The Value of Scientific Research to the Game of Baseball

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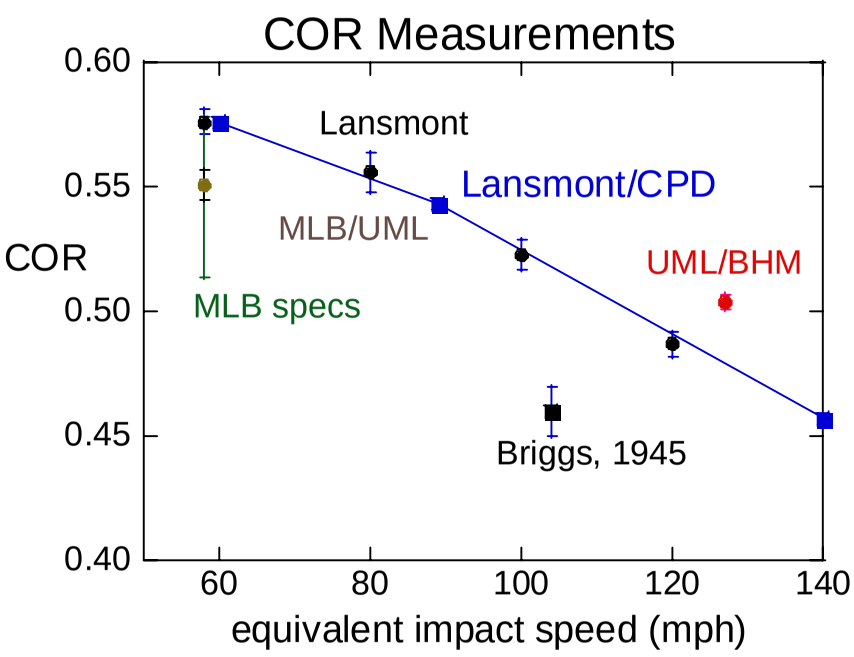
Summary of Important Points

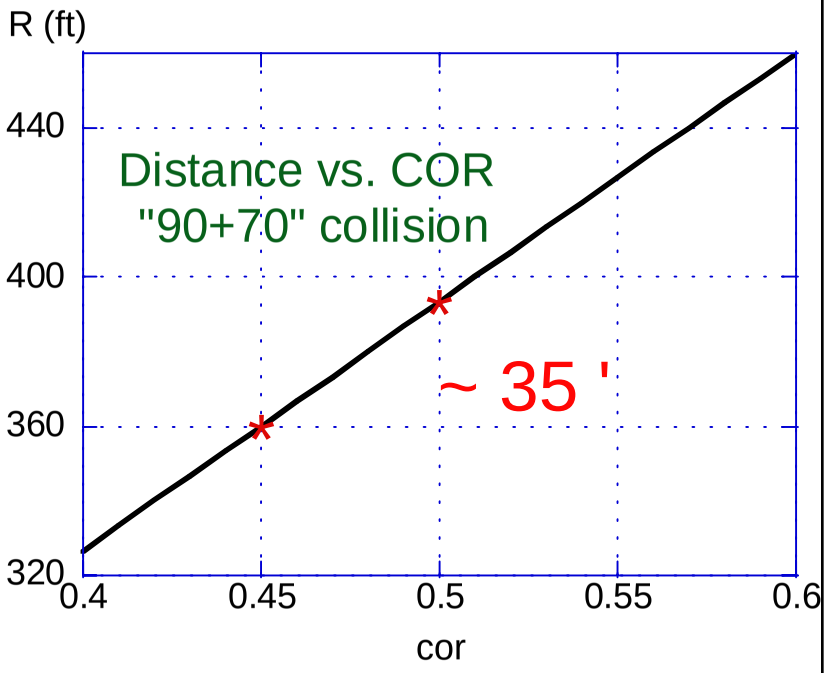
- Much of the physics of the ball-bat collision is understood from theory and laboratory measurements
- That understanding can allow us to establish meaningful performance metrics and standards
- These metrics and standards are of value to the game itself
- More and better research needed

Example 1: Ball COR

Is the Ball "Juiced"?

