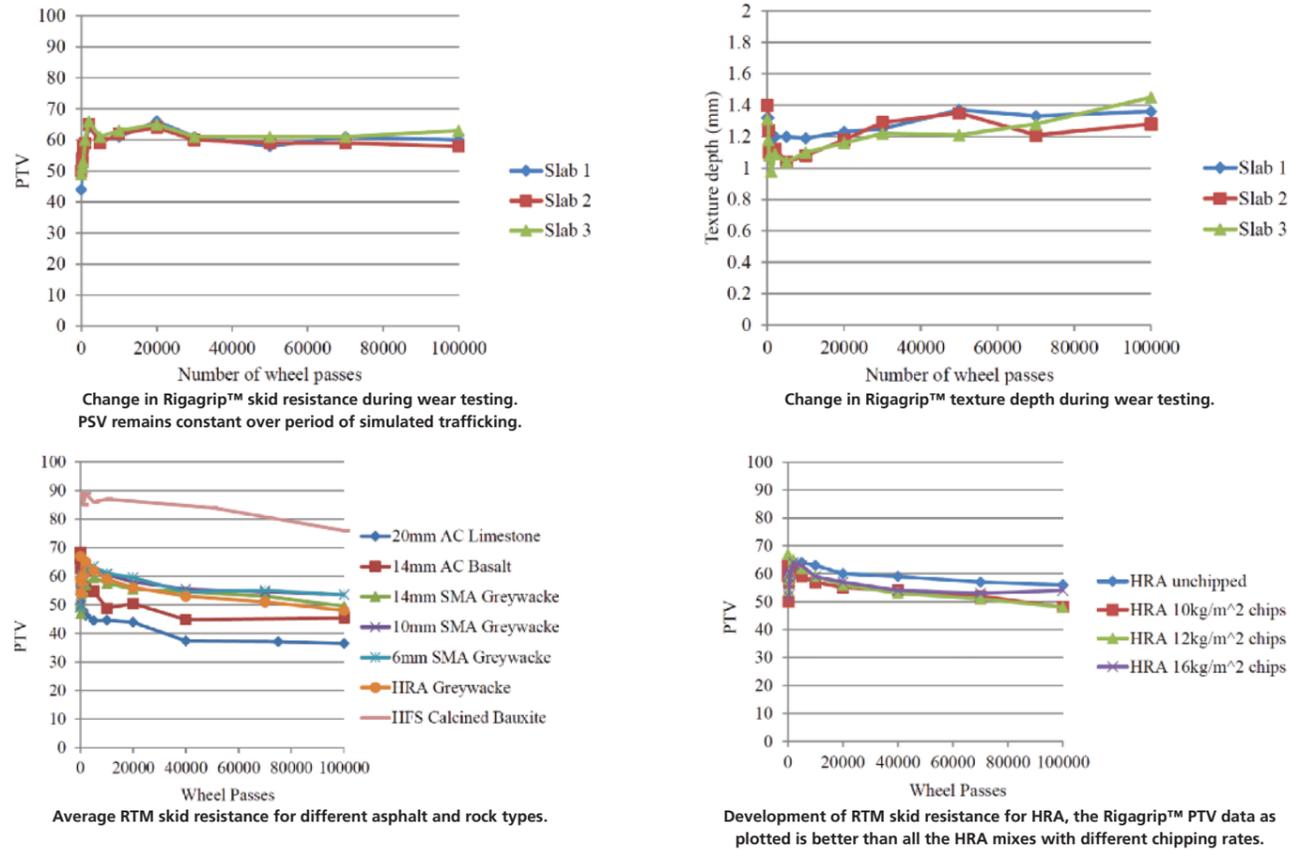


Typical Test Properties: Kishorn Aggregate

Test	Result	Test	Result
Particle Density	2.66Mg/m ³	Aggregate Abrasion Value	3.0
Water Absorption	0.4%	PSV 6/10mm	60
Magnesium Sulphate Soundness Value	1%	PSV 2/6mm	72

The University of Ulster was commissioned to test and report on the resistance to wear according to TRL methods as report 176 (1977) with amendments from the Guidelines Document for the Assessment and Certification of High-Friction Surfacing for Highways (BBA 2008). The extended wear test is equivalent to between 5 and 8 years actual trafficking.

