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ROADS & INFRASTRUCTURE AUSTRALIA

A GREENER INDUSTRY

How the roads and infrastructure sectors are adopting new technology and best practice to minimise impacts on the environment

CIRCULARITY THROUGH COLLABORATION

State Asphalts NSW is establishing meaningful partnerships as it looks to produce an alternative recycled material for road construction

THINKING OUTSIDE THE BOX

Industry leaders on what more can be done to support sustainable project delivery and procurement

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BITUMEN'S BEST FRIEND

SRIPATH'S PGXPAND, HAS BEEN ENGINEERED TO IMPROVE THE OVERALL PERFORMANCE OF ROADWAYS, WHILE PROVIDING SUBSTANTIAL ENVIRONMENTAL BENEFITS. *ROADS & INFRASTRUCTURE* LEARNS MORE.

PGXpand can reduce the viscosity of bitumen by five to 15 per cent.



Sustainability has long been a staple of Sripath's products.

Since 2006, the bitumen additive manufacturer and designer has developed solutions for legacy issues which have plagued the bitumen and asphalt industries.

In 2013, Sripath® commenced development of a new bitumen-friendly polymer, designed to improve the rutting resistance and increase the durability of roadways across the globe. This paved the way for the creation of PGXpand®.

As Sripath President Krishna Srinivasan tells *Roads & Infrastructure magazine*, the first challenge when developing PGXpand was designing the additive at a molecular level.

"PMBs based on traditional polymers require high energy processing equipment and higher temperatures to get them blended into the bitumen. They can often

be difficult to compact and lay down", he says.

"We wanted to create a product that could deliver roadways with outstanding rutting resistance, fatigue properties, high temperature performance, as well as durability, while also being easy to process and use. That's really the genesis behind PGXpand."

NOT YOUR AVERAGE ADDITIVE

Sripath's PGXpand has been uniquely engineered to boost the high-temperature performance of bitumen, while not affecting the lower-temperature properties.

Contractors in the bitumen industry can incorporate this binder-friendly product into the bitumen, using low shear mixers, lower mixing temperatures (at 150 °C), and shorter mixing times.

PGXpand is also highly dosage efficient,

and helps reduce greenhouse gas and carbon emissions, thanks to shorter mixing times, lower mixing energy, and lower paving temperatures.

Sripath Asia-Pac General Manager Ravi Rajagopalan says PGXpand can be used for a variety of applications, including, PMB (polymer modified bitumen) hot mixes, hybrid PMB mixes, high stiffness asphalt mixes, hot spray seal works and routine road repair and maintenance applications.

"That's where we set ourselves apart, with an additive that is bitumen friendly. It essentially dissolves easily into the bitumen and imparts exceptional properties to PMB hot mixes, therefore giving the contractor a better product," he says.

PGXpand targets and improves essential aspects of bitumen performance, such as the true high grade, softening point and penetration. All of which has been proven



PGXpand improving rutting resistance for a major highway in India.



A polymer modified bitumen and PGXpand mix being paved on a roadway.

hot spray seal applications,” says Dr. Filippo Giustozzi, Associate Professor, Royal Melbourne Institute of Technology (RMIT). “This PMB can be sprayed at lower temperatures, is easier to manufacture, and shows better adhesion to aggregates.”

Steve Halligan, Director of Road Surfacing Solutions adds that the addition of two per cent PGXpand to a C600 binder, improved the resilient modulus of an AC20 dense graded mix from around 4970 MPa to 5840 MPa, as tested by RMIT University.

“PGXpand has this unique ability to improve the stiffness of an asphalt mix, allow for the reduction of the thickness of a paved layer, and provide an opportunity for significant cost savings,” he says.

Srinivasan adds that the performance of the product is outstanding when compared to conventional products in the market.

“Especially when it comes to the dosage efficiency, which really translates to a cost advantage for the contractor,” Srinivasan says.

A SUSTAINABLE SOLUTION

Rajagopalan says PGXpand caters to the bitumen industry’s growing demand for sustainable alternatives, as Australia moves to achieve net zero emissions by 2050.

“Currently in Australia there’s a big emphasis on reducing the nation’s carbon footprint. Because of the lower energy requirements for using PGXpand and its compatibility with crumb rubber and other polymers in bitumen, it’s gaining traction

through the performance of the product, which has serviced roadways globally since 2015.

As with the majority of Sripath’s catalogue of additives, PGXpand is backed by the company’s international expertise and testing. Rajagopalan says customer trials have shown that PGXpand can reduce the viscosity of bitumen by five to fifteen per cent.

“What really helps us is our experience in Asia. The temperature range in the subcontinent, which can be more than 40 degrees Celsius in summer, along with really heavy traffic loads, closely aligns with Australian conditions,” Rajagopalan says.

“In Australia we’ve discovered some unique practices that aren’t used in other parts of the world. One example is hot spray and seal applications, where PGXpand, when incorporated along with

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crumb rubber, has shown some striking advantages in terms of reducing viscosity, making the hybrid PMB easier to spray, improving adhesion to the aggregate, and delivering outstanding performance, while reducing cost.”

RMIT University independently evaluated and vetted PGXpand and PMB hybrid mixes using local Australian aggregates, binders and additives and tested performance against national specifications.

“When compared to a control PMB made with 15 per cent crumb-rubber, a hybrid PMB containing 10per cent crumb-rubber and one per cent PGXpand has superior properties, which are more suitable for

from an environmental aspect,” he says.

Industry feedback on the performance of PGXpand has been supportive. Additional trials of the additive are set to start in the coming months. As Deepak Madan, Sripath Chief Marketing and Business Developer Officer, explains.

“People in the industry have commented on the ease in which they’re able to incorporate PGXpand into their own plants, as well as the viscosity and pavement compaction benefits,” Madan says.

“On several fronts, it holds up really well. Which is why we’re excited about the prospects for PGXpand going forward.” ■