David Alciatore, PhD ("Dr. Dave")   **ILLUSTRATED PRINCIPLES**
"Fundamentals - Part VI: CB control examples"

Note: Supporting narrated video (NV) demonstrations, high-speed video (HSV) clips, and 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 article 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 sixth article in a series on fundamentals. In the last five months, I've covered the stroke, the basics of aiming, issues involved with cut-shot aiming systems, the effects of bridge length, and the basics of cue ball (CB) control. This month we will look at some examples of how to apply the CB control principles covered last month. We will look at examples of how to avoid a scratch and how to plan and execute carom and break-out shots. Recall, the 90⁰ rule predicts that the CB will head straight in the tangent-line direction for a stun shot, where the CB has no topspin or bottom-spin at object ball (OB) contact. The 30⁰ rule predicts a rolling CB will deflect by close to 30⁰, with respect to its original direction, for a wide range of shots. And the trisect system predicts, for a good action draw shot, the final direction of the CB will be three-times the cut angle away from the original direction (see last month's article and **NV B.43** for more information).

normal video

NV B.43 – CB position control stun, roll, and draw reference lines

Diagram 1 shows an example of how to detect and avoid a possible scratch. Our goal is to pocket the 1-ball in the corner pocket and leave the CB with an easy shot on the 8-ball to win the game. From the 30⁰ rule, a slow rolling CB will likely result in a scratch (see the red shot in the diagram). You can use the Dr. Dave peace-sign technique (see **NV 3.8** and **NV B.43**) to easily visualize the 30⁰ direction. (Note – per **NV B.44**, for a shot close to a ½-bal hit, you want to stretch your peace sign slightly to visualize an angle slightly larger than 30⁰; and for shots closer to a ¼-ball or ¾-ball hit, you want to relax your peace sign slightly to visualize an angle slightly smaller than 30⁰.) The blue shot in the diagram shows what happens if you use a little more speed. As shown in **NV B.45**, the more speed you use on a roll shot, the more the CB persists along the tangent-line direction before it curves to the final 30⁰ direction. This slight shift is enough to avoid the pocket and get position on the 8-ball shot. However, if you use enough speed to safely clear the pocket, you might over-run the desired CB location; and because the CB "crosses the line" of the 8-ball shot, over-running will result in a much tougher shot. A better option is shown in purple. Here, less speed is used, but the CB is hit lower so full roll does not develop before contact with the 1-ball. As a result, the CB heads in between the tangent-line and 30⁰ directions. Also, the deflection off the side rail helps slow the CB and send it toward a desirable "shot line" for the 8-ball. If the speed is too slow or a little fast, you will still have a good shot at the 8-ball to win the game. All of these alternatives are demonstrated in **NV B.46**. Other scratch detect and avoid examples are demonstrated in **NV 3.7** and **NV 3.10**. To get a better feel for how speed, distance, and tip offset affect how much roll the CB has at OB contact, check out the stop/follow/draw drill in the "Instructor and Student Resources" section of my website.
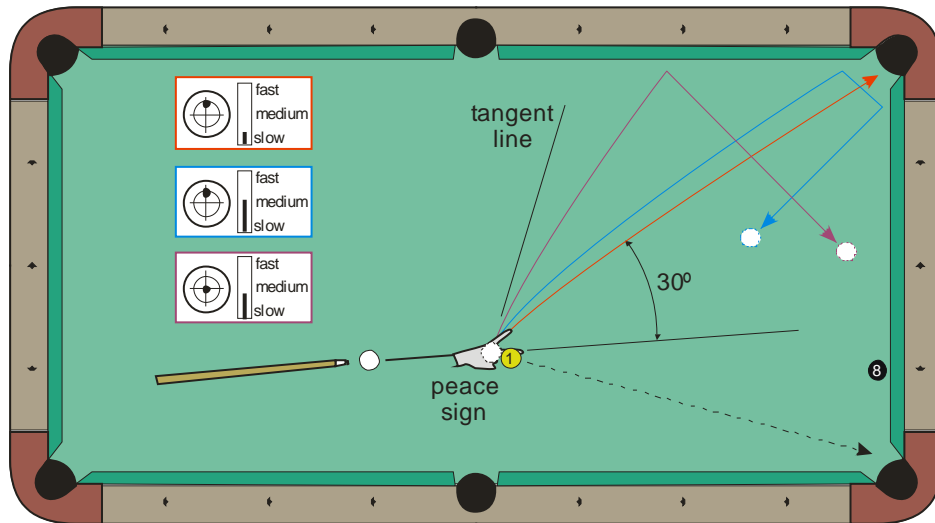
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Diagram 1 Detecting and avoiding a scratch

