

# Keeping Tabs on TEBS

In this special focus on TEBS (trailer electronic braking systems), heavy vehicle braking expert **STEVE SMITH** explains the fundamentals of the various systems and encourages operators to play an active role in specifying the optimum braking options when purchasing new trailers.

The generic term TEBS covers many levels of technology and braking options spanning 12 and 24 volt systems, lift axle controls, fully electronic air suspension and trailer information display modules. While electronic braking systems (EBS) on trucks have been well refined over recent years thanks to truck makers' strong engineering capabilities, lower economies of scale and tighter research and development budgets amongst trailer manufacturers have made it difficult to integrate the optimum braking packages into their products.

Put simply, trailer builders are very good at designing and constructing a robust piece of equipment to carry the desired payload, but cost constraints can make the braking system something of an afterthought, a legislated requirement separate from the primary load carrying task, that can be difficult to integrate into their designs and ultimately harmonise with the towing vehicle's braking system. This problem has been around for many years and most operators have developed hybrid solutions to minimise the effects of the compromises.

But perhaps operators could be more pro-active by taking the time to become fully conversant with the systems available in order to understand exactly what they need for their specific application. For instance, while many prospective new trailer buyers have strong preferences on axles, suspension, lights, wheels, tyres and hubs, often little time is spent investigating the braking system with the onus placed on the trailer builder to provide a solution. This is in stark contrast to a truck purchase where few would accept the specifications of a new truck based on the salesman's recommendations.

However, since trailers normally have at least twice the lifespan of trucks, it should



be seen as imperative to determine the optimum braking system (including electronic air suspension and lift axle control options) for now and the future. To this end, smart operators are making informed decisions after thoroughly researching the various brake vendors and the level of TEBS technology they wish to employ.

## HOW TEBS WORKS

The electronic braking system's computer monitors a range of factors including load, road speed, rate of deceleration and air pressure to optimise each brake application. It uses the minimum quantity of air and applies precise pressure to the foundation brakes, resulting in reduced wear on brakes, tyres and tow hitches. On this basis alone, the system can provide a quick payback of initial purchase cost.

Many of the latest EBS computers also have additional upgrade facilities allowing for air suspension functionality including axle lift and ride height management, as well as external interfaces for information panels and GPS. Another useful feature of EBS is the trip data recorder which stores information pertaining to the trailer's daily operations. This allows the fleet controller to access details such as loading, speeds, hours fully and partially loaded, harsh braking and roll stability events. Accessing the actual details allows empirical diagnostics to be undertaken, allowing sensible and commercially based fixes for any trailer problem, either mechanical or operational.

Local experience has shown EBS hardware to be extremely durable and reliable, with most faults caused by either incorrect application, poor installation or inadequate

programming. Like all advanced products, satisfactory after-sales support is critical. There are numerous cases where systems have been disconnected because no one was able to calibrate the unit or fix a particular problem. This would be less likely to occur if operators were more clued up on the system they had purchased.

The various EBS distributors can provide schematic layouts and sample reports from the brake computers, as well as the software and interface devices needed to access the trailer computer and advise on the costs involved. A data interface cable with the coupling port in a place that is suitable and safe for the operation (i.e. well away from the fuel delivery manifold on a fuel tanker) should be included with every system.

## VOLTAGES

While relevant Australian Design Rules (ADRs) previously stipulated 12 volt power transfer between trucks and trailers, these have been relaxed to accommodate either 12 or 24 volt (ABS or EBS respectively) truck power. Typically, US style trucks have 12 volt systems and Japanese and Euro trucks, 24 volts.

Where it gets complicated is that all full TEBS systems use 24 volt architecture. While there are some reduced functionality 12 volt systems that work well behind 12 volt trucks, the 24 volt brake computers have a higher degree of functionality so if a fleet of trucks is predominantly 24 volt, then 24 volt EBS would usually be the best choice.

The experience of reducing a 24 volt truck down to 12, cabling to the trailer, and then inverting back to 24 volts to run the trailer brake computer has not been fantastic. Voltage reducers and invertors are generally