

Riding the Paceline

Prologue

A pace line is a group of riders who trade off the lead to share the effort of riding in front so that the other riders can rest in the draft that is created. Some of the benefits of a paceline are safety, efficiency, and speed. Pacelines that lack discipline can be annoying and even dangerous.

Stage One - Basics

Group Interaction

Individual energy contributes to the group energy. How an individual interacts with the group is important and can have an impact on how easy or hard the ride seems to all riders. If the rider in front of you is predictable, then you are in a good position to understand what is about to happen.

Constant Energy Output

Riding the paceline is not about constant speed; it is about relatively constant energy output. Using constant pedal pressure is an effective way to produce constant energy output. Riders put out more energy uphill than downhill, and leaders work harder than others in the paceline. Non-leaders work less, so that they have energy to "pull". Overall, the group goal is uniform intensity, without undue speed variations in the paceline. As you are approaching the front of the paceline, take a mental note of how fast you are pedaling and then maintain the same cadence after the rider in front of you pull off. There's an implied contract with the group that you are the caretaker of the group's speed when you come to the front. Fast and slow riders alike should pay particular attention to detail here.

Safe and Smooth Paceline

Best behavior in the paceline is to maintain a constant distance between you and the rider in front of you. Make all your speed changes and moves smoothly, so that you are easy to follow. Pay attention and think about your effect on the group. Constant pedal pressure helps to maintain a steady speed and makes it easier for other riders to pace with you. Steady pedal pressure at a higher cadence is efficient, stable, and allows you to be more responsive to group speed changes that may occur. If you are drafting so well that you need to "feather" your brakes for long stretches, you may want to stop pedaling to let the rider behind you know that you are not putting energy into the pedals. Random speed changes have an "accordion-effect" that is disruptive to the paceline. Unnecessary side-to-side weaving is disruptive to the paceline. **Movements either by random braking or sudden movements to the left or right are detrimental to group interaction and can lead to crashes.**

Distance to Rider in Front

A tighter paceline is a lot more efficient. The distance between the rear wheel of the rider in front of you and your front wheel depends on trust and experience. If you are inexperienced and don't know the rider in front of you, stay within 2-5 feet of the wheel in front of you. This distance can be 1-2 feet if you trust the movements of the rider in front of you. If you and all the riders around you are very trustworthy and experienced, that distance can shrink to 6 inches, maybe less. Once the distance is established, it is best to maintain it by watching the front hub area of the rider in front of you. When doing this, you can see earlier the path the lead rider is taking as well as potential obstacles. For safety on fast descents, the distance can grow to a couple of bike lengths. In most situations, if you are two or more bike lengths back, you will not be in the draft.

Leader

- The leader decides what happens – for better or for worse.
- Maintain a relatively even pace.
- Give visual and/or verbal signals regarding road hazards.
- Pull on descent. On descent the front rider should still maintain moderate pedal pressure. If he doesn't, then the riders behind will be using their brakes too much.
- In a single paceline, the leader pulls off to the left.

- Short pulls. Pull to the top of the first hill.
- If you are tired when you come to the front, ***do not pull***. Rotate to the back of the paceline. This is the best behavior for the group. Pulling when tired risks slowing the group. Save your energy - stay with the group and don't get dropped.

Do

- Look ahead; pay attention; brake gently.
- Stay in sync with the person immediately ahead of you.
- Maintain a straight line while riding in close quarters.
- Remain attentive to what's going on, even in "safe" situations.
- Make others aware of individual / mechanical problems with verbal signals.
- Ride on the brake lever hoods for best and quickest control, unless you are in the lead.
- NOT use heavy braking unless you are slowing or stopping for traffic or traffic controls – then alert riders with voice and/or hand signals.
- NOT make sudden movements either by random braking or sudden movements to the left or right.
- NOT make random speed changes while participating in the paceline
- NOT overlap the wheel of riders in front of you. Wheel contact in this situation will often cause you to crash.
- ***NOT ride on aerobars in the paceline, unless you are in the lead.***
- NOT zone out while staring at the wheel in front of you. Look up every few seconds and look at what's happening 20 or 30 feet ahead.
- NOT let your bike kick backward when you stand. Do a couple of progressively harder strokes right before you get out of the saddle, then an even harder stroke as you stand. It takes considerable concentration to stand without letting the bike kick backward, so you should say "Standing" just ***prior*** to standing – not during or after.

