

Basic Cornering Skills

Ah, 'tis sad but true! Too many riders manage to become statistics simply because they don't really know how to negotiate a corner. And it's all the more sad because all you have to do is set up for the turn, look where you're going, make the bike lean properly and keep the suspension under control. Sounds simple enough, right? But like most simple things, there are a few details worth knowing. Interested? Stay tuned.

Setting up for the turn involves two things: position and speed. The correct position is the one that allows you to see as far through the turn as possible. Usually that means near the right shoulder for a left turn and near the center line for a right turn (assuming that we are talking about a two-lane road). But traffic and roadway conditions may force a position more toward the center of the lane. In any case, the goal is to be able to see as much of the turn as you can, as soon as you can. This is so you can make a good decision about the radius of the turn and detect any problems before they become emergencies. If you can't see the exit of the turn, then you should stay wide (toward the outside) until you can. This leads us to the second part of setting up, speed.

You can approach the turn at any speed that is consistent with your ability to brake and the permissiveness of the local gendarme. But prior to beginning the turn, you should smoothly brake to a speed that will permit a gradual, continuous roll-on of the throttle throughout the entire turn (more about this later). Obviously, this speed, known as "entry speed" varies from turn to turn and depends on the radius of the turn; the type, condition and camber of the surface; the type and condition of your motorcycle and its tires; and your skill. Now, that's a lot to consider, and there's a lot of room for making an error. Therefore, the prudent course is to enter an unfamiliar turn with a great deal of caution. In fact, even familiar turns can produce thrills in the form of gravel spzils, animals out for a stroll and Rex Racer (the squid who just overcooked the turn coming the other way). So the rule is: Enter slowly and stay slow until you're sure of what you're dealing with.

This brings us to what may be the *single most important aspect of negotiating a corner*: looking through it. What this means in the most basic sense is that the motorcycle will tend to go where you're looking. But there's more to it than that. If you look down at the road only a few feet ahead of your front tire, you'll end up missing a whole bunch of little turns out of what should be a single arc. That is, you'll find yourself wobbling and making a lot of steering and/or speed corrections. And you'll never pick up that decreasing radius, nor see the cow standing in the road until it is too late to react smoothly and properly. The natural tendency is to look too close to the bike. The sooner you can overcome this tendency, the sooner you'll begin to turn well and be able to really enjoy riding.

For gradual turns on flat terrain, a slight shift of the eyes may allow you to see all of the current turn and maybe the next two or three as well. But for most turns, both in the boonies and in town, you must actually turn your head to see what you need to see. As you approach the turn, turn your head and focus your eyes and your attention as far around the turn as you can. Your peripheral vision will pick up anything closer to the bike that you need to see. A quick peek while you're setting up for the turn isn't enough. Keep your head turned and look where you want to go all the way through the turn. Try to keep both eyes level with the horizon. Tilt your head opposite to the direction of the turn to keep it upright as you and the motorcycle lean.

Once you've set up for the turn and have your head and eyes where they belong, the next step is to establish the lean required for the turn. To make the bike lean, countersteer: Simply apply forward pressure to the inside handgrip in the direction you want to lean. Press forward on the left bar to lean left; press on the right bar to lean right. Or, if you prefer, pull on the outside bar. Either way, the harder you press or pull, the faster you'll lean. At low speed, light pressure will do the job; as speed increases, more and more pressure is needed. And you must hold the pressure until you get the lean angle you want; then relax the pressure to allow

the front wheel to follow the curve. Simple, neat and effective. But wait! This technique can do even more for you.

While in the curve, the motorcycle may tend to either straighten up or lean farther into the turn, depending on the motorcycle's speed and design. You can counteract these tendencies by holding light pressure on the inside handgrip to keep the bike from standing up or the outside handgrip to keep the bike from leaning farther.

Also, you may have misjudged the turn. The turn may get tighter, you may have to avoid a pothole, or an oncoming truck may be using part of your lane. Need to change the lean angle in the turn? No problem. Simply press on the inside handgrip to increase your lean angle, press on the outside grip to decrease your lean angle and the rate of your turn.

This brings us to the final aspect of turning: controlling the suspension. You should avoid slowing down while in a turn, if at all possible. It does several bad things, like overloading the front tire, while allowing the rear tire to become very vulnerable to skidding, and making the bike less stable. It also reduces ground clearance. All in all, it makes for a very uncomfortable and decidedly "uncool" looking turn at best. At worst, it can result in loss of control and a bad crash.

