

Impacts of Tri Drive Access

What is Tri Drive Access?

When Main Roads Heavy Vehicle Services (HVS) refers to “tri drive access”, we are referring to network access where a tri drive prime mover is allowed to tow the approved trailer configurations, as an alternative to a tandem drive prime mover.

A tri drive prime mover has three drive axles at the rear, compared to two drive axles at the rear of a tandem drive prime mover.

Tri Drive Prime Mover



Tandem Drive Prime Mover



Tri Drive Vs. Tandem Drive Combinations

When approving tri drive access, we are simply allowing a tandem drive prime mover to be substituted with a tri drive prime mover. Approving tri drive access does not provide an increase to the length of a vehicle combination.

For example, a Category 4 Tri Drive AB-Triple is allowed a maximum length of 36.5 metres, the same as a Category 7 Tandem Drive AB-Triple.

Tandem Drive AB-Triple



Tri Drive AB-Triple



Surface Scuffing at Intersection

When compared to tandem drive prime movers, tri drive prime movers are known for causing more surface scuffing at intersections. The additional surface scuffing primarily occurs at tight intersections, where the tri drive vehicle combination is required to turn sharply, at low speed, to manoeuvre the intersection.



The additional surface scuffing is less apparent at wider intersections with an increased turning radius.

Vertical Loading Impacts

While the tri drive prime movers may cause additional surface scuffing at tight intersections, when compared to a tandem drive prime mover, the effects of the vertical loading of the axle groups over the entire network need to be considered.

When comparing the individual axle loadings on a tri drive axle group to those on a tandem drive axle group, the tandem drive axle group is 1.58 tonnes heavier per axle.

Tri Drive Axle Group – 20t



Tandem Drive Axle Group – 16.5t



As a result, when compared to the tri drive axle group, the tandem drive axle group causes more structural damage to the pavement, potentially contributing to accelerated rutting and cracking, over a much larger portion of the road asset, i.e. along the entire route, not just at the intersections.



Considering this in terms of Equivalent Standard Axles (ESAs), which is the standard unit for measuring pavement damage, the ESA for a tandem drive axle group is 2.1, while the ESA for a tri drive axle group is 1.1. This means the tandem drive axle group is almost twice as damaging, yet carries 3.5 tonnes less payload.

Tri Drive Performance

Due to the better torque distribution, tri drive prime movers perform better than tandem drive prime movers on gradients. The majority of road trains assessed under the Performance Based Standards (PBS) Scheme will not pass the performance standards unless the vehicle combination includes a tri drive prime mover, particularly the startability, gradeability and acceleration standards.



Maintenance & Upgrade Considerations

When considering road maintenance costs, a road manager needs to consider the costs associated with repairing surface scuffing at a small number of intersections, compared to the costs of repairing rutting and cracking along their entire network. This will assist with determining whether to support tri drive access.

To support tri drive access and minimise surface scuffing, intersections and roundabouts should be designed with a turn radius as large as possible. Where a large turn radius is not feasible, consideration should be given to different pavement surface treatments that better tolerate the additional scuffing.