Stage Two - Refinements

Group Interaction

Good of the Group

The paceline works best with trust, tight discipline, and cooperation. At higher speeds, these elements become even more important, as do riding basics. Riding the paceline is a learned skill, because it involves the good of the group, which is not intuitively obvious to all individuals. When exhausted, the individual naturally thinks of himself. When you are riding at your limits, please do not forget the importance of working with the group, for your benefit and for the benefit of others. The majority of paceline rides work best if conducted like a team time trial, keeping the group together at a higher speed. There is often an explicit or implicit agreement that the ride becomes a race in the latter stages.

Ride Host

By convention, the ride host specifies the course, start time, and start place. The host also specifies the pace and general rules; the rules may be tightly or loosely defined. The host may also make requests during the ride, in the manner of a director or coach. Examples of requests:

- Riders off the back – wait and re-group
- Leader – give us momentum into this next hill
- Pick up the pace

Individual Responsibility

The paceline achieves higher speeds due to group efficiency through teamwork. Individuals should be concerned about group efficiency as a means to speed. This efficiency is achieved when individuals are consistent and predictable. The individual needs to make sure that all other riders (sometimes to their own detriment) are able to ride in an accordion-effect free paceline. Constant pedal pressure, constant distance to the rider in front, and straight riding enforce this concept.

Small actions like short pulls, coming off when favorable to the next rider, no accelerating around corners, and not attacking hills, reinforce this concept.

Consistent Distance to Rider in Front

Use pedal pressure modulation to maintain a consistent distance to the rider in front and minimize using your brakes. Feather your brakes if you need to. Sometimes you may need to feather your brakes while pedaling at the same time in order to maintain a consistent distance. While this is not efficient for the individual, it is more efficient for the group as a whole. The paceline is about using the efficiency of the group for the benefit of all individuals. This type of teamwork sometimes requires small sacrifices of individual energy. Stay directly behind the wheel in front of you. Do not swerve from side-to-side to prevent wheel overlap; it makes it hard for rider behind you.

Last in Paceline

If you are the last rider in the paceline, when the rider who has just pulled off the front drifts back, say that you are "Last Rider". If he is especially spent, this may help him take his place behind you.

Accordion-Effect

The paceline is subject to the accordion-effect when individuals are not behaving smoothly in the paceline. The longer the paceline, the more pronounced is the accordion-effect.

Gaps

All gaps begin as little gaps. When a gap occurs, everyone behind the gap is subjected to the accordion-effect. When gaps are frequent, the riders in the back must do extra work to stay with the paceline rather than resting.

When gaps form, strong riders need to fill gaps to preserve the flow. If a gap opens in front of you or a rider in front of you, accelerate smoothly and slowly to close it if you are able. Do not "attack" to close a gap, as this makes it harder for the riders behind you.

If you hit a hill and can't climb with the group, stay in line and say "Gap." This is an invitation to the riders behind you to pass you on your left. Peeling off to the left is risky here, since riders behind you may already be moving up to pass you.

Gap causes and prevention:

(1) Ungraceful lead change. The leader stalls before turning over the lead or the new leader accelerates quickly. A smooth paceline must have a smooth exchange at the front. Keep steady pressure on the pedals until you have cleared the front. As you complete your turn at the front, maintain pace as you move aside, then slow as the main paceline moves forward. Do not stop pedaling before pulling off the front. If you slow before moving off the front, you force riders behind you to slow, which creates an accordion-effect toward the rear. If you are the new leader, as you move into the lead position on the paceline, do not accelerate, but continue to maintain your existing cadence. If you accelerate as you come to the front, you open a gap that is not only difficult to close, but also creates an accordion-effect toward the rear.

