*Supporting narrated video (NV) demonstrations, high-speed video (HSV) clips, technical proofs (TP), and all of my past articles can be accessed and viewed online at **billiards.colostate.edu**. The reference numbers used in the articles help you locate the resources on the website. If you have a slow or inconvenient Internet connection, you might want to view the resources from a CD-ROM or DVD. Details can be found online at: **dr-dave-billiards.com**.*

This is the seventh article in a series dealing with *"How to Aim Pool Shots (HAPS),"* a three-disc instructional-DVD set I recently created with fellow *Billiards Digest* columnist Bob Jewett. HAPS covers cut-shot aiming systems, how to adjust for cut-induced throw, how to aim without guessing when using sidespin (english), and how to aim specialty shots including caroms, kisses, combos, rail cut shots, and elevated-cue shots. Also included are numerous simplified and effective systems for aiming kick and bank shots. An outline of the entire HAPS series along with video excerpts from each DVD can be viewed online at: ***dr-dave-billiards.com/aiming***.

This month, we will look at some simple but effective mirror-based systems for aiming kick shots, where the cue ball (CB) is rebounded off a cushion before hitting an object ball (OB). These systems are completely visual and do not require one to memorize a bunch of diamond numbering systems or formulas.

Diagram 1 illustrates the visual equal-distance method. It works by placing the cue over the cue ball with the tip in line with the rail diamonds. When the cue is along the correct line of aim, the tip will be in between the OB target and the projected CB position along the cue. In other words, the distances on each side of the tip must be equal. If the tip is too far to the shooter's right, the distance on the OB side will be larger; and if the tip is too far to the left, the distance on the CB side will be larger. In either case, you need to move the tip until the distances are equal. At that point, you have the necessary line of aim for the shot. This method works only for slow-to-medium-speed rolling-CB kicks where the target ball is a medium to far distance from the kicking rail. The CB must have complete topspin roll when it reaches the cushion; otherwise, the CB will rebound short of the target. This system, like many kicking systems, also requires that there be no sidespin on the CB. Even a small amount of sidespin will change the rebound angle, so it is critical to get a vertical-centerline-hit when using the systems in this article.
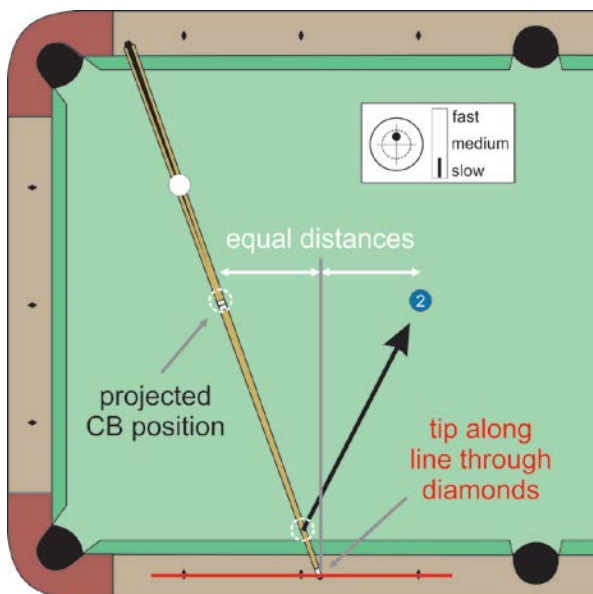

