

Asphalt turns down the heat

Reduced temperature asphalt production is being promoted by Nynas to help highway authorities cut energy use and limit greenhouse gas emissions.

Efforts by bitumen chemists to develop durable asphalt material at temperatures less than 180°C are beginning to pay dividends. A range of 'Warm' (100 - 140°C) and 'Half Warm' (70 - 100°C) mix materials are now available that not only offer a series of social, economic and environmental benefits – but are proven to be durable as well.

A four year study into the performance of three reduced temperature asphalt techniques, including foamed bitumen, is coming to a close in Belgium. Early results from the study indicate there is little difference between the performance of

warm and half warm asphalt compared to hot mix material. The research project, led by materials specialist Nynas and the Belgian Road Research Centre, also points to the conclusion that the same degree of compaction can be achieved in a foamed bitumen asphalt produced at 90°C as a hot mix material produced at 150°C.

Publication of the Belgian study is eagerly awaited by advocates of warm mix technology, who are looking to substantiate what they already claim: that asphalt performance does not necessarily depend on mix temperature.

They will also point to the numerous benefits on offer by specifying warm mix

material. Financially, there are savings of up to 50% to be had in fuel and energy costs when choosing a half warm mix. Reduced temperature asphalt can also be designed to include recycled asphalt planings. This leads to lower costs associated with mining virgin material and reduced penalties for disposing of unwanted aggregate.

Use of recycled material in warm mix asphalt has its environmental benefits as well. Substituting just 14% of primary aggregate for recycled planings can reduce carbon emissions in an asphalt by 4% and cut a surfacing's overall environmental impact by 9%, according to a recent study by the Waste & Resources Action Programme.

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There is also the not insignificant claim that lower temperature asphalt reduces carbon dioxide and nitrogen oxide emissions by as much as 50%.

From a social point of view, reducing asphalt temperature improves safety for operatives, as there is less chance of suffering burns when working with a warm, rather than a hot, material. Disruption for motorists around a warm mix roadworks site is also said to ease, as construction

Asphalt suppliers looking to develop and trial warm mix asphalts can work with Nynas and its comprehensive laboratory and testing facilities





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programmes tend to be quicker when such materials are specified.

One man with high hopes for the future of warm mix material is Nynas’ product application manager for cold paving technology and surface treatments Dennis Day. He says: “In the next 10 years, I believe a major part of the UK’s asphalt market will swap from using hot mix to warm mix.”

Warm mix material offered by Nynas makes use of the company’s foamed

bitumen binder Nyfoam. Foamed bitumen is produced when water is introduced to hot binder in small quantities. Water turns to steam and the viscosity of the bitumen is consequently reduced. This allows it to flow more readily and coat stone more effectively at a lower temperature than conventional hot mix.

The foaming action can also increase the length of time an asphalt remains workable on site, without the use of chemical additives. Bitumen can either be foamed before it is added to a mix, or during the mixing process.

“Use of foamed bitumen allows us to manufacture a durable asphalt with the performance characteristics of a material created using a hot binder, but at a lower temperature,” adds Day.

“We believe that our Nyfoam range of binders has better and more consistent foaming characteristics compared to other binders, and is suitable for a wide range of applications using half warm and warm mix processes.”

Nynas now hopes that warm mix material using Nyfoam will begin to be used in the upper layers of road pavement in the UK. This would mark a departure for the company, which until now has promoted foaming binder for lower pavement layer materials, mixed cold. For

over 20 years, Nynas has supplied bitumen to the European market, which has been used for foaming onto aggregate at between two and three percent of volume to enhance the characteristics of base course material.

According to Day, if a higher percentage of foamed bitumen is added to an asphalt – matching the levels used in conventional hot mix – the resulting material can be used successfully in binder and surface courses. The trick is to ensure aggregate particles are coated fully. Asphalts mixed warm have been used by Nynas’ customers on road construction projects in Holland since 2002. Products featuring the Nyfoam binder include the lower temperature road surfacing material LT-Asfalt.

Asphalt suppliers looking to develop and trial warm mix products are welcome to work alongside Nynas and make use of its comprehensive laboratory and testing facilities in the UK, Belgium and Sweden. In some cases, asphalt mixing plants may have to be modified to accommodate the manufacture of warm mix materials. Specialist staff from Nynas can help asphalt suppliers to invest in upgrades to their infrastructure wisely.



‘Half warm’ materials offer social, economic and environmental benefits