[**A Personal Attack on Average Launch Angle**](https://www.fangraphs.com/community/?p=75475)

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Quite often, we hear baseball analysts talk about average launch angle. Truly, I can see why they like to bring this statistic up. It gives them a modern and technical way to explain why a player is hitting more extra base hits, why he is deserving of the cleanup spot, or why he is a power hitter now. And I will absolutely not try to deny the notion that hitting the ball in the air is more productive over the long haul than hitting sharp grounders. My objective here is to speak about the misuse of the term “average launch angle”

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Here is a completely hypothetical example: in an Indians game, Francisco Lindor puts the ball in play three times. The launch angles of these three batted balls are 10°, 32°, and 21° respectively. Yan Gomes also puts the ball in play three times. His launch angles were 75°, -5°, and -7°. Lindor would likely have at least two hits depending on the luck factor that I will mention in a minute. Gomes would likely have no hits. In this game, however, they both would leave with an average launch angle of 21°. 21° amounts to a line drive, but Yan Gomes hit a pop up, two grounders, and zero line drives, so his average launch angle gives us a false idea of what his contact truly looked like in this hypothetical game. I understand that over the long run, fly ball hitters like Joey Gallo or Matt Carpenter (0 GIDPs in 2018, by the way) will have higher average launch angles than ground ball hitters like Eric Hosmer or Ian Desmond. The stat is not meaningless, but it is undoubtedly flawed in its inability to factor in variance and to truly evaluate trends in a hitter’s contact.

NOTE: According to Baseball Savant’s Hit Probability Breakdown tool, in the 2017 season, the launch angle degree that created the best wOBA was 26°. 1,657 baseballs were put in play last year at a 26° angle, and these balls amounted to a 0.508 BABIP and a 0.820 wOBA. On a side note, the launch angle that created the highest BABIP was 12° (0.785).

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Realistically, it is difficult to talk about launch angle without talking about exit velocity, too. A player could theoretically hit the ball at a 26° angle every time he comes up, but if he is hitting it off the end of his bat or getting jammed, then he is going to have less success than most. Also, every game has a few of those line drives that are hit right on the nose but happen to be right in the direction of an outfielder. This is tough luck, and maybe one of those bloopers that come off the bat at 45° and 74 mph will drop in to balance it out. This luck-factor is part of what players, coaches, and fans love and hate about the game. Nonetheless, in the end, well-hit balls have a much higher probability to do damage than poorly hit balls. In a game of endless variables, evaluating the probability of success or failure is really the best we can do.

So, I have identified the problem, which is that average launch angle is an overused, often skewed, and misinterpreted statistic. After trying to think of a better way to describe a player’s distribution of launch angles, I realized that standard deviation was not all that helpful because being a successful hitter is not necessarily about hitting the ball as precisely as possible. Using the standard deviation of a player’s launch angle would punish a Christian Yelich (low-line-drive prone) for crushing a towering home run or a Brandon Belt (fly-ball hitter) for smacking a line-drive double past the third baseman’s diving attempt. To me, those scenarios make standard deviation of launch angle an intriguing but flawed metric, just like average launch angle. A better idea came along as I was scrolling through the Hit Probability Tool. Every launch angle from 6° to 33° had a wOBA of 0.500 or better in 2017, and no angles outside this range exceed 0.500. So, even though this range is quite wide, I will consider 6° to 33° to be “optimal” for the remainder of this report.

Using Statcast data from Baseball Savant, I downloaded the data for the 40,000 balls put in play from July 6th to September 3rd of this season. Using RStudio, I filtered the data down to only players with at least 75 balls in play in the database and found each of their average launch angles and exit velocities. This left us with 260 players’ data. The scatter plot comparing each of their average launch angles (the problematic statistic) to their wOBAs is shown below in Figure 1 (NOTE: only data from the 40,000 point dataset previously mentioned was used to calculate average launch angle or wOBA in this project). Needless to say, average launch angle does not seem to have any indication of a hitter’s success. That graph shows no trends, and not much can be learned from it to help a front office, media member, or fan better evaluate the game of baseball.



Figure 1

However, once I manipulated the same data as used before to find the percentage of a player’s balls in play that fell in my quite arbitrary “optimal zone” of 6° to 33°, a trend emerges in the data (See Figure 2).



Figure 2

While it is by no means a perfect linear regression, it can be seen that players who hit a higher percentage of balls between 6° and 33° are more likely to have a higher wOBA. While there may be a range of launch angles (e.g. 12° to 26°) that shows a more glaring trend, I believe this is a good initial counter to the usage of average launch angle. I do not view my solution of “optimal percent” to be the perfect way to use launch angle going forward, but it is a step in the right direction. Hopefully, the announcers, journalists, and anyone else who informs the public about baseball will find ways to use launch angle data in a more insightful manner than simply finding the average. Also, my apologies to Yan Gomes for giving him the short end of the stick in my earlier example.