Federal Lands Office acted as project administrator and manager.

In this historic and scenic setting, a parade of haul trucks removing demolition materials — and bringing in virgin aggregate and pavement — would have been extremely disruptive and costly, especially given the exclusively tourist traffic through the monument. Under these circumstances, in-place reclamation and stabilization was a “natural” choice.



Expansion ratio and half-life of asphalt foam is checked prior to start of in-place cold recycling at Canyon de Chelly National Monument

Cement And Foamed Asphalt

Foamed asphalt is a new, cost-effective way of stabilizing road bases that is garnering much attention among contractors and the owning government agency level.

Foamed or “expanded” asphalt (also called bitumen) is created by carefully injecting a predetermined amount of cold water into hot penetration-grade liquid asphalt in the mixing chamber of a pavement remixing unit, and offers a cost-effective alternate for road base stabilization.

A certain percentage of fine material is required for adequate dispersal of the foamed asphalt. If fines are not available in the existing base, portland cement often is added to enhance fine material content and boost strength.

All these materials can be processed in-place by milling and crushing the existing pavement structure — while incorporating foamed asphalt — using an in-place pavement recycler such as the WR 2500 (now WR 2500 S) from Wirtgen America, Inc.

Precise addition of water allows control of the rate of asphalt expansion and the amount of expansion. The expanded asphalt has a resulting high surface area available for bonding with the aggregate, leading to a stable road base using the existing in-place materials.

The benefit is substantial cost savings over use of asphalt emulsions for base stabilization, and complete elimination of the cure or “break” period. The foamed base then is graded and compacted, and can permit traffic — including heavy trucks — almost immediately.

For best results, an optimal mix design must be obtained before field work begins. That can be determined using a portable lab such as the Wirtgen WLB 10, which lets contractors, engineers or government agencies pre-test materials and determine how much, if any, cement may be required to get optimum foaming in advance of a job or preparing a proposal.

Correcting Existing Pavements

A pavement investigation showed that the roads’ subgrade consisted of mainly clayey sands and silts, with the South Rim Drive primarily a 4-in. bituminous base and chip seal on silty sand subgrade, while the North Rim Drive a 6.3-inch chip seal and bituminous base on sandy clay subgrade.

The foamed asphalt mix designs were intended to utilize as much of the existing pavement material as possible, thereby reducing or eliminating the HMA overlay requirement.

For the South Rim Drive, existing materials required that



Heart of the in-place cold recycling train, the Wirtgen WR 2500 (center) pushes liquid asphalt tanker (left) while pulling water tanker (right) while in-place cold recycling pavement using 1 percent dry portland cement and 3.0 percent foamed asphalt

the 4-inch intermediate base and chip seal be recycled, foam asphalt-stabilized base to a depth of 5 inches, to be topped with a thin, 2-inch HMA overlay.

The North Rim Drive, however, did not require an overlay. Instead, the 6.3-inch base and chip seal was recycled and foam asphalt-stabilized to a depth of nearly 8 inches (200 mm), and was to be topped with a chip seal as per standard specs.

Testing in the Wirtgen WLB 10 portable lab using actual cores from the construction sites included

foamed asphalt added to representative samples of each design, at 2.0, 2.5, 3.0 and 3.5 percent foamed asphalt by mass, but with 1 percent cement.

The cement was included to increase the percentage dust (fraction passing the #200 sieve), which is critical for the proper dispersion of the foamed asphalt.

These tests determined an optimum foamed asphalt content of 3 percent for the South Rim Drive, and 2.5 percent for the North Rim Drive, both with 1 percent dry portland cement.

Applying Cement, Foamed Asphalt

In general, the process at Canyon de Chelly National Monument mirrored other foamed asphalt applications. Prior to recycling, all vegetation was cleared from roadsides using a motor grader.

Then, as specified in the mix design, 1 percent cement was spread on the existing pavement. In the meantime, sample foamed asphalt was taken from a side test nozzle on the WR 2500 to check its expansion ratio and half life of foam. When the right criteria were achieved, in-place recycling began.

