



A PUBLICATION OF FP² INC.

SPRING 2021

PAVEMENT PRESERVATION *JOURNAL*



INSIDE:

NDRM GOES VIRTUAL

PAVEMENT REPAIRS

PAVEMENT REPAIRS

ASPHALT RECYCLING

THINK OUTSIDE THE TOOLBOX

At Ergon, we're developing innovative ways to help you stretch your budget and treat more miles in your network. Our growing family of products provides the options you need to expand your toolbox and maximize impact on your roads.

Contact our experts today to learn more about the right tools, for the right roads, at the right time.

go.ergon.com/toolbox



 **Ergon Asphalt
& Emulsions, Inc.**

ergonasphalt.com

eFog
REJUVENATING
FOG SEAL

eTac HB
HOT-APPLIED BOND COAT

ePatch
HIGH-PERFORMANCE
COLD MIX

ePrime
ECO-FRIENDLY
PRIME COAT

eFlex ES
PREMIUM SLURRY SEAL

eFog HP
HIGH-PERFORMANCE
FOG SEAL

eScrub
REJUVENATING
CHIP SEAL

eTac
TRACKLESS
BOND COAT

eFlex
PREMIUM
MICRO SURFACING



PAVEMENT SPECIALISTS



MICRO SURFACING

SLURRY SEAL

FIBER SEAL

ASPHALT RUBBER

CHIP SEAL

CAPE SEAL

CRACK SEAL



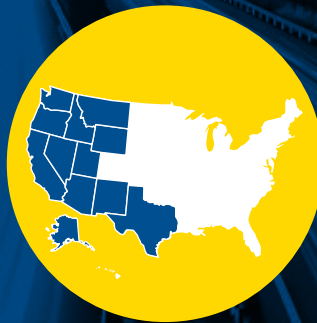
CONSTRUCTION OFFICES:

3785 Channel Drive
West Sacramento, CA 95691
916.373.1500

6751 W. Galveston Street
Chandler, AZ 85226
480.940.9690

MACROPAVER:

13024 Lake Road
Hickman, CA 95323
209.874.2719



PROUDLY SERVING
THE WESTERN
UNITED STATES

EMULSION PLANT LOCATIONS:

Redding, California
530.241.1364

West Sacramento, California
916.373.1500

Bakersfield, California
661.323.5904

Free Estimates • 1.800.748.6551 • vssiestimating@slurry.com • www.slurry.com

Macropaver • 1.209.874.2357 • sales@macropaver.com • www.macropaver.com

Crack Seal Essential Roadways!



Route



Clean



Seal

Spring season is an ideal time to crack seal because pavement cracks are at their mid-point and temperatures are moderate. Studies by the National Center for Asphalt Technology found that crack sealing is proven to extend pavement life for good, fair and poor pavement conditions.

1

Prepare cracks with a Crafcro Router

Placing Crafcro high-quality sealant into a routed reservoir provides a solution proven to double sealant service life vs. non-routed and sealed cracks — making the most of your investment. The Crafcro Pavement Router, Self-Propelled with Dust Control™ prepares cracks responsibly, keeping respirable dust and silica exposures below Occupational Exposure Limits (OELs).

2

Clean routed cracks using the Crafcro Crack-Vac™

The Crack-Vac is uniquely designed to be the most effective at cleaning cracks. It removes dirt and debris from pavement cracks, virtually dust-free, with compressed air, ensuring proper preparation. The Crafcro Crack-Vac reduces respirable dust and silica exposure, achieving the industry's lowest OELs.

3

Melt and apply sealant with Crafcro Melters

Awarded ROADS & BRIDGES magazine's "Contractor's Choice" for 7 years running, the Crafcro Super Shot™ melter is a model of quality, durability, safety, ease of use and productivity.

Crafcro achieved the longest pavement sealant service life in the industry! - Cracks sealed using Crafcro high-quality sealants have been proven to extend sealant service life to more than 7 years in AC and 21 years in PCC pavements.**

NON-ROUTED
Simple Band-Aid
Configuration

44.5*
MONTHS
SEALANT
SERVICE LIFE

ROUTED
Standard
Recessed
Band-Aid

94.5*
MONTHS
SEALANT
SERVICE LIFE

*Data on file

Sourcewell
Formerly NUPA

Awarded Contract

Contract # 052417-CFC

CRAFCO®
INC
PRESERVATION PRODUCTS PAVEMENT
Delivering Confidence Through Innovation, Quality and Value Since 1976

1-800-528-8242 • sales@crafcro.com • crafcro.com



Dedicated to preserving America's roads

At BASF, we are committed to helping our customers create roads that are safer, long lasting, and more cost effective. We are proud to support the essential pavement industry throughout America with chemistries that preserve our roads for tomorrow.

Connect with us:

Explore our solutions
www.basf.com/asphalt

Subscribe | Insights
www.insights.basf.com

contents

A PUBLICATION OF FP² INC. | SPRING 2021

PAVEMENT PRESERVATION JOURNAL

Features

- 10** ENJOY VIRTUAL NPPC21 NOW AT NO COST
- 12** HEAVY VISITATION, ENVIRONMENTAL NEEDS COMPLICATE GRAND CANYON PRESERVATION WORK
- 16** HOW 'TOOLBOX OF TECHNIQUES' DRIVES TOWN OF WOODSTOCK'S PCI HIGHER
- 22** PPRA, FHWA PRESERVATION WEBINARS FOCUS ON COLD IN-PLACE, CENTRAL PLANT RECYCLING
- 27** FOUR 'Cs' WILL MAKE 2021 A YEAR OF IMPROVEMENT FOR AGENCIES
- 29** BENEFITS OF LONG-TERM DATA COLLECTION
- 31** 2021: 'BUILD BACK BETTER' INFRASTRUCTURE PLAN
- 34** SMOG-EATING SURFACE TREATMENTS CAN LEAD TO COOLER CITIES
- 37** STATE, CITY DOTs STUDY PENETRATING 'REGENERATOR'
- 41** OGFCs, MOISTURE, STRIPPING DAMAGE STUDIED
- 42** ASPHALT PAVEMENT INDUSTRY REMAINS TOP RECYCLER OF MATERIALS IN TERMS OF WEIGHT

Column

- 9** PRESIDENT'S MESSAGE

Also

- 45** INDEX TO ADVERTISERS



On the Cover: Micro surfacing is placed on Hopi Point Road on South Rim of Grand Canyon, see article Page 12

PHOTO CREDIT: VSS INTERNATIONAL

Pavement Preservation Journal is published for FP² Inc., (512) 970-8865, www.fp2.org, Editor: Tom Kuennen, (262) 618-4819, expwys@expresswaysonline.com. Opinions expressed herein are those of the authors and not necessarily those of FP² Inc., its directors or staff.

Published for FP² by **NAYLOR** ASSOCIATION SOLUTIONS 1430 Spring Hill Road, 6th Floor, McLean, VA 22102, (800) 369-6220, www.naylor.com, Publisher: Heather Greyling, Project Manager: Adam Lingenfelter, Content Strategist: Geneva Toddy, Advertising Sales Representatives: Paul Walley (Director), Norbert Musial and Leron Owens, Project Coordinator: Cindy Samons, Design: Mahender Veer

©2021 Naylor, LLC. All rights reserved. The contents of this publication may not be reproduced by any means, in whole or in part, without the prior written consent of the publisher.
PUBLISHED MARCH 2021/FPP-Q0121/5353

COMMITTED TO OUR INDUSTRY

JUST LIKE YOU

Over 60 years of experience, five labs across the globe, and a team of industry-leading chemists and civil engineers. All dedicated to innovating emulsions for asphalt pavement preservation. This commitment led us to develop a respected portfolio of preservation products. It drives our continued support of the industry. And it enables us to transform your toughest paving challenges into successful solutions.

Learn more:

INGEVITY.COM

INDULIN® | PERAL® | ONYX®

 **ingevity**

Meet the Sponsors Who Make Possible

CORPORATE SPONSORS



SPONSORING ASSOCIATIONS



ABOUT FP² INC.

FP² Inc. is a non-profit trade association organized under the Internal Revenue Code Section 501(c)6, and is supported by the pavement preservation industry, contractors, material suppliers and equipment manufacturers.

Formerly known as the Foundation for Pavement Preservation, FP² supports the adoption of pavement preservation at all levels of government, and works to ensure that pavement preservation becomes a part of road programs from coast-to-coast. It also supports valuable research in pavement preservation, and works in close cooperation with the Federal Highway Administration (FHWA), the National Center for Pavement Preservation (NCPPI), and regional pavement preservation partnerships and state-based pavement preservation centers.

FP² also sponsors key promotional activity events, such as international and national pavement preservation conferences. It supports distribution of promotional information to support pavement preservation, such as brochures and the quarterly magazine *Pavement Preservation Journal*.

Please consider joining the leading-edge businesses and national associations above in making a financial commitment to the future of pavement preservation by supporting FP². For more information, contact executive director Jim Moulthrop, P.E. (PA, AZ), (512) 979-8865, jimmoulthrop@gmail.com.

Harrawood New President of FP²

BY TIM HARRAWOOD

President, FP² Inc.

I would like to introduce myself as the incoming president of FP². I am proud to serve you during my two-year term and look forward to advancing all pavement preservation disciplines to benefit all stakeholders from agencies to industry, and ultimately, the end user.

I have had the opportunity to work with outgoing FP² president **Scott Bergkamp** for a couple of decades now, and I can say without hesitation, it has been a pleasure. Scott has always put forth a tremendous amount of effort to further the causes of pavement preservation and that is evident in the initiatives that he has championed over the past two years while at the helm of FP². I sincerely thank him for his service.

If the acceptance of pavement preservation concepts by agencies across this great nation can be judged by the recent involvement in the International Slurry Surfacing Association's **Slurry Systems Workshop** in January 2021, we can assume that FP²'s message is being well received. The vast majority—more than 70 percent of the 985 registrants—were agency personnel. This marked the first-ever virtual workshop for ISSA, and boasts the largest number of registrations to date. Congratulations, ISSA!

The first-ever pavement preservation session was added to the **Association of Modified Asphalt Producers** annual conference Feb 9-12. The session was moderated by Jim Moulthrop, FP²'s executive director, and the presentations covered the definition of pavement preservation, integrating preservation into pavement management programs, site selection and preservation treatments commonly used to improve the condition and extend the life of flexible pavements. A panel discussion followed the session.

May 17-21 marks the dates for the virtual **National Pavement Preservation Conference**. This conference is the third in a series of conferences that offers something for every stakeholder associated with pavement preservation. The virtual platform is still new to us all, but the agenda is full of informative presentations and affords everyone the ability to network with others. For more information or to register see this issue's feature article Page 10.

TIM'S PRESERVATION BACKGROUND

Tim is very familiar with preservation surface treatments as he manages the Southern Contracting Division of **Vance Brothers, Inc.** The division's area of operation includes Alabama, Louisiana, Mississippi, Tennessee, Arkansas and Oklahoma.

He started in the slurry seal and micro surfacing industry 35 years ago in Little Rock, Ark. He's been involved in the installation and placement of slurry seals and micro surfacings in multiple states, but also several Central American countries. He's served on numerous International Slurry Surfacing Association committees and chaired the ISSA's Slurry Systems Workshop for seven years.

He served on the ISSA board of directors for eight years, and was president of the International Slurry Surfacing Association

in 2010. He was chairman of the ISSA **Technical Marketing/ Webinar and Web-Based Training** committee, which produced three web-based training modules through a cooperative agreement with the Federal Highway Administration (FHWA) and ISSA. Tim returned to the board of directors of ISSA in 2018 and serves on the committee tasked with the updating of the *ISSA Design and Inspection Manual* due to be published in 2021.

His term as president of FP² follows his work as vice president there, and he sits on the committee that helped design and implement the ongoing **Preservation Group Study** at the National Center for Asphalt Technology (NCAT) at Auburn University for the southern tier of states, since expanded to MnROAD in the northern tier of states. In addition to aiding in the development of this study, Vance Brothers construction crews were chosen to install all of the emulsified asphalt treatments at both locations.

He looks forward to putting his experience to work for you, the stakeholders of pavement preservation and of FP². Please reach out to Tim and let him know how all of us can boost pavement preservation in this new decade, and spread the gospel of preservation to new audiences and new generations.




Enjoy Virtual NPPC21 Now at No Cost

BY JUDITH CORLEY-LAY, P.E.

The National Pavement Preservation Conference (NPPC) planned for Indianapolis this year now will be a virtual event and will be held May 17-21, 2021.

The change to a virtual event was determined after a national survey of state and provincial agencies regarding travel restrictions during Spring 2021. That survey showed that only a handful of agencies were likely to approve travel to a face-to-face meeting in the spring.

