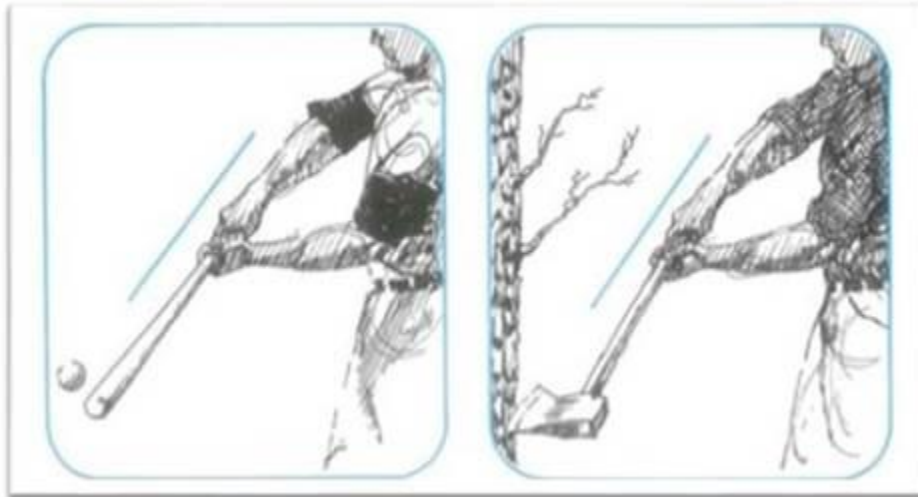


This is the first in a series of articles focusing on an often-overlooked part of baseball: the equipment. Periodically, Baseball Prospectus will interview people around the game to gather insight into what equipment the pros use and why they use it.

The first entry in this series focuses on a fascinating alternative to traditional bat manufacturers: [Baden Sports' Axe Bat](#). The Axe Bat has been used by some in the majors since [Jimmy Rollins](#) opened the 2013 season with an Axe. Since then it's been [much discussed](#), experimented with, and even [imitated](#). Below is an interview with the Baden Sports' team, providing a deep look into Axe Bat's infiltration of the major leagues.

**Baseball Prospectus:** How did the Axe Bat come to life?

**Hugh Tompkins, Baden Sports' Director of Research and Development:** The idea was invented by Bruce Leinert, a baseball coach, who would visualize hitting a baseball as kind of a way to mentally pass the time while cutting down trees on his land. Years ago, [Ted Williams](#) wrote about training in the offseason with an axe and it just kind of clicked for Bruce. He handmade some samples in his basement and brought it to Baden for development, to turn it into a product.



**BP:** What was the initial approach to the Axe Bat?

**Tompkins:** I have a design background, so I approached it by thinking, we have an existing product that's been made the same way for a very long time, that nobody has bothered to ask "why are we making it that way? Is the reason it was made like this in the first place still a valid reason, and if not, then is there a better way?"

As far as bats go, no, there's no good reason why it's still round.

**BP:** Why *are* bat handles round?

**Tompkins:** A hundred and fifty years ago, the only piece of equipment they had that could mass-produce a bat with a round barrel was a lathe. If you make a round barrel on a lathe you've got to have a round handle. So it's really just the limitations of the equipment they had 150 years ago.

**Michael Schindler (Baden Sports' CEO):** If baseball was invented today, the bat would probably look like ours, not a round one.

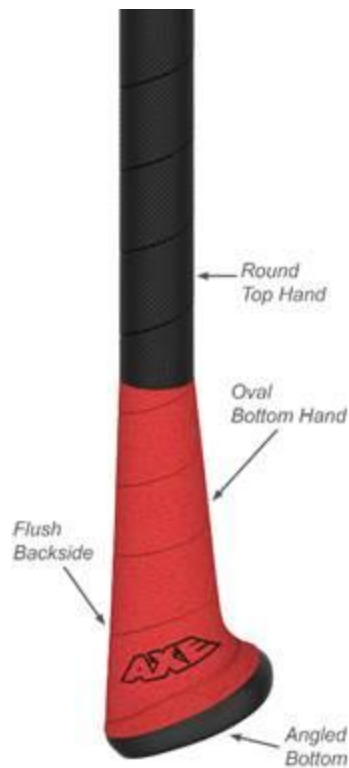
**Tompkins:** Axes have been around thousands of years and have evolved out of necessity, so their design is pretty refined and they are a very utilitarian tool. We approached it not as, we're going to make an axe handle on a bat, we're going to make a knob that is designed for the bat swing. But we're going to look at why an axe handle is designed the way it is, and see if there's anything we can borrow from that and expand out to an axe. So that's where we went.

