

# Trail Braking: On the track to win, on the street to survive

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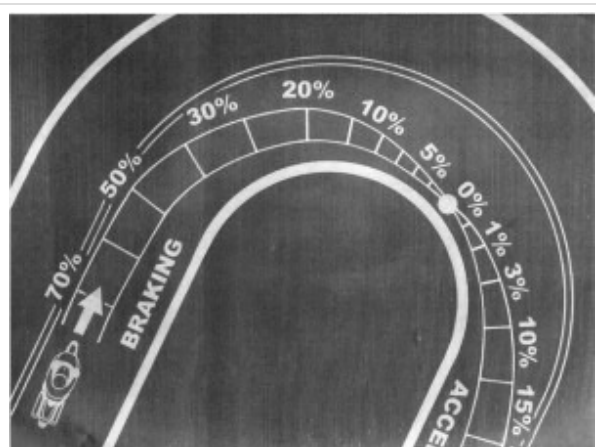
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Many “riding experts” feel trail braking is an advanced technique that beginning riders shouldn’t worry about. I don’t agree. It’s the new, low-mileage riders that are crashing the most, and the main reason they crash is due to too much speed at the corner entrance. Or as I put it, a lack of control at the corner entrance; the brakes are a control, and riders that crash rush into the corner without this control on. So wherever you are in

your riding career, study the following column. Keep it with you for the next few weeks and review it before and after rides. Riding improvement happens in your mind when the bike is sitting still and I encourage you to work hard at your riding because mistakes can be catastrophic. Riding well is difficult, riding poorly is easy and painful.

Trail braking will soon reveal itself as the secret to outright speed on the racetrack, but more importantly, the secret to consistent street riding at any pace, on any bike. A final point: an expert rider’s touch on the front-brake lever is much, much finer and lighter than you realize.

How can the fastest roadracers win races? If they’re going faster than everyone else, shouldn’t they crash more frequently? The Ben Spies of our sport set track records, yet collect championships by finishing races. Lesser riders try to match the champion’s



Trail Braking Diagram

pace, but crash trying. Amateur racers come to the same track and crash while pushing to get within six seconds of the champion's lap time. How can this be?

The confused "safety experts" in this country would have everyone believe that speed and safety are mutually exclusive, but racing tells us a completely different story. In racing, we find the fastest riders are often the least likely to hit the ground. Much of this can be explained by unique natural abilities such as eyesight and balance, or put down to a superior machine. But there is one aspect of their riding that will help every street and track rider in the world:

The champions realize that every corner has a slow point.

It doesn't matter how long they dirttracked, who their daddy is, how old they are, what they eat or how they train...the fast guys know that each corner has a point where the bike must be going a certain speed. Arrive at this particular point with too much speed and the bike runs wide or crashes. Arrive with too little speed and you're gonna get beat. The best riders have the ability to arrive at a corner's slowest point closer to the precise speed the chassis can handle. This ability makes them faster than the rider who over-slows his/her bike at the corner entrance, and more consistent than the rider who carries too much speed into the corner.

And this ability is called trail braking. You need to learn it...on the track to win, on the street to survive and fully enjoy this sport.

The term trail braking refers to the practice of trailing some front-brake pressure into the corner. Or you can think of trailing off the brakes as you apply lean angle. There are two extremely important reasons to trail your brakes into the corner, but before we get to that, understand that the majority of your braking should be done before you tip your bike into the corner. Don't get confused and believe that you are going to add brake pressure as you add lean angle. Just the opposite: you want to give away brake pressure as you add lean angle because your front tire can only handle so much combined braking and lean angle. I explain it with a 100-point chart in my book *Sport Riding Techniques*, writing about a front tire that has 100 total points of traction divisible between braking and cornering. As we add lean-angle points, we give away braking points. I've heard of riders believing that trail braking means running into the corner and then going to the brakes. There are some corners with that type of layout, but most corners require brake application well before turn-in. I think the point will become clear as we delve into why we want to trail brake.

We want to trail brake to control our speed closer to the slowest point of the corner. The closer we get to that point, the easier it is to judge whether we're going too fast or too slow. If your style is to let go of the brakes before turning into the corner, understand

that you're giving up on your best speed control (the front brake) and hoping that your pre-turn-in braking was sufficient to get your speed correct at the slowest point in the corner. If you get in too slow, this is no big deal. The problem comes when the rider's upright braking doesn't shed the required speed and suddenly the rider is relying on lean angle to make it through the surprisingly tight turn. Or to get under the gravel patch. Or to the right of the Chevy pickup halfway in his/her lane.