You can make a smoother, safer and faster turn if both tires are sharing the load and the bike remains stable on its suspension. For this reason, you should gradually and smoothly roll on the throttle as you go through the turn. Remember *entry speed*? This smooth acceleration keeps the weight distribution more even, and it keeps the bike from bobbing about on the suspension. And the increasing speed means more centrifugal force, which will help you straighten the bike up as you leave the turn.

So, that's all there is to the basics of cornering: slow down, look, lean and roll. There are lots of fine points to work on, but with the basics down pat, you'll be able to turn with the best of them and really begin to enjoy what riding is all about. But remember: in cornering, practice makes smooth, and smooth is perfect. □

Cornering - A New Look

By Gary Pennington, CWRMA #549, #1, Huntsville, Alabama

Recently I was reading the local newspaper and I came across a story about a motorcycle fatality. It involved a 65-year-old man and his wife riding a Gold Wing. He failed to make the curve and struck a tree. Unfortunately, this is not unusual. Recent statistics indicate the number one cause of accidents involving motorcycles over 1000cc is a failure to make it through a turn. What does this say about us as Riders? We need help with cornering and other riding skills. Last October, I took Keith Code's Cornering School at the Talladega Grand Prix racetrack. Yes, I took it on the Gold Wing. People kiddingly called it the "Mothet Ship," as it was the biggest thing there. Just me, one Harley Spocher and all these croch rockets. I thought the course was awesome. We alternated from the glass room in the track to practice the riding skills taught in the classroom. Each student had an instructor riding on the track to monitor progress and coach him or her. By the end of the day I was bone tired, since I had been concentrating hard from 7 a.m. to 5 p.m.

What does this fact-fact type of training have to do with a 65-year-old Rider and his Co-Rider, and the fact that the cause for most motorcycle accidents is failing to make a turn? The course teaches the basics for cornering. And I learned a lot. I have new appreciation for basic cornering technique.

Let's take a new look at the *Slow, Lean and Roll* technique of cornering. No, the technique has not changed, but I want to share some pointers I got from the course. They are very thought provoking and may lead you to rethink your cornering technique.

As riders, what is our job in a corner? I know it sounds like a foolish question, but our only job is to relax and control the throttle in the turn. If we are doing anything else, we are cornering incorrectly. Think about this part of the technique. For purposes of this article, let's look at the last step first.

ROLL

Once we are in a turn, our only job is to roll on the throttle. No adjustments in direction or braking should be required if we have done our job correctly up to this point. We must relax and be just as neutral

as we want our Co-Rider to be in a corner. Any tension we feel will be transmitted to the motor cycle, thus possibly affecting it. As all you'll see, what I mean is I hope that I started my discussion of the three-step *Slow, Lean and Roll* technique with the final step—roll—in order to help you understand the objective of achieving a successful corner. Again, this suggests no change of the continuously controlled technique, just a mental refresh that will allow you to know where you will be in a corner, every time. Now let's address the technique's other three aspects step-by-step.

SLOW

The first step of the technique is slow to the proper entry speed. A speed that will allow you to accelerate, or at least maintain your speed, through the corner. Of course, to correctly achieve this, you must know your limits skills. The road was also your motorcycle. Now, here is what I learned in the course.

As you approach the corner, you shouldn't need to use your brakes to adjust the speed. Use the roadway and engine. You may need to downshift to an appropriate gear depending on your entry speed. This is a real test of your cornering judgment skills. Most of us will over-speed the turn approach and depend upon our brakes as a crutch. Generally, this slows us too much and we climb out of the curve much slower than required. This poor technique is also heedlessly hard on the brakes, engine and drive train. With a little practice, you can be cornering a curve without using the brakes as a crutch and still gaining the proper entry speed.

When approaching a turn, we often find ourselves in an over-speed situation and our brakes yell. No accidents please! Hopefully, as you gain experience using the method, your technique will become more smooth and controlled. Remember, you are looking through the corner—the next step in the cornering technique—but you are not there!

LOOK

Based on research done by the Code group, it has been determined that more than 90 percent of all riders look and lean simultaneously. Think about the folly of this. How can you know where you want to go, or the required lean angle, if you

don't look before you enter the corner? Remember, visual directional control—you go where you look. Again, this is elementary, but very true: you must separate the look and lean steps of the cornering technique.

