NZ TRANSPORT AGENCY
WAKA KOTAHI

Surfacing Aggregate Skid Resistance Performance

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Introduction

To obtain the best skid related whole of life cost from a surfacing the nature and performance of the aggregates used needs to be understood.

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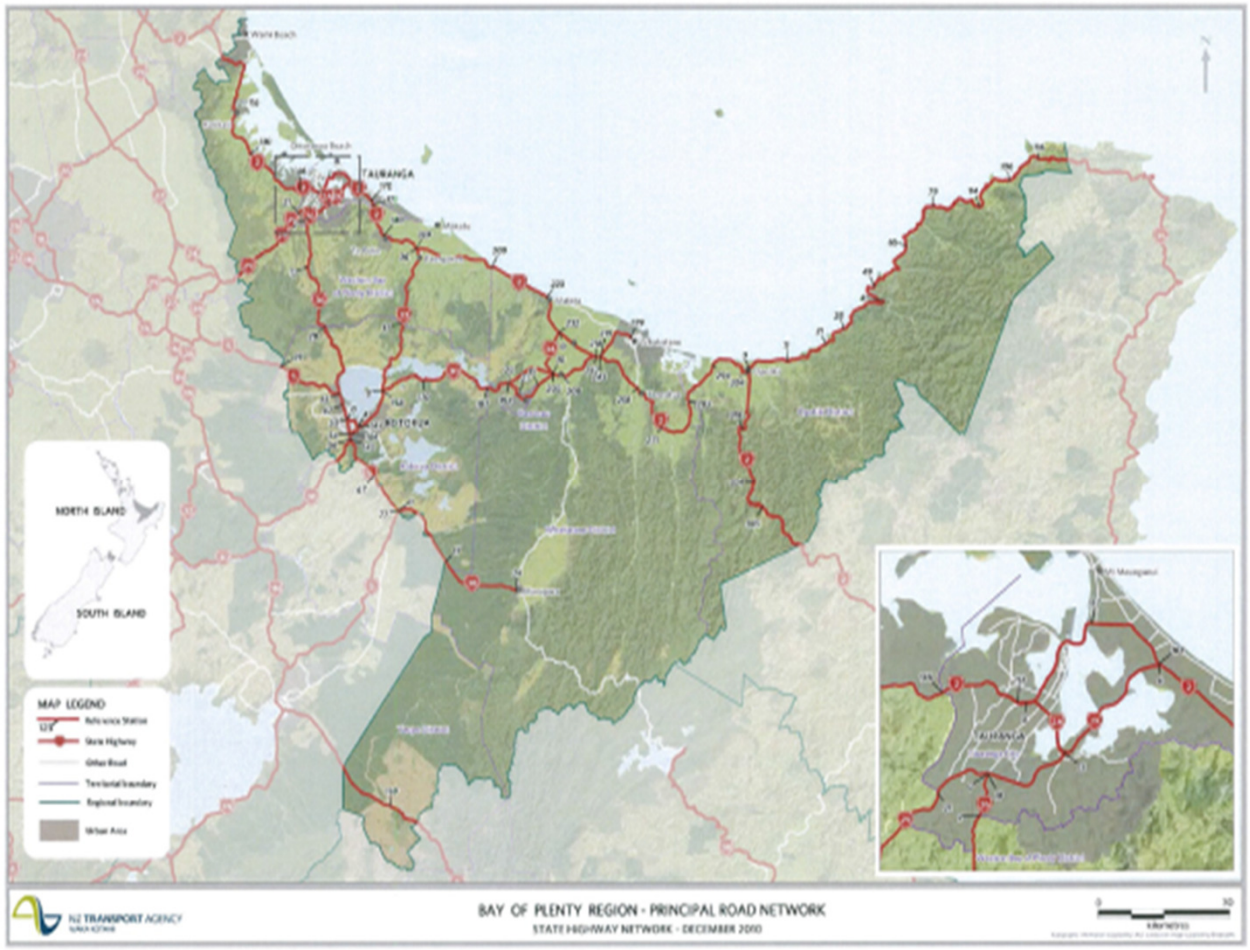
Background

Earlier versions, NZTA T10 specification used Polished Stone Value (PSV)

T10:2010 - "Aggregate Performance Method"

Investigation of extended PSV and onsite monitoring of Equilibrium SCRIM Coefficient (ESC) was undertaken on aggregates used on State Highways within the Bay of Plenty Region of New Zealand.

