

Drafting and Pacelines

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A paceline is a very efficient and enjoyable form of cycling teamwork. By sharing the work of overcoming air resistance, members of a paceline can ride significantly faster with less effort than would be possible for any of them individually. And the process of riding precisely and cooperatively with other skilled riders, exchanging the lead smoothly and precisely, is an extremely enjoyable experience.

Like any athletic endeavor involving teamwork, there are a number of skills that must be mastered. Some are individual skills, and some are group skills. How well a paceline works, and how much fun it is, depends on how well the riders have mastered these skills.

Ultimately, paceline skills are mastered only on the road, by practicing with other riders. But it's not easy to learn them only by observation, because there are many skills to master, and many of the skills are subtle, not easily observed and imitated.

What follows is a list of things to pay attention to as you learn to ride a paceline. The list is somewhat long, but don't be discouraged. Concentrate first on the safety tips, and you'll soon find that some of the skills become second nature, allowing you to concentrate on others. Before long, you'll be enjoying paceline riding, and your fellow riders will feel safe and comfortable with you!

Safety First

- In a paceline, each rider is responsible for the safety of the entire group. When riders accept this responsibility, pacelines are extremely safe. When riders fail in this responsibility, people get hurt, sometimes seriously.
- Leave enough space between your front wheel and the rear wheel of the rider ahead of you. See "How Close?" below.
- Never overlap wheels with the rider in front. If she moves to the side, she could take you down.
- Ride in a straight line so that you're easy to follow. Never swerve around an obstacle. If you can't avoid an obstacle without swerving, it's better to ride over it, at the possible risk of a dinged rim, than to swerve and risk taking down riders behind you.
- Ride at a steady pace so the rider behind doesn't have to change speeds. Be especially conscious of this when you get to the front of the line. The increased effort needed can

easily result in either surging or slowing down. Keeping an eye on your speedometer will help prevent this.

- When you're at the front, it's your job to watch the road for hazards and to point out obstacles. You should lead the line in such a way as to leave plenty of side clearance between the line and the hazards. You should signal hazards, and call them out depending on seriousness.
- When avoiding a road hazard, or passing another cyclist, give warning ahead of time and move left gradually so that the entire line can follow you smoothly.
- It's also your job at the front to warn the entire group when approaching red lights, stop signs, and any other situation which requires the group to slow or stop. Make sure you warn the group first, before you slow your pace. If you slow at the same time you warn, riders could overlap wheels and fall.
- Don't cry wolf by signaling or calling out minor bumps which can be easily ridden over. Save your warnings for actual hazards.

Risks

Consider the following scenario. In a ten-person paceline, there's a minor pothole that the leader doesn't see and doesn't warn people about. The leader rides to the left of the pothole, but her line is fairly close to it. The next three riders are fine. The fifth rider in line is a bit further to the right and, about to hit the pothole, swerves left to avoid it. While swerving, he naturally slows a bit and the following rider ends up with her front wheel overlapping his rear wheel and then being pushed to the left by it. As a result of losing control of her front wheel, she falls, and the last four riders crash into her and fall also. The result: one broken collarbone, five cases of road rash, multiple bruises, and some very hot tempers.

- Even though the crash happened six riders back in the line, the leader made the original error by taking a line that was too close to the hazard and failing to point out the hazard.
- The fifth rider made the second error. By taking sudden evasive action to avoid the pothole, he caused the five riders behind him to crash.

- Neither of the riders responsible for the accident fell. The risk, the pain, the medical bills impacted only the riders behind them.

The morals of the story:

1. You are your brothers' and sisters' keeper in a paceline. You're responsible for safety of others
2. By riding in a paceline you accept the risk that you could be hurt through no fault of your own. If you're not willing to accept this risk, don't ride in pacelines.
3. Exercise good judgment about whether or not a paceline is safe. If you're in a paceline and see a rider swerving around obstacles or behaving unsafely in any way, get out of that paceline.

General Tips

- Don't get on someone's wheel without them knowing you're there. Even a normally steady rider may make an unexpected maneuver if she doesn't realize anyone is on her wheel.
- Be sure to watch the riders three or four ahead of you in the paceline. Use your peripheral vision to keep track of the rider directly in front of you. If you're concentrating only on the rider directly in front of you, you won't be able to react quickly enough to changes of pace, obstacles, and other disruptions.
- Often you'll be able to pick up a slight decrease in speed by noticing that a rider in front of you has stopped pedaling. You can almost always notice this more quickly than you'll notice the reduction of speed.
- At first, you'll need to judge distance by regularly glancing down at the wheel of the rider directly in front of you, but you will soon learn to judge this distance while looking ahead instead of down.
- Don't ride tri-bars. They reduce your control, and using them in a paceline is considered dangerous. If you have them on your bike, don't use them. (The only exception is teammates practicing for or participating in a team time trial.)

