THE CHALLENGE

The integrated contractor and emulsion producer was tasked with re-paving the high-profile, heavily trafficked Brooklyn Bridge deck with a heavy application of micro-surfacing over the course of 6 nights with very limited paving hours. The weather conditions were less than ideal, with cooler temperatures and high humidity. The project presented the following unique challenges:

Limited Paving Hours
- Work could not begin until 10:00pm with approximately 2 hours of prep work (to cover expansion joints and drain inlets) required each night before resurfacing could begin. All covers had to be removed and traffic markings installed before re-opening to traffic by 5:30am.

Nighttime and Cool Paving Conditions
- Micro-surfacing had to be applied at night in high humidity and cool temperatures. Ambient temperatures were in the low to mid 60’s °F with a relative humidity of 80%+. Bridge deck surface temperatures were cooler in the upper 50’s to low 60’s.
- Cooler, more humid conditions are more challenging for applying micro-surfacing because traditionally, it takes a longer time after paving before the road can be re-opened to traffic. This is because at night and in cool conditions, the micro-surfacing needs more time to develop sufficient strength before returning traffic. As a result, the contractor must stop paving long before, sometimes up to a few hours in advance of opening the road to traffic, further limiting available paving hours. This leads to slower production rates and reduced operational efficiency.

Double Application
- The application was a double lift, with each lift consisting of 28 lbs of mix per square yard for a total of 56 lbs per square yard. Tack coat was applied to the concrete bridge deck substrate.
- Use of tack coat and a heavy application traditionally requires more time after paving before the road can be opened to traffic. A thicker application takes longer to set, cure and develop sufficient strength, slowing production and operational efficiency.

Traffic Volume
- The Brooklyn Bridge is about 1.1 miles in length with 3 lanes of travel in each direction, each approximately 10 feet in width. The Annual Average Daily Traffic (AADT) count is approximately 150,000 vehicles.
- Micro-surfacing done at night is more susceptible to early traffic damage and loss of stone. An AADT of 150K cars is very high, so the micro-surfacing must quickly cure and develop significant strength before traffic return otherwise excess damage could occur, in which case the contractor would have to remove the application and re-do the paving at their own expense.
THE SOLUTION

Road Science consulted with the client contractor and emulsion producer on the goals and challenges of the project. Road Science simulated the anticipated challenging field paving conditions in our customer support laboratory and measured key performance characteristics of the micro-surfacing using different emulsifier chemistries.

The most advantageous emulsifier was proven to be ArrTekk® 1295, a micro-surfacing emulsifier technology that lengthens micro-surfacing life cycle by up to 30%, allows for better workmanship and aesthetics, and facilitates quicker traffic return for faster paving and increased production rates. ArrTekk 1295 was used to formulate the emulsion and complete the micro-surfacing mix design.

Road Science plant and field support personnel traveled to the emulsion plant and to the Brooklyn Bridge to ensure emulsion production and the micro-surfacing application proceeded smoothly.

THE RESULTS

Due to the tight project schedule, ArrTekk 1295 emulsifier chemistry was vital to the success of this project because it resulted in:

- A quicker set time of < 7 minutes for a 40%+ faster rate
- A 50% reduction in additional water added to the mix to achieve proper mix consistency
- Faster and stronger cohesive strength development with cooler weather and surface temperatures allowing for earlier pneumatic rolling of the micro-surfacing, as soon as 20 minutes after placement vs. 45-60 minutes typically required
- The contractor exceeding the anticipated project schedule by allowing for more paving time within the short lane-closure timeframes, and faster curing for sooner placement of pavement markings and on-time traffic return
- Project completion within 4 ½ nights vs. the 6 nights allotted.

ArrTekk 1295 can also be used in micro-surfacing applications including those over asphalt pavements and in crack relief interlayer applications.
THE FEEDBACK

“Great set time under these cool conditions and the thickness we are laying. We will get more tons put down tonight than anticipated.”
Micro Paver Operator

“Never thought we could have micro set up that quick tonight and be able to roll it in 20 minutes without hurting it. I am liking this.”
Project Supervisor

THE ROAD SCIENCE ADVANTAGE

ArrMaz’s Road Science division is a leader in the development of asphalt additives, emulsifiers, and paving and recycling system technologies for the asphalt industry worldwide. Our offerings span the entire customer value chain from producing key chemical components for asphalt refineries, terminals, emulsion plants and hot mix asphalt (HMA) plants, to providing laboratory and field engineering support of pavement applications. Road Science delivers responsive, comprehensive and dependable customer support focused on helping our customers succeed. Through our experienced staff of professionals and world-class AASHTO Materials Reference Laboratory (AMRL) accredited laboratory, we work alongside our customers to:

• Improve product quality and consistency
• Improve product performance
• Bring new products to market
• Solve product problems
• Increase profitability
• Increase operational efficiency

Contact Road Science today and learn how we can help you make the grade.
Call 918-960-3800, email customerservice@roadscience.net or visit our website at roadscience.net for further information.

The information contained herein is presented in good faith and believed to be accurate, however, ArrMaz Products, LP assumes no responsibility or liability for the information provided. ArrMaz Products, LP further makes no representations or warranties, either express or implied, of merchantability, fitness for a particular purpose or of any other nature with respect to the information or the product(s) to which the information refers.

© 2017 ArrMaz Products, LP. All rights reserved. This material may not be reproduced, displayed, modified or distributed without the express prior written permission of the copyright holder.