

GLASS FINES IN CEMENT TREATED PAVEMENT

CASE STUDY

A significant amount of virgin materials is used annually to construct and maintain roads across Victoria. Rather than continue to use virgin quarried materials, a research project was undertaken to analyse the opportunities to use recycled glass fines in cement treated pavement.

Project Background

VicRoads manages a road network of approximately 151,000 kilometres including major freeways to minor local roads. Across Victoria hundreds of kilometers of the road network require the use of cement treated pavement bases, these are typically made with the use of virgin materials. Swinburne University of Technology in partnership with Alex Fraser Group and VicRoads investigated the use of recycled glass fines and crushed rock to create cement treated pavement bases. The research project involved laboratory evaluation of glass fines, crushed rock and crushed concrete blends for rigidity reduction. The project has the potential to lead to significant carbon savings with the use of recovered materials instead of virgin quarried materials in pavement applications.

What are glass fines and why are they a problem?

Glass fines are the small glass particles (typically between 3-8 mm in size) leftover due to breakage via comingled recycling collections. Glass fines are considered unsuitable for re-use in glass manufacturing. This is largely due to the size of the particles being too small for colour sorting and/or are contaminated with other materials like ceramic, stoneware, Pyrex and plastic. Because of these challenges and the low economic value of glass fines, the majority of volume is either stockpiled, or landfilled.

“The project involved collaboration between state government, industry, end-users and university researchers, all driven by the common goal to increase the uptake of recycled products in future Victorian roads.”

Prof. Arul Arulrajah, Professor of Geotechnical Engineering, Swinburne University of Technology

Research team

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SNAPSHOT

ORGANISATION

Swinburne University of Technology
Industry Partners: Alex Fraser Group and VicRoads

PROJECT

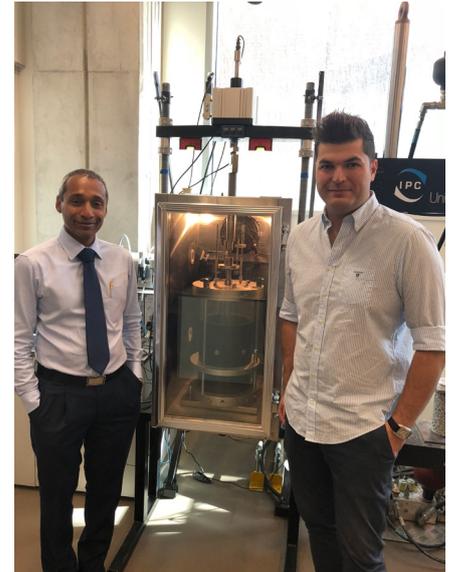
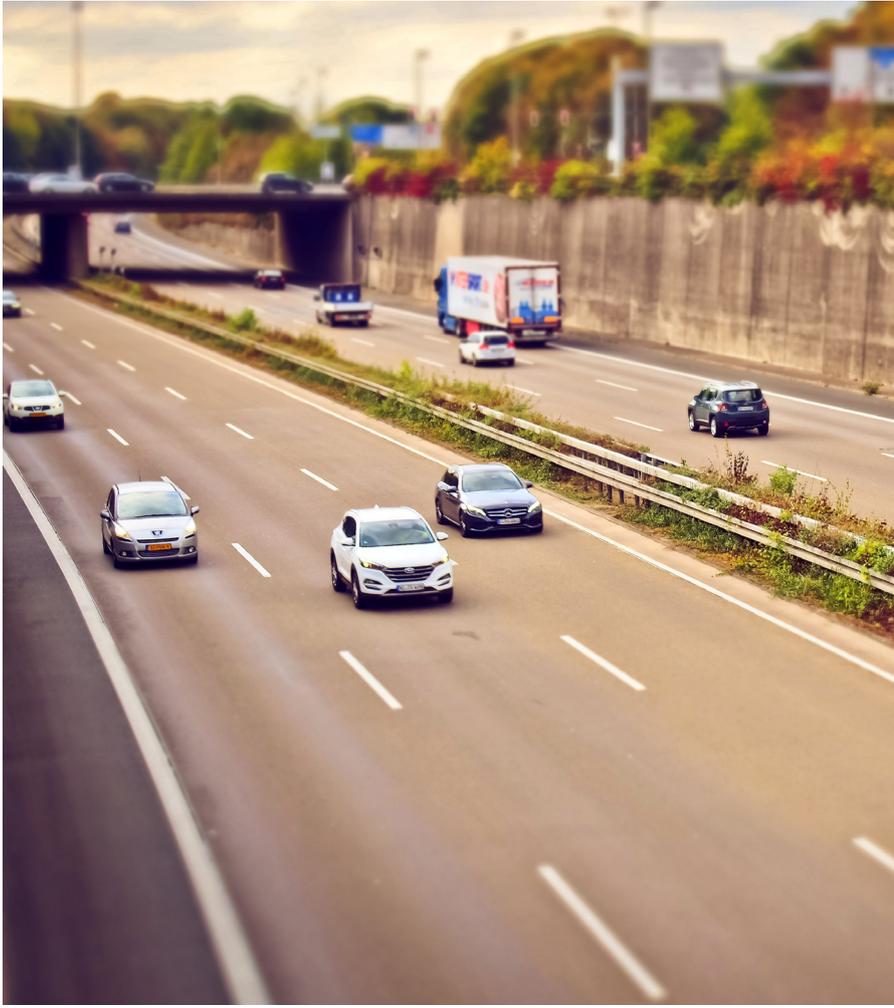
Investigate the feasibility of incorporating recycled glass fines in cement treated pavement subbase materials as well as laboratory evaluation of recycled blends for rigidity reduction.

OBJECTIVES

Reduce reliance on natural resources, carbon emissions, waste going to landfill and better utilisation of recycled materials and uptake of recycled products by industry.

OUTCOMES

Glass fines can successfully be added to crushed rock for use in cement by up to 15% for pavement subbase applications. Glass fines can reduce the rigidity of crushed concrete with the addition of up to 20% glass fines in blends with crushed concrete and crushed rock, for pavement base and subbase applications.



Research Results

Glass fines (5 mm) can successfully be added to crushed rock for use in cement treated pavements by up to 15%. Glass fines were found to adequately reduce the rigidity of crushed concrete with the addition of up to 20% glass fines in blends with crushed concrete and crushed rock. These results meet the required values prescribed by VicRoads for pavement base and subbase applications in road construction.

Opportunities

The project's research report provides VicRoads supporting information to review existing specifications and standards. Depending on the results of future field trials, it may be possible to increase the percentage of glass fines added in cement treated blends. Field trials will also provide real-world performance results that will alleviate concerns around increased rigidity in recycled concrete. This research project provides a significant opportunity for an increase in the use of recycled content in road construction for both state and local government managed roads.

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For further information

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