
Swing Profile

Jan 01, 2021 - Jul 28, 2022

A Driveline EDGE product designed to generate insights from a player's BlastMotion data. Use the expected batted ball metrics from Swing Profile to give a hitter an idea of his or her batted ball profile from a pure swing analysis. Use drill scores to train hitters and address identified swing weaknesses. Use the accompanying text and outside resources to increase education and swing tracking knowledge. In addition, if different bats were used within the date range of the report, equipment split stats will be included in the report after the general Performance Benchmarking pages.



Performance Summary

A set of player averages from the specific imported player data versus five playing level averages of all qualified hitters. Conditional green and red shades are applied to the bat speed, efficiency, time to contact and attack angle averages as well as the expected batted ball metrics based on the imported player being either 0.5 std devs above (green) or below (red) the respective playing level set of averages selected (in this case the selected level was: high_school!)

Key Metrics

| Description | | | Affiliate | Indy | College | HS | Youth |
|----------------------------|---|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Avg BatSpeed | The average of the hitter's bat speed values | 70.99 +/-4.8 | 70.17 +/-4.4 | 69.2 +/-4.6 | 67.53 +/-4.1 | 62.4 +/-5.8 | 49.21 +/-9.3 |
| 90th% BatSpeed | The 90th percentile of the hitter's bat speed values | 76.09 | 75.14 | 74.04 | 72.54 | 67.02 | 52.81 |
| Exp Top8th EV | The estimated EV mean of a hitter's top 8th hardest hit balls modeled off Blast values +/-the RMSE of the estimate as a proxy for variability | 100.48 +/-2.7 | 97.95 +/-2.7 | 96.55 +/-2.7 | 94.93 +/-2.7 | 88.94 +/-2.7 | 66.67 +/-2.7 |
| Exp LA at Top8th EV | The estimated LA mean of a hitter's top 8th hardest hit balls modeled off Blast values +/-the RMSE of the estimate as a proxy for variability | 19.36 +/-4.0 | 16.3 +/-4.0 | 14.97 +/-4.0 | 14.19 +/-4.0 | 10.86 +/-4.0 | 12.09 +/-4.0 |
| Avg Efficiency | The average efficiency value or bat speed divided by peak hand speed | 2.98 +/-0.2 | 3.25 +/-0.2 | 3.25 +/-0.2 | 3.24 +/-0.2 | 3.2 +/-0.2 | 3.03 +/-0.3 |
| Avg TimeToContact | The average of the hitter's time to contact values | 0.138 +/-0.0 | 0.147 +/-0.0 | 0.154 +/-0.0 | 0.154 +/-0.0 | 0.163 +/-0.0 | 0.19 +/-0.0 |
| Avg AttackAngle | The average of the hitter's attack angle values | 13.97 +/-4.5 | 11.09 +/-4.9 | 10.62 +/-3.9 | 10.52 +/-5.0 | 9.8 +/-5.1 | 11.78 +/-6.3 |
| Attack Angle Range | The proportion of swings where attack angle is between 4 and 16° | 69.83 | 53.2 | 62.8 | 55.7 | 59.3 | 36.7 |
| Avg PeakHandSpeed | The average of the hitter's peak hand speed values | 23.85 +/-1.6 | 21.72 +/-1.5 | 21.43 +/-1.3 | 20.97 +/-1.6 | 19.63 +/-2.1 | 16.28 +/-2.5 |

Performance Summary

A set of player averages from the specific imported player data versus five playing level averages of all qualified hitters.