Therefore, there will be no registration fee, to encourage as many state and local agency participants as possible.

As you may know, TSP•2 pavement partnerships held a very successful series of webinars in 2020 and learned two big benefits of the virtual environment (these presentations are archived and may be streamed from link at fp2.org/webinars).

State participation was much greater than at our in-person meetings and local agency participation was also much higher. While we miss the networking opportunities of a face-to-face meeting, we are building on these two benefits of virtual meetings in planning the virtual NPPC. **There will be no charge to attend any or all the sessions, encouraging larger participations from state, provincial and local governments.**

The work of the Executive Committee and the Technical Committee is being used for the virtual meeting. The theme remains *Pavement Preservation: Making the Right Choices*. And much of the technical content came directly from the intended program developed by a committee led by Larry Galehouse. We offer a big **Thank You** to all the participants!

LIVE EVENT IN 2023

Another committee, the Field Demonstration Committee, developed a great plan to include an equipment parade, pre-constructed demonstrations and live demonstrations. We will put that plan back into action at the next face-to-face NPPC, to be held in Indianapolis, Ind., in 2023.

The virtual conference will consist of nine webinars, with two webinars per day Monday through Thursday, and one morning session on Friday. Morning sessions begin at 11 am EDT to accommodate all continental U.S. time zones. Afternoon sessions begin at 2:30 pm EDT. Sessions will last 120 to 135 minutes. Continuing education units will be provided to attendees of each webinar session. Sessions may include up to two case studies of five minutes each related to the session content by conference sponsors. The table

below outlines the draft content for all the sessions.

We are in the process of confirming all the speakers. As soon as that is complete, the webinars will be scheduled, and that process will provide the registration links. All the information will be posted on the NPPC website, and a link to that website will also be available on the pavement preservation section of the TSP•2 website: <https://tsp2pavement.pavementpreservation.org>, and at fp2.org.

We will be sending information to national and regional partnership industry supporters about opportunities to sponsor the national conference, and to participate by providing either a case study or an equipment slideshow for one of the preservation treatments.

Each of the regional partnerships will have a two-hour regional meeting during the week following the national conference. Content for those meetings will include the annual business meeting and may include state reports, a panel discussion or a technical topic of interest to the partnership. Links to the regional meetings will be posted on the TSP•2 website by mid-March. 

Corley-Lay is director, National Center for Pavement Preservation

Date	Begin Time	Session Title	Content
May 17	11 am EDT	Opening	TSP2 Program and Welcome, FP ² Update, FHWA Preservation Initiatives, Keynote Address by Carlos Bracerias
May 17	2:30 pm EDT	Equipment and Placement	Control systems, Equipment for quality projects for common preservation treatments
May 18	11 am EDT	Pavement Preservation Basics	Keys to Program Success, Asphalt Treatments, Concrete Treatments, Using Data to Make Decisions
May 18	2:30 pm EDT	Asphalt Emulsions	Emulsions 101, Modifiers, Manufacturing, Sampling and Testing, Handling and Laydown
May 19	11 am EDT	Concrete Pavement Preservation	Partial Depth Patching, Full Depth Patching, Joint Resealing, Dowel Bar Retrofit, Diamond Grinding
May 19	2:30 pm EDT	Pavement Recycling	Project Selection, Hot in Place, Cold in Place, Cold Central Plant Recycling, RAP Stockpile Best Practices
May 20	11 am EDT	Preservation Research	NCAT/MnROAD performance studies, recent NCHRP projects, cracking definitions study, advances in 3-D imaging, performance related specification for asphalt emulsions.
May 20	2:30 pm EDT	Training, Certification and Accreditation	Knowledge books, TSP2 Certification Updates, AASHTO laboratory accreditation, and training programs in Kentucky and California.
May 21	11 am EDT	Local Agency Approaches	Integrating preservation into local programs, Impact and value for municipalities, counties and local agencies, Process for building a successful local program

NPPC21 Session Schedule



How do you resurface an aging road,
protect the environment, plus save
time and money?

Call Gallagher.

We'll show you how to dramatically reduce your pavement resurfacing program's budget, and do your part to help protect the environment.

Hot In-Place Recycling (HIR) is not only a very green process that reduces the carbon footprint by 28% versus mill and overlay, it also reduces congestion and user delays with far less trucking required.



Gallagher Asphalt Corporation

18100 S. Indiana Avenue
Thornton, IL 60476

800.536.7160

hotinplacerecycling.com

Heavy Visitation, Environmental Needs Complicate Grand Canyon Preservation Work

BY JEFF ROBERTS, MATTHEW FERGUSON AND SAYED HEKMATULLAH

During summer 2020, a multi-million-dollar contract to preserve 132.8 lane miles of road and 93 parking lot and vista pavements within Grand Canyon National Park was completed, saving taxpayers more than \$6 million in future reconstruction costs if preservation was delayed.

This work, conducted by VSS International, consisted of chip seal and micro surfacing. The work also included concrete joint sealing, concrete restoration, hot mix asphalt repairs, crack sealing and filling and permanent striping. These improvements were crucial in addressing base failure and extensive cracking before applying micro surfacing and chip seal.

The National Park Service maintains the vast network of roads that provide visitors access to the stunning vistas from the rim. The road network must be preserved for user experience, and there is an overall economic and ecological benefit to the park when using cost effective preservation methods before the roads completely deteriorate to the point that they need costly reconstruction.

PRESERVATION ON SOUTH RIM

Chip seal operations in the South Rim included resurfacing of approximately 35 lane miles of Desert View Road (S.R. 64 East) toward the east park entrance, and 14 lane miles of Hermit's Rest Road near Grand Canyon Village, which is one of the more heavily visited areas by tourists on foot, bicycle and bus.

Construction of both roads required rigorous traffic control and flexibility to provide public access to many scenic lookouts along these roadways. VSS International provided traffic control plans and performed situation specific traffic control for some lookouts and busier attractions.

With hikers and cyclists frequently using these winding and hilly roads, it was necessary to perform pre-work meetings at the start of each shift, which included safety walk-through discussions with key crew members prior to starting work.

Due to limitation of space and distance of staging areas from the worksites, VSS was required to strategically haul raw materials into the site each day. Aggregate samples were taken onsite and shipped to a quality control partner lab in Phoenix, which

would turn results around within 24 hours as required by this contract.

Placement of fog seal followed as soon as the quality control manager (QCM) inspected the placed chip seal, ensuring there were no deficiencies and loose aggregate before applying the fog seal. Temporary traffic control markings continued with chip seal schedule and permanent marking were placed as soon as fog seal placement was complete.

Micro surfacing operations were performed concurrently with the placement of chip seal operations in the South Rim. VSS International micro-surfaced approximately 80 parking lots, lookouts, campgrounds and roadways locations throughout the south rim area, which included a major section of the park's south entrance road, parking lots at the park's administrative facilities, multiple camping facilities and the park's heavily traveled main visitors' center.

All operations required that VSS International protect the extensive historic sandstone walls and curbing throughout the park by covering them with plastic to prevent staining of or damage to existing facilities.

Due to the size and scope of this project, VSS deployed two micro surfacing crews to ensure that all work was completed prior to the quickly approaching winter months. At one point VSS was working around the clock as one crew performed work during the day shift and the second crew worked nights to complete the micro surfacing of the south entrance road, allowing visitors access to the park without delay or any hindrance to the south entrance fee station.

A dedicated QCM monitored placement of all micro surfacing with each crew and performed spread rate calculations daily. Each crew performed equipment calibrations prior to starting work to ensure consistency of materials, and compliance with spread rate and mix design requirements.



Bicyclists were among road users who complicated preservation of Grand Canyon National Park roadways

Before starting full production, a test strip was placed to perform visual inspection of the finished product and spread rate. Aggregate was tested daily, and split samples provided to the government. The extensive quality control and testing allowed VSS to provide consistent results. As an added level of quality control, VSS partnered with key suppliers to bring in onsite screening equipment to ensure compliance with material specifications.

PRESERVATION ON NORTH RIM

With an elevation above 8,000 feet, temperatures at the North Rim drop early in fall, leaving a very tight window for chip seal and micro surfacing to be performed. Chip seal operations started as soon as the paving and crack treatments were completed in early August and continued through mid-September.

At the North Rim, this work consisted of approximately six lane miles on Point Imperial Road, and more than 40 lane miles on Cape Royal Road. Cape Royal Road provides access to almost all scenic lookouts at the North Rim, which include the Point Imperial Lookout, Greenland Lake, Roosevelt Point, Cape Final Trailhead, Walhalla Point, and Cape Royal.

Construction of Cape Royal Road and Point Imperial Road posed challenges from the beginning, as these two roads are only 19 feet wide with minimal or no shoulders, making it difficult to operate a 12-foot-wide chip spreader with ongoing traffic.

VSS International partnered with the park to implement alternative solutions to construct the road in the safest possible way, while providing full access to the park's guests. VSS International met all safety challenges while performing the construction at these winding and narrow roads by carefully phasing construction and traffic control to allow public access while ensuring public and worker safety.

The road work was scheduled in segments between lookouts, traffic control closures were placed, and closure information was communicated thoroughly throughout the park. VSS strategically stationed flaggers to allow the public to enjoy their visit while the road was under construction.

Upon completion of the chip seal operation, VSS International micro-surfaced all paved lookouts and parking areas located



Emulsion placed in Grand Canyon chip seal



Aggregate chips are placed in advance of seating



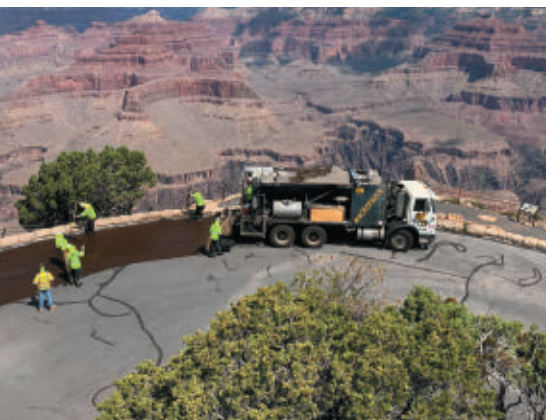
Pneumatic roller seats aggregate in chip seal above Grand Canyon

in the North Rim area. Then it was time for VSS's striping subcontractor to place permanent traffic markings, which was typically done on the day after micro surfacing was complete. The entire operation required intense coordination to ensure that chip seal, micro surfacing and striping were scheduled to allow public access

during construction and reduce interference with the park's operation.

PAVEMENT PREP WORK

VSS International was required to perform a substantial amount of preparatory work ahead of both the chip seal and micro surfacing on this project.



Micro surfacing is placed by VSS on Hopi Point Road on South Rim of Grand Canyon

The plan was to get all preparatory work started as early as possible as not to push the work into the colder months ahead. Crack seal and asphalt pavement repairs started in mid-June. Subsequent asphalt repairs were performed by removal of failed pavement areas, and re-paving the hot mix asphalt in 2-in. lifts as needed to address the underlying issues.

All new asphalt repairs received a fog seal to prevent draining of emulsion out of the subsequent chip or micro surfacing.

VSS International's superintendent and QCM monitored the work closely to ensure compliance with the specifications and performed required testing at each location. VSS replaced approximately 10,137 sq. yd. of pavements over a six-week period.

With the completion of prep work VSS International mobilized three crews consisting of more than 50 workers, three superintendents, two project engineers and senior management personnel to oversee the sheer amount of micro and chip production on this job. Outside help consisted of a QCM with each crew to ensure quality of work, and a traffic control supervisor with a traffic control crew.

SAVING TIME, MONEY, RESOURCES

The overall scope of this project required more than one million sq. yd. of pavement be treated with pavement preservation techniques. Utilizing the resources found at RoadResource.org, it's anticipated that the Federal Highway Administration saved taxpayers more than \$6 million by using life-extending surface treatments now while the park's pavements were in better shape, than waiting until the pavement

deteriorated to require a more traditional maintenance method such as removal and replacement of up to 2 in. of hot mix asphalt. That would have required the purchase and transportation of approximately 110,000 tons of hot mix asphalt, plus the removal and hauling off of grindings from the existing roadway materials.

By utilizing surface treatments as an alternative to mill-and-fill options, the FHWA greatly reduced the inconvenience to the traveling public by significantly decreasing the number of shifts required to complete the work. It's estimated that VSS International's placement of these treatments (including all preparatory work) required less than half of the working shifts anticipated to perform a 2-in. mill and replacement with 2 in. of hot mix, which greatly decreased the time required to complete the work, meaning there was much less inconvenience to the traveling public.

