

Reducing hydrogen sulfide gas emissions from the manufacturing of polymer modified bitumen

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ABSTRACT

"This paper investigates the use of sodium hypochlorite to reduce the amount of hydrogen sulphide (H₂S) gas released into the atmosphere when sulphur is used as a cross-linking agent in the manufacturing process of polymer modified bitumen (PMB).

In order to test the efficacy of this laboratory and manufacturing plant trials were conducted with and without sodium hypochlorite where a gas monitor was used to quantitate the level of H₂S emissions.

The results of these experiments showed that sodium hypochlorite was a highly effective and economical method of reducing H₂S produced in the manufacturing PMB. It was also shown that traditional methods of negating odour in PMB plants were completely ineffective at stopping actual H₂S from being released into the atmosphere.

This should be an issue that PMB plants should take into account as the uncontrolled and unmonitored release of H₂S gas can have a significant effect on the health and safety of those within close proximity of PMB plants and also may significantly impact the environment. "

Towards Safer Sprayed Sealing Operations

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ABSTRACT

"Paper submitted as a progress report on joint DoT/AAPA safety initiative for sprayed sealing operations.

This project will be by then at the end of its fourth year of a five year transition period and this report will outline on progress and initiatives to date.

The main focus will be on forward moving aggregate spreading operations, but comment will also be made on other components of this program such as non reversing rollers and the move towards high flash point cutters, and a concept to move towards the use of less cutters in the future."

Automated Binder Content Testing Is it Safer

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ABSTRACT

In recent years, several manufacturers have brought automated asphalt testing equipment to market. These machines offer an alternative to the AS/NZS 2891.3 methods currently used in day-to-day asphalt plant QA testing for the determination of asphalt bitumen content.

A putative advantage of automated asphalt testing machines is the reduced need for direct operator involvement, which has the potential to minimise operator exposure to hazards associated with currently used methods. Fulton Hogan has undertaken a comparison of an automated asphalt test machine with an existing test method to determine whether this hazard reduction potential can be realised.

This comparison indicated that:

- The automatic method reduces the duration of manual handling tasks by 30-45 minutes for every test
- The working temperature of the machine (80-110°C) is lower than existing methods involving hotplates (110°+) and involves significantly less operator interaction with hot surfaces and solvents
- The solvent used by the automatic machine has a higher flash point than those used in existing methods, which reduces the risk of fire and explosion
- Reduced operator interaction with the testing equipment has the potential to reduce exposure to hazardous fumes. Although the solvents used by the automated equipment are acknowledged to be more hazardous than solvents used for existing methods, the likelihood of exposure was found to be significantly reduced.

Growth & opportunities for bitumen during COVID-19

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ABSTRACT

The impact of covid-19 on bitumen has been complex across the region. As countries emerge from the first wave of the lockdowns, there have been pockets of demand seen surfacing in key nations like China. On the other hand, some countries that have struggled with prolonged lockdowns or have experienced the second wave of infections are witnessing a slowdown in all aspects of infrastructure development.

The year has seen most governments having to reprioritise infrastructure budgets with more pressing demands for healthcare. Countries like Indonesia reallocated as much as 40pc of its government budget for healthcare earlier in 2020, to cope with the impact of the pandemic. Credit issues and slow demand from road contractors have affected one of the largest countries in southeast Asia.

But the biggest impact of all has come from the erosion of nearly 50pc of the global fuel demand this year. The resulting impact of that on refining margins has pushed key refiners in Singapore, New Zealand and other parts of the region into prolonged shutdowns. Meanwhile, refiners in countries like the Philippines, Australia have been mulling refining production rates along with their governments. This reduction in bitumen production has come alongside the implementation of IMO 2020 regulations that resulted in higher volumes of low sulphur fuel oil (LSFO) being produced in refineries.

As 2021 approaches, the impact of covid-19 is expected to be maintained on refinery production rates. On the other hand, trade flows to major import destinations in south Asia, parts of southeast Asia and New Zealand are expected to see important shifts.

