

EXPANDING NEW USES FOR USED TYRES

TYRE STEWARDSHIP FUND

MARKET DEVELOPMENT UPDATE MARCH 2021

Since the formation of the Tyre Stewardship Fund in November 2015, Tyre Stewardship Australia has committed \$6.3 million in investment support to drive sustainable outcomes for end-of-life tyres.

Fund overview

Market Development of tyre derived products remains one of the main reasons for the existence of TSA. Our objective is to increase the demand for tyre-derived products and help address the challenge presented by the millions of tyres that reach end-of-life in Australia every year.

So far we have invested almost \$6.3M in supporting specific projects and studies aiming at addressing this challenge and some clear trends and successful outcomes are beginning to emerge.

TSA has funded manufacturing plant upgrades with Australia's largest asphalt and spray seal producers to increase the volume and quality of the crumb rubber binders they make. These projects combined create infrastructure capable of consuming over 15,000 tonnes of Australian crumb rubber per year. However, significant number of barriers still exist to the wholesale adoption of these materials.

This is why we invest so heavily in the road construction sector. Rubber works very well in roads as a performance enhancing polymer and thereby consuming large volumes of high value product. Furthermore, strong demand in this sector allows domestic operators to invest in the recycling equipment needed to competitively produce highly refined products for multiple applications.

Other areas of research will help us reach our goals and include:

- A detailed study of volumes generated by the mining and resource sectors.
- An updated analysis of pyrolysis as an emerging technology
- Use of tyres in bulk explosives for the mining sector
- Used Tyres Supply Chain and Fate Analysis Report

Total committed to date:

\$6,300,000

OVERALL FUNDING

Roads

~\$3.5M – 23 projects

Civil Infrastructure

\$1.3M – 9 projects

Manufacturing

\$585,000 – 3 projects

General Research

\$572,000 – 7 projects

Explosives

\$198,000 – 1 project

Rail infrastructure

\$160,000 – 2 projects

Featured projects

Resilience of crumb rubber asphalt mixes

Australian Road Research Board and Department of Transport



In this award-winning project (recipient of the 2020 Sustainable Transport Infrastructure Award), TSA worked with the Australian Road Research Board (ARRB) and the Victorian Department of Transport (DoT) to demonstrate the resilience of asphalt manufactured with tyre derived rubber crumb.

A total of 1,400 metres of road surface was laid in a busy location in Melbourne with the equivalent of around 1600 car tyres used. The demonstration project will be monitored for performance and durability.

An independent report on results will be issued by the ARRB in 2022.

Ballistic protective concrete

Flexiroc and University of Wollongong



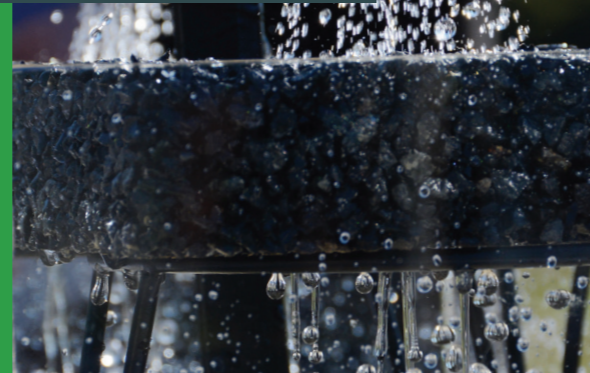
A partnership between TSA and Flexiroc has developed and tested *Protectiflex*, a blast and ballistic resistant concrete product.

The combination of tyre-derived rubber and composite fibers in a cementitious mix generates a product that offers substantial protection against blast, ballistic penetration, weapon, fire and seismic loads.

Suitable for both refurbishment of existing structures or inclusion at the design stage, *Protectiflex* will find applications in building façades, shielding of components such as navigation or communication infrastructure, tunnels and anti-ram devices.

Permeable Pavement

University of Melbourne, Merlin Site Services, City of Mitcham



The increased use of recycled passenger tyres is a high priority for the Australian resource recovery sector.

This project involved the installation of a large scale permeable pavement in a carpark in Adelaide to quantify the performance benefits of this product over conventional products.

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PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Roads		
Committed 2020/21 Rubber Binder Tank Upgrade Industry Partner	2,000t	\$180,000
Committed 2020/21 Incorporation of crumb rubber modified bitumen Industry Partner	500t	\$47,068
Committed 2020/21 Low Traffic Crumb Rubber Roads Fund (additional funding) TSA & various Local Councils/Industry Partners		\$202,000
2019/20 Asphalt Plant Modification and Research Project to Facilitate Use of Crumb Rubber Brisbane City Council	4,950t	\$100,000
2019/20 Upgrade Geebung Blending Plant in Queensland Fulton Hogan	TBC	\$150,000
2019/20 Exploring the Possibility of Recycling Passenger Car Tyres in Crumb Rubber Modified Asphalt RMIT & Department of Transport	TBC	\$135,000
2019/20 Crumb Rubber Bitumen Blending Unit Design Upgrade Boral WA	TBC	\$50,000
2019/20 Low Traffic Crumb Road Roads Fund TSA & various Local Councils/Industry Partners	TBC	\$150,000
2019/20 Crumb Rubber Capacity Expansion (for Spray Seal in Qld) Puma Bitumen	45,500t	\$300,000
2019/20 Recycled Asphalt Pavement Crumb rubber asphalt mix City of Logan	TBC	\$150,000
2019/20 National Specifications for crumb rubber binders in asphalt and seals Austroads	TBC	\$200,000
2019/20 Investigation of recyclability of crumb rubber modified asphalt Main Roads WA & Fulton Hogan Australian Asphalt Pavement Association	TBC	\$100,000
2019/20 Fume minimisation of crumb rubber asphalt Boral	TBC	\$90,000
2019/20 Puma Mobile Blending Units Puma Bitumen	21,000t	\$250,000
2019/20 Facilitating the use of crumb rubber modified asphalt on local government roads in South East Queensland Australian Road Research Board & Brisbane City Council	TBC	\$50,000
2019/20 CalTrans Gag Graded Technology Transfer Topcoat	1,650t	\$275,000
2018/19 Crumb rubber asphalt trial Australian Road Research Board & Department of Transport	100t	\$200,000

