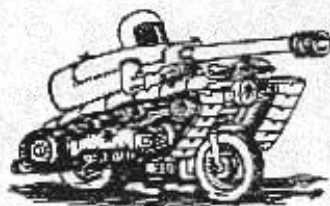


TRAFFIC SURVIVAL

Part VII

Braking



Article and Illustrations
by David L. Hough

In January, we offered the pointed suggestion that the name of the survival game for motorcyclists in traffic is "move it or lose it." And we suggested several evasive tactics a motorcyclist can use to avoid getting scrunched by an errant driver. Perhaps the most useful evasive tactic is being able to stop in the minimum distance when faced with an immovable object in our path.

We sometimes call this "panic braking." We've talked about it—now it's time to hone our braking skills.

We've got very good tires and brakes these days, so just about every contemporary motorcycle is capable of making quick stops. But accident statistics point to bad braking habits and techniques. The worst scenario is the rider who—afraid of using the front brake—stands on the rear brake pedal and slides, slides, slides hundreds of feet into a smasho. So, the weakest link in motorcycle braking systems seems to be the nut on the brake lever (if you'll pardon a pun).

Before we get our scooters out for braking exercises, it would be wise to review the dynamics of braking, and then we can have a little heart-to-heart chat about responsibility.

We covered braking dynamics back in the September and October, 1990 issues of *Road Rider*. If you are interested in a little more information about braking, I urge you to dig out those back issues, and review them.

It takes a lot of energy to get several hundred pounds of motorcycle and rider up to speed. And once bike and rider are zipping along, all that mass wants to keep on moving. It takes a lot of energy to overcome that forward inertia and bring all that weight to a stop.

All of the energy required to stop a speeding motorcycle must be transmitted

of the machine keeps pulling it straight ahead. The result is that the motorcycle is pitched forward over the tire contact patches, and it seems as if the weight of the machine has been "transferred" mostly to the front tire. (Figure 1)

Theoretically, a tire can create a braking force equal to the force pushing down on it. So, under hard braking, the front tire gets loaded with almost the entire mass of the machine. Typically, the front brake of a motorcycle supplies more than 70 percent of the total braking force. This "weight transfer" complicates how we must apply the brakes during a quick stop.

Quickest stops require immediate application of both front and rear brakes, then constant adjusting of brake force during the stop. Hard braking is a difficult skill to master, which is why some manufacturers build in "integrated" brake systems, or computer controlled "antiskid" or "antilock" brake systems.

Good News/Bad News: Integrated and automatic systems are marvelous, but they can't handle all situations. Even the riders of ABS-machines should practice braking in a variety of situations.

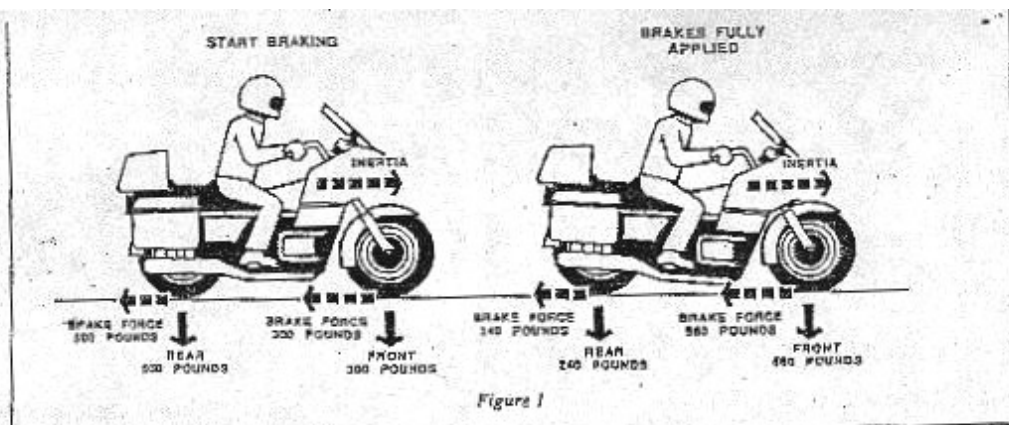


through the tires to the pavement. If we brake so hard that the tires slip, we won't be able to stop as fast as with the tires rotating. Worse yet, when the tires slip we may also lose directional control and balance.

With brakes applied, the tire contact patches are trying to slow the machine down at pavement level, while the inertia

Heart-to-Heart Stuff

Frankly, I'm reluctant to explain how to practice skill exercises, because I've encountered a great many riders who have come up with creative ways to subvert the instructions. If you choose to teach yourself, you'll have to be responsible for the results. If you are even a tiny bit appre-



hensive about trying any of these exercises, do us all a favor and sign up for an Experienced Rider Course where you'll have the benefit of a qualified instructor.

