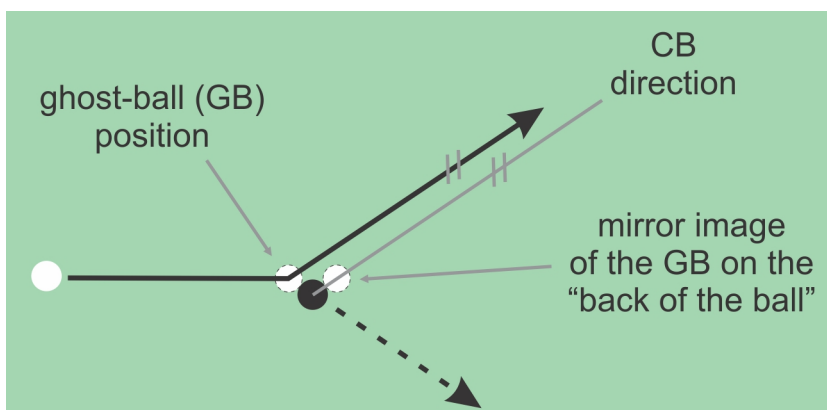


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Supporting narrated video (NV) demonstrations, high-speed video (HSV) clips, technical proofs (TP), and all of my past articles can be accessed and viewed online at [billiards.colostate.edu](http://billiards.colostate.edu). The reference numbers used in the articles help you locate the resources on the website.

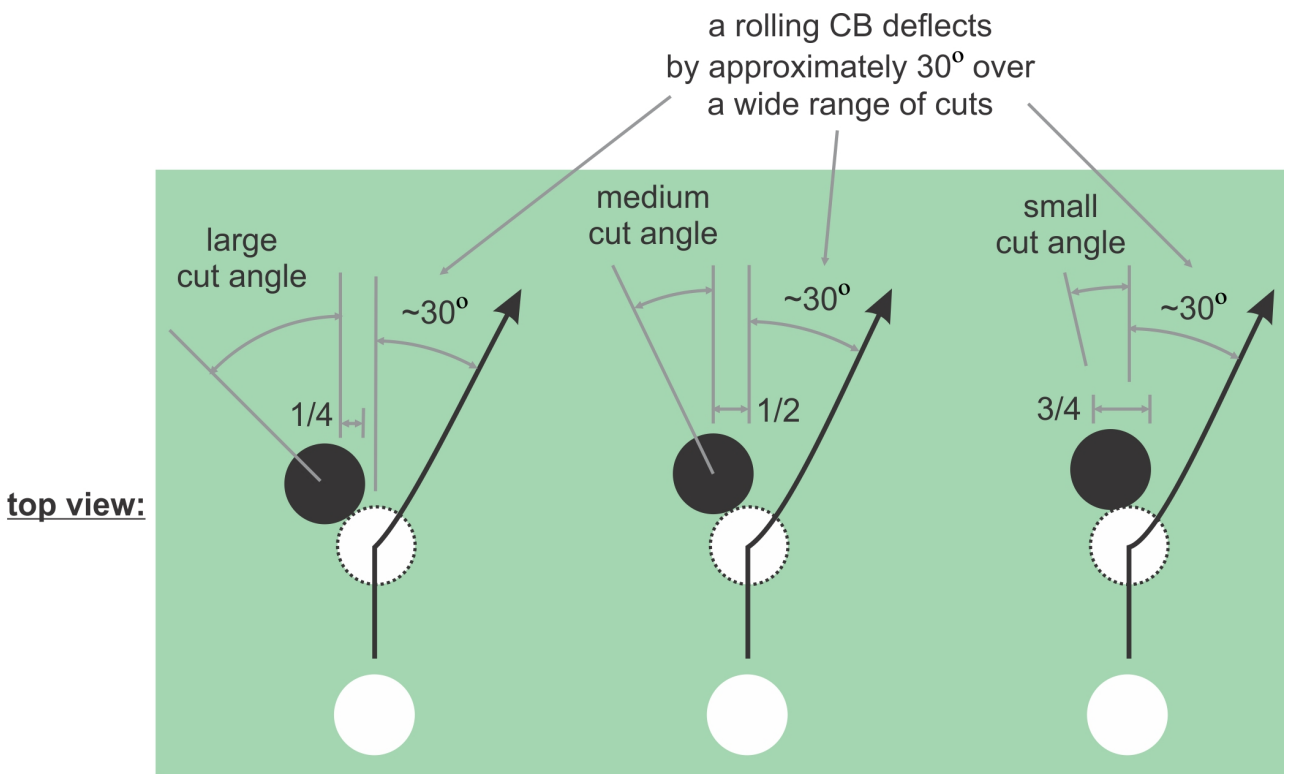
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If you ask enough “old timers” how they visualize where a rolling cue ball (CB) heads after hitting an object ball (OB), eventually you will hear: “I just visualize the CB on the back of the OB ... that’s the direction the CB heads.” This is sometimes called “back-of-the-ball” aiming. **Diagram 1** illustrates how it works. First visualize where the CB will contact the OB. This is called the ghost-ball (GB) position. Then visualize the mirror image of the GB on the other side of the OB (i.e., on the “back of the ball”). The final CB direction will be parallel to a line through the OB and mirrored GB (i.e., in the direction the “back” ball). This “old timer” trick works well for cuts close to a ½-ball hit where the back-of-the-ball aim points in the “natural angle” direction. It also works for a full-ball hit, where a rolling CB heads straight forward. However, it does not work well for cut shots too different from a ½-ball or full-ball hit. In the remainder of the article, I present two alternative systems that work much better. For those interested in a careful and detailed comparison of these and other systems, see [TP B.13](#) which does all of the math and uses graphs to compare the approaches.

