

Bowling by Numbers

Turning an Art into a Science

with the use of

Simple Numbers and 'Rules of Thumb'

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Introduction

If you are relatively new to bowls and haven't yet got a 'FEEL' for where your bowl is going to end up on the rink, this article may help get you somewhere close to where you want to be.

First and foremost (as Pat Metcalfe the Spanish National Bowls Coach will tell you) you need a stable and consistent delivery of the bowl to the carpet on an angle from the Jack line that you have chosen. You can practice this at home very simply and easily by placing a cushion at the end of a carpet about 3m to 4m away from where you are standing, and bowl into the cushion. This exercise will help you get a consistent and smooth delivery into the centre of the cushion (your delivery line). Alternatively, you can make a chute and bowl into the chute as shown below.



Illustration 1: Bowling Mat & Chute



Illustration 2: Close-up of Bowling Chute

The advantage of this is that the chute will convert the horizontal velocity into a vertical velocity and allow gravity to decelerate the bowl quickly and return the bowl to you. You will be able to deliver about 4 bowls a minute, allowing you to put a complete games worth of bowls down in around a quarter of an hour!

The bowl has a bias (i.e. it is not perfectly balanced side to side) and the heavier side will cause the bowl to arc off a straight line. Because the bowl, when it is travelling, is acting like a gyroscope, the out of balance will cause the bowl to precess at a rate which varies inversely with the speed of the bowl, that is to say that the slower the bowl rotation, the faster it will turn off line. In fact, the line of travel will follow the path of a parabolic curve. What's a parabolic curve? Most of you will have seen a satellite dish and the curve of the dish is parabolic (which focusses the microwave energy into a spot at the collector (LNB)). A parabolic curve has a constantly changing radius (*Illustration 3 shows the trajectories of two differently biased bowls*).