Diagram 1 Through-diamond equal-distance kicking system

An alternative to the equal-distance system is to mirror the CB or OB relative to the line of diamonds instead. **Diagram 2** illustrates how this works. We wish to kick at the 2-ball (for example, because there are obstacle balls preventing a direct hit). To determine the required line of aim, just measure the distance from the center of the OB to the line of diamonds. Then mirror this distance to the other side. As demonstrated in online video **NV E.7**, you can use your cue to easily measure off and mirror the distance. The required line of aim is from the CB to this mirrored point. As with the equal distance method, you can project or mirror either ball. In this case, where the OB is closer to the rail, it can be easier to mirror the smaller OB distance instead of the larger CB distance. This mirror system actually results in the same line of aim as the equal-distance system, but the technique is quite different.
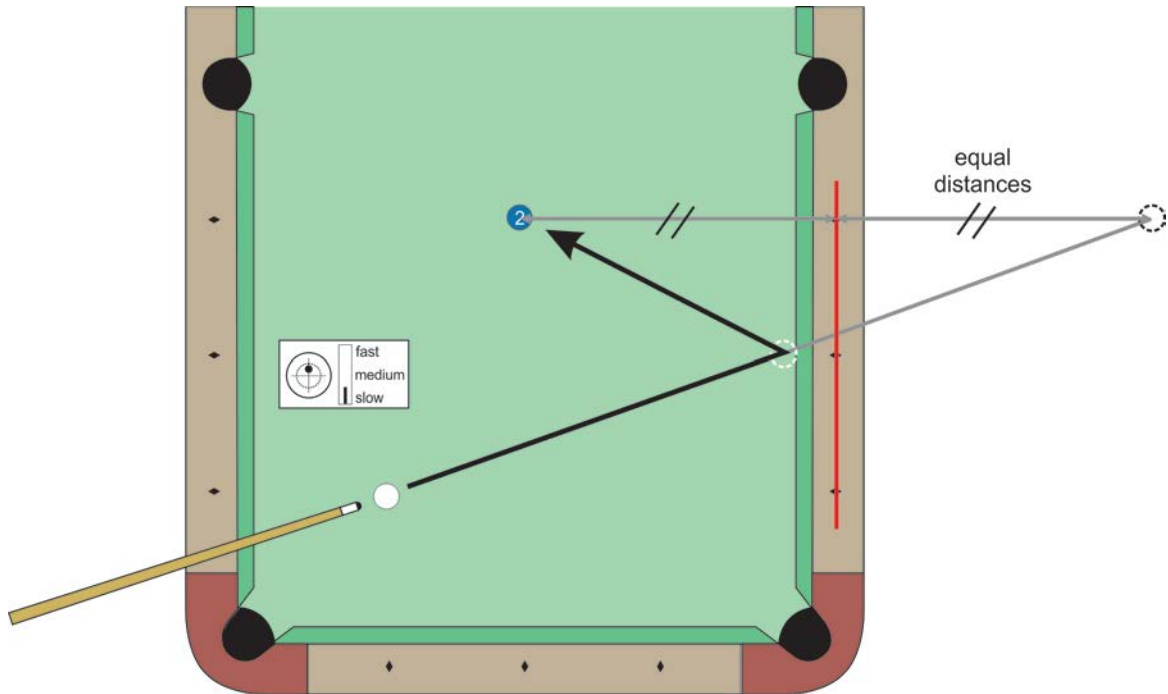

Diagram 2 Through-diamond mirror kicking system

When fast speed is used or when the OB is close to the kicking rail, the same methods we just covered can still be applied; but as shown in **Diagram 3**, the measuring and mirroring must take place relative to the rail groove instead of the line of diamonds. The rail groove is the imaginary line where balls sit when they are in contact with the cushion. On an old and worn cloth, the rail groove is actually visible from wear and dirt. Measuring relative to the rail groove creates a true mirror aim, which again applies only at fast speed or when the OB is close to the rail. If you were to measure relative to the line of diamonds instead, the CB would come up short of the target because the fast speed or short distance does not give the CB enough time to bend forward after rebound, as is the case with a slow-rolling kick. In this example, we want to attempt to pocket the 2 in the opposite side pocket. Therefore, instead of mirroring the OB for a square hit, we should mirror the desired ghost-ball target instead to attempt to pocket the ball. First measure the distance from the center of the ghost-ball position to the rail groove. Then mirror this distance to the other side. The necessary aim point in the rail groove will be along a line from the CB to the mirrored point. As demonstrated in online video **NV E.7**, it is usually easier to target points on the rail along the line of diamonds, so it can be helpful to project the aiming line to the rail and find a feature on the wood or visualize the distance from the nearest diamond. This provides a very clear aim point for the shot.
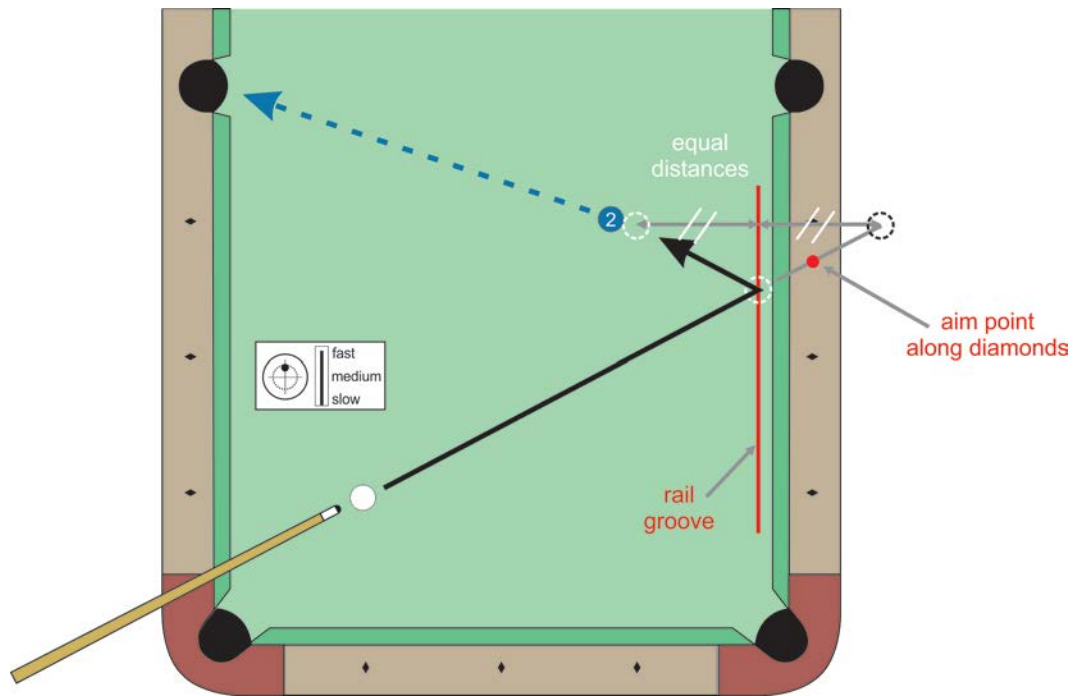
Diagram 3 Rail groove mirror kicking system

