

Brake Points

by Ken Condon

BEING ABLE TO SLOW and stop your motorcycle is obviously an important skill to have. But, too many riders take braking skills for granted. This is understandable, because most stopping situations are easily controllable even with poor technique. But when a situation presents itself that requires significant braking skill, these untrained riders often fail to stop in time or remain in control.

Practice

Braking proficiency begins by understanding some braking fundamentals, then learning proper braking techniques and finally keeping those techniques sharp through regular practice. It's important to note that knowledge and training alone will not necessarily lead to positive outcomes when complex stopping maneuvers or maximum braking is required. When a life-or-death situation unfolds in front of you habit, not knowledge, will prevail, which is why you must ingrain proper braking technique into your subconscious and muscle memory. This happens through continual practice.

Practice doesn't have to be formal. You can develop braking skills either by visiting a parking lot for 10 minutes before or after a ride or by simply keeping an eye out for opportunities to keep your good habits strong. Oftentimes when there is no surrounding traffic, I will practice emergency braking by delaying when I would normally apply the brakes before my driveway. The idea is to take the opportunity to purposefully practice hard braking. You'll thank yourself for taking the time to train your mind and body to

brake to the maximum while remaining in control.

Before you run out to practice braking, it's important to identify a few concepts and braking techniques. We'll also discuss some of the myths surrounding braking technique that can distract you from learning good habits.

Front Brake

The front brake provides the majority of braking power and is the primary tool for stopping a motorcycle. When you apply the brakes, the distribution of load between the front and rear tires shifts forward, which increases available front tire traction. You can feel the effect load has on traction by trying to slide the palm of your hand on a tabletop while pressing downward; the more you press, the more difficult it is to slide your hand.

Unfortunately, many riders subscribe to the dangerous myth that it's best to avoid using the front brake. This may come from past braking mishaps or from horror stories told by riders who fell victim to their own lack of braking skill. The usual scenario involves the rider locking the front brake in a fit of panic and dropping the bike. Such a mishap can convince a rider that the front brake is dangerous.

While it's important to learn to trust the front brake, it is also important to understand that it is possible to lock the front tire if brake power is introduced before the tire is adequately loaded. To avoid a front tire skid, squeeze the brake lever progressively. This allows time for traction to increase so you can then introduce more brake force. Do not grab the front brake lever! Instead, squeeze quickly, yet progressively. It may take a fraction of a second longer to achieve full brake power, but you will avoid locking the front tire.

Resisting the natural survival instinct to grab the front brake can be difficult when a deer jumps out in front of you, but with adequate



Practice braking to ingrain good habits.

practice, you can train yourself to respond properly.

Rear Brake

You may have guessed by now that when load shifts forward, the rear tire becomes unloaded and has less traction available. This is why rear tire skids are so common during emergency stops. Avoiding a rear tire skid requires finesse as you balance rear brake force with available traction. The trick is to begin braking with a firm press on the rear brake pedal, and then gradually release pressure as weight shifts forward. To do this with proficiency takes familiarity with your particular motorcycle's brake characteristics so you can know how much pressure is just enough. Again, practice is key.

You may be wondering why you should use the rear brake at all if it's so difficult to control in emergency braking situations. The fact is the rear brake is a useful tool for shortening stopping distances and for helping to stabilize the motorcycle.

Rear brake force is effective at reducing stopping distances when combined with the front brake. Unless your rear tire is completely off the ground, there is some amount of load on the rear tire to allow some brake force. And wouldn't you want to use all the brake force you can if a car were to cross your path unexpectedly?

There are even some situations when the rider needs to rely more on rear brake power than normal. In low traction situations, such as a rain-soaked surface, the amount of overall brake force you can use is limited, resulting in less weight transfer and closer to equal braking between front and rear. A heavy load or a passenger will also make the rear brake more effective by helping to keep weight over the rear wheel.

The rear brake also plays a role in stability. To minimize forward pitch, apply

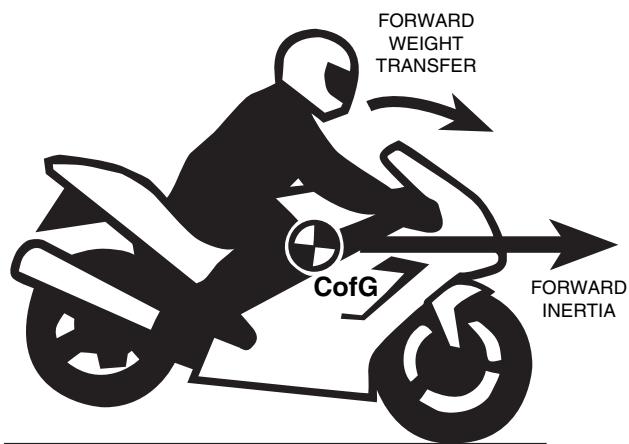


Figure 1: Applying the brakes causes load to shift forward, which increases available front tire traction.

