Ray's Way Ski Tuning

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SKI SHARP PRODUCTS

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Contents

How to Judge a Tune-Up

Can you tell if the shop has done a quality tune?
(Most shops do a great job of tuning.)

BASE FLATTENING-This is the first and most important element in a quality tune-up. The P-Tex portion of the base should be perfectly flat everywhere along the contact portion of the ski. There are three typical errors here.

1. Convex between the edges- If you lay a straight edge across the ski it will rock. That's bad because it will cause a skidding turn initiation instead of a carved initiation.
2. Concave between the edges- This is the typical condition of some brand new ski as purchased off the rack. The error is usually limited to the tip and tail ends of the contact surface and extends over a zone of several inches at each end. This error can encourage hooking and grabbyness.
3. Shaped skis with significant concavity at the start and end of the running surface should not be made perfectly flat across the base for several reasons. First, to do so entails removal of so much material that the life and performance of the ski will be seriously compromised. Second, on these skis the torsional stiffness is low enough that the concavity does not significantly affect performance. It is important in such cases to make certain the bevel is established as if the base were flat.
4. Railed edges- This is the case when the steel edges are higher than the P-Tex or the P-Tex is worn down where it meets the steel edge. You can check this by dragging your fingernail across the P-Tex toward the steel edge. If the edge is railed, your fingernail will hang up where the P-Tex meets the steel. This error will cause you to stay locked into a turn.

BASE STRUCTURE- The base should not be smooth and shiny. It should appear to have a brushed appearance. This "structure" or micro-grooves protect you from water vacuum which causes a delay in edge changes.

EDGE SHARPNESS- Some people judge edge sharpness by dragging the surface of a fingernail across the edge to be tested, looking for evidence that some fingernail material has been scraped off by the "sharp" edge. This is an ambiguous indicator because this scraping residue can also occur due to an edge burr. Burrs are bad! A magnifying glass is a more accurate way of confirming sharpness. You can also check visually by holding the ski crosswise to your body with the base up. With a bright light shining down on the edge from in front of you, rotate the ski and look at a reflection of the light on the edge. You can see if the edge has a radius, is sharp or has a burr quite easily. You can also check for sharpness by pressing the tip of your finger against the edge. With a little bit of practice you can easily distinguish between sharpness and a burr.

BEVEL ANGLE- After base flattening the next step is beveling. You can't see a one degree bevel! A one degree bevel over the width of the steel edge (about .080 inches) amounts to .0014 inches, un-measurable by the average home tuner. You have to trust your tools or the reputation of the shop. You can ask them if they beveled your edges and at what angle. Beveling should extend from the tip to the

tail. You can ask to see their beveling equipment. You can also ask them how they maintain and calibrate their equipment; in other words, how do they know one degree is really one degree. Please be considerate in asking these questions as most shop techs have a high degree in pride their work. Communicate from the point of view of wanting to learn so you can better appreciate their work.

DULLING (remember the definitions of dulling and detuning) - This is a finishing operation done after beveling. Tip ends and tails ends should show visible evidence of having had just the sharpness of the edge removed beginning from each end of the ski and extending TO THE WIDEST PART of each end of the ski. This will ensure smooth, predictable turn initiation and exits.

WAXING- The Last step in tuning. Traditionally waxing is done hot (just below 248 degrees F max.). A minimum of three passes of the iron, moving at speed to maintain 4-6 inches of trailing, melted wax is essential to achieve penetration into the sintered P-Tex. The Tognar free catalog (1 800 299-9904) has a very convincing graph on page 36 that shows the effect of time and temperature on wax absorption (be careful interpreting the graph because the y-axis scale is nonlinear). The wax should be scraped off AFTER the ski returns to room temperature following up with a brushing of the base to open the structure. Continue brushing until there is no evidence of any more wax being removed. Beware; a few shops do a superficial wax job! For daily maintenance or if you don't feel comfortable using an iron, my waxWHIZard is a very effective tool for applying wax.

