

TYRESAFE
A U S T R A L I A

TRANSAFEWA
TRANSPORT.SAFETY.COMPLIANCE
OO OO O

Tyre Safety
affects everyone,
you, me, your family, everyone.

「 IF THEY'RE
NOT TURNING
THEY'RE NOT
EARNING 」



KEY TAKEAWAYS

How to improve safety & increase availability simultaneously

Why tyres can cost more to operate more than they should do



DO YOU HEAR THE MESSAGES?

Tyres are messengers

Tyres accurately relate the maintenance and operational philosophies of the operator



SAFETY & TYRES

A tyre is a stored energy device

If not handled properly serious
and or fatal injury can occur



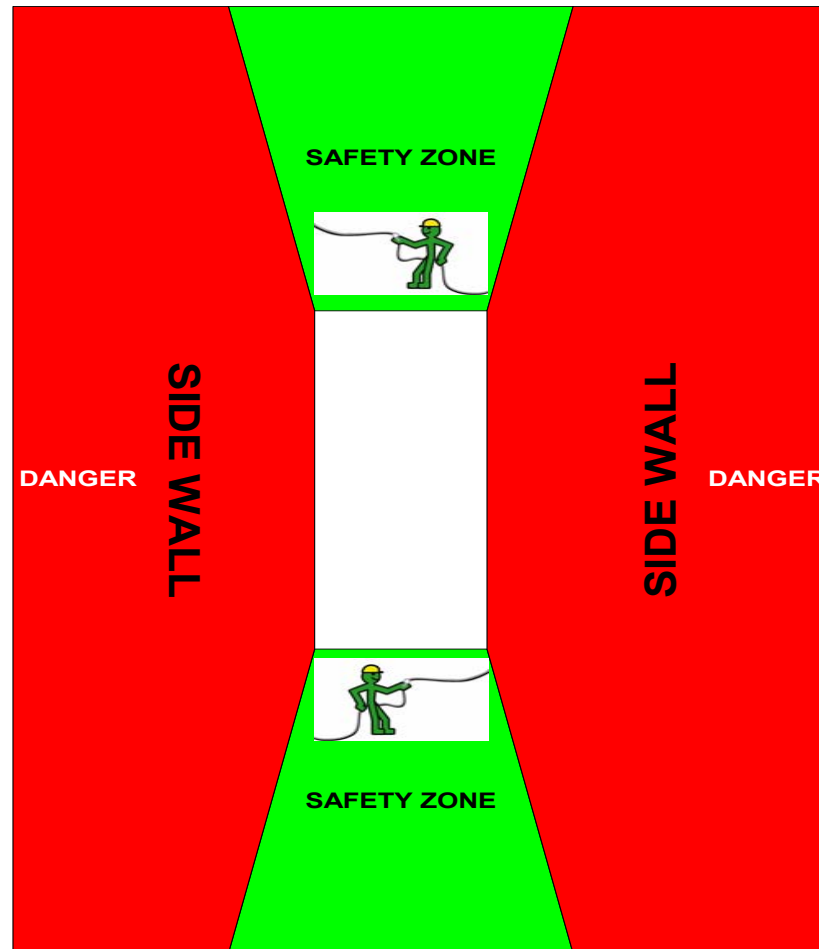
TYRE SAFETY VIDEO

<https://www.youtube.com/watch?v=294Wu6O0uW0>

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HAZARD RECOGNITION





HAZARD AWARENESS

DANGER - STORED HIGH PRESSURE HAZARD
ONLY A TRAINED PERSON SHALL MAINTAIN TYRES
Refer to Safe Handling Tyre Wheel & Rim Guidelines

Procedure For Tyre Service

A personal risk assessment shall be conducted prior to performing any work on a tyre assembly.

Inspect tyre assembly for deformities, cuts or damage, record & consult a competent person if observed.

Prior to conducting any work on single/dual tyre assembly, especially divided & multi piece rim assembly you should deflate tyres as per company or manufacturers OEM specifications

No unauthorised access in the tyre service area.

STOP

COMPANY S.W.I. PROCEDURE

TYRE CONTACT PH No.

TYRE PRESSURE COLD
(HOT = COLD + 15%)

TYRE POSITION

www.tyresafe.com.au

Failure to follow procedures may result in serious or fatal injury
Use industry best practice when maintaining or servicing tyres

TRUCK TYRES



It is no longer acceptable to think an employee knows “how to”.

Verification of competency must be established.

By alerting the work to a hazard the employer has performed their duty of care as far as is reasonably practicable.