High Sides

It may seem backwards, but the most insidious skids are on the rear tire. If the rear end starts to slide sideways, and the rider releases the rear brake, the bike can snap violently back to center with enough force to throw the rider off. Veteran riders call this "high siding" because the rider is flipped over the side of the machine that a moment ago was on top. Rather than live in fear of high siding, let's practice some rear wheel skids to gain familiarity with the correct skills.

Rear Wheel Skids

It is safe to skid the rear tire so long as the tire is perpendicular to the road surface. The motorcycle must be kept vertical and sliding straight ahead, and the smart rider keeps the tire skidding to a complete stop.

Figure 2 is our basic braking chute. Find a lane of clean, dry pavement away from traffic, and mark it off so you have a reasonable distance to get up to a steady speed, a braking point, and plenty of runoff distance at the end. For the first three or four passes, use the rear brake only. Stabilize approach speed at about 18 mph. When you reach the double cones, mash the pedal down as hard as you can to skid the rear tire, and keep it mashed down all the way to the end of the stop. Come to a complete stop with your foot still holding the brake—don't

let it lurch forward while you try to hop along on your left boot. Try the rear wheel skid again until you can do it perfectly. If your machine won't let you do rear wheel skids, you won't get full benefit from this exercise.

If the bike tries to slide sideways, it is most likely because you are leaning over slightly, or not headed straight down the chute, or not looking where you want to go. If the rear end *does* start to slide out, the creative side of your brain will try to signal your foot to let up on the pedal. *Don't do it.* Point the front end in the direction of skid, stay on the rear brake, and slide it to a stop.

Both Brakes

Shortest stops require both brakes but no skids. Stabilize approach speed down the chute, about 18 mph at first. As your front axle reaches the double cones, squeeze the clutch and apply both brakes together. Concentrate on maximum front brake pressure just short of a skid. As the "weight transfer" loads the front tire, you can squeeze harder on the front, and ease up on the rear.

If you skid the rear tire, use less pressure on subsequent passes until you can stop without skidding. An impending skid on the front tire makes the front end wiggle around. If you should brake hard enough to skid the front tire, immediately release the lever and use the runoff area to regain control.

Integrated Brakes

If your machine has integrated front/rear brakes, you will be able to make

reasonably good stops using the foot pedal only, but if you want to make really good stops, you will need to use the front brake lever as well. Be prepared to let up slightly on the lever towards the last few feet of the stop to keep from skidding the front tire.

ABS

If your machine has antilock brakes, this exercise will be easy, because the computer will do all the brake modulation for you. But don't get snug until we have finished all the exercises.

Braking in Curves

Imagine yourself zipping around a blind curve, only to find a lumber truck overturned in your path. You need to stop down as quickly as possible, but the bike is leaned over in the turn and using up most of the available traction.

Leaving the road isn't a good option, because of that concrete wall on the outside of the shoulder. You've got to brake. Anti-skid brakes won't save you here, because the computer probably won't recognize a sideways skid—it only computes wheel rotation.

There are two techniques for making quick stops in a curve: Brake modestly while continuing around the curve, or get the bike upright and brake hard in a straight line. The Motorcycle Safety Foundation commissioned a study on different braking-in-a-curve techniques, and reports that the quickest stops can be made by getting the bike upright and braking hard in a straight line. This also works best for the anti-skid owners.

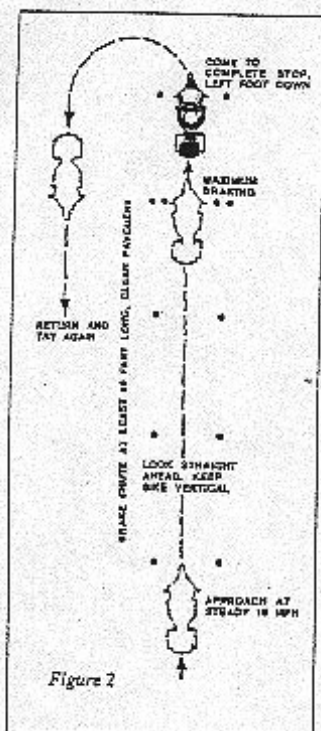


Figure 2

because it eliminates any sideways skid recognition.

Figure 3 depicts an exercise for practicing quick stops from a curve. Mark off a semi-circular lane with about a 25-foot radius. Set out double cones as a point of reference for braking. Approach at a stable speed, and stabilize lean angle as you enter the corner. When you pass the braking point, first get the bike upright, then brake hard in a straight line toward the outside of the lane. Once the machine is upright, braking technique is the same as for a straight-line stop. Try to point the straight line toward the outside shoulder of the lane, not off on an angle toward that concrete wall.

