

SKID RESISTANT SURFACING

INTRODUCTION

Surfacing treatments involving hard, polish resistant aggregates, and resin based binder systems can provide high levels of surface friction for critical locations such as intersections, tight curves and approaches to pedestrian crossings.

Research has indicated that reductions of up to 25% in skidding accidents can be obtained by increasing surface friction of the road at critical locations.

BACKGROUND

High performance skid resistant treatments were introduced in the United Kingdom in the 1960s to provide enhanced surface friction at accident blackspots. The system proved highly successful and is now used routinely in the UK in many hazardous locations.

Some trials were undertaken in Melbourne in the 1970s. Although the trials were successful, the lack of local specialist contractors meant that interest largely waned. That situation has changed and local suppliers are now able to provide a range of products on demand. Enhancements to binders have improved the reliability and effectiveness of the skid resistant surfacing treatments. Increases in traffic and a desire to improve the safety of the road environment have further increased the demand for higher performance products.



Figure 1: A Calcined Bauxite Surface

SURFACING SYSTEMS

Calcined Bauxite: Calcined bauxite typically has a Polished Stone Value (PSV) of around 75, compared to values of around 48 to 60 for aggregates from most naturally occurring stone sources. Calcined bauxite is also extremely hard and wear resistant. The resin based binder holds the aggregate firmly in place without the embedment of aggregates normally associated with heavy traffic and bituminous binders. The combination of resistance to embedment and resistance to wear results in good macrotexture being retained, even with small nominal sized aggregates (5 mm or less). The resin based binders are also highly resistant to oil or fuel spillage.

When tested using SCRIM¹, sideways force coefficient (sfc) values of around 0.75, and more, have been measured in trials of calcined bauxite surfacing systems.

Calcined bauxite surfacing treatments can provide very high skid resistance and improved safety performance but they are also very costly. These treatments can normally only be economically justified at high accident sites.

Other related surfacing treatments: Resin based binders can be combined with other small sized aggregates to provide good texture levels without the high polishing resistance of calcined bauxite. These treatments can be used where durable surfacings are required with moderate levels of surface friction and can include coloured resins for delineation purposes (see applications below).

Other options for improvement in surface friction, but at a lesser level than calcined bauxite include the use of polish resistant natural aggregates (PSV ³⁵⁵) in combination with normal asphalt and sprayed seal surfacing treatments. The use of high PSV aggregates provides an increase in skid resistance and safety, but not as high as a calcined bauxite treatment, with a marginal increase in the cost. This type of treatment can be economically used at potential accident sites.

APPLICATIONS

Typical applications for high performance calcined bauxite treatments include:

- Intersections where incidence of wet weather skidding

accidents indicates a need for greater levels of surface friction;

- Approaches to pedestrian crossings;
- Slip lanes and tight radius curves;
- Roundabouts.



Figure 2: Calcined Bauxite Intersection Treatment (Courtesy of SafeTsurfaces Pty Ltd)

SELECTION

The selection of high performance treatments should be based on an assessment of the benefits likely to arise from greater levels of surface friction and/or improved delineation.

High performance treatments should only be applied to sound pavements in good condition. These treatments should not be used on:

- rutted or unstable asphalt
- ultra thin open grade and open graded asphalts
- sprayed seals, whether flushed or not.

Consideration may also be given to alternative treatments using conventional materials with high PSV aggregates and enhanced surface texture.

CONSTRUCTION

Resin based binder systems should be applied by specialist contractors.

Asphalt and concrete surfaces do not require priming. All dust, loose aggregate and contamination by oil or grease must be removed from the surface before treatment. Pavement markings, etc. should be removed or masked prior to application.

Binder materials are mixed on site and applied by squeegee or metered spray.

Curing time will depend on binder type and ambient conditions. Typically 3 to 4 hours is required under average conditions before opening to traffic.

SPECIFICATION REQUIREMENTS

Currently there is no VicRoads Specification for high friction surface treatments, however the following are important components:

- PSV of aggregates used (normally greater than 75)
- Nominal 3mm or 2mm aggregate is usually used (normally passing 4.75mm retained 2.36mm or passing 2.36 mm retained 1.18 mm)
- Relative strength of the binder to grip the surface aggregate and the underlying road surface. Refer to the Tensile Adhesion test, TRL Report No. 176 Appendix J.

VicRoads is also considering the inclusion of the following performance parameters at 24 months of age:

- No more than 2% surface loss in any square metre
- Skid Resistance Value (SRV) > 60.

In addition, the contractor should have adequate procedures for:

- Preparation of the surface (cleaning procedure)
- Protection of the environment
- Application of the adhesive and aggregate
- Site cleanliness, including site clean up.

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¹ Sideways Force Coefficient Routine Investigation Machine