There needs to be a defined look before the motorcycle is leaned. Practice looking, then leaning, for turns. Practice all the steps to insure separation. If you don't look before you lean, most of the time you will make a mid-course correction in the curve. What did I say about being your only job in a corner?

LEAN

The last aspect of our step-by-step review of the cornering technique is *lean*. How do you lean the motorcycle and how quickly do you do it? Some riders slowly enter each corner and never seem to get their motorcycle leaned over. In fact, the longer you take setting the lean angle, the less likely you are to reach precisely where you will exit the corner. You should be looking accurate and want to go (your exit point of the curve) and quickly set the lean angle to accomplish the desired turning radius. Note once again the separation of the look and lean steps of the technique.

How do you initiate the lean of a motorcycle? You press on the handlebar in the direction of the curve. In other words, press right, go right; press left, go left. The duration and quickness of the press determines the arc of the curve. During the leaning step, make sure your body remains one with the motorcycle. This is not a sway, but a tilt. The sooner you place the motorcycle at the proper lean angle the sooner it stabilizes. Once you set the lean angle, this is when you are doing your only job in a curve—relaxing and rolling on the throttle to at least maintain your speed or accelerate through the curve.

I hope this article offers you a different perspective—a new view—of your cornering technique. You can know within inches where you will exit each corner if you use this technique, and your motorcycle will go around corners like it is on rails.

Practice this technique and let me know how you fare. ▲

SEASONAL CHANGE

A change of seasons usually accompanies a change of attitude. We braved last summers heat, the fall rains and winter's chaotic shopping and eating to emerge eagerly anticipating the riding season. Wings over the Smokies, Wing Ding and virtually dozens of other rally's around the country beg our attendance. Once off the superslab we can get down and do some real riding. Picture a two lane, smooth blacktop highway gently carving it's way through rolling hills on a sunny day. How can we compliment this picture? More specifically, how do we master the art of getting around a curve smoothly and gracefully?

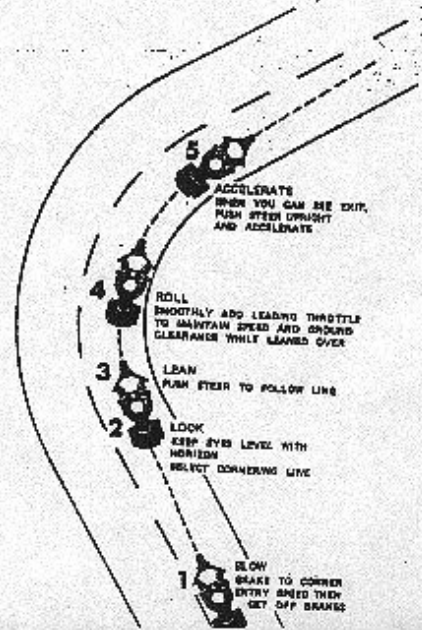
What happens when we turn? To get the bike to turn we steer the front wheel out from under the center of the mass, which allows gravity to pull the bike over on it's side. As we steer, we balance the forward inertia against gravity forcing the front end of the bike into an arc. The limiting factors are the tires and road surface. In other words, traction. Exceed the laws of traction and you go sliding (traffic laws can be ignored but the laws of nature tend to be self-enforcing).

How quickly we turn depends on how we harness gravity and traction to overcome inertia. With adequate traction you can cause the bike to turn tighter at the same speed by increasing the lean angle. Likewise decreasing the speed and holding the lean angle will cause the bike to turn tighter. Steering and braking (or acceleration) cause different loads on the tires.

Leaning and steering increase the side loads to the tires, where as braking/acceleration apply front or back loads to the tires. Either maneuver uses some of the available traction. (When you accelerate coming out of a corner you are also

straightening the bike to an upright position, thus the lean angle/side load is decreased while the front/back load is increased. Traction is no more or less than what you were using to get around the turn.)

What's the most important factor to negotiating a corner smoothly? Looking through the turn. Most of us are in the habit of looking at the road a few feet ahead of the front tire. If we see a pothole and stare at it, we will run over it. In cornering, the same principle applies and we tend to make a series of little turns in lieu of one continuous large turn. The secret is to lift your eyes to the edge of the turn where you want to exit. Lifting your eyes takes practice, but once mastered you'll find that zipping around corners becomes one of the most fun things about motorcycling. Thanks to Rider magazine for the basis of this short article. Ride Safe,



