



# ON TRACK ★ Slippery Shifting

By David Podolsky

To look at what a slipper clutch is let's start with engine braking and what happens without a slipper clutch. When you roll off the gas the bike slows down. Friction from the moving parts, like the chain and wheel bearings, has a drag affect, but the slowing engine also provides a braking force to the rear wheel through the crank/sprocket/chain.

The higher the compression of the motor and the bigger the pistons the more this effect is felt. Our Ducati 1098S has two 549cc pistons and a lot of engine braking. If you come up to a turn where you need to brake hard and reduce your speed quickly, this can be an issue.

Under acceleration the counter shaft sprocket pulls the top of the chain tight and the chain accelerates the rear wheel. When downshifting and decelerating the counter shaft sprocket tightens the bottom of the chain as engine-braking force is applied. If you decelerate very quickly your rear wheel will chatter as the motor slows the wheel to a speed that is slower than what you are traveling. This will make the motorcycle unstable and scare the hell out of you.

This is why you see and hear racers blipping the throttle as they drop into a lower gear; this blip of the throttle with the clutch pulled in revs the motor so when they

click into the lower gear and release the clutch it reduces the engine braking effect.

What does the slipper clutch do? I spoke to Joey Martinez, STM technical manager for FMF Racing, the importer for STM slipper clutches made in Italy. Joey says, "A slipper clutch makes every downshifting and deceleration situation easier to control, especially when entering the corner. With the STM slipper clutch the rider need only roll off the gas, brake and downshift into the gear he desires. There is no need to use the clutch lever, no need to blip the throttle and no chance of locking the rear wheel. The slipper allows the clutch to be slowly engaged automatically; it is consistent every time and is less fatiguing to the rider."

Joey continues, "The clutch has a ball and ramp system that reduces the reverse torque generated by engine braking.

When reverse torque is applied to the clutch the ramp/ball

system allows the clutch drum, which is two pieces,



STM slipper clutches are found on AMA, World Superbike and MotoGP machines as well as Supermoto and MX bikes.



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to separate. A stock clutch drum is one piece. This creates the effect of you pulling the clutch lever in and letting it out very slowly so there is very little engine braking. Once back on the gas, the clutch works as normal. It is interesting that even though this is a high-performance component (with AMA Formula Xtreme teams such as Erion Racing and Celtic Racing using the STM clutch) the STM slipper clutch actually makes the clutch plates last longer since the engagement is so smooth.”

After speaking to Martinez I was intrigued, but I have had so many years of racing single- and twin-cylinder bikes, and have

my throttle blipping technique perfected to the point that I was unsure how much help the slipper clutch would provide. The difference, I found out, is night and day.

At the Mid-Ohio track, where we were competing in the AHRMA Battle of Twins race, where the slipper made a big difference was the hard braking zone off the back straight where you need to slow from a top speed of 165mph to a third-gear corner of about 85mph. This braking zone is also a favorite passing place, so all riders are trying to brake late and deep. Eliminating the need to blip the throttle and modulate the

clutch allowed me to focus on only braking and steering.

I'm not sure if the big brakes on the new 1098S were helping, but the slipper clutch was making my job easier. Where last year this spot of the track was a weakness, this year it was my location of choice for passing.

On my drive home I thought of our races at Gingerman a few months ago where two left hand corners were so close together they were really one turn. The entrance to the first corner is open, but the exit out of the second one is tight. I wanted to enter in fourth gear, but couldn't get a good drive on the exit, and I couldn't shift while still leaned over to drop into third gear. I ended up entering the corner in third gear, which had the engine revving so high it was reducing my entry speed too much. The slipper clutch with its ability to reduce the reverse torque of the motor would have solved this problem.

Hmmm, when is the next race there? ☆



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David Podolsky is the founder of Chicken Hawk Racing, and is a nine-time national champion competing in AHRMA and AMA Sports Championships.

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