GROUP RIDING AND PACE LINES

PLUS SOME TECHNICAL NOTES ON PACE LINES

Clearly, it is more enjoyable and fun to ride in a group than by your self.

by

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GROUP RIDING

Group Riding consists of two or more riders traveling in a loose group (i.e., spaced several feet apart) who are not drafting. See below for an explanation of drafting! Although group riders may be riding parallel to each other, they are four to six feet apart. On narrow roads with moderate to high vehicle densities, parallel riding is not safe. If there is six or more feet of clean shoulder or bike lane width in the same direction of travel, then parallel riding can be done safely. A shoulder or bike lane of eight feet is better.

PACE LINE RIDING

Pace Line Riding consists of two or more riders traveling in a tight group in the draft of the rider(s) in front of you. If you are the leader of this pace line, than you are creating the draft for others. The draft envelope behind a single bicycle is about six feet long and behind a tandem is about eight feet. The closer your front wheel is to the rear wheel of the rider ahead of you, the stronger the draft. Riding in a pace line draft can save 20 to 30% of your energy output. This energy savings is what allows the pace line group to travel at higher speeds. Concentration on what you are doing in a pace line is essential. That is, there is no time for sight seeing.

Note that group riding also requires concentration on what the other riders and traffic are doing. In pace lines, concentration is essential. Hand signals to your fellow riding partners keep everyone alert to what is ahead of your group. Sometimes, voice signals are better and faster. In either case, hand signals and voice signals must be echoed from the front to the back and from rider to rider. If you break the communication chain, you may be responsible for injury to one or more fellow riders. So pass that hand and voice signal down the line - Please!

HAND SIGNALS

Hand Signals need to be held for four to six seconds so the riders behind you have a chance to react and signal the riders behind them. If you are the current Lead Rider of the pace line, then initiate your signal three to five seconds before reaching the location associated with its purpose.

When suddenly slowing or stopping or coming upon pot holes, communicating with loud voice commands, such as "SLOWING," "STOPPING" AND "HOLE" are best. By the way, the current leader needs to plan and initiate a change in the travel path before the group encounters other riders, debris, rocks, pot holes and the like. The leader needs to visualize his (her) bicycle as a vehicle towing many trailers. The leader must hold the new travel path well past the slower riders, debris, etc., until it is safe to move over to the right slowly. All too often, the leader of one group of riders passing a slower group of riders will pull over to the right too quickly. The other riders of the faster pack will initiate the same maneuver. Since there is a time delay in this process, each successive faster rider gets closer to cutting off the lead rider of the slower pack. This can create a pile up.

DRAFT ENVELOPE

The Draft Envelope in a pace line of fewer than six riders is about six (6) feet long (about the length of one bicycle). If you are further behind than six feet, you are out of the draft. Larger packs of riders riding in parallel will create wider and slight longer drafts. The same is true for one or more tandems. Cross winds change the position of this envelope. If the winds are coming from the left, then the envelope is moved to the right. When riders in a cross wind situation ride in a diagonal formation, it is known as an echelon. For winds coming from the left, then it is a right echelon. (Winds from the right generate a left echelon.) Often on the many narrow roads in California , it is difficult to safely ride in a left or right echelon with the usual moderate to high traffic densities.

PACE LINE ROTATIONS

When the current leader rotates from the front to the back, then point your left or right elbow at shoulder level with hand next to that side of your body. This forms an arrow that will not get confused with left or right turn signals or on the road debris signals. Hold that position for three or four seconds to show the direction you are pulling off the line and to give the rider directly behind you time to adjust to taking on the lead pull of the pace line. As you initiate the rotation process, be aware that you must not slow until you are completely to one side. The new leader must be careful not to change the speed (pace) or sprint (which is what most beginners do). If the new leader wants to change the speed, then change it smoothly so that the other riders will not create a bungee cord effect. In pace lines, riders need to have a smooth cadence (RPM) despite where you are in the pace line. Once the previous leader is well to the side of the pace line, then he (she) can slow. Many riders try to maintain a pace near that of the pace line. However, your goal is to get to the back of the line and in a draft to rest. As you near the end of the line, it is useful to come up out of the saddle to stretch and regain the speed of the pace line. NOW you can rest.

BASIC CONCERNS IN A PACE LINE

* Always provide hand signals to signal debris, other riders, autos, pedestrians, turns and pace line rotations.

* Give these hand signals for four or more seconds in advance.

* Pass the appropriate hand signal down the pace line from rider to rider.

* Always maintain a space between your front wheel and the rear wheel of the rider ahead of you. Avoid wheel overlap! NOTE: there is an exception to this in left or right echelons. (See below.)