(2) The front rider makes abrupt changes in the pace. The front rider must use constant pedal pressure to allow riders in the back to keep the paceline consistent using pedal pressure modulation. If you must change pace, please do so smoothly with little change in pedal pressure.

(3) Riders in the back don't hold to the wheel in front. To keep the group together, every rider must have the determination to hold to the wheel in front. Try not to let a gap open in front of you.

(4) The former leader misses the last wheel as he tries to get back on the end of the paceline. As you near the end of the paceline, move close to the last couple of riders and accelerate to match

speed as the last riders pass, so you can get into the draft. This is a special case, since there are no riders behind him who are affected.

Pace

- **Do not go out too fast.** Going out too fast is a common mistake made by rookies and veterans alike. This mistake can spoil the ride for everyone. He who “goes out too fast” frequently “blows up” before the ride is over. Everyone feels good at the start of the ride. Resist temptation; save your energy for the later stages of the ride.
- Control the pace. Most group rides are not true competition. Many riders will not be ready to ride fast from the start point. Keep the pace a bit slower for the first couple of miles until the group warms up. The pace can continue to increase gradually over the course of the ride. Unless all riders are close in strength, it may make sense to split into a couple of subgroups. If you are inclined to really turn on the speed, save it for later in the ride. In the later stages of the ride, the folks who want to hammer will probably be up front anyway, so you all can take off together.
- No fliers off the front. The paceline leader should set a “reasonable” pace. Look back to make sure the group stays with you. When the leader goes off the front, the benefit of the paceline is compromised. A rider who goes off the front may need to rotate to the back to get a better feel for the group's pace.
- Faster riders are encouraged to participate but should either ride the pace of the group or ride in another (breakaway) paceline.

Leader

- On flats and descents, for group efficiency the leader should be in the drops to minimize wind resistance. Avoid the temptation to accelerate as you go into the drops.
- Short pulls. The paceline is most efficient with short pulls of a few hundred yards or to the top of the first hill. The faster the pace, the shorter the pull. There is a strong tendency to pull too long. In addition, the traffic may force you to stay on the front.
- Turning over the lead. There is a strong tendency to slow down when you are about to turn over the lead. In any case, **do not stall while in the lead.** Your move to the left should be slow and deliberate; any quick move is alarming to riders in a tight paceline. Keep your hands on the bars and flutter your fingers to show that you are turning over the lead. Some riders prefer to use other low-key hand signals. Don't slow down until you see the new lead rider to your right. Stay close enough to bump elbows. Get to the back of the group quickly to conserve energy. As you come to the back of the paceline, stay close to the paceline and don't lose the draft. As the front wheel of the last rider comes into view, increase your cadence to be able to latch on smoothly as he passes. On any pull, the leader wants to come off the front at a point where he doesn't have to suffer too much to stay in contact. For short hills that is the top of the hill, not just before. Careful here - if you come off too soon before the top of the hill then the rider behind you may feel that he needs to work extra hard at the front for a couple of strokes which can cause an acceleration and gaps in the line.
- Ascending. Give the group good momentum going into the base of a hill. Keep the pedal pressure up until everyone is on the hill. This way, the group can go into the hill with momentum, the same as you did. If you slow down dramatically at the base, the group will slam into your backside. There is a variant that requires careful thought and action. If the low point of a descent is immediately into another hill, you will be climbing and some of the group will still have speed from the descent. To keep the paceline smooth, the leader should increase his pedal pressure until everyone is on the hill.
- Hilltop. When cresting a hill, wait for the group to crest, so you can all descend together. Otherwise, they will still be climbing while you descend. Conversely, this is an opportunity to drop people.
- Descending. If possible, keep the big guy in front – he coasts faster. Descents are an opportunity to attain higher speeds and have fun. It's almost impossible to pull too fast on a descent. As in all situations, just don't accelerate too fast. The leader must apply good/strong pedal pressure on a descent, so that the paceline is not forced to brake to avoid overrunning the leader. If you lead a

long fast descent, you will expend a lot of energy – you need to know what you will do at the next hill.