One of the greatest benefits of the placement of the surface treatments was the reduction in energy and materials consumption needed. VSS minimized the consumption of quickly diminishing natural resources. For example, the Type II



OFFERING A WIDE-RANGE OF PAVEMENT PRESERVATION TESTING & EVALUATION SOLUTIONS

Testing. Knowledge. Solutions.

SERVICE OFFERINGS

- ☐ Consulting
- ☐ Product Development
- ☐ Product Improvement
- ☐ Testing

PRODUCTS

- ☐ Aggregates
- ☐ Crack & Joint Sealants
- ☐ Cutbacks
- ☐ Emulsions
- ☐ Fibers
- ☐ Geotextile Fabrics
- ☐ Micro, Slurry, CIPR, Chip
- ☐ Performance Additives
- ☐ Rejuvenators
- ☐ Sealers
- ☐ Thin Lift Overlays

PRI Asphalt Technologies
6408 Badger Drive
Tampa, FL 33610
(813) 621-5777

www.pri-group.com



As part of plan, micro surfacing squeegee workers keep material off historic sandstone curbing

micro surfacing and chip seal applications required only 14,000 tons of virgin aggregate materials, whereas a 2-in. mill-and-fill approach for the same areas would have required the purchase of approximately 110,000 tons of hot mix which would have consumed more than 100,000 tons of aggregate materials.

The chip seal and micro surfacing treatments applied required approximately 3,000 tons of emulsion. Production of the emulsion utilizes much less energy than hot mix production, and the 3,000 tons produced for this project only required approximately 2,000 tons of liquid asphalt binder, whereas the 110,000 tons of hot mix asphalt would have consumed more than 6,500 tons of liquid asphalt binder materials. It is also important to note that the emulsion materials used are placed at ambient temperatures meaning that there are almost zero emissions compared to the placement of the hot mix asphalt alternative, which required elevated temperatures between 300-350 deg F.


Perhaps the greatest savings was the reduction of trucks required to haul these raw materials on and off site, which would have burned significant amounts of fuel, as well as provided much more congestion to an already congested roadway.

Removing and replacing 2 in. of 100,000 tons of existing hot mix roadway would have required approximately 4,600 truckloads of material to be hauled on site and at least another 2,000 to haul RAP materials offsite, whereas the surface treatments placed only required 700 truckloads of aggregate and emulsion, thus reducing the need for approximately 6,000 delivery trucks on the project.

COMMUNICATION AND COMPLETION

Successful completion of a project of such scope and magnitude required exceptional communication and precision execution. Weekly operations meetings were held as VSS met with all stakeholders to make sure all closures were communicated at least two weeks in advance.

Look-ahead schedules were constantly updated, reviewed, approved and communicated to the public through multiple channels within the park. This included the use of message boards and posting closure information at impacted areas and lots.

Phasing and communication of work went well beyond the placement of preservation techniques. Construction post-sweeping, striping layout and temporary striping—along with final striping and sweeping—required constant communication efforts to keep everyone moving efficiently on the project. 

Edited by Pavement Preservation Journal. Roberts is senior vice president, Ferguson is construction manager and Hekmatullah is project coordinator, VSS International, Inc



**All States
Materials Group®**



COMPLETE PAVEMENT MAINTENANCE SOLUTIONS

WITH OVER 60 YEARS OF EXPERIENCE IN THE ASPHALT INDUSTRY, **ALL STATES MATERIALS GROUP** IS A LEADER IN COMPREHENSIVE PAVEMENT PRESERVATION AND ASPHALT PAVEMENT MAINTENANCE.

OUR PAVEMENT PRESERVATION SOLUTIONS INCLUDE:

- FOG SEALS
- CONVENTIONAL CHIP SEALS
- FIBERMAT® STRESS ABSORBING MEMBRANES
- ASPHALT RUBBER STRESS ABSORBING MEMBRANES
- ULTRA-THIN BONDED WEARING COURSE

TO LEARN MORE, VISIT WWW.ASMG.COM.



**All States
Materials Group®**

www.asmg.com

How 'Toolbox of Techniques' Drives Town of Woodstock's PCI Higher

BY PAUL FOURNIER

The Town of Woodstock, nestled in the often-called "Quiet Corner" of northeastern Connecticut, was bustling with pavement preservation activity as it underwent a late summer/fall asphalt pavement program.

More than a half-dozen contractors were sealing, grinding, spraying, paving and generally changing the look of more than 235,000 sq. yd. of asphalt or gravel covered roads, all under the eye of John Navarro, director of public works.

There are a lot of moving parts to the preservation work, and Navarro understands what and how each part is contributing to the community's transportation network, a skill he developed through more than a quarter century of building, maintaining and repairing roads in Woodstock.

An "up through the ranks" director, Navarro was originally hired as a driver/laborer in February 1993, but advanced over the years in the highway department to become director in September 2008.

He serves under the direction of the Board of Selectmen, and currently heads up a crew of 12 that includes nine full time union employees, two part-time highway/grounds maintenance employees, and one part time administrative assistant.

A semi-rural bedroom community with a significant number of working dairy farms, Woodstock has approximately 114 miles of roads, about 80 percent of which are surfaced with asphalt, and about 20 percent with gravel. Among highway department maintenance responsibilities are such tasks as snow and ice control, gravel road grading, drainage upkeep, roadside mowing, tree and brush removal, and road sign installation and repair.

TOOLBOX OF TREATMENTS

During his long career, the director has utilized a "toolbox" of pavement management techniques for protecting and prolonging the life of the town's roads. His "tools" are designed to be the most cost-effective treatment to prevent or correct causes of specific pavement distress.

Pavement preservation techniques form a large part of the toolbox selection.

"When you're working with limited budgets, I don't see how you can get by without pavement preservation processes," Navarro said. A firm supporter of the concept, he believes applying preservation treatments to pavements while they are still in good condition postpones costly rehabilitation and reconstruction, ultimately saving taxpayers' money.

"For pavement preservation, we use fog seals, crack seals, chip seals and some thin overlays," he said. "We maintain an aggressive chip seal program and do about 15 miles per year of chip seal on the town's 90 miles of asphalt roads."

Navarro reviewed his hierarchy of preservation tools. "The lowest level of surface treatments for me is a rejuvenating fog seal, for a surface that is in good condition, usually between four to six years old."



In Town of Woodstock, Ct., cold in-place recycled (CIR) lift is compacted with Hamm GRW 280 rubber-tire roller (right) and Hamm HD 120i steel-drum vibratory roller (rear)



John Navarro, public works director of Town of Woodstock, Ct., oversees application of Delta Mist rejuvenating fog seal by Etnyre distributor operated by Riverside Asphalt Services

A typical fog seal consists of applying a slow-setting asphalt emulsion on an existing pavement surface without a cover aggregate, but a rejuvenating fog seal may contain petroleum or bio-based rejuvenators that restore properties of the aged asphalt binder in the surface layer. The director is thinking about making rejuvenating fog seals a permanent part of his growing toolbox selection.

"We have used Felix A. Marino's Co.'s petroleum-based rejuvenator for three years with good success," he said. This product, an aromatic resin, was recently used to soften recycled asphalt shingles during a demonstration by Rhode Island Public Works Association in Smithfield. Private consultant R. Paul Montenegro managed the application used to stabilize a gravel road.

Director Navarro has also recently treated local roads with *Delta Mist*, a non-petroleum, spray-applied, plant-based product manufactured, marketed and sold by Collaborative Aggregates. The new product is designed to increase pavement life by restoring oxidized asphalt and reducing loss of fines and aggregates. "Delta Mist is working fine and we're keeping an eye on it," he said.

Crack sealing is next on the director's ranking. This is usually performed by town forces, as differentiated from crack filling, which may be done by private contractors.

Chip seal is the department's pre-dominant preservation activity, as part of Navarro's overall plan for the town's transportation network. This involves the application of emulsified asphalt, followed immediately by a single layer of aggregate chips to a prepared surface.

"We perform a good deal of chip seals," he said. "I try to complete up to 15 miles per year. Most of our oldest chip seals are six to seven years old," Navarro said. The chip seal operation is often a public/private effort, with the town frequently helping by providing haul trucks and drivers to the private contractors, a contribution that actually saves money for the town.

Next on the toolbox echelon are non-preservation treatments for more distressed pavements. "If there are profile issues then we get into cold-in-place treatment," he noted. "And finally, for really distressed pavement, we would perform drainage upgrades and reclamation with up to 4 in. of new bituminous asphalt. We



New England Asphalt Services' Etnyre chip spreader drops chip seal aggregate as part of town's autumn asphalt pavement preservation program



In CIR operation, Roadtec RX900 recycler/cold milling machine supplies a Caterpillar AP1055F paver with cold recycled mix that has been replenished with emulsion and will serve as stabilized base for double chip seal

do not resort to 'mill-and-fill' for pavements beyond preservation help; in this situation, we usually do total reconstruction or full depth reclamation."

PAVEMENT MANAGEMENT SYSTEM

Navarro said the town employs a pavement management system to help guide their selection of treatments. "We use the *Road Surface Management System* (RSMS) Program originally done for the New Hampshire LTAP system," Navarro said. "They updated it, but we manage it."

The Federal Highway Administration created LTAP, the Local Technical Assistance Program, to provide local agencies with information and training programs for the maintenance of local roadways and bridges. LTAP is composed of a network of 58 centers, one in every state, Puerto Rico and regional centers serving tribal governments.

According to the Central New Hampshire Regional Planning Commission, RSMS provides an overview and estimate of a road system's condition and the approximate costs for future improvements. The RSMS contains five components: road inventory, road surface condition survey, priority analysis, repair selection, and planning and budget preparation.

"Also, the University of New Hampshire put our road inventory in their system, and we still receive support from UNH," Navarro added. "Jason Scranton manages the program under my supervision. And some of our crew actually do the road surveys."

The collection of this data enables pavement managers to determine the Pavement Condition Index (PCI) for sections, or for the entire road system of a community. The index is a numerical value between 0 and 100, with 100 representing the best

possible condition, and 0 representing the worst possible condition.

Navarro also stays informed about pavement management techniques by exploring a wide variety of sources. "I keep an eye on the UCONN T² list," he said, referring to the Connecticut Training and Technical Assistance Center (T² Center) at the University of Connecticut, the state's LTAP. "I speak with a lot of other highway maintainers, and I always learn something from visiting salesmen who offer different kinds of treatments. I will try a

product that interests me. I'm not afraid to try new stuff—anything that piques my interest. I also attend meetings of public works-related associations as much as possible."

Navarro keeps a close watch on construction taking place in town, making frequent job visits to check progress as the fall projects neared completion.

COLD RECYCLING TRAIN

As part of the fall pavement program, Gorman Brothers was performing

cold-in-place recycling (CIR) of approximately 29,000 sq. yd. of local semi-rural roads.

"I've been using this process for the last six years," Navarro said. "These roads were originally cold asphalt and the pavements are deep. We are out in the woods here and there are not a lot of structures or manhole covers or curb reveals to worry about. That's one of the reasons we do cold in-place out here.

"Gorman refers to its CIR equipment as *the Train*," Navarro said. "It consists of a milling machine, a pug mill and a paver and, of course, a tanker with emulsion. They mill about 2 in. of the surface asphalt, which is conveyed to trailer-mounted pug mill where emulsion is added, and the mix then proceeds to the paver where they re-profile the surface with the renewed asphalt. Gorman recommends a fog seal after this process, but we usually apply a double chip seal."


New England Asphalt Service was placing chip seal on about 128,000 sq. yd. of road. The town provided four International dump trucks to feed aggregate chips to the contractor's Etnyre chip spreader.

Elsewhere in town, Pinecroft Paving and Landscaping was installing asphalt overlay on 16,335 sq. yd. of pavement, while Felix A. Marino Co. applied its rejuvenating fog seal over almost 39,000 sq. yd. of pavement, and Riverside Asphalt sprayed about 4,000 sq. yd. of pavement with Collaborative Aggregate's Delta Mist rejuvenator.

The remaining contractor, Garrity Asphalt Reclaiming, was busy performing full-depth reclamation (FDR) of approximately 12,400 sq. yd. of roadway.

PROGRESS IN PCI

Navarro indicates the number and diversity of the fall pavement projects are examples of the town's pavement management toolbox approach in action.

"It's taken us about 12 years to develop our system, but it has allowed us to improve the town's entire road network," he said. "When we started this process, our PCI was in the mid-70s, now it's in the 90s." 