You are now informed- don't settle for anything less than the best.

You deserve it, you are paying for it!

Most Brand New Gear NEEDS a TUNE-UP!

When you buy new snow gear, in some brands, the base may not be perfectly flat because of production processes and materials used in manufacturing. This may sound shocking, but most new gear is not fit to use!

You need to ask the shop if your brand needs an initial tune before you take them out on the slopes. Before the advent of shaped skis, all ski bases were nearly flat off the rack or at least close enough so that you didn't have to remove a lot of material to make them flat.

I have examined shaped skis at ski shops and have found that areas at the start and end of the running surface on the ski bases of some brands were concave in one section and convex in the area just beyond the running surface at both ends of the ski.

To prove it to yourself, take a 6 inch ruler that you know has a straight edge and a piece of writing paper 1/2 inch wide by 3 or 4 inches long and go to your local ski shop. Grab a ski off the rack and place the ruler on edge across the base of the ski. See if you can slide the strip of paper either between the ruler and a steel edge or between the ruler and the P-Tex at the center of the width of the base. Most writing paper is about .003 inches thick. Ideally, you should not be able to slide the paper under the ruler anywhere on the surface of the base that contacts the snow!

Shaped skis with significant concavity at the start and end of the running surface should not be made perfectly flat across the base for several reasons. First, to do so entails removal of so much material that the life and performance of the ski will be seriously compromised. Second, on these skis the torsional stiffness is low enough that the concavity does not significantly affect performance. It is important in such cases to make certain the bevel is established as if the base were flat. In other words, don't use the concave surface to establish the bevel. In trying to establish a reference surface you might want to flatten the concave zone only enough to create a flat surface one half inch wide adjacent to each steel edge. Third, the ski manufacturers recommend against it for reason number one above.

Another problem that results from concavity is the difficulty of imparting any kind of structure in the concave zone. A skilled shop tech can do it but it's not easy because you run the risk of increasing the concavity. With RAY'S WAY it is easy to establish structure in the concave zone by turning the tuning tube at an angle to the axis of the ski.

NEVER Use a File to Flatten Your Bases!

When using a file, each file tooth is trying to attack both the P-Tex and the steel edge at the same time. P-Tex and steel are so different in character that a file is really an inappropriate tool for the job. The file produces a surface that is both inconsistent and inaccurate. A file is a poor tool for base flattening.

Files wear out quickly. As the file wears, you will have to apply more force. This increased force is directly proportional to the increased area due to tooth wear. Increased force will cause you to bend the file compromising the surface flatness of the base.

If the steel edges of the ski have been nicked by a rock, the nicked edge will be harder than your file and the file will be damaged. With RAY'S WAY the abrasive on the paper is much harder than a file. Nicks - no problem.

Skis are not flat along their length, but are arched (this is called camber). Unless you clamp the ski flat to remove the camber, it is mathematically impossible to tune the base flat with a file. It will always end up convex because you normally hold the file at an angle to the direction of cutting to make it work. If you want a perfectly flat base, you must remove the camber. With RAY'S WAY you do NOT have to remove the camber to create a flat base because with RAY'S WAY the line of contact of the tuning tube is always held perpendicular to the axis of the ski.

Correct file use requires SIGNIFICANT skill and proper maintenance, and will always take longer, require more effort and be less accurate than RAY'S WAY. With RAY'S WAY a child of 10 or 11 years of age could flatten bases and get the same high quality results that an adult could achieve. I know that would be impossible using a file.

Base Gouge Repair

For more effective base gouge repair use the following procedure:

1. Clean the gouge area with wax remover. Brush out any dirt, etc.
2. Wipe cleaned area with alcohol.
3. Use a soldering iron and clear P-Tex ribbon material instead of burning a P-Tex candle to create a patch. Lay the ribbon over the damaged area and slowly melt it into the surrounding P-Tex. Build it up gradually until it is slightly higher than the surrounding P-Tex.
4. After the patch cools, use a Surform tool to remove excess material down to the base level. Finish the job with your RAY'S WAY base flattener.

