Many issues for press wheel buyers

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Used correctly, press wheels can typically increase emergence by 10% to 25% and improve seedling durability.

Changing the shape or composition of press wheel tyres can make a big difference to the end result, and to get the best from press wheels it is important to have the right tyre for your conditions. If the tyre is wrong, the result will be too.

The importance of tyre choice is illustrated by the experience of a Moree customer who, after running the same machine for about 10 years, decided to have it extended. The engineer used the same press wheel assemblies as on the original machine but fitted different wheels and tyres. On the first morning of seeding the grower got out of the tractor as usual to clean off the build-up of soil across the machine and found that, while the older part of the machine was entirely clogged, the new section wasn't.

Press wheels:

- Increase seed-soil contact
- Maximise moisture retention
- Increase local soil compaction, which restricts insect movement and consequent damage to seeds and seedlings
- Reduce emergence depth by decreasing the distance between the seed and the soil surface
- Improve uniformity of soil coverage across the width of a planting machine
- Close the seed furrow to prevent surface light penetration, reducing the risk of premature sub surface leaf emergence
- Concentrate rain into the seed furrow, promoting faster secondary root development

When choosing a press wheel system, work out what you want to achieve and what will work best in your conditions.

Press wheel performance is strongly influenced by paddock conditions and the wrong decision can prove costly in terms of equipment cost and lost benefits including yield and is advisable to look for a system that can be adapted and if necessary easily modified.

PRESS WHEELS CAN INCREASE EMERGENCE AND IMPROVE MOISTURE RETENTION.

If you buy second-hand equipment set up for conditions in another area, don't expect it to work in your conditions without some alterations.

Working through the following factors will help you come to the right decision about which press wheels best suit your conditions and farming system.

1. Geographical characteristics such as whether your country is hilly or flat and the amount of rock or hard-setting compacted soil.
2. Predominant soil types, their characteristics when dry and wet and how abrasive they are.
3. Average rainfall including the amount of rain usually received during germination and establishment.
4. Crop types, their seed sizes and how sensitive they are to depth and pressure.
5. Seeder type and make and its characteristics including the disc or point type, its depth control, trash handling capabilities, breakout mechanism and pressure and where the seed box is located in the seeding rig.
6. Seeding system and configuration, including row spacing and working speed, the percentage of dry sowing, whether fertiliser is placed with or below the seed, the amount of residue typically on the soil surface.

It can also be helpful to consider trends in farming practices.

For example, many growers are concerned about how press wheels will perform in sticky conditions but an increasing area of crop is being sown dry, so the main consideration should be performance in dry conditions, not on sticky clay.

For those who still wait for rain before seeding the claggy-soil issue will probably dominate, but for growers who usually seed before it rains or usually find themselves chasing deep moisture, suitability for these conditions should be the main consideration.

Working through the characteristics of your soils, machinery and farming system usually enables the tyre and wheel options to be narrowed down to two or three combinations.

The following list of terms might help when discussing press-wheel issues with consultants or potential suppliers.

CENTRE MECHANISM relates to the hub mechanism used to carry the tyre. The most common centre mechanisms are integral hub, HT/Ford/BMW hub, sealed-bearing hub and nylon bush.

DIAMETER is the outer diameter of the tyre and is usually quoted in inches. Diameters range from 10" to 21" and are nominal, not exact. Larger-diameter tyres tend to be more durable than smaller

ones, reduce the wear on components such as bearings and may improve trash flow. They also have better mud-shedding capability in heavy soils, better obstacle clearance and will exert more direct pressure. On the downside they are heavier, so there is more load on hydraulics, frames and assembly components, are more expensive and may have clearance issues on some machines.

Manutec recommends larger-diameter tyres, depending on what will fit on the machine.

WIDTH is measured at the widest part of the tyre. Tyre width ranges from 25 mm to 150 mm and affects how much pressure is applied over the seed or the slot. In split-row or spread-row seeding the width will also determine the coverage of the seeded area. With soft tyres the width influences the amount of flex, with wider tyres generally having more flex, so they collect less soil in sticky conditions.

SHAPE is the profile of the tyre. The most common shapes are flat (narrow, medium, wide, extra wide), wedge (sharp, broad, wide), round and dome.

MATERIAL refers to the chemical composition of the tyre compound, which affects the softness, hardness and durability of the tyre.

TYPE relates to the structure of the tyre, with most tyres solid (hard), semi-solid, semi-pneumatic, pneumatic or high-flex.

