

## Safety Tips #3, by Ben Hochberg, ABATE of Colorado's Rider Education Division

It's time for a change of direction.

How do you make a bike change direction? The most efficient way is by "counter-steering." You may have heard the term, but do you know what it means? Do you know why it works?

What it means: In order to get a motorcycle to turn, you can press forward and down on the handlebar grip of the direction of the turn. In other words, if you want to turn to the right, you would press on the right handgrip, and if you want to turn left, you would press on the left handgrip. This causes the bike to lean toward whatever side you press, and then the bike starts turning in that direction.

But Wait, you say, If I Press Right, Won't the Handlebars Turn Left, and Won't the Bike Then Turn Left??? Well, that would be intuitive, and that's how "steering" works. However, bikes (at speeds over a few miles per hour) don't "steer," they "counter-steer."

And it seems counter-intuitive, doesn't it? This may be hard to wrap your head around it; it sure is for me. We will discuss why this works in a little bit. But for now, we need to accept that this technique works. If you have ever made a turn on a bike (or even on a bicycle), you have done this technique, whether or not you know it. Once you know it, and accept that it works, handling a motorcycle becomes lots easier! Your confidence goes up, and your ability to ride safely increases as well. Did you ever see a small, light person riding a large, heavy motorcycle and wonder how that person was able to handle it? It's because it has very little to do with size and/or strength; it has to do with counter-steering. Press right, lean right, go right. It works!

Why it works: Here's where things get complicated, and in a hurry, too! Counter-steering is a very complex phenomenon; very few people understand it fully, although many claim to know all about it. Engineers and physicists have written papers on this technique. They all sound very scholarly and impressive, but very few agree with each other on all the details. Counter-steering involves concepts such as gyroscopic motion and centrifugal force and gravity, and how all three affect each other. We have several types of gyroscopic motion in play: the wheels turning, the handlebars and front wheel pivoting around the steering head, and the

leaning of the motorcycle itself with relation to the ground. Centrifugal force occurs when an object (the bike) is pivoting around a central point (turning), but wants to keep going in a straight line, so there is outward force which must be counteracted. And, of course, there is gravity acting on all this motion. Adding to all this fun is anything the rider chooses to do during a turn, such as slow down or speed up. Then there's the traction factor. And the shape of the tires. And the bike's steering geometry. See why this gets complicated?

Novice riders sometimes ask for further explanation about counter-steering. Instructors find that it's better to explain that we need to know that counter-steering works, but we don't need to know why it works. I have been instructing riders for 18 years, yet I know I cannot provide a complete explanation of why counter-steering works. In the end, it's just not that big of an issue to us mere mortals.

Counter-steering is a technique that must be mastered in order to ride safely. Yes, there are other ways to get a bike to change direction, but none of them are as effective as counter-steering. Will you ever need to swerve in a hurry to avoid an obstacle? Of course you will! A technical definition of a swerve is, "two quick counter-steers in opposite directions." To swerve to the right, press right, then press left. How far over your swerve takes you depends on how long you hold that first handgrip press.

Practice counter-steering. Take a rider education class; counter-steering practice is included in these courses. Here's a tip for when you practice: avoid using your brakes when swerving. There may not be enough traction available to keep control of the bike. Brake only when you are finished with the swerve.