



TP A.11

Analysis of a common fractional-ball aiming system

supporting:

“The Illustrated Principles of Pool and Billiards”

<http://billiards.colostate.edu>

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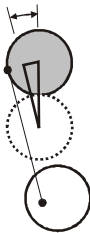
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A common aiming system based on fractional-ball aiming claims there are only three different aims for all cut shots: a "15 degree cut," a "30 degree cut," and a "45 degree cut." Here, I show that these aims are equivalent to 3/4-, 1/2-, and 3/4-ball-hits, and I show the 15 and 45 degree angles are not exact. Also, I show an example shot "in between" two of the aim references to show a deficiency of the method. The method provides easy visual aiming, and it helps a player establish good reference aims for different ranges of cut shots; but for "in-between" cut angles, one must adjust or compensate between the aim references.

3/4-ball hit:

aim the left 1/4 of the CB
at the left edge of the OB

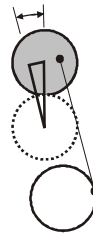
$$\phi = 14.48^\circ$$



"15° cut:"

aim the right edge of the CB
at the right 1/4 of the OB

$$\phi = 14.48^\circ$$



$$\phi = \sin^{-1}\left(\frac{R/2}{2R}\right) = 14.48^\circ$$

Note - the cut angle is not exactly 15 degrees.

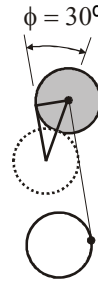
1/2-ball hit:

aim the center of the CB
at the edge of the OB



"30° cut:"

aim the edge of the CB
at the center of the OB

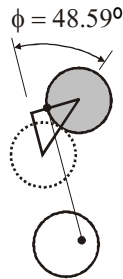


$$\phi = \sin^{-1}\left(\frac{R}{2R}\right) = 30^\circ$$

Note - the cut angle is exactly 30 degrees.

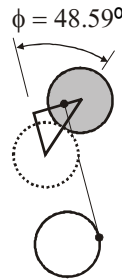
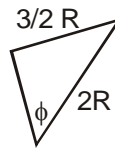
1/4-ball hit:

aim the right 1/4 of the CB
at the left edge of the OB



"45° cut:"

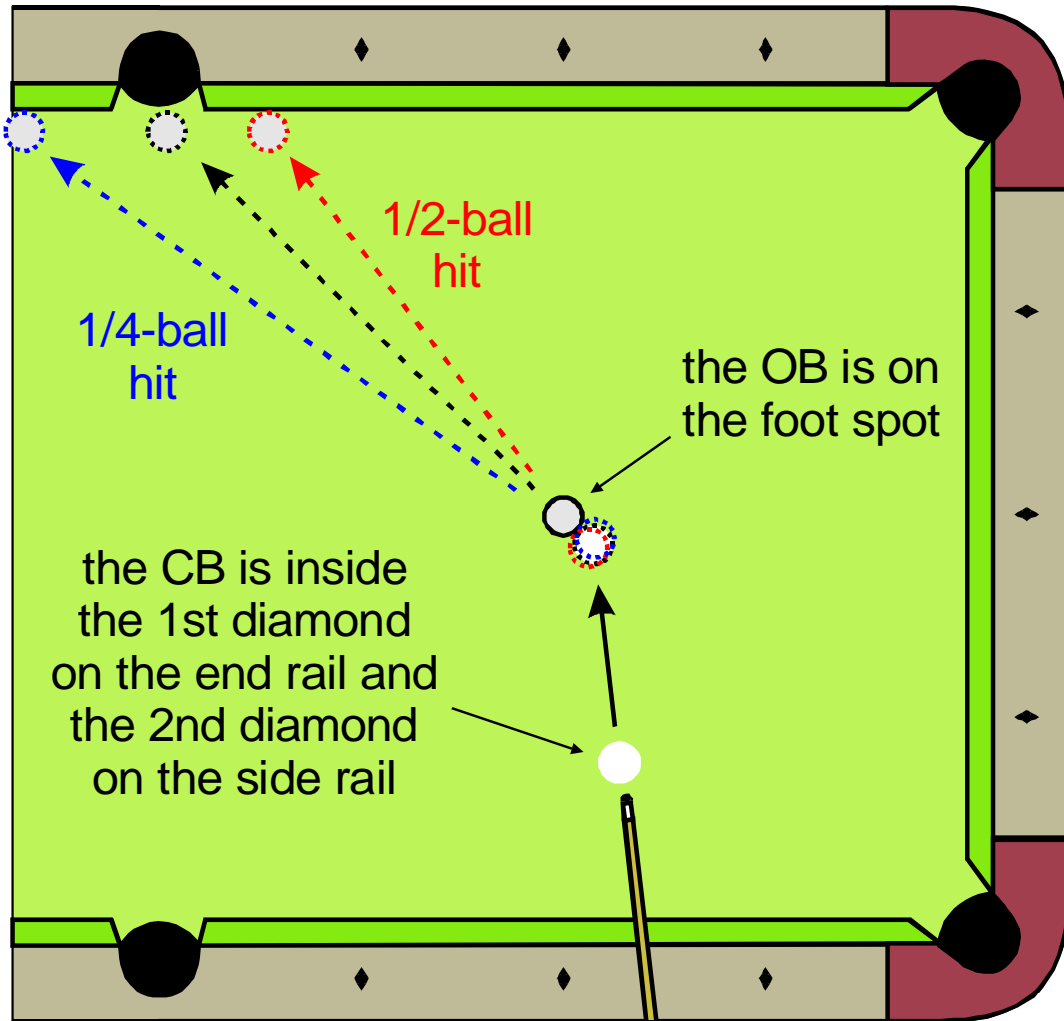
aim the right edge of the CB
at the left 1/4 of the OB



$$\phi = \sin^{-1}\left(\frac{3/2 R}{2R}\right) = 48.59^\circ$$

Note - the cut angle is not exactly 45 degrees.

Example "in-between" shot:



The optimal cut angle for this shot is 39.3 degrees, which is "in between" the 1/2-ball and 1/4-ball aiming references.