Understanding the Travel of the Bowl

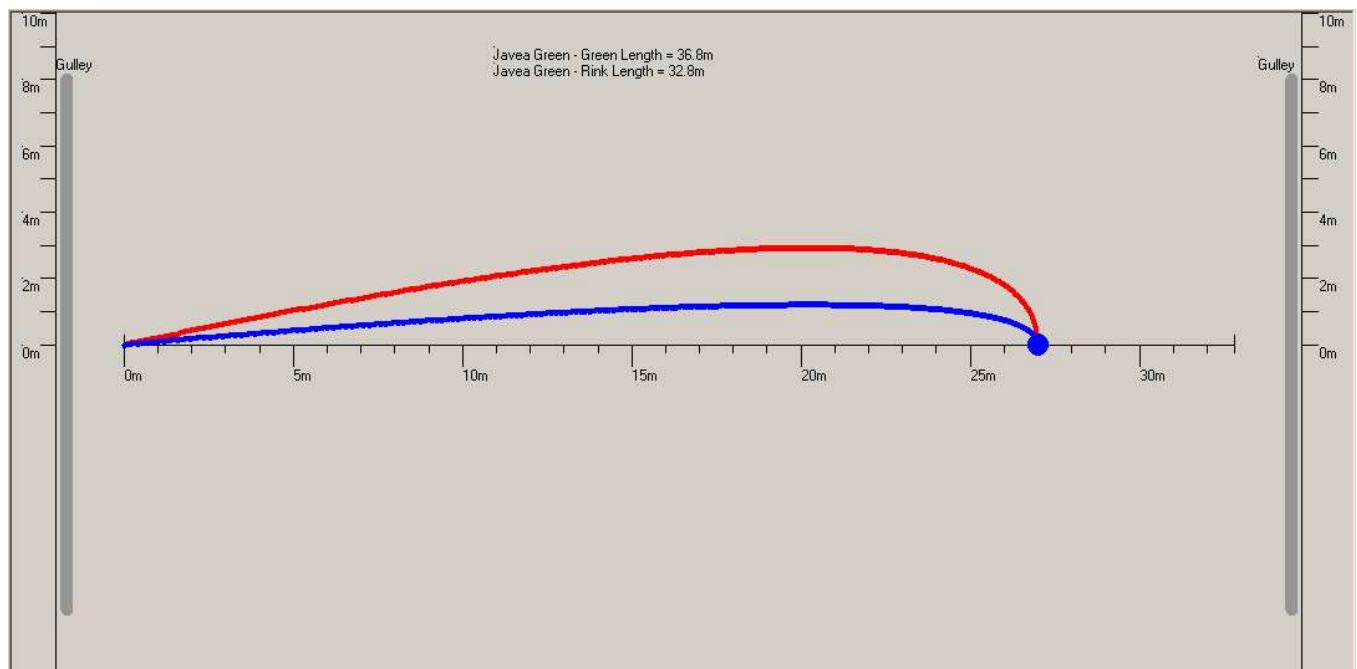


Illustration 3 Example of the Trajectories of Two Different Bias Bowl

Different manufacturers and styles of bowls have different levels of bias which means they all have different curving paths. For example, a Taylor Lignoid (*Illustration 3 Red line*) has a large curved travel

compared to a Taylor Vector VS (*Illustration 3 Blue line*) which has a very low bias, and travels to its target in a much flatter curve.

Another interesting point to remember is that for a given type of bowl, the delivery line (angle) remains constant regardless of the length to the Jack (*Illustration 4 below shows this*).

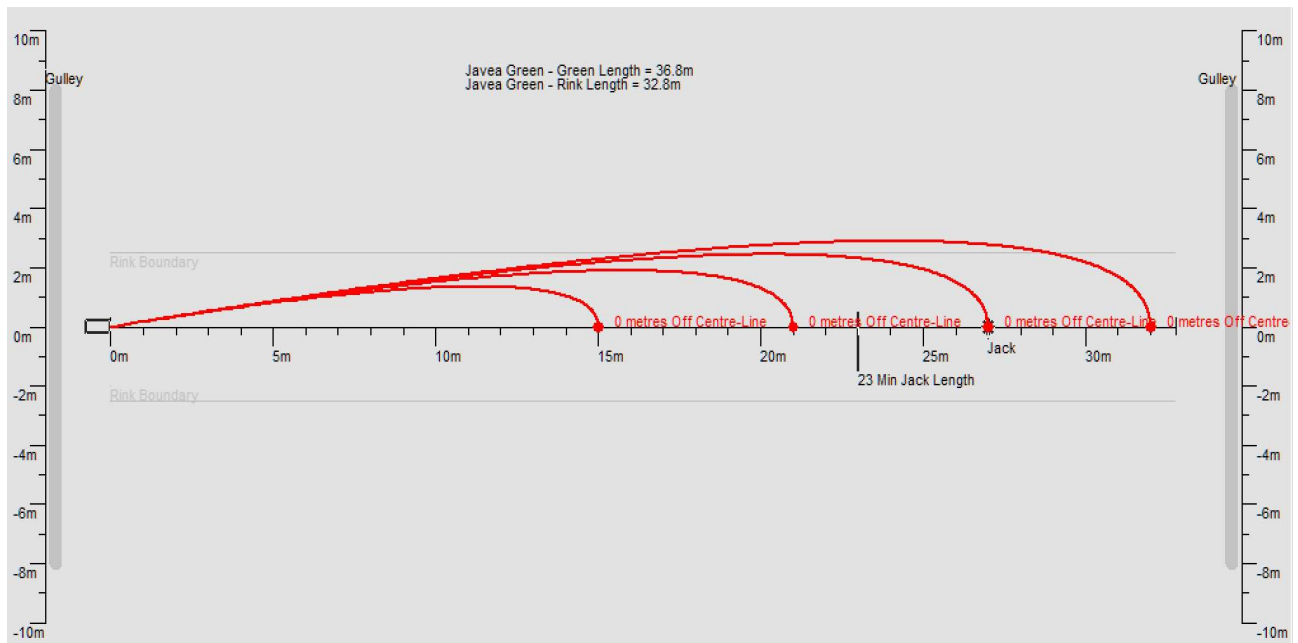


Illustration 4 Different 'Weights' on the same delivery line all end up on the same line

