



Bob Jewett



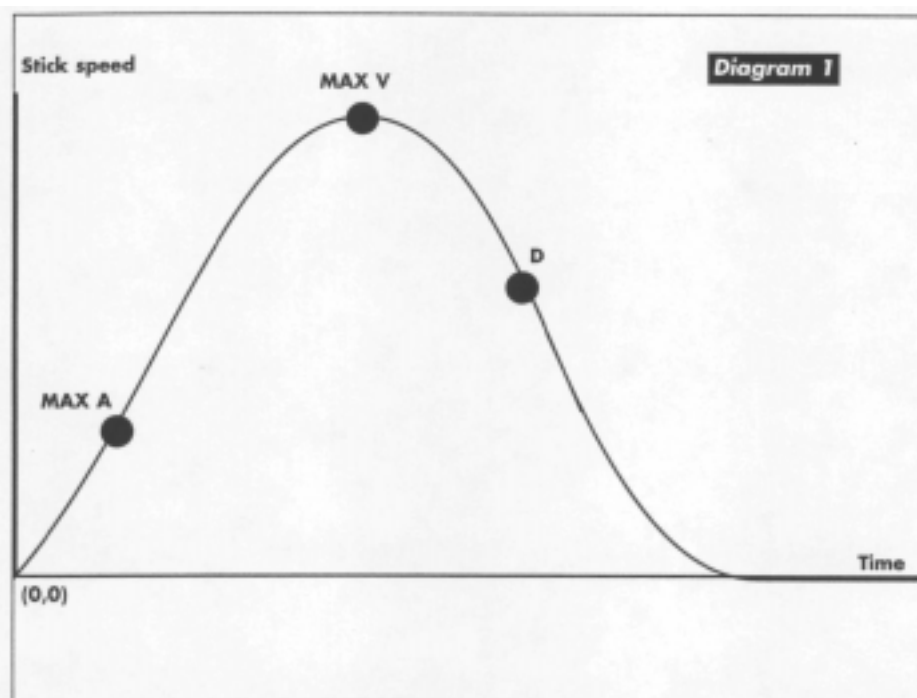
Hitting the Peaks

When you hit the ball can determine how you hit the ball.

Have you ever thought about when in the timing of the stroke is the best instant to hit the cue ball? Should it be while accelerating or decelerating the cue stick? Common advice is to be accelerating when you hit the ball. We'll see below why that's not such good advice.

In Diagram 1 is a plot of stick speed versus time during the forward part of the stroke. (Left out is the sudden slowing of the stick when the ball is struck.) The speed builds up from zero (that's the pause or stop at the end of the final backstroke), rises rapidly, hits a peak speed, and then drops to zero as the stick stops at the forward-most position. As drawn, this stroke is as smooth as it gets and is identical to the motion of a perfect pendulum. When on this stroke would you want to hit the ball? That is, how would you adjust your timing for most power, consistency or control? The answer is probably not what you think.

"MAX A" on the diagram marks the point of maximum acceleration. This is where the speed of the stick is increasing most rapidly. "MAX V" is another possible choice. It marks the point in the stroke of peak velocity. Since the peak is flat on top — that's the nature of such peaks in a smooth