Bay of Plenty State Highway



760 Km's of State Highway

Traffic volume range : 500 to 34,000 per day

HCV's : 90 to 2300 per day

Terrain : Plains to Mountainous

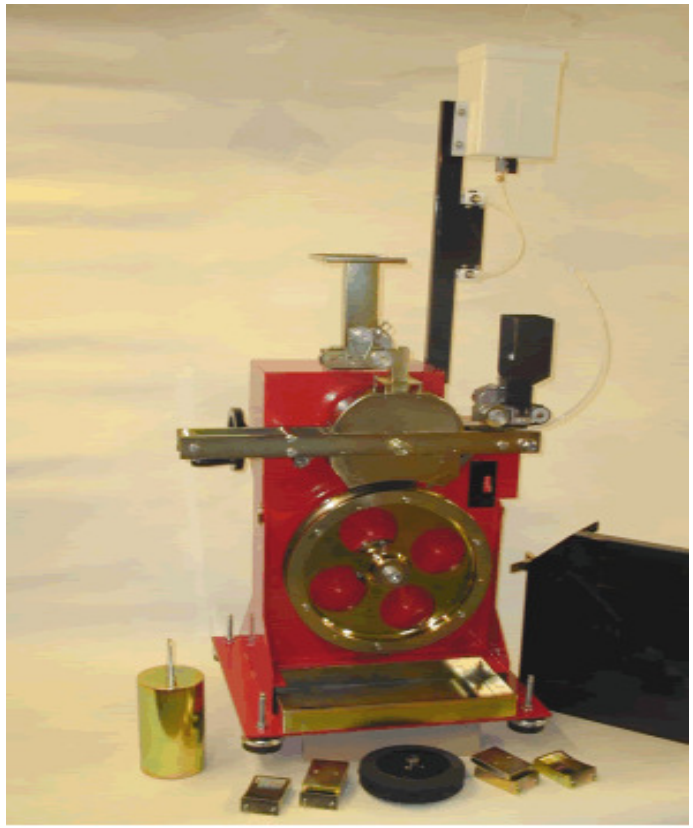
Extended PSV Polishing

PSV testing contained in the New Zealand Transport Agency's specification M/6 Notes - BS EN 1097-8:2009

Aggregate sample on a curved mould, the surface is subject to 3hrs of coarse polishing then 3hrs of fine polishing. Friction measured by British Pendulum Number (BPN)

Number of aggregate types selected and subjected to fine polishing regime with polishing times of 2,3,4,6,8 and 12 hours

