



Selecting Skis and Managing Fleets -> And Structuring

*2007 US National Cross-Country
Ski Coaches Conference*



Overview

- Ski Selection
- Fleet Management
- Structure



Ski Selection Overview

- Fundamental Characteristics of Skis
- Contributions to Performance
- Practical Application
 - Hints for selecting skis
 - Tips on Selecting Skis
 - General Themes for Each Brand
- Tools



Fleet Management Overview

- Knowledge is Power
- Roles
 - Coaches & Technicians
 - Athletes
- Testing
 - Day-to-day
 - Race



Characteristics of Skis

- Camber
- Activity
- Pressure Distribution
- Tip Stiffness/Splay



Camber I

- Camber is the height of the ski off of the gliding surface.
- The ski's profile
- Camber combines with the ski construction to form the ski's feel and stiffness.
- Camber profile itself is only useful when comparing skis of the same brand/model



Camber - Classic

- Camber profile under varying forces is very important in a classical ski.
- Determines how the ski should be waxed.
 - Thickness of application
 - Feathering at the end of kick zone
 - Cushion – where and how much.



Classic Camber: What you want

- For hard wax, a long pocket that opens up when weight is placed on heel, closes when on ball of foot.
- For sticky hard wax and klister, a higher, shorter pocket that takes an impulse to close.
- Generally, “residual” camber is bad thing.
- Adjust the wax layering to account for residual camber.



Camber - Skate

- Not very interesting as far as I can tell.



Activity

- Activity is how the ski reacts to loading and unloading.
- Generally, higher camber (same brand/model) results in higher activity.
- An active ski will feel more lively, but be harder to control and more physiologically demanding.
- Less active skis feel “flatter” and “deader”



Pressure Distribution I

- Significant contribution to ski performance
- Contact Zones with the snow and how they change at different weights.
- “Build” to pressure – how quickly and sharply the ski spreads force.



Pressure Distribution II

- Shape of pressure distribution describes performance.
- Static friction vs Kinetic Friction
- Highly focused, “hot” skis have higher static friction, lower kinetic. Fast at speed, accelerate poorly.
- “Cool” pressure skis lower static, higher kinetic. Accelerate well – slippery.



Pressure Distribution - Water

- Pressure distribution also greatly affects Creation and Dissipation of moisture.
- Camber profile a factor in wet snow.
- Saturated snow – want to lower surface area – hotter with a soft tip
- Cold snow – large surface area as far forward as manageable to melt the snow and provide lubrication for the bridge and tail.



Performance – What makes a ski fast or slow

- The best ski is the one that achieves the optimal balance of performance.
- A ski must glide well at speed, accelerate quickly from slow speed, be stable and active, but not too active. Kick well, glide well. To name a few.
- The ski that performs best in one area is not necessarily the best choice because often underperforms in other areas.



Performance – How to test

- How do we evaluate skis?
- Classic
 - kick (usually highest priority)
 - glide weighted equally toward heel (tuck downhill)
 - Glide in neutral position during striding
- Skate
 - Acceleration from stop (“slipperiness”) – static friction
 - Uphill with aggressive race posture
 - Glide out.



Ski Selection Tips

- Avoid Brain Damage
- Look at good and bad skis and find what you like/dislike
- Figure out what holes you have and try to assess what characteristics are most important for that ski.
- Find em, test em.
- Matched pairs!



Fischer Skate (610 mold)

- Cold ski generally has a longer pressure distribution, plus moved slightly back and more focused.
- Upper mid-range of camber height and activity.
- Ski is constructed for an aggressive forward position. Bridge is 2/3 in front of ball of foot, 1/3 behind.



Fischer Skate Good vs Bad

- Good generally will have high activity – 0.18 to 0.35 from 100% of weight to 120% of weight. 0.6mm camber height at 100% body weight. Should feel slippery when lean forward in hills
- Reject:
 - Pressure zones not matched in pair
 - Bridge too short, or too far back in forebody, too far forward in rearbody.
 - These skis will feel unstable, dead on uphills,



Fischer Classic (812 mold)

- Relatively low camber height.
- Low activation energy to close
- Large change in camber profile when weight shifted forward and back.
- Residual camber in front of the toe when loaded.
- Cold has different base & slightly shallower, longer pocket. Softer finish.



812 hints

- Cushion in front of the toe to where the residual camber ends when on heel. – paper test.
- Thin layers.
- Feather at edges – build a pyramid of layers when ski is slow build to pressure.
- ***Avoid excessive residual camber.***



Fischer Classic (902 mold)

- More of a traditional camber profile - Relatively high camber and higher impulsive action required to close.
- Tip Splay
- Large change in camber profile when weight shifted forward and back.
- Residual camber in front of the toe when loaded.



902 hints

- Need to have good, impulsive kick to get this ski down.
- Feather/pyramid layers and cushion under foot when needed.
- May not be a good choice in longer races



Atomic World Cup Skate Characteristics

- Relatively Low Camber Height and activity when measured on the flex tester.
- Javelin type gives slippery feel.
- Pressure distribution shorter and moved forward compared to most others. Cold ski is longer distribution, same base.



Atomic World Cup Skate Hints

- Atomic fit recommendations generally way too soft. Use as a guideline, but don't be surprised to be 20% or higher over their recommendations.
- Best skis seem to be dramatically higher camber and activity than typical.
- Watch out for hinge points or uneven flex
- Factory Grind ☹️



Atomic World Cup Classic Characteristics

- Generally low camber with higher activity and finish than Fischer and Madshus.
- Cold is lower slung, longer pocket and softer finish. Same base



Atomic World Cup Classic Hints

- Atomic fit recommendations generally way too soft.
- Many skis require lots of layers (9-12).
- Best skis seem to be dramatically higher camber and activity than typical.
- Watch out for hinge points or uneven flex
- Factory Grind ☹️



Rossignol NIS2 Characteristics

- New ski is much lower camber and activity than previous generation. Looks a lot like the Fischer Carbonlite in camber/activity profile. Dramatically softer tip.
- Pressure distribution is more like 50/50 at the balance point.
- Very stable and amazing on the flats
- Can bog in the hills for aggressively forward skiers.



Rossignol NIS2 Hints

- Look closely at pair matching, soft tip, smooth, supple activity. New production – always have interesting issues no matter what brand.
- Pressure distribution is more like 50/50 at the balance point.
- Very stable and all testers choose this ski as far superior on the flats.
- Can bog in the hills for aggressively forward skiers.



Rossignol Classic Characteristics

- Three “models”: C1, C2, C3. Exactly the same construction, but sorted by different camber heights and flexes. C1 cold hard wax, C2 is higher camber for sticky hard wax, C3 Klistler.
- Javelin tip gives slippery feel, perhaps slight loss of stability.
- Hard finish and significant residual camber.



Rossignol Classic Hints

- Look for soft finish and least residual camber possible.
- Lots of layers and cushion mid foot forward to end of residual camber.
- The good ones are great, the bad ones can be bad.



Structure

- Trends
- Fundamentals
- Tips



Trends

- Good skis are the most important part of the equation, therefore, while a very specific grind will almost always be faster than a “universal” grind, many skiers are using light grinds that take hand structure well. This provides flexibility and allows athletes to ski on their best skis most of the time.
- Many teams are moving towards having 3-4 standard grinds and a truckload of structure tools.



Fundamentals

- Manage Moisture
- Relieve mechanical stress