

# DEVELOPMENT OF SPECIFICATIONS AND TECHNICAL GUIDELINES FOR WARM MIX ASPHALT



Researching technologies for producing warm-mix asphalt which is manufactured at significantly lower temperatures to traditional hot-mix asphalt.

Warm Mix Asphalt (WMA) incorporates foaming, chemical, wax and/or synthetic additives that allows asphalt to be produced at temperatures up to 30°C cooler than hot mix asphalt (HMA). These lower temperatures can achieve lower emissions, reduce energy costs and provide a cleaner, safer working environment.

## Background

Main Roads Western Australia currently permits the use of the organic wax compound Sasobit®. Other additives to produce WMA are approved on a project-by-project basis. The development specifications and technical guidelines will facilitate the appropriate use of WMA in WA. Consultation with the asphalt industry will also increase confidence in applying warm-mix technologies.

Although the required specifications and technical guidelines have not been fully developed, findings from this project have provided information for Main Roads and industry to consider prior to advancing implementation. Field trials of materials incorporating warm-mix technologies have shown promise and these materials are worth further consideration.

## What have we learned to date?



Asphalt production temperature reductions of 20°C can decrease the plant process carbon emissions by up to 21%, and the asphalt production emissions by up to 5%.



Carbon emissions can be reduced by approximately 6–20% using warm-mix technologies, while the use of 20% Reclaimed Asphalt Pavement (RAP) can further reduce emissions by up to 13%.



Most warm-mix technologies can be successfully implemented with limited additional investment. However, chemical and organic additives may require minor modifications to some asphalt plants.



Field trials have indicated that the performance of HMA and WMA sections containing different percentages of RAP is similar.



Moisture susceptibility of early-age WMA is greater than the equivalent HMA.



Main Roads is the only jurisdiction that specifies a proprietary warm-mix additive.



Queensland Department of Transport and Main Roads (QTMR) and New South Wales Roads and Maritime Services (RMS) specify maximum warm-mix additive contents that may be added to mixes.



VicRoads, the Tasmanian Department of Stage Growth and the South Australia Department of Planning, Transport and Infrastructure allow a number of technologies to be used (subject to approval).



Main Roads requires the same mix design requirements regardless of whether or not warm-mix additives are used.



QTMR, RMS and the Northern Territory Department of Infrastructure, Planning and Logistics (DIPL) specifies additional testing for WMA mix designs.



Main Roads is the only agency that does not specify additional performance testing for WMA mixes.





### What do we hope to achieve in the future?

- Benchmark carbon impacts of warm-mix technologies currently available in WA.
- Generate draft Main Roads Specifications 504 and 510 with appropriate guidance notes on WMA.
- Prepare draft guidance notes for assessing warm-mix additives, associated production methods and resulting WMA products.
- Prepare draft guidance notes for evaluating the suitability of WMA relative to specific project constraints.

### What are the concerns regarding WMA?

- Long term pavement performance
- Increased residual moisture
- Increased potential debonding

#### SASOBIT PELLETS



Source: [www.engineeringnews.co.za](http://www.engineeringnews.co.za) Aug. 2015.

#### References

Main Roads Western Australia 2017, Asphalt wearing course, Specification 504, May 2017, MRWA, Perth, WA.

Main Roads Western Australia 2018, Asphalt intermediate course, Specification 510, September 2018, MRWA, Perth, WA.

Main Roads Western Australia 2017, Materials for bituminous treatments, Specification 511, May 2017, MRWA, Perth, WA.



Further understanding of WMA technologies and their possible uses in WA.



Conduct further trials and participate in the development of specifications.

### FUTURE CONSIDERATIONS

**Are we ready for WMA in Western Australia?**

**Has industry got the necessary skills and knowledge?**

**What is the impact of WMA on pavement performance?**