**BP:** What did that process look like?

**Tompkins:** We looked at all sorts of studies, and data, and products for inspiration. We looked at the kookiest one—and I like to bring it up because it's odd—an old study from the '60s where they had taken different-shaped handles for the meatpacking industry, and they had taken cadaver arms and put different shaped handles into the hands of cadavers, pulled on the tendons in the forearms, and measured the grip force versus the tension in those forearm tendons to figure out which shapes generated the greatest amount of grip force with the least amount of muscle tension. We looked at a ton of things like that.

**BP:** The finished product, is there only one axe handle shape?

**Tompkins:** The simple answer is yes. We have one knob size and shape for baseball and softball, with the caveat being that we do have a slightly smaller one on our tee-ball bat, and our slow-pitch bat because that's the one sport where players get into these unorthodox weird grips, and we wanted to design a knob that worked a little bit better for all those unorthodox grip styles. From youth to the MLB bat, it's the same handle design and same size and dimensions.



**BP:** What if [Dustin Pedroia](#) [Axe Bat's biggest pro advocate] calls up and says "Hey guys, I really like the bat but I want the knob to be smaller or bigger"? Do you customize bats for players with specific requests? What is the level of customization for guys of different hand sizes, like Dustin Pedroia, who—no offense—probably has smaller hands than a [Hanley Ramirez](#), or another taller, bigger guy.

**Tompkins:** I'm going to tell Dustin you said that, that was just uncalled for.



(June 22, 2015 – Source: Getty Images North America)

**BP:** So, no?

**Tompkins:** It's a great question and it's something we hadn't really thought that much about until this season, when we started getting a bunch of requests for that very thing. We had to figure out what our philosophy and approach was going to be there.

We spent a year refining this shape, so we know that this shape has all of the biomechanical benefits that we want, and you can't just start monkeying around with it. Each curve, each diameter, and each radius is contrived. I didn't want to have to have 50 different knob styles for the 50 different players swinging the bat, but there is some legitimacy to say that different style hitters might benefit from a slightly different execution of the knob.

We decided that we might be open to a few small tweaks, on pro bats only, based on specific requests or characteristics for specific players.

**BP:** What types of small tweaks are you considering?

**Tompkins:** Some guys want basically no hook whatsoever. So we still have our off-center, tapered oval, but instead of having the shelf that that pinky gets to rest on, they didn't want any

shelf. Guys that want to be more bottom hand than top hand tend to want more of a drop off on the back side, so we call that the ball-joint design. All of these still keep the salient design points that make the Axe work but they are sort of little comfort preference variances for these pros.

I still do think that for lack of a better term, our "standard" knob is probably the best embodiment. Dustin is the guy that I've gotten to have the most back-and-forth with as far as different designs. We've shown him a few of these variations as we've developed them per other player requests, and he tries them out, and always likes the original.

**BP:** What sort of range do you offer as far as turning models, like barrel, cup and taper? How custom can you make the rest of the bat to the players' likings?

**Tompkins:** Anything like that can be 100 percent custom. The axe knob only constitutes the bottom six inches of the bat, and we can put that knob on absolutely any style, material, barrel profile, cup, top hand, handle, and diameter. There are no limitations there.

**BP:** So are you able to reproduce a player's current model from another manufacturer with an axe handle?

**Tompkins:** Absolutely. We work with Victus to manufacture our pro model wood bats, and they've got a lot of barrel profiles on file, but if we don't have one, we grab one of the player's round-handle gamers and it comes here to my lab and we scan the barrel profile and then on the computer we Frankenstein on the axe-knob to that barrel profile.