Diagram 2 shows an example where knowledge of and creativity with CB control principles can help you make intelligent decisions and win more games. In this 9-ball example, there are several options. One option is to try to cut the 6-ball into the far corner pocket, but this is a difficult shot and you still need to get a shot on the 7-ball which is in a tough spot. You could play safe by hitting the 6-ball squarely, banking it to the opposite side rail and stopping the CB in place (or drawing it back slightly) to hide the CB behind the 8-ball, forcing your opponent to kick at the 6-ball. But your opponent might easily make contact with the 6-ball with a kick shot; and even if he or she didn't, you still don't have an easy out with ball in hand. A great option in this situation is a billiard shot, where you carom (kiss) the CB off the 6-ball to pocket the 9-ball and win the game. The best scenario for a billiards shots is when the ball you want to hit (the 9-ball in this example) is along the 30⁰ direction. In that case, a slow roll shot can be used and you have a huge margin for error (see my June '04 article for more info). Unfortunately, the 9-ball is not in the 30⁰ path in this example. However, if you are good at hitting a stun shot, a 90⁰ carom is a great option in situations like this. As demonstrated in **NV B.46**, the first step is to find the necessary aiming line to send the 6-ball perpendicular to (90⁰ away from) the desired final CB direction. Then, you just need to execute a stun shot (a "stop shot at an angle") to send the 6-ball in the planned direction. If you are concerned about scratching, you can use less speed (and hit the CB a little lower to ensure stun) and/or aim for a less direct hit on the 9-ball. Obviously, to be effective with 90⁰ carom shots, you need to have a good feel for creating stun for different speeds and distances to the OB. As I pointed out before, the stop/follow/draw drill in the "Instructor and Student Resources" section of my website can help you with this. Other billiards and carom shot examples are described and demonstrated in **NV 7.2-7.4**.
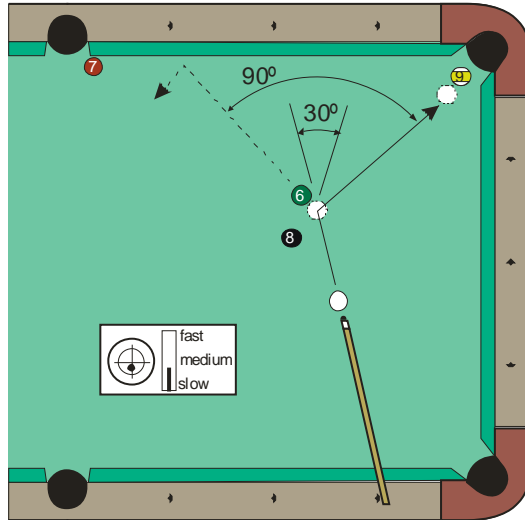
Diagram 2 Carom shot example

NV 7.2 – Cue ball billiard shot
NV 7.3 – Object ball carom shot
NV 7.4 – 30º rule billiard shot

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   Diagram 3 shows an example where CB control principles can be helpful with breaking out clusters. In the diagram, the goal is to pocket the 1-ball while breaking up the 4-ball-7-ball cluster so you can run the table. With a stun shot, the CB would head along the tangent line and miss the cluster. A slow roll shot would also leave the cluster untouched as the CB headed in the 30º direction. So to hit the cluster, the CB must have partial roll. An ideal path is shown in the diagram where the CB hits the 4-ball fairly squarely. As a result, the 7-ball is sent toward the corner pocket, the 4-ball drifts out from the rail for several options, and the CB doesn't move very much. With the resulting layout, a good player should have no trouble running the table for the win. With this shot, close to a center ball hit will get the job done. With medium speed the CB will develop some (but not complete) roll on the way to the 1-ball, and the CB will take a path similar to that shown in the diagram (see **NV B.46** for demonstrations). Like many things in pool, you need to develop a feel for how much speed and tip offset to use in different situations. That can come only with lots of practice. But understanding all of the principles involved should help you learn faster and be a better shot planner.
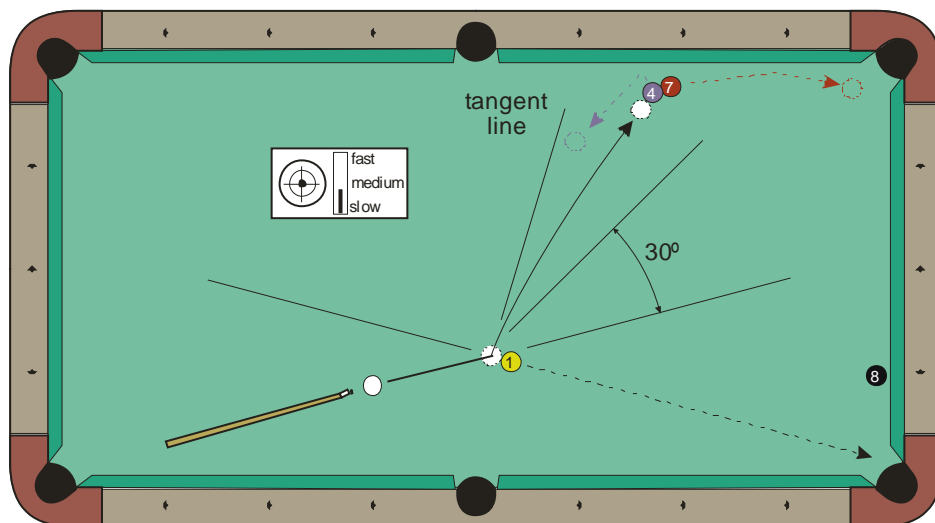
Diagram 3 Break-out shot example

Well, I hope you are enjoying and benefiting from my series of articles on fundamentals. Over the next two months, we will continue looking at important issues related to CB control. Specifically, we will look at thin and full hits, and speed control.

Good luck with your game,
Dr. Dave

PS:

- If you want to refer back to any of my previous articles and resources, you can access them online at ***billiards.colostate.edu***.

- I know other authors and I tend to use lots of terminology (e.g., squirt, throw, stun, impact line, etc.), 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 on my website.

- I want to thank "Jal" on the BD CCB online forum. He graciously proof-reads my articles every month to help find errors and make suggestions. My article quality is better as a result of his efforts. Thanks again Jim!

Dr. Dave is a mechanical engineering professor at Colorado State University in Fort Collins, CO. He is also author of the book, DVD, and CD-ROM: "The Illustrated Principles of Pool and Billiards," and the DVD: "High-speed Video Magic."