

## FM Slalom Tech Series

### Article #04\_04

## Tuning for Technique

Slalom skiers around the world ski in varying environments. Using a setup good for a pro in Florida is likely not optimum for a skier in who is on a cold northern lake in springtime. Thus it will be hard to achieve the same pro-style technique.

Through visual cues and using feel, it is possible to analyze your own skiing and trouble-shoot your setup. The analysis of your own technique in comparison to a pro coupled with an understanding of setup, enables you to ski more closely to the style you are emulating.

For example if a setup builds too much load and tip, the skier might react by going on the back foot in defense leading to the observation "your style is on your back foot too much".

Tuning for technique is an iterative process that carefully examines where you are in comparison to a pro skier and what direction you need to be headed. Always take the opportunity to consult with other skiers, coaches and pros whenever possible.

In setting up a ski you are after the right blend of ski size, fin DFT, depth/length/area, binding position and wing angle/size for you and your conditions. There are different paths between the start and end gates, and the goal of is to get the combination that enables you to ski the longest route (square wave theory) on the shortest rope.

### Video Comparisons

Video or still pictures of your skiing are necessary. The next step is a careful comparison against pro skiers at certain phases in the course determine if any adjustments are required.

### Trim on Plane

The glide at the gates is a great place to view the ski on a plane. The common observation of where the water is breaking at the front ankle is a useful indicator.

The trim on plane establishes not only your flat running attitude but sums with fin and ski sidewall hydrodynamics in slip, or the tip adjustment/edge bevels to determine how the ski operates in the pre-turn and through the wakes.

The size of the ski, binding position, distance from tail (DFT) dimension (wing positioning), wing angle and the type of water you are skiing on all factor into the equation that determines ski attitude on the plane.

Bindings back will put more skier weight on the rocker of the ski raising the tip. Forward does the opposite. A larger ski with bindings stock tends to ride flatter.



The wing pulls the tail of the ski down with a force determined by the angle & size of the wing. If the fin is back, thus moving the wing farther back on the ski, the wing pulls the tail down more easily. If the fin is moved substantially forward on the ski, the wing will not be able to pull the tail down as effectively. Thus the ski rides flatter with more drag felt from the wing.

Less ski is in contact in more viscous water, riding up higher and moving the point at where the water breaks further back on the ski. In order to reset the amount of water contacting the ski in this situation, options are to move the fin and thus the wing forward and the bindings moved forward. Moving the fin forward has a double benefit for viscous situations, enabling the turns to be completed more quickly. If the ski rides too flat and too close to the surface a smaller ski may be considered.

The opposite is generally true for soft and very warm water, or water that is less viscous. In this situation, too much ski may be in contact with the water, slowing the turns and producing slack. Moving the bindings back and the fin back resets the break point on the ski. If the ski is set too tail deep, a larger ski may be considered.

## Acceleration



A balanced acceleration phase with manageable load is vital to short line success. The theory is that if the skier gets down through the wakes and you are able to handle the load through both legs in a strong position, the faster cross course you'll move and while maintaining optimum direction.

The key is to be able to exit the second wake with the tip of the ski pointed away from the boat and in good position.

If the skier does not have sufficient slip and holds direction too firmly in the pull, the force balance is upset and the forward load is too great. A fin that is too far back is a more effective rudder, and directs the skier cross course without sufficient slip causing the high forward load on the rope. This is the reason for the out the front feeling one gets when running with a fin too far back.

Skiing on the back foot is often a result of trying to prevent being pulled forward, or to reduce the amount of skier in the water and load on the rope.

## Onside Exit



Velocity is speed with direction. The second wake is the place where velocity can be judged. Experienced skiers are good at maintaining position at the second wake,

leading to improved edge change and a wider arc into the turn.

The shorter the line the more the skier is able to get on the back of the ski, in a "sitting chair" position riding up on the wing, thus reducing drag and using the velocity to get wider on the boat.

## Offside Entry or Pre-Turn



Landing on the inside edge the skier begins a re-entry of sorts, with the fin length and trim of the skier providing for tip engagement as speed decays. The decay curve must be timed just right to deliver the skier at the buoy on cue. The wing is an important element because as the tip of the skier drops, the wing starts to do its work increasing the amount of skier in the water at the entry to the turn.



