

## **Gearing Chart Explanation**

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Greetings,

Since I was the one who designed the gear charts, I thought I might try to explain their usefulness. Since posting the charts I have received several emails that have shed some new light that may be useful to others.

Basically, the ratios you see in the cells are the ratio of crankshaft rpm / wheel rpm. If you see a ratio in third gear (with one particular set of sprockets) the same or similar to the ratio posted for another set of sprockets in the same or another gear..... it is the same ratio. The bike will go the same speed, have the same torque, and perform essentially the same. This means for any given rpm, the wheel turns over (RPM / final ratio) times. It doesn't matter what gear the motorcycle is in. If a Zundapp scooter is turning 4200 rpm @ a 10:1 final ratio..... it is going exactly as fast as a CBR 1000 turning 4200 rpm @ a 10:1 ratio (assuming the same size wheel and tire).

Why is this useful? If you need to change gearing due to track conditions (lets say add two teeth to the rear) but you don't have the sprocket you need, look for the target ratio (the one you wish you had the sprocket for) and try to find it somewhere else in the chart. You may find it with a different sprocket combination in the same gear or in another gear with a still different combination. Also, when trying to maintain a certain angle of chain to swing arm for controlling "squat", you can focus on keeping the rear sprocket a certain size and trying to find the proper combination of front sprocket and gear selection that produces the ratio you're looking to use.

Between any two gears there is a certain gap between the transmission ratios (not the final drive ratios). For example, between 1<sup>st</sup> and 2<sup>nd</sup> gear on a 2005 YZF450 the gap is .37 but the gap between 2<sup>nd</sup> and 3<sup>rd</sup> is .28. This means that when shifting between 2<sup>nd</sup> and 3<sup>rd</sup> there is not as much rpm drop as between 1<sup>st</sup> and 2<sup>nd</sup>. This can be very important when gearing for small bore motorcycles, gearing for TT tracks, or any track where you need to shift.

I spoke with a racing dad who was having troubles with gearing. His racer was shifting the minibike (as is expected) but was running out of gear at the end of the straightaway and having to shift again. When he geared it for the straightaway, he bogged coming out of the turn. We did a chart and found that he was running in a gear that when shifted was very close ratio. The next set of gears up had a wider gap.

**Starting with the ratio that pulled well coming out of the turn**, we found a set of sprockets that matched that ratio (but was one gear up). Then, when he shifted (remember the wider gap), he didn't run out of gear at the end of the straight. Results: Good pull off corner, 1 shift, plenty of gear at end of straight. You can work this concept from either direction using the ratio that works well off the turn, or the one that works well at the end of the straight.

This concept can be applied to a TT where one corner shows an opportunity for reducing the number of shifts (while the competition is shifting twice). Conversely, if you happen to be in too tall of a gear in a particular section after shifting once (and so does everybody else) you can choose another set of gears where the gap is closer. The chart gives you a very visual picture of where you might be able to do this.

OK.... That's about it. Glad there is such good feedback. I have posted the original Excel file for everyone to download. I have added a column showing the "gap" that I explained earlier. All you need to do is have Excel, input the correct information and presto!!!

Now you don't have to deal with the internet charts, or wait for me to post your favorite year or model of bike. I suggest a \$2 donation to Flattrack.com if you download it. Hos deserves it. You can't even buy a hotdog at the races for that.

Any other uses for the chart (cigar lighting perhaps) would be interesting to read.

Rubber side down is always good....

John Dupree