The test specimens were representative of the material laid at Westburn Road, Aberdeen. The results of the extended wear test are shown in the graphs below:



RTM – Road Test Machine
TRL – Transport Research Laboratory
HRA – Hot Rolled Asphalt
PSV – Polished Stone Value

PTV – Pendulum Test Value
AC – Asphaltic Concrete
SMA – Stone Mastic Asphalt

The main conclusions from the testing are:

- There was no significant reduction in PSV after 100,000 wheel passes.
- Rigagrip™ has better skid resistance than HRA, SMA and AC mixes made with other types of aggregate with comparable or better declared PSV.
- Rigagrip™ has been one of the best performing asphalt surfacing materials assessed using the Road Test Machine/BBA HAPAS wear test.

A full copy of this test report is available on request.

For further guidance or information, please call Leith's Technical Services:

E: Tech-info@leiths-group.co.uk

RIGAGRIP™

Built on Quality

The Rigagrip™ system consists of aggregate, filler and polymer modified bitumen. Mixtures are formulated to provide a dense durable mix with a surface texture to provide high levels of skid resistance.



Leiths have developed a thin surface course system to cope with all aspects of surfacing from overlays to new pavement construction. The Rigagrip™ system consist of aggregate, filler and polymer modified bitumen. Mixtures are formulated to provide a dense durable mix with a surface texture to provide high levels of skid resistance.

The design of the material is such that aggregate interlock provides a material that is not prone to rutting. Different types of aggregate and binder can be used to meet the UK's safety requirements for all surfaces. By using a particular Scottish aggregate, with superior hardness and polished stone values, mixes can be produced that will provide skid resistance equivalent to high friction surfacing.

Thin surfacing is not designed to treat pavements where structural deterioration or cracking is present in the underlying layer. The condition of the substrate is critical in determining life expectancy. By using certain polymer modified bitumens the strain capacity of the layer can be increased thus improving the overlay properties of the material.

