Prime Mover Magazine – TIC Article for April 2026 Issue.

Could Autonomous Trucks Reduce Fatigue Related Crashes in Australia?

The development of Autonomous Vehicles (AVs), including trucks, continues at pace globally and you might be surprised to hear that there are approaching 100 autonomous driving trucks currently operating in Australia, none of which are operating on public roads.

Australia is something of forerunner in autonomous vehicles, being the second country in the world to introduce a driverless mining truck in 2008, second only to the first deployment in Chile in 2007. Then in 2016, the Australian Rio Tinto Group, was the first in the world to transport all its iron ore via driverless trucks. The primarily reason for the introduction of an autonomous truck fleet was to remove human error and eliminate risks like fatigue and distraction. Rio Tinto and BHP have since reported significant reductions in safety incidents, some cases citing up to an 80-90% decrease in accidents compared to human operated fleets. These real world outcomes and the steady development of autonomous driving technologies, begs the question, could similar safety results be achieved in a driverless on-road truck fleet?

Operating autonomous vehicles in a “closed environment” such as a mine site, or on a private road network, is very different to deploying such technology on public roads. Let us look at the fundamentals of driverless vehicles and the potential roadblocks to their widespread deployment. The development of autonomous vehicles has been structured around six levels of automation defined by SAE International. These levels range from Level 0, where a human driver performs all driving tasks, through to Level 5, where a vehicle is fully autonomous and capable of operating without any human involvement. This scale helps clarify the capabilities of automated driving technologies and defines how responsibility is distributed between the human driver and the vehicle’s Automated Driving System (ADS).

Level 0 has no automation, meaning the driver performs all driving tasks. Level 1 provides limited assistance, such as adaptive cruise control or lane-keeping support. Level 2 allows the vehicle to control steering and speed simultaneously, but the driver must continuously monitor the system and the road. Level 3 enables the truck to manage driving in certain conditions without constant monitoring, although the driver must be ready to take back control of the vehicle. Level 4 vehicles can drive themselves in specific environments, say on specific roads and/or weather conditions, without any human help/input. Level 5 represents

full automation, where vehicles operate in all conditions without a driver or traditional controls.

A key distinction across these levels is who holds responsibility for driving. In Levels 0 through 2, the driver remains responsible for the vehicle and must monitor the environment at all times. In Levels 3 through 5, responsibility gradually shifts to the automated system. This transition raises important legal, safety, and technological challenges.

Currently in Australia, our driving laws require “hands on steering wheel”, hence only Level 0 and 1 vehicles are legal here. This is the first roadblock that must be overcome by our government regulators. This would potentially allow Level 2 automation to be deployed. Another major concern involves liability. With Level 3 automation, responsibility shifts more toward the vehicle manufacturer when the ADS is controlling the truck. If a crash occurs while the vehicle is operating autonomously, it may be unclear whether the driver or the manufacturer is legally responsible. This uncertainty will slow the adoption of Level 3 and beyond technology unless regulators establish clear rules.

Some Truck Industry Council (TIC) members have deployed Level 3 and even Level 4 trucks in “closed environments” across the country, however broader adoption on public roads will require the above regulatory issues to be resolved in a pragmatic manner.

There is no doubt that autonomous driving features can and will continue, to aid human drivers in cars and trucks, reducing driver fatigue and crashes on Australian roads. Level 3 and beyond autonomy in trucks will deliver better safety outcomes for all road users, however due to the barriers detailed above, deployment of such trucks is some way in the future.

There is a more immediate issue effecting heavy vehicle safety in Australia, that could be addressed today, that is the age of our truck fleet. At 15 years average age, many of the trucks on our roads do not have even basic safety features such as Anti-lock Brake Systems (ABS). Governments across Australia should be looking to action the measures detailed in TICs National Truck Plan that are designed to renew the Australian truck fleet, improving road safety and environmental outcomes for all.

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