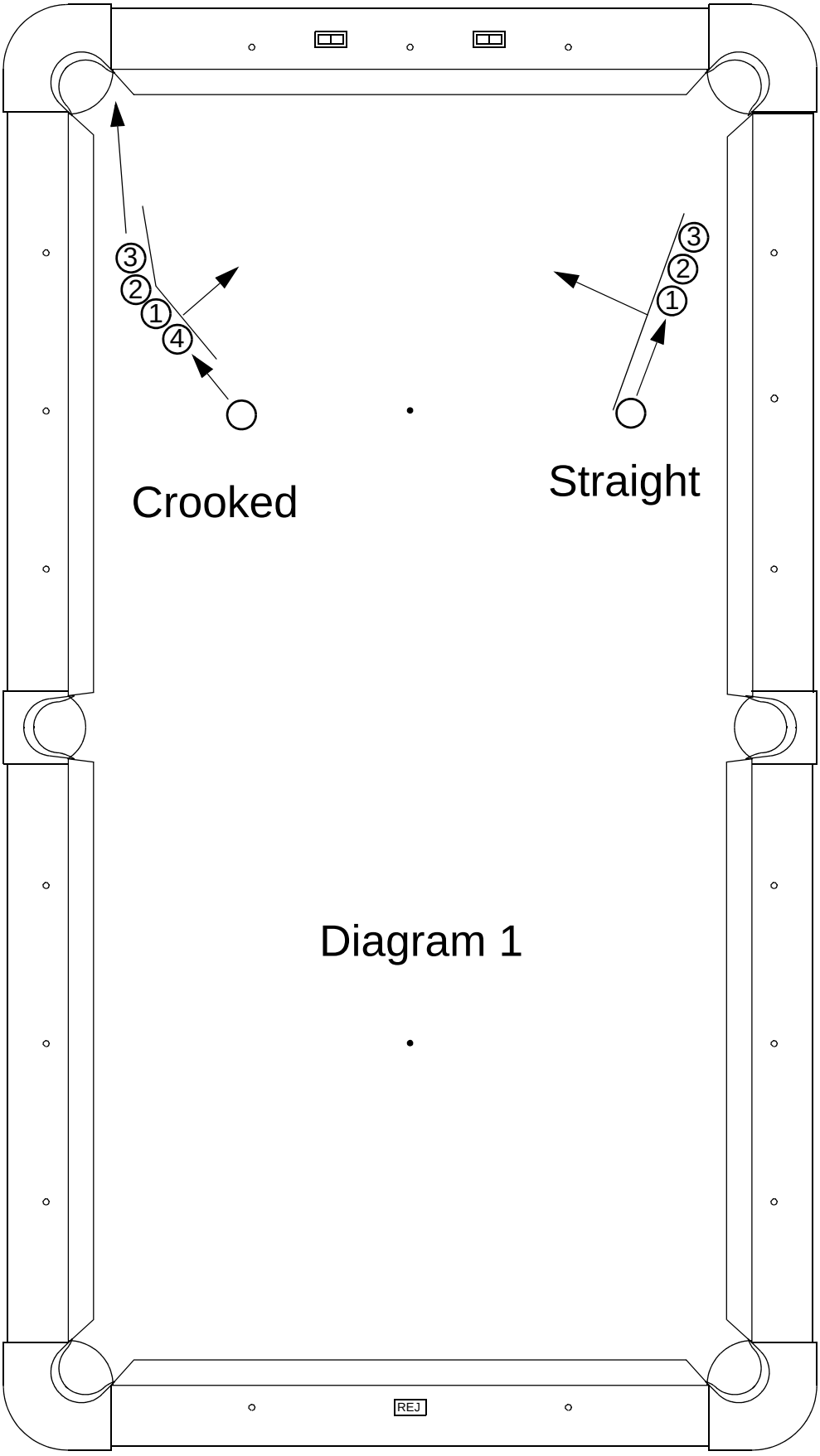


Diagram 1

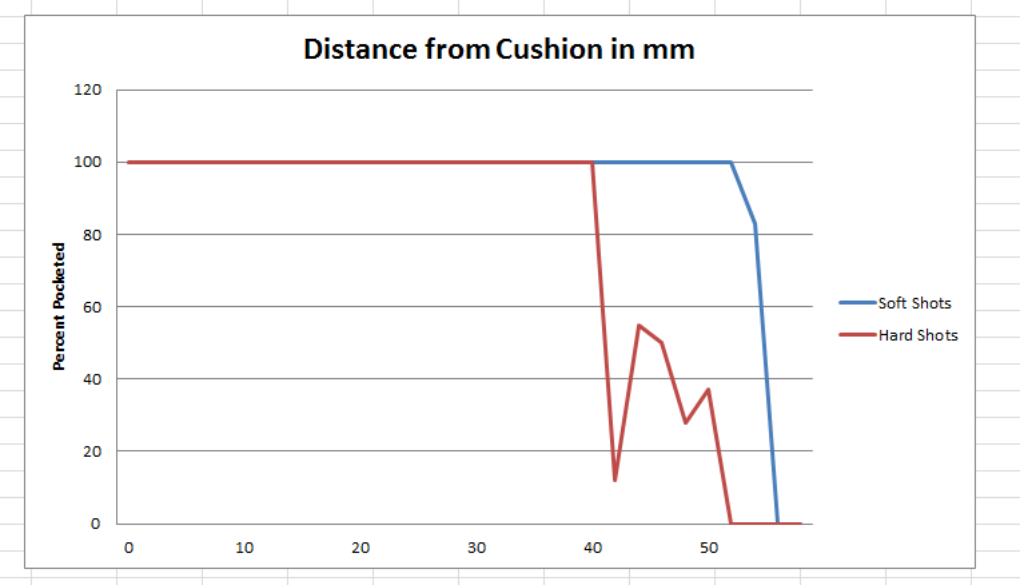
Distance from Cushion in mm
Percent Pocketed
120
100
80
60
40
20
0
0
10
20
30
40
50
Soft Shots
Hard Shots

Diagram 2

Get-In English, At Last
by Bob Jewett

Last month I described how Dr. Dave and I did an experiment to measure how large a pocket is. The setup we used is shown in the “straight” shot in Diagram 1 where a perfectly straight combination is pointed towards a pocket with an angle into the cushion. The group is moved left and right to see how far in each direction the group can be moved and still get the ball into the pocket.

The main results from last month were that for shots nearly along the cushion, the speed of the shot makes little difference to the width of the pocket, but when there is a little angle into the cushion, as shown in the diagram, the pocket is nearly twice as large for a soft shot as for a hard shot. A surprising result was that if the shot is nearly along the 45-degree line, such as from the foot spot, the pocket plays slightly larger for harder shots.

That experimenting answered some questions but failed to answer a question I posed in my June, 1998 column, which is on-line at http://www.sfbilliards.com/articles/1998-06.pdf. I wondered whether enough spin could be transferred to the object ball to change the size of the pocket. My wonder stemmed from a common belief that “get-in English” exists that helps pocketing percentages. The idea is that if an object ball has a little running English when it hits the far cushion on a shot more or less along the cushion, that English will help the ball into the pocket.

I put the proposition to you readers as a challenge -- you were supposed to do the experiment. Although I got two or three small nibbles over the intervening 15 years, no one actually took the bait, so I had to do it myself.

For the second set of measurements, I moved from the home table with the new, fuzzy cloth used for the results given last time to a more standard tournament table (Gold Crown III) with Simonis 860 cloth that’s about a year old but well maintained at the pool hall where I usually play. I got a lot of strange looks during the three hours of testing but fortunately was not arrested for public table abuse.

The first new measurement was to see how large the pocket is for shots right along the cushion but at different speeds. I was not comfortable with the previous result that speed made no difference along the rail, as my experience told me softer was better in that situation. I’ve played on one table where if you shot a ball perfectly along the cushion -- touching the cushion the whole way to the pocket -- it would not go in if you shot hard. Granted, that was a sort of tricked-up table and useful for trapping the unwary newcomer, but most tables seem to have a speed dependence for such shots. In Diagram 2 is a plot of what I discovered.

For the pocket tested, soft shots went in quite a bit better than hard shots. The plot shows the percentage of shots that went in versus how far off the cushion the balls were. All shots were played parallel to the cushion. The distance was increased 2mm on each try, which is about the thickness of two dimes, and up to 10 shots were taken at each distance.