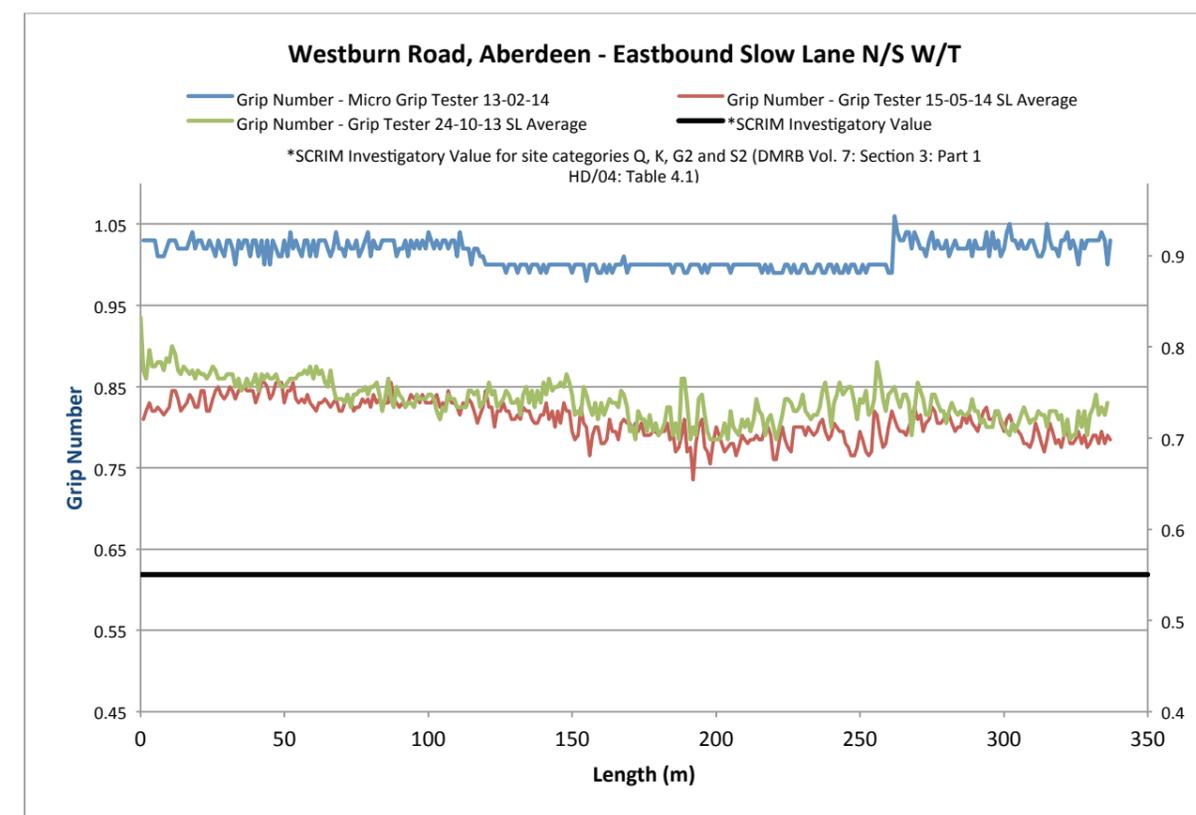
The Rigagrip™ systems offer a quick, cost effective means of resurfacing roads. Faster construction times potentially reduces traffic management costs and delays to the public. The uniform negative surface texture and machine laid surfaces produce a significantly quieter surface when compared with other conventional surfaces.

Conventional high friction surfacing systems have a limited life and can cause distress to the underlying pavement resulting in replacement of the surfacing and the high friction course often within a five year period.

A well designed thin surfacing requires low maintenance and is very durable when included in a properly designed construction. Longer life, thinner construction and reduced noise levels impart sustainable environmental benefits. This product also offers enhanced resistance to fuel and de-icing fluids when compared with products made with conventional straight run bitumens.

In summary the benefits of using Rigagrip™ are:

- Outstanding durability with excellent deformation and fretting resistance.
- High skid resistance thus avoiding the need for High Friction Surfacing.
- Smooth surface with extremely low traffic noise levels.
- Better weathering characteristics and strain capacity when compared with conventional bituminous thin surfacing.



The investigatory value referred to in the above graph is that at which a full investigation would need to be carried out if skid resistance values fall below that indicated level. Lack of friction can be an important contributory factor in road accidents, although it is not normally a causative factor. It is not possible to define a threshold at which skid resistance goes from being 'safe' to 'dangerous' because:

Even on wet roads with low skid resistance, friction will be adequate to achieve normal acceleration, deceleration and cornering manoeuvres.

Conversely, the friction needed to avoid an incident in some situations may be higher than can actually be achieved with any surfacing.

However, where high levels of friction are needed, as in an emergency stop, better skid resistance can help to reduce accidents.

To determine values and results presented in the above graph a micro Grip Tester has been used. This apparatus was correlated by the University of Ulster Highway Engineering Research Group using the pendulum test. The average Grip number obtained by using this apparatus was 1.0. This correlation indicates that a pendulum test value greater than 75 was achieved for this material six months after the material was laid. The minimum pendulum value requirement for a newly laid High Friction Surfacing system is a Skid Resistance Value ≥ 65 .

The Grip tests reported above were carried out over a six month period and the results are acknowledged as being well within the reproducibility limits of the Grip Tester. They also show that there has been no loss of skid resistance over the period tested.

