
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. See the website for details.

This is the fourth article in a series on fundamentals. In the last three months, I've covered the stroke, the basics of aiming, and issues involved with cut-shot aiming systems. This month, we will look at the bridge length and its effects. **Diagram 1** illustrates terminology related to the bridge and cue position. The *bridge length* is the distance from the bridge pivot to the front edge of the cue ball (CB). The *tip gap* is the distance between the tip and the CB at the “set” aiming position (i.e., your cue and body position before the final stroke). In general, you want the tip gap to be as small as possible when you are finalizing your aim. A smaller gap will help you better visualize where the tip contact point will be relative to the center of the CB. With a larger gap, parallax caused by our stereoscopic vision (i.e., the different views created by each eye) can more easily give a false perception of the exact tip placement. Also, with a smaller gap, your forearm will remain close to perpendicular to the cue both during the “set” position and at impact with the cue, helping to ensure an accurate vertical tip position on the CB (with a non-elbow-drop stroke). On the flip side, the smaller the gap, the greater chance you have of contacting the CB accidentally during the warm-up strokes. Bottom line: use as small of a gap as possible without risking unintentional contact with the CB.

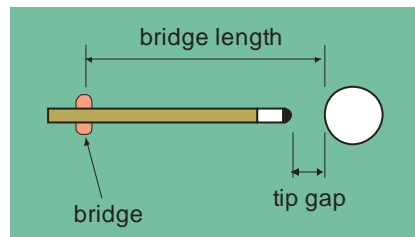


Diagram 1 Bridge length terminology

The decision on what bridge length to use is a little more involved than the tip gap distance. Instructors generally recommend a bridge length in the 6-8 inch range; although, some great players (e.g., the Filipino players) seem to do quite well with a much longer bridge. **Diagram 2** shows one issue related to bridge length: the longer the bridge, the larger your tip position error will be with unintentional stroking errors (see [TP A.10](#)). In Diagram 2a, the bridge is long and the resulting tip position error is relatively large for a given stroke error. In Diagram 2b, the stroke error is the same, but the resulting tip position error is much smaller because of the shorter bridge. Tip position error will result in unintentional English; and the larger the position error, the greater the English. With English comes squirt (CB deflection), swerve (CB curve), and throw (object ball direction change), all of which can reduce your chances of pocketing a shot. For more information on squirt, swerve, and throw, see my previous articles on these topics.

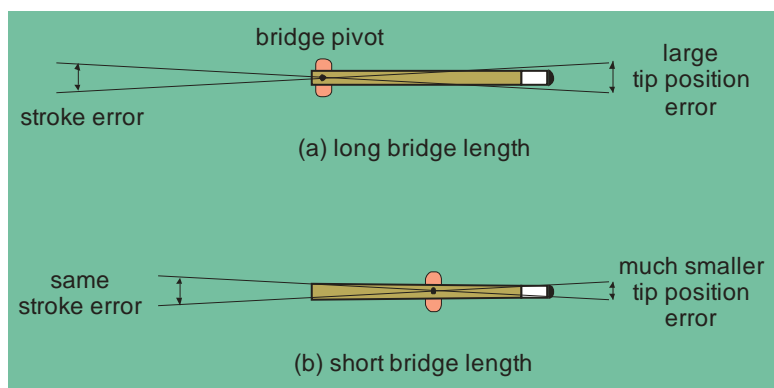


Diagram 2 Larger bridge length creates more tip position error



TP A.10 – The effect of bridge length on contact point accuracy

Diagram 3 shows another effect related to bridge length. In this case, bridge length is affecting the visibility of the end of the cue. This can affect how well you sight the cue along the desired aiming line. In Diagram 3a, a closed bridge is being used with a relatively short bridge, resulting in an obscured view of the end of the cue. In Diagram 3b, with a longer bridge, more of the end of the cue is visible making it easier to sight along the cue and align with the desired aiming line. In Diagram 3c, an open bridge is used, which offers an unobscured view of the entire end of the cue, making sighting even easier. This effect becomes more important when your head (and eyes) are lower and closer to the cue. You will notice that players who are low in their stance generally prefer an open bridge and/or a longer bridge. This allows them to more easily sight and align the cue. Generally, a lower stance, with your chin close to the cue, results in more accuracy. Snooker players, who require tremendous accuracy due to the large table size and small pockets, typically have a very low stance and use an open bridge. This technique has also become more popular in the pool world in recent history.

