WARRIP
WESTERN AUSTRALIAN ROAD RESEARCH & INNOVATION PROGRAM

Recycled Materials Database and Performance Monitoring

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Achieving sustainability requires reduction in waste and emissions and transitioning to circular economy to reduce the need for depleting virgin materials. This can be achieved by enhancing consumption of recycled materials in road infrastructure. This project sought to understand the current state of recycled materials records and develop performance monitoring framework for pavements incorporating recycled materials.

Background

Australian state road and transport agencies (SRTAs) have for a long time incorporated recycled materials in road infrastructure. During 2018-19 Australia generated 61.5 million tonnes of core waste of which 5.7 million tonnes generated in Western Australia (WA). The resource recovery and recycling rate was 60% (Pickin et al. 2020).

Several waste materials including glass, fly ash, plastics, rubber, reclaimed asphalt, crushed rock, masonry and concrete have long demonstrated successful incorporation into roads and pavements. Long term monitoring of conventional and recycled materials is critical in understanding and evaluating pavement performance. In WA, construction records do not record the use of recycled materials thus resulting in its poor monitoring.

Recycled materials

Source: WARRIP Website

Approach

The objectives of the project were to:

- Establish a database design to record type, location and quantity of recycled materials used.
- Develop a framework for monitoring long term performance of pavements and other road assets incorporating recycled and conventional materials.

Based on this approach, the project delivered the following:

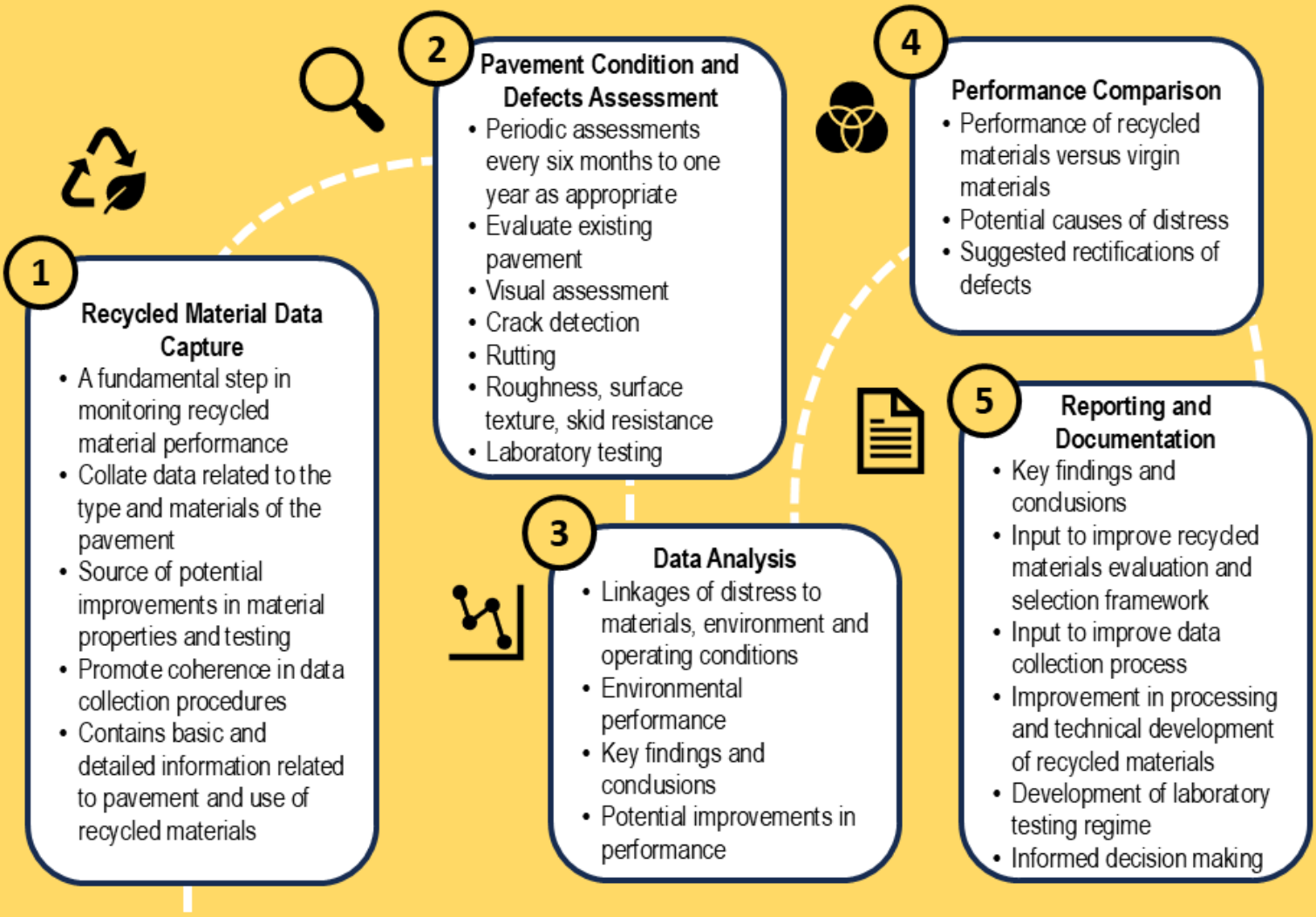
- A database template and a pilot database populated with recycled materials data related to selected LGs
- A framework for monitoring performance of conventional and recycled materials incorporated into the pavements.

Consultation and Pilot Data Capture

After reviewing Australian state road and transport industries current practice, discussions were held with Main Roads and selected LGs to evaluate the existing situation and gather data related to road assets incorporating recycled materials.

A data collection template was prepared to ensure that all required information is collected and documented. The relevant organisations were requested to fill in the template for those projects where recycled material was used.

FRAMEWORK FOR MONITORING PERFORMANCE OF RECYCLED MATERIALS



Opportunities for Implementation

If Main Roads and LGs amend their inventory database to include recycled materials in the road infrastructure, then we will gain the understanding of the performance of recycled materials and enhanced use of recycled materials in road infrastructure.

If government establishes a central database, it will be able to demonstrate technical leadership in documenting and promote the use of recycled materials.

Consistent records of recycled materials do not exist.

There are challenges in analysing data for recycled materials due to absence of central database.

Next step is implementation of recycled materials performance monitoring framework.

References

Pickin, J, Wardle, C, O'Farrell, K, Nyunt, P & Donovan, S 2020, National waste report 2020, Australian Department of Environment and Energy, Canberra, ACT.

How does this research help us?

This stage of the project captured the detail of the problem and uncovered some options for further research to support better pavement performance outcomes for everyone.