

# Rennen.Tech.Talk

with George Costa

## California Gear? True or False!

Back in 2001 I first learned of the notorious “California Gear” I was attending a west coast national and had the pleasure of meeting Donny Robinson’s father. Donny was new to the Pro Class and was and still is known for his very large gear selection (large in size, not rollout). Being a fan of Donny, I wanted to find out what the reason was for this gearing choice. I decided to ask his father who was hanging out in the same section of the bleachers watching. Mr. Robinson was very nice and told me a story about some track dads who years ago had figured this out and influenced their decision.

### The Story of the California Gearing

As the legend goes there was a group of track dads years ago somewhere in California who had discovered that there was a combination of front and rear gear combo that although were mathematically equivalent to a more standard gear lets say 44/16, their new combination would provide an additional 1ft in true rollout! Donny’s Dad was not sure of the exact details as it was many years ago that they were exposed to it. One thing that he mentioned which I found to be a smoking gun was the fact that in order for this to actually work you had to use specific manufacturers Front chaining and rear cog combo and nothing else. This story blew me away that these track dads think that somehow they are cheating the system or getting something for nothing which we all know is never the case. What I do know is that it has caused great confusion and I frequently am asked whether Big Gearing is beneficial or provides more leverage.

The proof:

I am going to draw out a comparison with the Big Gear/Small Gear theories and show you the pros and cons. In figure 1. you can see our test example. “D” will represent the effective diameter of the Cog and or Front gear.

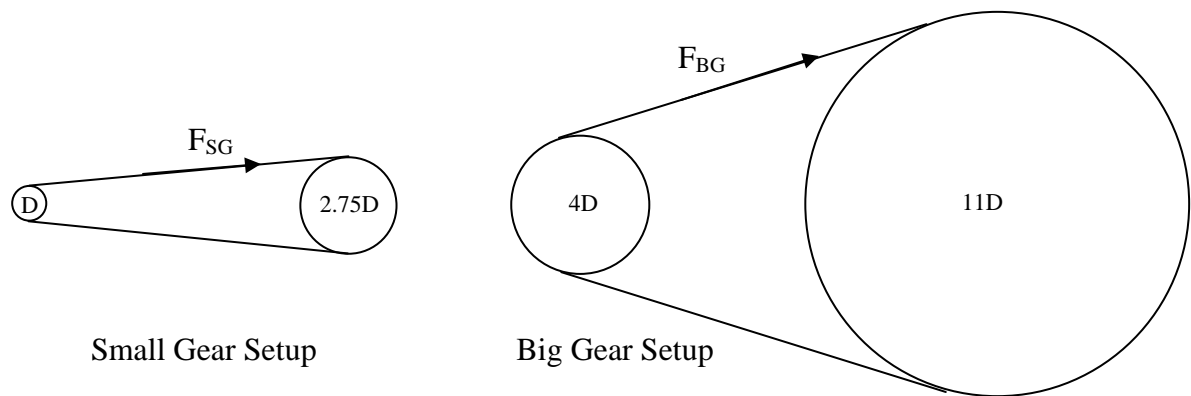


Figure 1.

I have drawn two gear setups that are equivalent to 44/16 ratio ie 2.75:1, The second big gear setup is 4 times larger than the small setup, just in physical size remember:

$$\text{Small Gear} = \frac{2.75D}{D} ; \text{Big Gear} = \frac{11D}{4D} = \frac{2.75}{1}$$

So the argument is that there is more leverage and therefore less effort to turn over these gigantic gears. Lets see if that's true.

Torque is a measure of Force times distance (T=F\*d) ; we will call this "T"

**Big Gear setup:**

$$T_{rider} = F_{BG_{Chain}} \times \left( \frac{11D}{2} \right)$$

$$T_{wheel} = F_{BG_{Chain}} \times \left( \frac{4D}{2} \right)$$

$$T_{wheel} = T_{rider} \times \left( \frac{2}{11D} \times \left( \frac{4D}{2} \right) \right) = T_{rider} \times \frac{1}{2.75}$$

**Small Gear setup:**

$$T_{rider} = F_{SG_{Chain}} \times \left( \frac{2.75D}{2} \right)$$

$$T_{wheel} = F_{SG_{Chain}} \times \left( \frac{D}{2} \right)$$

$$T_{wheel} = T_{rider} \times \left( \frac{2}{2.75D} \times \left( \frac{D}{2} \right) \right) = T_{rider} \times \frac{1}{2.75}$$

By rearranging the rider torque equations and substituting those into the wheel torque equations we can see the torque produced at the rear wheel is identical whether we are using a big gear setup or small gear setup so long as the gear ratios are truly equal!

Pros vs Cons

*Pros:*

**-Big Gears use less force exerted on the chain** (The first Child who can rewrite the some of the equations I have provided to prove this earns themselves a Free Rennen gear of their choice). I want to see the full proof, Send your information and answer to [George@RennenDesigngroup.com](mailto:George@RennenDesigngroup.com)

**-Big Gears allow smaller difference in gear changes** (ie 1 tooth on the rear in a 14T system is about 3 teeth change on the front vs 1T on a 19T system is 2.5T on the front)

**-Small Gear systems is lighter**

**-Small Gears are easier to find at a national**

*Cons*

**-Small Gears exert more force on the chain** (I will discuss this topic on the next installment of Tech Talk)

**-Big Gears systems are heavier**

**-Big gears are hard to find** Luckily at Rennen we have Cog/Gear combos available up to 25T/52T options with Decimal gears!

After Donnys Dad and I had our talk he said to me that the biggest reason Donny runs a Big Gear system is because he likes how it feels, which at the end of the day is the most important thing. I told him that feeling good about your hardware is one of the most important features of your ride and will instill confidence. At the end of the day he can win on anything but he chooses to run a certain setup which is fine by me.

This article was intended to provide some truth behind the Myth of the California Gear Next Month we will look at the forces in these two chain systems and provide some history also. I hope you enjoyed this month's installment of Rennen Tech Talk, as always stop by and see us at an ABA national near you.