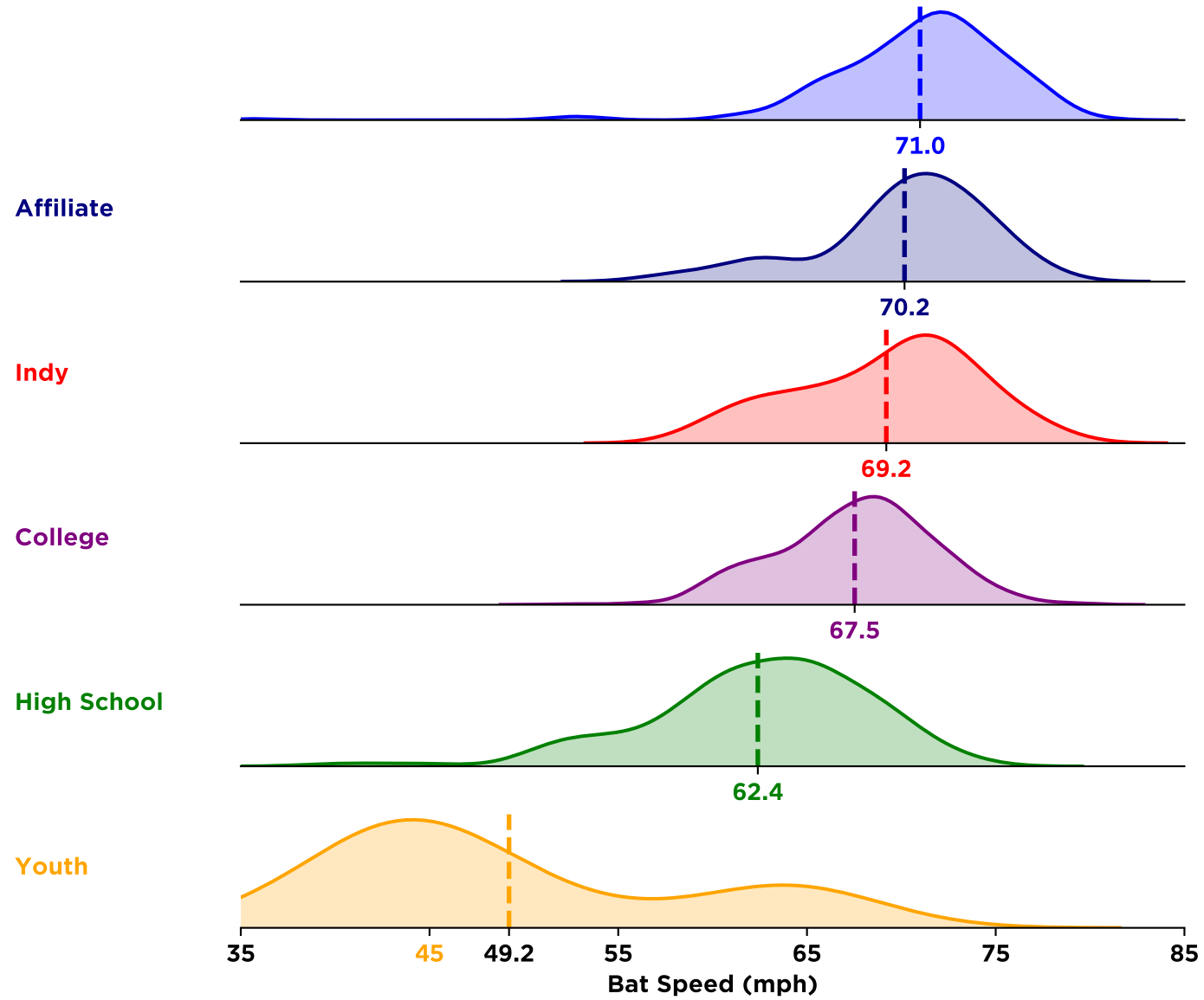
Supplementary Metrics

| Description | | | Affiliate | Indy | College | HS | Youth |
|-------------------------|---|-----------------|------------------|------------------|------------------|-------------------|------------------|
| Avg EarlyConn | The average of the hitter's early connection values | 72.5 +/-4.9 | 90.72 +/-11.3 | 99.83 +/-14.2 | 97.92 +/-13.4 | 101.24 +/-16.1 | 93.7 +/-14.8 |
| Avg ConnAtImpact | The average of the hitter's connection at impact values | 74.0 +/-4.6 | 80.25 +/-7.9 | 83.05 +/-9.1 | 82.4 +/-8.5 | 86.95 +/-10.3 | 84.9 +/-7.6 |
| Avg RotAccel | The average of the hitter's rotational acceleration values | 16.42 +/-2.9 | 13.96 +/-5.7 | 13.01 +/-4.8 | 13.16 +/-4.6 | 10.34 +/-5.9 | 7.07 +/-3.7 |
| Avg PlaneEff | The average of the hitter's On Plane Efficiency values | 84.35 +/-5.4 | 68.8 +/-10.8 | 62.92 +/-10.8 | 64.24 +/-9.8 | 65.16 +/-12.4 | 67.97 +/-12.2 |
| Avg/Max BatSpeed | The proportion of a hitter's average bat speed to their max bat speed recorded during the session | 88.19 | 86.9 | 86.7 | 85.9 | 85.9 | 86.6 |
| # of Swings | The # of swings recorded in a hitter's session as well as the # of swings per athlete pool in the selected Driveline sample | 242 | 12840 | 29312 | 182980 | 82532 | 21109 |

