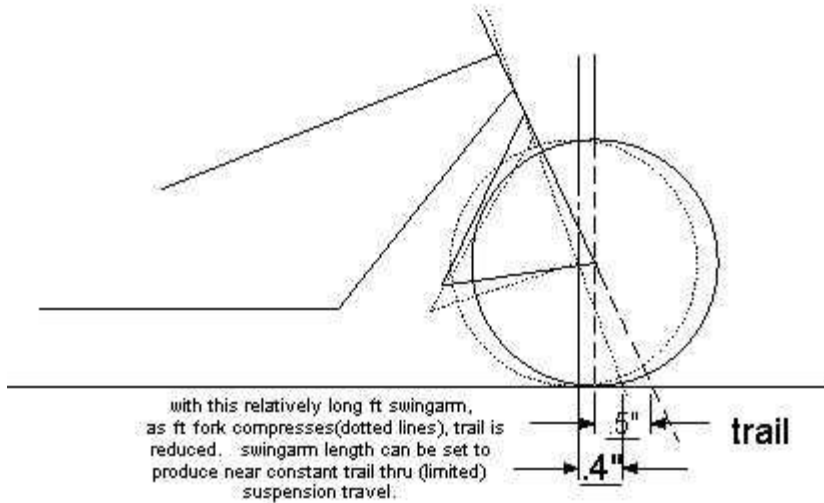


Rake & Trail (solo bikes) - Pete Talabach



There appears to be considerable confusion concerning the exact nature of the terms "rake" and "trail" so in keeping with the chaotic nature of the USCRA I have decided to muddy the waters even further by adding my two cents worth. I will begin by trying to define the terms rake and trail and describe a few things the home chassis tuner can do to affect them and what to expect as a result.

Rake, quite simply, is the angle that the steering axis makes with the vertical (or horizontal if you choose). On most vintage bikes and sidecars the steering axis is a centerline drawn through the center of the steering head bearings. Most vintage bikes have rake angles in the range of 26 to 28 degrees from the vertical. Trail is a little harder to visualize. If you continue the centerline that is the steering axis down until it intersects the ground that intersection describes one end of your trail measurement. Dropping a vertical line through the front axle center to the ground will generate the other end. The distance between these two points is the trail. If the axle center trails the steering axis the trail is positive if the axle center leads the trail is negative.

Positive trail helps make the steering self-center. If you have trouble seeing it think of a shopping cart caster wheel, the steering axis is the caster pivot (zero degrees of rake) it is not hard to see that the axle center is stable trailing the pivot when the cart is pushed forward. A motorcycle has positive rake, as well, which up to approximately 45 degrees uses the weight of the bike to orient the axle center in a trailing position to the steering axis. This eliminates the need to push the motorcycle forward to effect that orientation, as in the caster wheel. Most vintage bikes have trail in the range of three to four and one half inches. Most street bikes are set up with fairly slow heavy steering and a strong rearward weight bias. To quicken steering reducing trail is often beneficial although it also reduces front-end feedback and tire feel so the order of the day is a little at a time! Reducing rake lightens steering but can also encourage wobbling (think shopping cart, zero rake). The only practical method of reducing rake angle open to the home suspension tuner working on vintage bikes is to change the attitude of the frame by using longer shocks (careful of chainlines and swingarm angles) and shortening the forks, usually by sliding the tubes up. ...This method has the added benefit of shifting weight to the front wheel. Another word of caution though, a little at a time. I never move fork tubes more than 5 mm at a time and usually only 1 or 2.

Changing the frame attitude to reduce the rake also reduces the trail but there are a number of ways to reduce trail without affecting rake. Probably the easiest of these is to reduce the diameter of the front wheel. Alternatively, a leading axle fork or triple clamps with more offset will also reduce trail. It is important to bear in mind though that rake and trail numbers that are stable in a modern bike with a 6061 aluminum spar frame and 43mm inverted forks will be deadly in a vintage bike with 35mm or smaller forks and garden hose for frame tubes.

Ride fast and take chances; Pete Talabach