

Racing in Bunches

by Bob Seymour, March 2007

Riding in a bunch is generally better than riding on your own due to

- the protection of riders within the bunch from the wind by riders on the periphery of the bunch,
- the motivational effect of keeping up with the bunch,
- the social aspect of being with a group.

Racing with a bunch places emphasis on the first two points but there are several factors to consider in order to get optimal benefit. This article discusses these factors under the headings of

- Tactics
- Ethics / etiquette
- Safety

Other easily accessible articles on bunch riding, such as those issued with pre-ride briefing material from Bike SA, are generally geared more toward the recreational rider and emphasise the safety aspect. Safety will be discussed here but will be linked to the tactics and ethics aspects.

The majority of races run by the SDV&LCC fall into either of the two categories of *handicap* and *scratch* and bunch racing tactics are different for these two categories, except when a sub-bunch forms in a scratch race to work together for a common goal.

Handicap Races

In handicap racing there are bunches of riders, each of which, for the bulk of the race, ideally form a team committed to catching the bunches in front and staying away from the bunches behind. The team needs to cooperate in order to optimally protect each other from the effects of wind drag, the cyclists greatest enemy.

Scratch Races

Scratch races exhibit (much) less cooperation than handicap races, and each individual needs to utilize the benefits of being with a bunch to his/her own advantage. Several situations may occur (and considerable tactics are involved for each situation which will not be fully developed here, but see footnote 1)

- The whole field is in one bunch¹.
- A breakaway has occurred and the bunch needs to cooperate to bring it back
- Riders in a breakaway bunch need to cooperate to stay away

For the first case, when the bunch is all together, each rider needs to decide what is best for him/herself and need not be coerced by other riders to do something else that the others might want to do. Controversy exists in the area of the ethics involved in

¹ In this case, an individual needs to decide whether he/she wants to protect him/herself for a later effort or recovery from a prior effort, or whether (s)he wants to control the bunch in some way with the intent of tiring other riders. In the first case the individual would choose a position in the bunch that offers good protection from the wind but not so locked in by other riders that (s)he is unable to respond to any attacks that may occur. Some skill is required in balancing these two requirements. In the second instance the rider might want to increase the speed of the bunch to tire others or decrease the speed to recover. In both cases (s)he will need to spend a good deal of time on the front

the amount of contribution each rider should make in the later two cases. A point of view is expressed at the end of this article.

Bunch Riding to Beat the Wind

It has been estimated that a rider in a bunch who can effectively utilize the shielding effect of the other riders can save up to 30% of expended effort. A simplistic model would indicate that in a bunch of say 10 riders, if only the lead rider exerts maximum effort and the riders can effectively rotate the lead, then each rider only exerts 73% of the effort required to ride alone at the same speed². Reasons why the ideal result described by the simple model is rarely achieved include:

- The front rider does not effectively shield all the following riders so the effort saved by each following rider is usually considerably less than 30%.
- Change-overs, where a different rider takes the lead, are not instantaneous and involve loss of distance along the road (and hence lowering of average speed).
- All riders are not of equal strength all the race and the lead is not equally shared.
- Physiological factors, relating to the ratio of time at maximum effort versus recovery time for individual riders, need to be optimized or the riders will tire too quickly.

Two common tactics are employed in bunch racing to minimise these effects

- Roll-over turns (ROT)
- Time trial turns (TTT)

ROTs

Ideally the bunch forms two lines, called here a *pace line* and a *recovery line*, with the two lines next to each other. Riders in the pace line form a single file and ride at the speed set by the lead rider who stays in the lead only as long as it takes for him to pass the lead rider of the recovery line and safely pull over to lead the recovery line. The recovery line is going somewhat slower than the pace line and the lead rider needs to reduce his speed from the pace line speed to the recovery line speed when he pulls over. Each rider has four levels of constant effort in order of difficulty:

1. Leading the pace line
2. Riding in the pace line
3. Leading the recovery line
4. Riding in the recovery line

In addition there are accelerations and decelerations involved in the change-overs.

The recovery line always is on the windward side to shield the pace line riders so a balance needs to be struck by the recovery line between providing maximum shielding and dropping back quickly to minimize individual effort. This is one feature of the ROT method that is different to the TTT method discussed below and suggests the ROT method is better for strong cross-wind conditions.

