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*Cover picture: An aerial view of the new King Shaka International Airport in KwaZulu-Natal (see article starting on page 4)*

Asphalt News is published by the Southern African Bitumen Association (Sabita), a non-profit organisation sponsored by its members to serve all stakeholders through engineering, service and education.

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Editorial board: John Fensham and Jeanette Nichol
The World Cup —— A great success – well done South Africa and all who have contributed!

The demands placed on the country to be ready in time to host the greatest sports show on earth, have been phenomenal. Certain sectors creaked under the load, but despite the extraordinary challenge, managed to deliver. It is in this area of delivery that many excelled whereas others were found wanting - and the construction and roads industries had their share of both.

Notwithstanding the issues around bitumen supply, time constraints and weather, bitumen quality throughout proved inconsistent and remains a challenge for industry. Work has begun on the development of best practice guides with the intent of providing assistance in tackling this tough nettle.

Post World Cup uncertainties as far as economic growth are concerned are not giving way to clarity just yet as the global economy reports mixed growth results. The emerging pattern indicates Asia as the centre of gravity for growth, with the developed western economies losing ground as they battle with mounting debt. The implication for South Africa is that its growth fortune could be tied to that of its (traditional) major trading partners in Europe.

IRF World Congress

The recent IRF World Roads Congress held in Lisbon was attended by some 1100 delegates and covered the full spectrum of road provision and usage with themes on:

- Mobility and transport infrastructure;
- Road safety and security;
- Sustainable roads;
- Road financing and management;
- Techniques and innovation.

The one common thread that featured strongly throughout was that of “sustainability”, which again highlighted the ever growing awareness of the impact of human activity on the environment, and the need for mitigation measures. The use of technology to optimise road usage and improve road safety also permeated many topics.

These areas will no doubt see continued focus across the globe as those in the industry collaborate to find solutions to common challenges presented through the preservation and provision of the “economic arteries”.

Research, development and publications

On the (local) asphalt technology front, progress has been made with the HiMA mix design (see page 25), and we should soon see the long awaited guide on this subject. Sabita’s Manual 28, which deals with slurry seals, is now in draft form and ready for comments and upcoming workshops.Sabita's Manual 29, providing guidelines on the handling of solvents in bituminous products laboratories (see page 18), is now in production and will be available shortly.

The past six months have also seen an increase in HSE activity, with the development and launch of Sabita’s HSE Management System (HSE-MS). To further promote an HSE culture, the Sabita Council has approved the introduction of an HSE award scheme which we trust will find favour with all. The award is designed firstly to encourage, and then to acknowledge, excellence in the implementation of sound HSE practices (see page 11).
The pavement designs of the aircraft movement areas at King Shaka International Airport (KSIA) were based upon the ICAO Aerodrome Design Manual Part 3 and the latest advisory circulars from FAA. This included the use of the LEDFAA (version 1.3) computer software from FAA. However, due to many limitations in the Aerodrome Design Manual Part 3, especially with regard to the design of flexible pavements (e.g. the use of CBR cover method), the South African Mechanistic Design Method (SAMDM) was also used extensively. The method is deemed to be more relevant to local conditions where invert pavements are common. These types of pavement have been successfully implemented on previous airport developments in Southern Africa.

Design traffic loading

The aircraft movement area pavements were designed for a mixture of wide and narrow bodied aircraft. The mixture includes the following aircraft:

- Airbus A380-series, Boeing B777-200, Boeing B747-400F, Airbus A340-300 wide-bodied; and
- Airbus A330; Boeing B737-300; Boeing B737-800 narrow-bodied.

The mixture of traffic loading was converted to cumulative coverages of the Boeing B747-400F aircraft loading. After careful consideration of the various traffic growth scenarios it was decided to design the pavements for 150 000 coverages of the design aircraft over the design period of 20 years.

Background

The aircraft movement areas of the KSIA consist of the following elements, as shown in Figure 1:

- Runway 06/24;
- Parallel Taxiways A and B (both to the left of Runway 06/24);
- Transverse Taxiways C, E, F, N, P, M;
- Rapid Exit Taxiways G and H;
- Aprons A, B, C, D and E (Heliport).

All the taxiways have a width of 60m except for Taxiway P which is 15m wide and only serves the heliport. In general, Runway 06-24 can be classified as a Category 4F instrumented runway in accordance with ICAO Annex 14, with the predominant approach being from the north at Threshold 24 (60/40 split).

The runway and taxiway pavements have been constructed with a 40mm thick stone mastic asphalt (SMA) wearing course on two 40mm thick binder course layers of medium continuously graded hot-mix asphalt. The three-layer surfacing structure was preferred to ensure that exceptional riding quality is achieved.
SMA was preferred to continuously graded hot mix asphalt as the wearing course for the pavement elements of the KSIA airside due to its proven higher rutting resistance, but also because it shows better skid resistance after time due to less rubber built-up.

The mix design of the SMA wearing course was conducted in compliance with the *Interim guidelines for HMA in southern Africa* (2001), taking cognizance of the project specific requirements. There are different approaches internationally towards SMA gradations, especially in respect of the nominal maximum aggregate size (NMAS) and the material passing through the 2.36mm sieve (the distinction between the coarse and fine fractions). Excessively coarse gradations used in the past for SMA mixes in South Africa yielded poor durability due to high permeability and low density, and subsequent premature failures.

Durability is highly dependent upon the permeability of the mix, and thus dependent upon the NMAS and layer thickness. In view of the surfacing thickness of 40mm a NMAS of 13.2mm was chosen for the SMA mix, and the grading was established within the tolerances of the standard specifications. The chosen grading resulted in a densely packed stone-on-stone skeleton which yielded excellent resistance to permanent deformation and excellent durability. These characteristics were further enhanced through the use of a high quality polymer modified binder.

**Pavement Design**

The linear elastically based SAMDM was used to develop the optimal pavement design for the aircraft movement areas. The same pavement design was implemented for all of these elements, namely:

- 40mm SMA wearing course, using A-E2 (Sasolwax Flex™) modified binder and NMAS of 13.2mm;
- 2 x 40mm (80mm) medium continuously graded hot-mix asphalt binder course, using 60/70 pen-grade bitumen and NMAS of 13.2mm;
- 125mm G1 (COLTO) graded crushed stone base layer, compacted to 88% of apparent relative density (ARD) from commercial sources (tillite);
- 175mm C3 (COLTO) cement stabilised upper subbase layer, compacted to 97% of modified AASHTO density and using imported G5-quality crushed stone aggregate from commercial sources;
- 200mm C3 (COLTO) cement stabilised lower subbase layer, compacted to 97% of modified AASHTO density and using imported G5-quality crushed stone aggregate from commercial sources;
- 150mm G7 (COLTO) upper selected subgrade layer, compacted to 95% of modified AASHTO density and using a mixture of imported natural gravel (weathered dolorite) and natural sand (Berea red);
- Proof rolling to refusal of upper selected subgrade layer by means of heavy impact roller; and
- Minimum 800mm imported fill, compacted to 100% of modified AASHTO density and using dune sand with a minimum California Bearing Ratio (CBR) of 10% at 95% of modified AASHTO density.

