Establishing Bowling Green Levels

- A HI-TECH OPTION

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The need for level greens is obvious. And the essential first step towards getting a level green is to survey the surface and measure relative heights using a convenient grid. From here on it is just hard work, but at least you know where you are going.

To measure these levels there is a dazzling array of equipment on offer - theodolites, dumpy levels, laser beams, computerized work stations and so on. All are specialized techniques requiring skilled operators. You may be interested in a method we use at our club. It is simple, cheap, almost idiot-proof, and will give results that are at least as accurate as any other.

What you need:

- A small table, a large bucket of water and a brick.
- 30 meters of clear polythene tubing - 9 mm bore is fine.
- A stick about two meters long, and a meter rule.
- 40 meters of fishing line and two pegs.
- A pencil, paper and some masking tape.
- Two club members - one with reasonable eyesight.

You may dispense with the table if you are willing to lie down on the green to make each measurement. And you **may** use a small bucket of water if you are prepared to see it tipped over at some critical moment by some ham-fisted helper.

Preparation:

Take your fishing line and, using the two pegs to anchor it, stretch it across the green from ditch to ditch. Now tear off short strips of masking tape and wrap them around the line at whatever intervals you think appropriate, and pencil on each some identifying mark. In our case (33.5 m green) our first measuring point is 300 mm in from the profile - we don't consider anything nearer the edge of the green to be significant. This bit of tape is marked "0". At the other end, and again 300 mm from the ditch, we mark the last point "20". Nineteen other bits of tape are stuck evenly along the line and are marked 1 to 19 - this works out as just under two meters between grid points.

You're now ready to start.

Step 1: Stretch your line along the North profile and mark your grid intervals with chalk on the woodwork. Now do the same at the South end. Mark them 0 to 20 from West to East.

Step 2: Now stretch the line from North to South with the "0" profile marks at each end. The first 21 points of measurement now await your expert attention.

Step 3: Put the table in the middle of the green with the bucket of water on top - mix in a teaspoon of detergent to cut down on surface tension. Tie the brick to one end of the polythene tube and drop it in the bucket. Take the other end of the tube and walk briskly to the ditch. Suck hard on the tube until water starts to syphon from the bucket, and drop the end in the ditch and leave it syphoning until you are **absolutely sure** there are no air bubbles left in the tube.

Step 4: Pick up your stick, put one end on the green somewhere, hold it upright and tape the tube to it. Unless you have a **very** high table you will find that the water level will settle somewhere around eye level. If it's too low for comfortable reading jack up the table or put more water in the bucket.

Step 5: Tape your meter rule on the stick so that the water level is somewhere about the middle of the rule - for clarity in this description let's put the 0 mm end at the top. It doesn't really matter which way it goes as long as you remember which way is up. But it is **vital** that the rule is firmly fixed on the stick - any slippage will be immediately reflected in your measurements.

Step 6: Find somewhere on the profile which looks solid. It is going to be your "reference mark". It is your insurance against things like a bubble in the system, a leaking bucket, or a table sinking 50 mm into the green. You should check it about every 40 measurements.

Step 7: Place your measuring stick on the reference mark, hold it vertical (it has to be badly off vertical to make a really significant difference to your readings), and note the reading on the meter rule. Let's say you get 746 mm.

Step 8: Go to the grid point (0.0) and repeat the process. You now record 761 mm. You deduce from this that the (0.0) is 15 mm **higher** than your reference point. Think about it.

Step 9: Now do the whole green, shifting the line progressively across the green, and referring regularly to the reference point. Repeated readings should be within 2 mm of the mean.

With a little experience two people can complete the whole process in about three hours. One measures, the other records.

How to Present and Use the Data:

Initially we had a computer program that gobbled the numbers and spat out information like how much soil would be needed to fill the low spots to any selected level, the thickness of packers needed at each grid point for wires, etc., etc., It was all good fun but pretty much a waste of time.

What we do now can be easily done by simple arithmetic. Set up the grid on a piece of paper, find the lowest reading on the green surface, and subtract this number from all the measured points. You now have a pattern showing the height of each grid point relative to the lowest point on the green. This will quickly show you where your high areas are, or you can draw contours if that helps. How you interpret your information , and what you do about it is up to you.

A program of getting our greens level was started three years ago. Initial measurements showed deviations of up to 35 mm on the playing surface, and 50 mm in some corner areas. Now that levels are getting better we currently use a philosophy that goes something like this: "Any grid point that is within 9 mm of the lowest point on the green is near enough - a long screed will look after these minor imperfections. The place to watch and work on are the remaining high areas." So, any level from 0 to 9 is marked as "0". All others are reduced by 9 - these are the high spots on the green and during winter renovations we double-drill these ares and apply a minimum of topdressing. It makes only a small correction, but always in the right direction. Figure 1 shows one of our greens prior to renovation this year. Note the ridge running east/west on grid lines 15 and 16, and another one running north/south on grid line 15. Except in the extreme corners, none of the deviations are too serious. The green played well last season and it will be interesting to see to what extent we have managed to correct these deviations. It will be checked some time in October.

NORTH

0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	5	6	0	0	1	0	0	1	1	1	1	0	0	1	3	0	0	0	0	1	10
1	2	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2
2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
5	4	2	1	0	0	0	0	0	0	1	1	3	1	0	0	0	0	0	0	0	0
6	4	0	0	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	1	2	1	2	1	0	0	1	0	0	0	0	0
8	0	0	0	0	0	0	0	0	2	2	0	1	0	1	0	2	0	0	0	0	0
9	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
15	0	0	0	0	2	5	1	0	2	2	0	1	4	1	0	0	0	0	0	0	0
16	0	0	0	0	4	7	2	0	1	1	0	1	4	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	12	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3

SOUTH

Figure 1: The Elevation Grid (mm) on the # 1 Green of the Tarawhiti Bowling Club, Wellington, N.Z., Feb. 1992.

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