

How collaboration is expanding the circular economy

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Committee



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About Roads Australia

[Roads Australia](#) (RA) is the peak body for roads within an integrated transport system, representing an industry that contributes \$236 billion annually to the economy and supports 1.4 million jobs. RA brings industry, government, and communities together to lead the evolution of Australia's roads, integrated transport and mobility.

RA's members include all of Australia's transport agencies, road owners, major contractors and consultants, material suppliers, service and technology providers, and other relevant industry groups. RA's policy focus extends across five activity streams: Safety; Capacity; Transport Reform; Customer Experience; and Sustainability. Diversity and Inclusion is a commitment across each stream.

Background

The sustainability of the transport industry is a topic that is gaining more attention as Australia seeks to address climate change and its impacts.

The increasing emphasis on the infrastructure industry's environmental impact is evident through government net-zero targets and sustainability assessment requirements in procurement.

A crucial step to achieving net-zero targets and addressing industry's environmental impact is embracing a circular economy approach to materials used in infrastructure construction and maintenance.

In this webinar, strategies to support adoption of recycled materials are outlined, along with how collaboration can assist in growing the circular economy. Additionally, opportunities are revealed for greater involvement.

Event summary

Over 170 people registered to join the webinar to hear from the following speakers:

[Stephen Hulme](#) – Principal Engineer, Pavements, Research and Innovation, [Queensland Department of Transport and Main Roads](#)

[Mark Faulkner](#) – Senior Principal Consultant, [WSP](#)

[Laszlo Petho](#) – Pavements Manager, [Fulton Hogan](#)



The webinar was hosted by a member of [RA's Future Leaders Committee](#), [Verity Turner](#).

Recycled materials

There are many factors driving industry to embrace the circular economy and increase the use of recycled materials.

A range of waste resource standards, state government waste policies and the [Waste Export Ban](#) all demand an industry shift. In addition to these reasons, **Mark Faulkner** outlined that worldwide, we are destroying habitats faster than we are creating them and using 25 per cent more resources than we can sustain.

These collective concerns have increased appetite for the use of recycled materials.

Verity Turner opened the discussion by describing how governments are starting to adopt circular economy principles, realising numerous other benefits such as cost savings, reducing landfill, protecting the environment, and reducing emissions.

Verity recounted significant statistics outlining the impact of Transport and Main Roads Queensland's (TMR) work. Using recycled tyres (crumb rubber in seals) is estimated to have saved 1.7 million tyres from landfill between 1 July 2015 and June 2022. In addition, potentially up to eight thousand tonnes of construction and demolition waste can be diverted from landfill per kilometre of road constructed and eight thousand tonnes of waste can be diverted from landfill per kilometre of road constructed.

Stephen Hulme explained that the Queensland Department of Transport and Main Roads (TMR) is encouraging the use of more recycled materials by their contractors and suppliers.

TMR prefer the use of recycled materials, over conventional products, on their transport infrastructure projects where they are:

- Permitted in accordance with TMR's technical specifications;
- Cost competitive with conventional materials; and
- Available in quantities applicable to the specific project.

Stephen went on to explain that TMR apply four key criteria for recycled material use:

- The end result provides as good, if not better, performance than conventional materials;
- They do not harm the environment, community or workers;
- They do not cause operational issues in the longer term; and
- They are re-recyclable at the end of life

TMR stating a preference for recycled materials underscores that the appropriate use of recycled materials can be just as good - if not better suited - for project delivery. The appropriate use of recycled materials also ensures as much value as possible is extracted from the finite resources available.

Collaboration

The journey to net-zero is one that must be taken together.

The collaboration between WSP and Fulton Hogan is contributing to the expansion of the circular economy. WSP and Fulton Hogan have been working together in Australia since 2015. Their collaboration brings together asset management and maintenance delivery to develop solutions from a design point of view.

Mark shared lessons from the partnership, highlighting that early collaboration with Fulton Hogan, and all throughout the design process, allows recycling and sustainability initiatives to be incorporated into their designs efficiently. An important step in the successful collaboration is ensuring identified practices, processes or products are implemented in the final deliverable.

The significance of collaboration was reinforced by **Laszlo Petho** expressing how highly Fulton Hogan values joint ventures. True innovation means that ideas can be brought into consideration and discussed, while the risk can be assessed and adjusted. Working together is also a key strategy to overcome the biggest challenge when introducing or updating technical standards: user acceptance.

Mark highlighted that user acceptance is easier to achieve through collaboration, citing the recycled material standards recently updated by [Austroads](#).

Laszlo was involved throughout the whole process and this involvement encouraged user acceptance for the updated standards.

Industry awareness

TMR found during its consultation activities that low industry awareness of where and how recycled materials can be used was a barrier to greater use.

“One of the fundamental barriers to increasing the use of recycled materials is the awareness, put plain and simply.”