MLB: e = 0.546 ± 0.032 @ 58 mph on massive rigid surface

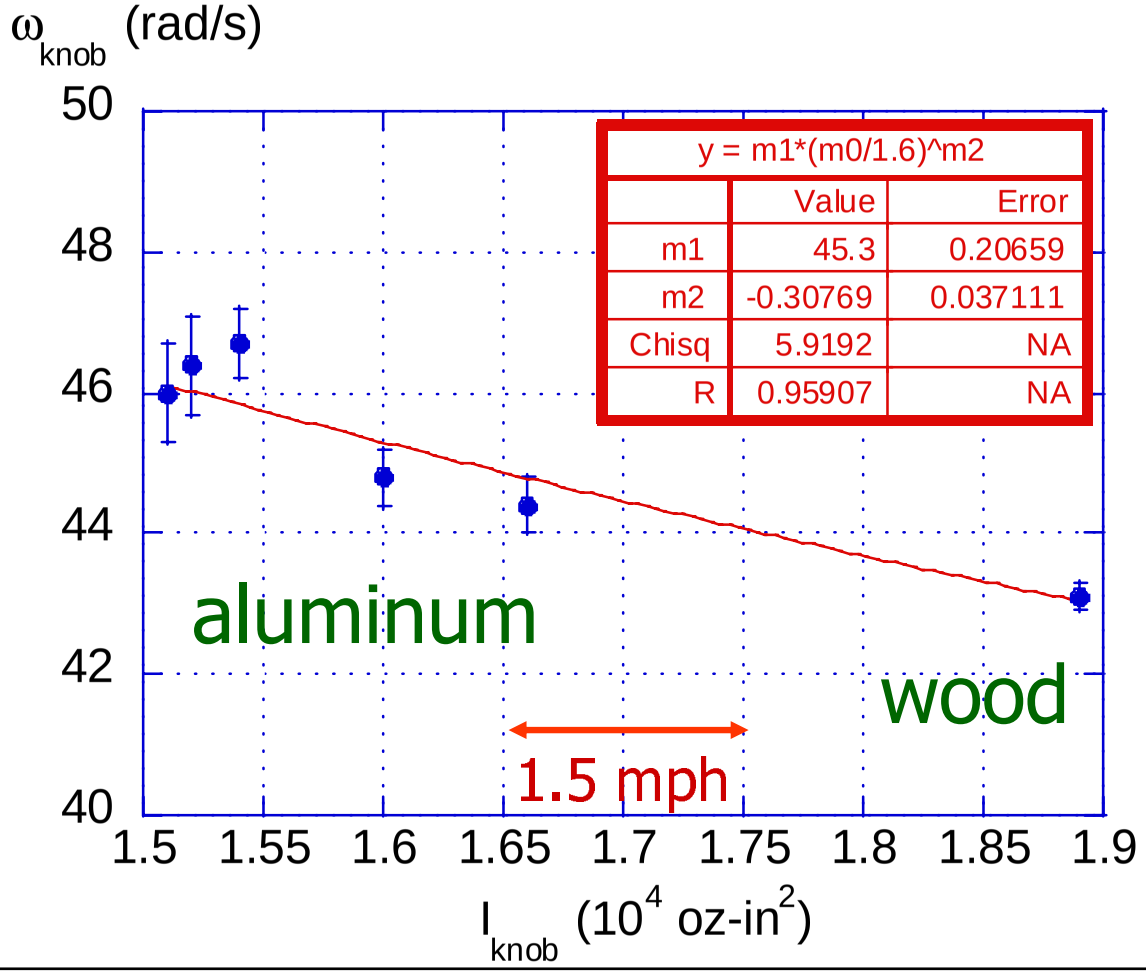




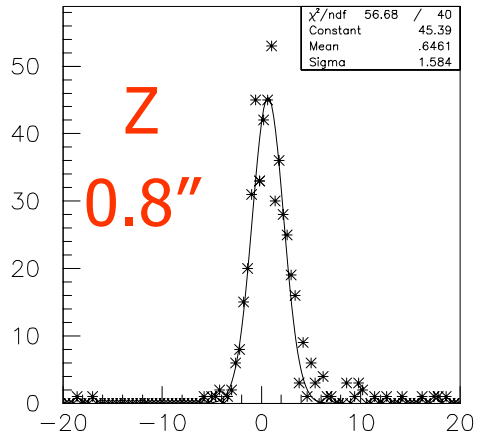
Example 2:

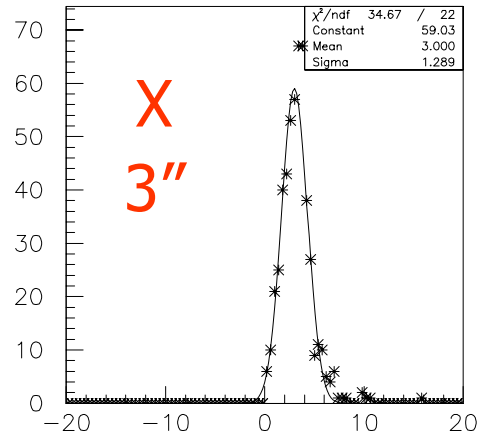
Bat Speed vs. MOI

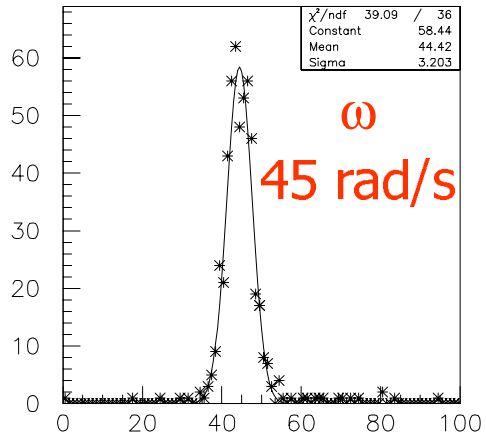
Crisco/Greenwald Batting Cage Study:

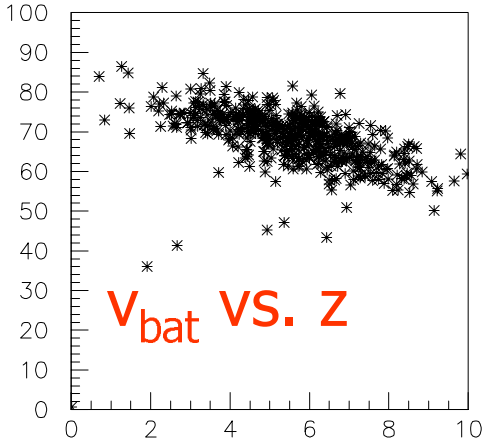


Example 3: Swing Speed







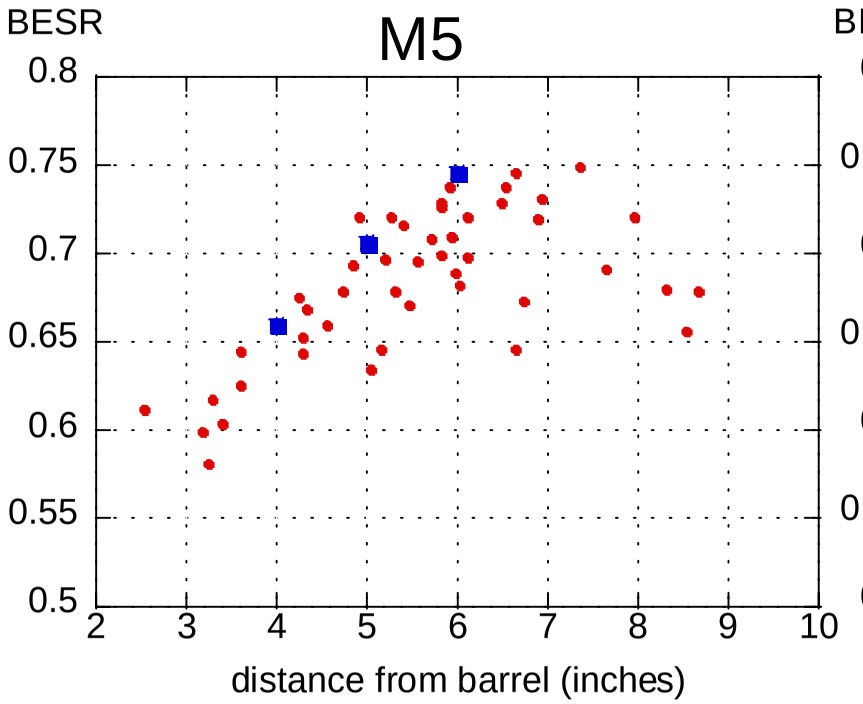


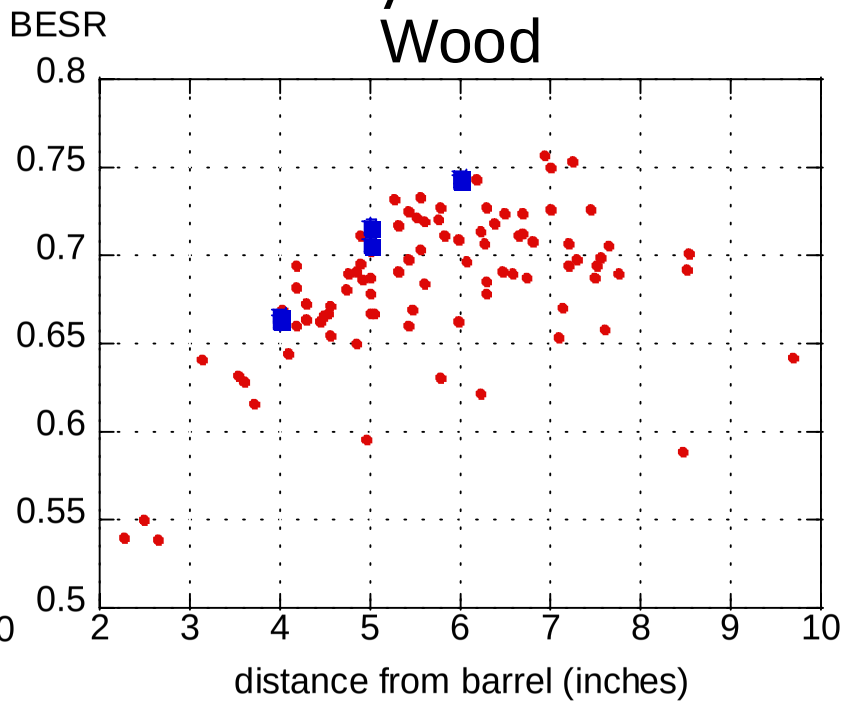
≈70 mph
@ 28″

Crisco/Greenwald Batting Cage Study