The Mathematics of Bowling

So, let's move on to the mathematics of Bowling. You will have heard people talk about the speed of the green – what do they mean when they say “The green speed is 15 seconds”? A 15 Second green means that it takes 15 seconds for a bowl to travel and come to rest 27 metres from the delivery point. A 19 second green means that the bowl takes 19 seconds to come to rest 27 metres away. Obviously, the bowl must be travelling slower on a 19 second green to get to the 27 metre point, than on a 15 second green. The slower speed (on the faster green) means that the bias of the bowl is acting on the travel of the bowl for a longer period of time, which means that it will curve round further. The deceleration of the bowl is constant once it has left your hand, and the delivery speed (*referred to as the Weight*) can be therefore be calculated from this deceleration value. The actual value in m/sec is immaterial as far as you or I are concerned because you don't have a radar gun to measure it, but, for the record, to travel 27 metres on a 19 second green requires a delivery speed of 2.84 m/sec and a 15 second green requires a delivery speed of 3.59 m/sec. To travel 1 metre further on the 15 second green requires a delivery speed of 3.66m/sec, an increase of only 0.07 m/sec, which is hardly measurable. So the advice to the beginner, when the Skip says “you are a metre short”, is to deliver the next bowl with the same swing as the first, because if you consciously add extra speed (*Weight*) to the delivery you are more than likely to go way past the Jack and miss the head completely! (*See Illustration 6*) But there is a way to help you get that extra metre, so read on.

What Happens in Actuality

How do we determine the Line and Length we need to get to the Jack. Let's take an example of the Jack being 27 metres away. The bowl, because it is travelling in a curve must actually travel further than the 27metres so we have to add a bit of extra speed. A simple way of estimating how much extra distance is required is to visualise a triangle as seen in *Illustration 5* on the next page.

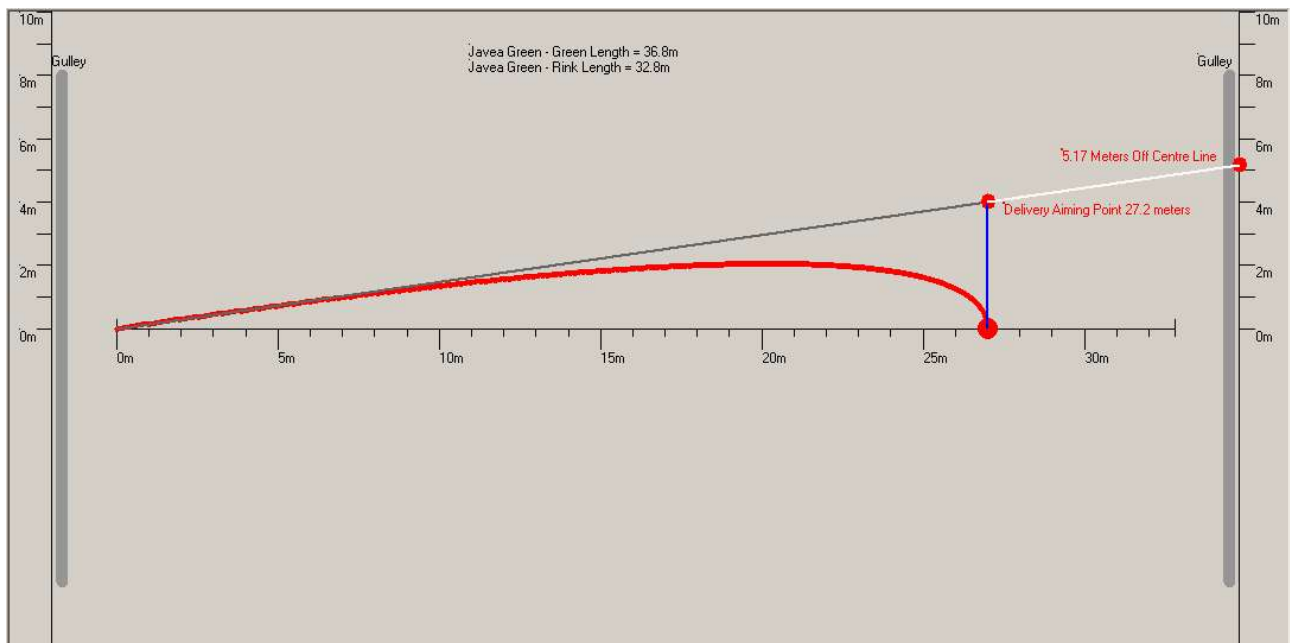


Illustration 5 Example of 'Jack High' aiming point

Here the black and white lines are the original delivery line extended to the far bank. The blue line is Jack level, and where it meets the delivery line is the point you should be aiming to reach (*Imagine you are casting a Jack to this point*). This is because the length of the hypotenuse of the triangle (the black line) is almost the same as the length of the curved path of the bowl. If your bowls are consistently short of the Jack, simply move your aiming point further along the delivery line and that should cure it. This also helps during floodlit bowls. When the daylight fails and the lights come on you will find that your perception of distance alters, and the tendency is to bowl short. Using the tip above helps negate the effect of the light changing.