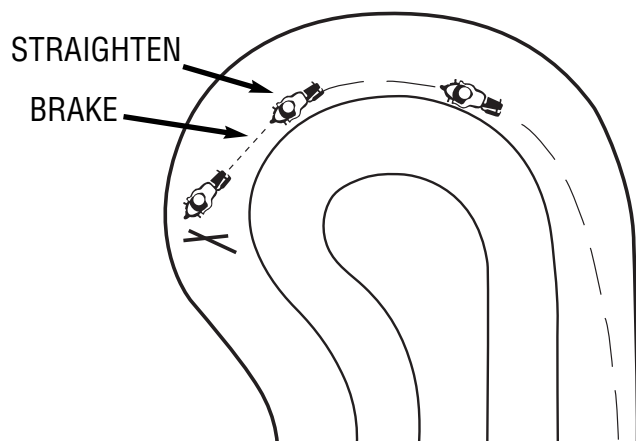


Figure 2: One way to stop quickly in a curve without skidding is to straighten first, then brake.



Learn to trust the front brake.

the rear brake a moment before you progressively squeeze the front brake. This braking technique allows the whole bike to “squat” for a more level attitude. The rear brake has an additional role in enhanced stability by keeping the rear wheel in line with the front wheel (Figure 2).

Rear Brake Only

There are times when it's best to use the rear brake only. At very low speeds, the front brake can be overpowering and overly sensitive, therefore it's better to drag the rear brake to adjust speed where rear brake power is more controllable.

Another situation where it's smart to use the rear brake only is when riding on very slippery or loose surfaces where the front tire can easily skid. Front tire skids should be avoided at all costs, because they usually result in an immediate fall. Instead, use the rear brake. If the rear tire were to inadvertently skid, the outcome is much more favorable as rear wheel skids can often be controlled.

Engine Braking

Engine braking is often used to slow a motorcycle, but it's important to recognize that engine braking is essentially rear wheel braking. While it's acceptable to use engine braking for small reductions in speed, it's best to use your brakes for significant speed adjustments. Also, be aware that extreme engine braking can cause rear tire skids, especially on high torque motorcycle engines.

Over The Bars

One concern some riders have is that they will go over the handlebars if they brake too hard. With today's tires offering excellent grip and modern brake systems featuring excellent power, it is indeed possible to cause a reverse wheelie, also known as a “stoppie,” and even go over

the handlebars (Figure 1). But, it is important to understand that this is of little to no concern for the majority of riders. Most riders are more likely to either not brake hard enough and hit the hazard or brake too abruptly and skid and fall. However, for well-trained riders, it is possible to brake effectively enough to cause the bike to tip forward.

It's comforting to know that most of us ride motorcycles with design characteristics that resist forward flips. Cruisers, tourers and most other types of motorcycles have relatively long wheelbases and low centers of gravity (CofG) that keeps the rear wheel planted. However, stoppies are more likely when riding a supersport bike that typically has a high CofG in relation to wheelbase.

To avoid an inadvertent forward flip on a supersport bike, practice maximum braking while keeping the rear wheel on the ground. Of course, it's best to avoid the need for extreme braking situations by looking well ahead and predicting hazardous scenarios early.

Laying It Down

There was a time when motorcycle brakes and tires didn't perform very well, which led to the standard quick-stop technique known as “laying it down.” Many riders from the good old days think that this is the best way to stop a bike in an emergency.

Even though motorcycle brakes have evolved remarkably over the years, this archaic method lives on with more than a few of today's riders out there who think that “laying it down” is still a reasonable option. Sadly, some of these riders continue to pass on this technique to newer riders in the guise of sage advice.

The way I see it is that if the tires can grip and the brakes are able to dissipate energy, then why not use them to their

fullest? The “laying it down” method gives up on any hope of stopping with the motorcycle on its tires and instead relies on chrome, plastic and metal sliding on pavement to somehow slow the bike down. It's interesting to note that some riders will often state that they had to lay it down to avoid a collision, when in reality they simply skidded and lost control.

While there may be a few rare situations where strategically laying a motorcycle down may make sense, it is better for riders to focus on proper braking skills that keep the rubber on the road. It's also important to use strategies that avoid the need to use emergency braking skills in the first place.

Skidding

Another false belief is that a skidding tire provides comparable stopping distances to a non-skidding tire. But, a skidding tire reduces grip, which allows the rear tire to fishtail and makes it hard to control the motorcycle. Skids also contribute to longer stopping distances.

