

## Research Summary: What Effect Does the CG Placement Have on Ball Motion?

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The United States Bowling Congress is undergoing a thorough analysis of ball motion. Part of this research has focused on the effect of the CG (Positive or Negative) placement, in a bowling ball with a symmetrical core, have on ball motion. Considering the recent responses from bowling ball manufacturers over the past 2 years, the USBC findings should be explored by all elite players and coaches.

**Difference Between Positive CG & Negative CG Placement in a Symmetrical Core Bowling Ball**

The United States Bowling Congress continues to conduct research on the ball motion. Recently, they published their findings on the differences that were produced with a bowling ball, with a symmetrical core, drilled with a layout that has a positive CG placement as compared with the same ball drilled with a layout with a negative CG placement. USBC comparing these two bowling balls on 20 different variables of ball motion. Both balls had the PIN placed above the fingers with the PIN on the midline and the PIN to CG measuring 45 degrees, from the midline. Harry, the automatic throwbot threw the ball at 17 MPH and 375 RPMs.

**SUMMARY of FINDINGS**

- (\*) The Positive CG ball had larger values on 14 of the 20 variables measured.
- (\*) The Positive CG ball had 1.25 ounces of positive side weight. The Negative CG ball had 1.35 ounces of negative side weight.
- (\*) The Negative CG bowling ball was 6 feet further, down the lane, to the roll phase.
- (\*) The Negative CG bowling ball has 2 extra feet of skid and 4 extra feet of length in the hook phase.
- (\*) Negative CG bowling ball went 2 feet further before starting the hook phase. Or, conversely, the Positive CG bowling ball hooks 2 feet sooner than the Negative CG ball.
- (\*) The Positive CG ball had 2 additional boards of hook on the backend and was 1.25 feet shorter than the Negative CG Ball.

	POSITIVE CG BALL	NEGATIVE CG BALL
SKID DISTANCE	23 Feet	25 Feet
HOOK PHASE ENDED	41 Feet	47 Feet
HOOK DISTANCE	18 Feet	22 Feet

**Conclusion:** True, the analysis was conducted with only one bowling ball and one bowling ball manufacturer's product. But, clearly, the results are intriguing from both a player and coach perspective. From these findings, the CG placement has implications for any bowler who is playing conditions in which length should be maximized and change of direction reduced. Due to the length of the skid and hook phases as well as reduced backend reaction, a negative CG layout in a symmetrical bowling ball is worth further exploration. Bowlers bowling on the CHEETAH pattern or a flatter short pattern, 36 feet and shorter, should punch-out a reactive cover or a mid-range, middle performance bowling ball with such a layout. Since the core is symmetrical, the ball will be far more stable and have less flare potential. A middle level performance cover will be weaker and get the ball through the heads more cleanly. As with all new findings, the bowling community does want more information. But, the greats will push the envelope earlier and give things a try. Without risk, we can't receive big rewards.

**KNOWLEDGE + PRACTICE = SKILL**

From USBC: "It is worth noting that even though these are minor differences, they are still differences. Mathematically, the difference in position is roughly only about 10 percent; this is not always easy to tell on the lanes observing from 60 feet away. USBC had thought the balls looked very similar in reaction; however, the math paints a different picture." To read the full report, [How critical is center of gravity placement on a symmetrical bowling ball?](#), click on the tilte to go to the USBC web site