Performance Detail

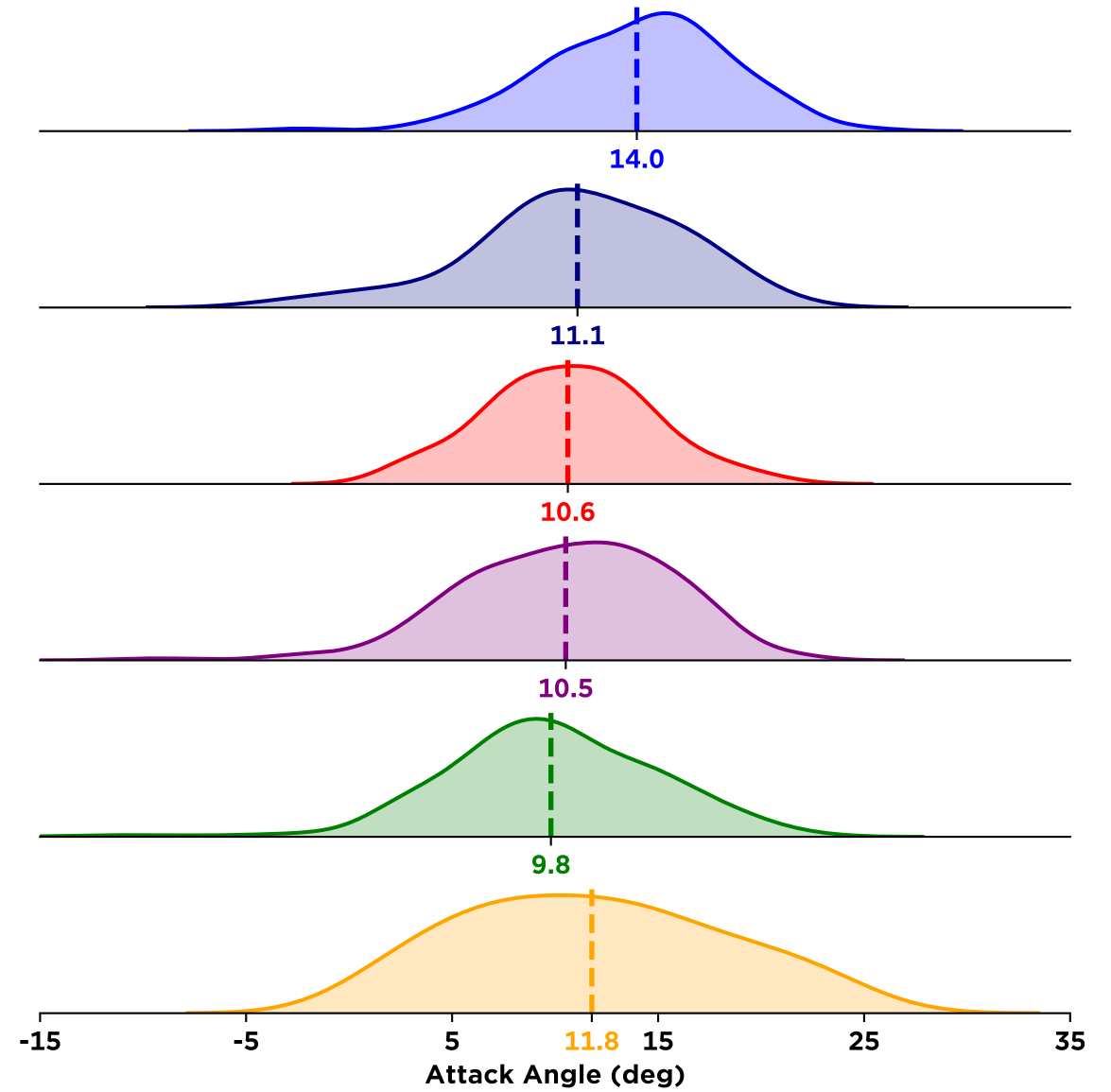
Bat Speed

A density plot distribution of the hitter's bat speed values against in-gym hitter averages, split out by playing levels.



