

## **LINKS Interview with Master Putter Maker Clay Long**

**LINKS:** Hello, Clay. I know that you've always been a keen golfer going back to your teen years, and played for your college team at Ole Miss. Do you still play quite a bit of golf?

**Clay Long:** Yeah. I've been playing quite a bit. I've always played at least once a week. And I used to play a little bit of competitive golf, but not so much anymore. But I've always worked, so I've never been where I just played golf. I was a college player, and a decent college player, and my handicap is like plus-2. I'm 68 and I shot my age two weeks ago. So, I can still play a little bit.

**LINKS:** Well, I guess so. That's pretty impressive.

**CL:** But, you know, I loved golf, and to play golf, and to compete in golf, long before I got into the business. But I was very lucky to get into the business in the area that I did because I've got a degree in mechanical engineering. So that, and loving to play golf, and then getting into the side of the business where you can take off and mess around and design stuff was perfect for all my interests.

**LINKS:** Had you been involved in making clubs or re-gripping or changing heads or anything like that before you got into the design business? Have you always been a club tinkerer?

**CL:** Oh yes. I learned how to take them apart when I was in high school. The pro at our club used to repair stuff and he taught me how to mess with clubs and regrip them and stuff like that. And even when I had my first job, which was not in the golf field, I had a spare bedroom and I had persimmon wood heads and inserts and things like that I bought from Golfsmith that I used to tinker with. So, I was doing that long before I actually went to work at a golf club factory, which is what MacGregor was when I worked there. It was a manufacturing facility where we made everything. And I really got to learn how to make them from scratch. And then that led me over into R&D, where I learned how to design them from people that already knew how to do that. So, a good fit for me. You know, I went to work in manufacturing engineering in the beginning, and that was the processing of the clubs. And then, because I could play a little bit, I ended up getting an offer to go over and work in design. So, that worked out perfect for me. I enjoyed it from day one and you still enjoy it.

**LINKS:** So how did that first gig come about with working at MacGregor on the manufacturing side?

**CL:** Well, you know, it's an interesting story. I was working for International Paper company at a paper mill in Natchez, Miss. on the Mississippi River. That was my first job out there. And I'd been down there about five years, and I was going to go play the mini-tour... I practiced every afternoon after work and played as much competitive golf as you can play with ten days of vacation a year. And I got a call one day from a headhunter, and this guy was in the pulp and paper industry, and he started telling me about some job he had at another paper mill. And I said, "Listen, if you don't have a job designing airplanes or golf clubs, you're just wasting your time talking to me because this is my last paper mill job." I mean, I liked it and I learned a lot, but that was not going to be what I did the rest of my life.

About six weeks later, he called me and said, "Listen, I'm sitting here looking at an advertisement, you know, in the *Atlanta Constitution* for a manufacturing engineer at MacGregor golf company in Albany, Ga. Would you be interested in taking a look at that?" I'd had some offers for jobs up in Massachusetts at Acushnet and Spalding. But I didn't want to live that far north because I couldn't play golf all year. And I said, you know, "I think I can live in Georgia."

So, anyway, one thing led to another, I went over there and interviewed at the job, and almost turned it down because I really just wanted to go play golf. But I decided, I'll go over there and work a year and learn how to make clubs, and then I'll go play golf. You know, that'd be great. That'd be my little break.

So anyway, I took the job and long story short, my golf never really gelled. When I got to Georgia, I worked hard at it, but I just wasn't going to be a pro. You know, I was a good amateur, but I wasn't even a really good amateur in Georgia. And I loved the work.

I was like a kid in a candy store, you know, working in a golf club factory. And it doesn't smell like a paper mill and we have all these holidays, and I couldn't get enough of it. You know, I'd stay out there after hours and have the guys on the production floor teach me how to grind irons and things like that. I liked to know how to do all that stuff. And so I got into it. And then, when the R&D manager left, the VP offered me the job of director of R&D there in the plant because we were all in one place at that time. And, of course, I was just thrilled to get that job. Never had managed people or anything, but I loved the equipment.