The hard shots started failing when the balls were about 40 mm from the rail which is about 1.6 inches. Strangely, the percentage of good shots does not go quickly to zero for increasing dis-

tance. Instead, the pocket is unpredictable over a range of about 12 mm (the diameter of a typical pool cue tip).

The soft shots to the pocket are much better behaved which is to say all shots within 52mm (2.1 inches) of the cushion went in and all shots 54mm from the rail and more did not go in. There was no strange transition region where the shot was uncertain.

A possible explanation for the strange behavior is that this particular pocket has multiple facings to make it smaller. In fact, it is impossible to fit two balls into the jaws of the pocket. A different way to make pockets smaller is to extend the rubber into the pocket, but that is a lot more work. So, in some sense, this is a tricked-up pocket although in a way that is fairly common.

Another explanation is that for harder shots, the ball bounces back and forth more times in the pocket and a lot more details of the pocket get involved, so that miss or make depends critically on how fast the shot is. Unfortunately, I did not have a robot available or any other good way to precisely control the speed of the shot, so there was surely some variability. I suspect your speed will have similar variability.

A similar test was done with the balls at an 8.5-degree angle of approach. If you put a ball about a diamond and a third off the cushion along the headstring, the shot to corner six diamond away is about this angle. A similar set of data was gathered but with an angle both the left and right side of the pocket needed to be found. The hard shot had much less uncertainty on where the edge of the pocket is.

The result is that for soft shots coming in at an 8.5 degree angle with the cushion, the pocket is about 2.8 inches wide. For hard shots, the pocket tightens up to only 1.6 inches wide. This width is the allowed range of the center of the ball as it approaches the pocket, so to be fair you need to add the diameter of the ball to get the usual notion of width. Using the numbers I list above is a better way to compare the allowed margin of error for the shots.

By calculating the center of the “go in” range for each set of tests, it is also possible to figure out where the effective center of the pocket is. Many years ago I proposed the intersection of the rail grooves as a single good target in the corner pocket, suitable for all angles of approach and all speeds. For the shot parallel to the cushion, this ideal target still holds for all speeds, but what about for other approach angles and speeds? For the 8.5-degree shot described above, the center of the pocket for the soft shot is 2mm closer to the near cushion than my estimate. For the faster shot, the center of the pocket moves away from that cushion and ends up 7mm on the other side of my estimated single spot. If during practice you mark the rail grove intersection with a donut reinforcement, slightly favor the rail-side of the center of the donut as your target for soft shots along the rail and go for the outside edge of the donut for hard shots along the rail.

Finally, I did a brief test of the idea of “get-in” English which has been an open question for a long time. I set up the multi-ball combo nearly as before, but the final ball was offset by about half a ball so that is was cut about 30 degrees by the preceding three balls as shown in the “crooked” shot in Diagram 1. This setup will get about as much side spin on the object ball as you can get.

Try it on a bank shot straight along the long string (centerline of the table) and see how much you can angle the ball off the cushion with transferred side spin.

The test was conducted as before with soft and hard shots and incrementing the position of the balls 2mm at a time to find the edges of the “go-in” range of the pocket. I was a little surprised by the result as I did not believe before the test that you could make any real change to the size of the pocket with the relatively small amount of spin that you can get on the object ball.

The surprising result was that the English increased the size of the pocket by about 20% for both soft and hard shots, so the sizes listed above increased to 3.4 and 1.9 inches respectively. While this is a significant increase, it is not clear how often it can be brought into play. Usually you have to worry about where the cue ball will go and your options are restricted. Often you get the benefit without working for it. If you are cutting a ball down the rail with no English or some inside English, you will get some of the helpful spin on the object ball automatically.

Clearly, there is a lot more testing that could be done. Many more angles could be measured with various speeds which could either be measured or controlled by a robot shooter. Besides “get-in” English, “get-out” English should also be tested. For the “fuzzy” edges of the pockets, where it’s a hit-or-miss proposition at high speeds, a lot more shots at each distance might clarify what’s going on. High speed video of the rattling ball would be interesting. Perhaps a reader would like to take on this extended testing. Don’t forget to try several brands of tables and be sure to include the side pockets in your tests.