Paul Fournier is a New England-based freelance writer. Portions of this article originally appeared in, and is reprinted with permission of, New England Construction/ACP magazine



Preservation for the LONG HAUL

 LOWER LIFE-CYCLE COSTS
  LONGER LASTING
  SMOOTHER RIDE
  ENHANCED STRUCTURAL CAPACITY

Starting at $\frac{5}{8}$ of an inch, Thinlays are the pavement preservation treatment designed to extend service life while improving performance, friction, and drivability. These thin asphalt overlays provide long-lasting smoothness and can be used to increase structural capacity, providing greater value for your pavement preservation dollar.




www.ThinlayAsphalt.com

ReGenX[®]

Performance Surface ReGeneration

ReGenX penetrates existing pavement, chemically restoring aged asphalt binder to create a renewed surface layer. **Apply ReGenX as part of routine maintenance to add years of service life to your pavement.**

Without ReGenX

With ReGenX

Application near Jackson, MS

Treated Surface

Learn more about the benefits of ReGenX at blacklidge.com/ReGenX or call us today at **1-800-866-3878**.

BLACKLIDGE[®]

FIX IT!

UNIQUE IS A ONE-STOP, FIX-IT-ALL SUPPLIER!

We are continually researching, developing, and testing new products and innovative ways to solve pavement preservation and concrete repair challenges.

Call or visit our website for our full product line and to find out how we can help you get the job done right the first time.

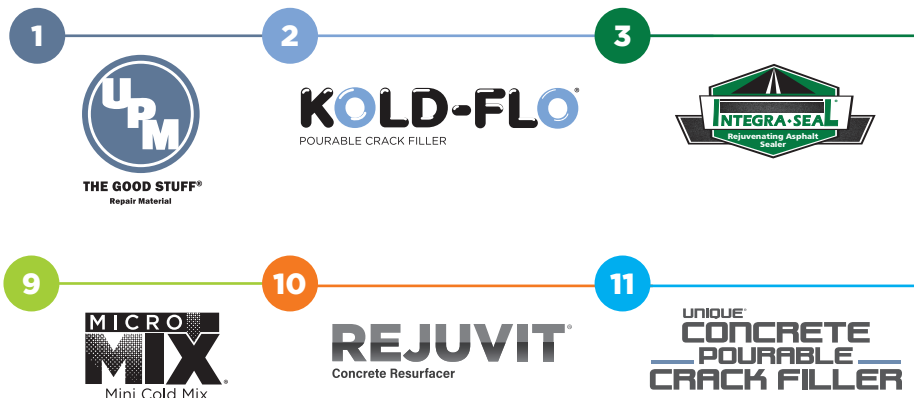
The makers of **UPM**® mix
Unique®
 Paving Materials Corp.



Customer Service
800-441-4880
uniquepavingmaterials.com



ASPHALT AND
 Offering more solutions



8

OIL
SPOTS

9

SHALLOW
ASPHALT
REPAIRS

10

CONCRETE
RESURFACE

11

CONCRETE
CRACK
FILLER

12

THIN &
FULL DEPTH
CONCRETE
REPAIRS

13

VERTICAL
CONCRETE
REPAIR

14

RAILING
POST
REPAIR

CONCRETE PAVEMENT SOLUTIONS

than just superior cold mix!

4

UNIQUE
FLEXICRETE[™]
XP POLYMER MODIFIED MORTAR

5

UNIQUE[™]
**HIGHWAY
DOT**
FAST SETTING
CONCRETE MIX

6

UNIQUE[™]
**ASPHALT
RESURFACER**

7

RAVEL SEAL
PAVEMENT PRESERVATION EMULSION

8

KWIK-L[®]K
PAVEMENT PRIMER

12

UNIQUE[™]
**HIGH
PERFORMANCE**
FAST SET MORTAR

13

UNIQUE[™]
**OVERHEAD[™]
VERTICAL
REPAIR** MORTAR

14

UNIQUE[™]
**POSTCRETE
GROUT / WS[™]**
HYDRAULIC CEMENT

15

UNIQUE[™]
**CONCRETE
SEALER**

PPRA, FHWA Preservation Webinars Focus on Cold in-Place, Central Plant Recycling

BY JASON DIETZ

As agencies plan for their 2021 construction season, they likely are struggling to prioritize their road maintenance projects to align with dwindling funding. What are your strategies? Are you planning to defer all maintenance or just responding to a few paving projects with hopes they will last another year?

Through good times or bad times, it is important to continue applying pavement preservation treatments on the right roads, with the right treatments, at the right time.

The Federal Highway Administration (FHWA), in partnership with the Pavement Preservation & Recycling Alliance (PPRA), has been offering free monthly pavement preservation webinars since February 2020 for anyone interested in “keeping good roads good.”

These webinars are designed to help agencies preserve their investment in roadways, enhancing safety, extend pavement life, improve functional performance and contribute to increased user satisfaction. Find archived webinars at RoadResource.org and fp2.org/webinars.

COLD RECYCLING PROCESSES

The September 2020 topic was *Cold In-Place Recycling (CIR)* and *Cold Central Pavement Recycling (CCPR)*. The webinar was presented by Jason Wielinski of the Heritage Group. Topics that were covered during his presentation included: sustainability, understanding the cold in-place (CIR) and cold central plant recycling (CCPR) processes, project selection and construction, mix design, and review of some example projects.

We started off by discussing the economic and environmental benefits that CIR offers. It's a less-disruptive alternative to conventional methods and in some cases, provides a base for the first time.

CIR offers significant energy savings compared to conventional reconstruction, while it substantially slows depletion of natural resources. With CIR, it saves the agency time by having the roadway open during construction. Additional benefits include up to one lane-mile per day production, reduced impact to adjacent roadways, reduced cost over reconstruction, enhanced re-use of existing material, reprofiled roadway, and improved curb reveal.

The CIR occurs within the roadway lane to be recycled and uses 100 percent of the RAP generated during the process. CIR treatment depths are generally 3 to 5 in. with use of stabilizer or emulsified asphalt (engineered emulsion), or with foamed asphalt (typically 2–3 percent liquid asphalt).

As thin as a 2-in. recycled lift is possible with good underlying support and up to a 5-in. lift depth is possible provided proper compaction can be achieved. The CIR process performs in-place recycling using either a single milling unit with onboard mixer, or a “train” of equipment, with cold mill, trailer-mounted mixer or pug mill, addition of binder or rejuvenator, paver placing the recycled mix, rolling, and curing of the compacted mix.

The CCPR process is similar, except the recycling train is eliminated. Instead, a single cold mill's pavement millings are trucked to a central plant, often a portable plant, mixed with binder or rejuvenator, and then transported back to the job site, placed, rolled and cured.

Cold recycling materials include the recycled asphalt pavement (millings), recycling agents (engineered emulsions or foamed asphalt), and other mix additives such as portland cement, lime, corrective aggregates and water.

Cold recycled mixes require a wearing surface because of higher voids than typical hot mix asphalt (HMA) once the mix is cured. The wearing surface can be HMA or surface treatments such as a chip seal, or two-layer cape seal, depending on the traffic volume.

CANDIDATES FOR CIR, CCPR

CIR candidates include pavements exhibiting raveling, reflective cracking, edge or block cracking, potholes, top-down cracking, and stripping if in localized areas.

Pavements with widespread subgrade showing fatigue cracking or rutting or with poor drainage are not good candidates for CIR. The existing pavement should receive an accurate assessment, including the



In Virginia, at nearby interchange, millings from pavement of I-81 are foam-recycled in portable Wirtgen KMA 220i cold central plant mixer and are trucked back to project for placement as base



Millings from Virginia I-81 are placed in hopper feeding KMA 220i plant in CCPR operation



In Nevada, Washoe County road gets cold in-place recycled (CIR) via recycling train, eliminating long hauls of both recovered material and virgin hot mix asphalt

taking of cores, knowing the pavement load restrictions, checking drainage and base and subgrade conditions, and review construction records. Areas of concern are that CIR cannot bridge poor subgrades and needs a strong base for compaction.

As all pavements are dissimilar, mix design must be based on material in actual pre-construction corings. Thus, pavement sampling and mix design also was covered in the webinar, including requirements for taking representative samples throughout the project, and laboratory testing such as Marshall Stability, adhesion tests for moisture damage, and strength development over time. The amount and type of new binder and any recycling agent, and the amount of new mineral additive also are determined.

The webinar's segment on the construction process included discussions on safety, traffic control, weather considerations, quality control (particularly gradations and density), base and subgrade repairs and specifications enforcement.

The compacted CIR mixture must adequately cure before secondary compaction. In addition, a wearing surface is needed. The rate of CIR curing is variable and depends on several factors, including recycling agent used, environmental conditions, drainage, and moisture characteristics of the mixture.

Typical curing periods can be as short as a few hours to up to several weeks. It was mentioned that the outcome of the ongoing NCHRP 9-62: *Rapid Tests and Specifications for Construction of Asphalt-Treated Cold Recycled Pavements* will

discuss the rapid test and specifications for recycled pavements. When a faster cure is necessary, a recycling additive (lime or cement) is used.

The webinar was ended with CIR case studies from West Virginia Department of Transportation and a CCPR project from Indiana Department of Transportation, that includes their pavement recycling treatment flowchart.

In summary, keys for successful projects include:


- Pavement selection and treatment based on the right treatment on the right road and the right time, and
- Using an engineering process, which includes project scoping, pavement design, selection of the correct recycling agent, mix design using in situ materials, and quality control.

If CIR or CCPR is done correctly, an agency can save money, save time, extend the life of the pavement, improve ride, reduce carbon emissions and improve sustainability.

ONLINE RESOURCES

Other resources provided via the webinar included:

- FHWA Check List and TechBrief on *Overview of Project Selection Guidelines for CIR and CCPR*: <https://www.fhwa.dot.gov/pavement/preservation/resources.cfm>; and <https://www.fhwa.dot.gov/pavement/asphalt/pubs/hif17042.pdf>
- ARRA best practices guide for CIR: https://cdn.ymaws.com/www.ara.org/resource/resmgr/Guidelines/ARRA_CR101_11-02-17.pdf
- ARRA best practices guides for CCPR: https://cdn.ymaws.com/www.ara.org/resource/resmgr/Guidelines/ARRA_CR102_11-02-17.pdf
- NHI 131050 updated course https://www.nhi.fhwa.dot.gov/course-search?sf=0&course_no=131050
- PPRA www.RoadResource.org

For more information, please contact Jason Dietz at jason.dietz@dot.gov or Jason Wielinski at Jason.Wielinski@hrlab.com. 

Dietz is pavement and materials engineer, Federal Highway Administration Resource Center, Colorado

Images by Tom Kuennen



Green Chemistry
Safety at Work

Delta Mist® Penetrating Asphalt Spray Rejuvenator

- Sprays white, dries clear and penetrates the pavement surface 3/8 inch without heating or agitation
- Does not require sand or aggregate cover and the subsequent clean-up
- Does not obscure traffic markings or affect reflectivity
- Does not negatively impact surface friction characteristics
- Allows for a return to traffic in 60-90 minutes based on ambient temperature and humidity level
- For use on highways, streets, longitudinal joints, shoulders, rumble strips, trails and paths



www.collaborativeaggregates.com



COLLABORATIVE
AGGREGATES LLC

Engineered Construction Products
Through Green Chemistry



**Turning the Pavement Preservation Industry
*Upside Down***

**Micro Milling, Recycling and Micro Surfacing
all in a SINGLE pass!**



For Information:
Pavement Recycling Systems | (951) 790-3430 | www.micromicro.com

Four 'Cs' will Make 2021 a Year of Improvement for Agencies

BY GRACE STANSBERY

RoadResource.org wants to make 2021 a year of improvement for agencies across North America by focusing on the four Cs of *Communication, Calculation, Connection and Confidence*.

With these themes, RoadResource.org sponsor, the Pavement Preservation & Recycling Alliance (PPRA), is developing new tools and resources to help agencies gain ground, one step at a time.

More agencies recognize that preservation and recycling can maximize road funding efficiency while extending the life of a road network. Expanding that recognition is more important than ever in 2021. With revenues uncertain due to COVID economic contraction, many agencies are forced to do more with less this year, making it critically important to demonstrate the efficacy of preservation and recycling on network health.

Over the course of this year, PPRA and RoadResource.org will introduce new initiatives designed to help agencies make 2021 a year of recovery, for both their communities, and for their road networks. New tools on RoadResource.org will be focused where agencies find their greatest hurdles in adopting and advocating for their roads and budgets: *Communication, Calculation, Connection and Confidence*.

COMMUNICATION GENERATES SUPPORT

If you're looking to change the status quo, you'd better have support. When the tax-paying public and elected officials have a good understanding of preservation and maintenance plans, both parties are more likely to lend their voices and support to ensure the success of an initiative.

