

Microsurfacing – a cost effective treatment for low trafficked surfaced roads

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1 Introduction

The use of microsurfacing offers the road asset owner with limited funding a cost-effective treatment to improve and maintain low trafficked surfaced roads in a good condition. This paper looks at the different situations where microsurfacing can be applied as a remedial treatment to replace conventional asphalt overlays or spray reseals. Many of the Council surfaced roads in residential carry low levels of traffic and these surfaces are more prone to damage from oxidation than traffic. The tendency is to resurface these roads with asphalt to appease the resident's requirements for a smooth quieter surfacing rather than apply a spray seal. The higher cost of overlaying these low trafficked roads with asphalt limits the area that can be treated within the allocated budget.

The successful use of microsurfacing depends on the appropriate treatment selection, correct mix design and emulsion formulation, quality control of raw materials, workmanship and weather conditions. Each of these variables will be discussed in the presentation to ensure that the Council optimises the use of microsurfacing on their network.

2 What is microsurfacing

Microsurfacing is a quickset mixture of polymer modified bitumen emulsion and graded crushed aggregate which is produced and applied in a single application. Microsurfacing relies on the chemical reaction between the emulsified bitumen droplets and the free ions in the aggregate to achieve sufficient cohesive strength to withstand traffic within 1 hour after placement. This process is aided with the addition of synthetic latex and chemical additives. A small amount of cement is used to act as a catalyst to accelerate the curing of the mixture. The formulation of the emulsion and the selection of aggregates are critical to ensure the performance of the microsurfacing.

The mixture can be applied in a thin layer of between 6 – 10mm over an existing bituminous surfacing in a single pass. The thickness will depend on the maximum aggregate size used in the mixture. This means that service covers, kerbs and gutters don't have to be raised. The micro texture of the surfacing improves the skid resistance without increasing the tyre noise levels normally associated with sprayed seals. The mixing and laying of microsurfacing requires minimal equipment on the work site compared with asphalt and spray sealing construction activities. The application of microsurfacing is also a cold process thereby eliminating the risk of people being burnt during the handling of the product

Nominal aggregate size (mm)	Wearing course (Traffic v/l/d)	Rut depth (mm)	Application rates (m2/m3)
3 & 4	< 100	No	300 -280
5	100 – 3000	10 – 20	200 -110
7	> 3000	20 – 30 >30 multiply layers	140 - 80
10	> 3000	20 – 30 >30 multiply layers	110 -70

Table 1: Aggregate size and application requirements

3 Suitability of Microsurfacing for improving the road condition

Microsurfacing can improve the functional properties of an existing aged pavement in many ways. Aging of binder mainly due to oxidation causes it to become brittle which can lead to aggregate loss and surface cracking. The application of microsurfacing will prevent the ingress of water into the under lying pavement by filling in the voids and micro cracks. It will also prevent further oxidation of the aged binder and extend the life of the existing surfacing.

Where there is a loss of shape in the surface due to depressions in the wheel paths from the consolidation of the base, microsurfacing can be used to fill the ruts without having to mill and fill with asphalt. This will also help reduce the risk of aqua planning in wet weather.

Microsurfacing can also improve the rideability of a road by filling the undulations in the existing surface to reduce the high frequency roughness. VicRoads has used microsurfacing effective for this purpose since 2006 as can be seen in Figure 1.

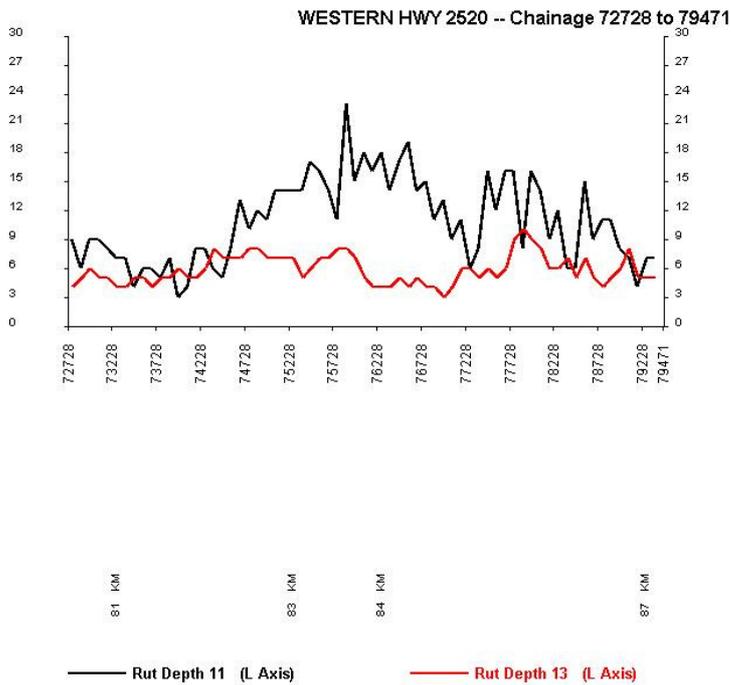


Figure 1: Improvement in roughness on Western Highway, VIC

In high speed areas it will improve the skid resistance of a smooth surface by using a large size aggregate in the mix. This is demonstrated in Figure 2.

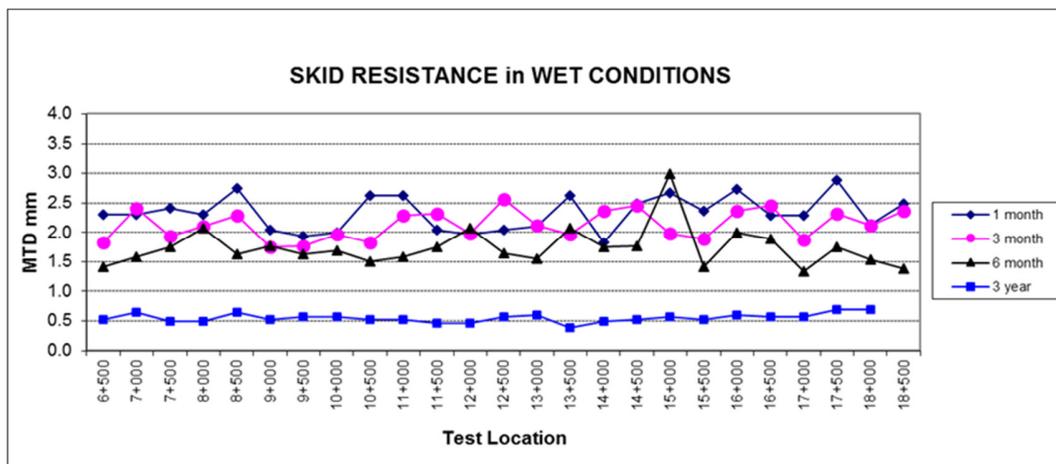


Figure 2: Skid resistance of microsurfacing over time

It is also important to ensure that microsurfacing has its limitations and should never be placed on pavements with high deflections and over active cracks.

4 Conclusions

The use of microsurfacing can provide a lower cost treatment option than applying asphalt to the existing surfaced network to remove ruts, improve rideability and skid resistance. The application process minimises the preparation work required as no manhole covers need to be lifted and no

edge milling is required to tie in the level of the new surface with the kerb and channels. It is a safer and more sustainable practice because the product is mixed and laid cold and less material is required to cover the same area than asphalt.

5 References

Guidelines and Specifications for Microsurfacing AP-R569-18 Austroads published June 2018