**Mix design approach for KSIA SMA**

**Aggregate packing and spatial composition:** The so-called “magic triangle” which is based on the spatial approach as developed by Francken (1993) was used to form a stone skeleton mix. The binary system guidelines (Van de Ven, 1999 and Francken, 1993) were used to determine the correct size ratios for the SMA mix. The size-ratio is the ratio of the maximum fine fraction particle size to the maximum coarse fraction aggregate size. The size-ratio for SMA mixes is normally between 0.00 and 0.25 and was determined as 0.23 for the KSIA SMA mix. The basic principle of this binary system is that there should be a well-defined gap between the coarse material (>2.36mm) and the fine aggregate (<2.36mm) to consider two separate systems in the grading:

![Figure 1. The aircraft movement areas of the KSIA](image-url)
• The coarse fraction forming the stone skeleton; and
• The fine fraction forming the mastic (including bitumen, filler and fibre).

Figures 2 and 3 illustrate the design and evaluation of the SMA mix in terms of the binary system and the typical classification of mixes according to skeleton structure.

Experience

The grading forms an integral part of the mix composition and related performance, especially the 2,36mm fraction. Typically SMA mixes are designed in South Africa by aiming for 21% passing the 2,36mm sieve and a high percentage (90%) retained on the 9,5mm sieve to ensure a well-defined gap in the mix resulting in a high stone content mix. Furthermore, SMA mixes are normally designed with the bottom of the grading envelope as flat as possible (i.e. sieve sizes 0,075mm to 2,36mm).

Experience indicated that the permeability on the SMA mixes remains an issue of concern. Irrespective of the densities specified and achieved, indications were that the highly defined gap graded mixes were excessively permeable. The authors are of the opinion that the excessive permeability is due to the lack of continuous transition from the fine to the coarse fractions of the material, i.e. the material passing the 2,36mm sieve size.

Air permeability tests conducted on cores confirmed that in the case of reduced percentage of material smaller than 2,36mm, the permeability increased, indicating the presence of interconnected voids in the mix. This experiment led to a review of literature on international practice regarding the gradation of SMA mixes. It was learned that different countries have different approaches with regard to the composition, and that the current South African approach is similar to the French approach where a distinct gap exists between the coarse and fine aggregate fractions of the mix.

German practice

In view of the findings of the permeability testing it was decided to opt for an approach similar to current German practice as far as target grading is concerned. The intention was to smoothen the grading slightly around the 2,36mm sieve and obtain a slightly coarser grading on the lower and upper ends of the grading curve.

Figure 4 illustrates this slight change in approach to current South African practice. The VCA\textsubscript{mix} was still less than the VCR\textsubscript{DRC} and the size-ratio (as described above) still lay between 0,00 and 0,25. Plotted in the magic triangle the mix still fitted in a stone skeleton mix. However, the smoothening of the target grading did not result in a gradation similar to that of a continuous gradation, as is clearly visible from Figure 4. Air permeability testing conducted upon cores taken from the constructed wearing course indicated that no interconnected voids were present.

This design approach yielded a surface structure with a macro texture in excess of 0,65mm and a good stone-on-stone contact as depicted in figures 5 and 6.

The materials available for the KSIA project could be described as good to very good, with the coarse aggregates (13,2mm and 9,5mm fractions) having a Polished Stone Value higher than 50, Flakiness Index less than 21% and Water Absorption less than 0,4%. In addition to the requirements for the coarse aggregates, hydrometer tests were carried out to determine the quantity of superfi nes in the filler. It was found that the...
percentage passing the 0.005mm sieve was less than 1.0%.

Binder selection

For the KSIA project a binder was required that could provide excellent resistance to premature ageing, especially in light of the hot climate of the region, but that would also contribute to the high resistance to permanent deformation required, especially at the taxiways, taxi-lanes and slow moving areas of the runway. For these reasons it was decided to make use of a polymer modified binder, and the product selected was Sasolwax Flex™, which can be classified as a Class A-E2 binder in terms of the requirements of the TG1 guideline entitled *The use of modified binders in road construction* (2007). The properties of the binder are shown in Table 1:

A Marshall mix design was conducted by the SRT laboratory in Durban. Based on the information obtained from the laboratory mix design, plant trials were carried out followed by a field trial section to determine the final Job Mix Formula (JMF). The coarse structure appeared to be well formulated with the VMAMIX being less than the VMADRC. The Indirect Tensile Strength (ITS) test results were fairly high (ranging from 950kN to 1100kN), indicating high resistance to permanent deformation and fatigue. The VMAMIX was well above the minimum of 18% required, leaving sufficient voids to be filled with binder, resulting in the VFB being in the order of 76%. The objective to obtain a durable mix based on the requirement of a minimum film thickness of 8,0μm was met with a minimum film thickness of 10,3μm and a maximum of 12,4μm. A minimum binder content of 6.2% was required to satisfy the requirements of the design method in respect of the Specific Gravity (Gs) of 2 690 kg/m³ of the combined aggregate grading.
The JMF for the trial sections resulted in the following targets:

- Binder Content (BC) of 6.4% ± 0.3%; and
- Target Voids in Mix (VIM) of 4.8% ± 1.0%.

Once the volumetric properties obtained from the Marshall tests of the trial section mix were proven to be satisfactory, more samples and cores were taken for further performance testing.

**Performance properties**

With an excellent performing binder and a well balanced aggregate structure, the challenge was to test and predict the performance properties of the mix. The following performance testing was conducted:

- Model Mobile Load Simulator (MMLS3) testing – rut resistance;
- ITS testing – fatigue;
- Modified Lottmann testing – moisture sensitivity; and
- Gyratory compaction.

The performance testing proved that the SMA mix design procedure followed yielded a durable rut resistance mix with all properties complying with the specifications.

**Construction methodology**

**Plant and equipment:** It is well known that a superior asphalt mix design and the quality of the mix manufactured is as good as the performance of the mixing plant. A dedicated plant was used for the manufacturing of the SMA mix on the KSIA project. All other hot mix asphalt was manufactured using another plant on site. The reservation of mixing plant specifically for the SMA production limited the possibility of contamination and recalibration errors. The mixing plant used was a drum mixer with a production capacity of 105 tons per hour, which included a pug mill after the drum mixer, where all the other ingredients such as fibres, filler and modified binder were added, all with their respective calibrated pumps and feeders.

The mixing plant was also fitted with a bag house system where the fine dust was fed back into the drum mixer, resulting in the capture of almost all the dust intended for use in the mix. This limited dust emissions, resulting in negligible environmental impact. The mixing temperature for the KSIA SMA mix varied between 160°C and 170°C.

The Sasolwax Flex™ polymer modified binder was blended on site. Special static tanks were modified with a feeder system at the top of the tank where the Sasolwax Flex™ was added to the 60/70 penetration grade binder. A slow rotating auger system at the bottom of tanks ensured homogeneous dispersion of the polymer additive.

**Control of stockpiles and materials:** The high emphasis placed throughout the international market on the use of premium materials for manufacturing SMA, and the impact of variation in the course and fine aggregates, can in fact be limited by executing proper stockpile control for each individual fraction. Dedicated stockpiles for the manufacturing of the SMA mix were implemented for the KSIA project to limit the risk of variation in material. These stockpiles were tested on a daily basis to identify early signs of variation and to ensure that the necessary adjustments to crushing and screening process were made timeously where applicable.