**BP:** Tell us about how you source the wood for your bats.

**Tompkins:** Wood sourcing is driven mostly by demand. We originally made a lot of ash bats because our wood bat manufacturing partner at the time had a lot of demand for ash. Eventually we changed to a new partner, [Victus](#), who weren't big ash fans. They actually carried a lot of birch and maple. So basically right now most of the wood bats we produce are maple because that's what players are demanding, and Victus is of the belief that maple is a better alternative, but I think that ash is still in our catalog technically. Our sales department has basically been of the opinion that if we get demand for it, we know that Victus can source ash, and cutting an ash bat is the same as cutting a maple bat.

**BP:** Does Victus handle all of the wood sourcing for Axe Bat?

**Tompkins:** A hundred percent, and they've been a great partner with that. It's not something that we wanted to have to reinvent the wheel on, so it's been really nice for us to focus on our composite and our maple and not have to go and learn how to grade a billet from the mill. Victus handles all that sourcing, grading, and all of that. They had a successful product before we came along, so we are confident in their abilities. They take care of the wood, and we work with them on designs specs.

**BP:** How do you line up the handle with the wood grain [\[1\]](#)?

**Tompkins:** As far as the production side, it is something because we have one-sided hitting. You are always going to hit the bat in the same spot because the handle is asymmetric. That's something built into our wood bat production process, where the billet is aligned before it goes into the mill, so that we are certain that we are cutting that knob in the correct direction with the grain alignment.

**BP:** So are players who over or under-rotate during their swing out of luck?

**Tompkins:** Not at all. Everybody can be a little over or a little under, but when you go [label up](#), zero percent of people hit directly 90 degrees from the label. That just doesn't exist. Even with a round-handle bat when you go label up, who knows where the ball is hitting, so one of the things that we can do is put impact labels on the barrel, go through a hitting session with our pros, and measure where they actually strike on the barrel with the ball. Then for their bats only, we can bias the grain alignment to meet that.

I did this with Dustin Pedroia about a month back in Boston, so that I could start cutting his bats custom like that, and he was a shocking 72 degrees off of perpendicular, so if you think about that, that is nowhere close. He is a lot closer to edge grain than he is face grain with where he actually hits the bat. We can actually keep label on edge grain, which is the MLB rule, but there is no MLB rule about asymmetric handles, so we just go ahead and put the label there, and then we bias the handle so that we can compensate for the 72 degrees, and now all Dustin has to do is pick up the bat, hold it naturally, and swing away, knowing that he is going to be hitting that ball directly in the center of the face grain.

**BP:** So we've talked a lot about the development of the Axe Bat, some of the hurdles you've faced, and how the product is becoming a real solution for MLB players. How is the product being adopted in the major leagues [\[ii\]](#)?

**Greg Barton [Baden Sports' Director of Promotions]:** Dustin Pedroia's success was the lightning rod for attracting additional MLB players to the Axe Bat – we had nearly a dozen players swing it in games after he started using it – and that added credibility to our entire bat lineup. Right now, we are working on extending our relationship with Pedroia, as well as with other MLB players who have expressed interest, and MLB clubs. On the amateur side, we have expanded our NCAA program this year and have several new schools on board to swing the bat in 2016. We're also continuing our support of baseball and softball governing bodies across the country. Most important, our full Axe Bat line is evolving and improving.



(Aug. 1, 2015 – Source: Maddie Meyer/Getty Images North America)

**Tompkins:** I think it's worth mentioning that all of these players are using Pedroia's bat profile. These guys are swinging bats that aren't even theirs.

**BP:** So all these guys are using Pedroia's bat?

**Tompkins:** Yeah, it really stuck out to us, once we started traveling around and talking to these guys, that we had guys going up to the plate using a bat that is an inch and a half shorter and lighter than their normal model, which is kind of crazy to think about someone going to a major-league plate appearance with a bat that is that different, because they want to use that knob. So we have a lot of these guys that had just used it, like a smattering here and there, are all guys who are requesting their models for the offseason to try and get into.

**BP:** That's fascinating! What's been the reaction to the Axe Bat from players and coaches in MLB clubhouses?

**Barton:** It's been positive. Every player, coach and club official we've talked with understands the benefits of an ergonomically designed, axe-shaped handle. That said, pro players have swung round-knob bats their entire lives and have been incredibly successful hitting a baseball. Some players will likely never change from their current bat models. But we believe, over time, most will.

