Submission to the House of Representatives Standing Committee on Industry, Innovation and Science

Inquiry into the current state of the Australian tyre industry, and any challenges and opportunities for the industry within the context of a circular economy

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Executive Summary

Road construction represents the largest and most durable high-value end market for tyre-derived materials in Australia. Crumb rubber derived from end-of-life tyres (ELTs), when incorporated into bituminous binders and asphalt, has a proven record of improving pavement durability, resilience, and whole-of-life asset performance under Australian conditions. In several applications, this use is already well established and has demonstrated prolonged, repeatable performance.

Australia possesses the technical capability, operational experience, and supply-chain knowledge to deploy crumb rubber modified binders (CRMBs) at scale. Importantly, sufficient processing and delivery capacity exists not only within established applications, but also across newer and emerging road surfacing technologies. With appropriate incentivisation and clearly defined mandating boundaries, this capacity can be expanded to support significantly higher levels of tyre-derived material reuse.

At present, approximately five million end-of-life tyres per year are diverted from landfill through use in road surfacing applications. With coherent national signals, aligned tyre stewardship settings, and demand-side procurement support, an achievable medium-term scenario is to increase this diversion to approximately twelve million tyres per year, with further potential available depending on the scope of mandated use.

The principal barriers are not technological. They arise from inconsistent specifications, procurement frameworks that prioritise initial cost over whole-of-life value, weak alignment between tyre stewardship schemes and infrastructure demand, and the absence of clear national signals supporting performance-based use of crumb rubber in roads

1. About the Author

I am a consultant to the Australian road surfacing industry with over 40 years of experience specialising in bituminous binders and asphalt technologies. A significant portion of my career has involved the development, evaluation, specification, and deployment of crumb rubber derived from end-of-life tyres (ELTs) in bituminous binders and asphalt mixtures for road construction and maintenance.

My experience spans laboratory development, field trials, asset performance assessment, and advisory roles to contractors, suppliers, and road agencies. This submission draws on that experience to provide a practical, delivery-focused perspective on how tyre-derived materials can be scaled into durable, high-value infrastructure outcomes.

2. Context and Rationale for This Submission

Road construction represents the single largest potential domestic end-market for tyre-derived materials. While the technical feasibility of using crumb rubber in bituminous binders and

asphalt is well established, implementation remains inconsistent due to fragmented specifications, variable procurement practices, and reliance on individual project champions.

Without practitioner input, there is a risk that future policy settings may emphasise material diversion volumes over durability, whole-of-life value, and long-term asset outcomes. This submission provides insight into real-world delivery challenges and opportunities for scaling high-value use of tyre-derived materials.

3. Term of Reference 4: Developing High-Value Uses for Waste Tyres and Tyre-Derived Materials

3.1 Road Construction as a High-Value End Market

Road construction offers a uniquely high-value and scalable use for tyre-derived materials when crumb rubber is incorporated into bituminous binders and asphalt. Benefits include:

- improved resistance to cracking and fatigue;
- enhanced deformation and rutting resistance;
- better ageing characteristics of binders;
- increased surface durability under heavy traffic and harsh climates.

These outcomes align directly with the objectives of a circular economy by extending asset life, reducing maintenance frequency, and increasing value extracted from end-of-life tyres.

3.2 Proven Technical Capability, Uneven Implementation

Australia has demonstrated capability in crumb rubber road technologies, but uptake varies widely due to:

- inconsistent specifications and terminology;
- lack of national guidance on performance-based outcomes;
- differing procurement risk positions adopted by road agencies;
- limited continuity of programs to allow learning and scale-up.

3.3 From Waste Management to Asset Performance

A critical shift is required from viewing crumb rubber primarily as a waste diversion solution to recognising it as a performance-enhancing engineering material. High-value use is achieved not simply by incorporating rubber, but by ensuring:

- appropriate rubber gradation and quality;
- proper binder interaction and digestion;
- fit-for-purpose binder and asphalt design;
- alignment between specifications, production capability, and construction practices.

Policy and guidance that focus solely on recycled content targets, without regard to delivery realities and asset performance, risk undermining confidence and outcomes.

4. Term of Reference 5: Effectiveness of Circular Economy Models and Opportunities for R&D

4.1 Current Circular Economy Models: Strengths and Limitations

Existing circular economy models for tyres in Australia have achieved meaningful progress in collection, initial processing, and diversion from landfill, particularly through road surfacing applications where crumb rubber use has been demonstrated over extended periods.

However, while proven applications exist, overall utilisation remains constrained by insufficient demand-side certainty. Processing capacity exists within both established and newer applications, but expansion is limited by the absence of consistent incentives and clearly articulated mandating settings. As a result, uptake remains fragmented and overly reliant on discretionary or project-specific decisions.

Without stronger alignment between circular economy policy and infrastructure demand, available capacity across the tyre recycling and road delivery supply chain will remain underutilised, limiting the scale of achievable outcomes.