PROFICIENT MOTORCYCLING— CORNERING AT SPEED

by DAVID L. HOUGH

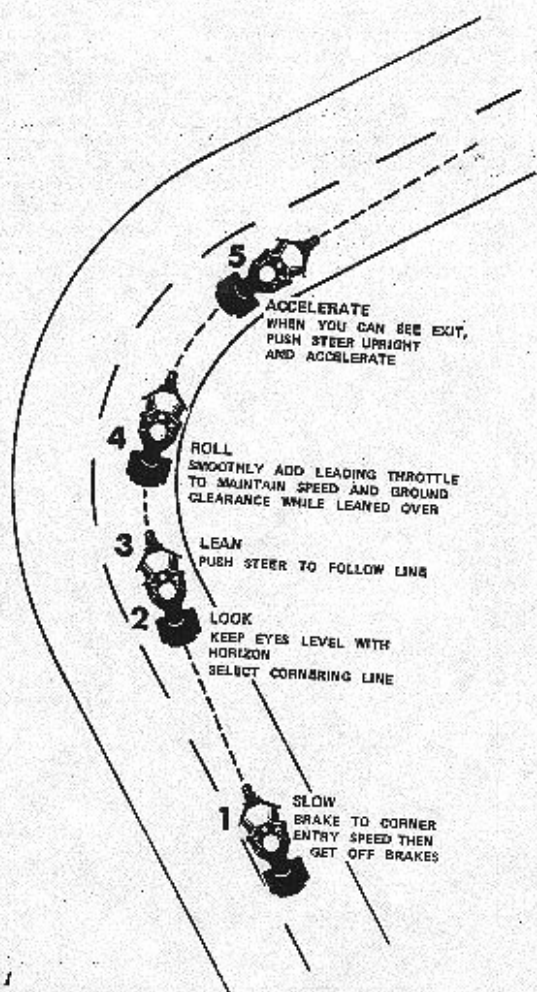


Figure 1

42 ROAD RIDER/February 1989

Most of us have already figured out that zipping around corners is one of the most fun things about motorcycling. But quite a few of us continue to anger into the landscape every now and then, or bash into things that suddenly appear out of nowhere just as we are leaned over to the limits. So let's dig a little deeper into the mysteries of making two-wheelers go around corners. You folks who already know everything about cornering can take a break and go polish your radar detectors or something.

In order to understand the basics of cornering, we need to identify some of the forces at work. After all, the laws of traffic may sometimes be ignored with impunity, but the laws of nature are self-enforcing. If you exceed the limits of traction, for example, you *will* go sliding.

Of course, there are all sorts of variable forces acting on the motorcycle as it hurtles down the road. Let's ignore the more obvious forces, such as air resistance and friction, and concentrate simply on how we get a single-track vehicle to change course.

Traction And Inertia

Once any heavy object is in motion, it wants to continue moving in the same direction at the same speed. To get the object to change direction, we must harness some forces to overcome some of this inertia. On a bike what we do is steer the front tire out from under the center of mass. That lets gravity start pulling the machine over onto its side.

As we steer the front tire toward the direction of lean, we balance the forward inertia against gravity, and the tires force the front end into an arc. But the bike would rather keep going straight ahead, and the front tire must overcome inertia with traction. If the tire loses traction, inertia will take over, and the bike will squirt off on a tangent, most likely sliding on the pegs.

How quickly we can change direction depends on how much we can harness gravity and traction to overcome inertia. The practical limits of lean are about 45 degrees. If we have sufficient traction, we can cause the bike to turn tighter at the same speed by just leaning over farther—that is, if we have enough ground clearance. Alternatively, we can cause the bike to turn a tighter circle at the same lean angle by reducing speed. If the road surface is banked into the turn, we can corner very rapidly, because the change in direction is mostly up, as far as the tires are concerned. On banked tracks, the forward inertia of the machine tries to push the tires down flat against the road, and compress the suspension fully. Let's assume for the remainder of this discussion that the road surface is level.

In that case, the phrase "if we have sufficient traction" is a pretty important part of the equation. Remember that the front tire traction overcomes forward inertia and pushes the front end into an arc. Even assuming perfect pavement, there are vast differences between tires. Some are "sticky" and some are "slippery." Even a "sticky" tire doesn't have maximum traction until it is heated up to the designed operating temperature, and pressurized to the correct numbers. If you like to explore the limits of traction, pay special attention to your tires. Buy tires designed for the speeds at which you usually ride, check the pressure "too often," and get them warmed up to operating temperature before you lean over too far in the twisties.

