

AN AIMING POINT METHOD FOR POOL

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A method is shown for determining where to aim the cue ball in pool. To use this method, the player must visualize two points on the object ball and the distance between them. It is easy to learn and use, and may be particularly useful for those new to the game. This paper describes the method, called here the "Double The Distance" method or DTD.

A brief description of the DTD is given first below, followed by further detail.

SUMMARY OF THE DOUBLE THE DISTANCE METHOD (FIGURE 1)

Finding the aiming point is a simple four-step process. Referring to Figure 1, these steps are:

1. Find the point where a line from the cue ball will intersect the object ball.
2. Find the point where a line from the pocket (or other target) will intersect the object ball.
3. Estimate the distance between these two points.
4. Double this distance to find the aiming point.

This usually takes 10-20 seconds.

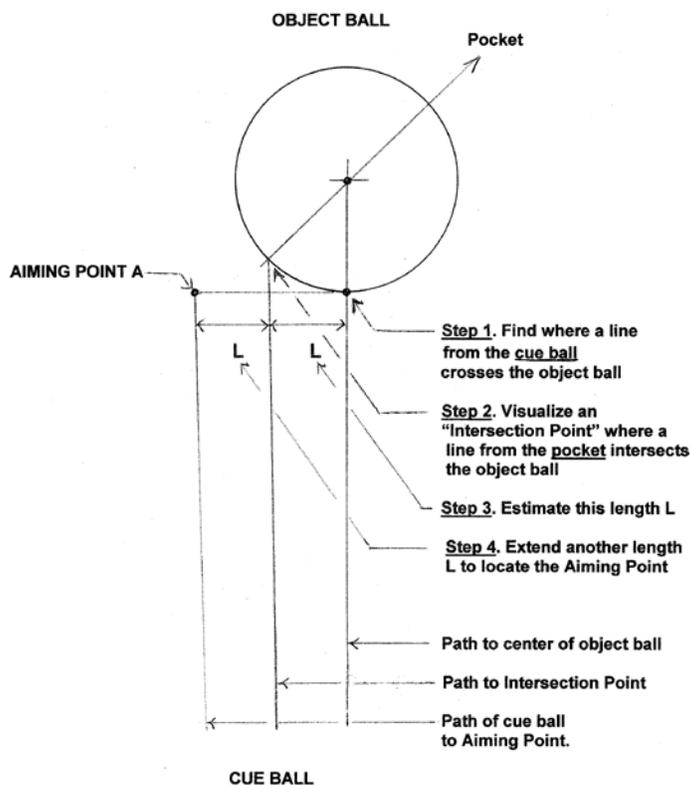


FIGURE 1. FIND THE AIMING POINT IN 4 EASY STEPS

INTRODUCTION

The discussion and diagrams given here assume a pocket billiards game like 8-ball or 9-ball. The DTD method can, however, be used for any billiards game. There can be pockets or not. The balls can be of any size. The object ball can be directed at any part of a pocket, at a point on the cushion, or at another ball. The cue ball and object ball can be anywhere on the table (with a modification described later, required when the cue and object balls are close together).

The aiming point determined by this method does not include the effects of such factors as cue ball speed and English. The DTD provides a simple way of making a good first estimate of the aiming point. The effect of other factors must then be taken into account before taking the shot.

The rest of this document gives:

- A more complete description of the DTD method.
- Examples.
- The “ghost ball” alternative.
- Finding the aiming point when the cue ball and object ball are close together.
- Using “cue tip widths” for measuring the distance to the aiming point.
- The theory on which the Double The Distance method is based.

MORE COMPLETE DESCRIPTION OF THE DTD METHOD (FIGURE 2)

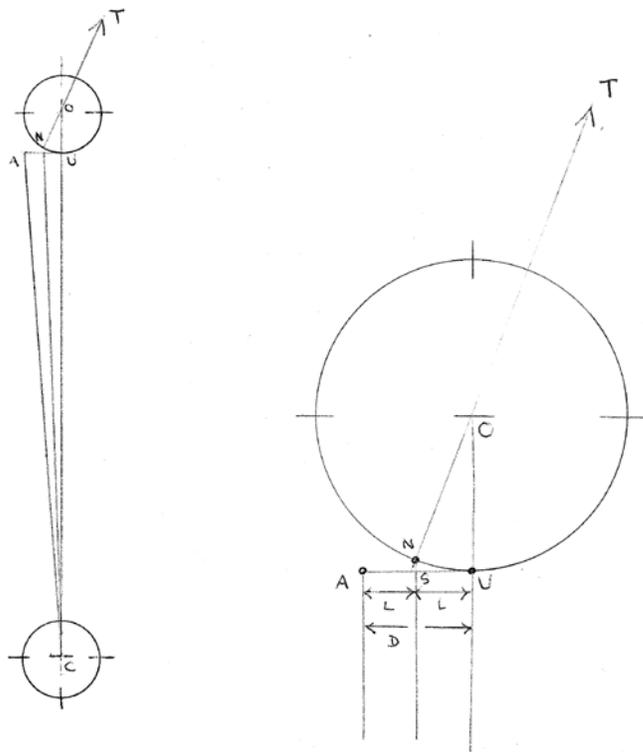


FIGURE 2. MORE INFORMATION ABOUT THE DTD

Step 1 of the DTD method, displayed in Figure 2, is to imagine a line from the center of the cue ball to the center of the object ball. This is line CO, which crosses the object ball at point U.