This method makes for a more controllable application of repair materials and holds up better to wear.

You can buy P-Tex ribbon at your local ski shop or from Tognar Toolworks at 1 800 299-9904 (a great source for tuning supplies)

An Easy Way to Remove P-Tex

(100 times easier and faster than using FIBER-TEX)

(50 times better and faster than using HI-glide)

1. Take a propane torch with a flame spreader tip and using a soft (cool) flame. Expose the flame to the P-Tex base (and hairs.)
2. Keep the flame about two inches away from the base and move the flame along the base as if you were painting the base with a paint brush. You only need to make one pass! Do not allow the flame to stay in one location ever - keep it moving at all times!! Done properly this is a lot less risky than it sounds!
3. The base will stay cool but the micro-hairs will melt down into little balls because of their relatively large surface area compared to the ski base.
4. At this point you should hot wax the ski. After the wax has cooled down for 30 minutes or so, scrape it off as usual with a sharp plastic scraper and brush the base to expose the structure.

The scraping will completely remove the P-Tex "balls"!

FOR A LESS SCARY METHOD USE THE RAY'S WAY HI-glide Tool

Better Edge Tuning

When tuning edges, be they square or beveled:

1. First coat the edges with a black Magic Marker so you can monitor your progress. This will give you a very accurate indication of when you have removed enough material. It will also keep you from removing too much material, thereby reducing the life of your edges.
2. Always use a guide to control the angle, even when deburring (Standard tolerances for angles are +/- a tenth of a degree. There isn't a man alive who can eyeball one degree and a tenth of a degree-forget it). Regardless of the angle you choose, if it's so important you ought to plan your technique to make sure you get it right.
3. If you are retuning your edges and the base P-tex is in good shape, just stone the base edge burrs. Remember, it is mathematically impossible to rebevel the base edge without reflattening the base because the P-tex base is the reference for the bevel. Do all your sharpening on the side edges. Retuning the P-tex creates microhairs which tend to slow down the ski until the P-tex becomes polished by skiing on it (unless you use the torch to remove the hairs or my HI-glide tool mentioned in a previous tip).

Understanding Tip/Tail Dulling

(Dulling is sometimes mistakenly referred to as detuning)Tip/tail dulling ensures that edge control is limited or restricted to that portion of the ski that influences turning.

Some tuners use rules of thumb such as: "6 inches back from the tip end and 2 inches back from the tail end". Given the variety in ski designs from one manufacturer to another these rules are obviously meaningless because they ignore the intent of dulling. Edge dulling should extend over the portion of the tip and tail edges that are not intended to influence turning. If it extends further, it becomes detuning rather than just dulling, an important distinction!

To find the dulling zone on YOUR skis:

1. Locate the widest part of the shovel. The edge between this point and the tip should have the edge sharpness removed.
2. Locate the widest part of the tail. The edge between this point and the end of the tail should have the edge sharpness removed.
3. Place a permanent mark on the sidewall of the skis at these points as a reminder - this marks the junction point between the turning and the non-turning zones of the ski. Dulling edges beyond this point will reduce the performance of your skis (that is why it's called detuning).

To dull the edges of the "non-turning zone" use a stone to remove just the sharpness from the edge in a smooth uniform way. It is not necessary to remove a lot of material, just the sharpness.

Daily Edge Maintenance

De-burr your edges and wax daily for top performance.

Nicks and burrs - burrs (a protrusion of steel) reduce the performance of your skis. They make turn initiation less predictable and reduce edge hold on ice. De-burring should be done with a 220 grit diamond stone (please use a guide to control the angle be it 90 or beveled). You will easily be able to feel the burrs as the stone passes over them. So it's easy to tell when you're done. There is nothing that can be done about nicks (depressions in the steel edge) without shortening the life of your skis. Nicks have a much smaller influence on performance than burrs and can be ignored.

