HOLING OUT

MEASURING PERFORMANCE ON THE GREEN

THE R&A 'HOLING OUT' TEST PROTOCOL

A METHOD FOR ASSESSING THE RELIABILITY OF PUTTING SURFACES

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Background and rationale

When golfers stand over a putt, if they hit it on line and at the right pace they expect to have every chance of holing the putt. Imperfections in the putting surface cannot be avoided but they should rarely be so severe as to deflect the ball from its intended line. Now we have a means of assessing the reliability of a putting green; the 'Holing Out' Test, developed by The R&A. The Test tries to eliminate as many variables as possible so that the results reflect only the influence of the putting surface or the golfer's putting stroke on the likelihood of the golfer holing putts. This gives golf clubs and their course managers an easy and affordable way of monitoring the reliability of their putting surfaces throughout the year. Such testing should always be carried out in conjunction with monitoring of firmness and speed.

The test involves using an inclined plane or ramp (modified as a curve) to deliver a rolling ball onto the green. The ramp needs to deliver balls consistently with a smooth transition onto the turf, without human error, and it has to be able to deliver the ball at varying speeds so that a range of distances can be assessed. The delivered ball is aimed at the hole, in such a fashion that a series of ten consecutive

"putts" can be replicated. These "putts" have the characteristics of normal putts, i.e. the ball is subject to variable velocity, slowing down as it nears the hole. At very low velocity, the ball is more affected by surface irregularities, which is exactly what happens to the golfer's putt.

On a good surface, 10/10 "putts" will be holed. The more reliable the surface, the greater the distance from which such a score will be achieved, e.g. from 3, through 6 and to 9 feet. The worse the surface, the fewer "putts" will be holed even from short distances. If more than 20% of "putts" miss the hole, concerns about the integrity of the surface may be justified.
The test has three main uses:

1) regular monitoring of reliability on an annual basis
2) checking reliability after disruptive remedial greenkeeping work
3) checking reliability in advance of important club events or tournaments.

Watch this short video on the 'Holing Out' Test.

The inclined plane

The use of an inclined plane to replicate "putts" was first successfully demonstrated by Sir Ralph Payne-Gallwey in 1908. His experiments clearly showed the inconsistent centres of gravity of rubber-cored balls at the time. Sideways deviation of 2 feet along the line of an 8 foot putt was not uncommon.

These tests were carried out indoors, on a full size billiard table, and showed that a ball with a true centre of gravity would consistently hold its line during an 8 foot putt. The surface was, of course, very true and very smooth. In effect, it was a constant, not a variable, in the experiments. The ball was the variable and Payne-Gallwey added further evidence with in vivo ballistic tests. The entire set of results were published in the London Times during March 1909 and ensured that golf ball makers improved their products.

In 2011, this idea was adapted by two UK golfers, Nick Park and Malcolm Peake, who successfully showed that an inclined plane could be used to test the reliability of a putting surface. In this modern version – The R&A 'Holing Out' Test - the roles are reversed. Modern golf balls, assessed to ensure that they have a reliable centre of gravity, can act as a constant, whereas outdoor putting surfaces are the main variable. In order to give the most accurate assessment of surface reliability, the ball should be rolling as soon as possible after delivery from the inclined plane. Demonstrating this surface variability, in a way that is meaningful to golfers, can be as illuminating as Payne-Gallwey's "curveball" putts.

Requirements for the test

1) Putting surface with hole cut and prepared for a day's play
2) Inclined plane with curved end – 'the ramp' – which has the capability of consistently delivering golf balls at varying speed (including those greater than the measured green speed of the day), through the availability of an adjustable ball-release mechanism. The 'Greenstester' is currently the preferred option for the 'Holing Out' Test
3) 10 test balls, selected for uniform centre of gravity (see Appendix)
4) Felt tip pen
5) Tape measure
6) Data sheet for recording results
7) Camera (optional)

Methodology

It is usual practice to keep three greens under observation – good, average and poor.

Ideally, testing should be carried out towards the end of the day but this is not always practicable, though be consistent about the time of day when testing is carried out. Avoid testing if there is wind above 20 mph.

Select balls of the same brand and specification for the test, which appear on the current List of Conforming Golf Balls issued by The R&A. Only 'true' balls as identified in the simple assessment outlined in the Appendix to this Protocol should be used for the 'Holing Out' Test. Dimple pattern can cause a significant oscillating effect on ball roll down the ramp.

To selected balls, draw a line round their circumference with the felt-tip pen so that the reliability of roll, if recorded on camera, can be demonstrated.

Choose greens with a hole location on a reasonably level surface at which the ramp can be aimed. All routine testing should be completed to a reasonably level area. The 'Holing Out' Test can be applied to hole locations on sloping areas using the ramp, but it will be more difficult to line up the "putts" and balls may well travel some distance beyond the hole even if they were travelling at the desired velocity approaching the hole. Tests to such hole locations will make you appreciate the potential for the ramp as a putting teaching aid, helping golfers with reading the line of putts.

The ramp should be set up on a level footing by careful attention to the spirit level, to a distance measured from the front edge of the hole. The foot of the ramp should not be placed on or immediately in front of any visible blemish on the putting surface that may cause deflection before the ball starts rolling, e.g. aeration holes, poorly repaired pitch marks or golf shoe spike marks.