To help with this effort, RoadResource.org is building a communication toolkit for use by city, county, state and provincial agencies. The toolkit is designed to speak to decision-makers and taxpayers about the benefits of proactive pavement management programs and asphalt recycling.

Among the items in the downloadable toolkit, agencies will have access to customizable templates for press releases, public service announcements, social media posts, door hangers, and yard signs with up-to-date research and information.

The goal is for agencies to have access to tools that advocate for proactive planning (or increased budgets) with their own decision makers. Likewise, those high-performing agencies who are already managing healthy networks can leverage taxpayer communication tools to ensure the longevity of their program through public support, and maybe even earn a few "thank you" from the public along the way.

CALCULATING ROI FOR RESULTS

What's the first thing a road manager must prove when recommending a change to the status quo? Three words: Return on investment.

It can be very difficult for many smaller agencies to adopt preservation programs because they simply don't have data to demonstrate results. Especially now, as decision-makers may be hesitant to adopt "new" processes, the story of impact is more critical than ever to making real change in the road networks across North America.

This year, PPRA is developing a new tool that will help agencies and elected officials visualize the financial and service life benefits of preservation and recycling treatments. Using rough figures about a given network and treatment costs, this tool will allow agencies without pavement management systems to visualize the impact of various plans on their network health over time to see that small steps taken today will pay dividends in the future.

MAKING CONNECTIONS TO GROW

In interviewing consulting engineers, agencies, and public works officials, there is usually a common thread: The most successful road managers are plugged into communities that allow for collaboration, shared learning, and peer exchange.



Big changes coming to RoadResource.org as project emphasizes the four "Cs" of Communication, Calculation, Connection and Confidence


Wouldn't it be great if that information could be shared virtually with a wider audience?

To make that happen, PPRA is creating a *LinkedIn* group designed for users of RoadResource.org. In this platform, participants can connect peer-to-peer to discuss successful projects, learn from each other, and share best practices when it comes to annual planning. The more connected we are, the more our industry will grow.

CONFIDENCE BUILDING

The year 2021 brings *in-depth* learning opportunities for agencies. Previously known as *Super User Training*, an updated modular training series will be easier than ever for agencies to access. With shorter sessions delivered via webinar, even the busiest agencies across North America can learn the tenets and tools required to improve their aging networks.

Working together as an industry, we can create opportunities to make 2021 the year of road network improvements that drive community improvements. Keep a close eye out for these and other PPRA initiatives debuting over the course of the year, on RoadResource.org.

To get the latest news in your inbox, sign up for a user account at roadresource.org/users/sign_up. 

Stansbery is account executive with Varrio Marketing, St. Louis



IT DOESN'T DO ANY GOOD UNLESS YOU OPEN IT UP.

Jump on our site. Discover a toolbox full of asphalt treatments and tools to help you learn, grow and deliver the best, most effective solutions for each of your roads. Before you know it, this will be your go-to resource.

Visit roadresource.org



Reclamite®

MALTENE BASED
ASPHALT REJUVENATOR

Preserve pavements for years at a low cost compared to conventional treatments.

Reclamite restores maltene components of asphalt lost through aging and improves durability near the surface where deterioration begins. Pavements in good profile but exhibiting signs of aging (hairline cracking, raveling and pitting), as well as pavements with segregation issues, benefit from Reclamite application.



7 years
after
Reclamite

Not treated
with
Reclamite

- Used at the top of the maintenance curve, delays need for scrub, chip, scrub/cape seals and slurry applications.
- Seals, tightens and waterproofs asphalt surfaces.
- 50% to 90% less expensive than conventional wearing course treatments.
- 50-year history of success. Marketed worldwide. Proven results and references available upon request.

Reclamite® – GOES DOWN PINK. KEEPS YOU IN THE BLACK.



CONTACT JOHN CHURCH: 760.600.6486
RECLAMITE.COM

Benefits of Long-Term Data Collection

BY DR. ADRIANA VARGAS

The Preservation Group (PG) Study is an ongoing research effort that was initiated in 2012 to address the need for a better assessment of pavement preservation performance, thus allowing agencies to make objective decisions regarding treatment selection.

Initially, the study was funded by seven state DOTs and FP² Inc., and consisted of 25 test sections located on a low-volume county road in Auburn, Ala. Thanks to the partnership established between the National Center for Asphalt Technology (NCAT) and the Minnesota DOT's Road Research Facility (MnROAD) in 2015, the study has expanded to account for the effect of traffic and climate on treatment performance and it now includes a total of 145 test sections distributed among five testing locations in Alabama and Minnesota.

RANGE OF TREATMENTS

The treatments applied range from crack sealing and surface seals to thin overlays and cold asphalt recycling, with several sections featuring multi-layer applications and treatment combinations.

Following construction, test sections are tested periodically to assess pavement condition and establish comparisons versus similar untreated control sections to determine the life-extending benefit of each of the treatments. Given the diversity of the treatments and testing conditions, performance is measured through various indicators such as cracking, rutting, roughness, texture, friction and structural integrity.

The frequency of data collection varies among sites, depending on traffic and climatic limitations; however, multiple measurements are obtained throughout each year to account for seasonal variations.

The oldest sections in the PG Study (Lee Road 159 in Auburn, Ala.) are now approaching nine years of service, providing a valuable amount of long-term data. Much of the analysis has focused on the MAP-21 performance indicators (cracking,

rutting and roughness), as state agencies are already familiar with condition assessment based on these parameters.

Thanks to the continuously growing databases, deterioration curves have been developed for each of the treatments as a function of pretreatment condition. These curves are compared to the deterioration curves of the untreated sections and the offsets at the MAP-21 condition threshold values are used to estimate the life-extending benefit.

While some treatments have reached these thresholds, others—especially those that were applied while the pavement was still in good condition—continue to show good performance and more information is needed to determine their effect.

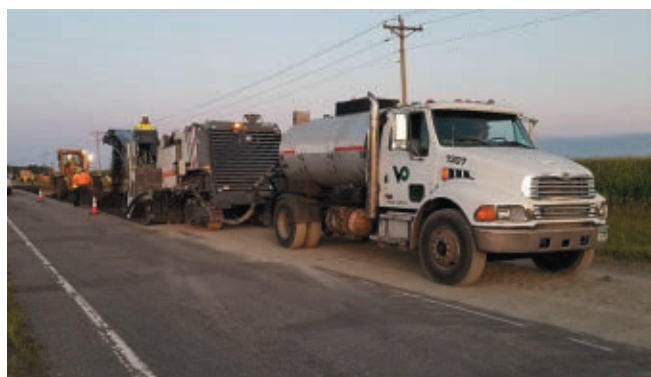
PRELIMINARY ASSESSMENTS

Still, preliminary assessments can be made in terms of the condition-improving benefit by comparing the amount of distress observed between treated and untreated sections at any point in time.

This analysis approach has provided helpful insight on the benefits of timely intervention and has allowed us to narrow the ranges for expected performance of the treated sections.

Similar work is being conducted on the remaining test locations (Highway US 280 in Opelika, Ala.; County State Aid Highway 8 and Highway US 169 in Pease, Minn.; and 70th Street in Albertville/Otsego, Minn.) to also determine the effect of traffic volume and climate on the life-extending benefit of the preservation treatments.

Although the MAP-21 indicators may be considered the main performance parameters, other data are also periodically




Full Depth Reclamation (FDR) takes place on 70th St. in Albertville/Otsego, Minn., as part of long-term northern climate pavement preservation study

collected and analyzed. **Friction measurements** are used to monitor the safety of the sections. **Falling weight deflectometer (FWD) testing** is used to determine whether the treated sections can remain in good structural condition for a longer period compared to the untreated sections.

Other parameters can be used to evaluate the functional life of the treatments themselves, for example, by observing **changes in macrotexture** for chip seals, or **changes in noise** and **permeability** in thin open-graded friction course (OGFC) thin overlays.

By continuing to collect and analyze data from this unique research study, it will be possible to provide agencies and industry with more detailed information regarding the benefits of pavement preservation.

The availability of **long-term performance data** is a critical component in the decision-making process for pavement managers. Along with cost information, the results from this study are expected to aid agencies, big and small, in selecting the most cost-effective options for preserving their pavement networks. 

Dr. Vargas is assistant research professor, National Center for Asphalt Technology, Auburn University, Ala.

Join Phase III Pavement Preservation Research

PLATINUM



GOLD



SILVER



COPPER



FP² Inc. – and the staffs of the National Center for Asphalt Technology and MnROAD – profoundly thank the businesses and associations above that have made a special contribution supporting important new research in pavement preservation at those research facilities.

A partnership between the National Center for Asphalt Technology in Alabama and the MnROAD Road Research Facility of the Minnesota DOT is

advancing research in preservation techniques for both low-volume and high-volume roadways, and is supported by stakeholder contributions channeled through FP², and a pooled fund supported by state departments of transportation and administered by the Alabama DOT.

The partnership will provide research in preservation techniques for both flexible [bituminous] and rigid [portland cement concrete] pavements, and supply real-world accelerated pavement preservation performance testing in both hot and cold climates. By leveraging economies of scale, it may deliver research products for a larger base of supportive agencies and private sector clients at lower buy-in costs. The partnership has the potential to play a much larger role in the national effort to validate pavement performance. Sharing resources and expertise will improve coordination of experiments and expand evaluation of pavement performance in both northern and southern climates. Also, the collaboration permits testing of PCC pavements and the inclusion of the results in comprehensive research products, which is not possible when NCAT works on its own.

The NCAT test facility (left) has multiple test sections on its 1.7-mile oval track, while the Minnesota DOT's MnROAD facility track (right) consists of a 3.5-mile interstate (I-94) high-volume roadway, and a 2.5-mile closed loop low volume road simulating rural roads.

The goal of this research is to quantify the life-extending benefits of different pavement preservation treatments for roadways in different stages of life and decay. Both facilities have a history of evaluating the performance of pavement preservation treatments, including chip sealing, micro surfacing, crack sealing and thin overlays.

Now, accelerated testing – including actual low- and high-volume pavements in the field – is providing unique opportunities to determine the field performance of breakthrough materials and pavement preservation concepts without the risk of failure that local and state agencies are unwilling to accept. To address the needs of northern and southern climates, similar test sections have been developed for both Alabama and Minnesota.

Please join your fellow stakeholders in pavement preservation by making a financial contribution to research at NCAT and MnROAD. For more information, contact FP² executive director Jim Moulthrop, P.E. (PA, AZ), (512) 979-8865, jimmoulthrop@gmail.com.



2021: 'Build Back Better' Infrastructure Plan

BY TRACY TAYLOR

As the moving vans bring the incoming Biden administration into Washington and the Trump administration out, support for a robust infrastructure plan remains constant. A key element of candidate Biden's campaign platform was strong support for substantial investment in the country's infrastructure. It is widely expected that once additional COVID-19 relief is addressed, a large infrastructure bill will be high among the earliest issues upon which this new administration will focus.

President Biden and his incoming Transportation Secretary **Pete Buttigieg**, the former mayor of South Bend, Ind., understand the value and need of supporting our infrastructure. Not only would a large infrastructure bill create good paying jobs at a time when the jobless claims are surging due to COVID-19-related closures, it's also one of the few issues that has the potential to garner the support of both Democrats and Republicans.

This is key in a 50-50 Senate and a House of Representatives that has the narrowest majority led by Democrats in more than 50 years. It also has the potential, as noted by then-secretary designate Buttigieg in his Senate confirmation hearing, to provide "a generational opportunity to transform and improve America's infrastructure."

A Biden plan would build on many of the elements present in the surface transportation reauthorization bill passed by the House of Representatives last year, such as making our nation's infrastructure more resilient to climate change while investing in green development and technology. As a mayor, Transportation Secretary Buttigieg is well aware of what is required to meet infrastructure needs while also balancing a budget.

GOOD NEWS FOR PRESERVATION

This is good news for environmentally friendly **pavement preservation**, which is labor intensive and saves financial

and natural resources while simultaneously maintaining and improving roads. Pavement preservation—which can save \$6-to-\$10 in future rehabilitation and reconstruction costs for every dollar spent—is widely used on local and municipal roads where decision-makers typically must balance their budgets.

With much work done by Congress last year to pass a long-term highway reauthorization bill, important groundwork has been laid. The starting point for an infrastructure package in 2021 is expected to be the House-passed bill shepherded through Congress by Transportation and Infrastructure Chairman **Pete DeFazio** (D-Ore.).

With Democrats taking control of the Senate, Environment and Public Works Committee leadership will change to Sen. **Tom Carper** (D-Del.). While he and his Republican partner, Ranking Member **Shelly Capito** (R-W. Va.), are both seasoned in transportation policy, the emphasis in the Senate will likely shift.