- **Stephen Hulme, TMR**

To overcome this barrier, TMR developed its ‘Waste to Resource’ Tender Schedule (C7810.S12 – Tender Schedule S12 – Waste to Resource Plan).

It is a tool to increase the awareness of potential recycled materials use on TMR transport infrastructure contracts.

When a tenderer is submitting a tender for a TMR (transport infrastructure construction only contract type) project, the tender schedule must be completed. It provides the tenderer with a ‘ready reckoner’ of where and in what quantities recycled materials can be used. The tenderer nominates how much recycled content they are planning to use in each application or product. If they are not proposing to use and recyclable materials or are not using the maximum allowable recycled material content, the tenderer will also need to provide reasons why this is the case.

This approach allows tenderers to show both the percentage of the material proposed for use compared to the specification limits, as well as the proposed tonnages for each application or product.

TMR aims to empower industry with knowledge about potential uses of recycled materials so people understand what they can do, how they can do it and that in many cases this is (relatively) easily done if permitted in specifications. In line with this goal, Stephen detailed the range of recycled materials TMR allows to be used on its projects. These include recycled concrete, brick, glass, reclaimed asphalt pavement (RAP), crumb rubber, as well as some other industrial wastes such as fly ash and slag. Recycling of roads in place (in situ recycling) is also commonly done.

Laszlo also described asphalt mixes designed with the addition of glass, rubber crumb or high content of recycled asphalt pavement (RAP).

Asphalt is the most recycled material globally and can be utilised in new hot mix asphalt. When asphalt is reclaimed together with roadbase, such a secondary material is not suitable for asphalt production; however, it is well suited for the use in roadbase and pavement shoulders. Laszlo also described RAP2(ES), which is a cold manufactured stabilised mix offered by Fulton Hogan, using secondary recycled asphalt pavement material.

Fulton Hogan already uses high RAP content asphalt mixes for road pavements and RAP2(ES) for shoulder build up on the network and have found that after the recent flooding and heavy rain, the shoulders remained intact. By contrast, unbound pavements are usually washed away, demonstrating that shoulders made with RAP2 are more sustainable and cost effective over the product lifecycle.

“If a product fails well before its intended service life, that’s not sustainability. That’s a very expensive exercise wasting resources and energy.”

- Laszlo Petho, Fulton Hogan

An important factor to consider is the capital cost compared to whole of life costs.

Mark mentioned that when considering material alternatives, the capital cost alone is not the best indication of value. Recycled material does not necessarily have to be cheaper than conventional products because the end product may have better performance that provides greater product life which reduces whole of life costs.

While using recycled materials in transport infrastructure is a positive step towards reducing the sector’s environmental impact, speakers pointed to some areas where more attention should be focused.

An important consideration when using recycled materials, mentioned by all the speakers, is balancing cost, risk and performance.

“In terms of evaluating alternative materials from a recycling point of view and a sustainability point of view, it’s all about balancing the tension between cost, risk and performance.”

- Mark Faulkner, WSP

It is also important to acknowledge that recycled materials, like conventional materials, can face availability issues.

Next steps

The conversation throughout the webinar highlighted several steps that can be taken to increase the use of recycled materials in our industry.

Raising awareness of the availability of recycled materials and their suitability for industry use is necessary to drive further industry adoption.

Stephen reinforced TMR’s current goal of optimising the use of recycled materials. This can be achieved by using it in the most suitable applications that meet circular economy principles, rather than mandating it.

An area of opportunity also exists to create a mechanism for network-wide rollouts of a product after its successful trial.

Tools & Resources

The valuable tools and resources mentioned in the webinar and available now are listed below:

- [TMR Waste 2 Resource Strategy](#)
- [TMR Waste 2 Resource Tender Schedule](#)

- [TMR Waste 2 Resource Calculator](#)
- [TMR Website 'building sustainable roads](#)
- [TMR Recycled materials factsheet](#)
- [TMR TN193 Use of Recycled Materials in Road Construction – technical document](#)

Another initiative is the Sustainability Assessment Tool being developed by TMR and Main Roads Western Australia with the Australian Road Research Board (ARRB).

This tool allows whole of life assessments of the greenhouse gas emissions and costs of various pavement options to be done. Currently, it is focussed specifically on pavements but may be expanded in the future.

Parting Thoughts

Jenny Lewis concluded the event by emphasising how encouraging it is to see organisations embrace sustainability as a core value for their business.

“A key takeaway is having the designers, the contractors and the suppliers all working together as early as possible. That is really key to optimising outcomes in terms of cost, risk and performance.”

- Jenny Lewis, WSP

Event outputs & next steps

An overview of the “How collaboration is expanding the circular economy” event and the broad themes addressed by each speaker was circulated via [RA's LinkedIn feed](#).

The importance of driving greater use of recycled materials is also a key theme in [Journey to Net-Zero](#). RA is continuing to work with its industry partners to drive support for that report's recommendations.