

Pace Line Basics

By Al Burdulis

Since many of the club's newer riders are beginning to ride faster I felt it might be helpful to introduce a term to your cycling vocabulary: *Pace line*.

Pace lines are those neat single file lines you see in the Tour de France and it's a great way to cover a lot of distance fast, with much less energy expended by everyone in the group. The concept is that wind resistance is your enemy (as much as 40% of your energy is spent overcoming wind resistance) and by following someone close behind you can use less energy. Of course the person in front will be doing most of the work so you trade off turns at the front so that every one gets a break.

A word about risk. The efficiency of riding in a pace line comes at the cost of added risk. Riding in a pace line is not as safe as riding by yourself. If the rider ahead of you (or behind you or on either side for that matter) does something unexpected, you could find yourself on the pavement in an instant. Don't ride in a pace line unless you're willing to assume these risks!

There are three basic rules to Pace line riding:

- 1) Don't do anything suddenly!
- 2) Don't do anything suddenly!
- 3) DO NOT DO ANYTHING SUDDENLY!!

This may sound obvious but it is the key to a good pace line. The best way to start out pace line riding is with a partner you trust who is a smooth rider (i.e. as smooth or smoother than you). Start out following him or her with about 2 feet of space between your bikes (or greater if your not comfortable that close). Gradually close the distance to whatever your nerves can stand. Ideally you want to be 6"-12" away, although as you can see from Fig 1, you can get a good draft a wheel's length away, so getting too close is not absolutely essential. It is also important that you do not ride up along the side the rear wheel of the person in the pace line ahead of you, this is called "overlapping wheels" and can cause a fall if the person ahead of you swerves to avoid an object in the road.

Fig 1 - The Effect of Drafting

Wheel Gap in Feet	decrease in resistance
.5	44%
1.0	42%
2.0	38%
3.0	34%

Start out riding a pace line with just two riders and do it on flat ground. It is a good idea to split your attention between watching the rear wheel of the rider ahead of you and glancing over his or her shoulder to see what's ahead. The lead person should be watching ahead and giving verbal cues along with GRADUALLY moving over for the ever annoying... er.. present, runners in the bike lanes (we don't ride on the sidewalks, why do they run in the bike lanes?). Later, as you develop more confidence in your (and the rider in front's) ability you can begin to reduce the distance between you. Be sure to "guard your front wheel" as it is the key to stability. If you do bump another rider, don't panic or make a sudden swerve, just move away from the interfering rider. One of the drills practiced at bike clinics is bumping and riding arm-in-arm on a grassy field. It's fun and teaches you that just because you bump or are bumped, doesn't mean you're going down.

There are other rules just as important:

Pedaling

Don't stop pedaling (see rule 1). if the speed of the pace line slows just pedal around slower ("soft pedaling" -- pedaling without applying a lot of force to the pedals), this keeps your pedaling motion going and prevents you from unintended acceleration when you go from motionless to pedaling again. It also prevents the person behind you from being startled. You can also reduce your speed without braking by raising your body to create more air resistance or moving over slightly out of the draft of the person ahead of you, but don't raise up off the saddle!

Braking

Basically, DO NOT (see rule 3). The person ahead of you must let you know about upcoming obstacles and if you are at the front you should give plenty of warning if you are going to stop for a signal. If you have a problem (flat, chain

came off, etc.) just yell "chain, flat, stopping, etc." and pull out of the pace line and coast until you are clear and can stop without endangering other riders.

Gear Changing

Try and stay in a gear that you can spin around at 80-100 RPM. The brake lever shifters (STI, Ergopower) are nice because they allow you keep your hands on the bars and shift which doesn't cause wobbles like the down tube shifters do. If you have down tube shifters you may have to refrain from changing gears as often as you would when riding alone.

Hills

Generally pace line and hill should not be used in the same sentence. Everyone has a different climbing style and unless you are familiar with the rider ahead of you may end up in a ditch from an overlapped wheel. Gradual hills are fine, just increase the distance between you and the bike in front of you and try not to accelerate up the grade (it's OK for your pace line speed to drop 2-3 MPH or more on an uphill drag). Oh yeah one more thing **NEVER GET OUT OF THE SADDLE IN A PACE LINE!!!** When you get out of the saddle you tend to throw you bike back 6-12" which will definitely cause a crash!

If you must stand up to make it up the hill and someone is close behind you, an advanced technique is to push down hard on the pedal as you raise up off the saddle. This compensates for the tendency of the bike to move back as you raise up. Practice this riding alongside someone going uphill before trying it out in a pace line. Likewise give an extra hard stroke as you sit down to avoid slowing during the transition to seated climbing.

Unintended Acceleration

Another thing to watch for is unintended acceleration. First made popular by Audi in the late 70's, it was actually first used to describe the phenomena of being "off the front" of a pace line which generally irritates everyone in the pace line. It happens when you get to the front and subconsciously you feel that you are not moving fast enough so you pick up the pace without realizing it. At some point you look back either to see no one, or a bunch of really annoyed riders.