As you gain confidence, move the brake point to different locations, alter the radius of the turn, and then ride in the opposite direction to give your skills a little flexibility.

This same exercise can be used to practice braking while continuing around the curve. The technique is to brake modestly at first on both brakes, then apply harder braking as the machine gets more upright.

Engine Braking

When a hazard appears around the corner, your first reaction is likely to be rolling off the throttle. Remember that engine compression demands traction from the rear wheel the same as rear wheel braking. Suddenly slamming the throttle closed can use up enough traction to break the rear wheel loose, resulting in a slide-out. If the rider then panics and pulls in the clutch, the rear tire can hook up again, and toss the rider off in a classic "high side."

If the machine you are riding has a tendency to slide the rear tire under engine braking, you may wish to get in the habit of squeezing the clutch first and then using only the brakes for deceleration.

We're assuming you are clever enough to have already replaced that bald tire.

Motorcycle Damage

When I was first introduced to exercises such as rear wheel skids, I rebelled. I didn't want to grind flat spots in my

expensive tires, and I didn't want to risk dropping my shiny motorcycle. What I discovered is that rear wheel skids at 18 mph won't cause any detectable wear on the tire, and that what lets motorcycles fall down is lack of rider skill. I decided that if I didn't have confidence in practicing skills in a parking lot, I probably shouldn't be out riding the urban streets where the real skill tests occur without warning.

We have separated the swerving exercises from the braking exercises for a good reason. Both swerving and panic braking can use up all of the available traction. If you must brake and swerve in close proximity, separate them. Get off the brakes before initiating a swerve. Get the bike straightened out from a swerve before grabbing the brakes.

Riding a motorcycle is a lot easier if you follow my advice to stay out of cities. If you are going to ride around in traffic, I urge you to practice your control and evasion skills. ♪

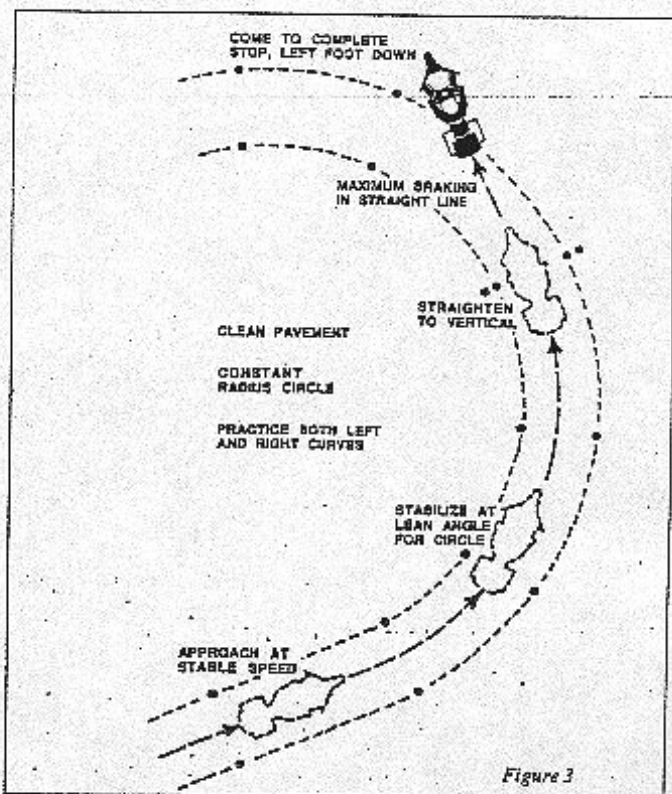


Figure 3

BASIC STRAIGHT LINE BRAKING

One of the biggest accomplishments Honda has made to the world of motorcycling is the popularization of the term "Turn Key Touring". The introduction of the factory made, full dressed Gold Wing in 1980 came as a relief to many of us who endured the rigors of installing saddlebags and fairings on earlier motorcycles. The latest edition is a refined package that encourages ex-riders to rejoin the sport as well as attracting many new riders. Unfortunately, many of the old myths and misconceptions that existed in the motorcycling world of yesterday, persist even today. Especially when it comes to the use of the front brake.

To the average American, the typical Gold Winger's are a middle aged couple rocketing down the freeway in a semi-comatose position. Too often this is an accurate portrayal. Skill and ability are usually not needed until you exit the freeway, then little things like low speed maneuvers and braking become the critical components of good riding. Even though most of us have accumulated many thousands of safe miles, the questions remain "are we skillful, are we consistent"?

