In the past, bowling ball motion was defined through visual analysis. That analysis led to the conclusion that a ball would skid, then roll, then hook, with the hook being the drastic back-end move of the ball. Currently through the use of equations and graphical dada analysis of a bowling ball's path, the individual phases of motion have been defined.

As a bowling ball travels down a lane it transitions through three distinct phases of motion: hook, roll and skid. As stated before, visual analysis was the way of the past concluding that the order of those phases was skid, roll and hook. However, during the course of analyzing bowling ball paths down a lane during the USBC Bowling Ball Motion Study, USBC Equipment Specifications Researchers determined that the actual progress order of the phases is skid, hook, roll.

The USBC Bowling Ball Motion Study conducted in cooperation with bowling ball manufacturers, characterized bowling ball motion through mathematical equations developed from ball path data generated with the use of C.A.T.S. (Computer Aided Tracking System). Figure 1 displays an example of data obtained from C.A.T.S. in graphical form with the three phases of ball motion distinctly labeled.

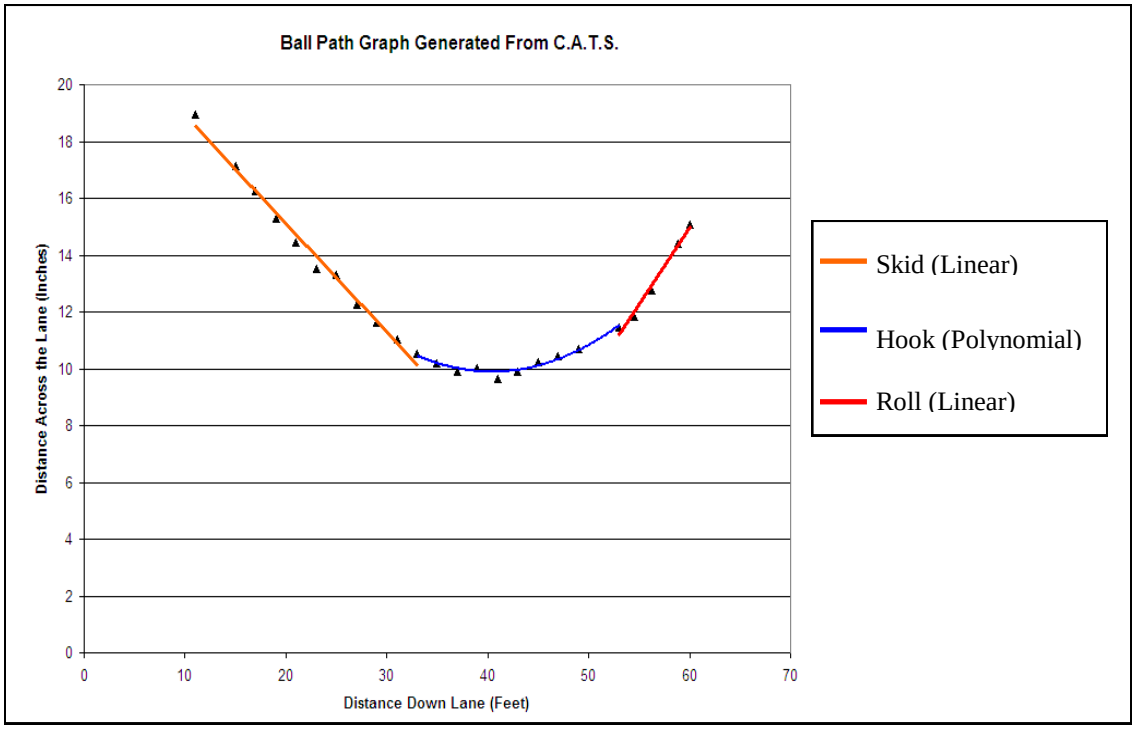

Figure 1 - Phases of ball motion illustrated graphically.

This data found that the first phase of a bowling pall's path on a lane had a mathematically-linear path, meaning it traveled along a line moving away from the pins, not in a curved path. This phase is known as skid.

As the ball continues down the lane, the mathematical analysis shows that the ball path will no longer match a linear path. There is a transition to a curved path. This non-linear, parabolic portion of the ball path is the hook phase.

Finally, in the third phase, the ball migrates back to a linear path toward the pins. This final segment is defined as the roll phase.

From a visual standpoint, some of the true phase transition points can be hard to see. The accompanying video shows a bowling ball on its path down the lane, notes the transition points and characteristics that mark the end of one phase and the beginning of the next.

Not all bowlers throw the ball like the player in the video; nevertheless, every shot thrown regardless of the bowler's individual style, will go through the previously mentioned three phases of ball motion.

So what's the take-home message for league or tournament bowlers who are not tracking and analyzing their ball paths via computer?

First off, communication is key. Being able to talk to your teammates during league or tournaments, especially about what the bowling ball is doing, can be a huge advantage. Doing so will allow the bowler and his or her teammates line up and play the lanes successfully.

This information also comes in handy when communicating with a USBC-certified coach. A bowler's ability to explain what his or her bowling ball is doing on the lane will allow the coach to suggest appropriate physical-game modifications that will help the bowler alter the way his or her ball moves throughout the various phases of ball motion.

Lastly, this knowledge will aid in the communication between pro-shop professionals and bowlers. If a bowler can verbalize his or her desire to see a longer skid phase or a more-defined hook phase in their ball motion, the pro-shop professional will be able to adjust a drilling layout and surface preparation to meet what the bowler needs or wants to see on the lane.

Remember, knowledge is power. Now that you have a better understanding of the phases of bowling ball motion, use that information to improve your game and that of your teammates.