Rennen.Tech.Talk

with George Costa

Dynamics of BMX: Power

What is Power?

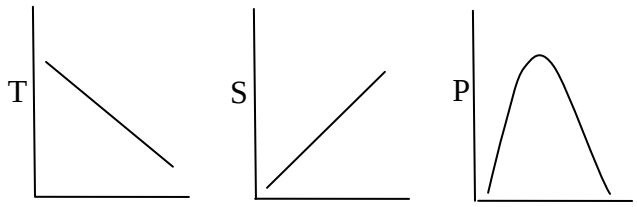
This month we will discuss the concept of power. In simple terms power is a measure of the amount of Torque that is applied at the pedals in conjunction with how fast you apply this Torque. The following equation describes the relationship.

$$Power = \left(Torque\right) x \left(Angular\ Speed\right)$$

Power is typically reported in watts or horsepower. A fun fact to keep in your back pocket is that 746W~1HP. Use this next time your at a party and you'll be sure to impress your friends.

It is clear that if you are looking to improve power output then there's only two things you can do. First is to apply more torque and secondly is to pedal faster. Sounds easy, but you have to keep in mind how this relationship behaves.

We all know that training in the gym helps us get stronger but it's a balance of strength and speed that help us apply lots of power to the pedals. Below I have drawn some simple graphs to help illustrate this concept of Power.



Torque (S) typically for a rider starts out very high because we are given it all we got and the bike hasn't moved yet. In this case we are trying to overcome the mass and inertia of the bike plus rider.

Speed (S) for a rider starts out at zero because the bike hasn't moved yet and then increases from there.

Power (P) starts off at zero then increases to a maximum and then decreases when the rider has fully accelerated the bike and doesn't need to do very much in order to maintain that speed.

The maximum of power occurs exactly at the intersection of the Torque and Speed Plots, which illustrates the need for a balance of both aspects of your performance.

In Figure 1. we can see a real life power profile of a ABA Vet Pro and it is clear that the power profile maximum occurs just before the rider reaches 20mph.

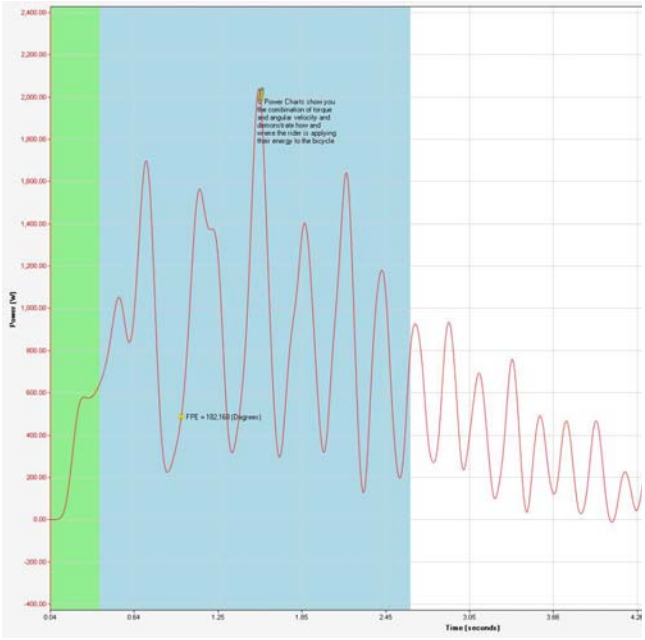


Figure 1. Power vs time for a sprint

We can also see that the power is not smooth and consistent like I earlier showed. This is because in real life humans are not machines (Unless your Maris). We all have dead spots in our pedaling and having a BMX powemeter like G-Cog shows you very clearly how good or bad your pedaling actually is.

We will continue to use G-Cog in upcoming Tech Talk installments to help us really examine some of the dynamics of racing. For those of you interested the data presented in Figure 1 is of your Vet Pro Rider and G-Cog test pilot Mr. Tim Dinger.