Reduction of immissions with the help of WMA and equipment related tools - practical implementation and evaluation

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ABSTRACT

In Germany, the relevance of HSE-topics slowly outperforms traditional technical issues. In 2018, a permanent scientific commission within Deutsche Forschungsgemeinschaft DFG (German Research Foundation) commonly known as the „MAK-Commission“ recommended a maximum working place concentration for fumes and aerosols from hot bitumen of 1,5 mg/m³. End of 2019, this value was transferred into a legally binding occupational exposure limit and for this purpose published as TRGS (technical rules for hazardous substances) by the German federal ministry of labor and social affairs. A transition period of 4 years was granted to set up a mutual branche solution to guarantee this on site.

The Office for Mobility and Civil Engineering (AMT) of the German City of Muenster has been running an environmental management system for many years, with those involved actively looking for and applying environmentally friendly solutions. Since technical measures to the paving technology as well as changes in material technology are conceivable to be compliant with exposure limit, four rural test routes were implemented in a joint project between EUROVIA Services GmbH and the city of Münster to gain experience with Warm Mix technologies. Additionally, a paver with a built-in exhaustion system in front of the screed was used, with which any aerosols and vapors near the screed can be extracted and blown out in front of the paver. In addition to traditional measurements associated with the self-monitoring (mix temperature, state of compaction - isotope probe, etc.), which brought initial positive results in connection with the control tests, additional exposure measurements were carried out with the help of a photoionization detector (PID). The PID measurements provided plausible results; though no final statements about carcinogenicity can be made.

Towards the elimination of cutters in spray sealing practices

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ABSTRACT

Whilst most developed countries have moved away from cutting back hot binders with kerosene to construct spray seals, it is still common practice in Australia. The continuation of this practice raises concerns about potential hazards which could result in incidents causing harm to people from explosions and the emission of volatile vapours into the atmosphere.

The primary reason for cutting back hot binders is to reduce their viscosity on a temporary basis to:

- Allow uniform lateral dispersion of modified binders during spraying to prevent tramlining
- Assist with the binder 'wetting' the cover aggregate during spreading when the pavement temperatures are lower
- Prevent brittle fracture with the onset of lower overnight temperatures which can result in the aggregate whip off under traffic

On the other hand, the presence of cutter entrapment in the binder can lead to flushing during high surface temperatures under heavy traffic in summer. The increase in the traffic density on our spray seal network has led to a reduction the amount of cutter that is used compared to past years to mitigate against the occurrence of flushing.

This paper will look at practices which can be used to eliminate the use of cutters to construct spray seals which have been implemented in Australia by the COLAS Group. These include:

- Establishing boundaries when cutting back of hot binders is not necessary to construct spray seals
- Use of the OB Vario synchronised sprayer which simultaneously sprays the binder and applies the cover aggregate.
- The spraying of low viscosity S45R crumb rubber binder without cutters
- The use of a second spray bar to spray a breaking agent onto bitumen emulsion to accelerate the cohesion development so the seal can be opened to traffic earlier than conventional emulsions
- The construction of Cape Seals using a single seal and one application of microsurfacing
- The construction of triple seals and the application of emulsion fog sprays to eliminate stone whip off under traffic
- The replacement of kerosene with bio oils in emulsions for use in priming granular base courses.

It is hoped that the above initiatives will provide the Industry with confidence to consider moving toward practices which will lead to the elimination of cutters in spray sealing practices.

Cat Safety VR

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ABSTRACT

Jobsites are full of hazards and distractions that create risks for employees, especially new employees. Training can make a difference in reducing incidents, but not all training is created equal. Teach workers how to avoid danger by immersing them into a safe and controlled environment with virtual reality (VR).

When using Cat Safety VR, learners wear a VR headset that fully immerses them into a jobsite. In the experience learners engage with the foreman on the jobsite and follow specific prompts to study and respond to industry-relevant risks. Teach employees to safely follow work procedures and recognize unsafe behaviours without putting them in danger.