



# SOFTBALL ACADEMY

with Mitch Alexander

## *Composite Bats - Part 2*

Last month, we had a look at some of the basic attributes of fast-pitch composite bats. This month, we'll take a deeper dive into bat testing and certification, composite bat break in, and the trampoline effect.

In 2000, The Amateur Softball Association (ASA) Bat Performance Standard went into place. This was the first time in our sport that bat performance was acknowledged as a potential safety issue. The ASA commented on this, "Through advancements in technology, it is currently possible to manufacture very high performing bats. Under field conditions with a given softball, a hit with one of these bats can reach a pitcher so quickly that it decreases the player's ability to appropriately react." Prior to putting these standards in place, batted ball velocity could exceed 110mph for a given ball/bat combination.

Although some bats were manufactured with new ASA 2000 certification marks, the ASA banned certain bats from championship play in 2002 after testing found the bats to outperform the ASA standard. A new certification mark was released by the ASA in 2004. This mark is still the one acceptable for play in ASA sanctioned

games and tournaments. All ASA certified bats are based on batted ball speed (BBS). This measures how fast a ball comes off the bat. The ASA 2004 standard set a maximum speed of 98mph for how fast a batted ball can come off a bat. It should be noted that even though bats may have the ASA logo, they can still be illegal for use in games. The ASA tests bats and maintains a list of bats that are not allowed for use due to failure to meet the ASA standard when tested.

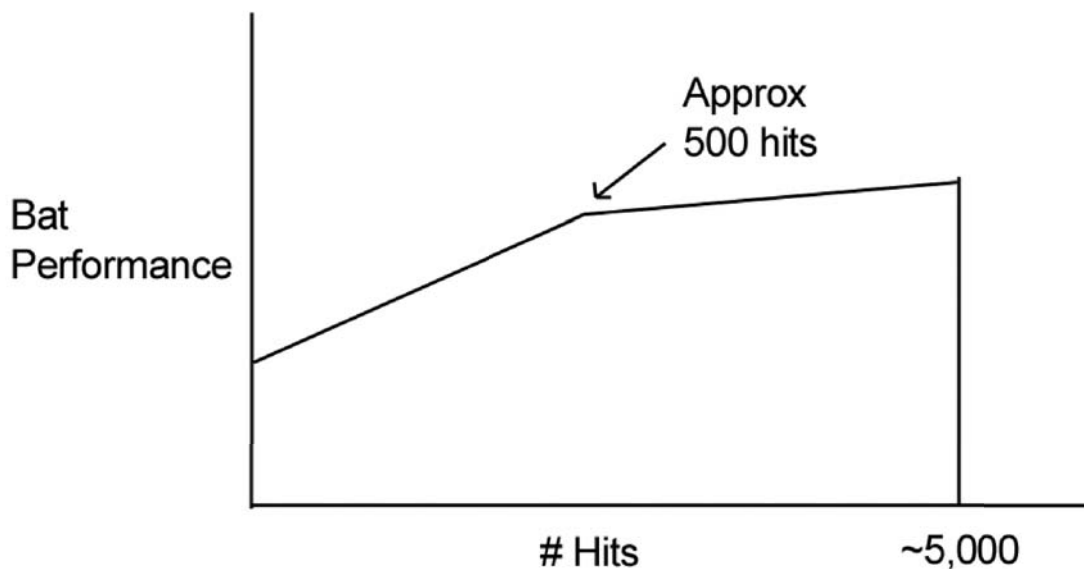
In 2011, Little League International, instituted their own ban on bats that were not ASA certified, and also included bats that the ASA found to not be in compliance with the Bat Performance Standard. Many local Little Leagues, instituted bat certification programs where a sticker was required (and in many organizations still is required) on all bats used in games.

Also in 2011, the USSSA recognized the need for certifying bats and limiting performance. "USSSA has been made aware in recent years that composite bats may become softer and therefore perform better with excessive use, abuse or when damaged. Even more concerning, players can accelerate this improvement by altering their bats." The USSSA uses a Bat Performance Factor (BPF) instead of a BBS. Where the ASA banned certain bats, the USSSA decided to use a grandfather clause to allow older non-certified bats to be used for a period of time. Beginning in 2011, a USSSA mark with 1.20 BPF was affixed to all certified bats. However, in 2013, a new finger print stamp was included on all new USSSA bats and in 2014 is now required for play in all USSSA sanctioned events.

While the 2011 USSSA mark and the new certification both have limits set at a BPF of 1.20, the new bats will develop “spiraling cracks” on the barrel or other visible damage if the BPF of 1.20 is exceeded. OK, but what does all this mean to fastpitch players and their families?