We don't crash on perfect days with perfect pavement and perfect tires. We crash when something unexpected crops up. The gravel, the truck in your lane, the water across the road mid-corner. If you've entered the corner with no brakes, then you've basically reduced your options to attempting to reapply the brakes when you see the unexpected surprise, adding lean angle, or standing the bike up and running off the road. You need to make a habit of turning into corners with just a little brake pressure because the unexpected is much easier to deal with if your brake pads are already squeezing your discs. You will be in control of your speed and as your speed drops, your bike will be able to carve a tighter radius at the same lean angle.

If you're sitting there thinking, "This guy doesn't know what he's talking about, my bike stands up when I grab the brakes mid-corner," I'd have to say you're right. Abrupt braking midcorner will collapse the fork and make the bike stand up. Remember, trail braking is a light touch on the brakes, not a grab. Think of trail braking as fine-tuning your entrance speed. The big chunks of speed are knocked off while straight-line braking.

Makes sense, doesn't it? This sport should make sense to you. If someone tells you something that doesn't make sense, ask questions. If it still doesn't make sense, quit listening to them. In this case, I'm telling you it's easier to judge your speed the closer you get to the slowest point in the corner. Your best speed-setting device is your front brake, so use it as you turn into the corner. All corners? No, don't make this math. Corners differ and your techniques must differ to deal with them. But the majority of corners have their slowest point somewhere after the turn-in. Find that point and trail the brakes closer to it.

The second reason you need to trail brake is because you can actually improve your bike's steering geometry, helping it turn better. A slightly collapsed front fork tightens the bike's rake and trail numbers and allows it to turn in less time and distance. Tighter steering geometry is one reason a sport bike turns better than a cruiser. Rather than let go of the front brake before the turn-in, keep a bit of pressure on and you'll immediately feel the difference.

Let's again study the rider who gets all his/her braking done before the turn-in. As the

front brake is released the fork springs rebound, putting the bike in the worst geometry to steer. As this rider works within this technique, he/she will attempt to turn the bike quicker and quicker, trying to make up for the extended steering geometry with more and more aggressive steering inputs. The faster they ride, the wider the bike wants to run through the corners, so the harder they'll try to steer. This rider will be forced to use more and more lean angle in an effort to "scrub off" speed with the front tire. Aggressive steering inputs and lots of lean angle...a recipe for disaster.

If we could convince this rider to stay on the brake lever a little bit longer, that lengthened brake pressure would tighten the steering geometry and the bike would turn better. It would carve a tighter radius sooner in the corner. It would take less lean angle. It would reduce the need for aggressive steering inputs, and anyone who does this sport well realizes that aggression with the brakes, throttle and lean angle can get painful. Fast guys load the tires smoothly, whether accelerating, braking or turning. Forget the "flick".

Time for a real-world example. I've worked at the Freddie Spencer High Performance Riding School and the Yamaha Champions School for fourteen years and in addition to sportbike training, we've had the chance to host groups of cruiser riders several times in those years. Over a period of ten days last year, almost 800 riders had a chance to ride a variety of motorcycles on the track and one of the two main points we stressed was the use of the brakes. Keep in mind that some of these riders had never even used the front brake, having heard from an uncle or neighbor that the rear brake was the one to use. On a long-wheelbase cruiser, the rear brake is quite effective, but mastering the front brake is still the secret to bike control. Some of these guys had ridden for over 30 years and were amazed at how much more bike control they had when they mastered the front brake. They were able to ride at a quicker pace than expected because they gained the confidence of slowing and turning their bikes at the next corner.

One more real-world example. MotoGP (or World Superbike or 250GP or AMA Superbike, pick your favorite). All those guys trail-brake and do you know why? It's faster and safer. Get in front of your TV and watch how long they stay on the front brake. They're champions because they carry as much speed as possible to the slowest point in the corner (and as much speed as possible from the slowest point, but that's another subject). It's not just about speed, it's about finishing tire tests, practice, qualifying and the race. Crashing is disastrous for street riders and equally problematic for racers who want a contract next year. Trail braking is about safety on the street and consistency on the track. It makes sense. You need to do it.

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