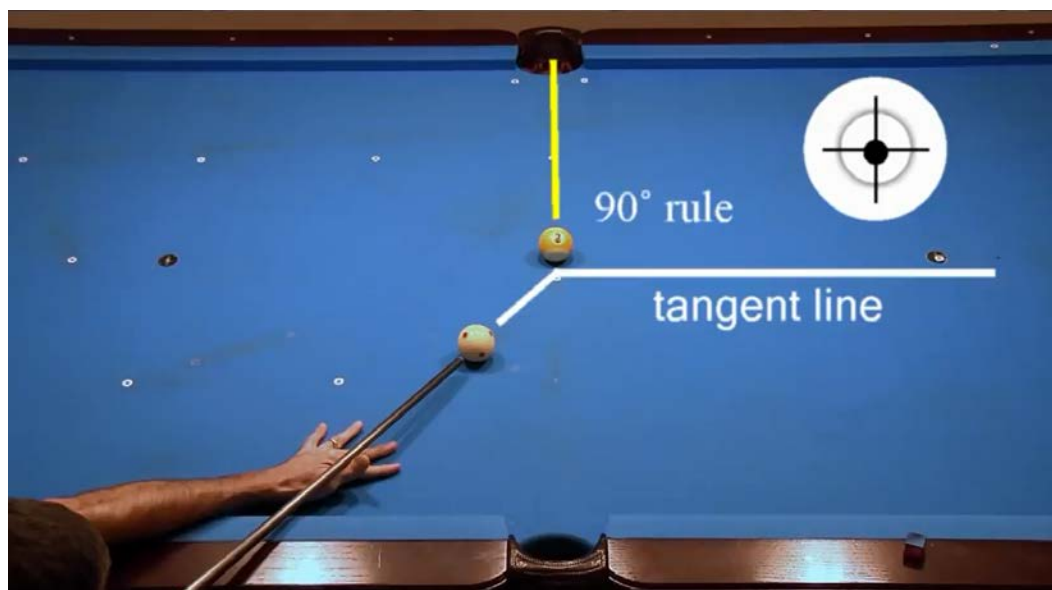

Supporting narrated video (NV) demonstrations, high-speed video (HSV) clips, technical proofs (TP), and all past articles are available online at billiards.colostate.edu. Reference numbers used in the articles help you locate the resources on the website.

Recently, I posted online video [NV J.27](#) that demonstrates all important cue ball (CB) control principles, effects, and skills, all in one place. Topics covered include stop/stun/follow/draw, 90° rule, 30° rule, 3-times-the-angle system, tangent line, natural angle, good action draw, pocket cheating, cut-induced throw, sidespin effects, speed effects, drag and spin conversion, and CB control drills. Next to pocketing a ball, controlling the CB so you can also easily pocket the next ball is a critical skill in pool. Predicting CB direction is also important for avoiding scratches, executing break-out shots, aiming carom shots, planning position play, and avoiding obstacles.

With a stun shot, where the CB has no top or back spin when it arrives at the object ball (OB), the CB heads in the tangent-line direction, perpendicular to the OB direction (see **Photo 1**). This is called the 90° rule. As demonstrated in the video, an easy way to visualize the tangent line at the table is to use your cue. If you orient the cue in the direction necessary to push the OB into the pocket (with the side of the cue), the cue will point in the tangent-line direction. Shot speed has no effect on tangent line direction, assuming the CB has stun at the OB. At slow speed, you must hit low on the CB, especially at larger distance from the OB. The backspin wears off on the way to the OB, resulting in a stun shot. With more speed, you don't need to hit the CB as low, especially if the CB is close to the OB. At fast speed, a near center-ball hit creates stun. A stun shot sends the CB down the tangent line regardless of the cut angle of the shot. With a small angle, the CB doesn't travel very far down the line. As the angle increases, the OB acquires less speed and the CB retains more, but the CB still moves along the tangent line. Even with no cut angle, the CB stays on the tangent line. It just doesn't move since all its speed is transferred to the OB. That's why it is called a stop shot. As with all topics in this article, online video [NV J.27](#) demonstrates everything.



