The seventh meeting of the Castlemains Climate Change Focus Farm was in conjunction with Redpath Tyres and Michelin, looking at the importance of tyre selection and management.

Key points:
- Selecting the right tyres is crucial to protect the soil, prevent erosion and maximise tractor performance.
- Know the capabilities of the tyres on your tractors by checking the tyre load and speed rating.
- Compaction caused by poor tyre choice can be costly to rectify and reduces efficiency.
- New tyre technologies have the ability to carry more load at the same pressure or carry similar loads at reduced pressure.

Tyre selection

The importance of selecting the right tyres

Farm machinery has increased in size dramatically over the last few decades as farmers are covering larger areas of land and needing the size and power to do so quickly. The correct sized tyres, inflated to the optimum pressure, are essential to protect the soil, prevent erosion, maximise tractor performance, and ensure compliance with legal road requirements.

When choosing tyres for your tractor and trailers, you should aim for maintaining optimum soil condition by spreading the load over a big area with the lowest possible tyre pressure. The goal is to achieve maximum grip and traction to convert horse power into tractive effort, without compacting the soil. Stability of the machine, safety and comfort is also important, whilst also choosing an affordable product. In order to choose the correct tyres you need to know:
- What operations you’ll be doing
- Soil type
- How much power (torque)
- Load required to transmit the power at the wheel
- Speed of operation
- Tractor’s inter-axle ratio
- Road or field work
Understanding tyre sizes

Knowing the tyre capabilities

A typical setup on a 150hp tractor would be 480/70R28 140D on the front and 520/85R38 155A8/155B on the rear. The 480 is the nominal section width or the width from one sidewall to the other, in mm. The 70 relates to the measurement of the sidewall which is 70% of the nominal width of the tyre. The R indicates the tyre is of radial formation and the 28 is the rim diameter in inches. The 140 indicates the maximum load of the tyre in kg and the D indicates the speed rating. The tyre load and speed rating can be found in the manufacturer’s guidance. On the front, each tyre can carry 2,500kg at a maximum speed of 65km/h. On the rear each tyre can carry 3,875kg at 40km/h. The second letter B does indicate the tyre can be used up to 50km/h.

Tyred of compaction?

Tyre demonstration shows the impact of poor tyre choice

As part of the meeting we set up a demonstration to show the impact of selecting the wrong tyres for the job. We compared a flotation tyre on one side of a laden trailer to a super single tyre on the other. The flotation tyre is designed to run at much lower pressures and still be capable of doing road work. The flotation tyre was inflated to 24psi, the super single road tyre was inflated to 70psi, and the unwheeled was a piece of undisturbed soil between the tyre tracks. The tractor was run over an area of stubble ground.
A penetrometer was used to assess the compaction caused by the different tyres. The graph highlights the difference in pressure required to penetrate the soil using a penetrometer from 0-30cm. The soil run over by super single required almost twice the force at 30cm to penetrate the soil compared with the soil run over by the flotation tyre.

As well as a measurable difference in the levels of compaction, the compaction and rutting caused by the super single was visible on the stubble ground, and caused considerable damage on a wetter area of the field which is being managed as fallow, pictured right with Bob Simpson to illustrate the depth of the ruts!

![Figure 1. The depth of compaction caused by super single tyres vs flotation tyres.](image)

Whilst this is an extreme example of how tyre choice and inflation pressures can cause soil compaction, it nevertheless demonstrates the importance of understanding the requirements of your tractor size and power, and the implements it is carrying. The correct sized tyres may be more costly, but ultimately could lead to big savings in fuel as there could be less wheel slippage as power is converted to traction more effectively, less compaction which requires less fuel to rectify, and better soil structure and condition. All of these factors add up to reduce your carbon footprint and increase efficiency.
Optimum tyre pressure
Correct tyre pressure to reduce compaction

Neil Redpath from Redpath Tyres explained how to work out optimum tyre pressure for your specific tyres, and safe working speeds. The correct tyre pressure is worked out using the tyre load index and axle loads. Each tyre manufacturer will have tables for a range of tyre sizes which give different brackets for tyre load and speed. This will give you an optimum inflation pressure.

It is important to get the right tyre for your tractors horse power to be able to inflate the tyre to the optimum pressure. The wrong sized tyres for high horse power might mean there is a need to increase the pressure so it can withstand the hp, but this can result in increased compaction. New tyre technologies, such as increased or very high flexion, have the ability to either carry more load at the same pressure or carry similar loads at reduced pressures. This has the benefit of increasing tyre footprint spreading weight over a bigger area, thus reducing the pressure tyres are imprinting on the soil and minimising compaction risk.

What’s next?
Keep an eye out for the next meeting invite, date and topic to be confirmed. Meeting notes and practical guides are added to the website, and videos and photographs from meetings can be found online and on the facebook page.

There are nine climate change focus farms in Scotland. Keep up to date with their activities at www.farmingforabetterclimate.org

Meetings are free to attend and all farmers are welcome.

For Castlemains, contact farm facilitator Mary-Jane Lawrie on 0131 603 7523 or via email at mary-jane.lawrie@sac.co.uk for more information.

Funded by the Scottish Government as part of its Climate Change Advisory activity