In Step 2, the player visualizes a line from the object ball target, point T, through the center of the object ball O and intersecting the outer edge of the object ball at point N. Point N is also the contact point, where the cue ball must strike the object ball in order to send the object ball to the target. Figure 2 also shows a point S, directly below N, on the line CN from the cue ball. Use of point S simplifies the discussions and figures given here.

Step 3 is to visualize line US. The length of US is termed L.

Finally, in Step 4, you imagine another line, extending from US and also of length L. The end of this line is the aiming point A. The length of USA (!) is termed D.

If the cue ball is now stroked along line CA to the aiming point A, it will strike the object ball at point N. The object ball will then (we all hope) go into the pocket (or wherever you wished). If it does not, the most common cause is that the length of L was underestimated. It is better to estimate L a little long, thus aiming further away from the object ball. This is equivalent to assuming the cut angle is slightly greater than it appears.

EXAMPLES (FIGURE 3)

In Diagram #1 of Figure 3, the cut angle is 30° . With this cut, the aiming point A, from the player's perspective, is located very close to the edge of the object ball. This is a fortunate location, since aiming at an edge is easier than aiming at a point inside or outside the object ball. If the cut is greater than 30° , the aiming point will be outside the object ball. Cuts of less than 30° result in aiming points inside the object ball.

The example of Diagram #2 has a 20° cut, and an aiming point slightly inside the object ball.

Diagram #3 displays a fine cut, 12° . It can be difficult to locate a clear aiming point for fine cuts because the distances L and D are short, short distances are hard to estimate, and if an error is made in estimating the length of a short line, that error will be magnified when taking the shot.

In Diagram #4 the cut is even finer, 6° . The best approach for playing fine cuts may be to memorize the cut and resulting aiming point of an example or two, then modify the shot at hand accordingly. Diagrams #3 and #4 provide candidate examples.

With a 45° cut, as in Diagram #5, the aiming point is outside the object ball. The normal DTD approach is to estimate the location of the aiming point then remember A for later in the shot setup routine. There is another approach to remembering A, shown in Diagrams #5 and #6. In this alternate approach, you remember the distance to the aiming point from the edge of the object ball rather than the center. This "edge-length" is termed H in Diagrams #5 and #6.

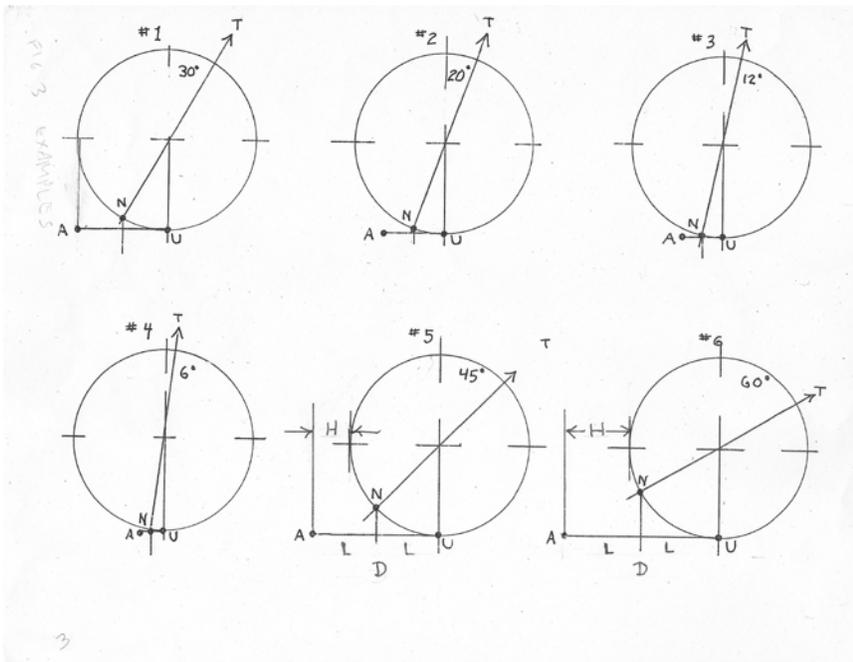


FIGURE 3. EXAMPLES OF THE DTD AIMING POINT FOR VARIOUS CUT ANGLES

THE "GHOST BALL" ALTERNATIVE (FIGURE 4)

A number of authors have described a method for aiming that employs a "ghost ball." (See, for example, David G. Alciatore, "The Illustrated Principles of Pool and Billiards," Sterling Publishing Co. Inc., New York, 2004, pp. 33, 35, 256.) Later sections of this DTD document refer to the ghost ball method, so a brief discussion is also given below.