- Slower places. At any place that will naturally slow the group, wait for the entire group to come through before accelerating. Don't accelerate hard from intersections until everyone in the group is through the intersection. As a rule of thumb, delay before accelerating a number of seconds equal to the number of riders in the group. Count to yourself in whatever way you count seconds, then accelerate slowly and evenly
- Yielding for traffic. If you are bringing the group through an intersection, you need more time/space than for just yourself. This is a tough call, especially if the traffic is moving fast. Err on the safe side. We don't want collisions or near collisions that frighten either riders or drivers. If possible, keep the group together. If the group splits, wait until everyone is back in the group and then accelerate slowly and evenly.

General

- If you see poor paceline behavior, consider asking questions or giving a little advice. If you receive comments about the paceline, consider them constructive.
- Personal needs. Stretch your legs, drink, eat, and spit when you are at the back. Take care of these as soon as you get your breath – the leader may come off the front at any time. The leader should be focused on the pull, and should not eat or drink while at the front; the second rider should be mentally preparing for the pull. Farther back in the paceline, drinking from your water bottle is more acceptable, if you can do so without disrupting the paceline.
- Hills. Bigger hills will split most groups. Sometimes the group benefits if the faster climbers wait for the slower ones. It may be best if the ride leader suggests a re-grouping at the top of a particular hill.
- Drafting a small rider. To draft behind a small person, assume a low body profile and get as close as safety permits.
- When experienced riders are “off the back”, wait for them if you think they can keep the pace. When they are back in the group, give them a few moments to recover before resuming the pace.
- Double paceline. With enough riders, when traffic and conditions permit, form a double paceline for better safety and draft. With groups of more than several riders, a double paceline shortens the length of the group and helps drivers to pass more safely. Ride closely abreast so that few drivers protest the double paceline. In a double paceline, it is common practice that the left leader pulls off to the left, and the right leader stays to the right; the double paceline comes up the middle. A double paceline is appropriate only on roads with very light traffic.
- Echelon paceline format is only applicable in competition or in very small groups that work well together.
- Hazards- A full discussion of hazards is outside the scope of this document.
 - Motorists – Most motorists are courteous and well behaved toward cyclists. When dealing with a difficult motorist, think carefully about the safety of the group. Think also about how your actions as a cyclist will be perceived by the general public. “Flipping off” a motorist is not wise behavior under any circumstances.
 - Dogs - When one or more dogs run toward the paceline, keep calm and stay in the paceline. Do not make sudden movements, especially with the brakes. Dogs are precise in their pursuit - typically, dogs will run to within about a foot of the rider(s). If you make an avoidance move a few feet away from the dogs, you may draw the dogs into your former place in the paceline – immediately in front of the rider behind you. Yell at the dogs or squirt them in the face with sports drink. Most dogs will be repelled if you point a water bottle at them – they may know that a squirt in the face is about to happen.
 - Squirrels – Do not brake or make sudden movements to avoid running over squirrels. Running over a live or dead squirrel on your bike is physically trivial. Attempting to save the life of a squirrel may cause serious bodily injury to fellow riders.

Stage Three - If Wheels Touch

Front Rider

- Don't panic – it's the back rider who may go down, not you.
- Do not brake and do not swerve.
- Stay steady and increase speed slowly.
- Don't accelerate into the rider in front of you.

Back Rider

- Do not suddenly brake or swerve, especially in tight quarters.
- For stability, soft-pedal and keep your weight on the saddle.
- Lean slightly away from the other rider, regain your balance, and steer clear.
- Apologize. It is likely that you are responsible. Hopefully this is from fatigue, not inattention.

Epilogue

Disclaimer

Cycling on public roads involves risk of property damage, bodily injury, and death. The authors and publishers of this document provide suggestions to improve the safety of cycling on public roads and assume no responsibility for how an individual may interpret or apply this information.

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