And that's where I got connected up with Jack. Not too long after that, he bought the company. Since I was head of R&D, I had to interface with him about everything that we were making because he was big on turning the

quality around the plant. And I got to know him really well. We got along really good. And, of course, I had to interface with Jack on all the new products and stuff we were building for him and all that.

And that worked out good. I think he liked the fact that I could play. We could both relate to hitting a golf ball and could talk about how the club reacted and all that. Of course, I couldn't remotely relate to how he played golf, but I could relate to playing golf. And I think that helped us interface really well and get along and understand what each one of us was talking about.

So anyway, that turned into about a 12-year career there. And then I went from there, I started my own consulting business (Plus-2) and got hooked up with the Arnold Palmer company, and worked for Arnold Palmer for five years as their kind of chief designer. And then I got offered the head R&D job at Cobra in '97... Titleist had just bought them.

So we moved out here to California and I did that for three years, and that didn't pan out to be what we thought it was going to be. So I left and started Plus-2 again, and immediately picked Nicklaus up in his company. And did that for another 10 years. So Jack and I had two long stints of working together.

And then I went in with TaylorMade in 2014 for three years and did wedges and putters there. And now I'm tinkering once again on my own. So that's kind of where I am now. But getting into the business was luck. Really. I wasn't even looking for a job at the time.

**LINKS:** How much difference does it make—how much does it help—for a designer to also a good player? Do you think it's possible for a club designer to design good equipment without being a good player?

**CL:** Oh, I think you can. It certainly helps to be a good player. In the early days of my career, the look and shape of the club was everything. I mean, that was the design. You know, it wasn't as high-tech as it is today. To be a club designer, you had to know how to make a driver look just a certain way on the ground, and the same way with an iron. And being a good player, having looked down at clubs for many hours, you know, hitting balls, that was a big asset to know what you were looking at. And, today, that's important, but it's not as important as it was in the early days, because although the shape is important, I really don't think it's quite as important as it used to be. And part of that reason is there are a lot of people designing clubs now that aren't players. They're doing it on the computer and never made a master model by hand and never had an old club maker show them how it's supposed to look.

**LINKS:** Well you know better than anyone the attention that your Response putter design got. It wasn't a crazy looking shape. It was just large, right? And nobody had seen anything like that. Compare that with today where you've got, some very unusual shaped putters that are designed for high MOI, and if it works and it doesn't twist and hits the ball straighter, people seem willing to put up with almost anything from an appearance standpoint.

Looking at things today, are there any limits to a putter's appearance—or are we in a world where anything goes if it works?

**CL:** I think definitely, if it works, anything goes for sure. We have a real heavy influence these days from industrial design. A lot of the companies have industrial design departments where they have a group of basically artists that are creating these renderings of ideas. And very few of those people are putter designers. They're just designers, you know, they're industrial designers. And you see that influence in the shapes of some of these new putters.

Now, usually, there's a putter designer in there somewhere to direct the designs of these guys toward some of the features that need to be there in terms of looking good on the ground behind the ball and all that kind of stuff... In industrial design, you have a group of industrial designers drawing pictures and renderings of ideas, kind of like the way they do cars. And so, you have this big influx of ideas and shapes and new looks that people are incorporating into the clubs and it's been good. And then, somewhere in that mix, there's a club maker in there that tries to keep a lid on it so it doesn't get crazy.

But in the early days, it was just the club designers designing the clubs. Like in the early days at MacGregor, we designed the golf club head, the metal part of the head, and we did the size, the shape, the look and the head on the ground, you know, the sole—all that. And we would do the back design, and then the industrial designers would put the artwork on the back design. We did the back design so that the club balanced properly and all that kind of stuff. And they designed the art—in those days it was just engraving—to fit the back design that the club makers had done. And it's a little different these days in that a lot of times the industrial designers will draw a picture of the back of the club and put all their design artwork and badges and all that in there. And then the club designers and the R&D guys will do the rest of the golf club.