Figure 4 displays the Ghost Ball Method for locating the aiming point. In this method, a ball is imagined placed tangent to the object ball, with the ghost ball center G on the line from the target T through the center of the object ball O. The cue ball should be struck along a line from the cue ball through the ghost ball center. This will cause the cue ball to occupy the position held by the ghost ball, striking the object ball at N, and pocketing the object ball.

An altered form of the ghost ball method is for the player to change position temporarily to a point C' on the line NC'. Here the player's line of sight is perpendicular to line ON, from where it may be simpler to visualize the ghost ball center. However, the player must then change position again to view the table from behind the cue ball. This second move may make it difficult to remember the aiming point previously determined.

It is difficult for some players to visualize the ghost ball and its center, particularly as the cue and object balls become distant from each other. For this reason, alternatives have been developed (such as the DTD). Some observations about the ghost ball are: (1) the center of the ghost ball is the best possible initial aiming point; and (2) an aiming point developed by any method (such as the DTD) must be on a line from the cue ball through the ghost ball center.

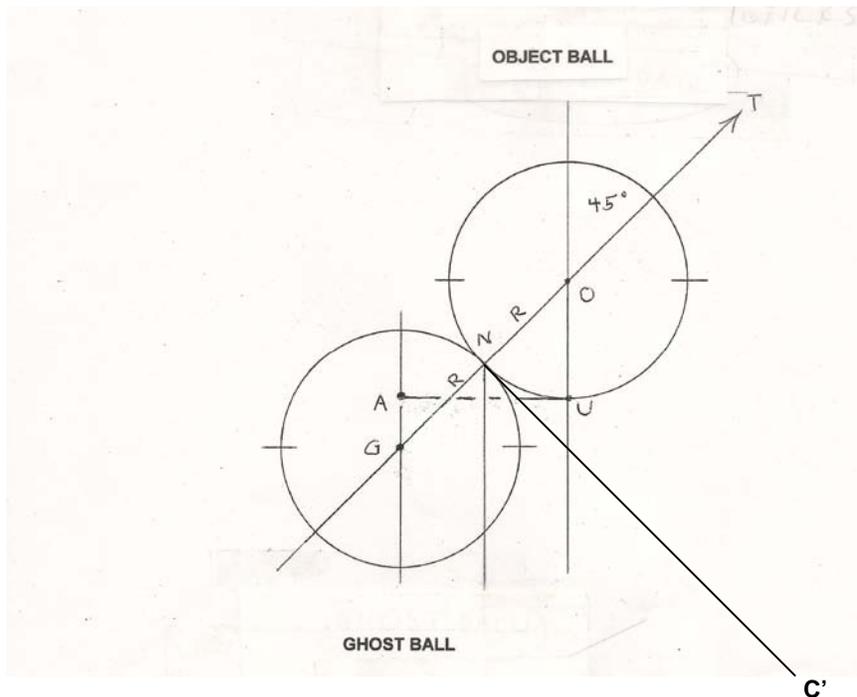


FIGURE 4. AIMING WITH THE AID OF A GHOST BALL

USING "CUE TIP WIDTHS" TO REMEMBER THE AIMING POINT LOCATION (FIGURE 6)

A useful approach for measuring distances from the object ball center and edge to the aiming point was discovered during DTD development. In this approach, distances are measured using the width of a cue tip as the basis. Diagram #1 of Figure 6 displays the concept, where W is the cue tip width (using the average width of 1/2"). In Diagram #1 the aiming point A is 2-1/4 cue tips away.

In Diagram #2, point N is about 3/4 cue tips from the object ball center. A is a bit over 1-1/2 cue tips away.

Diagram #3 shows a fine cut example. Here the aiming point is exactly 1 cue tip away, a good example to memorize. An even finer cut is shown in Figure #4. Here the intersection point N is 1/4 of a cue tip away, so the aiming point A will be at 1/2 a cue tip.

The examples of Diagrams #5 and #6 contain large cuts, 45° and 60° respectively. In these examples, it may be simpler to remember the number of cue tips from the edge of the object ball to A, termed H. H is 7/8 of a cue tip in Diagram #5, about 1-1/2 cue tips in Diagram #6.

