
MEASURING AND CORRECTING LEAD/LAG

MAXIMUM TIRE PERFORMANCE IN THE FIELD

- Lead/Lag – sometimes referred to as overspeed/underspeed – is a condition found in mechanical front-wheel-drive tractors which can shorten the life of the front tires AND cause wear and tear on the tractor's transfer case.
- Lead/Lag refers to the relationship between the speed of the front wheels and the speed of the rear wheels. If the front wheels' speed is faster than the back wheels' speed, we say that the tractor has a lead condition. If the front wheels' speed is slower than the back wheels' speed, the tractor has a lag condition. And if the front and rear wheels move at the same speed, the tractor would have zero lead/lag. But since front and rear tires are always different sizes, there will always be some amount of lead or lag.
- The desired amount of lead is 2 percent, which means the front wheels are 2 percent faster than the rear wheels. Anywhere from 0 to 5 percent lead is considered acceptable. But no amount of lag is acceptable. A lag condition puts excessive strain on the tractor's transfer case, and it causes the front tires to wear out more quickly than they would under normal operating conditions.

MEASURING THE AMOUNT OF LEAD/LAG ON A MECHANICAL FRONT-WHEEL-DRIVE TRACTOR

Testing for lead/lag is a four-step process that requires three people: one to drive the tractor, one to count the revolutions of the rear wheel, and one to count the revolutions of the front wheel.

1. Mark the tires. Using a piece of chalk, mark both the front and rear tires on one side of the tractor. Draw one line on the side of the rear tire, and 10 evenly spaced lines on the side of the front tire.
2. Find a long, straight piece of ground with firm soil on which to drive the tractor and begin conducting the test. Start with the chalk line on the rear tire pointing straight down. With front wheels engaged, drive the tractor forward. Using the chalk line as a guide, have one person count the number of revolutions of the rear tire and another person count the number of revolutions of the front tire. When the rear tire has made exactly 10 revolutions, stop the tractor and write down the number of revolutions the front tire made, to the nearest tenth of a revolution. To ensure an accurate reading, repeat the procedure at least one more time.
3. With the front wheels in neutral (disengaged), repeat the process. After the rear tire has made 10 revolutions, stop the tractor and write down the number of revolutions the front tire made, to the nearest tenth of a revolution. Again, it's a good idea to repeat the procedure at least once to ensure your reading is accurate. When you have accurate readings with and without the front wheels engaged, you're ready to calculate the percentage of lead or lag.
4. Divide the number of revolutions of the front tire with the front wheels engaged by the number of revolutions of the front tire with the front wheels in neutral, and then subtract one. If the resulting number is greater than zero – a positive number – the tractor has a lead condition. If the resulting number is less than zero – a negative number – the tractor has a lag condition.

Here are two examples. In the first example, suppose the number of revolutions of the front tire engaged was 14.3, and the number of revolutions of the front tire in neutral was 13.8. Dividing 14.3 by 13.8, you get 1.036. Subtract one from 1.036, and you get a positive .04. This means the tractor has 4 percent lead. In the second example, let's say the number of revolutions of the front tire engaged was 13.3, and the number of revolutions of the front tire in neutral was 13.8. Dividing 13.3 by 13.8, you get .96. Subtract one from .96, and you get a negative .04. This means the tractor has about a 4 percent lag.

Referring back to our acceptable and unacceptable amounts of lead and lag, you can see that the 4 percent lead would fall into the acceptable range of 0 to 5 percent, but the 4 percent lag is unacceptable and should be corrected.

CORRECTING LEAD/LAG

To correct lead or lag, change to front tires with a different diameter. If you have a lead condition of more than 5 percent, you would change to a front tire with a smaller diameter. If you have a lag condition, you'd change to a front tire with a larger diameter. If you have a tractor with 6 percent lead, use a front that's 4 percent smaller. If you have 6 percent lag, use a front that's 8 percent larger.

A final note. The wear and tear on the front tires and the tractor's transfer case as the result of lead/lag is increased during on-road travel. That's why it's important to always have the front wheels in neutral when the tractor is driven on-road.