The WR 2500 recycler, liquid asphalt supply tanker, and water tanker comprised the recycling train. The recycler pushes the asphalt tanker and pulls the water truck.

In one pass, the pavement was pulverized, with 1 percent cement mixed in; these materials foamed and correct moisture added for compaction; and required depth maintained.

A vibrating padfoot compactor followed immediately behind the recycling train, followed by motor grader cutting the recycled material to required levels. A steel drum vibrating compactor followed the grader, compacting to required densities. Then, these completed sections got an additional light watering prior to finish rolling with a pneumatic roller, which brought fines to the surface, and providing a tight surface on which traffic could run immediately.

Final HMA and chip seal courses were placed later, but the road could remain open prior to their application.



In Catskills, Foamed Asphalt Is A Natural



WR 2500 S can pulverize and foam reclaimed pavement in one pass, although Ulster County prefers to pulverize first, then foam



Ulster County foam-recycles over 20 miles of pavement each year; liquid asphalt is provided by tanker at right and water from tanker off margin at left

*“Citizens stay happy,
and when taxpayers
are happy, that
makes us happy and
helps us do our job
better and faster.”*

Foamed asphalt is a “natural” for rural Ulster County, N.Y., where the local economy depends on unimpeded tourist traffic to Ulster’s scenic Catskill Mountains north of New York City.

This process — now gaining popularity across North America — lets Ulster County keep its roads open to local and tourist traffic while they undergo complete recycling and stabilization as base material prior to overlay.

Excessive, weeks-long truck traffic, demolition material and virgin aggregate hauling, noise, dust and commotion are eliminated, and a virtually new, high-performance road base is created at a fraction of the cost of new base materials and deep lifts of asphalt pavements.

In-place recycling of rural roads with foamed asphalt lets Ulster County reconstruct far more roads each season than would otherwise be possible, letting precious road dollars go farther. This is even more important as Ulster is undergoing a residential boomlet as urbanites bypass New York City’s suburbs to build year-round homes there to escape the hectic urban life.

And the minimal environmental impact of in-place recycling means less disruption to tourists and outdoorsmen who come to Ulster County for its quiet

peaks, deep woods, and cold lakes and streams.

Keep The Roads Open

“Our policy is to try not to close the road under construction,” said John Lukaszewski, field operations manager, County of Ulster Public Works, Department of Highways & Bridges, Kingston, N.Y. “It’s a public safety issue. Sometimes we have to temporarily close a road, but the notification procedure is involved and we’d rather keep it open.”

Foamed asphalt gives Ulster County that option. “All traffic can continue as normal, with a little bit of delay, that’s all,” Lukaszewski said. “Citizens stay happy, and when taxpayers are happy, that makes us happy and helps us do our job better and faster.”

“In the long run this process saves tax dollars,” said Ulster County Commissioner of Highways & Bridges James Donahue. “It provides a great sub-base, and anything we’ll put on top will last that much longer, with much longer-term savings over the years. And the road stays open for residents, deliveries and emergency vehicles.”

Ulster County has been using foamed asphalt for at least five years, but has been doing road reclamation and recycling for about 16 years. “We’ve had a nice outcome with foamed asphalt,” Lukaszewski said. “Instead of having to put an asphalt binder down, it gives us our binder in-place, and we just have to

come back and top with a clean 1-in. top-size blacktop, 3 inches deep."

That first foamed asphalt job has held up well, he said. "It's a fairly high-volume road for us, about 5,000 vpd. It's done very well and we're really happy with it."

No Dedicated Road Fund

Being a rural county, Ulster lacks a strong tax base. Road and bridge expenditures come from the county's general fund — with some federal assistance — and thus compete with other worthy needs. The county maintains about 900 lane miles of roads, for a population of 140,000. The county needs to save money without cutting corners wherever it can, and foamed asphalt does the trick.

"The savings with foamed asphalt are enormous," Lukaszewski said. "We'd have to dig up and get rid of the material, and truck material back in. On a project like this one, we're saving hundreds of thousands of dollars. Economically it fits the bill. Money is the big issue. If you don't have the money, you can't do the work. So we work with what we have."