² For N riders the percentage would be $((N-1)*0.7+1/N)*100$

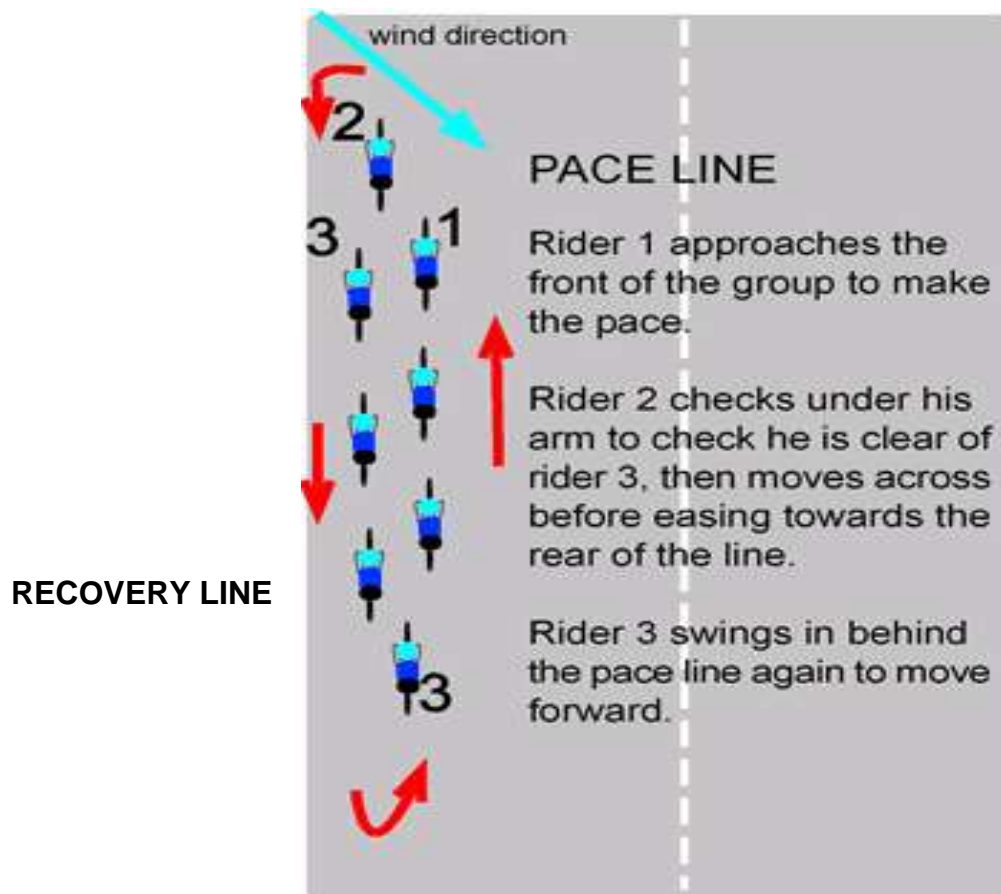


Figure borrowed from the Stephen Hodge article issued by Bike SA.

The ROT method is also characterized by a rapid change-over at the front to minimize the time a lead rider needs to be at his/her maximum effort. To this end, the lead rider in the recovery line needs to reduce speed quickly so that a quick transition can occur. If a lead rider changes from the pace line to the recovery line and does not reduce speed (or worse, increases speed) then this will force the following rider in the pace line to stay on the front longer than (s)he might wish or to attempt to change to the recovery line before (s)he is clear of the lead rider (and hence increase the risk of collision with that rider). However, if the recovery line is significantly slower than the pace line, not only will it provide less shielding for the pace line in strong cross-winds but will require a large acceleration of the last rider when he wants to rejoin the end of the pace line. This is a common cause for breakdown of the ROT method.

After the lead pace line rider changes to the recovery line the second pace line rider assumes the lead and should try to maintain the speed of the pace line, neither accelerating or slowing, and this will require an increase in effort due to the extra wind resistance. Smooth change-overs, where the pace line is not forced to accelerate or slow, are key to the success of the ROT method., and require a degree of skill from each rider, particularly when they are near their limit of exertion. Appropriate slowing of the recovery line will assist the pace line leader to maintain the pace line speed by not forcing him to accelerate to get clear for his change-over.

Pace line riders need to be as close as safety allows to the rider in front to maximize wind shielding but also need to stay close to the recovery line for cross-wind shielding. This is often referred to as 'keeping it tight'.

There are two major disadvantages of the ROT method. The first is a reduction in average speed of the bunch each time the lead changes. A change in lead will put the group as a whole back down the road by a bike length plus whatever gap the riders in the group adopt (another reason for a 'tight' group). The more often this happens the more the average speed of the bunch will be reduced. This argues for longer turns on the front by each rider but this has the adverse effect of tiring the lead rider. The TTT method is an alternative that minimizes this loss of average speed effect.

The other major disadvantage of the ROT method is that it can easily break down by riders not rejoining the pace line smoothly (either through fatigue or lack of concentration or unwillingness). When this occurs it is necessary for another rider to jump into the pace line out of turn, but in order to do this (s)he needs to be aware that this is required and the trialing rider could shout to indicate this. However, if this quick fix doesn't occur, the group might become one single line and the ROT method has to be restarted. The best way to do this is for the second rider to assume the lead either by riding around the lead rider or preferably by the lead rider pulling out of the way. Whichever rider decides to assume the lead, (s)he should do this smoothly such that a rider behind can 'take his/her wheel' in order to reform a pace line. It is almost counterproductive for a rider to accelerate quickly to the lead if (s)he takes no one with him as this only puts more stress on the group.