So, of course, there's a little battle there sometimes between the R&D's requirements to functionality and industrial designer's requirement for a certain look that he's trying to get. So they discuss things like, "We need more metal over here." Or, "Sorry—you can't put a hole there. It'll mess up the center of gravity. So you're going to have to like, change that a little bit." So that's the

kind of give-and-take that's going on now. But it's a good process and you get a lot of interesting stuff doing that.

**LINKS:** Going back to Response putter that you designed and that Jack Nicklaus used when he won the '86 Masters. I'm curious about what led to its development. Was it at search for more MOI? Was it just a fleeting thought? What led you to that idea of *bigger*?

**CL:** Well, when you're doing product development, and in my case, as a player and an engineer, I'm always trying to think about the functionality of the product to see if I can make it work better. First you have to understand how it works, what makes it work, and then you start the process of problem-solving, and trying to figure out, well, this is how it works now, could I make it work better? And what would I do to it to make it work better? And so that was kind of how we were looking at putters at that time.

And so, I had done some tinkering around with a laser measuring different players' ability to align the putter on target. I always considered myself not a great putter, and I was always curious as to these guys who were professionals and putted so great, what was it about them that made them such good putters? And I didn't know what it was. And so I decided, well, let me just see if maybe they inherently have the ability to aim the putter better than other people or, maybe their eyes are better.

Anyway, I was collecting data when I had a chance. And it turned out that some of them lined the putter up really good, and some of them were off. And so we said, let's see if we can build a putter with a corrective face on it—a face that was cut open or closed, but you couldn't see it when you set up over it. It would just look like a normal putter when you set up over it, but put the face would be cut open and closed. And then, depending on how you aim, you would check yourself before you bought a putter. You would buy the putter that helped correct your aim. And we said, "Well, we got to test this. Right? We got to see if this works."

So, to do this, we were going to build a putter where the top line overhung the face so you couldn't see the actual face, then we'd cut the angle underneath the top line overhang. So in order to do that, we had to make sure the overhang didn't hit the ball. So a standard-depth putter wouldn't work, obviously. We sat down and measured all this stuff and decided, well, we had to make the putter about 32% deeper, taller, than a regular putter. And if it was that deep, then there was no way the overhang could hit the ball when you putted. So we said, "Okay, we'll make it real deep. And that'll be our test club."

And so, we were in the process of making some extra models for some standard putters at that time, and we'd just finished working on the Smoothie putter line, and we had used the CNC machine to cut out the profiles of the model. This was early CNC stuff. We were actually writing all the code by hand, writing it all down on a little piece of paper, and typing all the coding on the teletype, not on the computer. So we had the profiles for the standard-size putters, and in CNC programming, you can add one line to the code and scale on it. And we said, "Well, shoot, that'd be a quick and easy way to make some prototypes. We'll just add one line to the code we've already got, scale the putter up 32%, and cut them out of aluminum," which we were making them out of aluminum anyway, and then we'll have a deep face. Of course, it made a huge putter too, but the face was the part we were after.

So, we made half a dozen prototypes, cut some open, some closed, and tested it. Went out and tested it on the guy at the club there with a laser. And it worked great. You know, it worked right. The people were consistently one way or the other. You lined it up open, you lined it open almost every time. So that was right. So we could correct the putter and then now the face was more on line and all this stuff.

So we had all this data, everything looked good. So we sent one of them into the USGA for approval. And they came back in a week or two and said, "It's not conforming. The face has to be flat. You can't have an overhang over it. The face has to be flat. You can cut it open and closed, but it has to be flat." The problem was, if you could see that it was open or closed, that would defeat the purpose of what we were doing.

So here we are, we got these giant aluminum putters with this overhang on the face and they're not conforming. So we were just kind of dead in the water. We'd just wasted our time.

