

REVIEW OF THE EFFECT OF MOISTURE ON ASPHALT PAVEMENT PERFORMANCE



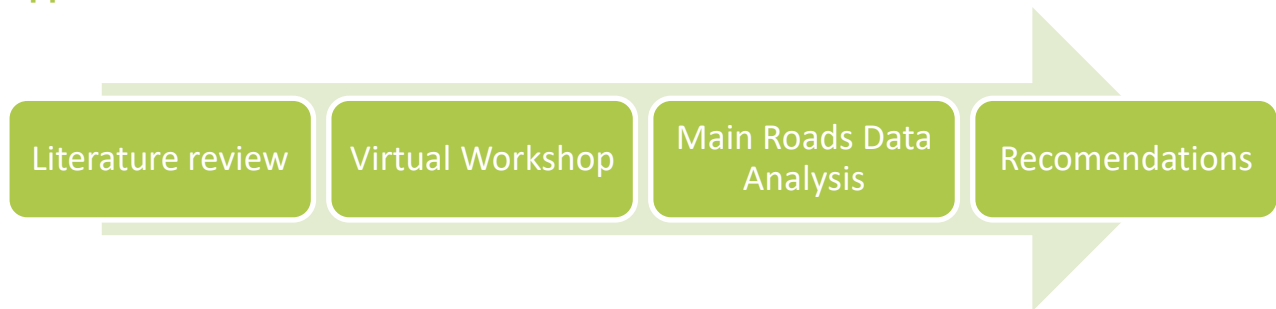
Understanding the effect of moisture on asphalt pavement performance and developing guidance to minimise moisture induced failures

WARRIP investigated the current understanding of water ingress and the damage it causes to asphalt pavements. Preventing premature damage to pavements will mean less disruptions to road users and cost saving on maintenance programs.

Background

Water is not a friend to roads, although they are designed to handle a certain amount of water, when water erodes the bonds between particles, some of the particles can strip away. Pavement designs can often mitigate the potential for moisture damage. Understanding how this moisture resistant design work will ensure we are building strong, water-resistant and long lasting pavements.

Approach



Literature Review

The literature review considered asphalt stripping research such as general mechanisms, critical design factors, aggregate type and mineralogy, testing procedures and road design and construction. It also compared common state road practices and international practices regarding different types of asphalt mixes with focus on dense graded asphalt.

Requirements	Main Roads	RMS	VicRoads	TMR	DPTI
Laboratory compacted air voids (%)	3.5 – 5.5	3 – 6	4.9 – 5.3	3 – 6	N/A
Tensile Strength Ratio (TSR %)	80 (min.)	80 (min.)	80 (min.)	80 (min.)	N/A
Deformation Resistance (mm)	4 (max.)	-	4 (max.)	4.5 (max.)	3 – 6

Workshop findings

During our workshop with industry some of our findings are:

- Need for a better understanding of the extent of stripping occurring across WA
- Potential for an investigation into moisture susceptibility of granite proportions in Perth asphalt mixes
- Performance based testing on asphalt mixes could help to indicate moisture susceptibility
- Consideration of regional materials and testing may be warranted
- Vertical and horizontal interconnected voids should be investigated
- Provision of drainage and waterproof seals are critical as preventative measures





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Findings

Although the current mix design practice is appropriate there could be benefits in implementing laboratory tests to assess the asphalt mix sensitivity to moisture. The type and chemical compositions of the aggregates used across WA need to be assessed as how well the stand up to water will impact the performance of a pavement.

It is critical that current practices ensuring adequate drainage, protecting vulnerable layers with waterproofing seals are continued.



Trials are performing well



Main Roads practice is comparable to national and international practices



Better understanding of our local material to inform mix design.

FUTURE CONSIDERATIONS

How much stripping is occurring across WA?

Should there be additional tests to understand moisture sensitivity of mix designs?

Ongoing monitoring of Gateway Field Trials to confirm findings