The county now reclaims and foams in excess of 20 miles each year. "We've tried liquid calcium chloride stabilization, and it does a good job, but it's kind of a mess," Lukaszewski said. "It's good for dust, and stabilizes clay somewhat, but people don't like to hear you're using calcium chloride in rural areas where they depend on wells."

What Is Foamed Asphalt?

Foamed, or expanded asphalt offers new options for contractors and state and local road agencies to undertake economical base stabilization.

Low-cost foamed asphalt technology stabilizes and improves the performance of existing road materials, producing high quality base courses and cold mixes at the lowest possible cost.

The expanded asphalt has a resulting high surface area available for bonding with the aggregate, leading to a stable road base using 100 percent of the existing in-place materials.

Excessive Heaving

Due to the abundance of glacial-deposited clays, Ulster County's roads suffer from major expansion of clay road bases. "The clay causes excessive heaving," Lukaszewski said. "Because of that, on a lot of roads we won't use blacktop, instead using a cold mix material we call Motorpave, which is very flexible and won't break down. If it heaves, traffic puts it back in its place as soon as the frost is gone."

Motorpave is a cold stone mix



On Blue Mountain Road, liquid asphalt is added as foam at a rate of 2.5 percent per volume of reclaimed material

blended with hot CMS-2 medium-set emulsion, mixed in a traveling pugmill on-site and placed through a screed. It's an update of the old "mix-in-place" method, Lukaszewski said, of stone placed on-grade and windrowed down the middle by motor graders.

The windrow would be shot with oil, mixed back and forth with the graders, then laid out, wet-rolled, chipped with fine stone, and rolled again. "That was the pavement," Lukaszewski said. "Instead of mixing in place, now it's done in a machine. Traffic continues to flow and it works well for us."

Blue Mountain Road

In summer 2003, Ulster was using contractor Reclamation Incorporated, West Hurley, N.Y., to foam-stabilize cracked and potholed Blue Mountain Road (County Road 35), a two-mile project. The road also suffered from excessive bleeding, the result of decades' worth of band-aid, chip-seal surface treatments.

Like other county rebuilds, the 22-foot-wide road was being reclaimed to a depth of 8 inches, with 4-inches of foam stabilization, bladed, compacted and topped with the 3-inch Motorpave thin lift. For the foam, liquid asphalt was being injected at a rate of 2.5 percent and no fines, cement or lime was being added. Shoulders were to be placed in some sections. The Motorpave mix was to be placed by contractor Peckham Materials, Kingston, N.Y.

"Reclaiming is saving municipalities thousands of dollars in removal costs," said Michael B. Haggerty, marketing director, Reclamation Incorporated. "By our recycling the existing pavement, and then stabilizing it, and creating a structure that is close to a new hot mix asphalt pavement, we only have to put a minimal structure on top, saving our customers money in the long run."

Foamed asphalt has become a significant market for Reclamation, Haggerty said. "Foamed asphalt has really come to light in the last five years. This year [2003] is our eighth season doing foamed and it's become a big market for us. It's a quick-curing product and we can pave on it the next day. It's more weather-resilient than other stabilization processes. It fits the bill for us."



Compacted foamed base can support loads as heavy as concrete mixers immediately, while road stays open to traffic

Wirtgen America Hosts Open House For World Of Asphalt Delegates

If the world came to Wirtgen Group's Recycling Days in September 2002, it made a return visit to Wirtgen America Inc. in Nashville in March 2003.

That's because Wirtgen Group's North American operating companies — Wirtgen America, Hamm Compaction Division, and Vögele America Inc. — together hosted nearly 700 visitors and employees at a spectacular open house at Wirtgen America's modern headquarters in suburban Nashville on Monday, March 17, 2003.

The open house was held on the occasion of the opening of the World of Asphalt 2003 Show and Conference March 18-20 in downtown Nashville. This exposition featured 177 exhibitors spread over 48,800 square feet, and drew over 3,800 asphalt industry delegates from 38 countries.