So, we cut the overhangs off to make square face putters. And we were sitting around talking about, well, you know, Slotline at the time was selling a putter called the Inertia putter, and they were doing really well with it. And they had this clever advertising where they had six or seven pictures of standard putters and a picture of their putter at the bottom, and they had like, 1.35 times better, 1.2 times better, 1.5, you know, whatever the inertia would be. They said, "Our putter is this much better than all these putters." And they were doing quite well.

So we were sitting around talking about it going, "Well, you know, this putter, we got has a lot more inertia than an Inertia putter because it's way bigger. And maybe we could just sell it on the inertia play..." And we have a sales meeting

in July of '85, and we had it in Albany, which was unusual. Business wasn't very good. And Jack came to the sales meeting. We were introduced on the 25th-anniversary set of woods and irons, and there was going to be a big sales contest. And he came to Albany to the sales meeting to talk to the sales force.

And that was over at our facility, not at the plant. And so, while he was there, we had programmed a robot to sand classic wood heads. And we decided we would take him over to the plant and show him the robot because it was pretty cool. And so, myself, and I don't know, there were three or four of us, we drove over to the plant, went in the plant, showed him the robot, and in the process, we walked back through my office back in the middle of the plant in the R&D offices.

And when we walked by my office door, I had about four of them [Response putters] propped up against the door. And as we walked by, I reached down and I grabbed one and I said, "Hey, look at this." And he took it from me and he looked at it and he looked at me and he said, "Is this a joke?" I said, "Well, no, not really." I dropped a couple of balls and he hit a couple of putts down the carpet. And he turned around to me and he says, well, "Send me a couple of those and I'll try them." And I said, okay. And that was it.

So, we made a couple of them that were silver at that time. I sent a couple down to Palm Beach, and about two weeks later, he called me on the phone and he said, "You know that putter you sent down here? It's not too bad. Really. It's not too bad, it's a pretty decent putter." And I said, "Well, great." I said, "Do you think we can make a product out of it?" And he said, "Yeah, I think maybe you could..."

We were selling no putters. We'd sold like 1200 putters the whole year before or so. So George Nichols, the company president, being a little bit of a gambler, he said, "Okay, I'll tell you what?" He says, "Make four models and we'll introduce them in January at the PGA Show." So this is July, there's not much time to have a product ready for January.

So, anyway, we made four master models, four blade-type models of it, and got it tooled up—it was a casting. And we took it to the PGA Show, and we gave away 300 of them there. And everybody in the show was walking around with these giant silver putters.

The sales forecast was 6,000 putters for the year. That was about five times more putters than we'd sold the year before. So that was a sales forecast. And we sold 5,000 at the PGA show. Now, that was back in the day when you actually sold product at the show. It wasn't all pre-booked like it is now. And

we were really excited about the fact that we almost sold the forecast at the PGA Show.

January comes, and Jack goes out [on Tour] and he calls up and says, “Paint me some black.” So we painted him some black and sent them down there and he started using it in the first of the year. And he was playing them, just playing terrible, but he was using the black and the big putter. And, we converted everything to black.

Anyway, he was playing terrible, all the way up to the spring. And up until about the Masters time, we’d sold about 20,000. I mean, it was a big, big success for us. I mean, really a big success. Doing that much more than the forecast. But we figured any day now, he’s going to put it up and get that George Low [putter] back out. Because he missed cuts, playing terrible. And we were just like, “Oh my God, you know, this product is just going to bust as soon as he switches back.”

And then the Masters comes. And he wins the Masters with it. And we thought we had already sold a lot of putters. But it just went through the roof. I think we shipped about 150,000 from March to the end of the year. And that was all we could make. We double and triple-tooled it. Because we were actually making them in the plant in Albany. We were finishing them and everything in the plant there in Albany. And so, this wasn’t like you just call the vendor in China and say, “Make me 10,000 more.” That’s the way it was in those days.