Polishing the edges improves turn initiation, glide and edge hold. Polishing should be done with 400 grit abrasive or a fine diamond stone (again, please use a guide to control the angle be it 90 or beveled). Interestingly, a polished edge resists rusting! This is for racers. Recreational skiers would not find the results worth the effort.

Diamond stones require VERY, VERY light pressure; too much and you'll lose the diamonds. Most of us have never worked with a tool as sharp or as hard as a diamond. Have faith. Be gentle. They are too expensive to waste.

Make sure to keep your stones clean. Since they readily fill up with wax you should use wax solvent for this purpose.

Use my waxWHIZard daily and hot wax every time you re-flatten the base. Waxing is one of the best things you can do for performance and extending the life of your skis. Remember, unprotected P-tex wears down due to snow abrasion. Don't let that happen to your expensive skis that you depend on for fun.

Last, dry your skis off at the end of the day and store them in a warm, dry place or the edges will rust. Never store your skis on/in your car or in an unheated garage. Make the time to rub some paste ski wax on the edges before storing.

Waxing Details

Waxing protects the P-Tex from damage due to abrasion, improves glide and makes it easier to initiate turns.

It is especially important to thoroughly hot wax new skis in order to fill the porous P-Tex as most factory wax is superficial.

Once the wax is gone you start to abrade the P-Tex surface. The easiest and safest way to wax is to use our waxWHIZard product that ensures, like hot waxing, that a residue of wax remains in the P-Tex after a day of skiing. After all, the idea is to maximize your skiing pleasure. No wax- no pleasure! You also eliminate the inherent risks of heat damage that will result from frequent hot waxing.

To give some perspective to this, my personal practice is to hot wax only when I have re-flattened the base, otherwise I only use the waxWHIZard for waxing. When I use the waxWHIZard I only apply wax for an inch along each edge rather than the whole base because I have found that I only lose wax along the edges, never in the center of the base because I am always on my edges. Black bases easily show the edge burn due to abrasion. My advice if you have non-black bases is to use a graphited wax and look at your skis at the end of the day. You will quickly learn where the wax has been abraded. Respond based on what you see. That way you don't waste wax or time. This little, thoughtful inspection will also tell you a lot about how you ski and as a result you can improve your technique. A tip- you can actually double the pressure for deeper penetration by letting the tube hang halfway over the edge.

What Follows are the details for hot waxing; just so you know (you might want to start by reading my article on the myth of hot waxing).

If and when you hot wax, make sure you know the temperature of your iron (DON'T let it get over 248 degrees F at the peak of its heating cycle). Over temperature will seal the P-Tex and it will no longer absorb the wax. Tognar Toolworks (1 800 299-9904) sells an accurate inexpensive (about 10 bucks) bi-metallic thermometer that will let you easily calibrate and monitor your iron.

Get to know your iron. Using a temperature measuring device, observe the on/off cycle limits of your iron when deciding on a set point. Avoid settings that will allow the temperature to overshoot 248 F on the reheat cycle. Better to play it conservative.

Wax EACH ski for at least 3 to 4 passes at less than 248 F. for maximum penetration of the wax into the base. Any longer doesn't offer any significant improvement. Move the iron at a speed that maintains a melted wax trail of about 4 to 6 inches. ALWAYS keep the iron moving.

Let your skis cool for at least 20 minutes before scraping. Use a sharp plastic scraper moving from tip to tail.

Finish the job by brushing the base with a nylon bristle brush (like the kind you would use to clean your hands). Brushing should be done from tip to tail and continued until there is no more evidence of wax being removed.

Unless you are a racer, use a good quality "universal temperature" wax to keep things simple.

Summer Storage Prep

"WHAT TO DO BEFORE YOU HANG THEM UP"

1. Clean your bases using hot wax (scrape while still hot, multiple times) or a citrus cleaner (apply, wait 5 minutes, wipe off).
2. Tune your skis as you normally would.
3. Rub some wax on the side edges. This will melt when you hot wax the base.
4. Hot wax your bases as usual but don't scrape the wax off 'til next season.