

ALANIAT

A Challenter

1-21 JAR

PROJECT TITLE:

Sustainability Assessment Tool for Innovative Pavement Materials, Designs and Processes

-

PROJECT LEADERS:

Zia Rice (ARRB) and Louise Dutton (TMR)

PROJECT STATUS: In Progress (continuing into 2021/22)

AN INITIATIVE BY: The Queensland Department of Transport and Main Roads and the Australian Road Research Board

PROJECT PURPOSE:

This project aims to develop a user-friendly Sustainability Assessment Tool (SAT) to calculate life cycle sustainability and economic benefits of innovative road pavements designs and rehabilitation treatments.

BACKGROUND:

The Sustainability Assessment Tool (SAT) is a collaboration between NACOE and the Western Australian Road Research and Innovation Program (WARRIP).

In 2019/20, a user requirements and model scoping study was undertaken. This work helped develop a project design and scope that has strategic linkages with Queensland and Western Australian government and departmental policy objectives and targets including:

- Greenhouse gas (GHG) emissions reductions
- Waste reduction and recycling targets
- Supporting innovation and business growth, especially in waste management and pavement construction industries
- Delivering high performing road infrastructure within budget constraints
- Achieving economic sustainability goals, through reduced life cycle costs.

The tool's scope, processes and outputs are also aligned with the Infrastructure Sustainability Council of Australia's (ISCA's) Infrastructure Sustainability (IS) rating process and requirements. In 2020/21, a minimum viable product (MVP) tool was built in an Excel platform with linked state-based reference data. The MVP tool is a fully-functional tool that meets the core user needs, but has not yet reached full development maturity, in terms of extended capability, design and a user-friendly interface. A range of model enhancements, including additional sustainability and economic outputs are being developed in the second half 2020/21. A user-friendly web-based interface is anticipated to be completed by June 2021.

APPROACH/METHODOLOGY:

Year One (2019/20): User requirements and model scoping study Year Two (2020/21): Sustainability Assessment Tool (SAT) development and testing Year Three (2021/22): Knowledge transfer to support SAT implementation and extension.

KEY PROJECT OUTCOMES:

To date, the project has resulted in:

- A unique design compared to existing methods currently being used in Australia
- · Pavement design flexibility not limited by drop down menus
- · Choice of around 80 pavement materials
- · Selection of pre-defined pavement products
- Evaluation of vehicle (use phases) emissions from pavement design and alignment decisions
- Concurrent economic and sustainability assessment over the pavement lifecycle.

KEY PROJECT OUTCOMES:

Once complete, the SAT will enable TMR, Main Roads and their partners to quantify and compare life cycle sustainability and economic impacts of innovative pavements consistently and reliably. This will contribute to:

- Improved capability in assessing sustainability impacts of designs for new pavements and pavement rehabilitation treatments, including innovative technologies
- Better understanding of the impacts of alternative pavement designs, leading to better long-term investment decision making
- Emissions reductions
- Cost savings
- Reduced landfill, and the promotion of circular economy outcomes
- Promotion of innovative pavement and recycling industries (incl. job creation).

Assessment results will inform pavement design and material selection and long-term maintenance strategy. Results also provide data suitable for annual or sustainability reporting and provide key inputs in project assessments, including the Infrastructure Sustainability Council of Australia's (ISCA's) ratings.

NEXT STEPS:

In 2021/22, the project transitions towards implementation of the SAT and examining the feasibility to extend the tool's capabilities beyond the pavement assessment scope to include all processes related to a road infrastructure project.

The knowledge transfer and dissemination program will be aimed at both internal (TMR) and external (industry) tool user groups.

IMAGES:

Road agencies and contractors are increasingly using recycled materials in road applications. The SATA will enable the calculation of lifecycle greenhouse gas emissions and lifecycle costs and benefits of innovative road pavements designs, including reclaimed asphalt pavement (RAP) (left image) and crumb rubber asphalt (right image is crumb rubber).





Figure 1.1: Reclaimed asphalt pavement (RAP) (left image) and crumb rubber asphalt (right image is crumb rubber)

IMAGES:

Current SAT pavement assessment scope boundary. In 2021/22 the project will examine the feasibility to extend the tool's capabilities beyond the pavement assessment scope to include all processes related to a road infrastructure project.



SAT life cycle assessment scope: GHG emissions and waste flows over the life cycle of a pavement.



WEBINARS:

A SAT development webinar will be delivered in mid-2021 followed by the release of demonstration videos and supporting resources, implementation/demonstration workshops with TMR staff and with QLD industry and other external stakeholders.

REPORTS & PUBLICATIONS:

A SAT development technical report is anticipated to be finalised by June 2021.