Extended PSV Polishing

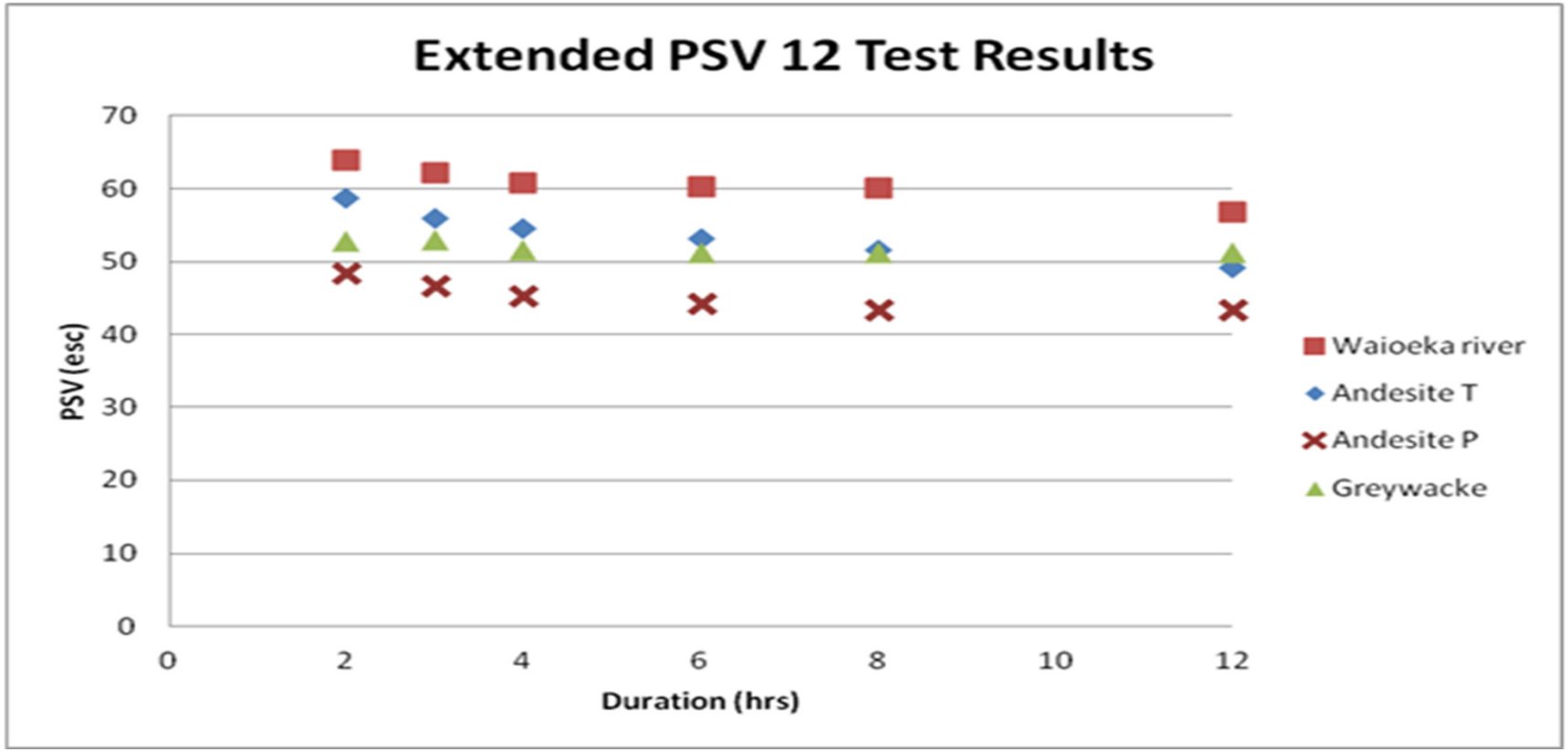


Accelerated polishing testing machine

British Pendulum Tester

Rock Type Polishing Results

Volcanic Andesite & Greywacke(weathered & unweathered)



Rock Type Polishing Results

Andersite "T" - Basaltic Andersite

Initial average polishing of 4.0 PSV units at four hours and 5.4 PSV units at 12 hours.

Andersite "P" - Uretara Andesite

3.2 PSV units at four hours and 1.9 PSV units at 12 hours.

Greywacke - Course to medium fine grained indurated volcaniclastic sandstone

2.2 PSV units at four hours and 1.4 PSV units at 12 hours.

Weathered Greywacke (Waioeka River) - Medium grained sand and silt stones mechanically sorted by the river