TYRE FACTS

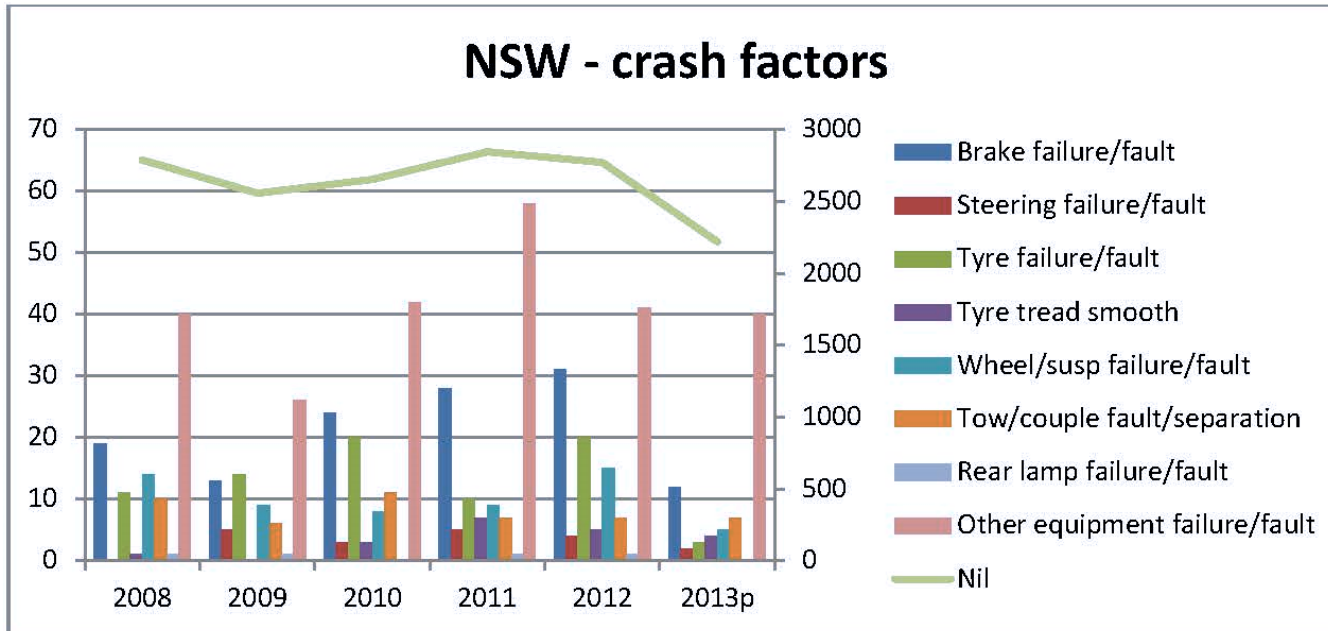


NTI reports 12.6% of all truck fires they recorded start at the wheel end

at a cost of \$170,000 an event



TYRE CRASH FACTORS



Source; page 23
 NTC HV
 Roadworthiness
 report July 2014
 ISBN: 978-1-921604-59-1

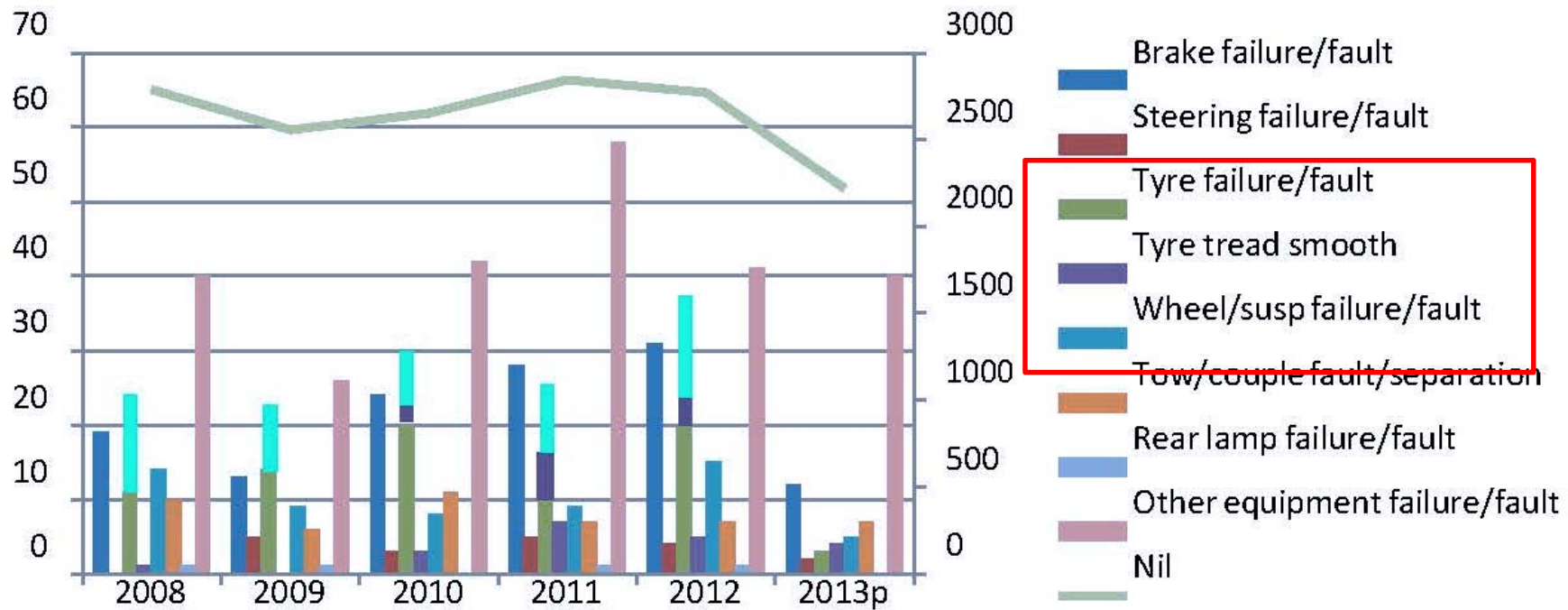
- Other equipment failure/fault includes overloading and incorrect loading.
- 'Nil' indicates that the accident was not caused by the criteria listed.

The data received from jurisdictions broadly corresponds with the findings from the literature survey in attributing faulty brakes, tyres and wheels as common factors in vehicle crashes. There are no standards for data collection and not all of the data collected can provide detail on individual crash factors. As Figure 3 shows, New South Wales has comprehensive data in regards to crash factors.

Data from other jurisdictions is presented in the appendix, showing the number of crashes and the main crash factor (mechanical). The data indicates that heavy vehicle crashes attributed to mechanical failure are below 5 per cent.



WHEEL END CHALLENGES





TYRE PARAMETERS

- Load higher = lower life
- Speed higher = lower life
- Tyre rating 11R22.5 as a K 146
120 psi for
110 km/hr speed @ 3000 kgs load

Tyre quality

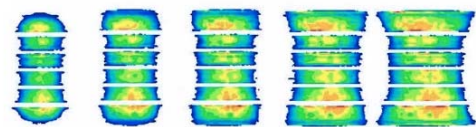
Lower rolling resistance
= lower fuel consumption

ROLLING RESISTANCE

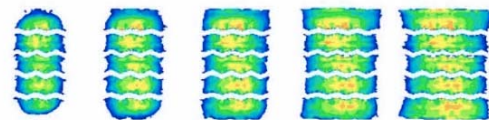
- Tyres are not created equally

4 Analysis of the Experiment Results

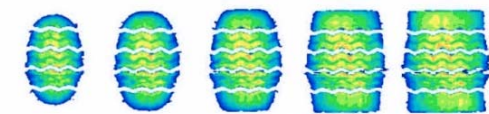
On the basis of the definition of the footprint shape, analysis of the law of the geometrical characters' variation along with the load was carried out. The contact pressure distributions of the three types of tires under different load levels are shown in Fig. 4.



(a) T1.385/55R22.5



(b) T2.385/65R22.5



(c) T3.385/65R22.5*

Fig. 4. Contact pressure distribution under load

Table 3. Parameters of footprint shape

Load m/kg		1 700	2 338	2 975	3 613	4 250
Contact area A_c/cm^2	T1	314.0	370.9	443.6	499.1	551.3
	T2	274.4	358.9	425.8	485.1	557.3
	T3	265.9	347.9	427.0	500.6	555.5
Footprint area A_f/cm^2	T1	384.0	445.5	527.7	588.3	648.0
	T2	329.4	424.3	503.5	572.2	656.4
	T3	312.1	395.5	477.8	556.7	614.8
Contact area coefficient c	T1	0.818	0.832	0.841	0.848	0.851
	T2	0.833	0.846	0.846	0.848	0.849
	T3	0.852	0.880	0.894	0.899	0.903
Tread contact length l/mm	T1	150.5	164.7	183.7	211.3	252.3
	T2	133.4	151.5	176.9	202.8	252.7
	T3	153.3	174.6	195.6	213.2	233.0
Tread contact width b/mm	T1	301.1	304.2	305.9	306.6	306.6
	T2	282.7	297.0	298.2	298.2	298.2
	T3	250.7	274.6	284.3	284.3	284.3
Coefficient of contact k	T1	0.50	0.54	0.60	0.69	0.82
	T2	0.47	0.51	0.59	0.68	0.85
	T3	0.61	0.64	0.69	0.75	0.82
Footprint-shape coefficient λ	T1	1.10	1.12	1.14	1.16	1.19
	T2	0.95	0.96	1.01	1.06	1.09
	T3	0.66	0.69	0.71	0.80	0.86



TYRES TELL ALL

- Tyres tell the story without any alterations
- Overload / under inflation is only 1 area
- Axle camber; identified by tyre pressures, always breaking inside wheels?
- Dragging brakes increase tyre pressures
- Alignment influences are shown by



ALIGNMENT

- Drive axles & trailers provide more challenges than steer axles
- Axles centred and set within millimetres
- A frames, track rod bushes & pins
- Peddle hooks affect alignment of trailers
- Even from new settling of components will affect alignment

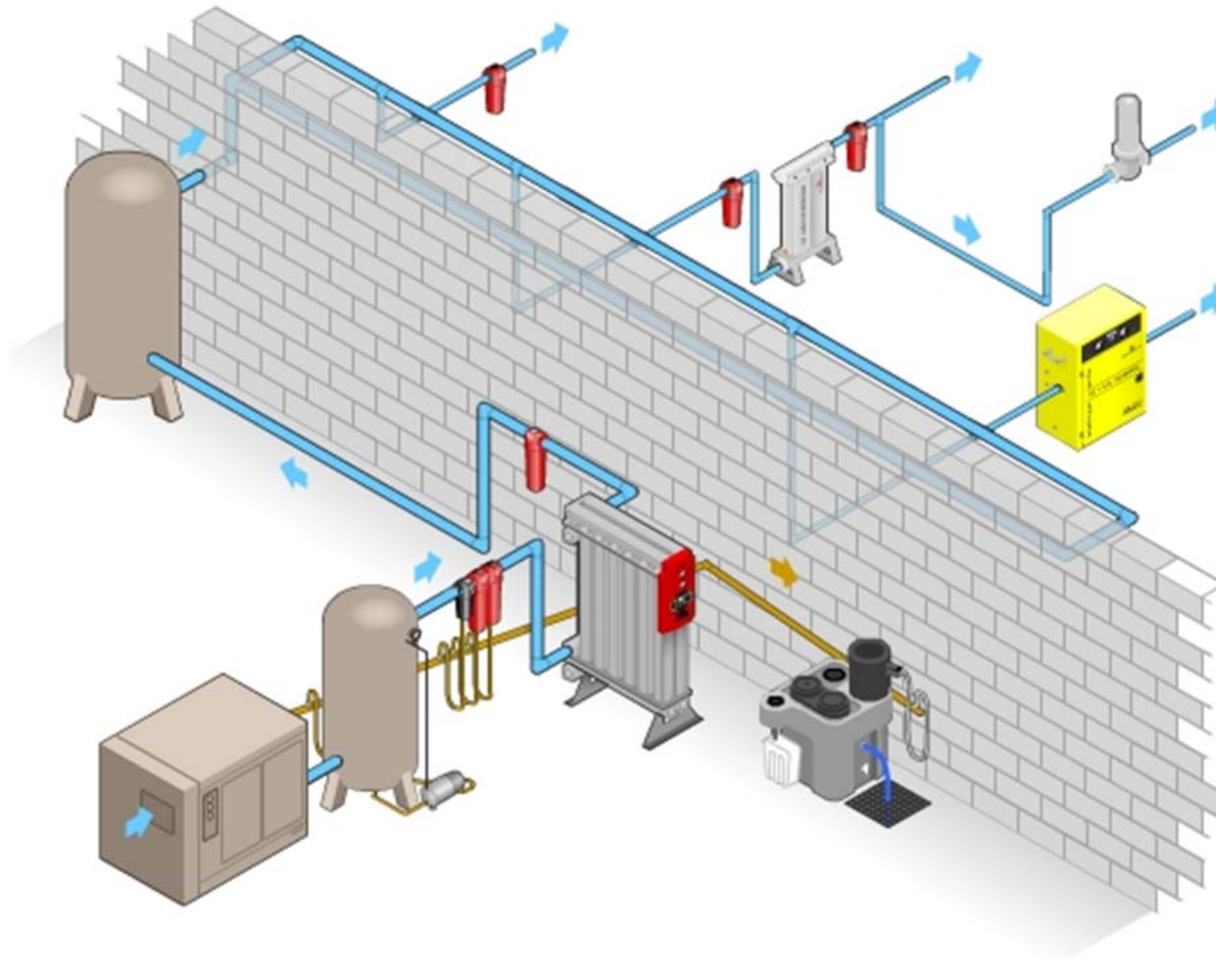


WHEEL ENDS

- Wheel bearings are affected by tyre pressures
- Bearings; a 5 psi pressure difference between duals will reduce bearing life by 10% (BPW)
- Rims (spiders); uneven mounting yields higher wear, uneven pressures



AIR SUPPLY



Does your air compressor achieve 140 psi at the receiver?

How do you make up pressure for an operating tyre?



CLEAN AIR NEEDED

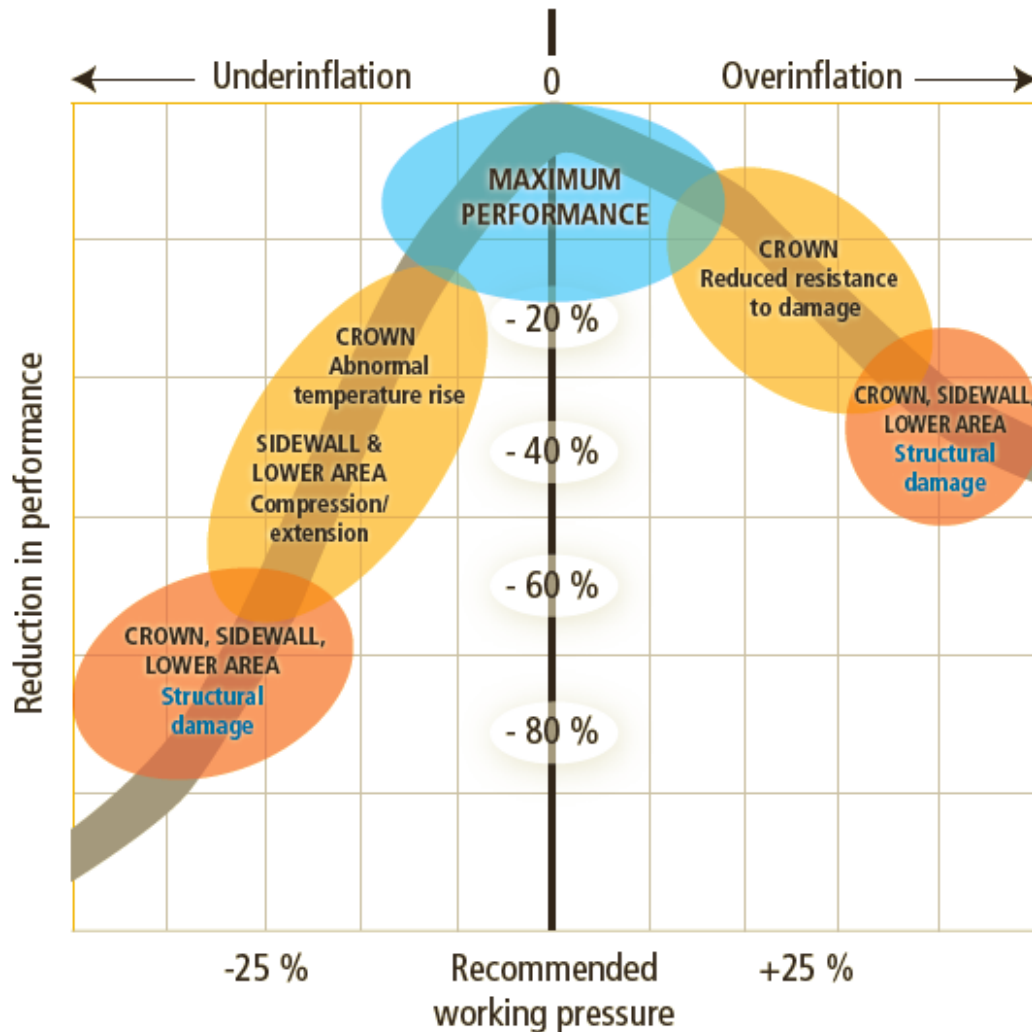
Air compressors, receivers, dryers / conditioners

Purification Equipment Technologies	Contaminants							
	Bulk Condensed Water	Water Vapour	Water Aerosols	Atmospheric Dirt & Solid Particulate	Micro-organisms	Oil Vapour	Liquid Oil & Oil Aerosols	Rust & Pipescale
Water Separator	●							
Coalescing Filter			●	●	●		●	●
Adsorption Filter						●		
Adsorption Dryer		●						
Refrigeration Dryer		●						
Dust Removal Filter				●	●			●
Microbiological Filter				●	●			



ECONOMICS

This chart is for tyres only



Tyres reflect additional and unnecessary operating costs

Fuel

Wheel bearings

Down time for repairs

Driver fatigue

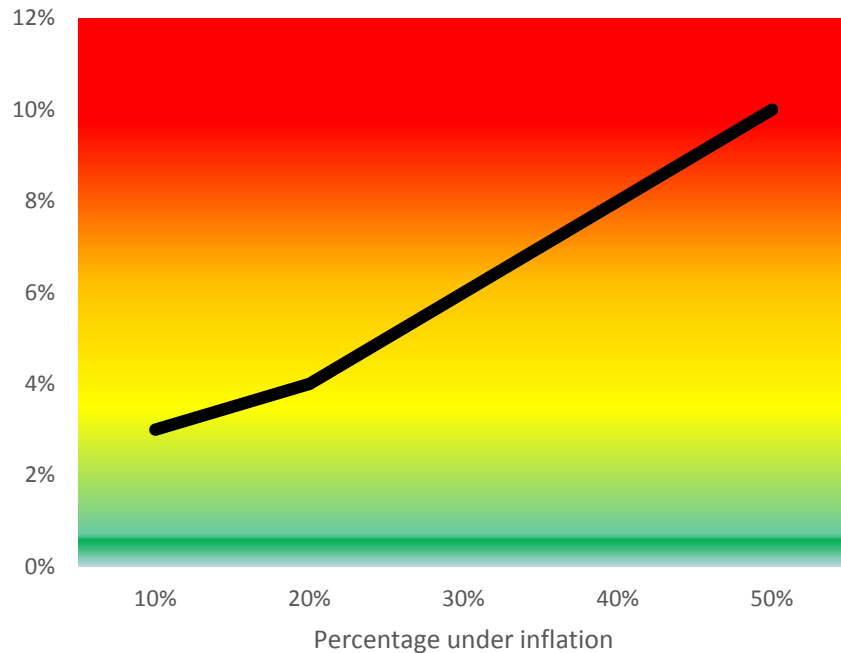
Non availability

These additional costs reduce your bottom line = \$\$\$\$\$ lost!

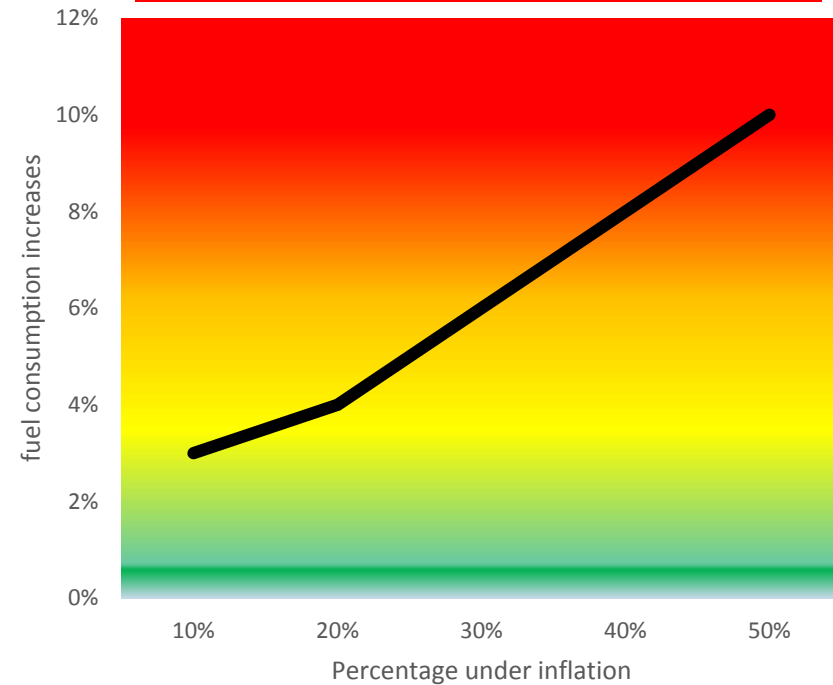


ECONOMICS

TYRE WEAR INCREASES AS TYRE PRESSURE REDUCES



FUEL CONSUMPTION RATE vs REDUCED TYRE PRESSURES





TYRE PERFORMANCE INFO

The S.2 Tire and Wheel Study Group of the American Trucking Associations' Technology and Maintenance Council (TMC) surveyed 435 fleets

Of the 21 respondents, 50% were line haul operations, 41% regional and 29% reported some pickup and delivery. The average number of trailers in the responding fleets was 2,093, indicating some large fleets responded

Average tyre mileage to take-off by position:

Steer position:	117,000 miles	=> 188,000 kms
Drive position:	236,000 miles	=> 379,000 kms
Trailer position:	123,000 miles	= > 198,000 kms

Uptake on tire maintenance technology:

Tyre pressure monitoring: 29% – 50/50 tractor and trailer

FedEx Ground is currently looking for ways to improve the accuracy and frequency of tyre inspections with data-driven solutions through on-board pressure monitoring and telematics.

Retreading worn out casings

is employed as a economic measure to reduce costs and emissions; with accurate pressure monitoring sound casings are available to achieve economic success in this area.





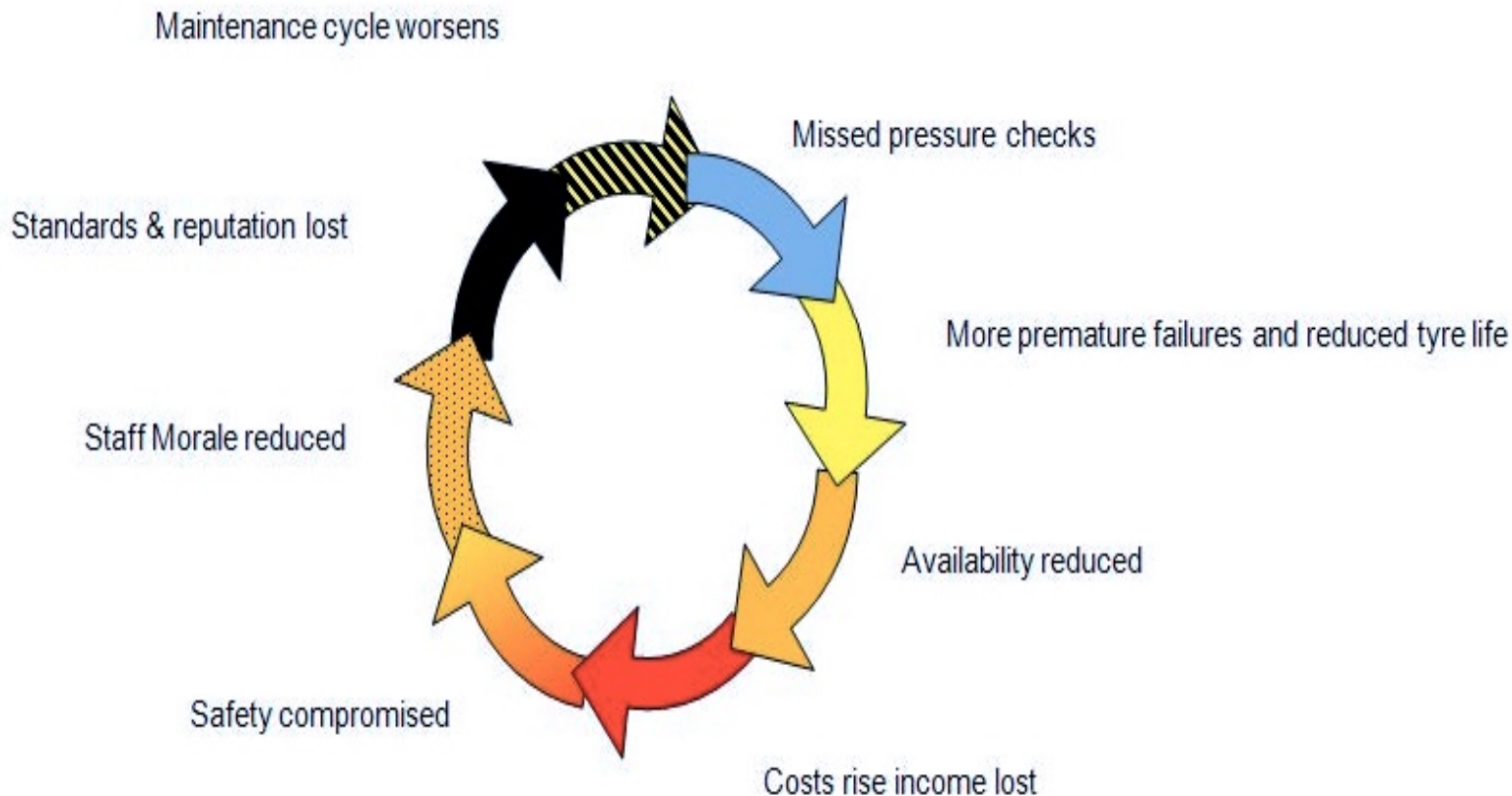
SAFE TYRE OPERATIONS

- If your tyres are under inflated braking distances are increased
- Steering & handling is affected negatively
- If your tyres are overloaded their life is reduced & they may fail catastrophically
- If your tyres are underinflated they are overloaded it's that simple.
- How often do you maintain your tyre pressures?



IT'S NOT ROCKET SCIENCE!

Outcomes from lack of tyre pressure maintenance



We've all laughed at a dog chasing it's own tail, Why ignore tyre pressures when they are easily monitored?



TYRE PRESSURE MONITORING SYSTEMS (TPMS)