At World of Asphalt 2003, the exciting new Hamm HD O90V tandem roller with oscillation and vibration was introduced to the North American asphalt paving industry. This 20,172 lb -



operating weight compactor now is appearing on job sites in North America, and is especially well suited for new demands of the Superpave markets in the United States.

Through the HD O90V roller, Hamm Compaction Division is actively promoting Hamm's time-proven, unique Oscillation technology to a new type of "quality-first" customers in North America.



At World of Asphalt stand, Tom Sanders, Rhino Parts sales manager, explains why genuine Wirtgen replacement parts are best

Also exhibited at World of Asphalt were:

- * Hamm HD 130. This double-drum roller, with operating weight of 30,430 lb, has center-point articulation, which appeals to the North American contractor. It's the largest Hamm asphalt compactor sold in the United States
- Vögele America Inc.'s 1110 RTB asphalt paver. With a 10-foot minimum paving width, the versatile 1110 RTB is designed to meet North American customer demands with features such as the highest roading speed available in a track unit, outstanding control and the smoothest ride. Manufactured in Chambersburg, Pa., it's the largest rubber-tracked asphalt paver from Vögele America.
- Vögele America's HS 1020B heavy-duty screed, mounted on the 1110 RTB. This hydraulically extendable screed provides superior mat density and smoothness based on a unique, heavy box frame design. When mounted on Vögele America's U.S.-made 1010 WB, 1110 WB and 1110 RTB asphalt pavers, the HS 1020B delivers paving widths from 10 feet to 19 feet, 6 inches hydraulically, and up to 25 feet, 6 inches with fixed extensions.
 - Wirtgen W 1900 cold milling machine
 - Wirtgen W 1200 F cold milling machine, and
 - Wirtgen W 500 cold milling machine.

As appealing as World of Asphalt was, the preceding night's Open House at Wirtgen America no doubt was more agreeable to World of Asphalt delegates and friends of Wirtgen Group.

Delegates arrived by chartered bus from convention hotels and directly from the Nashville Convention Center, where they entered Wirtgen America's impressive headquarters beneath an archway made of two conveyors of Wirtgen W 1900 and W 2000 cold milling machines facing each other.

From the entrance they filed through Wirtgen America's new offices and concluded their tour in the vast service bays, where they enjoyed genuine Tennessee barbecue, live country music from Dan England and the Western Swingers, draft American beers and Warsteiner.

During and after dinner delegates wandered outdoors, where they viewed nearly the entire Wirtgen, Hamm and Vögele America line of mobile equipment on display under bright lights.

Of special interest was the big new Wirtgen Recycler WR 2500 S — first to be displayed in North America — and the new Hamm HD O90V, whose oscillating or "rocking" compaction was demonstrated using color liquids beneath the drums.

The nearly 700 guests and employees consumed 12 half-barrel kegs of draft beer, each holding 58.7 liters, for a total of 704 liters (186 gallons) of beer. In addition, 132 one-liter bottles of wine were enjoyed, along with 550 lb of barbecued meat,

▲
W 1900 (foreground), and W 2000 cold milling machines formed triumphal arch for visitors to Wirtgen America Open House

including piquant "pulled" pork and sliced grilled sausage, served with barbeque beans, boiled new potatoes, green beans and dessert.

After dinner service, Wirtgen America Inc. president Stu Murray welcomed the delegates and described Wirtgen Group's philosophy in North America.

"Our three product lines affirm Wirtgen Group's single-source position as the provider of the world's most technologically advanced, durable and profitable road construction and maintenance equipment," Murray said. From Nashville, Wirtgen America manages distribution and provides post-sale support in North America for Wirtgen asphalt recycling equipment, Hamm asphalt and base compactors, and from Chambersburg, Pa., Vögele America asphalt pavers.

Wirtgen America's ultramodern office, distribution and service facility is located in southeast suburban Nashville. This \$4 million, 74,000-square foot facility was constructed in 2000 and dedicated Feb. 27, 2001.

Total office space of the new headquarters — including administration, board room, training center, conference rooms, and warehouse offices — total nearly 16,000 square feet on two levels. The structure includes 9,900 square feet of 60-foot clear-span shop.

