INTO THE RIDE #45

The Path of Least Resistance

by Randy Schlitter

Several hundred pounds of air is displaced by a passing truck…energy you can use to your advantage.

Powered plane pilots learn how to work thermals to increase speed or climb. Doing so can noticeably increase the cruise speed, reduce fuel consumption, and make a flight more rewarding. As an avid cyclist I have noticed there is a similar effect in road riding, and armed with knowledge and a willing pair of legs the path of least resistance can be explored.

The path of least resistance is something we should take advantage of when expending our own energy for transportation. This commonly known phrase was used by a top-notch mountain bike racer during a mini clinic. It was such an obvious thing to do, but until that pro-racer phrased it that way, it escaped me. Ever since the clinic I have been applying the idea to my mountain bike efforts. I was guilty of the very thing the racer avoided. I thought because I had a shock fork just plowing over whatever lay ahead was cool. It was refreshing to note how he gingerly navigated around the obstacles to keep his energy up and the path smooth. That bit of advice improved my pace and enjoyment of single track riding.

On road rides there are few obstacles that compare with single track. There is however, one big force de' resistance, the air. During road riding, depending on the location, we get passed by many trucks and cars. An average car displaces about 25 pounds of air, and the average semi-truck 315 pounds. The energy packed into this displaced air mass varies with velocity and air density, but knowing these rough weights gives insight to the force present. Imagine the force 315 pounds of air (4256 cubic feet) being slammed out of the way at 70 MPH.

When we ride we feel this force as either a sudden lull in the head wind, or a sudden increase. In the 70's we coursed the Kansas roads using Sailtrikes, and became very aware of these forces. Having a 30-square-foot sail and a wide track recumbent trike made for copious amounts of drag. We simply held a steady course and let the sail cash in on the energy bonus. On a road bike, CF, or recumbent one can also take advantage of such energy.

Visualize the air…it is not a smooth or constant force. If you could see the air flow as lumps of translucent colors varying from light to dark to denote less or more force, you would learn to ride around or duck through the dark spots, and speed up in the light ones. That is what you can do to some extent when road riding, by learning to react to the change in the force of the air resistance.

A fun experiment: Using a cycling computer, do a tail winded road ride. As you hear an approaching car start kicking up the pace with a mini-sprint. Note the speed you are prior to the sprint. As the car passes try to stay in the draft of the vehicle for as long as you can. Note the speed change, and how long you can sustain the increased speed after the car passes. You should see a healthy jump and be able to sustain the increased speed for several seconds or even a minute. It will far surpass a mini-sprint minus the passing car. If timed right it can mean a dramatic increase in distance between you and a less alert rider, or an over-all higher cruise speed.

That is all fine and dandy on one-way roads, but opposing traffic is slamming that same mass of air from the wrong direction, taking away what you gain. If you are keen to the fact that opposing traffic on a tailwind ride is going to diminish your tailwind, you can minimize the loss. If you can make yourself smaller, that is tuck to an aero position, and pump up the torque to hold the pace as the wave hits, less speed will be lost. I find simply tucking helps heaps on the Zenetik Pro and with little-to-no increase in torque required. The bike is pretty high drag when not tucked, so the change is more noticed. I visualize it much like ducking under a wave when at the beach; only you can see the wave coming. With an airwave you just have to develop a sense of timing.

When riding into a headwind you can take advantage of the breaks passing traffic provides. This lull will come only with traffic from behind; head on vehicles will be increasing your headwind. Tuck into the wave in that case.

The burst of head and tail winds thrown at us from passing traffic are like the thermals pilots experience while flying. And because they are perpetrated by visible vehicles, it is much more predictable and easy to develop a routine of tucking and sprinting to slingshot your way to the front of group or keep gaining after a break-away.

The wind alone is more difficult to read. It remains invisible, with no cars or trucks announcing its approach. Wind is not as constant of a force as one may believe. Wind is created by differential pressure, which is created by differential heating of the atmosphere, a constant process we know as weather. Many out here in Kansas claim the wind sucks, and that is exactly right, since pushing air is only successful for few meters. Movement of air mass from a high to low pressure is purely suction. Localized intense suction such as tornados is created when temperature differences are high enough between meeting air masses, and can impart excessive energy onto a cyclist. The combination of uneven heating and terrain result in gusty winds. Regions, like Kansas, are famous for gusty winds, since it is not truly flat or even in temps. Air is also very stretchy as it gets moving, taking time for the whole mass to come up to speed causing the variance in velocity. Fronts illustrate this phenomenon quite well, announced by a gusty entry and more steady flows after passing.

Understanding the wind and the mechanical influence applied against the air mass by vehicles can only mean good things for a cyclist learning to find the path of least resistance. Next time out try to catch and ride the breaks in the breeze the passing traffic provides, or learn to sense the modulation in the “steady” breeze, learning to tuck and sprint with the flow. It makes riding more rewarding, just like it does for the pilot trying trade turbulence for speed. In either case speed is enhanced and the path less resistance is found. Until next month, stay safe and stay into the ride!