A Slo-Mo Read for Seeing Enough Break

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ZipTip: GREEN & PUTT READING: A Slo-Mo Read for Seeing Enough Break

Speed determines break, and optimal speed at the hole determines optimal break; the optimal break is obviouly between the fastest speed that will drop and the slowest speed that will just get the ball to the hole, and is a lot closer to the slowest than the fastest to make more of the hole available for capturing the ball and avoiding long comebacks.

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If you're tired of missing breaking putts on the low side, you can always force yourself to aim higher as a matter of habit, but this doesn't really come to grips with the problem. How much higher? How do you see enough break to begin with? Here's a quick tip to help: Try to envision the slowest putt you can hit that will still make it to the hole. That's the putt with MAXIMUM break. Your putt ought to have a little less break than that, but not too much less.

Some Theory.

Speed is the first and last consideration for breaking putts. All breaking putts are speed putts. Imagining or "seeing" the curve of a breaking putt first requires a pretty accurate appreciation of how fast the ball will be rolling in the putt.

The trouble is, there is a range of possible speeds that can get the job done. With different speeds, the curve the breaking ball will follow is different. Generally, the slower the ball rolls, the more opportunity the constant tug of gravity from the tilt has to curl the ball downslope. So slow putts have greater break than quicker putts.

The situation is greatly simplified by realizing that for every putt, there ends up being only the speed you actually give the ball. In this sense, there may not be a single "optimal" speed, and instead a fuzzy range of usable speeds, but in any event you will only hit one speed, and it ought to be comfortably within this optimal range.

The trick is to focus in on the optimal range. The set of curves corresponding to the optimal speed range clearly lies between the extremes. The easiest and perhaps most accurate way to find the optimal range, then, is simple: identify the outer, extreme boundaries first, and then work inward to the optimum, based on the ball's approach speed as it enters the cup.

A Dash of Science.

To get the speed and shape of the curve right, we need to consider the motion patterns of breaking putts.

First, gravity is constant, but its effect shows up more as the ball slows down. A fast ball and a slow ball moving along the same line on a tilted surface have identical tugs from gravity downhill but it's sort of like both balls have their steering wheels turned downhill to the same degree. The slow ball runs off the road in a lot shorter stretch of highway than the fast ball does. The slow ball's radius of curvature is sharper but only because it's not going as fast forward. For this reason, putts seldom break much in the first two-thirds or so of the putt because the ball is then moving too fast to curl too far off line. By the same token, most of the curl occurs as the ball is slowing down, and the curl gets tighter just as the ball is ending its roll.

Second, all breaking putts on slopes like this start out uphill and then come back downhill in the arc of the putt. This alters the speed pattern of the putt somewhat.

Third, when a ball crosses the cup's lip, it starts dropping by gravity as it continues laterally across the hole. If the lateral speed is too fast, the ball doesn't have sufficient time to drop at least halfway before it bangs the back lip and pops out. And on breaking putts, the back lip is always lower a bit than the entry lip, so the ball needs even more time for dropping than it would on a level putt.

Imagining the Extremes.

To take a simple case, imagine a flat green that is medium fast (so a test ball rolls about 7.5 to 8 feet off the Stimpmeter), with a tilt of 3 degrees right down to left with an axis of tilt that parallels a direct line from the ball to the hole. (There is no elevation change up or down on a line from the ball straight to the hole.) On a putt length of 10 feet, how much break would you estimate? The answer, of course, depends on how fast you start the putt off. But the extremes of possible speeds are fairly easy to identify.

For MINIMUM BREAK, see the fastest curve for the putt that will not run over the hole. The first extreme is the most direct line to the hole, or the fastest speed. By the laws of physics, there is an outer limit on this speed and that is a speed that is too fast to allow the ball to drop halfway while crossing over the 4.25-inch diameter cup. Without getting into details, this "capture" speed has to be less than about 50 inches per second as the ball crosses over the front lip (roughly, a ball that is rolling about nine revolutions per second covers about this distance in one second, so they are two ways to express roughly the same speed.) If you need to visualize this speed, roll your index fingertip over your other index finger nine times while counting "One Mississippi..." It's pretty fast. A ball that misses the hole going this fast will roll about 4 to 5 feet past on a medium fast green.

A putt that is going to go 4 to 5 feet by the hole if it misses will have the path with the slightest curvature, but it will have some curvature. In our case, it probably wouldn't be much more than two or three inches off the direct line to the hole (or baseline).

And such a putt must cross the hole dead center, too. Anything off to the side a bit doesn't leave enough hole-crossing for the ball to drop far enough for capture, and it hops or spins out of the hole. In order to have the central third of the hole available for capture, the ball can't be going much above 30 inches per second as it crosses the lip. That's a 40% decline in putt speed.

Backing off from the maximum speed 40% results in a higher curve right away. Just because it's easier to feel, you should go ahead and back off half the maximum speed and make a rule: Never hit a breaking putt so it reaches the hole at more than HALF the maximum capture speed.

