

Re-use of High Skid Resistance Aggregates in Porous Asphalt

Irina Holleran

Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand

Douglas J. Wilson

Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand

Glynn Holleran

Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand

Bruce Chappell

Beca Ltd, Auckland, New Zealand

Lubinda F. Walubita

TTI – The Texas A&M University System, College Station, Texas, USA

Porous asphalt (PA) overlays are routinely used in New Zealand (NZ) primarily for safety reasons. The average PA lifespan on Auckland motorways is 10 years at replacement compared to 7 years nationwide. Melter slag, a by-product from a steel mill located in Auckland, is one of the main aggregates used on Auckland motorways in areas where higher skid resistance is needed. Melter slag has the ability to maintain its micro-structure in the long-term compared to naturally occurring aggregates, including those with high Polished Stone Value (PSV). Currently, the demand for melter slag in NZ is relatively higher than the supply as many projects in the North Island would prefer to use this material unlike in the past where it was considered a waste material.

In the study to be presented in this paper, Auckland motorway PA sites were visited over an 18-month period to record and document the state of the PA sites prior to milling. It was found that most of these PA sites were well below the 10-year period when they were milled and replaced and that the major causes of the failures were base-related, not PA ravelling due to aging, or failing of the skid resistance requirements. Some of these sites used melter slag aggregates, which means that this high value product did not provide its full potential benefit. PA-derived millings often end up in low value applications. Furthermore, in NZ, no RAP, including PA-derived RAP, is allowed to be incorporated into new PA mixes. This paper will review and discuss the benefits of using PA-derived aggregates, especially melter slag, in PA mixes and the importance of utilizing this valuable resource more efficiently. The paper will also highlight that PA mixes are sometimes replaced due to other factors not necessary related to the PA mix itself.