The parts warehouse is 38,000 square feet in size, and is enhanced by a 20-foot clear minimum height. Mezzanines within the warehouse provide even more space, to a total of approximately 50,000 square feet on two levels.



Traditional Southern barbeque dinner was featured

Contractors examine 880 RTB from Vögele America, Inc.



Visitors can't wait to get their hands on Hamm product

Dan England and the Western Swingers performed in the Country Music Capital of the World



Nearly 700 guests and employees were served in Wirtgen America's maintenance shop



Big W 2200 draws customer prospects



Daisy Construction Marks 30th Anniversary

Wirtgen America salutes Daisy Construction Company on the occasion of its 30th anniversary in May.

Leonard Iacono, president of the Newcastle, Dela.-based company, founded Daisy in 1973. The company was known as Daisy Concrete at that time. Today the company has diversified into three divisions and now includes site development, infrastructure utilities, heavy/highway construction, and asphalt and concrete paving.

Daisy works in southeastern Pennsylvania, and the states of Delaware and Maryland. Among its fleet of mobile equipment is a Wirtgen W 2000 and a 1900 DC. For more information, visit Daisy at <http://www.daisyconstruction.com>.

New WR 2500 S Boosts Performance Of Proven WR 2500

The big, new WR 2500 S Road Reclaimer and Soil Stabilizer from Wirtgen America, Inc. is a next-generation successor to the proven Model WR 2500.

The "S" in the WR 2500 S stands for "Super", because the WR 2500 S is a beefed-up, higher performing version of the existing WR 2500.

In addition to its high performance as a full-depth base recycler of failed road pavements and as a soil and base stabilizer, like its predecessor, the WR 2500 S when equipped for foamed or expanded asphalt can be used to make a foamed asphalt-stabilized base, with significant savings and base performance improvements for the owner and contractor.

Among the improvements of the WR 2500 S over the WR 2500:

- A new fuel injection system in the 12-cylinder Mercedes engine boosts engine power from 455 to 500 kW (610 to 670 hp). The engine now meets EPA Tier II regulations.
- A redesigned, reinforced cutter drum housing includes multiple wear plate inserts to minimize wear. The cutter drum has been redesigned to include bolt-on end rings, which are easier to service.
- Cooling air routing has been reversed, improving cooling performance, operator comfort, and ambient particulate levels. The engine now rests in a newly enclosed com-

partment. And a new dual-cyclonic air pre-cleaner will result in an extended service life for the air filtration system.

- Exhaust emissions are redirected toward the rear of the machine and away from groundmen.
- The operator's compartment has a larger air conditioning capacity, with increased visibility despite a reduced glass surface area. A second seat has been added. And the ergonomic control panel has been redesigned, including a height-adjustable, multifunction computer graphics display which helps the operator visualize and control functions such as steering, drum door position, and emulsion injection system.
- The area work lighting system has been placed in a bar integrated with the operator's compartment roof for a cleaner and safer performance.

Its diesel engine powers a 96-inch-wide by 20-inch-deep cutting rotor, making it a true, high-horsepower deep-cutting heavyweight. Its two-frame design allows the WR 2500 S to retain the very important "floating hood" concept, allowing an expanded volume of material to pass freely through the process without creating a "friction brake" effect on the cutter and cutter drive components.

Material size is controlled by using hydraulically adjustable, manganese-lined breaker bars that can be remotely adjusted by the machine operator to tighten or close down the area between the rotating cutter and the impact bars, a scheme used for decades by the aggregate crushing industry.

Its Type III holder system allows quick and easy replacement of broken or worn-out cutter bit toolholders without the inconvenience and added cost of a cutting torch and welder. Drum rebuilding can be executed in one day by two workers without removal of the cutter.

For more information about the WR 2500 S, contact Wirtgen America, Inc. at 615.501.0600, fax 615.501.0691, <http://www.wirtgen.com>.