[Photo 1](#) 90° rule for a stun shot

A straight shot with topspin follows forward. And with a thin cut, topspin has very little effect, and the CB does not change direction very much. But over a wide range of cut shots in between, a rolling CB deflects by a fairly consistent angle called the natural angle. This angle is very close to 30° (see **Photo 2**) and can be easily visualized with a firm but relaxed peace sign. See the video for demonstrations. You point your first finger through the center of the CB in the direction of travel, with the middle knuckle adjacent to the center of

the OB. Your other finger will point in the direction of final CB travel. At very slow speed, the CB deflects more than the natural angle because there is more friction between the balls at slower speed causing more of the topspin to be lost. At a little faster speed, the CB retains more topspin and follows more forward. However, as you increase the speed more, the CB persists longer along the tangent line before curving forward. As demonstrated in the video, you can visualize the delay by shifting your peace sign down the tangent line depending on conditions and based on how much speed you plan to use.

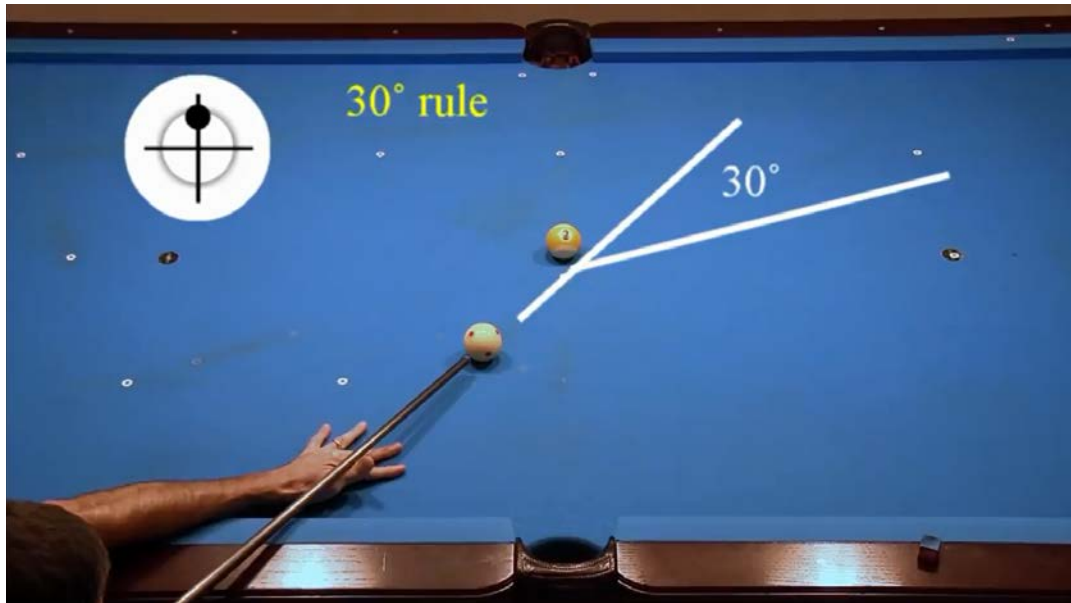


Photo 2 30° rule natural angle for rolling-CB shots

The 30° rule peace sign applies over a wide range of shots between a $\frac{3}{4}$ -ball hit and a $\frac{1}{4}$ -ball hit. The center of the range is a center-to-edge (CTE) $\frac{1}{2}$ -ball hit shown in **Photo 3**. In the YouTube video description, there is a link to an angle template you can print and use to help calibrate your 30° peace sign. The 30° angle is a good average value to use over the entire $\frac{1}{4}$ -ball to $\frac{3}{4}$ ball-hit range. However, if you want to be more accurate, when the shot is fairly full (close to a $\frac{3}{4}$ -ball hit) or fairly thin (close to a $\frac{1}{4}$ -ball hit), you need to shrink your peace sign a little. And when the shot is close to the center of the range at a $\frac{1}{2}$ -ball hit, you need to stretch your peace sign a little. A shot close to $\frac{1}{2}$ -ball hit is easy to recognize because your line of aim will be close to the edge of the OB.



