



Treading a new path

Tyres

Returning to agricultural tyre manufacturing has seen Continental design its new products from the ground up by introducing new technologies and improving efficiencies. *CPM* finds out why tyres are back in focus.

By Rob Jones

Continental bounced back onto the agricultural scene in 2017 and now boasts multiple tractor tyre lines including specifically designed harvester and telehandler options. UK sales manager Tom Godwin explains how and why this renaissance is bringing new tyre technology to farmers.

“Tyres are the only part of a machine that contacts the ground. Obvious, but it makes the way the tyres perform an extremely important part of agricultural machinery efficiency. The right tyres, set to optimum pressure for load and application, can help improve fuel efficiency, save time and provide safety and stability to operators,” says Tom.

Why the return to making agricultural tyres? “Continental built a new manufacturing plant in Lousado, Portugal, at a cost of more than €50M, solely for the

production of agricultural tyres. This investment alone should go some way to explaining the importance of tyre technology to agricultural progress,” he says.

Various sources suggest the agricultural tyre market is worth around \$7Bn dollars globally. *Tyres and Accessories* publisher Tyrepress ranks Continental as the fourth largest tyre producer in the world. This, suggests Tom, is the basis from which the decision was made to return to agricultural tyre production.

Knowledge sharing

“Continental has an agricultural research and development facility at Lousado that works with our team in Hanover to develop and test new tyres for agricultural machinery. The team shares knowledge with others at Continental who design and manufacture truck, earthmover, and other specialist tyres. Together, they’re pushing the boundaries of what tyres can provide in a wide range of machinery sectors,” he says.

Tyres fulfil a great many functions: a tractor tyre must be capable of carrying the weight of the tractor and any additional load such as ballast and implements. However, Tom is keen to emphasise that the tyre is the vessel, and it’s the air within it that’s doing most of the work.

“Consider the difference between truck and tractor tyres – the size, shape, pressure and load bearing capacities are almost at opposites. Trucks have to carry heavy loads on relatively small tyres set to a

high inflation to improve rolling resistance on the road. A tractor has to carry heavy loads on soft ground, so much more air is required to prevent it sinking,” he says.

The upshot of the additional air which tractors rely on is the calculation of the optimum pressure for load and application. Too high and the tractor sinks and digs into the soil, causing compaction. Too low and the tyre footprint becomes hard to drive forward and can be unstable, explains Tom.

“Tractor tyres have to carry load while providing operator comfort in a way that improves how the tractor drives and performs on a variety of ground conditions. This includes steering, grip, stability and braking. It’s a lot to ask while also

demanding that the tyre performs for thousands of hours and delivers good fuel economy and power transfer during this time,” he adds.

So what’s Continental done differently? If there was a part of the tyre development process which could potentially be improved, the

Continental team looked into it, says Tom. “With the benefit of a blank canvas to

build a new production line, almost everything was up for review to help make the new generation of tyres more efficient.

“We’ve developed an entirely new single wire bead core – this is the part of the tyre that holds it to the rim. Historically, tractor tyres have been manufactured with up to 10 wire beads, joined together to make one bead core. These 10 joins present weak spots which is why we’ve designed a bead with only one join,” he says.

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Rubber is a relatively small component of a tractor tyre and Tom suggests the way the tyre is formed, and other materials used, are as important to the way the tyre performs during its lifespan.

“When designing our new production line, we chose to change the moulds that tractor tyres are made in. Typically, a tyre can be made of around five sections which are fused together, but our tyres are made out of two because we’ve been able to redesign the production line and make larger moulds. This makes the tyres stronger and improves the overall roundness of the tyre,” he says.

In the round

And while it might seem strange to want to improve roundness when all tyres are circular, Tom points out that some tyres are actually rounder than others. “Think about flat spots that occur when tyres cool in a stationary position. When a tractor is hauling trailers all day in hot harvest conditions this’ll cause the tyres to heat up and become softer. The heavy weight of the tractor when stationary then forces the tyre to become flatter in one section, resulting in flat spots,” he says.

To mitigate this, Continental has coined yet more new manufacturing methods and even developed a unique material which sits underneath the tread layer of the tyre, explains Tom. “It’s called N.flex and is a patented nylon which provides greater flexibility and helps the tyre to resist damage, while also helping it to return to its round shape faster. This means that when flat spots occur due to the machine being parked overnight, the operator will see the effect of the flat spot disappear faster as the tyre recovers to its round shape.”