Once the aim of the ramp is adjusted so that two consecutive putts fall into the centre of the hole, a series of 10 putts is carried out.

On calm days tests from a variety of directions circling the hole can be made to confirm the reliability of the green. Initial testing should be carried out downwind and experience has shown that testing above wind speeds of 20 mph (about 30 km/hour) should be avoided as it may affect results adversely. On windier days, such confirmation should only be achieved by carrying out an additional test into the wind.

The length of "putt" to be used will vary according to season. Distances up to 9 feet can be useful in summer, whereas when sward growth is minimal or dormant then distances of 6 feet or less will give a useful assessment of surface performance. Clubs can choose their own length of 'Holing Out' Test, because the results are for intra-club use and comparison. The required distance is set by using the adjustable ball release mechanism on the ramp.

A test variable which needs careful management is the velocity at which the ball enters the hole. A ball which has slowed right down in the last few inches - thus magnifying the effect of any surface imperfections near the hole - represents a desirable test with high sensitivity. The acceptable entry velocity is for a ball is that if it misses, it should only run on for one full rotation of the golf ball, i.e. 5.25 inches (13.4 cm) beyond the front edge of the hole.

Record the number of balls that are holed out of the series of 10 putts. This can either be described as a value out of 10, e.g. 6/10 or 9/10, or as a percentage success rate, e.g. 60 or 90%.

If a series of 10 putts gives a rogue result that can be explained by external influences not related to the test, then repeat it. A result of 10/10 means no further test is required on that day, from that distance.

Throughout testing, keep the ramp free from debris such as grains of sand and grass clippings as these may have an adverse impact on ball roll.

Summary of variables

1) Wind – avoid testing in wind speeds of more than 20 mph (about 30 km/hour).
2) Surface – recent disruption from greenkeeping procedures; health of sward; time of day.
3) Sensitivity – aim for entry velocity into hole as described above.
4) Operator – care when releasing ball.

Interpretation of results

Frequency of testing is crucial to monitor putting surface performance over time. Weekly testing is recommended. Any decisions which require fundamental management changes should only be based on the results of full-year monitoring, as full year monitoring will provide a good sampling range of hole locations, from different wind directions.

Interpretation of results should be kept in context as even surfaces which record 10/10 from any given distance are only true and reliable on that day, and only on that line of putt. Tests from a variety of directions circling the hole on calm days, will help to confirm the quality of the surface. If a number of tests are undertaken to the same hole location, then the reading for the hole location should be the average of the individual test results.

When putts are missing, an understanding and diagnosis of the likely cause(s) is needed, especially for readings worse than 8/10.

The 'Holing Out' Test will identify issues related to foot printing on overly soft surfaces, disease scarring, grass seed head production, seasonal variation in growth and general wear and tear. It will then let you evaluate the success of maintenance intended to address such issues. Carry out the Test in the morning after finishing your surface preparations to demonstrate the effectiveness of this programme, or if you want to show how resilient your greens are to wear and tear, carry out the Test towards the end of the day's play.

The Test can also be used to measure the impact of intensive maintenance procedures. The 'Holing Out' Test will identify the degree and longevity of disruption to the reliability of putting surfaces from essential maintenance operations. The 'Holing Out' Test can show that maintenance practices which might appear to impair playing quality only affect the look of the green and, provided appropriate reinstatement work is completed, do not actually impact on the reliability of the surface.

The 'Holing Out' Test can also be used to inform preparation for important tournaments. Short-term refinements to turf management, e.g. when preparing for an important event, may be guided by only a few test results taken over the final preparation period. The fairness of proposed hole locations can be assessed using an artificial target, such as tee pegs, to indicate the resting position of balls rolled from any set distance, in this instance 6 feet.

Causes of poor surface performance

Random distribution:

1) variable growth of sward
2) seeding *Poa annua*
3) disease scars
4) pitch marks
5) moss
6) footprinting anywhere on the green in swards with high organic content.

Predictable distribution:

1) footprinting around the hole in swards with high organic content
2) aeration patterns.

All of these causes of poor surface performance are preventable on a well-built and well-maintained putting green except, perhaps, during periods of extremely wet weather.

General Comments

This test should be used as an aid to monitoring the reliability of putting surfaces. It should not be used as a sole measure of surface quality – firmness and speed must also be taken into consideration.

Once the technique is mastered, it offers a quick and easy way of testing the reliability of surfaces, usually at the same frequency as testing for speed.

APPENDIX. 'True' ball assessment

A ball with an off-set centre of gravity may deviate from a 'true' line of roll to the extent that it may miss the hole, even if lined up perfectly. To determine if a ball is 'true', submit it to the following assessment:

1. put 6 tablespoons of Epsom salts in a fairly open vessel that has enough surface area to be able to get your fingers in to spin a golf ball

2. pour in about one cup of warm water and stir to dissolve the Epsom salts and then add enough water to provide a depth of at least twice the diameter of a golf ball

3. put a golf ball into the liquid and see if it floats. If it doesn't add more Epsom salts until the ball floats

4. spin the ball

5. take a felt pen marker and put a dot at the very top of the ball. This marks the lightest side of the golf ball, as the heaviest side is on the bottom in the solution

6. spin the ball a second time. If the same spot ends up at the top, the ball is out of balance and should not be used for the 'Holing Out' Test.