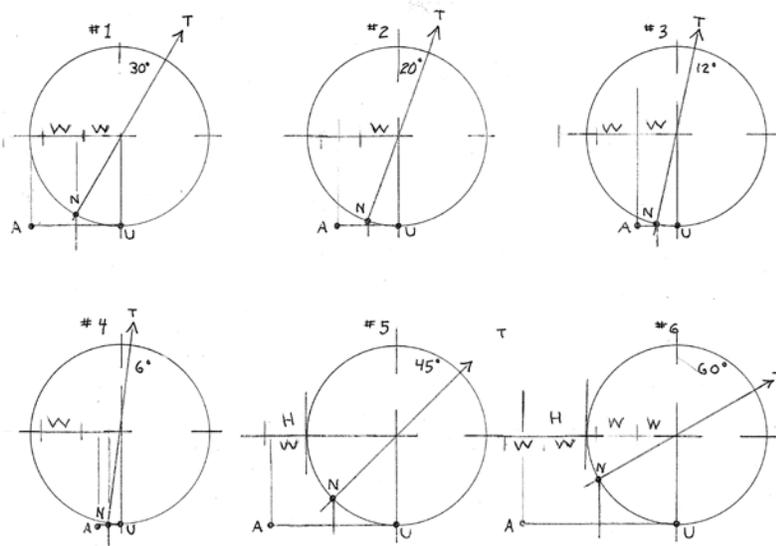


FIGURE 6. USE OF "CUE TIP WIDTHS" FOR MEASURING DISTANCES

THEORY (FIGURE 7)

Figure 7 displays the object ball, the ghost ball, and labeled points defined in previous figures. Also constructed are: (1) additional points (upper case letters, as before), (2) lines between points, and (3) angles (lower case letters). Two triangles are frequently referenced here, the larger formed by the three points GOK, and the smaller by points GNM.

The relation that must be developed before the DTD can be accepted as valid is: the distance L, defined by the two object ball intersection points U and N, when extended another length L, define the location of the aiming point A.

From Figure 7, this relation can be stated as $US = L$ and $UA = 2L = D$. An equivalent relation, and the one that will be shown as valid here, is: $JN \times 2 = GK$.

Major steps in the validity process follow. Some steps readily determined from the figure are omitted. *(The validity of the method previously described as a "modified DTD" is clear from inspection of Figure 7, as the radius of both balls is the same.)*

1. Triangles GOK and GNM are both right triangles.
2. The aiming point A is on a line from the cue ball through the ghost ball center.
3. Angle $a = \text{angle } a'$, and $b = b'$. (Line GO intersects parallel lines.)
4. The two triangles GOK and GNM are proportional. (The three angles of one of the triangles are equal to the same angles in the other triangle. As a result, the length of each of the three sides of one triangle are proportional to the corresponding sides of the other.)
5. The distance GO is twice the length of NO.
6. $JN \times 2 = GK$. (True because the two triangles containing these lines are proportional and the line GO is 2 x the length of line NO.) The necessary DTD relation is valid.

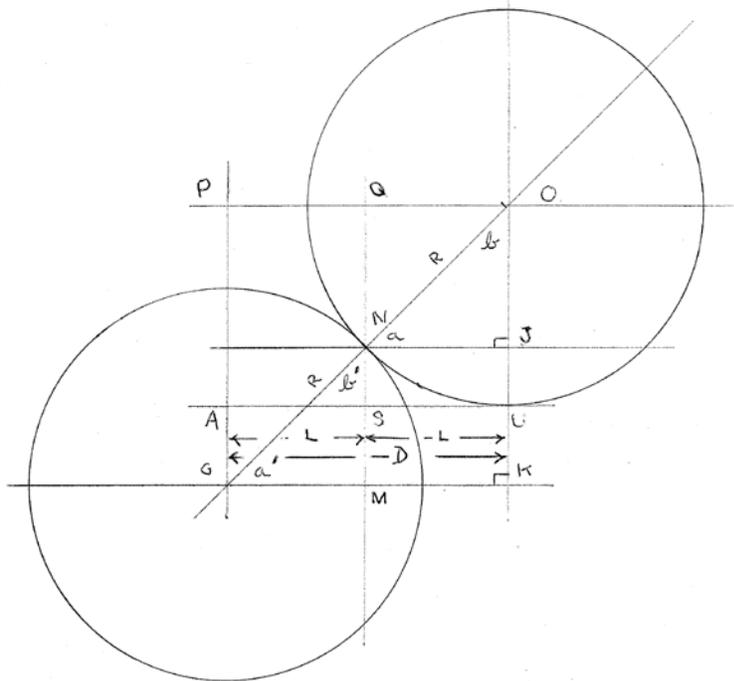


FIGURE 7. THEORY