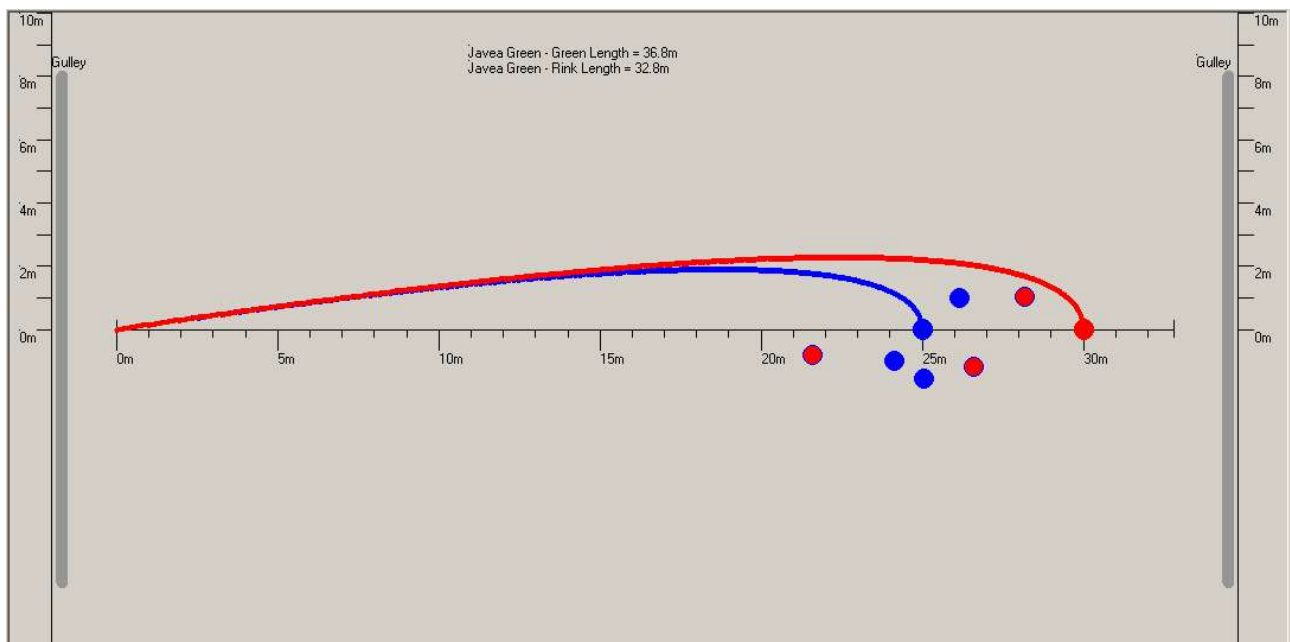


Illustration 6 Example of too much 'Weight' causing the bowl to completely miss the head

Now let's look at what we should do when the Skip says “Bowl into the Head”. We obviously need a bit more weight, but that is going to take us outside the head as shown by the red bowl (*Illustration 6 above*). Here we added 5 metres to the distance on the same delivery line and missed the head completely!