Attack Angle

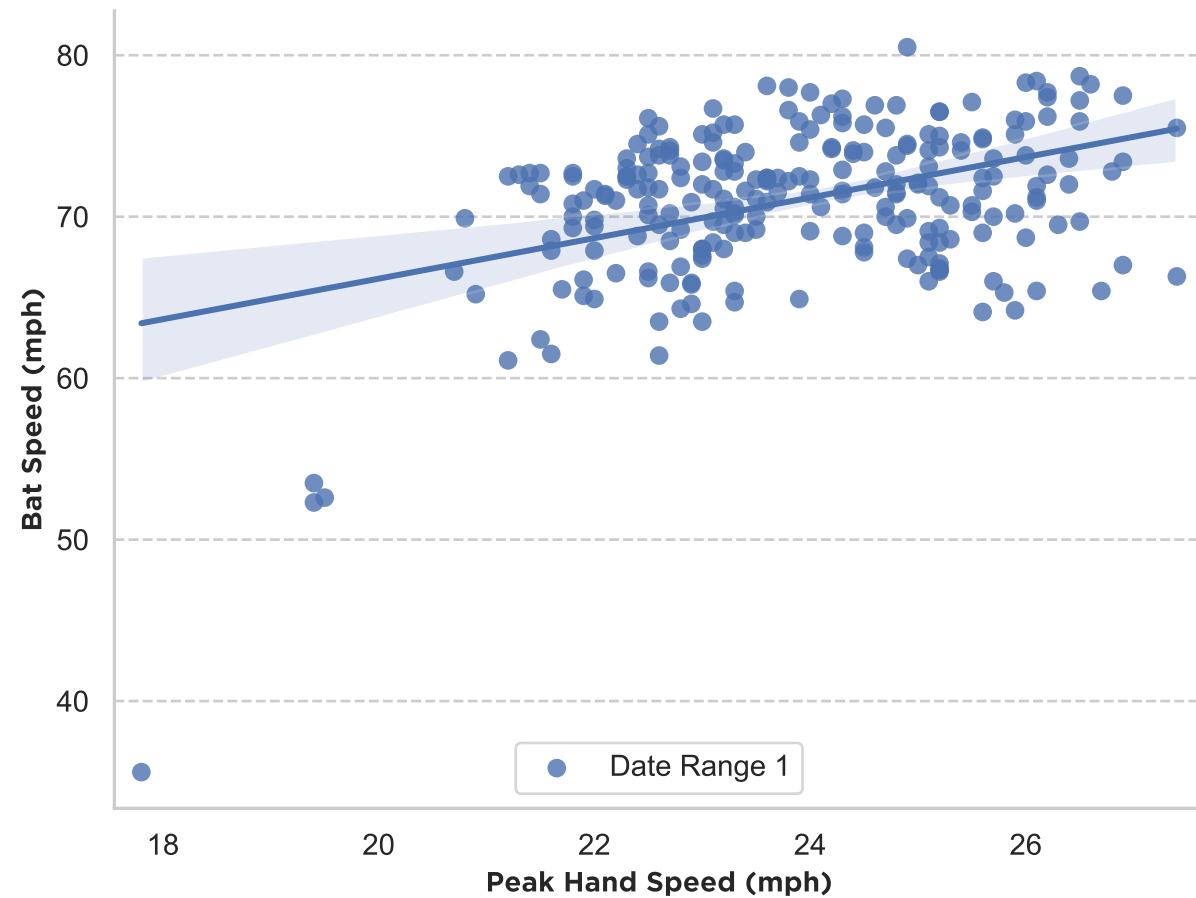
A density plot distribution of the hitter's attack angle values against in-gym hitter averages, split out by playing levels.