The most common press-wheel tyre shapes and their characteristics are:

Broad wedge (760 mm overall width, 25 mm flat tip)

- Available in high-flex, semi-pneumatic, semi-solid and solid
- Available in 13”, 15”, 16” and 18” diameters
- Used extensively in regions where systems and conditions vary
- Good moisture-harvesting properties
- Good depth control in medium to light soils
- Provides a good balance between seed-soil contact and moisture harvest
- Ideal for single, narrow-row seeding
- Good tracking characteristics
- Above-average wear and durability, particularly semi-pneumatic type
- Average to good mud-shedding capability, particularly semi-pneumatic and high-flex configurations
- Good wear and durability, particularly with solid and semi-solid
- High-pressure tyre
- Tends to leave paddocks rough

Wide flat (sometimes referred to as square – 100 mm or 125 mm overall width)

- Available in high-flex, semi-pneumatic and solid
- Available in 13”, 15” and 18”
- 125 mm width available only in 18” semi-pneumatic
- More common in areas with above-average rainfall or sandy soils
- Very good seed-soil contact
- Good depth control in medium to light and sandy soils
- Good scattering of loose soil above pressed seed
- Ideal for spread-row or split seeding
- Good mud-shedding capability (semi-pneumatic)
- Average wear and durability (semi-pneumatic)
- good wear and durability (solid)
- Low-pressure tyre
- Does not handle conditions requiring high pressures well
- Can shoulder out in some conditions
- Leaves paddock smooth
- Good for canola and other small seeds

TYRE SHAPE AND COMPOSITION HAVE A BIG IMPACT ON PRESS WHEEL PERFORMANCE, SO IT IS IMPORTANT TO CHOOSE THE RIGHT TYRE FOR THE CONDITIONS.

Rounded (760 mm or 890 mm overall width)

- Available in semi-pneumatic (760 mm) and solid (890 mm)
- Only 15" diameter
- Used as a mid-way option between wedge and flat profiles
- Properties similar to but less pronounced than wedge or flat profiles
- Medium-pressure tyre
- Semi-pneumatic format handles sticky soils well
- Solid format has very good durability, handles rock well

Wide wedge (100 mm overall width, 40 mm flat tip)

- Available in semi-pneumatic and solid rubber
- Available in 13" and 15"
- Above-average moisture-harvesting properties
- Good depth control in light and sandy soils
- Good all-purpose profile gives a good balance between seed-soil contact and moisture harvest
- Good for spread and split-row seeding where some moisture harvesting is required
- Good tracking characteristics
- Above-average wear and durability
- Low-pressure tyre
- Average to good mud-shedding capability
- Does not handle cloddy soil well
- Will not leave paddocks as rough as the 760 mm wedge
- May shoulder out in heavy soils or behind some knife points
- Good for smaller seeds
- May require ticklers/snake chain to give soil scatter over pressed seed

Narrow wedge (50 mm overall width, 20 mm flat tip)

- Available in semi-pneumatic, semi-solid and solid
- Available in 15" and 18"
- Very good moisture-seeking and moisture-harvesting properties
- Good depth control in heavy soils
- Poor depth control in light soils
- Good seed-soil contact when drilling deep
- Good for cereals and larger seeds
- Ideal for single narrow-row seeding
- Good tracking characteristics
- Semi-pneumatic has average to low wear and durability. Solid has very good durability
- Semi-pneumatic has good mud-shedding capability; the solid does not
- Semi-pneumatic doesn't handle dry seeding very well; the solid does
- High-pressure tyre
- Tends to leave paddocks rough

Medium and narrow flat (sometimes referred to as square) (50 mm and 75 mm overall width)

- Available in semi-pneumatic, semi-solid and solid
- Available in 15" and 18"
- More common in areas of above-average rainfall
- Very good seed-soil contact
- Good depth control in medium to light and sandy soils
- Good scattering of loose soil above pressed seed
- Very good mud-shedding capability. Handles clay very well
- Semi-pneumatic has average to low wear and durability; does not like dry seeding
- Solid has good wear and durability but does not handle the sticky soils well
- Low to medium-pressure tyre
- Does not handle cloddy soil well
- Doesn't leave paddocks rough

Material

The best tyre material for a particular situation will depend mainly on soil stickiness and abrasiveness.