It's expected that Chairman Carper will likely more heavily address climate change issues in any infrastructure bill.


While there is an institutional history of both parties working together in a bi-partisan fashion with any infrastructure bill, the big question, as always, will be how to fund an infrastructure bill. With dwindling highway trust fund revenues, finding a way to fund a large infrastructure bill encompassing a long-term highway reauthorization bill will be a challenge. The funding challenge is greater given that both President Biden and Transportation Secretary Buttigieg, just days into their terms, have indicated an opposition to funding any increases through the most straightforward approach, that is, increasing the federal gas tax, which has not been raised since 1993.

Hope springs eternal. With Democrats in control of the White House, Senate and House of Representatives, albeit with the narrowest of margins, tools such as reconciliation, which allow a simple majority



Mayor Pete Buttigieg is new U.S. Secretary of Transportation

vote in the Senate, may be utilized. It is too soon to tell whether a large infrastructure bill will become one of the first signature pieces of legislation out of this administration, but the possibility is real.

The interest, enthusiasm and energy coupled with FAST Act highway reauthorization bill expiration on Sept. 30, 2021 acting as a book end, provides optimism that Congress may just pass an infrastructure bill early in the Biden administration that both sides can call a victory. 

Taylor is principal at FP²'s legislative counsel, Alignment Government Strategies, Washington, D.C.

SealMaster

MAINTAINING THE V

YOUR NATIONWIDE ONE-STOP
MAINTENANCE PRODU

CRACK FILLING SOLUTIONS



- Crack Pro® Melters/Applicators
- CrackMaster® Hot Pour Sealants
- Cold-Applied Crack Sealants
- Rental Programs
- Mastic

ROAD SEALANTS



- Liquid Road® Surface Treatment
- AsPen® Surface Sealer
- OptiPave® Surface Sealer
- Pavement Sealers

TRAFFIC PAINT



- Highly Durable,
Traffic Paints
- Line Striping Equipment
- Pavement Markers

SEALMASTER.NET • LOCATION



WORLD'S PAVEMENT

TOP SOURCE FOR PAVEMENT
PRODUCTS & EQUIPMENT

FFIC
NTS



Fast Drying
Equipment
ing Stencils

BIKE LANE
COATINGS



- Safe Ride™ Bike Lane Green
- Safe Ride™ Bus Lane Red
- ColorPave® Coatings

SPORT
SURFACING



- Tennis Court Color Coatings
- Pickle Ball Color Coatings
- Running Track Coatings

ONS NATIONWIDE • (800) 395-7325

'Smog-Eating' Surface Treatments Can Lead to Cooler Cities

BY MICHAEL P. DURANTE

In early December of 2020, the Global Cool Cities Alliance (GCCA), which is a consortium of major American cities, foundations and corporations committed to accelerating a world-wide transition to cooler, healthier cities, launched a new *Cool Roadways Partnership* in recognition of the critical role our transportation network plays in this global effort.

The not-so-silver lining of America's magnificent built-environment is the human toll it is taking due to the excess heat absorbed and emitted by our heavily populated cities. Urbanization inevitably results in a reduction of green space, as land is reallocated to buildings and pavements. Pavements alone cover as much as one-third of any given city!

When this reality combines with dramatic increases in vehicular emissions, our cities become the victims of a one-two punch. The mobile-pollution related hazards of greenhouse gases (GHG), when combined with the health hazards related to heat sinks [more commonly known as the urban heat island effect (UHI)], are creating untenable economic and health concerns in our communities.

To make matters worse, the burdens of air pollution and UHI are not evenly shared. The higher rates of poverty within densely populated inner cities result in social inequities, as these residents experience the highest exposures to pollutants and urban heat. Public officials and urban planners are well aware of these facts, but historically have lacked the tools to implement measurable change.

COOLER PAVEMENT MATERIALS

As a sustaining partner of the Cool Roadways Partnership, which consists of 20 jurisdictions, non-profits and industry representatives, **Pavement Technology, Inc. (PTI)** is deeply engaged in accelerating the development and scaling the deployment of pavement materials that reduce surface and air temperatures.

Recent real-world pavement applications and extensive laboratory research are demonstrating that traditional state-of-the-art maltene-replacement preservation technologies that prolong pavement life, when combined with photo-reactive materials that purify air and reduce heat, result in significant improvements in the quality of air surrounding our roadways.

Today's preservation material innovations are demonstrating improvements in the solar reflectance of our urban infrastructures as high as 100 tons CO₂ equivalents per lane mile of roadway per year, in addition to reductions in vehicular NO_x and VOCs as high as 60 percent. When combined with the use of cool materials for urban roofing, aggressive global adoption of cool, smog-eating pavements could lead to a potential offset of over 40 gigatons CO_{2e} annually.

Solar reflectance values from a Texas A&M Transportation Institute (TTI) study of this new generation of roadway preservation materials are summarized in the table below. In every case, real-world applications performed in excess of the threshold for the U.S. Green Building Council's LEED standards for heat island reduction.

Compound / Substrate	Solar Reflectance Index Values (SRI)					
Application Rate (a)	Control Sample	Control Sample	0.10 gsy	0.10 gsy	0.08 gsy	0.08 gsy
A.R.A.-1 Ti® / Asphalt	9	8	40	39		
Litho1000 Ti® / Concrete	24	24			38	38
Application Rate (b)	Control Sample	0.03 gsy	0.06 gsy			
Ti-introCME™ / Asphalt	11	30	34			
Ti-introCME™ / Concrete	20	37	42			
Litho1000 Ti® / Concrete	25	41	46			

Solar Reflectivity Chart. Source: Texas A&M Transportation Institute; Orlando International Airport; Charlotte County, Fla.



PTI's PlusTi™ asphalt rejuvenator/sealer application, Raleigh, N.C., 2020

On asphalt surface courses, these pavement solutions can improve roadway heat resilience by as much as four-fold. In addition to mitigating the negative health effects related to smog and heat retention, these new pavement solutions dramatically extend the life of roadways, resulting in reduced asphalt consumption, while reducing building energy demand (BED), thereby realizing even further reductions in the carbon footprints of urban areas.

INTEREST IN TITANIUM DIOXIDE

UHI researchers at the Massachusetts Institute of Technology (MIT), using data from these same studies, have estimated that pavements embedded with TiO_2 can reduce electricity demand by 10 to 17 percent.

As a natural decomposition accelerant, TiO_2 is a multifaceted photo-responsive material rapidly gaining increased scientific and commercial interest for near-roadway microenvironments (MEs), as it advances a host of positive environmental benefits, including but not limited to:

- Creating a solar-reflective top boundary that lessens pavement-related radiative forcing (RF)
- Reducing the convective emissivity of solar radiation that leads to the undesirable UHI effects
- Enhancing the life-cycle assessment of pavements by slowing-down oxidation, and
- Depolluting TiO_2 -reacted surfaces by oxidizing a variety of vehicle-related pollutants and contaminants, thereby reducing ozone pollution and mitigating acid rain formation.

Major municipalities in Arizona, California, Kentucky, Missouri, Mississippi, North Carolina, New Mexico, Pennsylvania and Texas have joined the Cool Roadways Partnership initiative, and work is already underway to improve the quality of life in our communities. Together, public works professionals, and representatives of our country's leading foundations and corporations, are taking the lead in combating the ill-effects of climate change and urbanization...one road at a time. 

Michael P. Durante is vice president, finance and strategic planning, for Pavement Technology, Inc., and managing partner of Blackwall Partners LLC. Edited by Pavement Preservation Journal from material provided by PTI. Opinions expressed herein are not necessarily those of FP² Inc. or this magazine. For more information, contact your local PTI technical consultant (440) 892-1895 or visit www.smogeatingroads.com

Discover the Difference

Spreaders for Soil Stabilization, Soil Remediation, Cold-In-Place Recycling & Full Depth Reclamation



Stoltz Site Spreaders are the Leader in Low-Dust Application of Soil Stabilization Materials

These spreaders revolutionized the industry as construction companies were finally able to apply large quantities of lime, cement, fly ash, quicklime and similar materials accurately and with minimal dust. Available

in a variety of sizes and configurations, each Site Spreader is manufactured for application accuracy and longevity in the harsh environment associated with applying dry binding agents.



Truck Mounted Spreaders



Trailer Mounted Spreaders



Custom Designed Spreaders

- Spreads all dry binding agents accurately including Quicklime
- Spread rates up to 120 lb/sq. yd.
- Pneumatic fill units include "pulse jet filter can" for clean loads
- Available in manual or automatic rate control with Stoltz Controller
- Sizes from 8 to 27 tons

STOLTZ

SITE SPREADER

1-800-843-8731

Get all the details you need at www.stoltzspreaders.com



There are partners. Then there is Russell Standard.

Rest assured, when it comes to a partner you can trust in asphalt materials and pavement preservation, look no further than Russell Standard. Visit russellstandard.com and find out how we are truly unmatched all the way around.



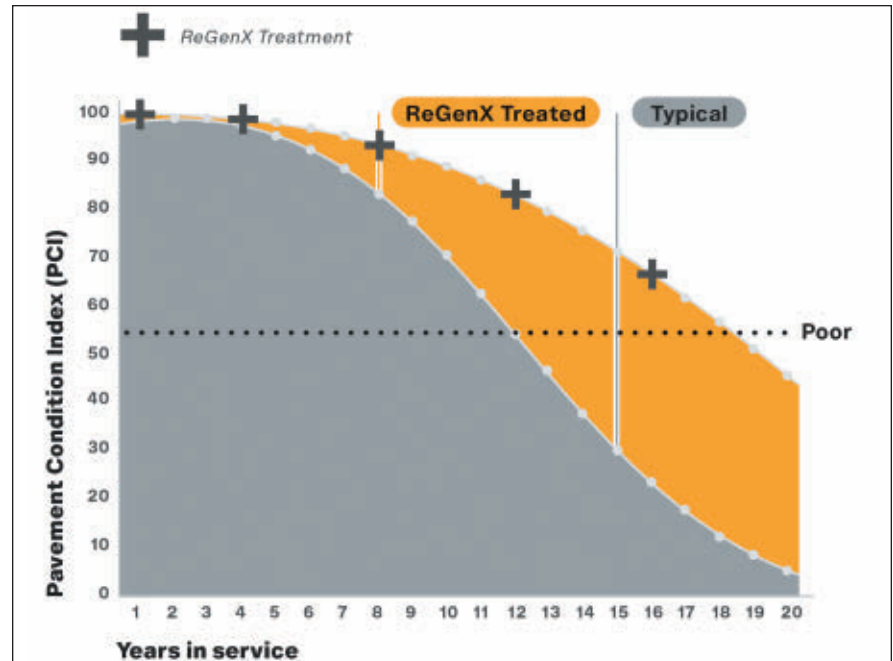
State, City DOTs Study Penetrating ‘Regenerator’

Roads are the backbone of our economy and the framework of our mobility. They provide easy access to our family a city away and a safe passage to and from work every day. They also sustain wear and tear regularly, resulting in continuous maintenance. We have all faced bumps, cracks and potholes on the road, and the reason is aging pavements that are rapidly deteriorating.

“Our district has a big backlog of pavement rehab, mill-and-fill jobs which is statewide and centrally managed by our pavement management section,” says Matt Schlitter, assistant maintenance engineer for the Southern District of the **Delaware Department of Transportation** (DelDOT). “And, if you account for inflation, our budget has decreased. So, it kind of feels like we are on the same course as the *Titanic* getting ready to run into the iceberg.”

Agencies like his are starting to explore how they can stretch their taxpayer dollars further, and one way to do that economically is to make their roads last longer by focusing on pavement preservation.

In Mississippi, the **City of Ridgeland** Public Works Department is actively finding ways to extend the life of its pavements and recycle asphalt materials in an effort to control costs. Today, the city is evaluating



Estimated improvement of pavement condition over time through routine application of ReGenX

the effectiveness of age-regenerating treatments, such as Blackledge’s Performance Surface ReGeneration, named **ReGenX®**.

ENHANCED PAVEMENT FLEXIBILITY

Blackledge’s ReGenX is a state-of-the-art regenerating emulsion available for high-performing surface treatment

applications. ReGenX upgrades the pavement or surface treatment binder by re-balancing the asphalt’s chemical makeup and particle size distribution, thereby significantly reversing the adverse effects of aging. It may also be used in high-RAP cold mixture applications. In many cases, it is possible to use ReGenX



Near Jackson, Miss., regenerator-treated lane is contrasted with untreated lane

**If you could
extend pavement life
while improving
UV reflectivity
by as much as 400% and
capturing up to 60% of
vehicular pollutants,
why wouldn't you?**

P/USTI™
Smog Eating Roads

A Better Way to Get There

mdurante@pavetechinc.com



www.SmogEatingRoads.com

Real Science. Real Results.

to extend the useful life of the pavement surface or existing surface treatment in lieu of more expensive treatments or rehabilitation alternatives.