**Compaction:** In general practitioners are of the opinion that due to the stone-on-stone matrix of SMA mixes, it is fairly easy to compact the paved mix. This is generally the case for SMA with conventional penetration-grade binders. However modified binders, such as the specified Class A-E2 binder, exhibit high viscosity properties and are classified as fairly stiff binders with high softening points. The high viscosity normally results in difficulty with compaction and higher compaction temperatures are normally required to achieve the minimum specified density. For this reason the Sasolwax Flex™ modified binder was introduced into the KSIA SMA mix to address the stiff binder by lowering the compaction temperature windows compared to the conventional A-E2 type binders.

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Table 1. Properties of the Sasolwax Flex™ binder used at KSIA

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Testing before ageing of Sasolwax Flex™ binder in terms of TG1: 2007</th>
<th>Testing after ageing by means of RTFOT in terms of TG1: 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softening point</td>
<td>(°C)</td>
<td>66</td>
<td>0.066</td>
</tr>
<tr>
<td>Elastic recovery @ 15°C</td>
<td>(%)</td>
<td>81</td>
<td>-2.0 to + 8.0</td>
</tr>
<tr>
<td>Dynamic viscosity @ 165°C</td>
<td>(Pa.s)</td>
<td>0.251</td>
<td></td>
</tr>
<tr>
<td>Storage stability @ 160°C</td>
<td>(°C)</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Mass change</td>
<td>(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference in softening point</td>
<td>(°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elastic recovery @ 15°C</td>
<td>(%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The deformation resistance of the new asphalt layer can be adversely affected by applying too many roller passes at excessively high temperature (150°C), therefore only two flat steel drum rollers without vibration were used to compact the KSIA SMA mix.

Compaction of the mix with the steel drum rollers can, however, result in over-compaction, causing break down of the stone skeleton, a reduced void content and flushing of the binder. Compacation was not allowed to continue once the surface temperature of the paved mix had dropped below 60°C.

**Joints:** A fact well known to asphalt designers and suppliers is the sensitive nature of construction joints of any asphalt mix. This is the most sensitive area as far as segregation is concerned, and is therefore susceptible to water ingress. Attention to joints can therefore not be over emphasised. On the KSIA project it was specified that at least 1/3rd of the cores tested for densities should be on the joints, which should not vary more than 1% from the specified density. Furthermore all longitudinal joints had to be neatly cut at 45° using an appropriate cutter wheel. The joints had be smooth, with no differential differences between any adjacent lanes, and should be cut as soon as possible, preferably within 24 hours.

**Quality control**

Working with premium materials to ensure a premium product requires adequate and superior quality control. At the KSIA project quality control systems were implemented by using statistical judgement plans. The judgement plans were based on uniformity of workmanship, and all test results were measured against average values obtained, outliers replaced or discarded, and standard deviation calculated into the acceptance limit formula. This meant that the higher the standard deviation, the higher the acceptance limits and *vice versa*. The properties evaluated against the judgements were densities, VIM, and binder content. Proficiency testing and quality audits were carried out on a regular basis to ensure an acceptable mix. Tests on the binder were carried out on a continuous basis on both the parent binder and the modified binder. Any work not complying with the specifications was rejected with no option of partial payments.
Our basket of bitumen modifiers provides you with:

- Reduction in mixing temperatures of 20-40°C depending on environment
- Energy cost savings at the premix plant of 10-15%
- Extended long haul window of up to 800km
- Extended seasonal paving window and night work under low ambient conditions
- Reduced compaction effort required to reach density
- Increased asphalt deformation resistance making it suitable for High Modulus Asphalt pavements
- Eliminating binder incompatibility of traditional polymer systems
- Eliminating binder instability under extended high temperature storage
To underpin its ongoing drive to entrench global standards of health, safety and environmental conservation (HSE) practices and management in South Africa, Sabita has launched an annual award scheme open to all Sabita members.

The award will be based on a member company's HSE performance from 1 September to 31 August each year, with assessment and adjudication to take place during November/December, and the award ceremony to be held early in the next year. Companies will only be eligible if they have not suffered a recordable fatal accident during the period, and have reported the required HSE statistical information to Sabita for the period.

**Award categories**

- **Best sustained performance in overall HSE management for the period:** Companies must demonstrate that all elements and expectations of the Sabita HSE-MS have been completely implemented, and must have a Total Recordable Case Frequency (TRCF) rate of less than 10 for the period under review;
- **Recognition of progress in successful implementation of an HSE Management System:** Entrants must demonstrate that implementation was in progress for at least 60% (6) of the mandatory award scheme expectations during the first period of participation and thereafter 100% (10) for subsequent award periods, and must have a TRCF rate of less than 15 for the period under review; and
- **CEO merit awards for other notable HSE achievements:** No specific performance requirements are linked to this category. The purpose is to allow for recognition of notable initiatives by members (and individual employees) that have made significant contributions to the enhancement of HSE management within their own organisations or the bitumen industry in general.

**Assessment criteria**

The Sabita HSE-MS consists of eight core expectations and 26 sub-expectations, each with required processes or actions to meet the expectations. These expectations are individually numbered and represent the scheme elements that will be assessed for award purposes.

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Fully satisfies requirements;</td>
</tr>
<tr>
<td>2</td>
<td>Substantially satisfies requirements;</td>
</tr>
<tr>
<td>1</td>
<td>Partly satisfies requirements;</td>
</tr>
<tr>
<td>0</td>
<td>Does not satisfy requirements.</td>
</tr>
</tbody>
</table>

In addition a "weighting" factor of 1 - 4 is applied to each of the required processes or actions of a sub-expectation:

<table>
<thead>
<tr>
<th>Weighting</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Mandatory (legal and HSE-MS critical requirement);</td>
</tr>
<tr>
<td>3</td>
<td>Very high importance (HSE-MS critical requirement);</td>
</tr>
<tr>
<td>2</td>
<td>High importance (considered essential to support HSE-MS critical requirements);</td>
</tr>
<tr>
<td>1</td>
<td>Low to medium importance (not critical but should be considered).</td>
</tr>
</tbody>
</table>

The score of each of the elements assessed for award purposes is multiplied by the weighting factor, and aggregated to determine the total points scored by the participant.

The first assessment period is expected to run from 1 September 2010 to 31 August 2011, with the first Sabita award in recognition of outstanding HSE management to be made early in 2012.
The 6th State of Logistics Survey™ for South Africa notes that while logistics costs relative to GDP are at their lowest level since the inception of the survey (R339-billion or 14.7% of GDP) they still remain unacceptably high by global standards.

In America, for instance, logistics costs in 2008 were just 9.4% of GDP, and one major factor influencing this high rate in South Africa was road quality – the percentage of bad and very bad roads in the secondary road network increased from 8% in 1998 to 20% in 2008.

“Deteriorating road quality can potentially have many negative effects on the vehicle maintenance costs of a company, which in turn can translate into increased logistics costs and may eventually have a negative effect on the broader economy of the country,” the survey notes.

