

WHAT ABOUT THOSE TRELLEBORG TIRES?



Introduction

Are those big Trelleborg tires that you have been hearing about an advance in agricultural traction that you should be considering? Maybe they are and maybe they are not. Tests at the Alberta Farm Machinery Research Centre (AFMRC) suggest that potential customers need to carefully consider what they expect to gain from Trelleborg tires before they adopt them.

Trelleborg tractor tires showed up in Canada in 1994. They were advertised as torque transmitting flotation tires that have the advantages of bias ply sidewalls and radial ply footprints. Since their introduction they have been aggressively marketed as replacements for radial tires. The company has claimed that the tires have higher efficiency, lower compaction, and none of the power hop concerns that radials have. Trelleborks are available in sizes that start around the same size as the largest currently available radials and go up from there.

The Tests

In 1998, AFMRC ran field tests to evaluate the Trelleborg claims. We compared a set of Trelleborg 750/65-38 dual tires to three sets of radial tires, 710/70 R38 duals, 20.8 R42 duals and 20.8 R42 triples. Several companies including Trelleborg, Goodyear, Firestone, John Deere, New Holland, Flexi-coil and AFMRC cooperated in the project. The tire sets were tested across a wide range of soil conditions, power loads, weights, speeds and pull levels. Power delivery efficiency, pulling ability, loading capability, power hop characteristics, flotation, ride quality and cost were evaluated. Two complete sets of tests were run. The first set was done in the spring during typical wet conditions where traction and flotation were concerns. The second set was run late in the summer during typical dry conditions where power hop could be a problem. Durability issues with the various tires were not addressed in the tests.

The Results

So how did the Trelleborgs stack up? The short answer is that they acted like the bias ply tires that they are. On the positive side, they showed no problems with power hop and could carry weights and transmit torques similar to radial tires. On the negative side, they operated at higher inflation pressures than some of the radials, pulled less for the same ballasted weights and were a few percent less efficient. They also cost substantially more than radials or conventional bias ply tires.

As far as a score card on individual items, consider the following:

Power Delivery Efficiency

A Plus for Radials

- Power delivery efficiency is the percent of the power from the engine that is made available at the drawbar. Depending on soil conditions and setups, it ranged from 55% to 75%. It was lower for the Trelleborgs than for the radials. The Trelleborg maximum efficiency ranged from 88% of the radial maximum efficiency at the worst to 102% at the best. The average for the Trelleborgs over all the tests and conditions was 96% of the average for the radials. As well, the Trelleborgs typically reached their peak efficiency at a lower pull than did the radials.

Figure 1 shows a comparison of power delivery efficiency across a range of pull for Trelleborgs and a set of 20.8 R42 radial triples.

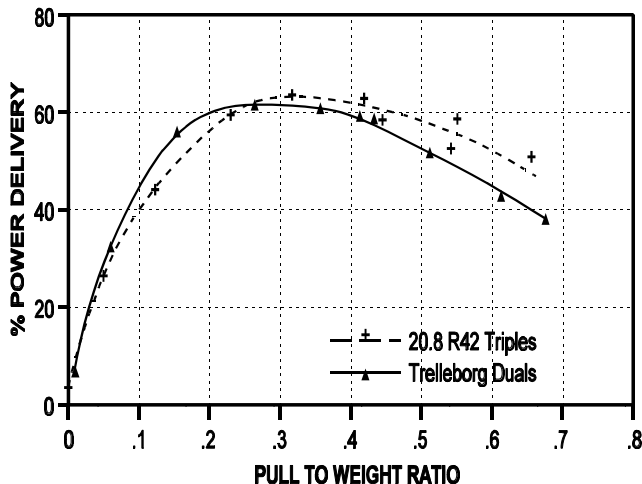


Figure 1.

Pulling Ability

A Plus for the Radials

- Pulling ability is the ability to generate horizontal force at the drawbar. As pull increases, the percent slip, or the amount of lost motion between the tire and the ground also increases. At the same percent slip Trelleborgs pulled less than radial tires. In one example, where the radials reached a pull-to-weight ratio of .4 at 10% slip, the Trelleborgs were only at .35 and did not reach .4 till 15% slip. Figure 2 shows a comparison of pull-to-weight across the slip curve for the same test shown in Figure 1.

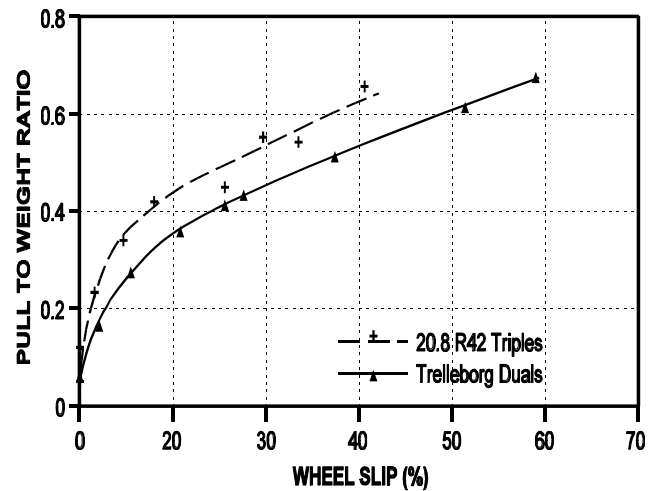


Figure 2.

Loading Capability

A Slight Plus for Radials

- Loading capability is the ability of a tire to support weight and transmit torque. As the maximum loaded weight and torque increases, tire inflation pressures must be increased to maintain an optimum or at least acceptable tire shape. To maintain their correct sidewall profile and integrity at the same weight and torques, Trelleborgs needed tire inflation pressures at least equal to and sometimes over 50% higher than similar radials. Depending on the soil conditions, the higher inflation pressures could result in greater soil compaction.

Power Hop

A Plus for Trelleborgs

- Power hop is a resonant fore-aft bouncing or porpoising that can occur in a tractor under load. Depending on ground condition, tractor speed and tractor load, the severity can vary from a minor annoyance to a show stopping problem. Power hop rarely occurred with the Trelleborgs, probably because of their stiffer sidewalls, but it was often noticeable and sometimes a problem with the radials. Radial tire inflation pressures sometimes had to be adjusted upward to control power hop.

Flotation

Equal for Either Tire Type

- Flotation is the ability to move through and over ground without getting stuck. In wet ground the flotation was the same for the Trelleborgs and the radials of similar size and footprint, the 710/70 R38 duals. The footprint area seemed to be the key here. The larger footprint 20.8 R42 triples showed better flotation than the Trelleborgs and the smaller footprint 20.8 R42 duals were not as good. In dry ground there were no measureable differences in flotation between any of the tires.

Ride Quality

A Slight Plus for Trelleborgs

- Ride quality is the motion and acceleration experienced in the tractor cab. The ride with the

Trelleborgs was subjectively judged as slightly better than the ride with the radials. While there were no apparent differences in the measured vertical accelerations produced with the different tire sets, the stiffer sidewalls of the Trelleborgs seemed to reduce the side-to-side motion of the tractor.

Cost

A Major Plus for Radials

- The Trelleborgs cost significantly more than the radials. In Canadian dollars delivered to Lethbridge, unmounted and excluding rims, the Trelleborgs were some 60% to 140% higher than the radials used in the tests.

Conclusion

What does all this mean for producers? While Trelleborgs are one more traction option, they have both pluses and minuses to consider. Potential buyers will need to weigh the positives of better power hop control and calmer ride against the negatives of higher ground pressure and lower efficiency to decide if the tires are worth the additional cost.

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