1.6 PSV units at four hours and 0.9 PSV units at 12 hours.

Onsite Performance

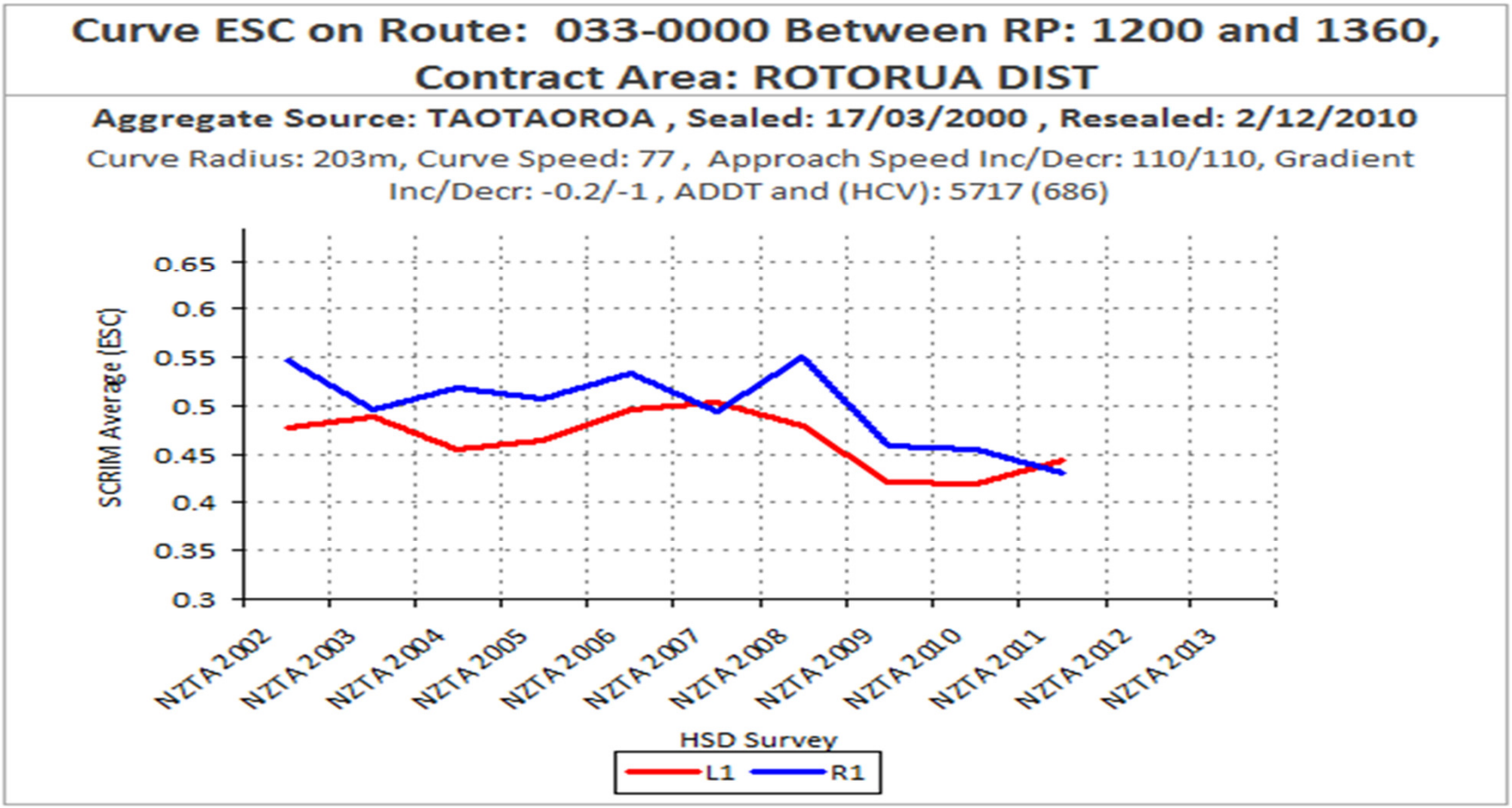
Extended PSV polishing substantiated from onsite performance monitoring.

Curves - Out of Context Curve (OCC) - were investigated for change in their Equilibrium SCRIM Coefficient (ESC) over time.