So why go to the trouble of making so many changes? “Modern agricultural machinery is more powerful and to realise the benefit of that power, the machine has to be able to transfer it through the tyres to the ground, be this fuel efficiency or the effective transmission of engine power.

Soil compaction has become something of a buzz term in recent years with more farmers focussed on soil health. Tom suggests that Continental has been at the forefront of providing the tyre technology required to help run heavy machinery in a way that’s less detrimental.

“Pressures are a function of weight, load and surface area. The load of a 60kg woman in high heels exerts 1.06kg/cm² when standing still, and this increases to 240kg as she walks, because the majority of her weight goes through

the heel of her shoe which has a tiny surface area. A 5500kg tractor, with its tyres set to low pressures, can travel over the ground exerting just 1.4kg/cm² because the air in the tyres is spread over a wide footprint,” he explains.

Continental has been running its ‘Stamp Out Soil Compaction’ campaign for four years in a bid to help operators better understand the fundamentals of tyre design and what tyres can do to improve soil health, says Tom.

“When we launched our VF (very high flexion) tyres we wanted to demonstrate the efficiencies operators could gain from having the technology. In essence, VF provides the ability to carry 40% more load at the same pressure as a standard tyre, or for the machine to run at 40% less pressure than a standard tyre when carrying the same load.”

Continental has brought out VF technology for tractors and harvester tyres and has a growing range which caters for rim sizes from 76-127cm (30-50 inches).

“VF isn’t necessary for all but is of great benefit to some machines. Take a 300-400hp tractor with a 6-8t disc cultivator, it can run VF TractorMaster 650/60R38 front and 750/70R44 rear tyres and reduce the pressure to below 10psi while carrying that load and still transferring all the power from the tractor to drive it forward with minimal slip,” he says.

But tyres only make up part of what Continental does, meaning it’s able to bring other aspects of its portfolio to help improve agricultural tyre performance. “Continental is one of the leading suppliers of technology to the automotive industry, specialising in brake systems, instruments, systems and components for powertrains and chassis, vehicle electronics, infotainment solutions,



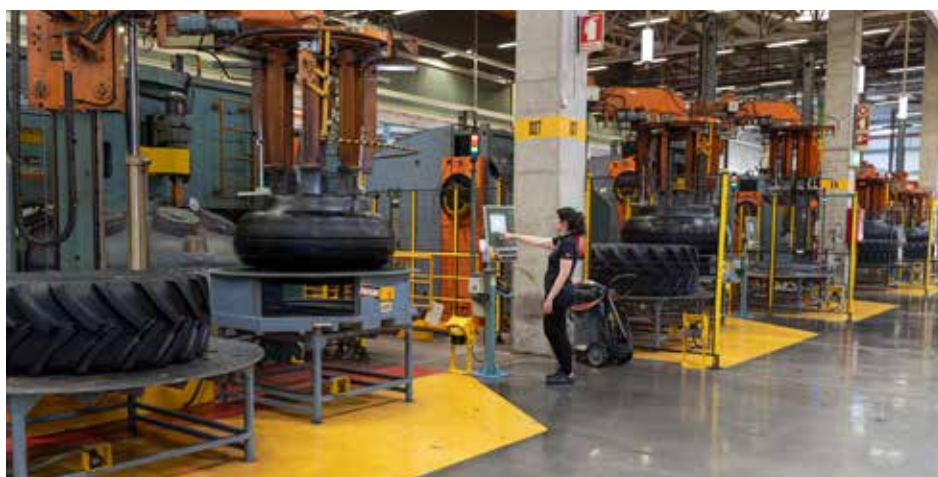
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and technical elastomers,” he says.

This means Continental has brought technology from cars and trucks to agriculture, including pressure sensors that provide continual readings to the operator when working.

“ContiConnect Lite is the latest example of our onboard tyre sensing technology. Sensors in the tyre communicate pressure and heat build-up to the operator’s phone or a terminal in the cab via Bluetooth. When combined with a central tyre inflation system (CTIS), this provides the operator with the information required to optimise tyre pressure on the move and prevent unnecessary wear, fuel use and potential tyre failure,” he says.

This technology is also relatively cheap – at £200 for four sensors it’s a tiny supplement to pay considering the cost of four new tractor tyres, highlights Tom. “Continental has also developed a free mobile app that calculates the optimum pressure for load of any Continental tyre manufactured since 2017.” ■



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