The future is foam

Posted on July 27, 2020 by **Lauren Jones**

Hiway Stabilisers is using foamed bitumen to improve road pavements across Australia and perfecting techniques to provide standard and bespoke solutions for maintenance and construction projects.

Over the past decade Hiway Stabilizers has laid over four million square metres of foamed bitumen which equates to around two thirds the size of the entire Sydney Olympic Park, measuring 6.5 million square metres.

The company has been refining foamed bitumen technology for nearly 20 years, working to provide the road industry with the benefits of the process for pavement rehabilitation or new applications.

Allen Browne, Hiway Group Technical Director, says Hiway Stabilizers effectively started developing foamed bitumen in the early 2000s. The results of trials completed in 2003 prompted the company's investment in two of Wirtgen's state-of-the-art pavement recyclers, to expand works.

"Using Wirtgen machines, Hiway Stabilizers has been able to build a quality track record for rural and urban settings, in diverse environments across Australia, New Zealand and Fiji," Mr. Browne says.

Foamed bitumen recycling is a pavement rehabilitation process involving the mixing of foamed bitumen with existing pavement materials to produce a high quality, durable and flexible pavement layer with similar performance to traditional asphalt.

In this process imported aggregates can also be treated, either independently or blended with existing aggregates.

"Foamed bitumen is created by injecting a small amount of water into hot bitumen, around 175 to 190 degrees Celsius, and offers a holistic, fast and cost-effective alternative for road pavement rehabilitation. The principal is based on the bitumen being at such a temperature that the water vaporizes and the bitumen foams, expanding up to 15 times its original volume," Mr. Browne says.

"This expansion process occurs inside the rotor chamber where the foamed bitumen can then be immediately and thoroughly mixed with the pavement material."

Mr. Browne says in its expanded state the bitumen disperses very well forming thousands of 'spot welds' and results in visco-elastic performance, which can be similar to asphalt.

The company has undertaken around 1.5 million square metres of foamed bitumen projects in Australia. This includes projects in Queensland which were shown to be highly moisture resilient following extensive flooding events in the state in 2010/11 and 2013. This work was done by Hi Group in the areas of Townsville, Rockhampton, Mackay and Cairns.

"For those programs of work in Queensland, Hiway Stabilizers led the charge and undertook around 250,000 square metres of foamed bitumen stabilisation works," Mr. Browne says.

These projects come in addition to the nearly three million square metres of foamed bitumen works the company has undertaken in New Zealand and 200,000 square metres of work in Fiji.

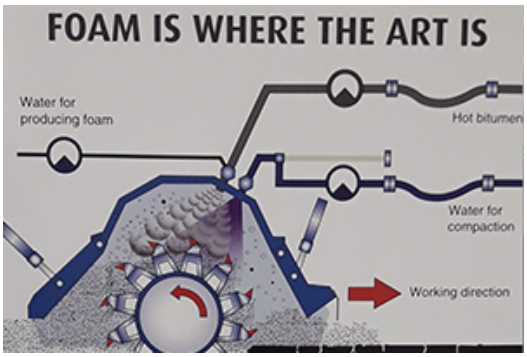
"A key driver for Hiway Stabilizers in developing the foam programme has been the range of benefits that can be derived from using the product," Mr. Browne says.

"Hiways has a strong focus on reducing its carbon footprint in all its activities and is constantly striving to deliver products and work activities which drive sustainable outcomes, while also achieving huge strength and resilience gains."

One example of this is how the company strives to incorporate and recycle existing materials in pavement construction. This can provide a number of benefits including reduced demand for virgin aggregate and reducing the amount of bitumen used in road construction.

"Hiway Stabilizers' approach to recycling also aims to reduce transportation costs and effects such as reduced heavy vehicle movements, noise, fuel requirements and emissions. While at the same time we work to provide an extended pavement life which requires less maintenance activity over time," Mr. Browne says.

The company has developed a tried and trusted operational process over the years however, it also has a strong in-house design team.



"Our design team enables us to provide clients with a 'one-stop-shop' approach to get better outcomes through the design of bitumen treated mixes and determining the best materials composition. The team can also optimise pavement design and influence the construction methodology to achieve the best possible, whole of life, benefits," Mr. Browne says.

Hiway Stabilizers has the capability to manufacture and deliver both plant mix foamed bitumen and in-situ foamed bitumen which provides options for many road types. The company can also produce foamed bitumen in a storage grade stockpile that can be used for a period of up to 28 days.

"This approach offers a better value proposition for projects that require varying tonnages throughout a defined period," Mr. Browne says.

"We are continuously working with regulators to ensure compliance to Australian standards for stockpile applications and we have been very pleased with the outcomes we have achieved."

In recent years, Hiway Stabilizers has used polymer modified foamed bitumen successfully on both construction projects with new quarry materials, and for rehabilitation projects using existing pavement materials which are sometimes mixed with new materials.

"Our calculations show whole of life cost evaluation using foamed bitumen demonstrates significant savings in both resources and carbon footprint, where salvaged pavement materials can be reused," Mr. Browne says.

"Prepatory treatment with supplementary aggregate and, or binders may be required to bring recycled materials to the standard required for the foamed bitumen process."

Recently Hiway Stabilizers was faced with a challenge, as part of a full-term maintenance contract, to ensure that during road repairs, full reinstatement to match the adjoining lanes on the road had achieved every night.

"This was a difficult task given the time available and the nature of some of the repairs. For example, we had to lay structural asphalt on a motorway or heavy load route which can require three or four lifts impacting on productivity," Mr. Browne says.

"We produced a foamed bitumen design and developed a methodology whereby we milled out the existing asphalt surface to provide appropriate composite materials. Then we blended those with imported make-up materials and created a foamed bitumen mix, which we laid to a depth that matched the level of the surrounding existing surfacing."

When this process was completed the company was able to open the road and let traffic run on the foamed bitumen surface at a limited speed for several days as the road cured.

"Once the curing was complete, we then profiled out 40 millimetres of the foamed bitumen to inlay the wearing course for final geometrics. Consequently, productivity and the time savings achieved reduced the overall cost of the operation significantly," Mr. Browne says.

"Hiway Stabilizers always aims to be at the forefront of the development of foamed bitumen solutions and we will continue to deliver successful, sustainable outcomes for our clients over the coming years."

Foamed bitumen applications:

- New pavement construction
- Rehabilitation of existing pavements
- Production of maintenance patching materials
- Storage grade stockpile application, for extended working times.

Hiway Stabilizers estimated foamed bitumen benefits:

- Can be more cost effective than structural asphalt
- Similar strength to asphalt possible
- Resilient pavement material which can be less prone to moisture or flood impacts
- Long working time
- Strong, durable and flexible pavement layer
- Reduced environmental impact

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