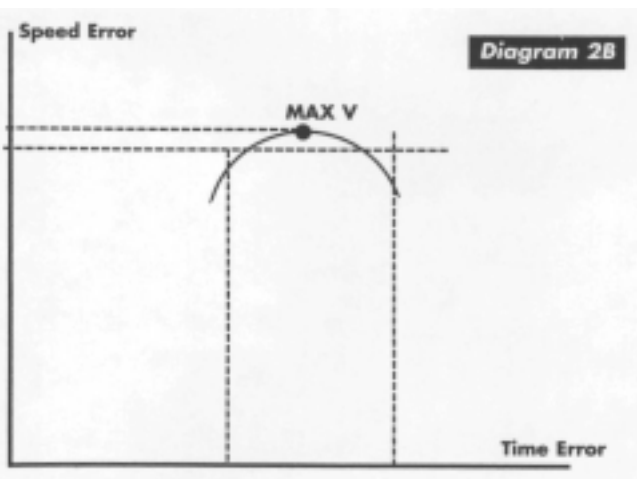
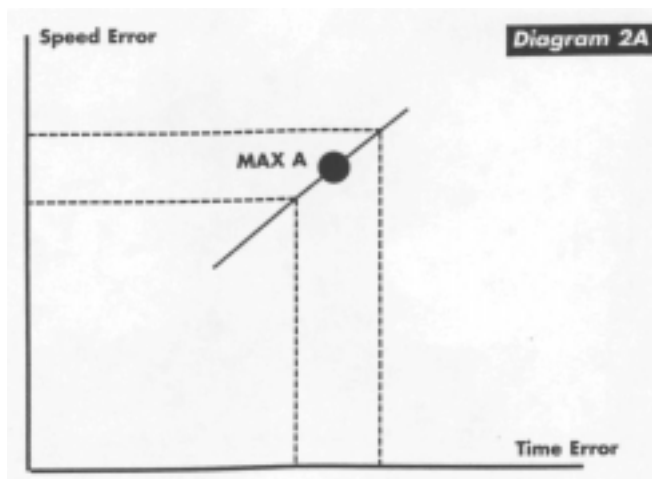


stroke — there is zero acceleration there. Point "D" is another choice. This is some time after the peak where the stick is starting to slow down.

The common advice would have you hit the ball at "MAX A". A major problem at that point is that if your timing is a little early or late, your speed will be off by quite a bit. (See

Diagram 2A.) That's because the slope of the curve is so steep there. A similar problem occurs at "D", but the slope might be a little less.

Consider the speed error caused by a timing error for an attempted hit at "MAX V" as shown in Diagram 2B. Because the peak is smoothly rounded, even a much larger mistake in when



you hit the ball would result in less error in the speed at impact.

Another factor is how efficient the shot is. That is, for each timing, how much energy from the stick gets into the ball?

The speed of the cue ball will increase directly with the speed the cue stick has at the time of impact. The speed of the stick at MAX A is only half the speed at MAX V, so the latter would propel the ball twice as fast. This amounts to four times as much energy in the cue ball, since energy goes up as the square of the velocity. Point D would also waste energy compared to MAX V.

From this fairly simple argument, it seems that for both best power and best speed control, you should strive to hit the ball when the stick is going at peak speed. How can you train yourself to do this?

My belief is that good players have already learned this timing instinctively while their games were forming, so the following suggestions will be of more help to beginners and anyone who is having a hard time with speed control.

First, try practicing your stroke with no cue ball on the table and your eyes closed. Feel your back stroke — put a small pause at the end — then feel the timing of your forward stroke: the accelerating part, the peak, and the stop. Do you also feel a jerk back at the end? I hope not. Keep it a simple, smooth forward motion.

Second, try for the same feeling with a ball. Your eyes may need to be open for this part. Does it feel like you hit the ball at the peak? It may help to say to yourself, "Just let the stick do the work. Don't try to force it."

The last suggestion to optimize your timing is to play the cue ball four table lengths up and down the middle of the table — this is a fairly powerful stroke — but try to do it with a minimum of effort. When you can get that distance consistently with ease, you know your timing is right.

Can you get more speed on the cue ball with a firm or loose grip? Probably not. As noted in the July issue, the contact is very brief, about 1/1,000 of a second, and that is not time enough for the relatively soft flesh of your hand to react to apply any extra force through the tip.

Why is the "hit while accelerating"

advice so common? I think partly because many people confuse acceleration and speed. Without thinking, they would pick MAX V as being the point of maximum acceleration, when in fact the cue is just coasting then and the acceleration is zero. And I think the advice works for those players who jerk prematurely to a stop — they are the "D" players. Getting them to accelerate for a little longer gets them

to hit at the peak.

After you try the exercises above, let me know if you are playing with less effort and more accuracy, either electronically at jewett@netcom.com, or in care of this magazine if you are still un-networked.

Bob Jewett is an advanced level BCA instructor with the San Francisco Billiard Academy — one of seven BCA master academies.