Performance Detail

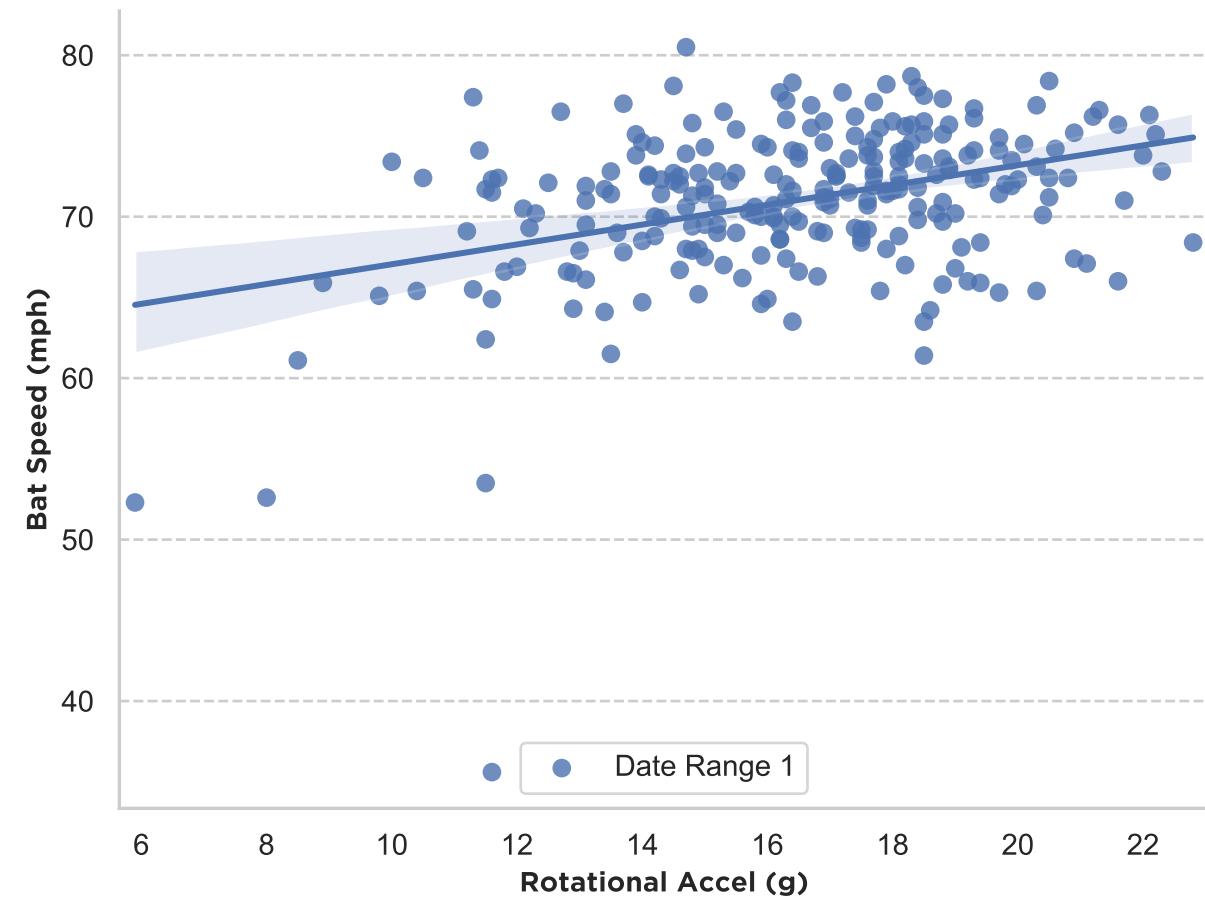
Batting Efficiency

A linear model of best fit with 95% shaded confidence intervals plotted between peak hand speed and bat speed



