The Science of Olympic Bike Racing

By: Hunter G.

Ever thought about the bikes that the Olympic bikers use in the competition? You might know that they are expensive, but there are many more aspects to a racing bike than the price, such as the tires, the aerodynamics, and the mechanics. The bikes that the Olympic riders use are very high tech, compared to their road-going counterparts. They are built to race and win, more than to enjoy.

Let’s start with the tires. The tires are specially engineered to create as little resistance as possible between both the ground and the air. They are filled to the brim with air, sometimes around 120 psi (pounds per square inch), which is a lot, considering the size of the tires (the tires the Olympic bikes use are only about a centimeter tall and a centimeter wide. That’s only about the width of your thumb). This pressure keeps as little of the tire on the ground as possible, creating less rolling resistance and more speed. Rolling resistance is the friction generated by too much grip. However, too much rolling resistance could cause wheel spin and sliding. This could cause serious injuries from sliding off track or into other riders. You wouldn’t want that, would you?

 Next is the aerodynamics. The ordinary road bike is very poorly designed when it comes to aerodynamics. They tend to have lots and lots of air resistance, which in turn slows the bike down. However, race bikes are very aerodynamic, with a slim design and low profile. This causes the bike to have less air resistance, and an easier ride. Some bikes even have flat, hubcap-like rims, which slip through the air with ease. While all this is good for the bike, the rider is a different story. The human body is not really made to cut through the air. The human body has very poor aerodynamics. Therefore, the rider will wear sleek, tight fitting clothes to cut through the air. Another solution to the body’s poor aerodynamics is to hunker down to where there is less air resistance on the rider’s body. Also, companies make handlebars to where the rider can lean on them. These are called bullhorns, because of their resemblance to horns.

 Finally, on to the mechanics of the bike. This includes the gears and chain, as well as the steering and braking. The gears and chain are very important in the biking world. You may need to go up a steep hill, so you will change into a lower gear to ease the climb. If you're on a flat surface and can pedal easily, you may shift into a higher gear to speed past the other cyclists. This can help to save the cyclist’s energy for the final stretch. Also, it can help to climb and speed on hilly areas. Now on to steering and braking. Steering is very important. If you don’t steer, you will likely go flying off a cliff. There are many techniques to steer, but the most significant is to counter-steer. If you have watched the biking events, a cyclist will usually lean the opposite direction of a sharp corner before leaning into the corner. The momentum of the cyclist will help to take the corner sharper than it would to just lean in. This can improve the rider’s speed around the corner, as well as their lap time.

 Now is there more to racing bikes than a $10,000 price tag? As said above, these speed machines take science, tech, and math to a new level, with the tires, the aerodynamics, and the mechanics. They slip through air with ease, power on with their gears, and resist resistance with their tires. This is a perfect example of science, technology, engineering, mathematics and sports going hand in hand.

References:

Spadaccini, Jim. “The Science of Cycling.” *The Science of Cycling.* Exploratorium. Info retrieved on 8/15/16. <http://www.exploratorium.edu/cycling/>