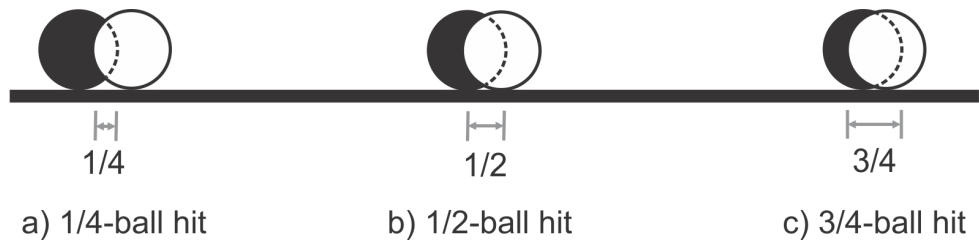


**Diagram 1** “Back-of-the-ball” aiming

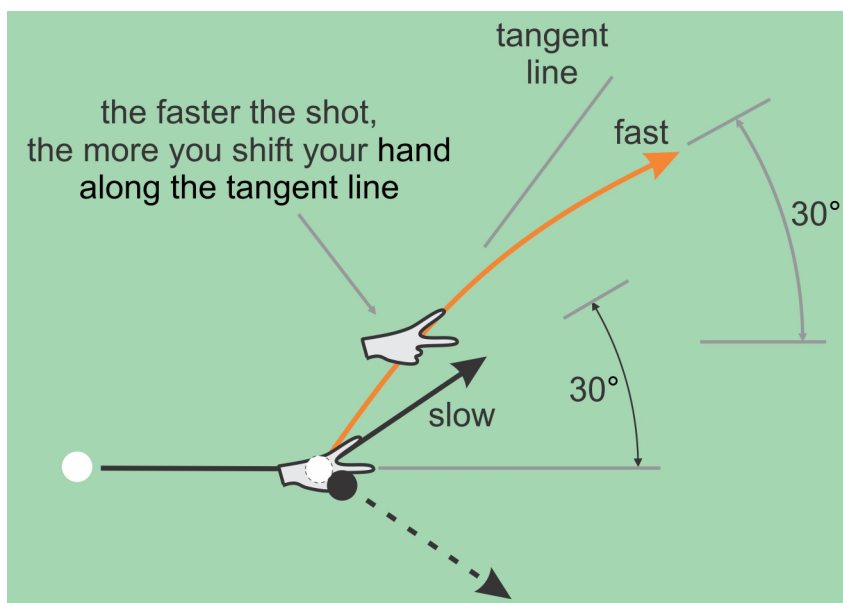
**Diagram 2** illustrates a system that is more reliable over a wide range of shots. I call it the 30° rule because, with a rolling CB, the CB deflects off the OB by close to 30° over a wide range of shots between a ¼-ball and ¾-ball hit. Many typical shots at a pool table fall within this range. **Diagram 3** illustrates how the Dr. Dave “peace sign” can be used to visualize the 30° natural-angle direction. For most people, a firm but relaxed peace sign forms close to a 30° angle. If you point one finger in the direction the CB will head into the OB, the other finger will point in the direction it will head after hitting the OB. Diagram 3 also shows how faster speed affects the CB path. With more speed, the CB swings out more along the tangent line before curving to the final 30° direction. For more information and demonstrations of how to apply this useful rule at the table, see [NV B.66](#) and the other online videos and past articles on the “[30 degree rule](#)” resource page in the FAQ section at [billiards.colostate.edu](http://billiards.colostate.edu).



