

TRIKE STEERING GEOMETRY - Rake & Trail

Although there are many kits on the market that change trike steering geometry, the affect of these kits on trike handling characteristics is often not fully understood.

Rake is the angle measured between the steering axis and vertical. The steering axis is the line about which the steering system turns. Although the angle of the fork tubes from vertical is often the same as the rake angle, they are not always the same.

Trail is the distance measured from where the steering axis meets the ground to where a vertical line drawn though the front axle meets the ground. It can be thought of as the distance that the front wheel "trails" the steering axis.

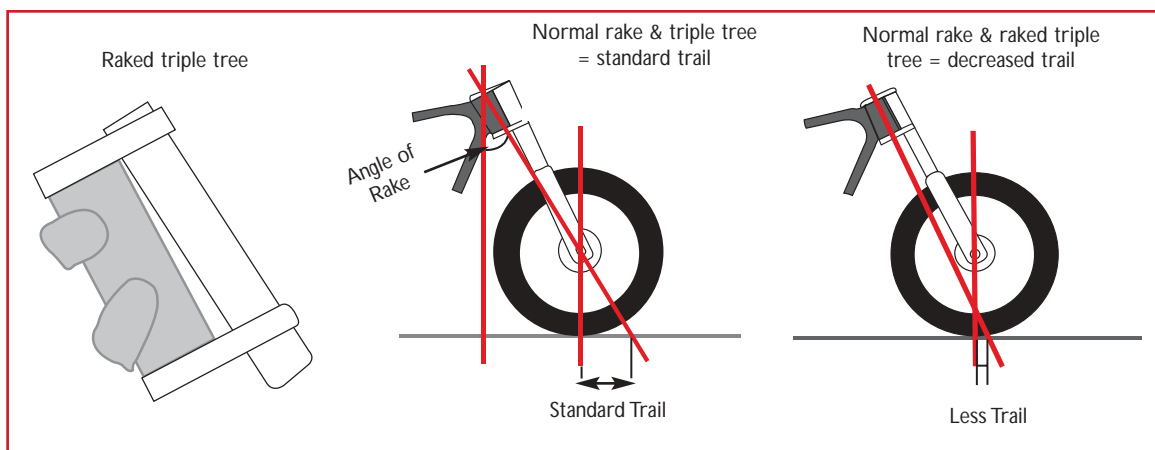
The effects that rake and trail have on steering performance can best be explained using a shopping cart front wheel as an example. The front wheel of a shopping cart is a castor that has a vertical steering axis that is in front of the wheel. The vertical steering axis results in zero rake, and having the pivot in front of the wheel results in a significant amount of trail. This results in the front wheel tracking directly behind the pivot regardless of the direction the cart is pushed. If the vertical pivot axis were directly above the wheel axle, the wheel would not track directly behind the pivot.

In this case both the trail and the rake would be zero resulting in a wheel that has as much possibility of turning sideways as it does going straight. This is a very unstable condition for both a shopping cart and a motorcycle.

Motorcycles and trikes both use a certain amount of rake and trail to ensure proper handling and steering response. In general, more rake provides greater straight-line stability, less rake makes the bike more responsive. This is why the forks on a sport-orientated motorcycle are more vertical than those on a cruiser or touring motorcycle. In short, smaller rake values result in quicker steering, while larger rake values result in slower steering.

Installation of a Lehman Trikes Triple Tree kit improves the trike riding experience by reducing the steering effort required to turn the trike, while making the steering more responsive. The triple tree kit modifies the fork tube angle moving the front wheel further out in front of the trike, reducing the trail.

Lehman Trikes has experimented with a variety of different triple tree angles and has determined the optimum angle for both the Honda Gold Wing and Harley-Davidson Touring models. The angle chosen reduces the steering effort and improves steering response while maintaining the stability required at higher speeds.



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