The shorter the line the slower the speed at buoy, and the more of the tip drops in the turn, until the entire ski is engaged, ideally through 41 off. It is possible to have a setup that drops too much tip too early in line shortening leading to offside breaking at the waist into mid-short line. It is also possible the tip profile is the other way, causing the ski to zoom past the buoy wide and early with no means to execute a turn.

### Turn Completion



The tip of the ski enters the apex of the turn, building tip pressure and causing the tail to slide out and dig a hole in the water. The tail slide is sometimes called the “wash out” and is similar to over-steer in a car.

The surface area of the fin, the fin location on the ski (DFT) with respect to bindings, the surface area of the ski behind the bindings, and to some extent the wing size/angle determine how deep the tail goes, and how high the tip of the ski finishes the turn.

The ideal situation is to have the ski execute a controlled turn within the radius and duration to necessary to produce a tight rope at the finish. The behavior of the ski’s tip is a good indicator on how well the above process is completed.

Some pros are setup just on the edge, producing a slight tip rise at the finish of the turn, before the ski gets back down for the hook-up and pull. It would make sense to have the ski err to the side of a complete turn vs. a turn that sends you on your way with less angle.

A problem that may occur into or at completion of the turn is a stall, similar to loss of lift in aircraft. A stall occurs when there is not enough ski and fin area in the water to support the skier. Stalls tend to happen at the completion of the turn, when the skier is at the slowest speed and highest “gs”. The result is an abrupt tip rise as the skier disappears into spray. In Bob LaPoint’s well-known slalom video, ball #2 on the 38 pass is a stall. Stalls may occur at the offside, onside or both.

When analyzing tip attitude it is important to identify tendencies based on repeated or consistent events. There may be the odd turn, for example, approached on a late line which causes the ski tip to rise abruptly or grab hard at the finish no matter how dialed-in the ski is. But generally a well-tuned setup possesses a greater margin of safety increasing chances of recovery in the event of a mistake.

### The Offside Finish



The finish of the offside pull establishes direction into the onside turn. The biomechanics of skiing mean that it’s harder to keep the ski directed away from the boat at the finish of the offside pull, than the onside. So skiers are generally a bit more narrow and just slightly “later” coming into the turn

Elements that provide more of a rudder effect to keep the ski in a straight line produce a stronger offside finish. Moving the fin back or boots forward, increasing the length of the fin (with reduction in depth), or a reduction in wing, build distance before the onside ball.

As with most adjustments, trade-offs occur. Increasing the binding center to fin center increases the radius of the onside turn. Depending on the state of the turn before the adjustment, such a move may bring on slack

Too much fin area also causes slack on side. While not a problem for the offside where the skier drives harder against the fin, excessive fin area onside will keep the ski under the skier, preventing the ski from rolling out on edge and sliding or over steering.

Similar to the offside turn, the ski’s and fin length engage the tip of the ski in the onside pre-turn. As most skiers know, this is a heel side turn, so the ski can be driven into a deeper and more aggressive edge.



### **Credits**

Photos have been captured from video provided by Mark Kovalcson.

Pro skier Ben Favret appears courtesy of Elan Boats. For great skiing, quality and performance see [www.elanboats.com](http://www.elanboats.com)

### **Onside Finish**

Keeping the ski moving through an aggressive and controlled turn into a tight line makes for an ideal finish.

As mentioned the fin DFT and fin area are important in determining the outcome of the onside turn.

Ski sizing and binding placement are also considerations. A ski that has too much surface area or is too large, will carve a longer radius turn, increasing the chance of slack. On the other hand, a setup with insufficient ski surface may have a tendency to lose lift and stall out, just as the ski comes around.

A larger ski with bindings back may be an option for skiers in warmer water, where it is easier to build tip pressure in the softer water. However in cold or more viscous situations, putting the bindings back to fix the onside turn radius, tends to trim the tip high, making it impossible to get enough tip bite.

Therefore, fin forward/binding forward setups on typically sized skis, or ski one size down may be explored in cold-water situations, using the on side as your barometer. To achieve the necessary acceleration on a small ski may also mean that the boots need to be slightly ahead of the normal position, along with the fin.

### **Edge and Bevel Tuning**

Adjustments made directly to the ski are sometimes necessary for tackling problems that can't be corrected by fin adjustments. This subject is coming soon on our slalom tech series.