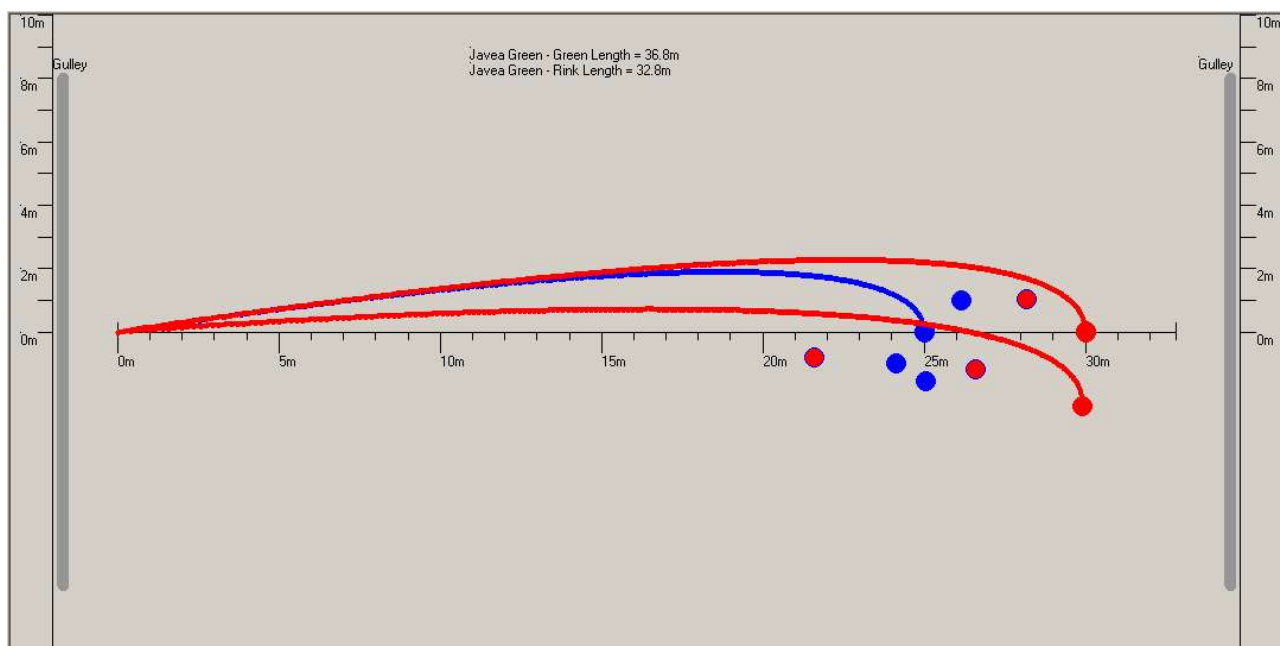


Illustration 7 Aiming to get the bowl through the head

So we need to reduce the delivery angle to cater for this. How much? Well a simple 'Rule of Thumb' is to take 50 % of the delivery angle and add 20% to the length (in this case 5 metres) and the result is that we bowled right through the head as requested (*Illustration 7 above*).

In fact, using half our normal delivery angle and reducing the extra distance to just 10% (2.5m) (*Illustration 8 below*) we are still very close to the centre of the head. So we can afford to be a little bit out on the distance (*Weight*) but still be able to please our Skip, and our 'Rule of Thumb' changes to 50% Angle and 10% - 20% extra distance.