Compiled by the CSIR, in partnership with Stellenbosch University and IMPERIAL Logistics, the 2009 report Logistics value and costs – Driving macro and micro-economic change towards global competitiveness and sustainability analyses the importance of South Africa’s logistics and supply chain management in the world marketplace.

In his preamble to the report Hans W Ittmann, executive director of the CSIR Built Environment, puts this into perspective.

Cost-effective

“Supply chains pervade every enterprise on the planet. These chains include all the activities, linkages, information exchanges and relationships that are formed by all those who choose to work together. The overriding goal and objective of each and every chain is to transport, distribute and move products and services ever closer to final consumption in a more cost-effective way, adding value in the process,” he said.

The preface to the report, compiled by IMPERIAL Logistics CEO Marius Swanepoel, notes that companies which “integrate sustainability practices throughout their supply chains are experiencing a clear benefit.”

He adds that it is not just the threat of negative publicity that is pushing corporations into the green zone. “With world leaders struggling to agree on a climate change treaty, it is only a matter of time before environmentally unaware companies will face steep fines for their failure to keep pace. At the same time the global recession is forcing companies to focus on improving their efficiency to offset tepid demand and counterbalance the price volatility of commodities such as water and energy.”

The survey makes it clear that despite the drop in logistics costs, South Africa’s logistics and supply chain sector needed to step up and improve its overall performance, while addressing continued sustainability, if it was to become and remain competitive internationally.

While the logistics cost of R339-billion relative to GDP represented a drop of 1.2% from the previous year, transport cost increases of 2.4% were also lower than any previous year, although these still accounted for 50.4% of total logistics costs. Inventory carrying costs were once again much higher than in 2008, increasing by 21.2% and now constituting 18.6% of total logistics costs.

**Fuel costs**

Freight transport activity rose by 4% in 2008 in ton-kilometres shipped and 2% in tons shipped, which is just over 1.6-billion tons shipped on the four transport typologies (metropolitan, rural, corridor and bulk mining). Roads transported 1.4-billion tons of freight at an average transport distance of 640km, 100-million tons of which were on the two bulk mining corridors.

“Given the significant contribution of fuel costs to total transport costs, and the volatility of its input commodity, the mitigation of this risk remains prominent on the strategic agendas of the road haulage industry,” the survey states.

On the question of road quality a case study indicated that vehicle maintenance and repair costs could increase by as much as 121% for a truck travelling on a road with a bad condition rating, and total logistics costs of a company can increase by as much as 10%.

“This could lead to unnecessary increases in the total logistics costs of a country and hamper economic growth. It is therefore vital to create awareness of the potential negative impacts of bad roads amongst stakeholders to ensure that proper attention is given to timely and proper maintenance of roads.”

**Sustainability**

The challenge of sustainability in South Africa becomes apparent when considering that the average volume of fuel consumed per capita in the country’s transport sector is much higher than the world average. A major contributor to this scenario is the “logistically challenged distribution of industry”, with the production sector and consumers largely concentrated 600km from the coast. This adds a substantial (mostly road) transport leg to deliveries, resulting in both increased fuel costs and higher emissions of greenhouse gases. This is significant because the carbon footprint of up to 75% of most local companies is generated by transport and logistics.
An analysis of road conditions in the various provinces is shown below.

![Figure 1. Summary of the South African road network condition](image)

The survey includes a case study conducted by Cardiff University, IMPERIAL Logistics and the CSIR, which identified “extra kilometres” (the difference between the distance vehicles actually run, and the distance they would have needed to run if transport planning was undertaken with accurate and timely information). The study focused on the secondary distribution network of a major grocery retailer in Johannesburg and Cape Town, and data was collected for a typical week in January 2009.

In this case study extra/non-value adding kilometres travelled accounted for more than R8,88-million in additional costs and 1 071 additional tons of CO₂ pollution annually.

Gala dinner highlights success of Go for Gold programme

A gala dinner at the Kelvin Grove in Newlands on 25 May landmarked the ongoing success of the construction industry’s Go for Gold programme.

Attended by a number of participants who have benefited from the initiative, the dinner’s fundraising drive was a huge success which also underlined the construction industry’s commitment to redressing South Africa’s skills shortage. More than R700 000 was raised through industry support and the entertaining efforts of MC and auctioneer Deon Bing.

Major contributors were Group Five (R175 000) and the Master Builders’ Association (R80 000), with the balance of funds coming from a lively auction of donated wines, sponsored meals and weekends, and memorabilia from the construction of Cape Town’s Green Point Stadium.

Highlight

A highlight was the auction of a breakfast for ten with the Stormers rugby team at the Cape Milner.

Guest speaker Helen Zille, Premier of the Western Cape, spoke glowingly of the Go for Gold model, and urged that it be replicated in other industrial sectors. Other speakers included two star Go for Gold achievers for 2009 – Anele Mqhayi, who graduated with BSc honours in Construction Management from the Nelson Mandela University of Technology, and best honour student Ightishaan Groenewald, who attained 14 distinctions in his first year at CPUT.

Another honoured guest was Michelle Marco, who had her legs amputated soon after birth. Despite this setback, Michelle is in her second year of civil engineering at CPUT, and has set her sights on a career in the construction industry.

Western Cape Premier Helen Zille pictured with Go for Gold participants at this year’s gala dinner at the Kelvin Grove
SUPPLIERS OF:

MATEST

CIVIL LABORATORY EQUIPMENT

FOR BITUMEN - ASPHALT

Asphalt content furnace
ignition method

Automatic binder
extraction unit

Continuous flow
filterless centrifuge

Marshall computerized
50kN load frame with
digital display unit

Marshall mechanical
50kN load frame

Marshall stability mould

Automatic
penetrometer

Gyratory compactor
"Servopac"

Universal testing
machine UTM-5P

Universal testing
machine UTM-25

Automatic Ring & Ball
apparatus
Following the reports on Warm Mix Asphalt (WMA) trials in the previous issue of asphaltNEWS, good progress is being made with the next set of trials, with laboratory mix design work now completed, and plant mix trials initiated.

Just to recap, the forthcoming trials are aimed at pushing the boundaries in producing mixes with:

- a 30°C temperature reduction frontier in the manufacturing and paving processes;
- the use of up to 40% reclaimed asphalt (RA) in the warm mix asphalt;
- the use of polymer modified binders in WMA.

Additionally the foamed bitumen process is now being used in the manufacture of WMA - this for the first time in South Africa!

**Fine tuning**

Following experience gained in the previous WMA trials, much emphasis has been placed on comparing the mix designs carried out in the laboratory with those produced full-scale in the mixing plant. This second step of carrying out plant mixes before the main trials provides an opportunity to fine-tune the mix designs with regard to aggregate proportions and binder contents.

The plant mix trials also provide the opportunity to learn how the various mixes behave under compaction; in particular the "compaction window" of the mixes can be assessed, and this experience can be utilised in the main trials.

It must be remembered that the use of "warm" mixes with polymer modified binders has not been undertaken in previous WMA trials, and this has led the trials into new territory. The same can be said for the mix using foamed bitumen, where careful monitoring of the mix properties during all stages of manufacture, paving and compaction is necessary to gain a proper understanding of this "new" WMA technology.

