

RECYCLED BALLAST



WHAT IS RECYCLED BALLAST?

Recycled ballast is rail ballast, which forms the base for railway sleepers, that has been used and subsequently cleaned to remove fines or fouled material to return it to a suitable level for reuse. Ballast acts primarily as a level, load-bearing platform, provides drainage and limits vegetation growth around tracks. It comprises coarse-sized crushed rock and generally has a nominal size of 53 or 63 mm. It can be readily purchased as a virgin aggregate material.

WHAT ARE THE BENEFITS OF USING RECYCLED BALLAST?

The benefits of using recycled ballast in road and rail infrastructure are as follows:

- **Environmental benefits**
 - Reduced use of virgin aggregate, landfilling, and haulage if reused in-situ.
- **Performance benefits when used as ballast**
 - Recycled ballast, if cleaned and processed to remove fines and fouled material, can be returned to a suitable level to meet ballast specifications and be used once again in its most valuable form – as ballast.

WHERE IS IT USED?

The reuse of ballast as ballast is facilitated in two ways. Either the material is washed in-situ at the track and reused onsite; or it is extracted, taken to a recycling facility to be washed ex-situ and returned to a suitable standard to meet specifications, then reused as ballast.

Ballast can also be reused in low-grade applications, such as road subbase in access tracks, structural pavement layers, embankments and general earthworks.

HOW MUCH CAN BE USED?

Up to 100% recycled ballast can be used, provided it has been suitably cleaned to meet relevant aggregate specifications that apply to virgin ballast.

WHAT OPPORTUNITIES ARE THERE FOR IMPROVING ADOPTION?

There is an emerging market within the rail industry for using reclaimed ballast as ballast again. Some independent operators offer ex-situ washed and scrubbed reclaimed ballast products that are suitable for reuse in high-value applications. Ideally the market would grow through the development of new washing facilities and the increased acceptance of recycled ballast by the rail industry. Key barriers to recycling ballast ex-situ include the required cleaning equipment and the associated financial investment needed. Furthermore, transporting the material from the rail environment to cleaning sites, and vice versa, presents a key challenge to the process being financially viable and environmentally beneficial.

With few standards and specifications for the use or allowance of recycled ballast, there is an opportunity for rail asset owners to kickstart further adoption through creating or updating these.



RECYCLED BALLAST: VIC



In 2019, the Level Crossing Removal Project: Southern Program Alliance (SPA) Initial Works Package (IWP) recognised the significant volume of waste ballast that is generated in major projects of Metro Trains Melbourne (MTM)'s network. About 10,000 tonnes of recycled ballast was used in temporary mainline tracks and a temporary train stabling siding as well as in permanent train stabling sidings at Kananook railway station. The recycled ballast was sourced from several Level Crossing Removal Projects.

The engineering properties of recycled ballast were assessed against those specified by L1-CHE-SPE-064 and AS2758.7. While recycled ballast was generally compliant with AS2758.7, there were some instances where the material did not meet the requirements of L1-CHE-SPE-064, such as gradation. This was due to the anomalies between the Australian Standard and the MTM specification. As such, the use of recycled ballast was subject to the endorsement of MTM Standard Waivers SW1541 for temporary state and SW1992 for permanent state. The waivers state that wider use of recycled ballast can be warranted since the trial results demonstrated adequate performance, i.e. comparable performance to that of virgin materials.

Aside from performance, supply cost is a key consideration from a procurement point of view. A cost analysis suggested that there would be about a 44% reduction in supply cost when replacing virgin ballast (at about \$35.85 per tonne) with recycled ballast (at about \$20 per tonne). The distance from the recycling facility or ballast quarry to the project site can affect the final costs though.



LOCATIONS

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