* Keep your eyes up at all times so you can see what is happening.

* Avoid looking at the ground in front of you or the rear wheel of the rider ahead of you.

* Protect yourself by being slightly off to one side of the pace line (left is best) so you can see what is ahead. This is especially true when you have not practiced with the riders. By the way, this means that your head is out not your entire bike. And yes, you lose some effectiveness of the draft for safety.

* Always look at the arms and shoulders of the rider in front of you. This gives you the best indication of a quick turn or change in direction usually associated with debris or obstacles.

* Maintain a constant speed in a consistent direction of motion. That is, no surging (fast - slow: the bungee cord effect) and no weaving (unpredictable direction of travel).

* Never suddenly slow or attempt a quick stop without a voice signal first. "It results in pile ups!"

* Maintain your speed when pulling off the front of the pace line. Once you have cleared the front of the pace line, decrease your speed and get to the back quickly for a deserved rest.

TECHNICAL ASPECTS

If the above was not enough, let us get to the technical aspects. First, we will discuss the rotation frequency of the pace line. Second, the new pace line leader comes from the front or the back of the pace line. Third, we will discuss the effects of winds and echelons. Fourth, pace line chains (require twelve or more riders) and the rotation frequency. Next, two parallel pace lines, their rotation frequency, and the pull off procedures. Last, two parallel pace line chains.

PACE LINE ROTATIONS

How long do you pull the pace line before rotating to the back? The answer depends on the number of riders in the pace line and their relative strength. If you are struggling to maintain speed at the front of the pace line, then it is past the time to rotate to the back. Note: some riders are stronger than other riders. However, every contribution, small or large, adds to the complete effort and provides additional rest for the stronger riders that they would not have had without your effort.

Clearly, the length of each pull will decrease with more riders. For illustration purposes, let us assume that the strongest rider(s) pulls for 100 pedal strokes. Let us also assume that the weakest rider is only 70% as strong as the strongest rider. This often translates into a pull of 50 to 60 pedal strokes and less than 70% of 100 pedal strokes. The reason has to do with the higher cardiovascular efficiency levels at the higher speeds of the pace line and the fact that the weaker rider's efficiency is lower than just the differences in strength. (Another reason to practice riding with higher RPMs is to increase your cardiovascular efficiency.) In a typical pace line, the stronger riders will be pulling for 60 to 80 pedal strokes of five or fewer riders. In larger pace lines this should decrease to a range of 30 to 60 pedal strokes. Weaker riders should be down to 15 to 40 pedal strokes.

NEXT PACE LINE LEADER AND SIGNALS

From a safety and efficiency point of view the next pace line leader is the rider directly behind the current leader. How does the current leader communicate to the immediate riders directly behind that he or she is pulling off? One of the best hand signals is the use of the rider's left or right elbow pointed straight out from the shoulder with the hand near the waist. Use the left elbow when pulling off to the left and the right elbow when pulling off to the right. This hand signal needs to be held for four or five seconds to give the rider directly behind the leader an opportunity to prepare for becoming the new leader. This is a matter of safety. Normally, the current leader pulls off to the left of the pack. As the current leader pulls off, his or her speed must remain the same before slowing to ensure the new leader an opportunity to safely take the lead of the pack. Once the retiring leader is safely over (typically to the left), he or she slows to efficiently return to the back of the pace line. As the retiring leader nears the back of the pace line, it is very useful for the end rider of the pace line to tell the retiring leader that they are approaching the end of the line. Once the retiring leader gets near the end of the pace line, it is useful to get out of the saddle and bring the speed back up to the pace line speed. This out of the saddle approach serves two purposes. First, it helps the retiring leader speed up and, second, it provides an opportunity to stretch their leg muscles.

The new leader must maintain the same speed without sprinting, speeding up or slowing down during the first few seconds of the transition. If the new leader wants to increase the speed, then the best results are achieved with a slow increase in order to keep the pace line smooth and efficient. When should the new leader become the retiring leader? The new leader should signal his or her retiring before fatigue or slowing becomes apparent. If the current leader's speed is becoming hard to maintain, then it is slightly past time to retire. The best result is to retire just before slowing occurs. That way, the retiring leader still has enough energy to get back onto the end of the pace line.

PACE LINE LEADER – FROM THE FRONT OR BACK

Some coaches have riders sprint from the back of the pace line to the front of the pace line for training purposes. However, this is considerably less efficient and poses some safety concerns. It still most efficient to pull off the front and return to the back of the pace line.