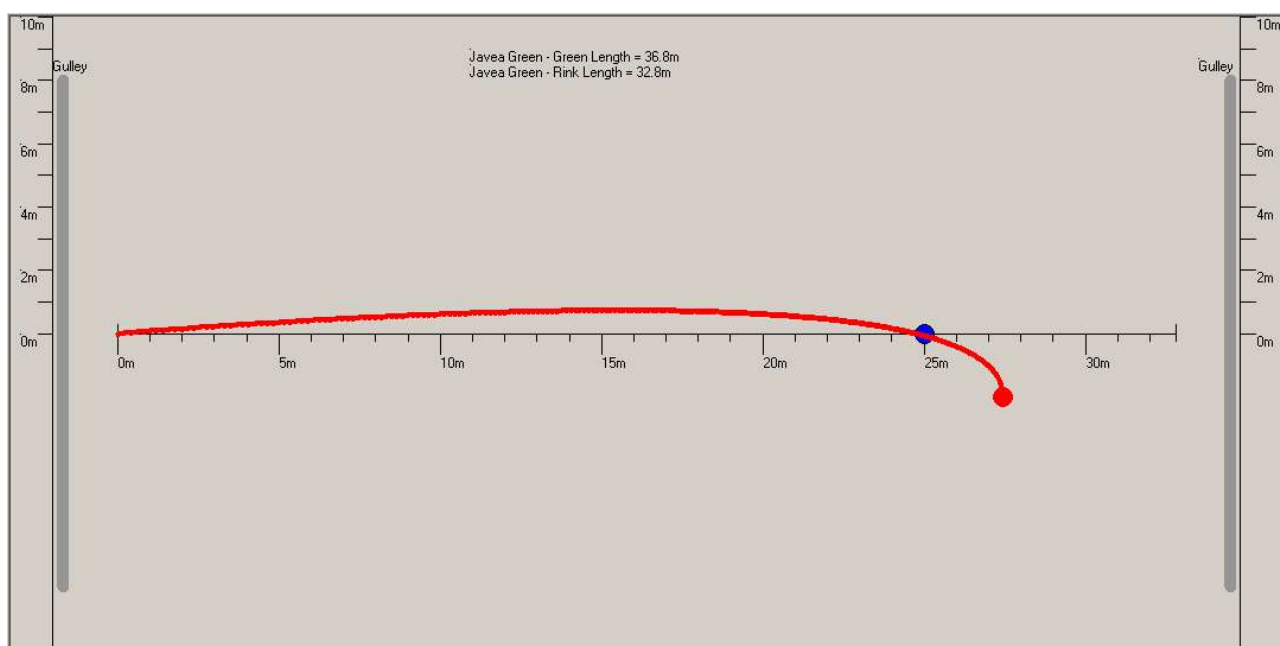


Illustration 8 50% Aiming angle with 10% (2.5m) extra distance

A simple way of estimating how short or long your bowl has stopped is to view the relation of the bowl to the jack as follows. If you can see the bottom of the jack sitting on top of the bowl (*Illustration 9*) then your bowl is approximately 2 meters short. Alternatively if your bowl is behind the jack and you can see the bottom of the bowl sitting on top of the jack (*Illustration 10*) then your bowl is about 1 metre past the jack.

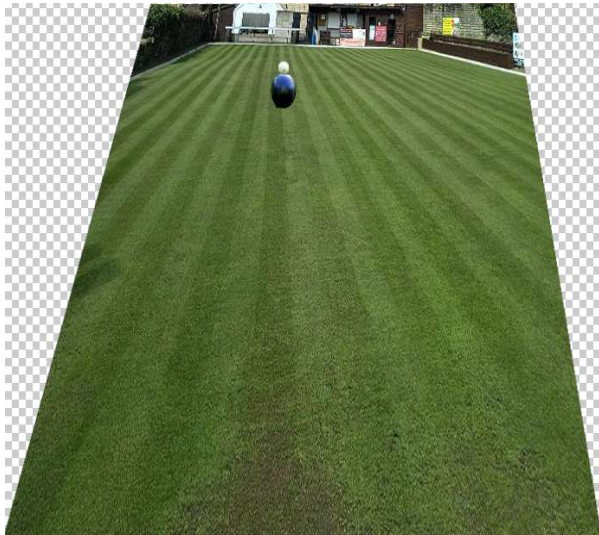


Illustration 9: Short Bowl by about 2 metres

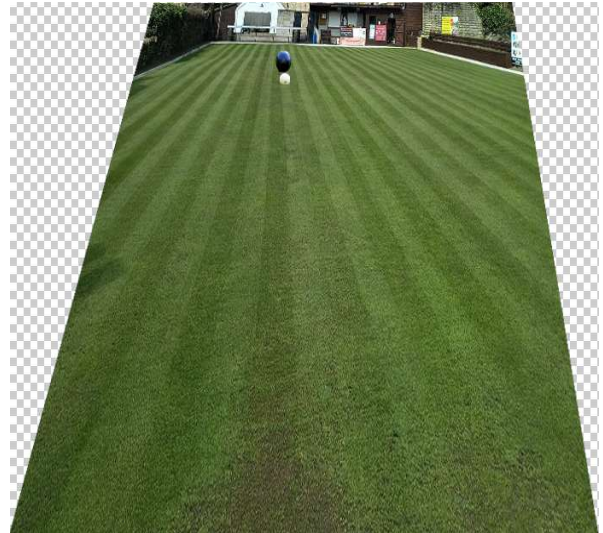


Illustration 10: Long Bowl by about 1 meter

So there it is, hopefully a simple way to understand how to get your bowl close to the jack, how to play a weighted shot if requested by your skip, and how to estimate how short or long you have bowled.

As you gain experience you will find that you acquire a feel for where your bowl will end up and the need for a 'mechanical' approach to the game will reduce. But remember a consistent, reliable delivery onto your chosen line is of paramount importance, so practice it!

There are plenty of free articles on the web and some of the best are written by the renowned Australian bowls coach Rob Judson .

Enjoy the sport of Flat Green Bowls.

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