WR 2500 S is successor to WR 2500



KMA 200 is permit-free recycling plant

New KMA 200 Cold Recycling Plant Comes To Your Site

The new, emission-free KMA 200 portable cold mixing plant from Wirtgen America Inc. is the recycling plant which comes to your site and operates without emission permits.

The KMA 200 builds on the successes of its predecessor, the KMA 150. It will mix 200 tph of cold mix asphalt without emissions, and therefore doesn't need EPA permits.

The KMA 200 is a highly mobile, 200-tph plant which can make several types of high quality, high strength asphalt blend products. All virgin materials can be processed using emulsions or foamed asphalt. These mixes can incorporate lime, cement, polymer additives, fly ash and other materials to enhance strength and performance.

Its remarkable features include the improved arrangement of its individual machine components over the KMA 150, and the fully diesel-hydraulic drive of all components.

The heart of the KMA 200 is a completely modified, low-wear, twin-shaft continuous mixer, allowing a mixing capacity of 200 tph. The mixing plant is driven by a powerful diesel engine with an output of 175 hp.

To ensure an ample supply of water, the capacity of the KMA 200 integrated water tank has been increased by 50 percent, to 1,188 gallons.

Operating convenience and operating safety were high among the KMA 200 design elements. An operator station cabin is available for the mixing plant, protecting the plant operator from the weather and allowing an optimum view of the mixer and the loading area.

The precise sequence of the mixing process and all cold mix recipes are easily monitored and controlled by the Cockpit Graphics Center (CGC), an exceptionally user-friendly operating and control panel.

Grids on top of the material hoppers can be folded hydraulically to facilitate cleaning. Folding ramps on the sides of the material hoppers protect the plant from being contaminated.

The KMA 200 is powerful when in operation, but can be completely transported on its low-loader trailer. The loading conveyor is simply folded for transport, and the operator's cabin is slewed into its transport position at the end of the low-loader.

For more information about the KMA 200, contact Wirtgen America, Inc. at 615.501.0600, fax 615.501.0691, <http://www.wirtgengroup.com>.

Wirtgen Supports Racing Against Cancer



In 2003 Wirtgen America Inc. has emerged as a strong supporter of Racing Against Cancer (RAC), a motorsports-grounded, non-profit organization dedicated to the raising of funds for cancer research, patient services, youth tobacco educational programs, and awareness.

Since 1996, Race Against Cancer volunteers and donors have generated over \$200,000 to fight cancer through the American Cancer Society.

Its support for RAC overlaps perfectly with Wirtgen's motorsports involvement. In addition to other activities in professional motorsports racing, in the 2003 season, Wirtgen America sponsored two midget cars within the Northeastern Midget Association (NEMA), and is 2003 NEMA's title sponsor. The cars are owned by S&S Racing and are driven by Bobby Santos and his sister, Erica Santos.

As a supporter of RAC, Wirtgen America joins with the many efforts of NEMA racing teams to raise money to fight the disease through contributions to the American Cancer Society. "Wirtgen America not only sponsors the two cars, but we participate in fundraising events as well as making contributions to the RAC fund," said Stu Murray, president of Wirtgen America.

Wirtgen marketing strategy has utilized motorsports for 10 years, most notably in the ultra-competitive World of Outlaws. WOO champions Danny Lasoski and Mark Kinser have carried the Wirtgen banner. "NEMA appears to be a perfect vehicle to expand our marketing program into the Northeast," Murray said.

Wirtgen is a sponsor of NEMA's premier event, the Boston Louie Memorial Classic, and has a long relationship with the Marlboro, Mass.-based Spirit of Boston USAC Silver Crown team driven by the legendary Bentley Warren.

For more information about Racing Against Cancer, visit www.racingagaincancer.com. For more information about NEMA and midget car racing, visit www.nemaracing.com.



Bobby Santos drives Wirtgen-sponsored car in Northeastern Midget Association (NEMA) competition



Vögele
**Virginia SMA Placement Requires
Special Care, Specialized Paver**

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Wirtgen
**Wirtgen 2100s Speed Work,
Bring Bonuses**

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Hamm
**Kits, Dealer Programs Ease
Compactor Maintenance Programming**

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