

by DR. GEORGE ONODA

Faster Than A Speeding Bullet?

How fast does the cue ball really travel on a typical break shot?

"HE'S GOING TO knock this ball in at 100 miles per hour....," whispered an ESPN announcer during a televised 9-ball match.

No, the announcer wasn't Joe Isuzu. But, the inference that the cue ball can travel 100 MPH made me curious. Just how fast *does* a professional pool player propel the cue ball on a 9-ball break shot?

I asked some of my pool playing friends, and their guesses ranged from speeds of 50 to 150 miles per hour. Since I had never seen this actual speed reported, I set off to make such measurements.

Video tapes are a rich resource of top professional players in action. With modern technology, it is now possible to analyze these tapes in great detail, using slow motion and frame-by-frame stop action. The time between each frame is one-thirtieth seconds.

The average speed of a ball between two points can be measured from a video tape by knowing the distance traveled and measuring the time taken to travel this distance. Since the dimensions of a table are fairly standardized, the distance between the starting cue ball position and the loot spot where the one ball lies can be easily determined. For example, if the cue ball is placed on the head string, one diamond to the right of the head spot, the distance to the foot spot is typically 53 inches.

The time of travel is obtained from the number of video frames taken from beginning to end. The position of the cue ball in each frame is marked as a dot directly on the video screen. The result is a series of dots along the path. The spacing of the dots in the middle of the path are measured. From this we can determine the total number of frames from the beginning to the end. The time from start to finish is equal to the number of frames times one-thirtieth second. Dividing this into the total distance gives the average speed of the ball in inches per second. This is converted to miles per hour. The measurements are accurate to around plus or minus one-quarter miles per hour.

To be certain that the frame counting method gives the right answer, spot checks were made using an entirely different technique. Here I used the sounds

made when the cue hits the cue ball and when the cue ball hits the rack. With a special oscilloscope, which plots the sound intensity versus time, the time of travel (from one sound impulse to the next) could be accurately measured. It was found that this sound method and the frame counting method gave the same results.

These methods measure the average speed of the cue ball. Because the cue ball actually slows down gradually, the initial speed is slightly higher and the final speed is slightly lower than the average speed. But since the speed only diminishes by a few percent, the average speed serves adequately as a measure of the cue ball speed in a break shot.

I analyzed video tapes of some of the matches in the 1986 Resorts International tournament, and the 1987 Brunswick 9-Ball Team Challenge. (Players involved in the tapes included Mike Sigel, Jim Rempe, Allen Hopkins, Steve Mizerak, Nick Varner and Jose Garcia.) The speed of break shots ranged from 22 to 26 MPH, the average being 24 MPH. The top speed of 26 MPH was recorded for several break shots by Mike Sigel. At this speed, the cue ball reached the one ball in 0.12 seconds.

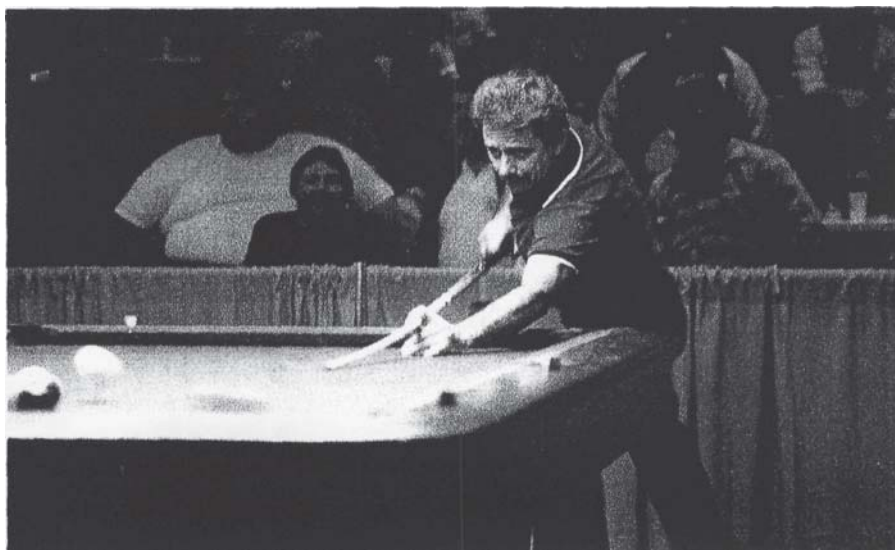
The speeds of break shots in several women professionals were also measured, using a tape of the Brunswick Team Challenge. In one break shot Jean

Balukas propelled the ball at 22 MPH. Ewa Mataya, Belinda Bearden and Loree Jon Jones typically had speeds between 18 and 21 MPH. From this small sampling, the women's speed were on the average around 20 MPH, which is about 83 percent of the average for the men.

The three or four MPH variations in break shot speeds within players of the same sex might account in part for why some players have better break shots than others. But the tapes reveal that success, where a ball is made, was not strongly correlated with speed. Accuracy was equally important, which meant hitting the one ball in the right place and with the proper English. Often in successful break shots, the cue ball was observed to move about less after hitting the rack than with the unsuccessful shots, indicating that more of its energy has been transferred to the object balls.

In any event, the surprising truth is now revealed. The top speed that a professional propels a cue ball is around 26 miles per hour. Sorry to say that it is not 100 miles per hour, which is the top speed for throwing a baseball. While this may damage egos, take comfort in the fact that the cue ball weighs twice that of a baseball.

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The truth is finally out: Break shots by pros like Danny DiLiberto (above), travel around 25 MPH.