How Close?

- When you're new to pacelines, half a bike length behind is plenty close enough.
- As you get comfortable with your paceline skills, and as you develop confidence in your fellow riders, reduce this distance gradually. Eventually, with smooth trustworthy riders, you can reduce the distance to between six inches and a foot.

- Leave more space — lots more space — if the rider you're following is squirrely or irregular. Better yet, get out of the line entirely!
- Leave more space if you don't know the rider in front of you. Sometimes riders who appear smooth may do something unexpected due to a road hazard or some other reason.
- Leave more space as you approach a light, a stop sign, possible cross traffic, or any other situation the group might have to adjust to.
- Leave more space when you're getting tired and are in danger of losing concentration. If you're losing concentration, you should seriously consider getting out of the line.
- The closer you get to the wheel you're following, the more help you get from the draft. As you get smoother and more comfortable, you'll feel the difference between a three-foot gap and a one-foot gap.

Smoothness

- By watching riders ahead and anticipating minor changes in the speed of the line, you can help to make the line smooth, avoiding the need to accelerate to close a gap or to brake as riders ahead bunch up.
- If you do find gaps opening in front of you, try to close them smoothly, without accelerating suddenly and without braking when you reach the wheel in front.
- If you find gaps opening repeatedly, ask yourself whether the paceline is irregular, or whether you're struggling. If the paceline is irregular, don't ride in it. If you're struggling, skip pulls. (See below for how to do this.)
- Don't ever get out of the saddle in the middle of the line. Doing so moves the bike backward (relative to the line) between six inches and a foot, risking overlap with the rider behind you. If you want to get out of the saddle periodically, to change your position, stretch your muscles, and so forth, do so when you're at the back of the line. Similarly, drinking from a water bottle is best done at the back of the line.
- When you come to the front, be sure to maintain the speed of the group. You need to increase your effort in order to keep the speed constant. It's easy to misjudge the additional effort needed once you're in the wind, and either slow a bit when the headwind hits you, or accelerate as a result of your eagerness. Watch your speedometer until you get used to how it feels.

- Keep an eye on your speedometer while you're on the front. If you find yourself slowing down during the course of your pull, increase your effort and shorten your pull. If you can't pull off because you're not clear yet of the rider in the recovery line, you must put out the effort to get past her. Slowing down in this situation just prolongs your agony, by leaving you no way to get off the front.
- As you get ready to pull off, you need to look around to make sure it's safe to do so. The natural tendency at this moment is to slow down, because you're turning your attention elsewhere. Avoid this tendency; it can result in overlapping wheels at the most dangerous time. In fact, a bit more effort in anticipation of pulling off is a good idea, in order to avoid a problem if the rider behind you has gotten a bit too close.
- On an uphill stretch, the leader should moderate her effort to make sure others are not dropped. The advantage of a paceline is much less when riding uphill, so riders who can keep the pace on the flat can easily be dropped on an uphill.
- On a downhill stretch that's smooth and straight, it's a good idea for the leader to increase her effort. If the leader coasts, or even keeps up the same effort, following riders are likely to need to use their brakes. By increasing her effort, the leader can alleviate the need for the rest of the line to brake.
- On any downhill stretch, but especially one that's curvy or bumpy, leave extra space between wheels. You need a little extra space because you have less time to react. In addition, at high speed the draft of the rider in front of you extends farther behind her, so you can still get plenty of advantage without being as close.

Formations

- Rotating paceline. (This is the most efficient formation when a group contains at least 5 or 6 evenly matched riders.) The line consists of two rows of riders rotating in a clockwise direction, with the left line advancing and the right line recovering. As each rider comes to the front, she maintains the pace for 20-30 pedal strokes, until her back wheel clears the front wheel of the rider who has just pulled off. She then pulls off to the right and slows slightly, allowing the next rider to pull through. As that rider pulls off, she picks up that wheel, and continues drifting back, staying on the

wheel of the rider in front of her, until she's the last in the recovery line. As the rider who was behind her pulls by in the advancing line, she moves left and accelerates slightly to pick up that wheel.