**front view:**  
(shooter's perspective)

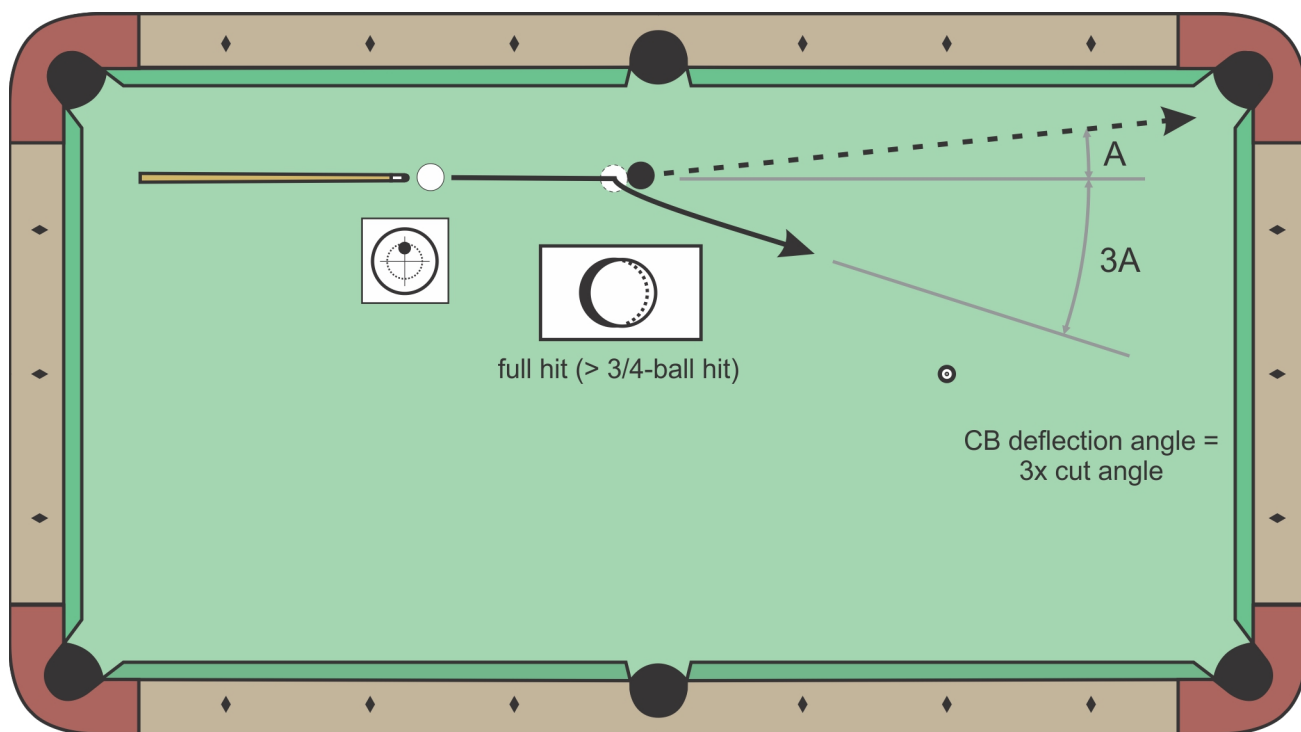


**Diagram 2**  $30^\circ$  rule



**Diagram 3** 30° rule peace sign visualization

**Diagram 4** illustrates a system that works better for fuller hits (thicker than a 3/4-ball hit), where the 30° rule does not apply. The CB deflection angle for full hits is about three times the cut angle. You just need to visualize the cut angle (“A”) of the shot and then visualize three times that angle (“3A”), which is the amount the CB will deflect off the OB. FYI, there is also a useful system for predicting CB direction for thin hits (less than 3/4-ball hits). It isn’t as useful, but if you want to check it out, along with other CB control systems, see the “[where the CB goes for different types of shots](#)” resource page in the “[cue ball control](#)” FAQ section at [billiards.colostate.edu](http://billiards.colostate.edu).



**Diagram 4** 3x rule for thick hits

I hope these systems help you better predict and control where “whitey” will head in key game situations where you need to detect or avoid a scratch, break out a cluster, execute a carom shot, or just get through traffic while playing position. I also hope that the next time “old timers” tell you to use the “back of the ball” system, you can help them learn some new tricks.

Good luck with your game,  
Dr. Dave



normal video

[NV B.66](#) – 30° degree rule, from VEPS I



technical proof

[TP B.13](#) – Rolling cue ball deflection angle approximations

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](http://billiards.colostate.edu).

*Dr. Dave is author of “[The Illustrated Principles of Pool and Billiards](#)” book and DVD, and co-author of the Video Encyclopedias of “[Pool Shots \(VEPS\)](#),” “[Pool Practice \(VEPP\)](#),” and “[Eight Ball \(VEEB\)](#),” and the “[How to Aim Pool Shots \(HAPS\)](#)” and “[Billiard University \(BU\)](#)” instructional DVD series, all available at: [dr-dave-billiards.com](http://dr-dave-billiards.com).*