The most common material is a soft, flexible compound that gives good self-cleaning capabilities and reduces the need to use scrapers. However, this compound is not very durable and does not handle stone, wire or sharp sticks well.

Its popularity is driven by grower concerns about sticky conditions, making its self-cleaning capabilities the deciding factor for many buyers. Hard tyres, which are likely to require scrapers, should be used in country with a lot of rock.

The trend for growers to seed at least some of their crop dry creates a dilemma, because a hard tyre is best for dry conditions and a soft semi-pneumatic tyre the best for wet soil conditions.

The options for farmers who sow some crop dry are:

- Hard tyre (with scrapers in heavy wet conditions after rain)
- Soft tyre (wears out quickly in dry conditions)
- Two sets of tyres; hard for dry seeding and soft for after the rain (ideal scenario)
- Semi-solid tyre (trade-off), which is fabricated from the softer material but has more than double the wall thickness of a pneumatic tyre

Semi-solid tyres are used where the press wheel is more for closing than pressing and in highly abrasive soils. They do not perform well in sticky conditions.

The best option for sticky-soil conditions and those farmers who only sow after rain is a very soft high-flex tyre designed for minimum soil build up in clay soils. This tyre should never be used in dry or rough conditions.

Many farmers do not like the idea of two sets of tyres or wheels because of the cost. However, fitting the right tyres for the paddock conditions will produce a better result and reduce future costs and down time.

The average cost of a set of tyres for a 50-tine machine is $2,500 and second set of wheels would cost about $7,000. It takes two to three hours to change a set of tyres and one to two hours to change a set of wheels.

Pressure

Optimum press-wheel pressure depends on soil type, soil moisture level, crop type and time of planting.

Lower pressures (two to 3 kg/cm^2 of tyre face) are generally used in wet conditions and lighter sandier soils, with pressure increased (three to 4 kg/cm^2 of tyre face) for drier planting and in heavier clay soils.

The press wheel must close the planting slot. If the seed is visible in the bottom of the trench the wheel is not doing its job and you need to either increase the pressure, change to a more aggressive tine point, or both. Once the slot is closing

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safety than achieved with some other machines and configurations.

Disc seeders are often operated at fast travel speeds (10 to 18 kph,) which can influence seed placement, with poor seed placement increasing the risk of herbicide damage. In the trials, increasing sowing depth minimised herbicide damage when an NDF disc was used (Figure 1), apparently because of the depth of soil between the herbicide and the germinating seed. Shallow-sown seed is more likely to be closer to herbicide on the soil surface and less rain is required to move soluble chemicals from the surface down to the seed.

Herbicide damage was further reduced by the use of residue managers on the JD90 series and NDF disc seeders used in the trial. The managers cleared a three to four-centimetre band of surface residue and herbicide ahead of the disc opener, limiting the interaction between treated soil and the germinating crop (Figure 2). Where openers were used there was no crop damage observed with Sakura®, which appears to be the safest pre-emergence option for use in wheat sown with discs.

Annual ryegrass control was shown to differ between pre-emergence herbicides following disc incorporation at Halbury and Mallala (Figure 3). Even though most of the ryegrass seedbank was near or on the soil surface, control with trifluralin was poor (<40%) at both sites. The low level of ryegrass control provided by trifluralin at these sites was most likely a result of poor incorporation, but the site's long history of trifluralin use means herbicide resistance cannot be ruled out.

The longer residual control (≥70%) for Boxer Gold® and Sakura® is most likely related to their longer persistence in soil than trifluralin.

Boxer Gold® and Sakura® appear better suited than trifluralin for use in disc systems but neither herbicide is registered for use with disc seeders and both cost considerably more than trifluralin.

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A layer of loose soil on top of the press wheel track will help preserve moisture and prevent the tyre track from setting hard. Some soils will flow naturally into the press-wheel furrow. Others will require the use of 'ticklers' or lengths of chain.

Always check your calculated press wheel pressure in the paddock at the intended working depth. This can be done with a spring scale or a set of bathroom scales. Use the lightest pressure that will close the slot, particularly for sensitive seeds. This will benefit the crop and reduce the load on tyres, bearings and other components.

Use pressures at the lower end of the recommended range on poorly-structured soils with hard-setting characteristics. In these conditions too much consolidation of soil over the seed may cause surface crusting and impede emergence.

Use higher pressures when:

- Zero-till planting into sticky clay soils
- Soil moisture is marginal and planting depth is increased
- High soil-insect populations are present