Rotational Efficiency

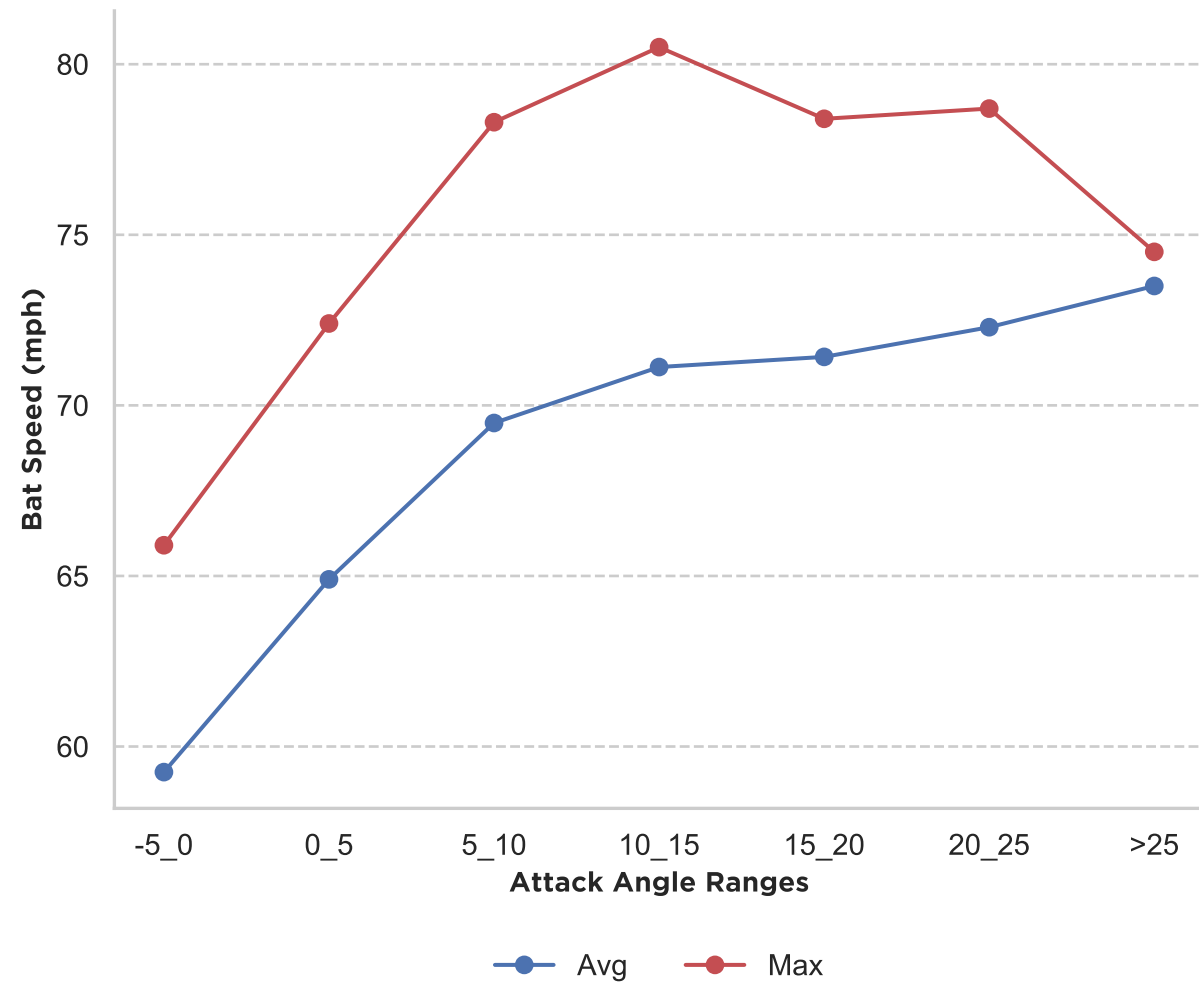
A linear model of best fit with 95% shaded confidence intervals plotted between rotational acceleration and bat speed