The second consideration about traction is the road surface itself. Surface traction varies dramatically from one spot to the next. Seldom do we encounter a road surface that's perfectly clear of loose sand, gravel, oil, debris, or mud. So the road surface ahead must have a very high priority. In very gross terms, never mind the line you would like to follow, give priority to the line that goes over the most tractable surface. When riding those beautiful twisty Class 3 roads, I figure I devote maybe

half of my attention to the road surface. I'm looking for clues to changes in traction, and I'm especially interested in any changes of color or texture. A little rain or frost demands an immediate priority over speed.

Braking And Leaning

With those precautions in mind, let's get on with our introduction to the fine points of cornering. Remember that we are constantly applying different loads to the tires. Cornering and steering apply side loads. Braking and accelerating apply front/back loads. So, either accelerating or braking uses up some of the available tire traction, and there is only so much traction to go around (if you'll pardon the pun). If we're really interested in fast cornering, we can maximize traction by separating hard leaning from either hard braking or rapid acceleration. We can do this by braking down to cornering speed before we lean the bike over, and by waiting to gas it until after we have pulled the machine up out of the corner.

When we teach new riders, the Motorcycle Safety Foundation recommends a very specific way to get this point across. We've also discovered that a great many grizzled, old, die-hard

bikers need to learn the same techniques as well when we see them in our Experienced Rider courses. You may prefer to find yourself some nice, remote, slow-speed corner out in the desert somewhere, and practice the techniques yourself.

Ideally, we should brake smoothly right up to the turn entry, slowing exactly to the predicted cornering speed, and then get off the brakes. We should get in the habit of "push steering" the bike over to the correct lean angle, and simultaneously adding just enough leading throttle to keep the machine up on the suspension and maintain momentum. At the point where you can see the exit from the turn, push-steer the bike upright, and roll on the gas.

There's one additional habit that's very important: looking through the turn. Most inexperienced riders have a tendency to fix their gaze on a spot right ahead of the front tire. You have to look as far around the corner as you can see to properly choose the correct line and speed. Most riders find that it helps to keep their eyes level with the horizon, even while leaned over. If you have trouble remembering what to do, remember the MSF phrase: "Slow, Look, Lean, and Roll" (Figure 1).

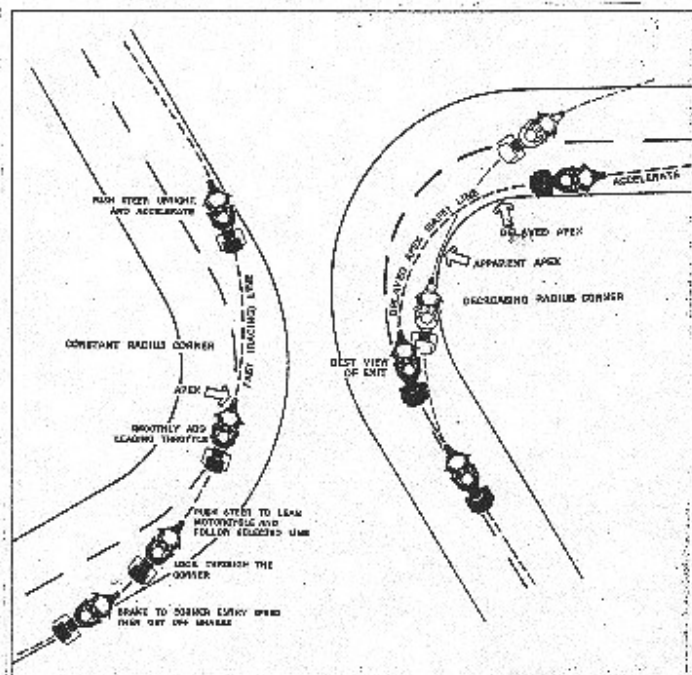


Figure 3

Figure 3

Safety Forum

Chapter 8

You might feel just a tad silly riding back and forth around the same corner by yourself, but believe me, these are the *basics* of cornering. If you don't master the basics, you can get into deep trouble very quickly later on. When slowing for the turn, use lots of front brake, and shift down to a suitable gear for the turn. If you find yourself still braking hard deep into the turn, it means you aren't braking soon enough or hard enough. Be off both brakes entirely as you lean over, at least for practice. When you look through the corner, swivel your head up and around so you can get a good view, and start looking where you want to go, not at things you would rather avoid. In very simple terms, the bike will go where you are looking. When practicing these basic techniques, don't worry about your line just yet; concentrate on the skills.

