

# Case Study

## High Productivity B-Triples Will Reduce Truck Numbers On Australia's Highways

*B-Triples and B-doubles using advanced technology under Performance Based Standards are expected to substantially reduce the number of trucks necessary to perform Australia's transport task transport task. The National Transport Commission asked an independent journalist to compile this case study.*

Keeping truck traffic growth down by applying the latest technology to improve productivity and safety is a high government priority given the predicted doubling of freight volumes by 2020.

It is estimated that only 15% of freight is "contestable" between rail and road, so even with a vastly improved rail system and improved intermodal links, the road freight task will still be close to double by 2020.

Improved B-double and B-triple combinations are part of the solution.

B-doubles have had an outstanding road safety record and have helped to reduce truck numbers since they were introduced in the late 1980s.

A B-triple is essentially a B-double with two "A" type semi-trailers instead of one.

They handle exceptionally well, in part because the trailers and prime-mover are 'roll-coupled' by the use of fifth wheels (turntables). In effect each part of a roll-coupled vehicle helps stabilise the other parts, unlike road-trains and truck-trailer combinations.

Fifth wheel couplings also improve "trailing fidelity", which means the rear trailer does not swing as much as road-trains do.

The main constraint on the use of B-doubles and B-triples is their swept-path or "low-speed offtracking". They just can't fit around the corners on tight intersections.

There is, in fact, more difference between the swept path of a B-triple and a B-double than there is between a B-double and a six-axle single trailer articulated vehicle.

B-triples are in limited use at present and offer far superior stability, handling and tracking fidelity to road trains. But their swept path is slightly worse than road-train doubles.

Performance Based Standards will allow the use of innovative technology like steerable axles to improve B-triples' low speed off-tracking and thus enable them to fit on more of Australia's road network.

Because they will operate under PBS, those innovative B-triples will also be required to comply with the latest noise and emissions standards to further reduce environmental impacts.

The first steerable axle trailers have already appeared on B-doubles and AirRoad Distribution has put a such trailer into a B-triple.

That trailer runs as part of a B-double on the East Coast and as part of a B-triple on the run from Port Augusta to Northern, near Perth. The improvement in swept path is notable.

AirRoad is currently developing B-double and B-triple combinations with steerable axles on all trailers that will offer even better overall performance because swept path benefits are cumulative in multi-combination vehicles.

In other words each semi-trailer in the combination with a steerable axle improves swept path by approximately 300mm, so a B-triple's swept path will improve by about 900mm.



AirRoad like other innovative transport operators, will be seeking a wider route network for their steerable axle equipped B-triples and B-doubles.

AirRoad's approach to increasing productivity is likely to be emulated by other operators seeking a competitive advantage under Performance Based Standards. They did not settle for merely adding an "A" type trailer.

They lowered the floor and raised the roof.

The "A" type trailers have drop decks. AirRoad developed an axle-free suspension for the B-trailer using box frames and super single tyres which allows a floor height only 300mm off the ground. The trailers are 4.6 metres high, and feature mezzanine floors to protect delicate cargoes from pallet stacking.

The result is an amazing 270 cubic metres of space inside the trailers.

AirRoad had also achieved significant gains in fuel economy for the payload. AirRoad B-triples use only 150 litres more fuel each way across the paddock than their B-doubles.

Most B-triples on the road currently are used on road-train routes but there is a notable exception.

Ford Transport runs a B-triple fleet that operates in the Melbourne metropolitan area on heavily trafficked multi-lane roads between Geelong and Braodmeadows.

Ford's six B-triples replaced a fleet of nine B-doubles on the same work and affected significant cost savings as well as reducing fleet journeys by one third.

The Ford example shows clearly the productivity benefits possible with B-triples. One B-triple can carry as much as two standard six-axle articulated vehicles and one third more than a B-double.

Ford's B-triples also illustrate that the inherently superior safety and stability of roll-coupled combinations like B-triples make them suitable for use in metropolitan areas and highly trafficked roads that may be unsuitable for conventional road-trains.

Ford's B-triples are 33.5 metres long while AirRoad and Queensland B-triples are up to 36.5 metres long, the same as road-train doubles because they operate on road-train routes.

B-triple route access under Performance Based Standards will be determined largely by their swept path.

Key innovative technologies like steerable axles can only provide productivity benefits under Performance Based Standards. There is simply no room for that level of innovation in the prescriptive Australian Design Rules at this time.

Steerable or "castoring" axles are the latest developments in B-triples but there are even greater possibilities for improving swept path with active steering units like the TrackAxle steerable tri-axle group. The TrackAxle system swivels on its own turntable and each axle also turns in relation to the others.

Preliminary calculations show that a B-double with TrackAxle trailers will get around tighter corners than a normal six-axle single trailer articulated vehicle. And the improvement in swept path with B-triples is likely to be even more dramatic because of the cumulative effect with more trailers.

Steerable axles and active steering systems will enable significantly better access to freight terminals and distribution centres for high productivity, high safety, and low environmental impact vehicles in the future.

The result will be far fewer trucks to accomplish Australia's transport task.

And those trucks operating under Performance Based Standards will be the safest, quietest, cleanest trucks on the road.