For slow kicks with the target far from the cushion, we measure or mirror relative to the line of diamonds. For fast-speed or short-distance kicks, we use the rail groove. For shots in between, still with a rolling CB, where the speed and distance are medium, measuring or mirroring relative to the cushion nose is a good alternative, as shown in **Diagram 4**. This provides a good average reference for a wide range of kicks. That's why some people prefer to measure all kicks relative to the cushion nose, or relative to the base of the cushion just inside of the nose, and just make adjustments for speed and distance as necessary. On HAPS-I, we recommend instead to use whichever reference is most appropriate for the specific shot you are shooting. Then little or no adjustment is required. The equal-distance and mirror methods work the same way regardless of the reference … you just use a different line depending on speed and distance.
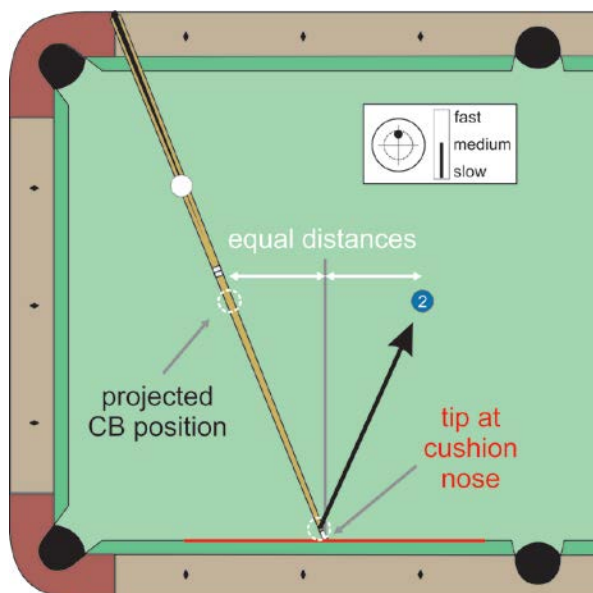

Diagram 4 Cushion-nose equal-distance kicking system

One caution concerning mirroring deals with accuracy. When mirroring a ball or target close to the rail, a small error in the small distance measurement can have a big effect on the resulting aim. However, when mirroring a target far from the rail, it can be difficult to keep the mirroring line perpendicular to the rail, especially when visualizing the line from the mirror point to the CB to find the aim point on the rail. Try out both approaches when you practice to see which works better for you. Concerning whether you choose the equal-distance approach or the mirror approach, the equal-distance approach is more visual and can be faster; although it can be difficult to visualize at larger angles and distances. The mirror approach can be more accurate if done carefully, but it is more cumbersome, requires more room, and it takes longer. Again, try both approaches to see which you prefer in different situations.

Demonstrations of all of the shots in this article can be viewed in online video **NV E.7**. The HAPS-III DVD also includes numerous game-situation examples showing how the systems are applied effectively at the table. As always, you should check out the videos and try the shots yourself the next time you are at a table. Reading is good, and watching is better, but trying is best. If you want more information or want to learn about other kick shot aiming systems, see the "bank and kick shots" resource page in the FAQ section at ***billiards.colostate.edu***.

I hope you are enjoying my series of articles dealing with the "How to Aim Pool Shots (HAPS)" DVD collection. If you want to view video excerpts from the entire DVD set, check out online videos **NV E.1** through **NV E.8**. Enjoy!

Good luck with your game,
Dr. Dave

NV E.1 – Fractional-Ball Aiming, from HAPS I
NV E.2 – Back-Hand (BHE) and Front-Hand English (FHE), from HAPS I
NV E.3 – Using "Gearing" Outside English to Eliminate Throw, from HAPS I
NV E.4 – Carom-Shot Trisect-Draw System, from HAPS II
NV E.5 – Combination Shot Throw Adjustment, from HAPS II
NV E.6 – Rail Cut Shot Aiming, w/ and w/o Sidespin, from HAPS II
NV E.7 – Mirror Kick-Shot Aiming System, from HAPS III
NV E.8 – 1/3-More-Than-Twice Bank-Shot Aiming System, from HAPS III

normal video

PS:

- I know other authors and I tend to use lots of terminology, and I know not all readers are totally familiar with these terms. If you ever come across a word or phrase you don't fully understand, please refer to the online glossary at ***billiards.colostate.edu***.

Dr. Dave is author of "The Illustrated Principles of Pool and Billiards" book and DVD, and co-author of the "Video Encyclopedia of Pool Shots (VEPS)," "Video Encyclopedia of Pool Practice (VEPP)," "How to Aim Pool Shots (HAPS)," and "Billiard University (BU)" instructional DVD series.