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Roads (continued)		
2018/19 High Shear Mobile Crumb Rubber Mixer EDI Downer	2,500t	\$175,000
2017/18 Dense Grade Crumb Rubber Asphalt Trial – City of Mitcham City of Mitcham (SA), Australian Road Research Board, Topcoat	6,000t	\$200,000
2017-18 Transfer of crumb rubber modified asphalt and sealing technology to Queensland & WA Main Roads Western Australia and Australian Asphalt Pavement Association, Australian Road Research Board, Qld Department of Environment & Heritage Protection, Qld Transport & Main Roads,	20t	\$170,000.00
2015/16 Transfer of crumb rubber modified asphalt and sealing technology to Queensland Australian Road Research Board Queensland, Transport and Main Roads Queensland, Department of Environment and Heritage Queensland	6,500t	\$150,000
2015/16 Explore and evaluate local market development opportunities for crumb rubber asphalt in Australia Australian Road Research Board, Department of Transport & Sustainability Victoria	TBC	\$113,715
2015/16 Tyre-derived aggregate as a supplementary material in pavement sub-bases Swinburne University & Department of Transport	20,000t	\$91,812
		\$3,529,595

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Civil Infrastructure		
2019/20 Spayed Protectiflex Blast Mitigation University of Wollongong/Flexiroc	4,000t	\$62,000
2018-19 Concrete road barriers University of Melbourne	750t	\$180,000
2018-19 Permeable Pavement – University of Melbourne City of Mitcham, SA	3,680t	\$240,000
2018-19 Protectiflex Pumped & Composite Blast Mitigation Project Flexiroc	635t	\$63,000
2017-18 Development of reinforced concrete – recycled tyre bale sandwich structural wall system Curtain University and Lomwest Enterprises	TBC	\$170,000
2016-17 Equine Air Pakenham Racing Club Project Flexiroc, Tuff Turf and Pakenham Racing	1,500t	\$70,000
2016-17 Reinforced crumbed rubber concrete for residential construction University of South Australia & Australian Research Centre	140,000t	\$200,000
2015-16 A green lightweight composite panel system using recycled tyres University of Melbourne & PreFab Australia	TBC	\$200,000
2015-16 Recycled tyre in permeable pavement applications University of Melbourne & Merlin Site Services	TBC	\$130,000
		\$1,315,000

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Manufacturing		
Committed 2019/20 Rail Crossing Mats Baron Rubber	TBC	\$300,000
2019/20 Cattle Mats Taurus Mats	500t	\$50,000
2017/18 Production of tyre crumb derived composite material Polymeric Powders	1,000t	\$213,000
2016/17 Tyre crumb derived Polymeric Powder / Polyolefin composite material piping Polymeric Powders & Austeng	TBC	\$22,988
		\$585,988

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
General Research		
Committed 2020/21 Tyre Cemented Rockfill Deakin University	280t	\$100,000
2018/19 Crumb rubber asphalt binder characteristics and specification for road pavement applications RMIT University & Australian Asphalt Paving Association		\$82,500
2017/18 Innovative Design of Lightweight and Structurally Efficient Composites Incorporating Crumb Rubber RMIT University		\$82,500
2017/18 Physical properties of tyre walls in residential housing construction UniSA & University of Technology Sydney		\$82,470
2017/18 Generation of gases from end-of-life tyres and purification using novel graphene molecular sieve University of NSW		\$75,000
2016/17 Assesment of liquid fuel chemicals and porous materail production from end of life tyres Monash University		\$75,000
2015/16 Developing Graphene supercomposite using end-of-life tyres University of NSW & Green Distillation Technologies		\$75,000
		\$572,470

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Explosives		
2015/16 High speed polymer coating of rubber crumb fuelled explosives Chip Tyre, BioAust Energy, Sequence Blast & Drill	3,500	\$198,500
		\$198,500

PROJECT	POTENTIAL MARKET VOLUMES P.A	TSA FUNDING (EXCL. GST)
Rail Infrastructure		
2015/16 Completed Performance of recycled rubber inclusion for improved stability of railways University Wollongong and the Rail Innovation Cooperative Research Centre	-	\$110,000
2015/16 Completed Performance of rubber-based absorbing layer (REAL) for railroad stability University of Wollongong & EcoFlex	144,000t	\$50,000
		\$160,000
TOTAL		\$6,361,553

TSA CONTRIBUTING BRANDS:

