

Tyre pressure and fuel efficiency

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Managing tyre pressure is an essential means of achieving fuel efficiency in tractors and other heavy farm machinery.

Fuel savings of 5 to 15 per cent can be made by correctly adjusting tyre pressure to match operating conditions.

The basic rules are:

- use lower tyre pressure in the field to reduce tractive power demand, track depth and soil compaction, and
- use higher tyre pressure on the road to reduce rolling resistance.

Tools to facilitate tyre pressure management include wireless monitors and central tyre inflation systems.

Quick tips

- **Know your recommended pressures.** Research recommended operating pressures for your machine and its tyres (in paddock and on the road).
- **Check tyre pressures regularly.** Make a tyre pressure plan that details when and where to make tyre-pressure changes.
- **Provide training and motivate staff.** Don't assume your staff know how to measure and adjust tyre pressure on

heavy vehicles. Ensure supervisors/operators are aware that staff are required to conduct routine checks.

- **Put tyre-inflation charts and instructions in the cab.** Make it easy for operators to know what to do.
- **'Low in the paddock, high on the road'.** Take the time to change pressures when moving between road and paddock.
- **Install labour-saving technology.** Consider installing a wireless tyre-pressure monitor or central tyre-inflation system.
- **Get the right wheel and tyre set-up.** Ensure you have a wheel and tyre configuration that allows for tyre pressure that is sufficiently low.
- **Use tyre pressure, not ballast, to manage traction.** Once ballast is in the right ball park, adjusting tyre pressure is the most effective means of optimising wheel slip.

Wheel and tyre configuration

Double and triple wheel configurations help spread the load and enable lower tyre

pressure for given gross machinery weights, but limits on track width may rule out such wheel configurations on your farm. Seek configurations of wheels and tyres that give you the most scope to operate at low tyre pressures and that maximise wheel-to-ground contact in the paddock.

Implementing a tyre pressure plan

Identify target tyre pressures

Load and inflation tables are available from tyre manufacturers and online, as are tyre pressure calculators that you can download onto your computer, smartphone or other mobile device.

Combine this research with your knowledge of what works for your particular operations to develop a table that documents target pressures for the main duties of each machine or trailer.

Figure 1: Many farm machines and trailers must be moved between jobs on roads or tracks with hard surfaces. For transfers involving significant distance and speed, increasing tyre pressure to recommended road pressures will both save fuel and extend tyre life



Planning and implementation

Develop a practical implementation plan which may entail discussion with your operators, agreeing on how often to measure and adjust tyre pressures, and agreeing pressures for given situations and for events that routinely trigger pressure changes (posting them as notes in the cab). It is suggested that you monitor results to see if you are getting the expected fuel savings and performance benefits.

The physical task of deflating and inflating tyres in the field can be time-consuming, so your tyre-pressure plan should be practical to implement. The 'when' and 'how' of adjustment is therefore an important consideration.

Figure 2: Tyres that are overinflated will dig deeper, increasing soil compaction, and will provide less effective traction



Adjusting tyre pressure for the paddock

As a starting point, inflate tyres to the lowest recommended pressure for the weight carried per tyre.

- If the axle load changes, adjust the tyre inflation pressures accordingly.
- To determine load per tyre, divide the total axle weight by the number of

tyres per axle, taking into account extra weight on the rear axle due to mounted equipment.

- For optimum performance, set all tyres on a given axle to the same pressure.
- Observe traction outcomes and readjust accordingly.

Check the inflation pressure often, preferably when the tyres are cold, such as in the morning. Gauge readings can be one to three psi higher when the tyres are warm.

Measuring pressure

Make sure your staff members understand how to measure tyre pressure and keep a tyre gauge in each cab. Several options are available to enable operators to monitor tyre pressure easily:

- **Manual tyre gauges** are a cheap and adequate solution for many machines.
- **Wireless tyre pressure monitors** provide remote measurement of tyre pressure to the operator and are relatively inexpensive. They allow the operator to see an in-cab display of all tyre pressures at one time.
- **Central tyre inflation (CTI) systems** provide pressure monitors and allow tyres to be inflated and deflated from the cab using an on-board air compressor.

Case study

The owners of Windella, a mixed cropping/grazing operation between Walgett and Moree NSW, introduced an induction process for new farm workers to emphasise the importance of energy efficiency. This includes training in correct tyre pressures and ballasting, fuel

monitoring and adaptive driving which is expected to reduce consumption of diesel used for the farm's five tractors by 5-10 percent per year.

Further information

Soil compaction

Soil compaction can have an impact over a range of soils and climatic zones and can affect different industries, such as cropping, grazing and forestry. An overview of contributing factors and of the effects of soil compaction is available at:

www.dpi.nsw.gov.au/agriculture/soils/structure/compaction

Improving tractor performance and fuel efficiency

The Michigan University in the USA has a great overview (even if they can't spell tyre)!

https://www.canr.msu.edu/field_crops/Improving%20tractor%20performance%20and%20fuel%20efficiency.pdf

Developments of low-pressure tyres

Recent developments in high-tech tyre technology include low ground pressure systems (improved flexion and very high flexion) for a greater load capacity and reduced soil compaction. These tyres can operate at significantly lower inflation pressures (e.g., 0.8 bar) than the normal tyres (e.g., 1.2 bar). For the same size wheel, low-pressure tyres have also a greater load capacity.

<http://www.tyres4u.com.au/BrandImages/brandselector/alliance/pdfs/AllianceFANDVF.pdf>

Michelin

Michelin's website outlines four main criteria for calculating the right agricultural tyre pressure and includes an agricultural tyre-pressure calculation tool.

https://agricultural.michelinman.com/us/pressure_calculator/default

Goodyear

This major tyre manufacturer's website includes a mobile-friendly tyre-pressure calculator.

www.tirepressurecalculator.com

AIR CTI Australia

Information from an Australian supplier of central tyre-inflation systems.

<https://www.aircti.com/>

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<https://www.aginnovators.org.au/initiatives/energy/information-papers/tyre-pressure-and-fuel-efficiency>.

Please see this factsheet for more information about this topic.

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