

TTIPS Vol. 1/22 - Insights Cycling Aerodynamics

This week let's discuss cycling aerodynamics, or simply put, the effect of wind resistance on a bike rider. But first, a question for you. When geese are flying in a V-shaped formation, do you know why one leg of the "V" formation is longer than the other?

Answer: Because there are more geese in it. Ugh! Bad joke. Though that might be factually accurate, the correct answer is, the lead goose is breaking the head wind while those behind the leader are "drafting."

Of course, we take advantage of the same "drafting" phenomenon in cycling. But you already knew that from your experience, right? Okay good, but how much of an advantage do we get when we are following the lead rider? Good question. Except for rides in a strong crosswind, and at riding speeds exceeding eleven miles per hour (mph) riders in a direct line behind the lead rider enjoy approximately a 30-33 percent power advantage by "drafting" the leader. Want an example? For the sake of this example, let's say there is no wind, and the lead rider is pedaling 21 mph. Obviously, the lead rider is expending sufficient energy to move the bike at 21 mph. The following riders who are keeping pace are moving at 21 mph, but only need to expend approximately enough energy to go 14 mph. That's why bike companies and riders spend lots of money to improve their aerodynamics. Thus, our helmets are carefully shaped, our road bikes are built to move efficiently through the wind, and our riding clothes fit snugly to our bodies. Of course, we rarely, if ever, have zero wind and rarely is the wind directly on our nose for the whole ride. But trailing riders always have some energy savings over the lead rider.

If crosswind is negligible, you can derive some advantage as far back as ten bike lengths, albeit very slight. The closer to the lead rider the better. BUT....for safety, you should stay about one bike length from the bike in front of you and certainly no closer than one wheel length (circumference). Observing this rule-of-thumb will help to allow sufficient reaction time to the actions of the rider in front of you. Never, ever overlap your front wheel over the back wheel of the bike in front of you.

So the moral of the story is, let someone else lead. And by the way, the real reason why most of the geese follow in a V-shaped formation is because the lead goose has the map.

See you next time.

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