Learn to brake to maximum effect through practice. But even with well-developed skill, it is possible that you will one day have to handle an inadvertent skid. If you accidentally skid the rear tire, it is often suggested that you keep the rear wheel locked to prevent being catapulted by a highside flip. A highside can happen if the rear brake is released while the rear wheel is out of line with the front tire in a fishtailing motion. The rear tire suddenly regains traction and instantly tries to align itself directly behind the front tire track and catapults the rider.

Keeping the rear brake locked only works if you are able to successfully keep your motorcycle straight and upright while the rear tire squeals and wags beneath you. This can be difficult to manage, but the best way to keep from falling



Favor the rear brake when riding over surface hazards.



The rear brake must be controlled to prevent a rear tire skid.

is to keep your eyes fixed near the horizon. Doing so will naturally encourage your mind and body to maintain upright balance by steering the motorcycle straight.

Keeping the rear tire locked and keeping your eyes up doesn't guarantee that you won't fall. If you are on a surface with minimal traction, it is possible to fishtail so far that you lose balance. In this case, you should consider releasing the rear brake. This is usually okay to do because highside crashes are less likely on surfaces where traction is less abundant. Again, it's best to avoid getting yourself into these difficult situations—practice to avoid rear tire skids.

A rear wheel skid doesn't necessarily mean a crash is imminent. But front wheel skids are another matter. A skidding front tire allows no directional control and will wash out to the side, "tucking" underneath the bike and dropping the rider almost instantly. If you do lock the front wheel, release the brake immediately and reapply more gently.

Anti-lock Brakes

To prevent skids, many manufacturers equip some of their touring and sport-touring models with anti-lock braking systems (ABS). ABS works by sensing a change in wheel speed and releasing brake pressure in rapid pulses to prevent a skid. ABS gives the rider confidence to apply the brakes aggressively, which can translate into shorter stopping distances, especially on slippery surfaces.

ABS is wonderful for adding a margin of control when braking in a straight line. But, ABS can't do much to prevent a slide-out when leaning, because ABS detects only whether the wheel is spinning slower or faster, not whether the tire is sliding sideways.

Also, with the bike leaned into a corner, side forces are using most of the tire's

traction, leaving very little for braking no matter what brake system you have. It's important to recognize that riders who rely on ABS to prevent skids should take extra caution when riding a motorcycle without ABS.

Trail Braking

It's usually best when approaching a corner to brake early and then release the brakes while the motorcycle is still upright and heading straight. This is a prudent technique for the majority of cornering situations. Trail braking is a technique that breaks this rule. Trail braking refers to the technique of applying the brakes while leaning into a turn.

Racers routinely use trail braking to achieve faster entry speeds, often braking right up to the apex. To avoid sliding out, the brakes are eased off as the bike reaches full lean angle. But the line is very thin between just enough brake force and too much. Racers run the risk of crashing while trail braking, but they are familiar with each corner and can be sure that the surface is clean and unobstructed.

Trail braking is not suggested for routine street riding because there is no assurance that the next turn is what you expect, that the corner is clean, or the road clear. However, there are times when you must brake while leaning, which requires the ability to apply brake pressure without skidding. This type of corner braking is used as a way to manage a mid-corner obstacle or to salvage a corner entry miscue. In most situations, this braking technique is not necessary or desirable. If you find yourself braking into corners, then you should reduce your corner entry speed.

Stopping Quickly In A Corner

Sometimes you need to stop quickly while you're leaned in a turn. When an obstacle appears mid-corner, a startled

rider typically responds with a knee-jerk grab of the brakes followed shortly by the sound of scraping metal and plastic. To execute a quick stop from a lean, you must manage the limited amount of traction available.

You can preserve traction when stopping quickly in a curve by first straightening the bike to free up traction for braking, then applying maximum brake power in a straight line (Figure 2). You may find yourself in a situation where you need to stop quickly in a corner but must maintain your lean angle to avoid colliding with a guardrail or an oncoming car. The solution is to apply as much brake power as possible without losing traction and applying more brake pressure as the motorcycle slows and straightens.

Success at any of these corner braking techniques requires flawless execution, because traction is so limited. The best way to improve your cornering and braking skills is to practice these techniques in a parking lot or on some deserted street with clean asphalt and wide lanes.

Swerving

Sometimes an obstacle appears so suddenly that stopping is not possible. Under these circumstances, you will need to swerve. Swerving requires two forceful steering inputs that use a lot of traction, so it's important not to brake and swerve at the same time. Instead, brake first, then release the brakes to initiate the swerve, or swerve first and brake only when you have recovered and the motorcycle is straight.

Braking skills improve with continual practice. You will respond to an emergency braking situation effectively or not depending on what habits you've developed. Practicing maximum braking may feel intimidating, but it's a lot better to hone your skills before you're faced with the big test. ➤