4.2 The Role of Procurement and National Signals

From a road delivery perspective, procurement settings are the most powerful lever. Effective circular economy outcomes in roads require:

- clear national signals supporting performance-based use;
- consistency across jurisdictions;
- performance-based specifications; and
- recognition of whole-of-life value, not just initial cost.

4.3 Research and Development Needs

Australia has strong technical knowledge, but better connection between research, trials, and delivery is needed. Priority areas include:

- nationally coordinated performance monitoring;
- guidance on specification harmonisation and validation;
- improved methods for characterising and reusing crumb rubber modified reclaimed asphalt pavement (CRM-RAP);
- practical design frameworks linking binder properties to field performance.

4.4 Enabling Scale and Industry Confidence

Confidence across the value chain is essential. This requires stable policy, consistent demand, and clear recognition that crumb rubber is a legitimate, high-performance material.

5. Key Messages and Recommendations for the Committee

5.1 Key Messages

1. Road construction is Australia's most significant and sustainable high-value end market for tyre-derived materials.
2. Crumb rubber modified binders have demonstrated long-term performance and durability benefits.
3. Uptake is constrained by institutional and procedural barriers, not technology.
4. Fragmented specifications and procurement uncertainty undermine confidence and prevent scale.
5. Circular economy success depends on demand certainty, performance outcomes, and whole-of-life asset value.

5.2 Recommendations to Government

To enable the consistent, high-value use of tyre-derived materials in Australian road construction, the Commonwealth Government should focus on enabling demand, confidence, and scale through the following actions:

1. **Acknowledge and build upon proven applications**, recognising that crumb rubber has a long-established performance history in certain road surfacing uses, while enabling expansion into newer applications where sufficient capacity already exists.
2. **Introduce targeted incentives and clearly defined mandating boundaries** for the use of tyre-derived materials in road construction where performance criteria are met, providing certainty to support scale and investment.
3. **Strengthen and mandate a comprehensive tyre stewardship scheme**, requiring tyre manufacturers and importers to fund and manage end-of-life tyre collection and recycling, supported by levies on new tyres and mechanisms to ensure full industry participation and prevent free-riding.
4. **Direct stewardship-derived funding toward product-focused research and development**, supporting improved crumb rubber technologies, specification harmonisation, validation of emerging applications, and confidence-building performance data.
5. **Align stewardship schemes with infrastructure procurement and policy**, ensuring tyre-derived materials are actively pulled into high-value, long-life public assets such as roads rather than remaining focused on collection and processing alone.
6. **Embed whole-of-life assessment in infrastructure decision-making**, recognising reduced maintenance frequency, extended service life, improved climate resilience, and associated reductions in lifecycle greenhouse gas emissions.
7. **Provide long-term demand certainty through stable policy settings**, enabling industry investment in processing capacity, manufacturing capability, quality assurance, and workforce skills.

Collectively, these measures provide a pathway to increase diversion of end-of-life tyres from current levels of approximately five million tyres per year toward an achievable medium-term target of around twelve million tyres per year, with further potential available as capacity and policy settings evolve.

6. Practitioner Insight: Delivery Reality from the Road Network

From a delivery perspective, crumb rubber roads often fail to transition from trials to mainstream use not because of poor performance, but because of institutional risk aversion and fragmented guidance. Road agencies are accountable for long-life assets and are cautious where specifications are inconsistent, performance frameworks are unclear, or peer adoption is variable.

This results in repeated trials and pilot projects, even with strong evidence of successful performance. Breaking this cycle requires national leadership that normalises crumb rubber modified binders as a mainstream, performance-based option.

7. Relevance to National Climate Resilience and Sustainability Objectives

Australia's road networks are increasingly exposed to extreme heat, heavier axle loads, and more variable climatic conditions, which accelerate binder ageing, cracking, and deformation. These pressures increase maintenance requirements and associated greenhouse gas emissions.

Crumb rubber modified binders have demonstrated improved resistance to:

- thermal and fatigue cracking;
- oxidative ageing;
- deformation under heavy traffic;
- premature surface distress in harsh climates.

By extending pavement service life and reducing maintenance frequency, crumb rubber roads contribute to lower whole-of-life emissions, improved network resilience, and more efficient use of public funds. These outcomes directly support national objectives on climate adaptation, infrastructure resilience, sustainable asset management, and emissions reduction.

8. Closing Statement

This inquiry represents a critical opportunity to transition tyre-derived materials from intermittent trials into durable, mainstream infrastructure solutions. Input from road surfacing practitioners is essential to ensure that future policy settings reflect delivery realities, asset performance requirements, and long-term value for the Australian community.

I respectfully submit this contribution to assist the Committee in shaping practical, effective outcomes for the tyre circular economy and Australia’s road infrastructure.

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