Cornering Lines

Once you have mastered the techniques to your satisfaction, it is time to consider cornering lines. Let's go back and find a nice medium-speed turn with a constant radius. Keep practicing those skills, but now concentrate on the smoothest possible arc that provides the most gradual curve. Whether you intend to ride at warp-eight or puffer along smelling the posies, a gradual curve will maximize traction and reduce your risks of a spill. This "fast" line will start at the outside of the turn, touch the inside exactly at the apex, and exit again toward the outside (Figure 2). As a general rule, I don't borrow the other half of the road, even if I can see that no traffic is coming.

If all corners were smooth, clean sweepers with unlimited visibility, we wouldn't have so many motorcyclists making unplanned excursions into the weeds. Unfortunately, the real world isn't a carefully monitored racetrack. The roads we ride have all sorts of different shapes. Some whoop up over a hill and make sudden turns just over the crest. Others are hidden in the trees or behind rocks, and have deer standing in them. The most infamous corners are those "decreasing-radius" turns that

tighten up halfway through. So, the real world demands a more sensible line than the fast line. We need to ride where we'll get a better view of the corner ahead, and follow lines that allow for unpredictable changes of direction.

The answer is the "delayed-apex" line. We just pretend that the apex is always a bit farther around the corner than we think it is, which puts us farther toward the outside of the turn (Figure 3). If this bend happens to be the local "killer corner" with the decreasing radius, the delayed-apex line gives you a better chance to correct, provides the best view of the exit, and puts you in the best position for a fast getaway. If this corner doesn't happen to be Killer Corner, you haven't lost much time. In fact, there are some riders who argue that the delayed apex line is just as fast, because it provides a better exit line. Their logic is: "Go in slow, go out fast."

Unless you live in level farm country, you are likely to encounter a series of turns linked into "S" bends. With any luck, you'll find a twisty-turny road with all sorts of different bends. While there is a temptation to ride through every turn the same way at the same speed, that can get you into trouble. You don't want one turn to set you up in the wrong position for the next one. If you're interested in speed, you want to give priority to the fast corners. If you're interested in safety, you don't want to drift across the centerline, or auger into the weeds. Consider the path of two identical machines (Figure 4). The white bike follows the "fast line." The black bike follows the "delayed-apex" line. Rounding a light corner, the white bike must brake during the turn to correct a bad line, and must then make a drastic correction to keep from leaving the roadway. The black bike can accelerate smoothly through the second turn, and its rider has the best view of the road throughout both corners.

Easy Does It

Finally, while you are practicing some of these techniques, do yourself a favor and wear all of your crash padding. If you are learning everything from yourself, you must consider the qualifications of your teacher. It isn't always obvious when you are repeating bad habits. Frankly, the hot tip is to sign up for the next MSF Experienced RiderCourse in your area. You'll have a better chance of improvement when there is a trained instructor to guide you

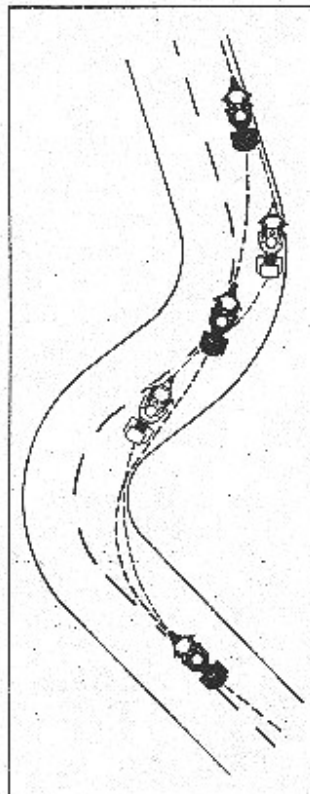


Figure 4

through the exercises, and you will also get the added bonus of some crash-avoidance strategies. If you have never taken advantage of a rider training class, you've missed something. If you haven't taken an MSF course recently, you're in for a surprise.

If you're holding back from taking rider training with the excuse that you don't know how to find a course, I'll help you along. You can obtain course information anywhere in the U.S.A. by phoning the toll-free hotline: 1-800-447-4700.

In Canada, the Canadian Safety Council offers basic rider training programs nationwide. Some provincial safety councils offer advanced courses, also. Contact the CSC at: 1765 St. Laurent Boulevard, Dept. RR, Ottawa, Ontario K1G 3V5; (613) 521-6881.