"We hope to find that ReGenX increases our pavement's flexibility to better contend with shifting subgrade soil conditions and leads to less cracking," says Chris Bryson, Ridgeland city engineer. "If ReGenX does what it's supposed to before the road's subgrade deteriorates, then it could save the city more than \$1 million dollars in additional paving costs. It's kind of like buying insurance. The cost of applying ReGenX is a small price to pay for pavement preservation. It's less than 5 percent of the overall value of the pavement it is enhancing."

Meanwhile, DelDOT has many prime chip roads and relies on tar-and-chip to build cost-effective pavements. While there are obvious financial incentives for tar-and-chip construction, there are some downfalls as well.

"A lot of people from other states retire in this region," says DelDOT's Schlitter. "They do not know what tar-and-chip is nor do they like loose stones hitting their cars, and we're getting about seven years out of a tar-and-chip surface."

Because of this, DelDOT is exploring new, economical ways to preserve its hot-mix paved roads so they last longer and are able to build more. One product they have tested to achieve this is ReGenX.

Just how long does a product like ReGenX extend the life of the roads? According to independent studies by the National Center for Asphalt Technology (NCAT) at Auburn University, and Asphalt Testing Solutions & Engineering (ATS), the life of the road could extend up to 18 years.

NCAT found that an aged section of road treated with ReGenX sustained a reduction in binder stiffness and a significant improvement in low-temperature properties after testing a sample.


ATS partnered with Duval Asphalt to perform a product demonstration of ReGenX and initially found a significant reduction in viscosity. Duval currently is still testing the product for more findings.

As the typical lifespan of a pavement is 12 years, an additional six years of service life would mean substantial savings for local governments. How does ReGenX achieve this? Once sprayed onto the pavement, ReGenX penetrates the surface to

restore asphalt binder performance, thus extending the service life.

Versatility and constructability are other cost-saving measures a product like ReGenX provides. Many age-regenerating surface treatments can be applied without special equipment—a conventional distributor truck, tractor or "gator"—on a variety of surfaces that need limited surface preparation.

Additionally, with routine treatment, ReGenX has been proven to improve mix durability by reversing the effects of aging due to oxidation.


Looking down the road, the future of road construction must incorporate pavement preservation in order to keep up with the rising cost of maintaining aging pavements. Using products like ReGenX will be key to restoring the pavement's surface layer to enhance pavement performance while extending the life of the road, delivering savings and sustainability along the way. 

Edited by Pavement Preservation Journal from material provided by Blackledge Emulsions. Opinions expressed herein are not necessarily the those of FP² Inc. or this magazine

ALBINA


ASPHALT

Improving the road ahead.



OUR SERVICES

• Paving Grade Asphalt	• Asphalt Rejuvenating Agents	• Railcar Logistics
• Cut Back Asphalt	• Asphalt Release Agents	• Asphalt Delivery Services
• Asphalt Emulsions	• Dust Palliatives	• Asphalt Spreader Services




Paving Roads in the Northwest for over 50 years
www.albina.com

HEADQUARTERS
 Vancouver, WA
 360-816-8016

VANCOUVER TERMINALS
 Vancouver, WA
 360-816-8550

MADRAS TERMINAL
 Madras, OR
 541-475-6638

KLAMATH FALLS TERMINAL
 Klamath Falls, OR
 541-884-5100



ASPHALT ADDITIVES

EVERY HIGHWAY. EVERY ROAD.

WE'RE HERE TO PRESERVE & PROTECT

At KAO, we have the specialized asphalt additives you need to solve any paving challenge. We have been manufacturing and supplying high-performing asphalt emulsifiers and additives to customers in over 30 Countries for over 40 years.

We're flexible, reliable, and here to stay.

Asfier®

Asphalt Emulsifiers

Gripper®

Anti-stripping Agents

Danox® RAP

Recycling Agents



ksa.asphalt@kao.com



OGFCs, Moisture, Stripping Damage Studied

Editor's Note: This is the 16th of a continuing series of profiles of civil engineering students who are undertaking pavement preservation as a course of study. These students bring a different perspective of why a young civil engineer would pursue preservation study. This month we look at Hossam Abohamer, a doctoral candidate in Transportation and Highway Engineering at Louisiana State University. Our thanks to Mostafa A Elseifi, Ph.D., P.E., Occidental Chemical Corporation Distinguished Professor at the LSU Department of Civil and Environmental Engineering, who coordinated Abohamer's participation.

WHAT GOT YOU INTERESTED IN PAVEMENT PRESERVATION?

My first experience with pavement preservation was during my master's studies in Egypt. At that time, our research sought to use both functional and structural indices to select optimum preservation treatments for flexible pavements.

After I joined Louisiana State University in 2019, Prof. Mostafa Elseifi assigned me a task in an ongoing research project that aimed to evaluate the performance of chip seals and thin asphalt concrete (AC) overlays in the presence of moisture damage in the underlying layers.

I also completed a class about pavement evaluation and rehabilitation in which I learned about different evaluation tools and treatment activities for both flexible and rigid pavements. In this class, I learned how to develop a list of preservation activities that can be applied to a given pavement section based on its functional and structural conditions. In addition, I was introduced to the monetary and non-monetary factors that affect the final decision in selecting a pavement preservation activity.

HOW IS YOUR RESEARCH RELATED TO PAVEMENT PRESERVATION?

My graduate research is related to pavement preservation in two areas. First, every year, Louisiana receives about 60 in. of rainfall. Therefore, the issue of AC stripping and moisture damage is of great interest among pavement maintenance and design engineers.

The Louisiana Department of Transportation and Development (LaDOTD) applies **chip seals and thin AC overlays** as a maintenance treatment every year.

However, the underlying conditions of the existing pavement is rarely considered.

In this study, we evaluate the effects of the presence of moisture damage on the performance and cost-effectiveness of chip seals and thin AC overlays.

The **Pavement Condition Index (PCI)** is used to assess the conditions of chip seal and thin AC overlays throughout their service life. In addition, four different performance indicators: **pavement service life, average deterioration rate, average increase in pavement condition, and cost-effectiveness** are used to quantify the impacts of moisture damage on the different pavement preservation treatments.

The results of this study indicated that the presence of moisture damage adversely affected chip seals and thin AC overlays performance and cost-effectiveness. In addition, the results highlighted the importance of treating AC stripping prior to placing any preservation treatments.

Second, my current research focuses on another pavement rehabilitation treatment: thin **Open Graded Friction Course (OGFC)** layers. Many highway agencies across the United States apply a thin OGFC layer to existing pavements to provide road users safety during rainy conditions and to reduce traffic noises in urban areas. OGFC also reduces hydroplaning and provide high skid resistance that may prevent crashes in wet conditions.

However, many states reported durability issues with OGFCs, as is the case in Louisiana. Therefore, my research seeks to develop an OGFC mixture that can achieve its functional purposes without adverse durability issues. Our project team aims to introduce a new generation of OGFC mix that may enhance the performance of the



Hossam Abohamer field-tests chip seal sections constructed in District 58, Tensas Parish, La.


current OGFC mix used by LaDOTD with no significant increase in cost.

HOW HAS YOUR PERSPECTIVE CHANGED ABOUT OUR ROAD INFRASTRUCTURE SINCE BEGINNING RESEARCH?

Pavement preservation treatments are the most cost-effective way to keep road networks in an acceptable condition. However, the concept of pavement preservation is not popular in many countries around the world.

In many **underdeveloped countries**, highway agencies tend to place AC overlays with a constant thickness regardless of the functional and structural conditions of the road segment. This approach is very costly and is more expensive than following the proper maintenance and preservation procedures. However, there is a need to identify the optimum treatments based on a comprehensive evaluation of the existing pavement. Adopting the correct maintenance and preservation procedures will help underdeveloped countries use preservation and restoration activities on structurally-sound pavements and save limited funds such as rehabilitation and reconstruction activities to structurally deteriorated pavements.

DO YOU HAVE PLANS TO CONTINUE IN THE FIELD OF PAVEMENT PRESERVATION UPON GRADUATION?

It has been one of my long-term career goals to contribute to pavement engineering and preservation. In the U.S., the construction of new roads is limited and much of the construction activity is related to pavement preservation and rehabilitation. Therefore, pavement preservation will be the first area in which I aim to contribute upon graduation. 

Asphalt Pavement Industry Remains Top Recycler of Materials in Terms of Weight

The asphalt industry maintained its stellar reputation as the country's top recycler in terms of weight, according to an updated survey released late in 2020.

Put in easily visualized terms, if one considers all the newspapers, aluminum and steel cans, glass, and plastic bottles the U.S. recycles annually and put them on a scale, they would still weigh less than three-fourths that of reclaimed asphalt pavements in 2019, making asphalt pavement America's most recycled product.

The objective of this survey, first conducted for the 2009 and 2010 construction seasons, was to quantify the use of recycled materials by the asphalt pavement industry, primarily reclaimed asphalt pavement (RAP) and reclaimed asphalt shingles (RAS), in addition to warm mix asphalt (WMA) technologies.

For the 2019 construction season, the most recent period for which data are available, the National Asphalt Pavement Association (NAPA)—in partnership with the Federal Highway Administration (FHWA)—conducted a voluntary survey of asphalt mixture producers across the United States on tons produced, along with a survey of state asphalt pavement associations (SAPAs) regarding total tons of asphalt pavement mixture produced in their state.

The late September report compiles results from 212 companies with 1,101 plants in 48

U.S. states, the District of Columbia, and one U.S. territory. Of the 97 million tons of RAP reclaimed, contractors reused 89.2 million tons in new asphalt pavements in 2019. That 97 million tons of RAP saved enough landfill space to fill up the U.S. Capitol dome 1,223 times, NAPA says.

This is a nearly 8.5 percent increase from the 2018 construction season and represents a nearly 59.3 percent increase from the total estimated tons of RAP used in 2009, when this annual survey was first conducted.

For the first time, the survey evaluated greenhouse gas emissions, finding RAP usage saved 2.4 million metric tons of CO_{2e}, the equivalent of removing 520,000 passenger vehicles from the road. In concert with the survey, NAPA has also released a recycling video and sustainability-themed *Pave It Black* podcast.

"NAPA and its members are committed to building and maintaining our country's infrastructure with the utmost goal of recycling, sustainability, and concern for our environment and resources while providing the smoothest, quietest, safest, and most perpetual pavement surface available," said NAPA 2020 chairman Jay Winford Jr., Ph.D., P.E.

The use of recycled materials—primarily reclaimed asphalt pavement (RAP) and reclaimed asphalt shingles (RAS)—in asphalt pavements conserves raw materials and reduces overall asphalt mixture costs,

as well as reduces the stream of material going into landfills.

WMA technologies have been introduced to reduce production and compaction temperatures for asphalt mixtures, which reduces the energy needed and emissions associated with mixture production. Additional benefits include improved low-temperature compaction of asphalt mixtures leading to improved pavement performance, as well as a longer paving season. WMA was chosen for accelerated deployment in federal-aid highway, state department of transportation, and local road projects as part of FHWA's 2010 *Every Day Counts* initiative. Access the full report at <https://www.asphaltpavement.org/>.

PERCENT RAP USED RISES

Results show significant growth in the use of RAP, RAS, and WMA technologies since 2009, although the rate of year-over year growth has generally slowed since 2013. The asphalt industry remains the country's most diligent recycler with more than 99 percent of reclaimed asphalt pavement being put back to use.

The average percentage of RAP used in asphalt mixtures has increased from 15.6 percent in 2009 to 21.1 percent in 2019. The 2019 estimated RAP tonnage used in asphalt mixtures was 89.2 million tons, representing 4.5 million tons (24 million barrels) of asphalt binder conserved, along with the replacement of more than 84 million tons of virgin aggregate.

The use of RAS in asphalt pavement mixtures has increased from 701,000 tons in 2009 to an estimated 921,000 tons in 2019 with the use of RAS decreasing (12.5 percent) from 2018 to 2019.

The combined savings of asphalt binder and aggregate from using RAP and RAS in asphalt mixtures is estimated at more than \$3.3 billion and some 59 million cubic yards of landfill space.

More than 1.3 million tons of other recycled materials were reported as being incorporated into nearly 8.3 million tons of asphalt pavement mixtures during the 2019 construction season, including recycled tire



Beneficiation of raw milled RAP via crushing and screening boosts consistency and re-use of reclaimed material in mixes, via stockpiling of preferred aggregate sizes and average residual asphalt content after testing



Raw RAP awaits added-value beneficiation via crushing and screening



Shredded, screened reclaimed asphalt shingles (RAS) prior to re-use in mix

rubber, blast furnace slag, steel slag, and cellulose fibers.