**BP:** How about adoption in other major leagues like the Nippon Professional Baseball?

**Tompkins:** We officially introduced the Axe in Japan in July of 2014. I was lucky enough to go over for that unveiling and big press event, where the company that we partnered with, the Japanese bat company, [Mitsuwa Tiger](#), unveiled the Axe. I would say that it had faster success than in the US. Granted, they got to go with a finished, very refined product and just bum-rush the market with it, where here we went through some growing pains as a new bat company in addition to trying to convince everybody that we had a better knob. It has done very well there, and I think that the Japanese in general are a little bit more open to new technology, specifically around baseball, and so I think that has helped its rapid adoption.

**BP:** So should we expect to see more players swinging Axe Bats next season?

**Barton:** That's more of a capacity question than a matter of player preference. We are working with Victus Sports to expand our capacity to meet MLB players' needs. Dozens of new players are experimenting with the bat this offseason. It's tough to put a number on how many will use it in games next season, but we expect continued acceptance and growth in the years ahead.





(Oct. 11, 2015 – Source: David Banks/Getty Images North America)

**BP:** Is there a specific thing attracting MLB players to the Axe Bat? Is it injury prevention? Performance?

**Barton:** It's almost easier to answer this question from the other direction. What are the benefits of a standard, round knob for hitting a baseball? The answer is none. The Axe Bat offers players a bat uniquely designed for hitting a baseball, one based on the latest advancements in science and technology. This means players can reduce their risk of common hand and nerve injuries, reduce hand fatigue and improve their performance by simply choosing the Axe Bat. We believe every player, pro or amateur, can benefit from the design because it's safer and performs better.



(The knob on the left, the traditional Axe Bat handle, is used by Dustin Pedroia on his gamer. The knob to the right is a modification for Marlins' outfielder [Giancarlo Stanton](#). Stanton's hamate bone injury could have been caused by the knob of his bat [digging into his palm](#) during swings.)

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When you first hold an Axe Bat in your hand, it feels foreign. There's a moment of cognitive dissonance; the traditional barrel stretching out from a strangely shaped knob that doesn't seem to fit right in your hand. You expect, no, want it to be round. You want it to feel like bats always do, but it doesn't. For someone who has swung a baseball bat thousands of times, the Axe Bat certainly takes some getting used to.

Patient hitters might just reap some rewards, however. After a while each swing comes easier than the one before it. It starts to feel right and you start to wonder why you ever swung bats with traditional handles. Does it hurt your hand less than a traditional swing? Maybe. Does it help you generate more swing speed? Possibly. It's hard to say if the performance lives up to Baden's lofty expectations, because it's unclear what part of the performance is real, and what is some sort of placebo effect.

The Baden Sports team believes that the more time you spend with the Axe Bat, the easier it is for you to reap the rewards of swinging one. This too, seems plausible. It's why I'll be swinging an Axe Bat, in addition to my traditional-handled bats, this spring; and why many major leaguers have been testing the bat out over the offseason. Keep your eyes peeled, because Axe Bats are spreading throughout major-league baseball, one curious player at a time.

*Special thanks to [Stephen Reichert](#) for assisting in the interview of the Baden Sports team, and Bryan Holcomb for assistance in painstakingly transcribing the interview.*

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[i] The wood grain indicates the direction the wood fibers run along the barrel of the bat. Aligning the wood grain properly reduces the chances of breaking your bat. More details about the physics of breaking bats are available [here](#).

[ii] A full list of MLB players swinging the Axe Bat in regular/post-season games in 2015 (first use): Dustin Pedroia (May 25), Hanley Ramirez (June 18), [Mike Napoli](#) (June 26), [Cameron Maybin](#) (Aug. 1), [Darin Ruf](#) (Aug. 1), Giancarlo Stanton (Sept. 1 – MiLB Rehab), [Collin Cowgill](#) (Sept. 2), [Brock Holt](#) (Sept. 16), [Allen Craig](#) (Sept. 16), [Mookie Betts](#) (Sept. 18), [Blake Swihart](#) (Sept. 22), [Yadier Molina](#)\* (Oct. 9 – NLDS).

\*Yadier Molina had been sidelined with torn ligaments in his left thumb. One of the Axe Bat's primary benefits is that it puts less stress on the ligaments in a hitters' hand.