**Pushing the boundaries**

While the main intention of these trials is to push the boundaries, it must be appreciated that the transition from mixes that have been successfully manufactured in the laboratory to full-scale production through the asphalt mixing plant, is no easy task. The plant mix designs are specifically intended to find out what is practical and feasible before proceeding with the main trials.

Preparations for the plant mix trials have progressed, and roads in the Mpumalanga residential area near Hammarsdale were selected and prepared for this purpose. These roads, which have been highlighted by eThekwini Municipality's PMS as requiring attention, are being strengthened with the WMA overlay. The preparatory work consisted of milling off the existing cracked and aged asphalt surfacing, and replacing it with a new asphalt layer on which the various WMA mixes are to be paved.

All the mixes in the trials contain reclaimed asphalt (RA) provided by eThekwini Municipality, which utilises all its RA in either hot mixed asphalt or in cold bituminous stabilised mixes. Their recently commissioned crushing...
and screening plants are able to process 100% of the RA, fractionating it as required for use in the respective mixes.

In total, 15 mixes (nine "warm" asphalt mixes and six control mixes) are scheduled to be included in the main trials; however, as mentioned above, the final number of mixes will depend upon experience gained in the plant trials.

It was agreed that only the nine "warm" mixes would be manufactured and paved as part of the plant mix trials. To provide sufficient quantities for plant adjustments as well as extensive monitoring and testing, the plant mix trials made allowance for around 300 tons of each mix to be produced and paved. Taking into account the nine trial mixes, total tonnage paved in the plant mix trials is in the region of 2 700 tons.

Descriptions of these mixes, together with respective temperature limits (based on mix laboratory data) at various stages, are tabulated below.

<table>
<thead>
<tr>
<th>Mix details</th>
<th>Temperatures (°C)</th>
<th>Mix details</th>
<th>Temperatures (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manufacture</td>
<td>Arrive on site</td>
<td>Compaction</td>
</tr>
<tr>
<td>SASOBIT+10%RA</td>
<td>120 – 130</td>
<td>110 – 120</td>
<td>100 – 110</td>
</tr>
<tr>
<td>REDISER+10%RA</td>
<td>120 – 130</td>
<td>110 – 120</td>
<td>100 – 110</td>
</tr>
<tr>
<td>FOAMITE+10%RA</td>
<td>120 – 130</td>
<td>110 – 120</td>
<td>100 – 110</td>
</tr>
<tr>
<td>AE2+10%RA</td>
<td>140 – 150</td>
<td>130 – 140</td>
<td>120 – 130</td>
</tr>
<tr>
<td>AP1+10%RA</td>
<td>140 – 150</td>
<td>130 – 140</td>
<td>120 – 130</td>
</tr>
<tr>
<td>AE2+20%RA</td>
<td>140 – 150</td>
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<td>AP1+20%RA</td>
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<tr>
<td>AE2+40%RA</td>
<td>140 – 150</td>
<td>130 – 140</td>
<td>120 – 130</td>
</tr>
<tr>
<td>AP1+40%RA</td>
<td>140 – 150</td>
<td>130 – 140</td>
<td>120 – 130</td>
</tr>
</tbody>
</table>

A full array of testing is being carried out at National Asphalt's laboratory at their Shongweni asphalt plant site, while further testing is underway in SRT’s Pinetown laboratory. Additionally, more sophisticated testing is to be undertaken by the University of Stellenbosch. Alex Mbaraga, a Masters student, is responsible for preparing slab samples, which he will later cut into beams for stiffness and fatigue testing.

The plant mix trials were expected to be completed by the end of July 2010. Intensive monitoring of mix temperatures, at the mixing plant, upon delivery, and behind the paver, has been instituted. The number of roller passes vs field density is also being recorded.

Thermal images are also being taken to record the temperature profiles of the various mixes. All this data will be useful when the main trials are undertaken.

The delay expected from the replacement of the old water main running along Shepstone Road made it necessary to shift the main WMA trials to Higginson Highway.

A 3.2 kilometre section of the outbound carriageway of this urban arterial was chosen for this purpose, and a full investigation and rehabilitation design report has already been undertaken. Preparation work, which includes the installation of subsoil drainage, milling out most of the existing distressed asphalt, and paving of a levelling course in readiness for the WMA mixes, is already underway. The original schedule for the main WMA trial to commence in September 2010 is therefore unlikely to change.

Although it is too early to state categorically, the plant mix trials to date show promise in achieving the goals of further temperature reductions, increased RA contents, and the use of both polymer modified binders and foamed bitumen technologies in the manufacturing and paving of warm mix asphalt.
Streets ahead . . .

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MUCH ASPHALT IS A LEVEL 3 BBBEE CONTRIBUTOR

A Murray & Roberts company
New guideline on safe handling of solvents now in preparation

The health, safety and environmental (HSE) hazards of working with solvents in a bituminous materials laboratory have been widely documented. In its ongoing efforts to implement global standards of HSE in South Africa, Sabita has now produced a draft guideline which identifies hazards and makes wide-ranging recommendations to minimise hazards and improve overall safety standards in a typical bituminous products laboratory.

Sabita's Manual 29: A guide to the safe use of solvents in bituminous materials laboratories is now being prepared for publication.

Developed by J O'Connell and G Mturi of the CSIR and evaluated by Sabita's HSE consultant Anton Ferreira, the guide draws comprehensively on international norms and standards, rigorously adapted to comply with South African legislation and industrial practice.

Disadvantages

The guide's introduction briefly summarises the disadvantages associated with the use of solvents in a bituminous laboratory with reference to the hazard categories and the cost implications of continued use of solvents. It also lists the specific test methods where solvents are used in bituminous products laboratories, and examines the disadvantages associated with the use of solvents, the departure point being to eliminate or substitute solvents where practicable.

A specific section on cleaning laboratory equipment with solvents suggests possible alternatives aimed at decreasing the dependency on solvents and the substitution of hazardous cleaning solvents with alternative 'safety solvents'.

The guide examines international test standards and compares these with current South African practice and concludes that "the current status quo in South Africa with regards to the determination of binder content, as well as to the recovery of binders cannot be maintained. South Africa is trailing Europe and the USA in the formulation of a cohesive national binder recovery philosophy" and makes recommendations on possible solutions. These include:

1. General laboratory safety rules:

   This chapter contains a very detailed and comprehensive discussion of generally accepted guidelines for laboratory safety (including but not limited to the use of solvents), under the following headings:
   - Introduction;
   - Hazard communication;
   - Chemical storage;
   - Personal Protective Equipment;
   - Eye and face protection;
   - Protective clothing;
   - Foot protection;
   - Hand protection;
   - Respirators;
   - Handling and use of chemicals;
   - Fire and gas safety;
   - Hazardous waste management;
   - Ventilation and fume hoods;
   - Physical hazards, ergonomics, safe conduct and housekeeping:
     - Electrical safety;
     - High pressure and vacuum work;
     - Repetitive work and ergonomics;
     - Glassware safety;
     - Safe laboratory conduct and housekeeping;
     - Equipment safety;
     - Emergency processes.

