Submission No 43

INQUIRY INTO HEAVY VEHICLE SAFETY AND USE OF TECHNOLOGY TO IMPROVE ROAD SAFETY

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As per ADR 42 that requires a Tyre Placard for a vehicle under 4.5t and a minimum tyre pressure displayed Heavy Vehicles impose greater stresses upon tyres than lught vehicle do, yet the topic of tyre inflation pressure is iognored under NHVR legislation.

What supports the vehicle? The tyres.

What greatly influences the braking and steering if not appropriately set as per OEM's recommendations? The TYRES.

Chain of Responsibility (CoR)

Tyres are a critical link in CoR.

Due Diligence; are you aware of the role tyres contribute to your operations and safety?

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The Chain of Responsibility (CoR) is the overarching legal requirement that all parties in the supply chain from the consignor to the consignee have to ensure their legal responsibilities have been met.

As a Director of a transport operation your responsibilities extend to understanding every link of the entire chain throughout your business. Failure to appreciate all the aspects and respond accordingly could result in a legal liability including large fines and prison.

Accreditation systems such as WAHVAS, NHVR and Trucksafe are available for HV businesses. There are many compliance systems that cover driver accreditation and topics such as fatigue, journey planning, load restraint, fault registers and maintenance.

All vehicles on our roads today have a single common factor, all vehicles, heavy, light, electric, diesel even autonomous vehicles, they all ride on pneumatic tyres.

How is tyre maintenance evidenced within your CoR? Do consider that a vehicle can be overloaded yet under mass. If tyres are not "right" the vehicle can be deemed unroadworthy. How is this so?

Tyres 101 tells us a tyre's prime function is to contain the air. We all know that a flat tyre supports no load. Let's look at an 11R22.5 16 pr tyre, at 120 psi this tyre in a dual configuration will support 2,725 kgs, that's 10,900 kg for an axle (4 tyres). At 100 psi the same tyre supports only 2,470 kgs, that's 9,800 kgs axle load. That's a 10% reduction in load capacity. A 295/80R22.5 goes from 3,150 kgs @ 120 psi to 2,770 kgs @ 100 psi, that's a 12% reduction in load capacity.

Figure 1; 295/80R22.5 steer tyre, reduced by 10 psi from 120psi to 60psi. When is it flat?

So if the tyres are not appropriately inflated for the load on the vehicle then the vehicle will be overloaded, even if it is within the GVM requirements. How many tyres are operating at the level they are actually required to be?

There are weigh-in-motion devices on trucks, engine control modules that regulate the amount of power a driver can apply, GPS and speed tracking devices and even cameras to see when the driver is getting droopy eyes. When did you as a manager last ask a driver to stop his truck, open the engine cover, remove the radiator cap and dip a thermometer into the coolant to check the engine temperature? The usual response is to break into laughter, until asked how tyres are currently checked. Putting a manual gauge onto a tyre is akin to the process just outlined, last used in the 1930's.

Tyres support the vehicle in more ways than just a load carrying capacity. Traction, steering and braking efforts are all applied via the tyres. If the tyre is underinflated the tyre will not perform as the tyre designer intended and will the vehicle perform as the vehicle designer intended?

When the CoR is considered most often there is only consideration of the personnel involved but let's apply it to the vehicle for a minute. The steering wheel is connected to the steering shaft and steering box, which is connected to the linkages that rotate the wheels around the axles axis. The wheels have tyres. The engine produces power that is transferred through the clutch into the transmission that reduces the speed increasing the torque that is transmitted to the differentials and axles to drive the wheels. The wheels have tyres fitted to them. The trailer axles wheel end is fitted with brakes, which are applied by the driver as required, the brake shoes or pads engage with the drum or disc and convert the kinetic energy into heat energy reducing the speed of the wheel. The wheel is fitted with a tyre. The tyre connects the brake to the pavement.

Why are tyres not important? Tyres are absolutely critical in vehicle safety. ABS, ESC, all sorts of electronic devices depend upon the tyre to transfer the forces without diminishment.