TPMS was mandated in the USA from 2008

The EU from 2012

In Korea from 2013

TPMS will be mandated in China from 2014

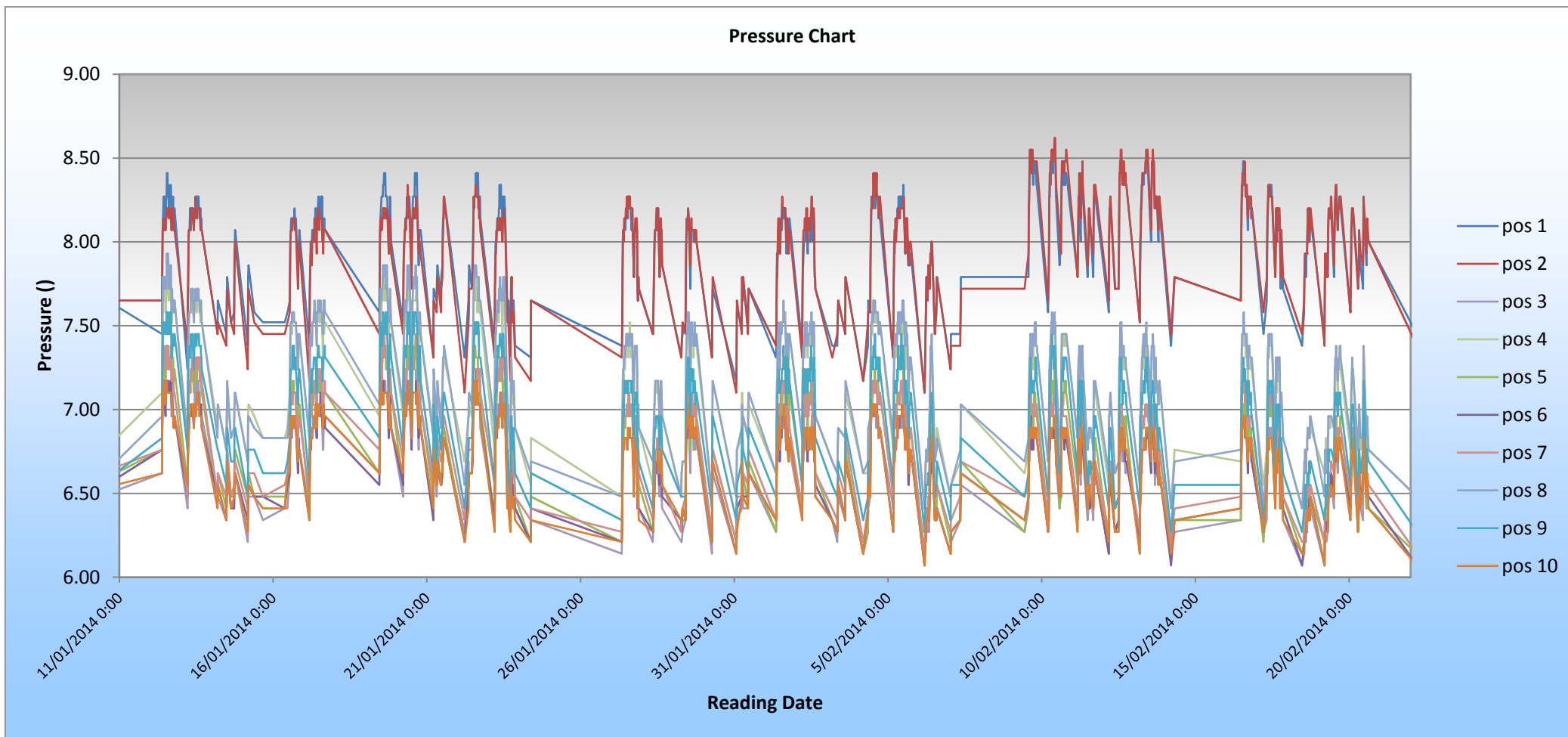
TPMS like ECU, GPS, ABS, ELB's, IAP, will happen
in Australia

TPMS is a value adding tool to assist in
maintaining a safe and profitable operation





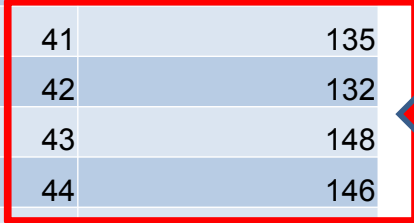
TPMS DATA





TELEMATICS DATA

	Calc Speed	Meas Speed	Trailer ID	Wheel ID	Pressure Tyre
27/06/2013 18:32	89.91kph	89.82kph	165	24	138
27/06/2013 18:32	90.47kph	89.82kph	165	31	139
27/06/2013 18:32	90.20kph	88.90kph	165	32	139
27/06/2013 18:33	90.01kph	89.82kph	165	33	145
27/06/2013 18:33	90.13kph	89.82kph	165	34	133
27/06/2013 18:33	90.13kph	89.82kph	165	41	135
27/06/2013 18:33	89.98kph	88.90kph	165	42	132
27/06/2013 18:33	89.44kph	88.90kph	165	43	148
27/06/2013 18:33	88.14kph	87.04kph	165	44	146
27/06/2013 18:44	63.07kph	68.52kph	165	12	144
27/06/2013 18:44	73.98kph	76.86kph	165	13	140
27/06/2013 18:44	79.94kph	81.49kph	165	21	134
27/06/2013 18:44	84.14kph	85.19kph	165	22	135
27/06/2013 18:44	90.010kph	89.82kph	165	23	123
27/06/2013 18:45	91.62kph	90.75kph	165	24	138
27/06/2013 18:45	100.61kph	89.82kph	165	31	139
27/06/2013 18:45	90.40kph	89.82kph	165	32	141
27/06/2013 18:45	90.40kph	89.82kph	165	33	147
27/06/2013 18:45	90.60kph	89.82kph	165	34	134
27/06/2013 18:45	90.42kph	89.82kph	165	41	135
27/06/2013 18:46	90.51kph	89.82kph	165	42	131
27/06/2013 18:46	90.19kph	89.82kph	165	43	





REAL TIME TPMS PROVIDES

- Fuel
- Tyre life
- Availability
- Equipment life
- Service costs
- Fatigue



1 – 3% +

~ / >10%

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extended as it's
working in harmony

reduced

drivers are relaxed

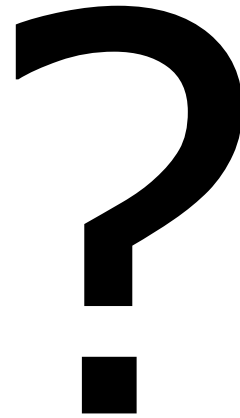


SIMPLE SOLUTION

Monitor, measure, maintain, ensure safety & income



What's the cost of a flat tyre on the side of the road
Especially if that tyre is a steer tyre?





THANK YOU