Performance Detail

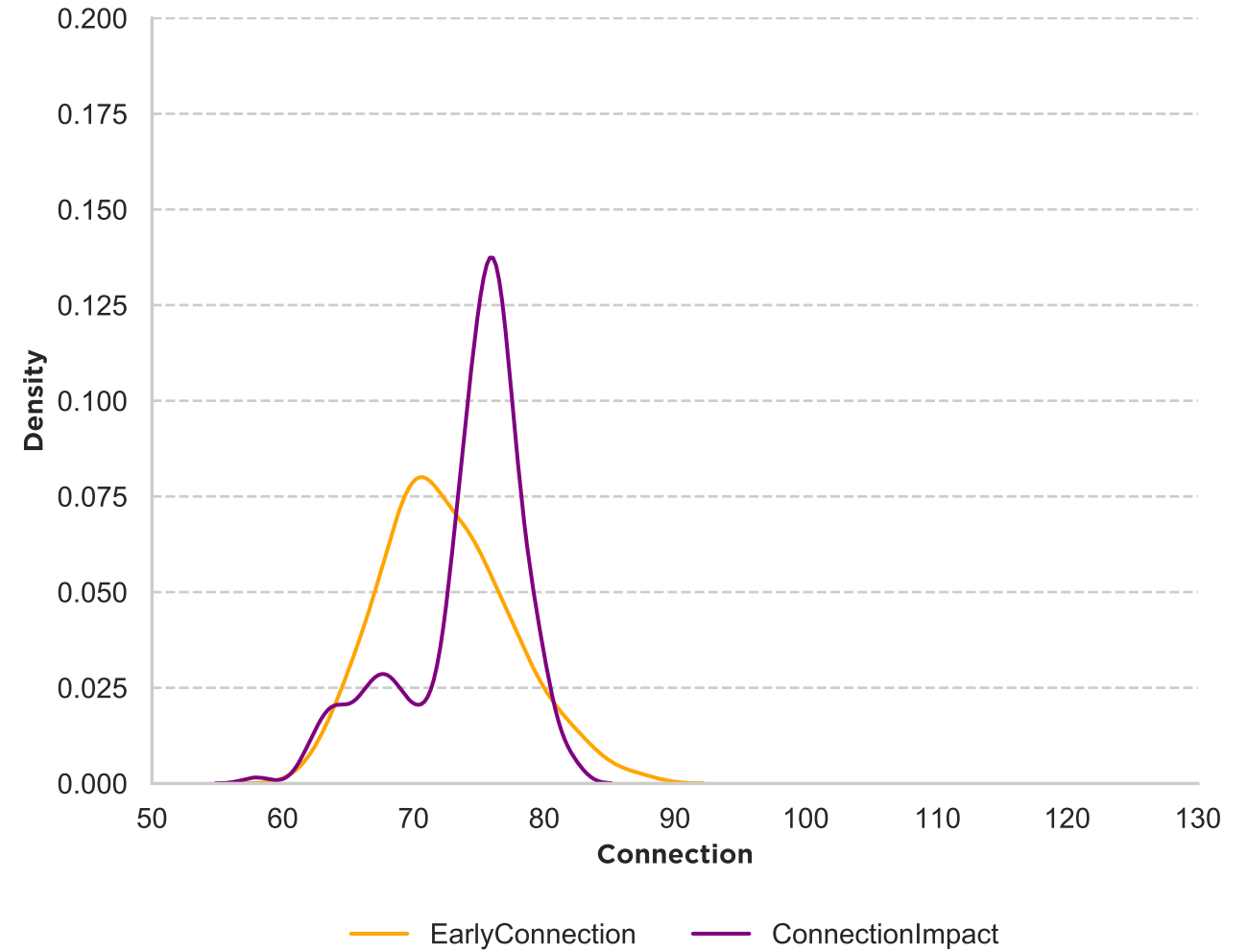
Avg/Max Bat Speed by Attack Angle

Average bat speed plotted by attack angle ranges. If there is no swing data for any one of these ranges, it will not be plotted.