- A bit of trivia: Clockwise rotation is the norm in the Bay Area, but in other parts of the country counter-clockwise rotation is more common. (In a crosswind, experienced riders even determine the direction of rotation according to the wind, so that the advancing line is to leeward and the recovery line to windward, minimizing the risk of wheels overlapping when the front rider pulls off.)
- Double paceline. (This is primarily a social formation; it allows riders to ride side by side and converse.) Two rows of riders, but both lines stay at the same pace, with riders side by side. The lead riders stay on the front for a minute or more. This is not too difficult because the pace is usually not as fast as a rotating line. When they're ready to pull off, the front left rider moves left and then slows slightly, and the front right rider moves left into the spot just vacated (being sure that she's clear of the rider behind). As the first rider to pull off drifts back, the rider who had been front right moves further left, allowing the next two riders to pull through.
- Team time trial. (Most efficient for 2-4 riders.) This resembles a rotating paceline, but the pulls are somewhat longer, and as each rider pulls off, she drifts to the back fairly quickly, without waiting in the recovery line for the next rider to pull off. Her objective is to get to shelter at the back of the line reasonably quickly, but not so quickly that she's lost too much speed and has to struggle to accelerate and catch the last wheel.
- Pacelines in endurance rides often follow a similar format as a team time trial, but with considerably longer pulls, sometimes several minutes in length. The resulting paceline is necessarily slower (appropriate for such an event), and has the advantage of providing following riders with extended periods of rest.

Traffic

- Because it's two abreast, a paceline can easily obstruct overtaking auto traffic. If the lanes are wide, the paceline should stay well right to allow cars room to pass. If the lanes are narrow, take the full lane, so cars don't try to squeeze by dangerously.

- When traffic is stopped at a light, stay behind the last car, rather than threading up alongside. A car passed in this way could end up dangerously in the middle of the paceline, or the driver could become angry and make an ill-advised attempt to pass.
- It's dangerous to take a long paceline through a yellow light, particularly if there are gaps in the line. It's the responsibility of the lead rider to make sure the line stops — safely — in such situations.
- When a paceline is turning left, it's safest if the riders at the rear can determine when to move to the yellow line, and call out "Clear back!" to the riders in front of them.

Communication

- When you're at the front, you're the only person with a totally clear view of what's ahead, so you have the responsibility of keeping the rest of the line aware.
- Point out minor obstacles and road debris, while moving the line smoothly to the side so that everyone can avoid them safely.
- Call out more important risks (holes, approaching stop signs or red lights, etc.)
- Warn everyone before slowing the line, and make sure your warning precedes any actual reduction in speed.
- If you're in the middle of a long line, try to repeat the leader's warnings for the benefit of those behind you.
- If you're in the middle or at the back and the pace is so high that a gap is opening in front of you, call out and let those in front know. It often happens that the front rider gets excited to be at the front and pulls a little too hard without realizing. This can fracture a paceline even when there's no intent to do so. The front rider cannot easily see what's happening farther back, so other riders should inform her.

Skipping Pulls

- If you're having trouble pulling through when it's your turn, or if your speedometer shows that you're slowing down during the course of your pull, or if you find it challenging just to stay close to the wheel in front of you, you're better off skipping pulls, at least until you've recovered and are feeling strong again.
- The natural inclination when you want to skip a pull is to stay in the advancing line and drop back, leaving a gap for the last rider in the recovery line to drop into. This is wrong for two reasons: It leaves you

unprotected, and it doesn't make your intent clear.

- Instead, switch from line to line to stay on the wheel of the rearmost rider. When you're in the advancing line and the last rider in the recovery line comes even with the rider whose wheel you're on, switch to the wheel of the rider dropping back. When this rider looks to the side for the last advancing rider, she won't see you, and will know that she needs to switch lines. (You can make it a bit easier for her by shading your position a bit to the other side, to make sure she won't see you.) As she switches to the advancing line, you stay on her wheel. This way you're always protected, and nobody ever wonders whether they should move over in front of you or behind you.
- The result of this approach is that you're always protected from the wind, and you're almost invisible at the back of the group.

Summary

The main benefits of a paceline are (a) allowing everyone to ride faster and farther with less expenditure of energy, and (b) allowing everyone to have the fun of participating in a shared effort in which riders use their skill and experience to help each other.

Safety is the first priority. Ride safely and smoothly, and ride only in safe and smooth pacelines.

By riding in a paceline, you're assuming some risk of injury. If the line doesn't seem safe, get out of it.

By riding in a paceline, you're assuming the responsibility of doing what you can to make the line safe both for yourself and for others.

Keep the line smooth, with no surges, gaps, or swerves.

The more experience you have and the more skill you develop, the more fun pacelines will be.

Talk to each other. Each rider has a responsibility to communicate with the rest of the group in order to ensure safety and good teamwork.

Pay attention. If you're too tired to pay close attention to what's happening around you, you're too tired to ride in a paceline.

Have fun! The joy of a well-oiled paceline, allowing you and your fellow riders to move considerably faster as you change lead smoothly and protect each other, can be a wonderful part of your cycling experience.