WMA VOLUME INCREASES, TOO

The estimated total production of asphalt with WMA technologies during the 2019 construction season was 164.5 million tons, of which about 48 percent was produced at reduced temperatures. This was a 4 percent increase from the estimated 157.7 million tons of WMA in 2018, with increased utilization reported for the DOT and Commercial and Residential sectors tonnage for the year. Utilization of WMA technologies in 2019 was 879 percent more than the estimated 16.8 million tons in the 2009 construction season.

Asphalt produced with WMA technology made up 38.9 percent of the total estimated asphalt mixture market in 2019. Production plant-foaming, representing 51 percent of the market, is the most commonly used warm-mix technology; chemical additive technologies accounted for a little more than 48 percent of the market. Relatively minor differences were seen in which WMA technologies were used when production temperatures were or were not reduced.

More information is available at https://www.asphaltpavement.org/uploads/documents/09-28-2020_Press_Release_2019_WMA_Survey_Final_Draft.pdf.

GUIDE TO SUSTAINABLE ASPHALT

NAPA continues its efforts in spotlighting the environmentally sustainable aspects of asphalt pavements with the fourth installment in its *Sustainable Asphalt Pavements: A Practical Guide* series, titled *How to Develop a Sustainability Program*.



U.S. asphalt producers reclaimed some 97 million tons of asphalt pavement in 2019, according to NAPA/FHWA survey released late last year

Released in November, the 50-page book outlines the components of a successful sustainability program.

"Many asphalt pavement producers already engage in sustainable practices, but they don't always have a formal framework for recognizing, quantifying, and reporting out on these activities," said Joseph Shacat, NAPA's director of sustainable pavements. "This guide helps in building out that framework, drawing inspiration and examples from well-known companies in the sector that have a good deal of experience with running sustainability programs."

The sustainable pavements practical guide series was released beginning in 2019. The first three volumes—*Sustainability Overview*, *Sustainability Specifics*, and *Procuring & Evaluating Sustainability* were released earlier, and now the four volumes have also been compiled into in a single tome, *Sustainable Asphalt Pavements: A Practical Guide*.

Each volume in the series is accompanied by a webinar explaining how the concept of sustainability can be applied in asphalt pavement production and road construction. The webinars and books are available at no charge via www.AsphaltPavement.org/PracticalGuide.

GREENHOUSE GAS CALCULATOR


In addition, NAPA's online *Greenhouse Gas (GHG) Calculator* (v. 5) allows users to evaluate greenhouse gas emissions related to asphalt pavement manufacturing in a gate-to-gate analysis. The web-based software tool is free to use.

The user-friendly interface provides a list of typical fuels that are linked to GHG emission factors. GHG emissions are expressed as carbon dioxide equivalents (CO_{2e}), the universal measure of greenhouse gas emissions in terms of global warming potential.

The GHG Calculator provides inputs for separate fuels used by a rotary dryer plus additional fuels used inside the facility by equipment, including vehicles. A final category addresses CO_{2e} attributed to electrical use, with location-specific factors to account for the different types of power generation used in each region of the country. Fuel used for onsite power generation can be entered in the Equipment & Vehicles section. Generally, the more fuel combusted or burned, the higher the CO_{2e} emissions.

Version 5 uses most of the same assumptions, calculations, and emission factors as the previous version. The biggest change is that it was migrated to a new format in 2020 because the Flash-based format of the previous version will become obsolete in 2021.

It should also be noted that the GHG Calculator uses a different set of system boundaries, assumptions, and emission factors than the *Emerald Eco-Label* environmental product declaration (EPD) tool, so the results from the two tools are not directly comparable.

Access the NAPA Greenhouse Gas Calculator at <https://asphaltpd.org/ghg/>. 

Compiled by Pavement Preservation Journal from material provided by the National Asphalt Pavement Association Images by Tom Kuennen

PRESERVING PAVEMENTS SINCE 1923

MICRO SURFACING ♦ SLURRY SEAL ♦ CHIP SEAL ♦ FOG SEALING ♦ CRACK SEALING

Specializing in work for Cities, Counties and State DOT's

All Emulsified Asphalt based treatments installed for the preservation research at NCAT/MNROADS were completed by Vance Brothers, Inc. crews.



Bringing Integrity to the Surface.®

vancebrothers.com

Looking for a better Micro Surfacing solution?

Our new micro surfacing product offers you several advantages

Delayed reflective cracking
Superior wearing surface
Cold weather aggregate retention
Improved self-healing



Connect with us to learn about how our
Soft-Binder Fiber-Reinforced Micro Surfacing product
can fit into your road maintenance plan...

www.strawserconstruction.com/contact-us/

INDEX TO ADVERTISERS

ASPHALT

All States Asphalt, Inc./DBA
All States Material Group 15
www.asmg.com
National Asphalt Pavement Association 18
www.asphalt pavement.org

ASPHALT ADDITIVES & MODIFIERS

BASF Corporation 5
www.basf.com/asphalt
Collaborative Aggregates LLC 24-25
www.collaborativeaggregates.com
Kao Specialties Americas LLC 40
www.kaochemicals-eu.com

ASPHALT DISTRIBUTORS

E D Etnyre & Company 45
www.etnyre.com

ASPHALT EMULSIONS OR EMULSIFYING AGENTS

Blacklidge Emulsions, Inc. 19
www.blacklidge.com/ReGenX
Cleveland Asphalt Products 45
Ergon Asphalt & Emulsions, Inc. Inside Front Cover
www.ergonasphalt.com
Ingevity 7
www.ingevity.com
Russell Standard Corporation 36
www.russellstandard.com

TRICOR Refining, LLC 28
www.reclamite.com

ASPHALT EQUIPMENT & SUPPLIES

Sealmaster 32-33
www.sealmaster.net

ASPHALT PRODUCTS

McAsphalt Industries Limited Inside Back Cover
www.mcasphalt.com

ASPHALT TESTING

PRI Asphalt Technologies inc. 14
www.priasphalt.com

CHIPSEAL

VSS International, Inc. 3
www.slurry.com

COMPACTION EQUIPMENT

Wirtgen Group Outside Back Cover
www.wirtgen-group.com

CRACK REPAIR

Crafco, Inc. 4
www.crafco.com

CRACK SEALANT/FILLER MATERIAL EQUIPMENT

Crafco, Inc. 4
www.crafco.com

CRUSHERS

Wirtgen Group Outside Back Cover
www.wirtgen-group.com

CLEVELAND ASPHALT PRODUCTS

Emulsions • Cutback Asphalt • RAP Recyclers



PLANT & FLEET

P.O. Box 1449
US 59 North
Shepherd, TX 77371



936-628-6200
1-800-334-0177
Fax 936-628-6602

ccmcapco@msn.com

WHEN IT COMES
TO PAVEMENT
MAINTENANCE,
WE'VE GOT YOU
COVERED

Etnyre



Variable Width ChipSpreader

BEARCAT
MANUFACTURING
A WIRTGEN GROUP COMPANY



BC-502 Asphalt Distributor

RAYNER
EQUIPMENT SYSTEMS
A WIRTGEN GROUP COMPANY



PavementSaver II w/ARC



INTERNATIONAL

bearcatmfg.com etnyre.com roadsaver.com

DUSTROL, INC.

INNOVATIVE ASPHALT MAINTENANCE
SINCE 1973



SERVICES AVAILABLE:

- > Surface Recycling
- > Milled Rumble Strips
- > Cold Milling

OFFICE LOCATIONS

Towanda, KS
316.536.2262

Roanoke, TX
817.430.3958

El Paso, TX
915.849.8773

Pueblo, CO
719.583.0905

Lincoln, NE
402.466.1184



1200 E. Main, Towanda, KS 67144
Ph: 316.536.2262 • Fax: 316.536.2789

bhansen@dustrol.com
www.dustrol.com

INDEX TO ADVERTISERS

EMULSIONS

Crafco, Inc.4
www.crafco.com

HOT-IN-PLACE RECYCLING

Dustrol, Inc.46
www.dustrol.com
Gallagher Asphalt Corporation11
www.gallagherasphalt.com

LAYDOWN CONTRACTORS

Strawser Construction Inc.44
www.strawserconstruction.com

MICROSURFACING

VSS International, Inc.3
www.slurry.com

MILLING MACHINES

Wirtgen Group Outside Back Cover
www.wirtgen-group.com

PAVEMENT MAINTENANCE PRODUCTS

Unique Paving Materials20-21
www.uniquepavingmaterials.com

PAVEMENT PRESERVATION

Albina Asphalt39
www.albina.com
Asphalt Materials, Inc.46
www.asphalt-materials.com
Pavement Technology, Inc.38
www.smogetingroads.com

TRICOR Refining, LLC28
www.reclamite.com
Vance Brothers Inc.44
www.vancebrothers.com

PAVING EQUIPMENT

Wirtgen Group Outside Back Cover
www.wirtgen-group.com

RECYCLING EQUIPMENT

Pavement Recycling Systems26
www.pavementrecycling.com

SLURRYSEAL

VSS International, Inc.3
www.slurry.com

SOIL STABILIZING EQUIPMENT

Stoltz Mfg35
www.stoltzmfmg.com

SPREADERS – STONE, SAND & CHIP

E D Etnyre & Company45
www.etnyre.com

TANKS – BULK STORAGE/TRANSPORT

E D Etnyre & Company45
www.etnyre.com

TRUSTED ASPHALT PARTNERS

INNOVATIVE SOLUTIONS FOR ALL OF YOUR ASPHALT NEEDS.

WWW.ASPHALT-MATERIALS.COM

EMULSCOAT, INC.

BITUMINOUS
MATERIALS & SUPPLY

ProTack
Asphalt Spraying Experts

MEIGS
Paving Asphalt & Emulsions

Asphalt Materials, Inc.

BAND

Pavement Maintenance
Systems, LLC

TRI STATE
ASPHALT

Preservation

Construction

Specialty
Applications

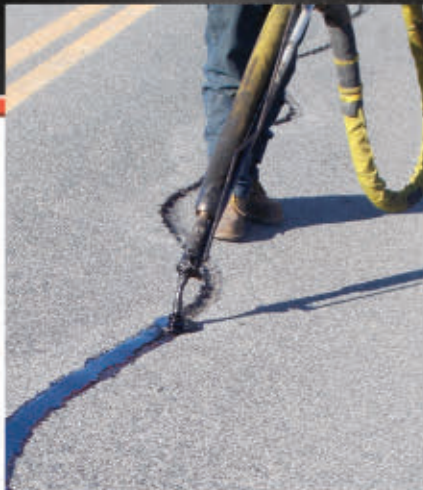
CONTACT US :

info@asphalt-materials.com
Office: 317-872-6010



MACSEAL

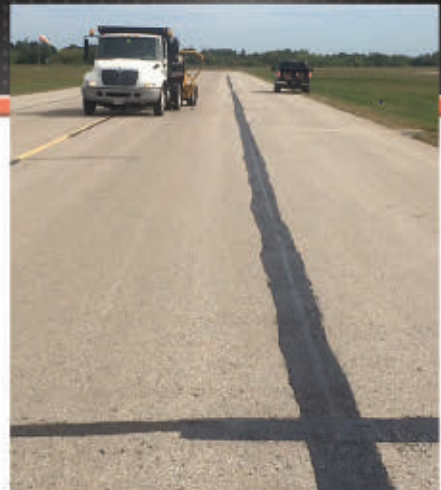
PAVEMENT SEALANTS



**JOINT
& CRACK
SEALANTS**



**ASPHALT
WATERPROOFING
MEMBRANES**



**ASPHALT
MASTIC CRACK
REPAIR SYSTEM**

H O T A P P L I E D



With our broad array of crack sealant products we are committed to providing you with the knowledge, quality and performance you deserve.

mcasphalt.com

ISO 9001/14001/45001

The Most Innovative Paver Technology!

VÖGELE SUPER 1700-3i / SUPER 1703-3i
VÖGELE SUPER 2000-3i / SUPER 2003-3i



The number one on the global market presents the “Dash 3” paver generation for the North American market. The 8-foot SUPER 1700-3i track and SUPER 1703-3i wheel and the 10-foot SUPER 2000-3i track and SUPER 2003-3i wheel pavers are available with an unparalleled range of screed offerings including front and rear-mounted vibratory screeds to high-compaction screeds. The new pavers include the intuitive ErgoPlus 3 operating system along with a few enhancements including VÖGELE EcoPlus and PaveDock Assistant.

 www.wirtgen-group.com