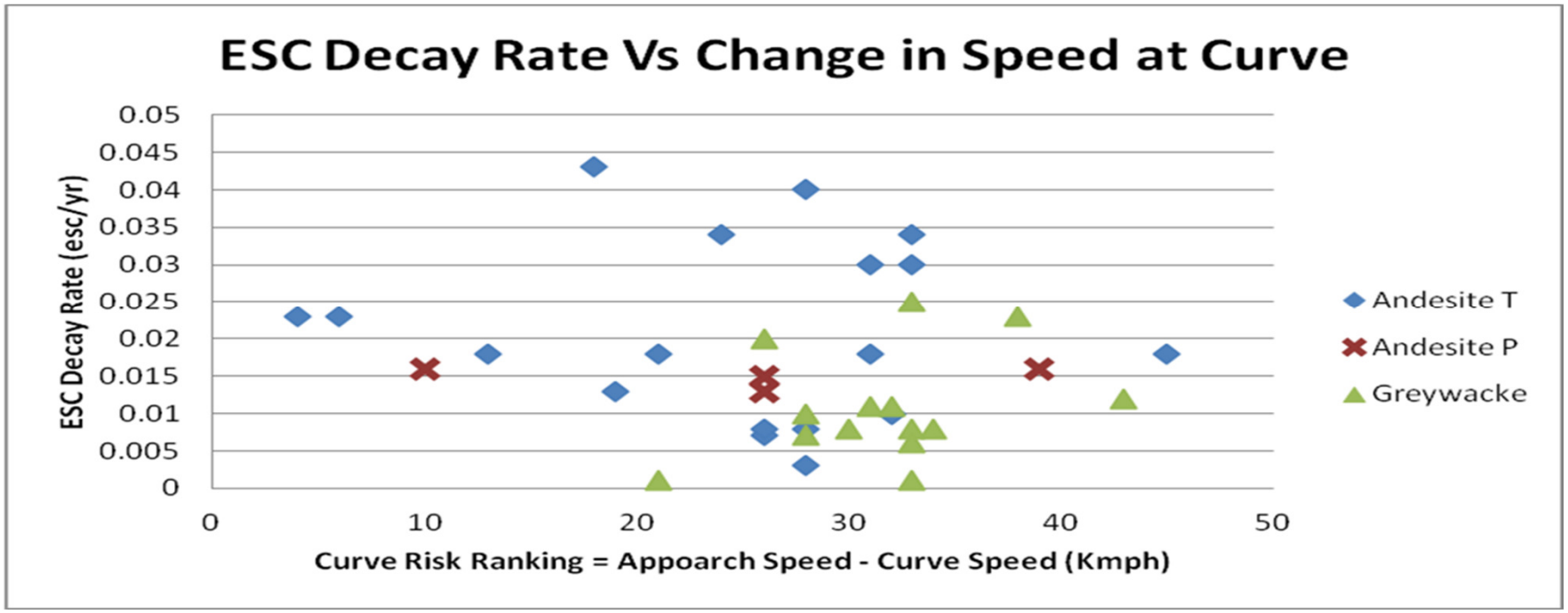
OCCs were established by the Risk Ranking of Curves.
– High, Medium and Low

ESC of these curves averaged and plotted by year

Onsite Performance



Onsite Performance



No significant trend that can be derived

Andersite T appears to polish more than the other two aggregate types

Weighting each site by its heavy commercial vehicle count

Recommendations

- There is enough of an indication to warrant extending the PSV 12 testing to all aggregate sources.
- That the PSV value be based on at least four hours of fine polishing.
- The analysis of OOC may give some appreciation of how an aggregate will perform on the road.

Practitioner Upskilling

Roadshow's were an attempt to move practitioners forward but slow uptake of the concepts.

Exercises such as extended PSV 12 plus onsite monitoring are good at upskilling our practitioners in better aggregate selection.

However…

Needs to be reinforced by regional skid resistance reviews.

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THANK YOU