A while ago I was coming home from a rally and managed to catch a yellow light ahead of me. There was no one directly in front or behind me. Cross traffic was light, the day sunny and the pavement dry. I hesitated longer than was prudent but finally decided to stop for the light. From a speed of 45-50 mph I clamped on both binders hard and brought the bike to a safe and complete stop just short of the crossing marks. What truly amazed me was how fast the bike came to a complete halt. I anticipated stopping in the crosswalk or slightly beyond but to my surprise I was well short of that line. I've never had the occasion to apply maximum braking before, and hope I never will, but the experience taught me a valuable lesson. These "lead sleds" can stop in a very short distance.

Straight line braking is one of the most fundamental skills in the safe operation of any motorcycle. The myth that any use of the front brake will lock up

the wheel and cause an uncontrollable skid is unwarranted. With 70% of a motorcycle's ability to stop resting with the front brake alone it becomes imperative that the operator learn how to use it correctly and practice its use often. (The concept that you can stand a fully loaded Gold Wing on its nose using the front brake is a myth. Superbikes, with their sticky tires and light weight, yes. A loaded Gold Wing simply has too much mass and its touring tires are too small and too hard.)

The shortest possible stopping distance is attained by applying maximum pressure to both brakes just short of locking up the wheels. Try using the following technique: use light to moderate steady pressure on the rear brake then smoothly apply steadily increasing pressure to the front brake. Do not "grab" the front brake nor "stomp" on the rear brake, as abrupt application will more than likely lock up the wheel. As you practice you will gain the ability to stop the bike in such a short distance that it will absolutely amaze you. Trust me, I've been practicing.

In a straight line stop, should you lock up the front wheel and are unable to steer release the front brake and squeeze it again using slightly less pressure. If you lock up the rear wheel keep the front wheel pointing straight ahead and release the pressure slightly, freeing the wheel to rotate. (Don't look down, keep your eyes straight ahead at eye level.) If the rear wheel locks up and starts a major sideways slide or drift, keep the wheel locked up until the bike comes to a complete stop. Too often operators release the rear brake in a slide, the wheel regains traction and swings the bike violently around. This is known as "High Siding" and the rider ends up being thrown completely off the bike.

Practice is the key to effective braking. If you normally ride two up, practice when riding two up. Start slow, in a deserted parking lot, using only the rear brake. Note the distance. Then use both brakes moderately. Then use both brakes hard. If you skid the tires you failed. Practice. You will be pleasantly surprised.

Basic Straight-Line Braking

If your first ride was preceded by some "instruction" that consisted of a brief preview of the controls and a warning either not to use the front brake or to use it only with great caution, then you need to pay close attention to what I'm about to say here. You've been a victim of one of the most vicious rumors in motorcycling, and *your life is in danger!*

The person who gave you this all-too-common advice wasn't trying to get you hurt. He or she probably had the best of intentions and an honest belief that the front brake should be avoided, especially by new riders. It is, nonetheless, very bad information.

The front brake(s) can produce up to 75 percent of a street bike's total braking ability. To avoid or minimize its use is, at best, foolish. At worst, it's suicidal.

It's the front brake's ability to lock the wheel that makes it something to be respected. With a locked front wheel, you can't steer, and you'll fall down unless you quickly get the wheel rolling again. But that's not a reason to avoid or be timid with the front brake. Instead, as with all of the other controls, you need to learn how to use it correctly.

Even if you don't need maximum braking power, it's a good idea to always apply both brakes. You need to train your reflexes for the times when you will need to stop quickly. If you get into the habit of using only one brake, that's exactly what you'll use when you encounter an emergency-stop situation.

The shortest possible stopping distance is attained by applying maximum pressure to both brakes just short of lock-

ing the wheels. This is very difficult to achieve consistently, but it can be approached by using the following technique: Use light-to-moderate, steady pressure on the rear brake pedal, and smoothly apply steadily increasing pressure on the front brake lever until you get the desired deceleration. You can apply the pressures rapidly, but do not "grab" the front brake lever or "stomp" the rear brake pedal. Abrupt application of a brake is more likely to lock it.

In a straight-line stop, if you should lock the front wheel and are unable to steer, immediately release the front brake lever, then squeeze it again using slightly less pressure. If you lock the rear wheel in a straight-line braking situation, keep the front wheel pointing straight ahead (don't look down; keep your eyes straight ahead at eye level). If you are braking simply to reduce speed, make sure that the bike is going perfectly straight before releasing any pressure on the brake pedal. Releasing the rear brake with the bike in a major sideways slide can result in a very violent form of crash, called a *high side*. In such an extreme braking emergency, it's better just to leave the rear wheel locked until you come to a stop. Doing anything with the rear brake (even thinking of it) only diverts your attention from the maximum application of the front brake and increases stopping distance. On your next stop, use a bit less rear-brake pressure.

Practice! Practice! Practice! □

About the author: J. T. Smith is a Chief Motorcycle Safety Instructor in Clarksville, Tennessee. He also trains other chief instructors for the MSF.