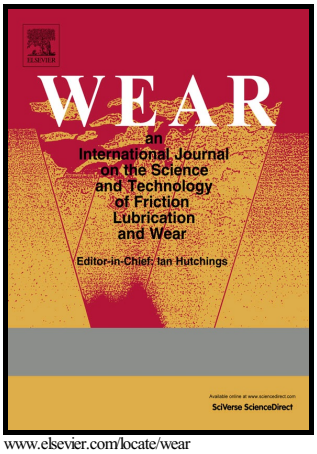

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Mineralogical and Microstructural Controls on the Surface Texture of High Polished Stone Value Aggregates

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Abstract

The number of stone aggregate sources that provide a high polished stone value and therefore a high skid resistance on road surfaces is relatively small. The factors that influence polished stone value have traditionally been associated with mineralogical and mechanical properties of specific rock-types. This study examines a group of variable lithologies from a single source, that exhibit similar laboratory measured polished stone value readings. It can be shown that multiple properties, including microstructural fabrics, can influence the potential PSV of an aggregate. 3D areal surface measurements of the aggregate surface, obtained using z-stacked digital images, can be combined with traditional mineralogy and microstructural observations, to track the development of surface microtexture from the source through to in-service trafficked sites . These combined methodologies can provide a detailed picture of how specific rock-types or regional geological settings can influence the polished stone value of aggregates and how different and varied factors can control the maintenance of a textured surface throughout its use.

Keywords: Aggregate, Polished Stone Value, Microtexture, Microstructure, Petrography, Metrology

1. Introduction

It is critical for many road surfaces to maintain a high-level of skid resistance throughout their in-service lifetime. As a consequence, many attempts have been made to fully characterize the properties of materials utilised in a road surface with a strong focus on High Specification Aggregates (1,2) and especially those that provide a high skidding resistance.

The theoretical skid resistance of road aggregates is measured in many countries by the polished stone value or PSV test, formerly BS 812 (3) and now adapted into BS EN 1097-3:1998 (4). This test was first developed in 1952 and has not yet been superseded by a suitable alternative. The test involves mounting 35 to 50 relatively cubic aggregate particles, measuring approximately 10 mm in diameter, into curved resin mould segments. These are fixed onto the outside of a wheel and polished to simulate road wear using coarse emery and emery

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