Everyone has done this accidentally at some point (yes, even our editor) [*That's a lie, I do it intentionally. -ed.*] and you can avoid it by looking at your computer (yes Brandon, they are useful) and noting the speed before taking a

pull at the front. Stay within 1.5 MPH or less of that speed and avoid looking like a wanker!!

Multiple Riders

Once you feel comfortable riding with another person in a pace line you can graduate to multiple riders. This gets a bit trickier since you are dealing with more than just two people. Everyone has a different comfort speed and this really shows up in multiple rider pace lines. Again, watch your computer and try to keep with 1/2 MPH of the last leader's pace. If you find the pace too fast, take a shorter pull at the front, or better yet "pull through and off which means when you get to the front just pull off without

taking a pull at the front. When pulling off the front of the pace line ease up on your pedaling but don't stop, the idea is to get to the back of the pace line as fast as possible in order to get a break from the wind. As you get toward the back of the pace line, gradually increase your pedaling speed to match the pace line speed and pull in behind the last rider. Be careful to make sure that the rider you pull in behind is the last rider, More than one crash has been caused by someone pulling into another rider thinking they were at the end. (Another reason to keep the gap between you and the next rider at 6-12"). Even good riders have trouble in multiple rider pace lines, the best remedy is practice.

Echelons

Echelons are used extensively in team time trials and you may have unconsciously used them in your daily riding. Usually the wind is not head on to the riders in the pace line and may come from one side or the other to the direction of the pace line. In this case you will see the riders following to the side of the rider in front of them. The technical explanation is termed "relative wind" but is best explained by experimenting with a friend the next time you are in a crosswind. If you notice you are still feeling a headwind when following another rider pull off slightly to

one side (away from the wind) and see if this helps block the wind. Remember to stay out of traffic and don't overlap the wheel in front of you, even if you are off to the side the front rider can still swerve over and take you out.

Dual Pace Lines

Dual pace lines are used with larger groups (8-15 riders) as a way of keeping the group from stringing out too far behind. It also has a pleasant side effect of

enhancing communication within the group. It is really just two single file pace lines put side by side. The rotation can be done two ways. Normally the lead rider pulls over to the side away from the wind, and the rider at the end of this line moves over into the end of line on the wind side. This has the effect of creating a continuously rotating pace line.

Where there is lots of road and no traffic, this can also be done by having both the riders at the front come off the front to the outside of the dual pace line and drift to the back. Note that the California Vehicle Code requires riders to stay to the right unless they are passing another vehicle (bike or car), or avoiding debris in the roadway.

Duties of the Lead Rider

In a smooth running pace line riders do not have time to see and avoid obstacles, such as rocks, holes, cracks in the pavement, old muffler pipes, cans of Bud, etc. The riders depend on the lead rider to be the eyes of the pace line and to either point out or shout out a warning, (rock right, runner right, car up, etc.) These warnings should be passed down the pace line by each rider. If you don't feel comfortable taking your hands off the bars to point out a rock, just shout "rock right (left)".

If the pace line needs to slow down because of a stop sign, car turning ahead, or whatever reason, the leader must shout out a warning, "light up" [*meaning a stoplight, not time for a Marlboro -ed*], "car up", etc., and the following riders must pass the word.

Drinking and Foreign Substances

It's probably best to get a drink when you're at the back of the line, so you won't mess someone else up if you swerve while swigging your favorite tonic. The same goes for spitting, this is best done when you're the last rider. Projectile vomiting and excretion in the pace line is discouraged by the CVC.

Problem Riders

Occasionally you may be troubled by other riders who don't hold their line, stop unexpectedly, etc. Don't ignore this, often it's just a matter of education. Please talk to the offending rider in a polite way, asking him or her to refrain from the problem behavior. If you are reluctant to do this, ask one of the ride leaders to handle the problem. Safety is every one's concern!

Being Smooth

The best pace lines have the smoothest riders and the smoothest riders got that way in one of two ways. either by riding the track or by riding rollers. I do not recommend riding the track right off because it is just downright scary, they won't fit in you living room, and they are rather expensive.

This leaves rollers. (Not the same thing as a wind or mag trainer!) Rollers are three drums 6 inches in diameter, Your rear wheel sits between the two rear rollers and you front wheel sits on the front roller. The middle and front roller are connected with a belt. There is nothing to physically attached to your bike to hold it up, therein lies the secret to being smooth. When you ride your bike on rollers the wheels spin and it is this action that accelerates the wheels and creates a gyroscopic effect that gives your bike (and you) stability to stay upright.

The reason rollers are good at making smooth riders is that they amplify any movement or steering on the bike. Subtle shifts of body weight while riding rollers will cause wobbling, likewise steering input to the handlebars. It takes about three or four hours for a reasonably coordinated person to ride the rollers without assistance from crash pads, pillows and friends, and you will fall down (at least once). The best advice is not to try this on a hard surface. Once you have mastered riding rollers on your own you will be amazed at how much smoother you are on the road. This will translate into a much more enjoyable and confident pace line rider.

We will be trying out pace lines with the Saturday sport ride as conditions warrant (i.e. wind, interested riders ride length) and everything will make a lot more sense once you have experienced them on the bike.

*[Al Burdulis, better know as **Burdman**, rode for the UCSB Bicycling Team]*