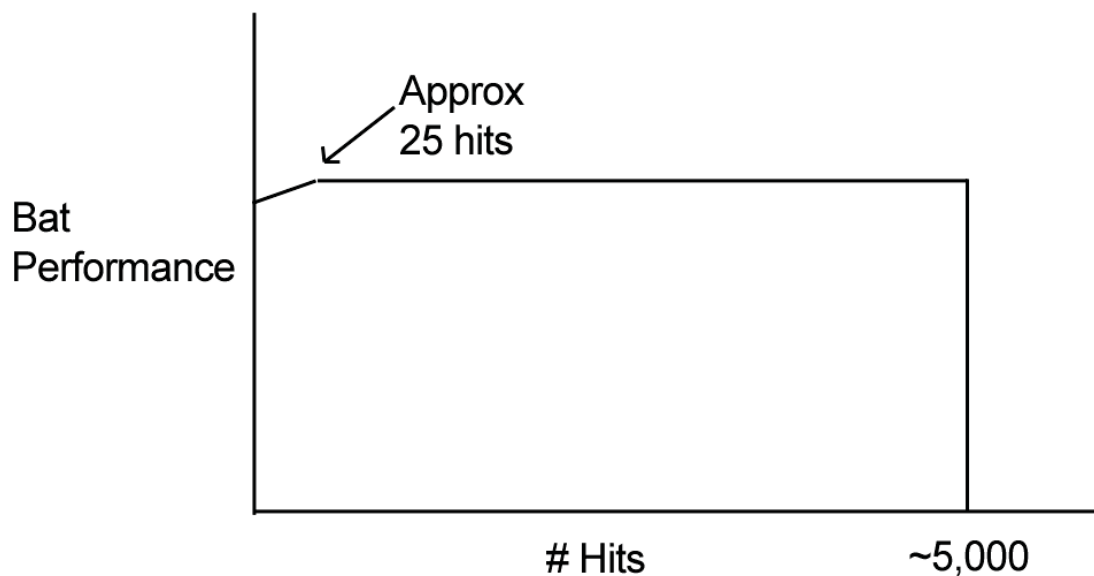
Recently, the ASA funded some batted ball studies. The results may surprise you! One of the studies included data from four games in the 2013 WCWS. The average Batted Ball Speed was 59.3mph and the maximum BBS was only 83.1mph. This data was based on an average pitched ball speed of 63mph. Balls that were hit with an average BBS of 59.3 mph were driven 122 feet. One study also found that single wall bats the ASA refers to as Non-linear bats, such as the Louisville Slugger Xeno require less force to result in the same wall deflection (the bat wall being flattened out, or loading the trampoline) compared to double wall bats. These bats however, top out at a maximum deflection of just under a quarter inch, while double wall bats can provide more deflection albeit with more force required to get that deflection.

New bats bought in the last year or two that are USSSA certified and have the new finger print stamp affixed to the taper are now supposed to be “hot out of the wrapper.” Where older composite bats required a lengthy break-in process, new bats only require a few swings prior to regular use. Figure 1 below shows a graph of older composite bat performance. The performance is somewhat low until the bat is adequately broken in. Often, this was thought to be approximately after 500 hits. The bat performance would keep climbing and would be hottest just before it failed, somewhere around 5,000 hits.



*Figure 1*

New bats are supposed to be ready to go at their maximum level of performance after a dozen or two hits. They aren't supposed to appreciably exceed the 1.20 BPF throughout their useful life. Figure 2 below shows a graph of what the new composite bat performance factor is supposed to be across its useful life.



*Figure 2*

Bat performance is related to break-in. When a composite bat is broken in, this refers to the carbon fibers being able to flex all around a bat at near maximum performance. The problem with the older bats is that they would continue to get hotter and hotter after break-in and eventually exceed the 1.20 BPF. New bats aren't supposed to do this.

I recently spoke with a customer service rep at DeMarini who acknowledged that the CF4 and CF5 were very hot bats and gave a great "pop." Apparently, in an attempt to limit bat performance and be compliant, the rep told me that players found that the CF6 did not give the same "pop" as the CF4/CF5. In my experience, the CF6 required an extended break-in period before it would give great performance. The rep also stated that the new 2014 CF7 bats were designed to give the same "pop" as the CF4/CF5. I have seen a 2014 DeMarini CF7 act closely to Figure 2, but the break-in seems to be approximately 100-150 hits instead of one or two dozen. I have also worked with a Mizuno Whiteout bat that follows Figure 2 very closely – hot out of the wrapper, and little improvement past a dozen or two swings.

All bats are not created equally. Each manufacturer has their own secret recipe for their composite material and use different manufacturing methods. A lot of research and development goes into the design of these bats. The bat must provide great performance but cannot exceed a BPF of 1.20. These are not easy simultaneous design goals to meet. Single wall non-linear bats may provide better hits with less force required, but top out no matter how much force is applied. Double wall bats typically have larger sweet spots and provide linear performance depending on how much force is



applied to the bat, but require more force to obtain the same wall deflection. Which one should you use? It depends on many factors, including: your bat speed, your strength, and finally your hitting mechanics.

*Mitch Alexander is the CIO for a major electronics company and coaches both Little League and Travel softball teams and is currently completing his PhD. He is a certified SUNY, ASA, and Double Goal Coach. His wife, Marie was one of the first female student athletes in the country to play Little League softball after Title IX was passed and played in the first Little League Softball World Series. Over the years, both have managed teams together and helped spark a love for softball in their student athletes. In his spare time, Mitch designs websites for fastpitch teams and businesses and can be reached at [fastpitch2001@optonline.net](mailto:fastpitch2001@optonline.net).*



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