

South Africa's road industry focuses on reducing asphalt manufacturing temperatures

The pivotal role of energy conservation and continually striving to provide safer working conditions to promote a sustainable bituminous products sector has led to the South African bituminous products industry to look at warm mix asphalt (WMA) technology as a means of keeping abreast of global best practice.

“Warm mix asphalt can be manufactured at temperatures of 100-135°C, compared with the 140-180°C for conventional hot mix asphalt,” Trevor Distin, CEO of the Southern African Bitumen Association (Sabita) said this week. “This reduces the consumption of scarce energy resources and the production of greenhouse gases, and minimises fumes and unpleasant odours during the manufacture and paving of asphalt – all of which contributes to ensuring the sustainability of our industry into the future.”

Additional environmental and sustainability benefits of WMA, highlighted at a Society for Asphalt Technology (SAT) seminar in Tshwane, Gauteng, in July, include:

- improved durability of mixes due to reduced oxidation of the binder during mixing;
- increased haulage distances of asphalt from mixing plants;
- extended working season before the onset of wet or cold weather;
- extended compaction window for thin asphalt layers;
- improved workability of stiff mixes, which facilitates hand work and patching;
- increased utilisation of recycled asphalt pavements (RAP) because of a reduction in steam production during mixing.
- open newly paved road to traffic sooner than conventional hot mixed asphalt
- improved compaction between longitudinal joints

“There are also significant health and environmental benefits associated with WMA,” Distin added. “Bitumen releases fumes at temperatures above 135°C, and the volume of fumes produced doubles for every additional 10°C increase in temperature.

“Our industry is obligated to take actions that continually improve HSE conditions in the workplace, and a logical step is to lower the asphalt mixing and paving temperature. This can be done by reducing the viscosity of the binder (bitumen) during mixing and application, and the challenges are to ensure complete coating and adequate drying of the aggregate, and to maintain temperatures that are high enough to prevent condensation in the baghouse.

“The lowering of the binder viscosity can be achieved by either adding chemical additives to the binder or using foaming techniques. Proprietary additives include Evotherm (DAT process by Westvaco), Rediset WMX (Akzo Nobel surfactants), Revix (Mathy Technology) and Sasobit (Sasol Wax). Successful WMA production has also been achieved with foaming techniques using Astec foaming attachment, Shell WAM foam technology, and Alpha min (Zeolite). Astec have already sold 75 of their Double Drum plants with the foaming attachment with one of these plants destined for South Africa. According to NAPA's President, Mike Acott, the USA is

aiming to produce 50% of all their asphalt needs in five years time by using WMA techniques. To this end the first international conference on WMA is scheduled to take place between 11 -13 November in Nashville Tennessee to review best practice developments.”

Distin added that savings of 20-30% in burner fuel could be achieved through WMA technology, resulting in reduced GHG emissions. Lower temperatures also reduce binder oxidation, and therefore it makes sense to incorporate RAP into the mix to stiffen the mix to make it more rut resistant. The softer binder will also help rejuvenate the RAP.

“Given the global focus on reducing the carbon footprint of the bituminous products industry, the wider use of WMA makes simple good sense,” he said. “However, it is important that this technology be part of an arsenal of resource conservation tools. Our industry is therefore actively promoting the use of RAP in new asphalt mixes, up to 20% of which can be incorporated in WMA. Discussions are already underway with key suppliers of WMA technology to conduct trial sections in order to facilitate the transfer of global best practice to South Africa,” he said



The effect of reducing fumes is best demonstrated in the picture when loading new asphalt into a tipper truck from a storage silo. The silo on the left is conventional hot mix asphalt being loaded whilst the one on the right is WMA.