Connection Distributions

Density plot distributions of the hitter's early connection and connection at impact scores



Drills & Insights

Below are your drills -- arranged by weighted importance given to them. A drill closer to the top should be given greater emphasis. Text insights from our trainers accompany it on the right.

Drills

| |
|-------------------------------|
| Overhead Velocity w/ Overload |
| Overload Pull/Underload Oppo |
| Short Bat |
| Hitting Plyo Balls |
| Offset Rotation |
| Batspeed Trainers |
| Long Bat |
| Depth Ladder |
| Launch Angle Ladder |
| Top of the Zone Velocity |
| Offset Open |
| Offset Closed |
| Hitting Pivot Picks |

Insights

Athlete possesses sufficient bat speed (70.99) in comparison to other in gym pro hitters. Athlete has an attack angle within range (0.7%) on a consistent basis. Athlete is "quick to the ball" (0.14 time to contact) and should be able to handle moderate velocity and hit the ball with a proper attack angle deep in the zone. Athlete does a poor job transferring hand speed into bat speed (2.98 efficiency) and efficiency is low in comparison to other in gym pro hitters. Athlete possesses sufficient average peak hand speed (23.85) in comparison to other in gym pro hitters. Athlete has a low early connection (72.5) and will likely struggle with swing direction, adjustability and making consistent quality contact. Athlete possesses the ability to quickly accelerate (16.42 rot acc) the bat into the swing plane.

Continuing Education

Swing Profile: Introducing Expected Batted Ball Results

Knowing that bat sensor data is both reliable and often very descriptive of a hitter's batted ball talent, we decided to build a more powerful report, termed here as Swing Profile, based on *only* swing characteristics... the report also features two new predicted batted ball metrics: Peak Exit Velocity and Launch Angle at Peak Exit Velocity. In this case, we use Peak EV to reference the average EV of an individual's top eighth hardest hit balls, a proxy for exit velocity that has been used for years by the sabermetric community and has been validated by Driveline's own findings.

Learn More: <https://rb.gy/4tedu7>

Pairing Blast and Hittrax Data

Exit velocity increases (in order of strength) with Blast's power metric, bat speed, peak-hand speed, and the rotation metrics, while decreasing with time to contact. Launch angle has a positive significant correlation with attack angle which, while completely different metrics, are often either confused for one another or believed to not be correlated at all.

Learn More: <https://rb.gy/mwm721>

Driveline Hitting KPI's

...at Driveline, we have a little bit more data to use, as our concerted data collection efforts on the hitting floor have allowed us to pair tens of thousands of rows of Blast and HitTrax data by their timestamps and users, allowing us now to put a concrete bat speed figure with batted ball data. Regressing completely off this we have found a simple linear regression explaining around 80 percent of the variation (or $.8 R^2$) of bat speed.

Learn More: <https://rb.gy/s9j5tp>

Pairing Blast and Hittrax Data Part II: Specific Focuses

In this piece, we take a look at commonly held, specific beliefs that have been touched upon by our hitting trainers and see whether the data backs it up. We also take a more nuanced view of a popular sabermetric proxy for evaluating attack angle via unsupervised learning.

Learn More: <https://rb.gy/qmj2um>

Debunking Bat Speed Myths

With the ability to measure bat speed and pair the findings to launch monitors and 3D motion devices, the claims on the relationship between bat speed and batted-ball characteristics can finally be examined. These are the ways to produce higher exit speeds:
--increase the speed of the most distal segment (the bat)
--decrease vibration on contact (sweet spot)
--increase the speed at which the ball is pitched

Learn More: <https://rb.gy/erjuxv>

Rotational Acceleration, Sequencing, and the Swing

Our R&D team has paired Blast, K-Vest, and HitTrax data, allowing us to take a deeper dive into rotational acceleration to evaluate claims surrounding it. We have found relevant correlations with sequence percentage, time to contact, and peak hand speed.

Learn More: <https://rb.gy/j4mmkr>