Photo 3 1/2-ball hit CTE aim

For a straight shot with backspin, the CB draws straight back. And with a thin hit, backspin has very little effect, and the CB stays close to the tangent line. For all cut angles between 0° and 40° , which is a fairly wide range, the total angle the CB draws back with a “good action” draw shot is 3-times the cut angle (see **Photo 4**). To use this system, you first need to be able to hit “good action” draw consistently. Here is how it is defined. For a 1/2-ball hit CTE shot, “good action” draw causes the CB to come back at a right angle or 90° relative to its original direction. The reason for this is that a 1/2-ball hit is a 30° cut angle, and 3-times 30 is 90. As demonstrated in the video, you can use your cue to visualize the 3 angles at the table. First place the tip at the ghost-ball position and point your cue at the pocket. Then visualize the cut angle of the shot by imagining a line through the center of the CB. Focus on visualizing the angle as a piece of pie. Now duplicate that pie angle on the other side, and then duplicate it once more for a total of three. You can also measure the angles with your hand, moving the angle distance along an arc, with the center of the arc at the ghost ball.

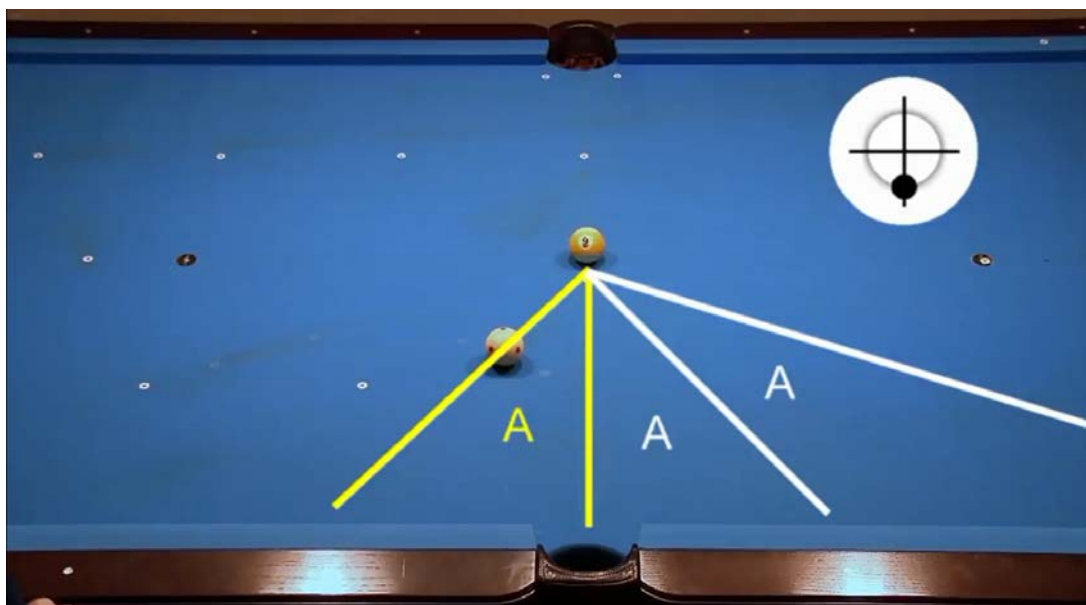


Photo 4 3-times-the angle system for draw shots

When using the 3-times-the-angle system, you need to be careful to account for any pocket cheat. If you hit a shot a little full, 3-times the angle comes up much shorter. And if you hit the shot a little thin, the predicted draw direction goes much longer. Make sure you spend time practicing “good action” draw. Then you will be able to effectively use the 3-times-the-angle system to predict draw direction for a wide range of shots. If you need help with draw shot technique, see the resource page linked in the YouTube video description. Remember, the 3-times-the-angle system works for all cut angles up to about 40° (i.e., a ball-hit fraction greater than about 3/8).

Speed has a big effect on draw shots. If you hit the shot too softly, even with an extremely low tip position, the backspin will wear off on the way to the OB. At fast speed, backspin is retained, but the CB shifts down the tangent line more with more speed. The final draw angle is the same, but it is shifted.

I hope the information in this article and online video [NV J.27](#) help you get a better handle on CB control, allowing you to better “keep whitey on a string.” Be sure to watch the video and practice the drills at the end of the video. Only then can you really put the information to use effectively.

Good luck with your game,
Dr. Dave



[NV J.27](#) – CUE BALL CONTROL ... Everything You Need to Know

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 do not fully understand, please refer to the [online glossary](#) at billiards.colostate.edu.

Dr. Dave is a PBIA Advanced Instructor, Dean of the Billiard University, and author of the book: [The Illustrated Principles of Pool and Billiards](#) and numerous instructional DVD series, all available at: DrDaveBilliards.com.