

The Effect of Dirt Accumulation on Skis

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We recently collected some data that quantified just how much the gliding property of a ski can be degraded by the accumulation of dirt on the base. This experiment happened by accident but it is enlightening nonetheless.

As we've discussed previously, when we measure the gliding properties of a particular wax, we do all of our testing with two pair of test skis and one pair of control skis. The test skis get treated with the wax we are measuring and our control ski always gets waxed with Rex Blue and we measure the difference in friction between the test skis and the control ski. It's a very powerful method for eliminating noise in our test results and quickly understanding the behavior of the wax under investigation. (For more info on this method visit our website: www.skitestguys.com or our technical paper in Journal of Sport Engineering <https://link.springer.com/article/10.1007/s12283-017-0230-5>)

Periodically we wax the test skis with Rex Blue just like the control ski to show they are equivalent. We've done this a number of times over the last 3 years and the difference in the coefficient of friction between the skis when they are all waxed the same has been 0.001 or less.

Recently the control skis were used for some recreational skiing on the Birkie trail. Upon returning from the ski trip the control skis got a couple fresh applications of Rex Blue (in fact, these ski never are waxed with anything except Rex Blue). The test skis were also waxed with Rex Blue and tested against the control to show equivalence prior to moving on to a different wax investigation. But, the test results showed they weren't equivalent. The control skis were significantly slower than the test skis. The control skis were waxed again with Rex Blue and tested again with the same result. The control skis were much slower than the test skis.

The next step to try and get the skis to perform the same was to clean the bases of the control skis with Toko HC3 ski wax remover. The wax remover was sprayed onto the ski base then immediately brushed with a brass brush and wiped with a paper towel. It was immediately clear the bases were quite dirty. It took five applications of the wax remover to get the bases clean. Figure 1 shows the residue on the paper towels used to wipe off the wax remover.



Figure 1: Dirt removed from ski bases with 5 consecutive applications of wax remover

After cleaning, the skis were treated with 3 applications of the Rex Blue control wax and were tested again. This time we found the control skis behaved as expected and matched the friction level of the test skis.

So, how much difference did the dirty ski bases make? Figure 2 shows the difference in the friction between the test skis and the control skis before and after cleaning (*Note: the test skis were thoroughly cleaned with wax remover prior to treating them with Rex Blue and did not show significant dirt accumulation*).

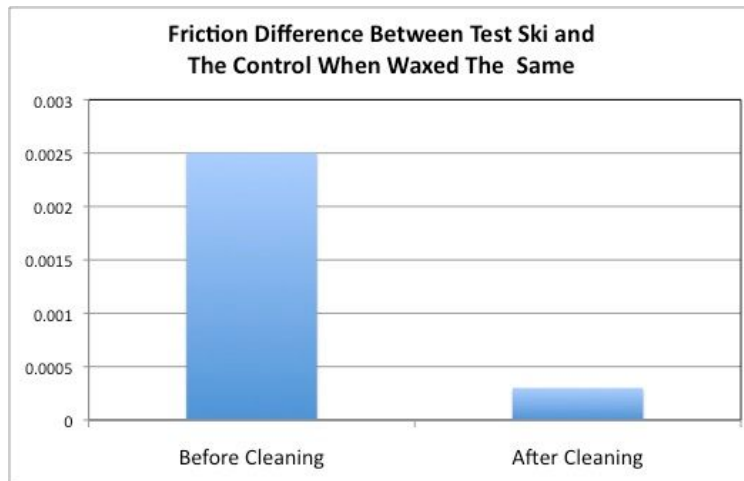


Figure 2. Effect of cleaning the control skis

Before cleaning, the difference in the coefficient of friction was 0.0025, much more than the historical average of 0.001 or less when the skis are treated with the same wax. After the cleaning the difference was 10x less or 0.00025. To put these numbers into perspective, that level of friction difference would cost an elite wave skier 4 minutes in the Birkie. A middle of the pack 4 hour skier would be 9 minutes slower in the Birkie with the dirty skis. Of course this assumes that the friction difference remains constant throughout the course of the race, a topic we will address in a future article.