2. Recommendations for solvent storage:

   This chapter is specifically dedicated to solvent storage practices. The guidelines are discussed under the following headings:
   - Introduction;
   - General storage guidelines;
   - Chemical compatibility;
   - Unstable chemicals;
   - Explosive chemicals;
   - Chemical storage cabinets;
   - Flammable storage units.
3. The management and interpretation of Material Safety Data Sheets (MSDS) (for bituminous products laboratories):

This chapter provides a brief background on the necessity and merits of MSDS as an important source of material/substance HSE related information that can be applied for various purposes. A glossary of typical definitions and technical terms found in MSDS is provided, as well as links to sources of local and international versions of MSDS relevant to the bitumen industry.

4. Supplementary:

Focussing on legislative obligations, this chapter includes links to the Department of Labour website to ensure access to the current versions of the OHS Act and relevant regulations.

5. Conclusions and recommendations for implementation:

Evaluator Anton Ferreira believes the content of the guideline is of a high standard, is relevant and represents examples of acceptable best practice for laboratory health and safety management.

Caution

"It is my opinion that, if used with care and regard for specific RSA legal requirements, the information in this guide will be very useful as a reference document to Sabita members and will assist with the following processes:

- Laboratory generic risk assessments and specific job safety analysis;
- Developing hazard registers and hazard control sheets;
- Developing site/laboratory specific task procedures, safe work practices and emergency reaction plans;
- In the application of the hazard control hierarchy to achieve a state of ALARP (As Low as is Reasonably Practicable) with regard to identified hazards;
- Developing induction and task training programmes for laboratory technicians and other affected personnel;
- Review of laboratory processes/methods with regard to cost-efficiency and productivity.

He adds, however, that while most of the information contained in the guideline was obtained from international sources and was reviewed for local application and found to be relevant and of an acceptable standard for general guidance, users should exercise care to ensure that compliance with local legal requirements takes precedence when any specific laboratory codes of practice/task procedures are developed.

Sabita's DVD 440 - Fire fighting in the bituminous products industry has now been finalised and is available to promote members' efforts to entrench a culture of occupational health and safety awareness in their workplaces.

The DVD addresses the following areas of firefighting specifically related to the hazards in the bituminous products industry:

- Components of fire and fire fighting techniques;
- Identification of extinguishers and their uses;
- Use of portable fire extinguishers in the workplace;
- Emergency information placards;
- Identification of LPG faults and corrective action;
- Extreme temperature days; and
- Incident report form.

The insert accompanying the DVD contains comprehensive information on the full range of Sabita's HSE products and publications. These include:

- DVD series on working safely with bitumen and on treating bitumen burns;
- Sabita's safety posters, including the "Protect yourself" series;
- Sabita manuals on workplace safety.

The DVD is available to Sabita members at R50/copy and to non-members at R90/copy. Please browse www.sabita.co.za, or email info@sabita.co.za to order.
A number of problems have been experienced when using more than one nuclear density gauge, with significant variability in field density results and differences of up to at least 3% being reported. As part of the TMH1 revision project an investigation was undertaken under the leadership of consultant Dave Wright to identify the problems and to produce a series of standard methods (SANS) that would improve the situation.

The investigation took the form of extensive gauge tests on a set of standard blocks involving several thousand readings using a number of makes and ages of gauges. The work was done in consultation with Barry Dumas (WCPA) and a panel consisting of major gauge suppliers.

The initial problem lies in the general perception that many people believe the gauge is a density meter that gives an absolute value every time. However, the nuclear density gauge does not provide a direct reading of the density of a material. It emits gamma radiation on a random basis from a caesium source in backscatter mode (indirect) or from a probe (direct) which passes through the material. The radiation, having passed through the material, is measured by detectors located in the base of the gauge and converted by a microprocessor into wet density readings. The more dense the material, the fewer the counts that are measured. Moisture readings are obtained by counting slowed neutrons emitted by a neutron radiation source in the gauge and measured by a detector in the base.

The gauges are calibrated by taking readings on sets of either two or three calibration blocks of known (or assigned) density. The density algorithm used by the microprocessor contains three constants that are calculated using the manufacturer’s formula, the average counts from the standard blocks and the block densities. Currently the tolerances applied to the measured vs known values per block are plus or minus 1% for the density and 2% for the moisture content. This, together with certain other factors shown in the investigation, can result in two ‘calibrated’ gauges differing by at least 2%. In addition the sets of calibration blocks around the country have not been referenced on a national basis and there are some large differences.

Gauge performance

The investigation showed that using a range of old and new gauges of different makes, given that they were in good working condition, provided very similar performance measurements. Typically, a set of ten one-minute readings, at one position and probe depth, produced a range of values of up to 0.8% of the block value. For example, on a 2 600 kg/m$^3$ block two values out of ten could differ by as much as 21 kg/m$^3$. If a 15 second count is used instead of a one minute count, the range of values is approximately doubled. Further, if the gauge were switched off and on, and the exercise then repeated, sets of ten readings could vary by up to a further 0.35% of the block value or 9 kg/m$^3$ on a 2 600 kg/m$^3$ block. It can thus be seen that with the gauge in perfect working order it is possible to achieve quite a range of values at one single location in a uniform material. Having understood this, one can not be blamed for a sense of anguish or even desperation! However, comparisons with the old sand replacement test indicate even bigger differences, particularly in sharp angular material such as crushed stone.

Problems and solutions

Bearing in mind the comments above, the use of nuclear gauges is somewhat more complicated than people imagine. The following main problems were identified:

- Relatively wide tolerances in the calibration procedure;
- Lack of a national reference standard for calibration blocks;
- Lack of standard procedures for maintaining, calibrating and operating the gauges.

It is obvious that with the current technology it is not possible to provide absolute answers. However, by producing a set of standard methods to address the problems it is hoped that all aspects of gauge use will be improved and that this will in turn reduce the differences. The methods which turned out to be quite a daunting task are as follows:

NG1 - Administration, handling and maintenance of a nuclear density gauge:

The use of gauges is covered by the South African Hazardous Substances Act, which rates the gauges as Group IV hazardous substances. Although the quantity of radioactive material contained by the gauge is small, the owner and operator of a gauge needs to be familiar with and comply with the requirements of the Act. Most operators currently do not comply with many of the requirements. NG1 outlines all the necessary actions and also sets requirements for routine maintenance and validation of gauges.
NG2 - Validation of standard calibration blocks:

This of itself is an arduous exercise which will be necessary for all owners of standard blocks and which will then link their blocks to the set held by the CSIR.

NG3 - Calibration of a nuclear density gauge:

The calibration exercise has been tightened by a more detailed procedure which will take about five times longer than at present. To avoid doing this on an annual basis a simpler gauge validation procedure has been developed, and calibration is only required when the gauge fails the validation test.

NG4 - Validation of a nuclear density gauge:

The validation procedure is required on an annual basis (following routine maintenance and leak testing) or when repairs are made that alter the performance of the gauge.

NG5 - Determination of in situ density using a nuclear density gauge:

An essential part of NG5 is compliance with NG1 to NG4. Matters such as the length of counts, use of gravimetric moisture contents, standard counts and preparation of sampling areas are covered.

General

Currently no specific work has been done on the use of gauges (standard or thin) on asphalt materials. A number of problems are known to exist and it is recommended that until such work is done, densities should be determined by coring or, in the case of thin layers, controlled by permeability testing.