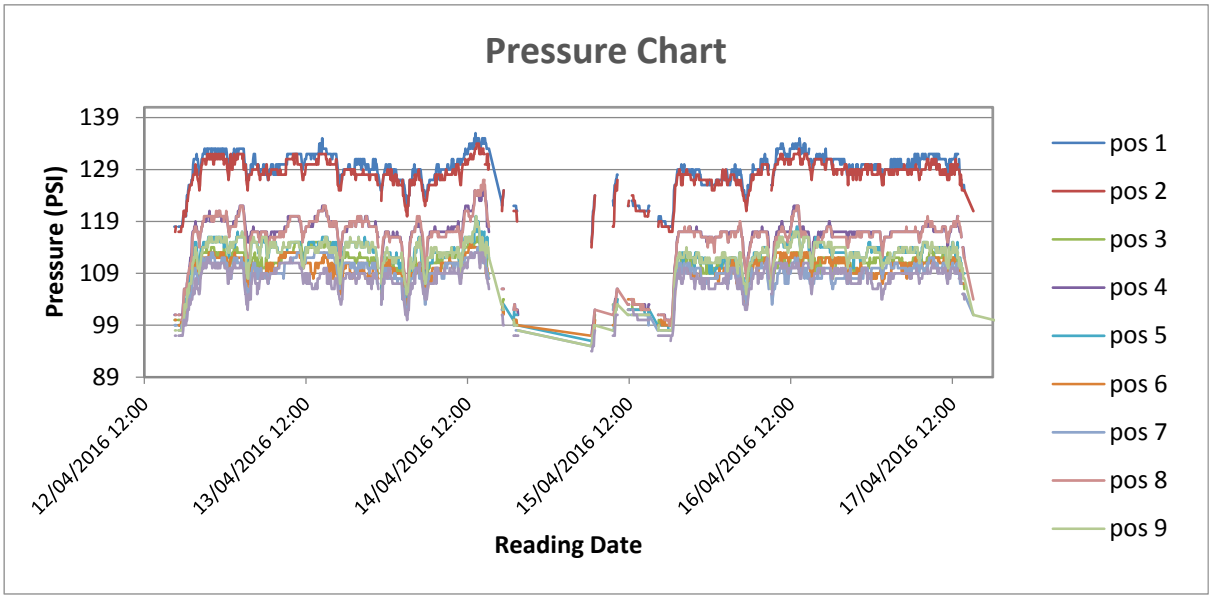

Figure 1; tyre pressures every 10 minutes, Perth - Melbourne return

Stopping to consider how tyre maintenance plays a critical role in vehicle performance should ring alarm bells for most operations as there is little if any evidence that the tyres have been maintained beyond a cursory glance during periodic servicing.

The tyre is like the consignee; it is the last point of contact. It has the responsibility to transfer the steering, drive and braking forces from the vehicle to the pavement. It is ultimately responsible for vehicle performance.

The PBS states on page 84 in section E

"all the forces needed to both support and guide a vehicle ultimately arise in the area of contact between the tyre and the roadway. These forces are generated at the road surface in response to the deformation of the tyre structure."

Tyres provide not only safety but contribute substantially to economics. Tyres are one of the largest operating expenses for a heavy vehicle. They are one of the most uncontrollable expenses as well. If a tyre fails catastrophically then the damage can be considerable, busted guards and lights, lost time in awaiting a tyre service even the total loss of the vehicle. How? Just think of a truck driver's worst nightmare, a steer tyre failing whilst at highway speed. How many single vehicle accidents are the result of a steer tyre failure?

The upside of maintaining tyres is manifold in that not only do the tyres themselves last longer but the wheel ends and bearings, the transmission and driveline last longer, fuel burn is reduced by a couple of percentage points at least. Even driver fatigue is reduced! WHAT? Think of a tandem drive, all 8 tyres driving. If the tyres are at different pressures (yes very common), then they'll all be driving at a different rate. Imagine this tandem drive set-up wearing a running shoe, teamed with a work boot, a golf shoe, a football boot, a slipper, another different running shoe and a dress boot. How are these all going to work at the same rate? If the tyres don't work as a team then the driver will be constantly redirecting the vehicle as each shoe, sorry tyre, imparts its own effort in driving forward or around a corner. After hours of constantly providing subtle inputs to the steering why would a driver not be tired and fatigued? The driver may well be fatigued before the driving hours are up, just as the vehicle can be overloaded but under mass.

Aah yes, the perennial statement of "our tyre service has set the tyres during the last service". So what have the tyres experienced since? Even if the tyres were all set to the same cold pressure before the vehicle departed, the tyres in operation would not be at the same pressure. Inside tyres are deprived of the same cooling as outside tyres experience, steer tyres experience higher loads on downhill sections and higher speed, drive tyres experience more load on uphill sections. Inside tyres experience the waste heat from the engine and exhaust emission systems, high horsepower trucks are even worse, add long range fuel tanks and the ventilation goes to nada, zip, zilch, and the tyres? They just keep working but they are getting hotter, increasing in pressure and size resulting in the outside tyres scuffing every revolution. Can you evidence what they experience?

Maintaining tyres in real time is a no-brainer. Just as modern trucks have electronic gauges to monitor engine/transmission pressures and temperatures alerting to out of specification levels so trucks and trailers can be fitted with real time tyre pressure monitors to display tyre pressures, without leaving the driver's seat. Systems can be connected to data loggers or telematics to provide historical evidence but more importantly data to drive positive economic outcomes.

BPW Axles report that a 5 psi difference between a pair of dual tyres equates to a 10% reduction in bearing life, a 10 psi difference equates to 20% reduction. Transfer this wear back up the driveline exacerbating wear along the way until the engine is working harder wearing parts out, burning more fuel.

Figure 3; catastrophic steer tyre failure, how do you evidence the pressures were appropriate?

Just as a fatigue log book can evidence a driver's work, an ECU can be downloaded to reveal the speed and driver attributes so too tyres can be monitored and evidenced. The Chain of Responsibility does not stop with humans, it extends all the way through the vehicle, from the consigner, the engine to the consignee, the tyres.

As a Director the ultimate responsibility rests with you.

How do you evidence your Chain of Responsibility obligations?

How do you maintain your safety record and keep your reputation in tact?

How do you maximise your bottom line?

If your tyres aren't turning, they're not earning©. Aim to keep them turning for longer.