

“TRAMPOLINE EFFECT” ADDS POWER

If you have been listening to major League baseball broadcasters in recent years, they have been paying a lot of attention during games to noting the ball-exit-speed of home runs and line drives. Why is that? Well, swing-speed seems to have taken a back seat to ball-exit-speed; ball-exit-speed is now considered the key stat to focus on as the best indicator of a batter's contact efficiency. Clearly, the faster the ball is moving on the playing field, the more difficult it is to make a play and the greater the risk of injury.

There is confusion between what bat-swing-speed is versus ball-exit-speed.

- BAT SPEED is the speed of the bat itself,
- EXIT SPEED is the speed of the ball after it hits the bat.

In the game of baseball, a quality hit is the aggregate of the solid bat and baseball's characteristics, coupled with the batter's swing-speed and hitting mechanics. These elements all factor into how well swing energy is transferred to the ball. In slow pitch softball, we must also consider the “trampoline effect” as an additional factor that determines our ball-exit-speed.

Seniors often times comment to teammates and on message boards, that they are hitting the ball farther than they did in high school or college. Let's examine why those statements may have merit. Given today's carbon fiber technologies and the fact that our senior softball bats are hollow, adds a dimension to our game not seen during our early baseball, slow-pitch or fastpitch playing days.

Today's senior softball bats are more effective than traditional solid wooden bats because they are hollow and compress considerably upon contact, producing the “trampoline effect”. This phenomenon is found in all hollow baseball and softball bats as well as the modern golf driver.

The “trampoline effect” was observed years ago when the hollow metal bats were popular. The thin aluminum hollow shell compressed during the collision with the ball, springing back just like a trampoline does adding additional speed to the exiting ball.

Two definitions of senior bat “trampoline effect”:

- During the collision of the senior bat and ball, the ball experiences an incredibly large stored up force for an extremely

short period of time, causing the ball to instantly reverse direction at a speed that is far greater than that of a solid bat,

- During the collision with the hollow barrel the bat compresses and then expands instantly, seemingly to fling the ball forward. This singularity is unique to hollow metal and composite bats, giving rise to the term "trampoline effect".

I have not found any numeric values quantifying the "trampoline effect".

However, I conclude that it's a substantial amount from the difference in performance when hitting the softball with a solid wood bat, and then our senior bat.

Points:

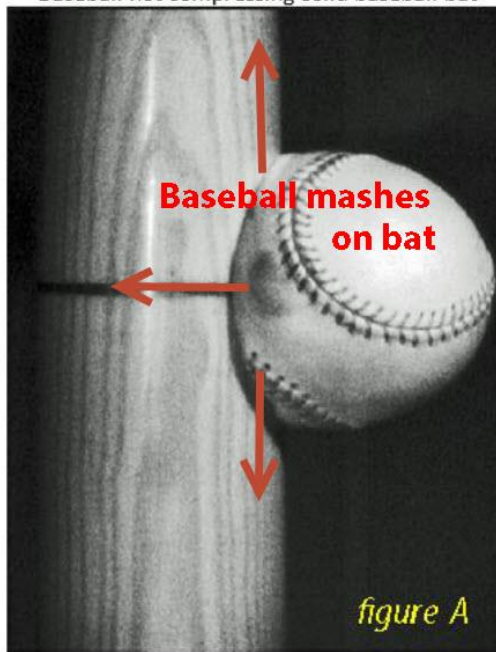
- Bat barrel trampoline is similar to tennis and racquetball racquets where strings store up ball energy and then release it back to the ball,
- Unlike hollow bats, solid wood bats have no "trampoline effect" (see figures A & B),
- Ball-exit-speeds for baseball are higher than for the game of softball due to the baseball's lighter weight and higher ball COR and compression rating,
- Softball exit-speeds, just like in baseball, depend on the player's bat-speed, mechanics and ball characteristics; but when using a hollow bat, we must add the bat trampoline performance to the equation,
- For each mile-per-hour of ball-exit-speed, hitting a 44/375 softball, the ball travels on average about 4 feet according to an internet source,
- Kinetic energy is the energy an object has because of its motion,
- Physicists measure the energy applied with a solid baseball bat to the ball with the Kinetic energy equation.
- This equation is described as being directly proportional to the mass of the bat times the square of its speed all divided by 2,
 - Equation for Kinetic Energy (solid bat): $K_e = \frac{1}{2} \times (\text{mass} \times \text{velocity}^2)$.
 - Unofficial revised equation using a hollow bat: $K_e = \frac{1}{2} \times ([\text{bat's weight}] \times [\text{bat's speed}]^2) + \text{Trampoline_factor!}$

My objective in this article is to convey that our senior bats do enhance our hitting performance. In no way am I trying to make a case against their usage, as I believe they are good for our game. However, we seniors should recognize that our 1.21-BPF SSUSA senior bats do augment our hitting skill.

Happy hitting,

Art Eversole

Baseball not compressing solid baseball bat



Softball compression of hollow softball bat barrel