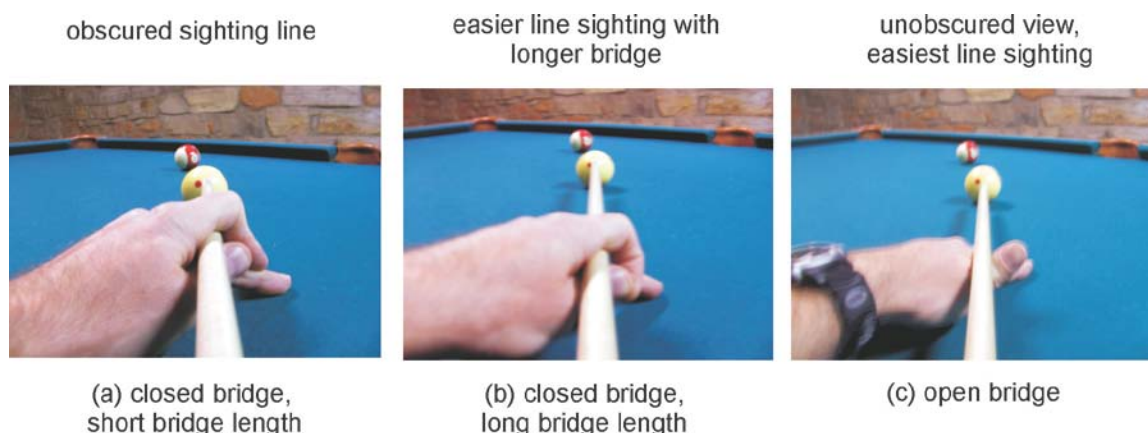


Diagram 3 Effects of bridge length and bridge type on sighting

Bridge length is also very important if you are using pivot-based “aiming systems” (e.g., center-to-edge [CTE], Pro-One, or 90-90 swivel) taught by some instructors. With these systems, there are various techniques to establish an initial offset cue alignment, and then the cue is pivoted to the center of the CB. **Diagram 4** shows an example where the initial cue alignment is offset. Obviously, when the cue is pivoted to the center of the CB relative to the bridge pivot, the bridge length has an effect on the final aim of the shot. With the shorter bridge (shown in blue), the OB is cut thinner than with the longer bridge (shown in red). If you are using a pivot-based system, you need to be aware of these effects. For more info on cut-shot “aiming systems,” see my previous two articles.

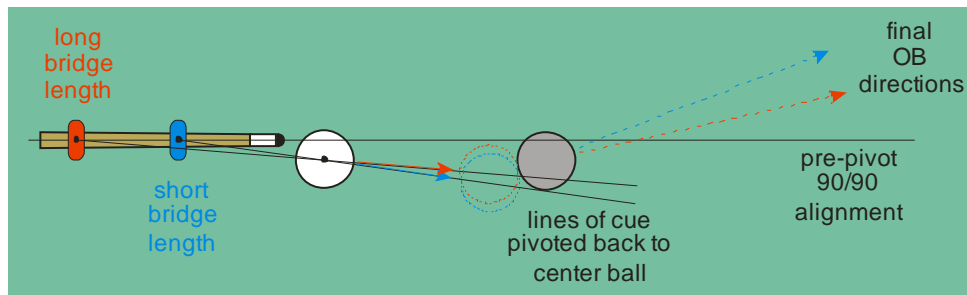


Diagram 4 Effect of bridge length on pivot-based aiming systems

Here’s a fairly complete summary of all of the cons and pros of a longer bridge, including the items discussed above:

Disadvantages of a longer bridge:

- Stroking errors result in larger tip position errors (see Diagram 2).
- If the length is not needed for power (see below), the longer stroke might allow more room for error to be introduced during the stroke (i.e., a shorter, more compact stroke might be more accurate).
- If a player has a long bridge but is not using the full length on the back stroke, the bridge length (and associated tip position error) is larger than it needs to be. However, if the extra length is helping with sighting and aiming (see Diagram 3), it might be justified.
- A small change in bridge position creates a larger change in cue tip position. If the bridge hand shifts accidentally or deforms during the stroke, or if the cue shifts slightly within the bridge, larger errors will result.
- For soft touch shots, a shorter bridge and stroke is usually more effective.

Advantages of a longer bridge:

- A longer bridge can help improve visual sighting (see Diagram 3).
- Smoother acceleration is possible, especially when using more power. Not as much force will be required over the longer distance to achieve a desired cue speed. The stroke will tend to be jerkier and usually more susceptible to errors with a shorter bridge, requiring larger forces over the shorter distance to achieve the desired cue speed.

- A person with large and/or inflexible hands might need to elevate the back of the cue more with a shorter bridge, and cue elevation can reduce accuracy by creating more swerve when English is used (intentionally or not). Using a longer bridge can help some people keep their cue more level, especially with draw shots. I want to thank “Spiderman,” a user on the BD CCB online forum, for pointing out the “large-hand” factor to me. I hadn’t thought of this before.
- A longer bridge might better match the natural pivot length for your cue (especially low-squirt cues). This can help reduce CB direction errors when unintentional English is applied (e.g., due to stroke swoop). It can also be important if using the back-hand English (BHE) method to compensate for squirt when applying English intentionally. For more information on these topics, see “aim compensation for squirt, swerve, and throw” in the FAQ section of my website.
- A longer bridge and stroke might help some people gauge the speed of the shot better; although, this might not apply for soft touch shots (see above).
- Some people just feel more natural and comfortable with a longer bridge and stroke, and shortening it will feel too uncomfortable (even after practice), and their overall performance will not be better with a change. Like many things in pool, personal preference and comfort is often an important factor.

I hope this article doesn’t make you think and worry too much about your bridge length. Regardless, you might try some drills (e.g., [MOFUDAT](#) available under “drills” in the resources section of my website) and experiment with various bridge lengths at different speeds to see what works best for you.

Well, I hope you are enjoying and benefiting from my series of articles on fundamentals. Next month, we will start looking at important issues related to CB 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.

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](#).”