For the MAXIMUM BREAK, see the slowest curve for the putt that will just make it to the hole and drop. The other extreme is a little more tricky. This is the SLOWEST possible putt that just makes it to the hole's edge and topples in. This is where the imagination is tested. People with a lot of experience putting will naturally find this curve easier to envision, but novices can learn this technique pretty readily, too.

The quickest way to get a feel for this curve is to imagine putting straight at the hole with just-get-there speed, knowing the ball will curve low. Try to imagine just how far below the hole the ball would end up. See the whole curve in your mind's eye from the address spot to the endpoint, and then pivot the whole curve uphill as if on a hinge at the address spot. When the endpoint connects up with the hole, you have a good approximation of the slowest putt you can hit and still get the ball to the front lip.

In our 10-foot example, this SLOWEST possible putt in our case would run approximately 20 inches uphill from the baseline, and this "breakpoint" or apex will be somewhere near the start of the last one-third of the total putt (say, three feet from the hole). From the ball to the breakpoint, the curvature from gravity will be pretty slight, since the ball will be moving fastest in this section of the putt. The putt needs only a little more speed than necessary to reach this highest breakpoint to then curl back downhill three feet to the hole. From the ball's perspective, three feet is not quite seven rolls.

So this slow putt is about the same as putting uphill a bit to just barely send the ball through a point about seven feet away and 20 inches or so uphill from the baseline. The surface rises 3% of these 20 inches, or 6/10th of an inch, so it's not THAT much uphill. For this extreme, then, the "seeing" of the putt's speed and curve translates into seeing the speed of a putt of about seven feet to a point 20 inches up-slope from the baseline.

Narrow Your Focus to the Optimal Breakpoint.

If the maximum break is 20 inches, then half the maximum speed / minimum break curve can't be any less than 10 inches, so the optimum curve must have a breakpoint between 10 and 20 inches uphill. That's still a big range, and needs more focusing.

The optimum break depends on managing the last few feet of the putt to maximize the chances of sinking the putt. Obviously, the optimum will be closer to the highest curve, because even the highest curve has sufficient speed to deliver the ball into the cup. And there are two others reasons: a slower approach to the hole results in misses that are a lot closer; and since the ball approaches the hole from uphill, the opposite side of the hole's rim is a little lower than the entry edge, so the ball has to be slower to have more time to drop farther than normal to be captured.

Broadly speaking, on a scale of 1 to 10, with 10 being slowest, the optimum speed for the putt we have described is definitely above 5, and probably above 7. That puts the optimum breakpoint around 70% of the way from minimum to maximum.

On the other hand, you don't want to go all the way to the slowest extreme, because then you would have no margin for error on the slow side left. Any slower than the slowest is too slow!

Taking everything together, the optimum is probably about two-thirds to three-fourths the way between the minimum and the maximum breakpoints. For simplicity, make this the rule: Find the maximum curve; the optimum's breakpoint is 3/4ths the way up from the baseline to the maximum breakpoint. This curve gives a very nice approach speed into the hole, with a good margin of error.

Finally, Work Backwards from the Hole to the Breakpoint.

Now that you can see one specific optimal breakpoint, it's critical to finish the job by seeing the last several feet of the putt. You really need to make sure the vision of the putt has the ball actually entering the cup dead in the heart. This is essential to crystallizing the very line your actual putt needs to follow.

If the closest point on the cup to you is the six o'clock position on a clockface, a right to left breaking putt as described will enter the cup at about the four o'clock position, and at a speed such that the ball drops well below the back rim before hitting the back wall of the cup down in the hole. Coming backwards out of the hole with our imaginary vision, we can pretty clearly see exactly where the entry curve connects back up with the optimal breakpoint. The curve has to flatten out here and parallel the baseline. From here, the task is very direct: send the ball to that breakpoint with the right speed so that the ball smoothly connects with and follows this final entry pathway and rattles home. That's about all you can do.

Make This Part of Your Game.

When faced with a breaking putt (with the surface otherwise generally flat), imagine a putt straight at the hole with just-get-there speed and visualize how far down the amateur side the ball would curl. Transplant this "slowest" trajectory uphill so the ball would end up in the cup. This curve sets the maximum breakpoint. The optimum breakpoint or apex will be somewhere around three-fourths of the way from the baseline to this maximum break. Get the whole putt crystallized in an exact curve by seeing the last several feet of the putt in reverse, with an optimal entry speed, from the hole back to the optimal breakpoint.

Now you're back full circle to concentrating on th speed, since the curve is set. The speed won't be much more than just enough to get the ball uphill to this breakpoint, because the final three feet past this point or so are downhill at least a little.

The numbers will vary with green speeds, slope, actual contour, and other factors, but generally speaking, looking at breaking putts like this will help you see more break than you might be accustomed to, and will keep you within the ballpark of the possible as you try to give your putt its best chance of going in the cup.