Certain materials such as ferricretes, some calcretes and materials with bituminous or plant matter can give unreliable results. Other approaches such as a trial section with sand replacement testing or an agreed method specification should be investigated.

A very useful course on the nuclear gauge is offered by the Asphalt Academy based on work by Barry Dumas and Sydney Crocker of the WCPA.

Conclusion

An exercise is currently under way comparing block sets across the country to establish assigned values for the CSIR set of calibration blocks, and hence enable the use of NG2. Once this has been completed (hopefully by the end of August) it is intended that the methods NG1 to NG5 will be posted in draft form on the SANRAL website, and their use recommended until they have been formally published as South African National Standards by the SA Bureau of Standards.

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**SAT reviews its achievements and sets course for the future**

The Society for Asphalt Technology held its 17th Annual General Meeting on 4 May 2010 in KwaZulu Natal. A record number of 73 members attended the AGM.

At the meeting the following of note was recorded:

- The resignation of Basil Jonsson as chairman of SAT Central Region and the appointment of Herman Marais to that office;
- The creation of two new office bearer positions, i.e vice-president and past-president. The Society’s constitution needs to be amended accordingly;
- The approval of the 2009 financial statements;
- The re-appointment of Mazars Moores Rowland as the Society’s auditors for 2010.

Focus areas for the remainder of 2010 are adding value to membership through regional initiatives, with more interactive workshops, and improved connectivity with members.

A workshop on Mix Design was held in Pretoria on 3 June 2010, with 72 delegates attending. Further workshops are planned for Cape Town and Durban.

Wim Hofsink made a presentation on the works at the King Shaka Airport on 10 June 2010 in Durban. The presentation is available on www.socsat.co.za.

Workshops on Best practice in the design and construction of slurry seals are also planned for the remainder of the year.

ECSA has been approached to register SocSAT, which means membership of the Society will carry CPD points - another benefit for members!

The Society continues to grow, with 30 new enrolments to date this year. Membership currently stands at 493 members.

The Road Pavements Forum (RPF) in May in KwaZulu-Natal was well attended by SocSAT members, and the Society’s standing as a sponsor member of the RPF has proven to be of great value to members. The next RPF will be held on 9 and 10 November in Pretoria, and invitations will be emailed to fully paid-up members during September/October.
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Sabita manuals and DVDs

Manuals

Manual 1: Technical guidelines: Construction of bitumen rubber seals
Manual 2: Bituminous products for road construction and maintenance
Manual 5: Guidelines for the manufacture and construction of hot mix asphalt
Manual 7: SuperSurf - Economic warrants for surfacing roads
Manual 8: Guidelines for the safe and responsible handling of bituminous products
Manual 9: Bituminous surfacings for temporary deviations
Manual 10: Appropriate standards for bituminous surfacings
Manual 11: Labour enhanced construction for bituminous surfacings
Manual 12: Methods and procedures - Labour enhanced construction for bituminous surfacings
Manual 13: LAMBs - The design and use of large aggregate mixes for bases
Manual 14: GEMS - The design and use of granular emulsion mixes
Manual 17: Porous asphalt mixes: Design and use
Manual 18: Appropriate standards for the use of sand asphalt
Manual 19: Guidelines for the design, manufacture and construction of bitumen rubber asphalt wearing courses
Manual 20: Sealing of active cracks in road pavements
Manual 21: ETB - the design and use of emulsion-treated bases
Manual 22: Hot mix paving in adverse weather
Manual 24: User guide for the design of hot mix asphalt
Manual 25: Quality management in the handling and transport of bituminous binders
Manual 26: Interim guidelines for primes and stone precoating fluids
Manual 27: Guidelines for thin layer hot mix asphalt wearing courses on residential streets

Under review


New manuals in publication process

Manual 29: A Guide to the safe use of solvents in a bituminous products laboratory

Test methods

DVD 100: Test methods for bituminous products
DVD 200: Training guide for the construction and repair of bituminous surfacings by hand
DVD 300: Manufacture, paving and compaction of hot mix asphalt

HSE

DVD 410: The safe handling of bitumen
DVD 420: Treatment of bitumen burns
DVD 430: Working safely with bitumen
DVD 440: Firefighting in the bituminous products industry

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South Africa’s continued economic growth has seen large increases in volumes of heavy vehicles on the country’s road network. To ensure long-term serviceability of our roads, and to underpin low-intervention strategies on high traffic volume roads such as urban freeways, asphalt mix design technology has to keep pace with the changing demands placed on pavement materials.

One of the initiatives aimed at increasing the options available for the design of heavy trafficked sections is Sabita’s High Modulus Asphalt (HiMA) Technology Transfer (T2) project.

HiMA, or Enrobés à Module Elevé (EME), was developed in France in the early 1990s, where it is now used extensively on main routes, airports and urban roads. HiMA technology combines superior permanent deformation resistance with high structural stiffness and good fatigue performance. The key characteristic of HiMA is a high binder content of hard bitumen with a penetration value of between 10 and 25.

The Sabita HiMA T2 project consists of four phases:

1. Phase 1: Preliminary assessment of viability;
2. Phase 2: Preliminary guidelines on mix design and structural design;
3. Phase 3: Validation of HiMA technology through accelerated pavement testing, long-term pavement performance and laboratory studies;
4. Phase 4: Drafting of guidelines and specifications for HiMA.

Phase 1 of the study was completed in July 2008. A first study was performed in a French laboratory using materials selected from South Africa (aggregate and bitumen). These components did not allow the production of a mix meeting all the mechanical characteristics of an EME. Limitation of the bitumen content was necessary to ensure an acceptable rutting behaviour. As a result, the fatigue resistance was below the requested threshold, although all the other parameters were fully in line with the specifications, including the complex modulus (>14 000 MPa 15°C 10HZ). It was found later that the shape of the aggregates played a key role in this. Phase 2 was revised to include a mix improvement project, with the French mix design taken as a benchmark. The objective was to produce a mix design with improved fatigue performance, as this was the one property that did not meet French specifications. Aggregate packing analysis was used to identify aggregates and grading curves that would yield higher voids in mineral aggregate (VMA). The higher VMA in turn allowed for mix designs with a higher binder content, resulting in an improved fatigue life. The testing performed by the CSIR on the HiMA mixes also feeds into the larger SANRAL revision of the South African Pavement Design Method (SAPDM).

Figure 1 shows a comparison of dynamic modulus master curves for different mixes tested under the SAPDM project. The master curves show the high stiffness of HiMA compared to other mix types at low loading frequencies, which equates to its performance at high temperatures. HiMA’s greater resistance against permanent deformation compared to other mix types is shown in Figure 2. The results shown were obtained from the repeated simple shear test at constant height (RSST-CH).

As part of the T² project, tentative performance criteria have been set for the South African equivalents of the French test methods. A preliminary guideline for the design of HiMA mixes and pavement structures containing HiMA layers has been completed. In Phase 3, locally designed HiMA mixes will be tested under APT to validate the design methods and gain further local experience of this technology.
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Resolution 1: That the RPF sponsors explore avenues to reinstate the collection and dissemination of transport and road statistics for South Africa to support sound decision making processes.