WINDS

Winds will generate several problems for a pace line. Head winds or head winds within plus or minus 30 degrees of front will require that the period of rotation be shorter. For example, ten mph head winds would require the number of pedal strokes to be decreased from a range of 60 to 80 to a range of 50 to 60. Head winds of 20 mph could decrease the number of strokes to 30 to 40. At 30 mph winds the range could get to down to 15 to 20 strokes. When winds get above 10 mph, pace lines of two or three riders deteriorate in the speeds that they can maintain as the wind speeds approach 20 mph. As winds become more of a cross wind (that is, from 30 to 120 degrees from the front), then the draft pocket begins to move to one side of the rider ahead of you. In fact, the draft pocket can be at the side and slightly back (about a foot or so) of being adjacent (parallel) to the rider ahead of you under the most extreme situation. This depends on the wind speed and the direction of the cross wind (typically 15 to 25 mph and wind directions of 70 to 110 degrees from the front). When cross winds are present, then the pace line forms an echelon. If the winds are from the left, then the current leader rides as far to the left as safely as possible (depending on road conditions and traffic) with the rest of the pace line staggered to the right of the leader. This is known as a right echelon. Similarly, if winds are coming from the right, then the leader rides as far as to the right and the rest of the pace line forms a left echelon. For a right echelon the leader always rotates by pulling to the left and dropping back. With this right echelon the old leader begins to move to the right while continuing to fall back. Once the old leader has cleared the new leader, then the new leader gradually moves to the left where the old leader was and the rest of the pace line does the same. This creates a space for the old leader to pull into on the right-hand side. In extreme cross winds, the old leader needs only to drop straight back and move diagonally to the right. When pace lines are riding in a right or left echelon, then there will be an overlap of front and rear wheels. However, there is a significant difference. Here the lateral separation between adjacent riders is typically two to three feet and not two the six inches. Since the pace line riders are to one side, the riders have a clear view of the road conditions ahead.

Can you tell which direction a cross wind is coming from? Yes. Note which side of your body is cooler or which side is warmer. If your left side is cooler (or your right side is warmer), then the cross wind is coming from the left. The reverse suggests a right cross wind. Of course, a flag on a flag pole, tall grass, or trees (if present) is even better.

Remember, Right and Left Echelons require lots of room, but traffic/road conditions may not allow its safe deployment, unless roads are closed to traffic.

PACE LINE CHAIN

Pace Line Chains require twelve or more riders riding in two parallel lines. For purposes of matching vehicle passing procedures, the line of riders on the left will be traveling faster than the line of riders on the right. The object is to form a chain of riders who are in a draft no matter which line the riders are in. Each new ride leader is only pulling for five to 10 seconds. This type of drafting takes much more practice and care. This is not for beginning riders or lower level intermediate riders. This is strictly for advanced riders.

As a rider in the left line reaches the front of the left line, (s)he passes just beyond the lead rider of the right line and then moves to the right creating a draft for the right line. A new left line

leader appears and the old left line leader (now in the right line) slows to match the speed of the right line, which is continually falling back. Typically, the left line leader is only pulling for about five to 10 seconds, while passing and moving over to the right. Within another five to 10 seconds, the new right line leader (the old left line leader) is now in the draft created by the new leader who is passing and moving over in front of you. Your exposure at the front is together about 10 to 20 seconds. For the most part, all riders are in a draft. Pace line chains can reach and sustain speeds more than 32 MPH for long periods. With 14 to 16 riders, the pace line chain becomes very effective and efficient. However, when the group gets too large, the likelihood of rider strength variation will cause deterioration in the groups' efforts. At these higher speeds, the individual's cardiovascular efficiency at the higher RPMs (although the rider is mostly in a draft) is the limiting factor. This is another reason for riding and training at spin rates at 95 and above all the time.

TWO PARALLEL PACE LINES

In two parallel pace lines, the left front leader moves to the left and the right front leader moves to the right. The two leaders move simultaneously in unison. The total road width requirement is the width of four parallel riders. Usually, this is difficult to set up, though part of the time these pace lines are only two parallel riders wide.

TWO PARALLEL PACE LINE CHAINS

For two parallel pace line chains, the road width requirement is always four parallel riders wide. Unlike a single pace line chain, the two inner lines are traveling faster than the two outer lines, which are falling back. This type of pattern has more to do with safety than other considerations. This type of pace line configuration can only be done safely on closed roads. This double pace line chain is a highly organized pack and could create energy savings as high as 40% with speeds more than 35 MPH for extended periods.

SUMMARY

REMEMBER -- CONCENTRATION, SMOOTH PACE AND GOOD HAND SIGNALS ARE CRITICAL!

By the way, PRACTICE – PRACTICE – PRACTICE, with your fellow cyclists to insure a well oiled team effort and safer results.

Although this article has covered many aspects of pace lines, there are additional technical details to refine the well-practiced pace lines and racing.