Features of the ROT method include

- A pace line with riders as close as possible to the rider in front
- A recovery line going somewhat slower than the pace line and to the windward side of, but close to, the pace line
- Regular change-overs of the lead rider from the pace to the recovery line
- Smooth rejoining the rear of the pace line by riders from (the rear of) the recovery line

The ROT method works best when

- There are cross-wind conditions
- There are a lot of (say 10 or more) riders in the group
- Each rider appreciates the features of the technique and is attentive to his/her role.

TTTs

The TTT method can be thought of as a derivative of the ROT method. It is the method used by professional racers in team time trials where the team might be anything from 2 to around 8 members. That professional racers adopt this method suggests it is more efficient and leads to a higher average speed than the ROT method for groups of this size.

In the TTT method the recovery line does not exist. A single pace line is formed³ and the rider stays on the front for a significantly longer period of time than in the ROT method (somewhere between 30 seconds to 3 minutes) and then pulls aside to let the second rider assume the lead. The second rider (and the rest of the pace line) does not change speed when the lead changes although the second rider would need to increase his/her effort due to increased wind resistance. When the lead rider pulls off (preferably to the windward side) (s)he drifts to the back and rejoins the pace line. Each rider needs to decide how much (s)he will reduce speed when (s)he pulls off such that (s)he can manage the acceleration needed to get back on but also get to the back quickly so that (s)he is not on his/her own and in the wind too long.

.Each rider can choose how long (s)he stays on the front. This choice should consider

- The requirement to be able to maintain the group speed for the duration of the turn.
- The relative strength of the individual to that of the rest of the riders in the group.
- An individual's optimum effort-time versus rest-period such that the rider might maintain his/her effort for the duration of the race.

Breakdown of the method can occur if the second rider is unable to increase his/her effort when (s)he assumes the lead such as required to maintain the group speed. In this case the group will slow, but the rider should recognize this and pull off quickly such that a stronger rider might take the lead.

Advantages of TTTs include

- TTTs reduce the frequency of change-overs as compared with ROTs and as such minimize the loss of average speed effect.
- They are less susceptible to breakdown as the second rider is always there to take the lead when the lead rider pulls off.
- They are more conducive to ensuring that all riders contribute their best effort to the group.

A Point of View on the Ethics Involved in Scratch Racing.

As mentioned above, three general situations arise in scratch racing.

- The whole field is in one bunch.
- A breakaway has occurred and the bunch needs to cooperate to bring it back
- Riders in a breakaway bunch need to cooperate to stay away

The way a bunch cooperates in the last two cases is similar to the bunch racing tactics employed in handicap races as discussed above. Ethics involved in these two cases are that every rider should get involved in the cooperative effort to the best of his/her ability⁴. If, for example, (s)he does not contribute to a breakaway staying away then

³ The pace line may be angled across the road as wind direction dictates in order to provide maximum protection for the following riders. The lead rider should ideally position him/herself to allow the rest of the riders to benefit from his/her shielding. (eg nearer the edge of the road if wind is from the left or nearer the middle if wind is from the right). Safety considerations will limit the extent this can be applied, especially when the road is open to other traffic.

⁴ This is not the case in team racing as practiced by the road racing professionals and which most keen cyclists will have witnessed in the Tour de France telecasts for example.. However team racing is currently not practiced in Veterans' cycling and the tactics and ethics exhibited by professional teams are totally different and will not be considered here.

ethics suggest (s)he should not compete for the win against those that have. A grey area exists in the case of chase-downs. For example, some riders might consider a chase futile and not contribute or may simply choose not to contribute, saving themselves to sprint for a minor place (or for first place if the chase happens to succeed). This (in my opinion) is also unethical and the riders who do not contribute to the chase should not sprint over those that have at the finish. However, some riders may not agree and will argue that they are racing smart, but if everyone took this position, chase-downs would never occur. Many different chase-down situations are likely to develop throughout a race. Each individual will assess each situation as regards the seriousness of the breakaway and decide whether and when a chase is warranted. The assessment is likely to be different for different riders, some may think a chase is necessary while others may not. In general, if several riders decide to instigate a chase then all other riders should contribute even if they are not convinced of the necessity. The opinions expressed in the later part of this paragraph are personal and will not sit well with the 'sit and sprint' brigade, and much of the interest in scratch racing results from this conflict of opinion on the ethics of contributing to a group effort versus winning with an unfairly low share of the effort expended by the bunch required to get into a winning position.

Summary

This article has addressed the issue of bunch racing in terms of the tactics involved and related safety issues, and has expressed some opinions on ethics. Two methods of utilizing the wind-shielding effects of riding in a bunch, *roll-over-turns* and *time-trial-turns*, are developed and the advantages and disadvantages of each are discussed. It is hoped these descriptions will benefit new racers in particular and assist in the smooth introduction of these riders into the racing ethos of the club. It may also assist some not-so-new riders in better understanding the theory behind the different methods and perhaps improve their contribution to their group's effort. In the area of ethics, the opinions expressed are personal and it is accepted that there will always be disagreement, and whereas one side of the conflict of opinion is favoured here, the alternate position will be favoured by others. Individual motivation, ability and personality traits will ultimately determine which side is taken, and no amount of moralizing by the 'workers' will ever convince the 'sit-and-sprinters'.