Resolution 2: That the RPF sponsors engage with DoT to prioritise best practice documentation in need of revision and to facilitate the appointment of appropriate service providers for the revision of these documents.

Resolution 3: That Sabita puts a request to the primary producers to schedule the turnarounds such that it does not impact on peak bitumen demand periods.

The next meeting of the Road Pavements Forum will be held in Pretoria on 9 - 10 November 2010.

Sabita's burns tags reissued and now available free of charge to members

Sabita's green burns tags, an essential addition to the BitSafe first aid kit and containing vital information for medical practitioners treating victims of bitumen burns, have been reprinted and are available to Sabita members free of charge on request.

The burns tags have been compiled by specialists with specific knowledge of the unique nature of burns associated with contact with hot bitumen, and ensures that medical practitioners without this specialised knowledge are able to provide adequate treatment.

Orders should be emailed to info@sabita.co.za.

Local and international events calendar

Local events 2010

CAPSA’11 Exco and Steering Committee meeting
11 August

29th Annual Southern African Transport Conference SATC 2010
16 - 19 August, CSIR ICC, Pretoria

BitSafe course
5 - 7 October, Pretoria

4th SARF/IRF Regional Conference for Africa:
11 - 13 October, Somerset West

CAPSA’11 Exco and Steering Committee meeting
November

Road Pavements Forum
9 - 10 November, CSIR ICC, Pretoria

Sabita Council meeting (after the RPF)
10 November

International events 2010

11th ISAP Conference (ISAP Nagoya 2010):
1 - 6 August, Nagoya, Japan

World of Emulsions, Emulsion Producers’ Day:
11 October, Lyon, France

2nd International Sprayed Sealing Conference 2010:
11 - 12 October, ARRB, Victoria, Australia

24th ARRB Conference:
12 - 15 October, Victoria, Australia

5th CME World Emulsions Congress:
12 - 14 October, Lyon, France

5th China Asphalt Summit
20 - 21 October, Shanghai, China

17th ITS World Congress, Busan 2010
25 - 29 October, Busan, Korea

Local events 2011

CAPSA’11 Exco and Steering Committee meeting
9 February

CAPSA’11 Exco and Steering Committee meeting
8 June

Conference on Asphalt Pavements for Southern Africa (CAPSA’11):
11 - 14 September, Drakensberg, South Africa

International events 2011

Mexican Asphalt Congress
4 - 6 May, Mexico

PIARC, 24th World Road Congress
25 - 30 September, Mexico
Over the past three months the Asphalt Academy (AsAc) reached the end of the pilot course on pavement engineering run in association with Gauteng Provincial Roads Department (GPTRW), and launched its new Bituminous binders for roads course.

The Bituminous binders for roads course has been developed to replace the very popular Introduction to bitumen course, and will provide detailed information on the use of bituminous binders for road construction and maintenance. The course is structured around the 4th edition of Sabita’s Manual 2 – Bituminous binders for road construction and maintenance, published in August 2007, and is divided into the following five modules presented over two days:

- Manufacture and properties of bitumen;
- Types and grades;
- Specifications and test methods;
- Safe handling of bituminous binders;
- Selection and application of binders.

The course is intended to inform professionals on the constituents and engineering properties of bituminous binders in general use, and their significance in practice, while creating an awareness of the importance of the safe and responsible handling of these products. The course is targeted at practitioners operating at NQF level 5 and above in support of their continuing professional development.

The first course was held in Pretoria on 18 and 19 May 2010, and two further courses are scheduled to be held on 3-4 August 2010 in KZN, and 21-22 September in Cape Town. Online registration is available at http://www.asphaltacademy.co.za.

The pilot course in pavement engineering started in September 2008. It was run as a Public Private Partnership and capacity building project for the Gauteng Provincial Government, with the final certification ceremony held in April 2010. The course was designed as a 12-module course with the 11 technical modules being completed in November 2009 and the final assessment module completed at the beginning of April 2010.

Of the 22 students selected for the course from the public and private sector in Gauteng, it is very pleasing to report that 21 were still present during the final module in November last year, which is a testimony to the quality of the course and the dedication of the students. It should also be noted that the one student who dropped out did so reluctantly because of a promotion at work and an increased workload.

Students were assessed on the presentation of the main assignment to design and construct a new and a rehabilitated road, a theme which ran through the whole of the course and was also included in specific assignments for some of the course modules. Of these, five students were rated as above expectation, 12 met expectations and only four students were below expectation because they did not submit the required assignments on which to base the assessment.

Many lessons were learned during the presentation of the course and the feedback from the students after each module. These will be taken into account with the presentation of subsequent courses. The course has now been fully tested and there is no doubt that it fills an important gap in providing practical training to graduates and diplomates from tertiary institutions who need to apply their basic civil engineering knowledge to designing and constructing a road.

Discussions are at an advanced stage with a tertiary institution to present an accredited course in pavement or road engineering at NQF level 6 or 7 on an ongoing basis, with support from GPTRW. Further details on subsequent courses will be provided as soon as the details have been finalised.
The South African Road Federation (SARF) was launched 60 years ago to fulfill the need for a body able to represent the total spectrum of practitioners and institutions involved in the roads sector. Its aim was to promote better and safer roads and road operations.

Since that time the SARF, as a member of the International Road Federation based in Geneva-Switzerland, has become one of the foremost bodies dedicated to promoting the interests of the roads sector. By fostering an efficient and effective road system it contributes to economic and social growth in the country.

Its membership is made up of a wide range of authorities at all three levels of government, as well as all sectors of private sector interests in roads. The SARF aims to:

• interact with Government on behalf of its members;
• promote and assist the development and management of an effective road system, and build capacity through seminars, training courses, workshops and bursaries;
• facilitate contact, communication and dissemination of information to all stakeholders in the roads industry and co-operate with the IRF and other relevant national and international associations towards the promotion and transformation of the road sector in South Africa.

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www.sarf.org.za

Outeniqua Lab (Pty) Ltd was established in George in 1993, where it set up its head office and first laboratory. The company has since established satellite laboratories in Mossel Bay, Knysna and Jeffrey's Bay.

In 2008 the company further extended its professional services with the launch of Outeniqua Geotechnical Services cc, a specialised geotechnical consultancy.

The company aims to provide “accurate and efficient service delivery through competent and well trained staff. A wide range of services is delivered by a highly experienced team comprising professional geotechnical engineers, civil engineering technicians, geologists and numerous experienced laboratory and field technicians. Both companies are BEE compliant, and Outeniqua Lab (Pty) Ltd is SANAS/ISO 17025 accredited.

Services offered include:

• A civil engineering and building laboratory through its ISO/SANAS accredited materials laboratory for soils, aggregates, concrete and asphalt testing as well as on-site testing for quality control.
• A geotechnical consultancy providing professional geotechnical support to civil and structural engineers, developers and contractors, including geotechnical and geological investigations and reports for residential developments, golf estates, commercial and industrial structures, dams, quarries, cemeteries and roads.

The company’s client base includes all major consulting engineering companies and contractors, and has played a major role in the development of the southern Cape, with projects ranging from golf estates to low cost housing throughout the western and eastern Cape, commercial and residential developments, irrigation dams etc.

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