

INVESTIGATION OF USE OF RAP FROM CRUMB RUBBER MODIFIED ASPHALT



This project investigated if asphalt which contains crumb rubber modified (CRM) binders can be successfully recycled as reclaimed asphalt pavement (RAP) and incorporated into new asphalt mixes at different percentages.

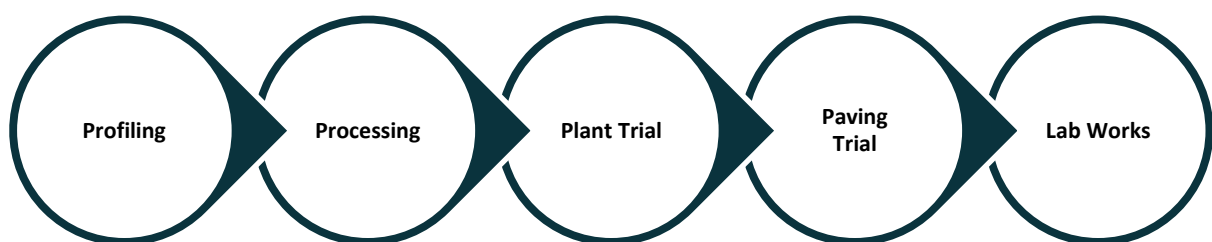
In an effort to encourage the wider use of recycled materials such as crumb rubber to modify bituminous binders and to ensure recyclability of these rubber modified asphalt mixes in the future, WARRIP undertook a field review to understand if the typical steps of reclaiming and reusing reclaimed asphalt pavement (RAP) were jeopardised by the presence of the crumb rubber modified (CRM) binder.

Background

In its current form, unmodified asphalt is 100% recyclable. The asphalt is collected off the road surface using profiling machinery and processed by crushing into a uniform product. This processed material is known as reclaimed asphalt pavement (RAP).

To reduce the amount of end of life tyres sent to landfill, crumb rubber can be produced by grinding and processing the tyres into a fine crumb. This crumb rubber can subsequently be used to modify bituminous binders to improve the performance of the binder and the asphalt mix it is used in.

WARRIP undertook a two-stage practicality study to ensure that the typical steps of collecting, processing, and re-using CRM-RAP were not affected by the presence of rubber in the asphalt. The study also undertook a laboratory investigation to understand the implications of the rubber on measuring the viscosity of the CRM-RAP to use in the design of new asphalt mixes containing CRM-RAP.



Approach

- ✓ Undertake a field trial of reclaiming asphalt containing CRM binder using conventional profiling equipment
- ✓ Undertake a field trial of processing CRM-RAP material using conventional processing equipment
- ✓ Undertake a plant trial of both a batch plant and a drum plant to incorporate varying percentages of CRM-RAP into new mixes
- ✓ Undertake a paving trial of the new mix containing the CRM-RAP with conventional paving equipment
- ✓ Undertake a laboratory investigation to understand if the viscosity of the CRM-RAP can be successfully measured for use in the design of new mixes





Outcome

The practicality studies found that the rubber did not affect the typical processes of RAP and conventional equipment could be used without modification.

The laboratory study found that measuring the viscosity of the CRM-RAP was a difficult process and typically not representative or repeatable due to the presence of the rubber particles in the CRM-RAP material. Further investigation is required in this space.



Execution of field studies to test the different processes of asphalt recycling with rubber present.



Laboratory investigation to understand the implications on characterisation of the CRM-RAP due to rubber being present



Further investigation into the characterisation of the CRM-RAP materials in the laboratory

NEXT STEPS

Investigate the performance implications of incorrect viscosity values on level 2 RAP mix designs

Understand the implications of using diluted or undiluted CRM-RAP in new mixes