Example 4: Lab vs. Field

Crisco/Greenwald Batting Cage vs. Lansmont Laboratory

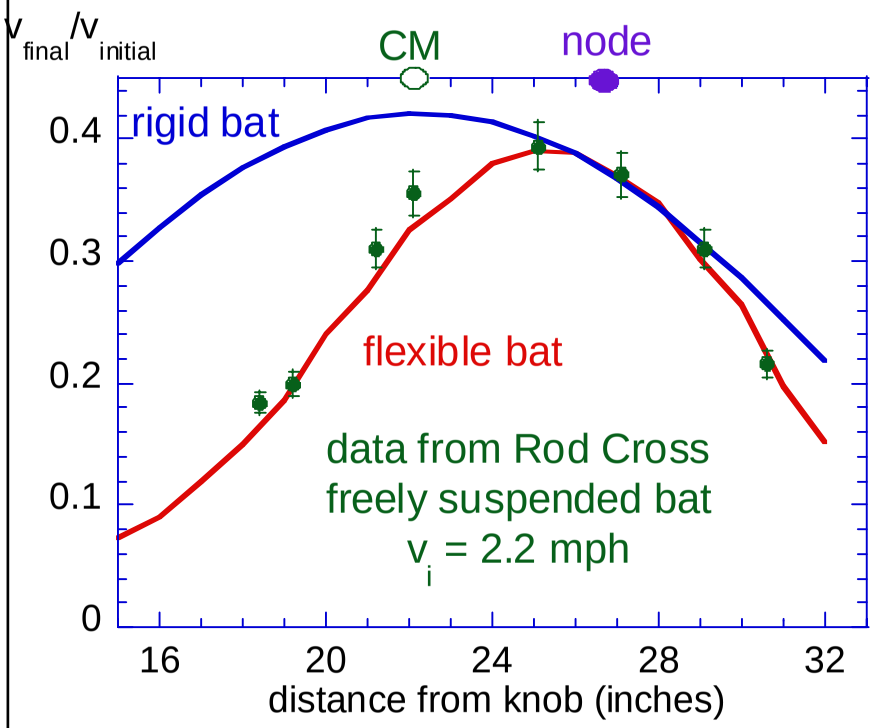


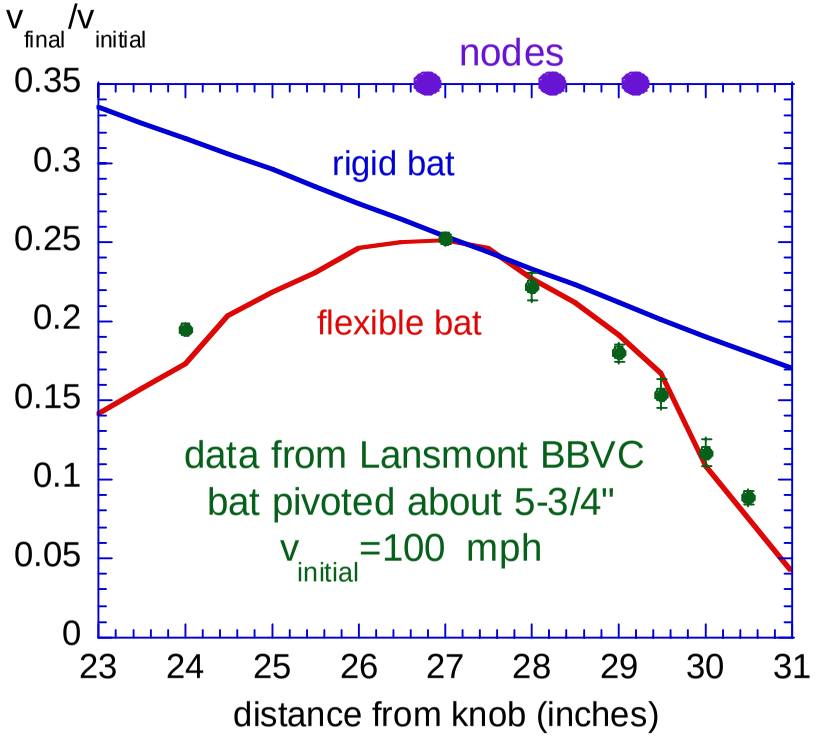


Conclusion:

Lab measurements can predict field performance

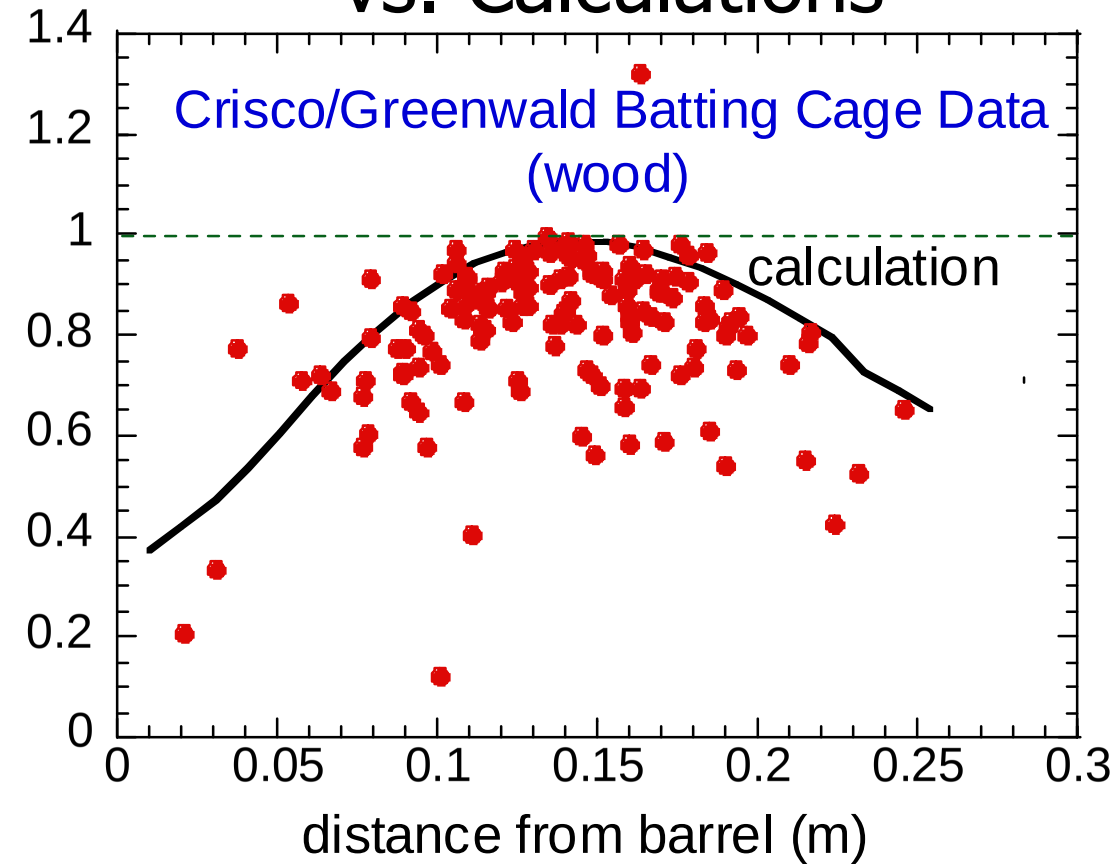
Example 5: Lab vs. Calculations





Example 6: Field vs. Calculations

Crisco/Greenwald Batting Cage BPF vs. Calculations

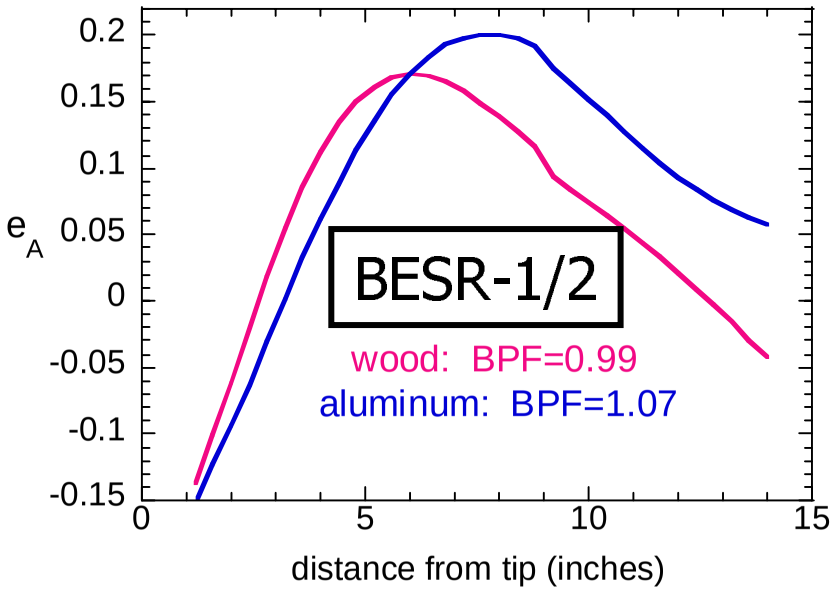


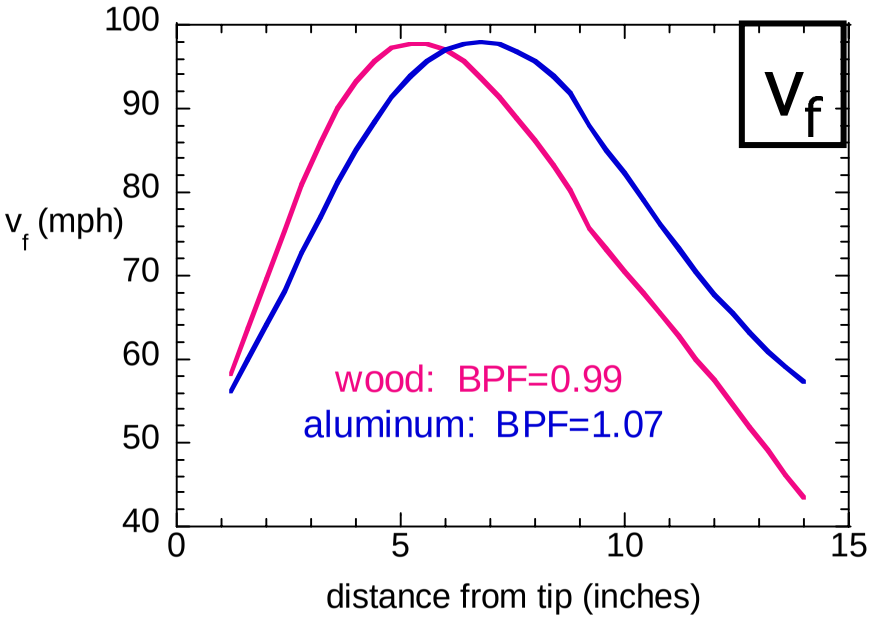
Example 7:

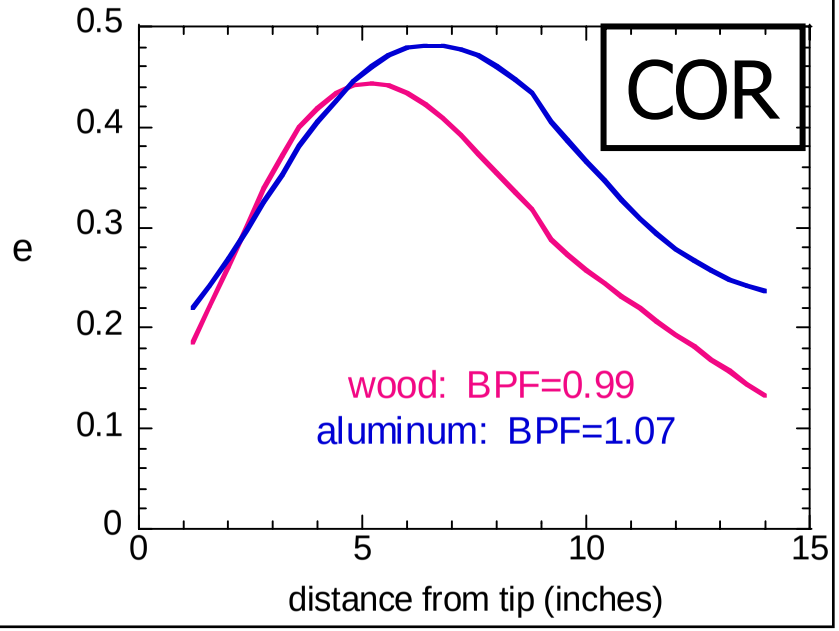
Bat Performance Metrics

Which Metric to Use?

e_A or COR or v_f







Areas for more Research

- More extensive wood-aluminum comparisons
- BHM vs. stationary vs. field comparisons
- COR: flat vs. cylindrical
- Collision time vs. v_{rel}
- COR vs. v_{rel} (recoil effect)
- v_{bat} vs. M, MOI, z_{CM}, …
- e_A for free vs pivoted bat
- width of sweet spot

NOTE: research requires $

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