

Safety Tips #14

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The Power Band

For this month's installment, let's talk about a characteristic of motorcycle engines, and how we can use it to our advantage: the power band. Engines typically make more power at certain engine speeds (revolutions per minute – RPM – as indicated by a tachometer, if your machine is so equipped).

That zone of engine speeds at which the engine makes usable power is called the power band. Many things combine to determine where in the RPM spectrum any particular engine will make usable, or the best, power, and an explanation of those things is beyond the scope of this article. But we should know about how to use the engine properly and efficiently in order to maintain the highest level of control, and therefore of safety, when we ride. Keeping the engine in its power band is the job of the rider (obviously) but demands the function of a transmission to be able to accomplish the task.

Some engines provide good power at relatively low RPMs. Engines with fewer cylinders typically have this ability. Other engines require higher RPM levels to make their best power, and multi-cylinder engines are typical of that. Engines can vary greatly in this regard. I once had a Triumph Speed Four (four cylinders, totaling 600 cc) that made its best power at engine speeds between 8,000 – 14,000 RPM; if I tried that on my Harley (two cylinders, 1450 cc), the engine would fly apart! The Harley makes good power at engine speeds between 2,500 – 5,000 RPM; the Triumph made very little power in that range. The Triumph's was a much more efficient engine: it was capable of making more power than

the Harley's engine, and it was of less than half the displacement (cubic centimeters, or cubic inches), but you had to get those revs up to get to the power band. So I had to downshift the transmission often to keep the RPM up. And there's nothing wrong with that, as long as that fits into your riding style.

Engines run their best when they are used in their power bands. Revving them too low, called *lugging*, causes low performance and is hard on the machinery. Revving them too high can cause damage. Many machines have *rev limiters* to protect them from this damage. The maximum speed at which an engine is designed to be operated is indicated by the tachometer's red line. It's OK to run the engine up to the red line, but not a good idea to exceed it. When I got my very first bike I was told to never take the engine to the red line because the engine parts would be going too fast and the engine would wear out prematurely. This is only partially true, at best. At worst, one would never find out the performance capabilities of the machine and would not be likely to apply that performance should a riding situation call for it, thereby yielding an unsafe situation.

Read the owner's manual for the bike; look at the tachometer its markings. Ride the bike in a familiar and safe environment and observe the throttle response of the engine at various engine speeds. Then ride the bike in an RPM range that allows you to have good throttle response at whatever road speed you happen to choose, so that you can have power on tap if you should need it. We do this by being in an appropriate transmission gear. No matter what bike you are riding, you will have to shift in order to accomplish this at varying road speeds. An additional benefit of riding in the power band is that engine braking is enhanced: you can reduce your road speed significantly simply by rolling off the throttle.

So, you see that knowing about the power band, and riding accordingly, can make you a safer rider.