So, we just sold a billion of them. We sold, I don’t know, I think by the end of the next year we’d sold about 350,000 of them... Nobody at the company had ever experienced anything like that from a product standpoint. It was crazy. It was fun. It was *wild*. The plant down at Albany, it’s abandoned now, was a 250,000-square-foot building, half of it was irons, half of it was woods—we were making wood woods there at the time. And at any given time, there were about 6,000 sets of irons moving down through the iron part of the assembly, grinding and polishing.

And I’d say, about six weeks after the Masters, all you could see in the iron department were racks of putters. It was full of putters. It was truly incredible.

**LINKS:** At the time, do you think that that club was the highest MOI putter?

**CL:** Oh, it was at that time. Yeah. It was pretty light. It was probably about 320 grams at the time... We followed it with an LC model, which was a stainless oversize model, which Jack played with for quite a while also, but we only made two models of it. You know, we didn’t make a whole line of it. And we



didn't go out on a tour and try to get a bunch of people to use it. We were not too smart about, you know, the marketing and promotional aspects of the Tour at the time...

A few people did use it and a number of people kind of tried... Raymond Floyd tried it for a little while... But we didn't have much of a presence out on Tour the way people do today. We had a Tour rep, but he didn't go out every week, and it was just one guy. And we didn't have a huge Tour staff at the time. We had Jack and three or four guys.

Knowing what I know about that now and looking back on it, we should have had a dedicated putter rep, and two or three people back at the plant dedicated to just putting together putters for the tour—whatever customizations, whatever the guy wanted. "Make one like this, make one like that." And that's how you get those things in play. There were a few people that used it, but it didn't really sweep through the Tour like something else.

People don't realize this, but Jack used an oversize putter for over 10 years. So that oughta tell you right there that there was no deficiencies in it. Because I promise you, he wasn't going to use anything if it didn't work for him. And it didn't matter whose brand it was.

But, you know, it didn't go like drivers. Drivers got big and everybody uses a big driver. And I've always felt like, really, putters should be the same way. Because the same physics apply both ways.

**LINKS:** As you look back over the history of putter designs, what are the paradigm shifts along the way that to you represent the big breakthroughs?

**CL:** Well, certainly, Karsten [Solheim]'s cavity back putter was a big milestone in design and look. And in 1966, that was really good looking putter, with a plumber's neck. And it was like every bit as odd as a Spider putter looks today. And the premise of that putter, interestingly enough, was inertia. Well, that was the reason it looked the way it did because he'd pushed the weight down to the ends and the putter was more forgiving. And I can't remember all these numbers. I did a piece as a presentation piece when we were doing the OS line at TaylorMade, which never really got launched very well, but I looked at how much higher the inertia of a Ping Anser was compared to, say, a George Low 8802 type putter... And it seemed like it was maybe, I can't remember, like maybe 15%, 20% more inertia. It wasn't very much.

And then I looked at what this OS line that we were working on over there. We made a stainless hollow putter. It seems like we were able to make it like 40% higher than a current-day Anser.

And the idea was, if this Anser putter was a paradigm shift in putter design, which it was, then, if I doubled what it did in this new design, why shouldn't this be another paradigm shift? That was kind of just the technical premise of why an oversized putter should be a viable product in today's market. There's no question that the Anser putter was a paradigm shift in design. And so, if you look at the physics of it, it was this much better... and putters today are way better in that category than it was over its competition in the day.

But it still remains a little bit of a tough sell to put an oversized putter, a scaled-up putter in front of a pro. I guess we haven't quite figured out the aesthetics of it yet, but we're making progress.

**LINKS:** That brings up another question, which relates to feel. So, if you can increase the inertia, that's going to help keep it on path better, on target better. And then you've got the aspects of appearance—do I like the appearance? Do I feel comfortable with it? Does the weighting feel right in my hands? But then on top of all that, you've got feel. I'm curious about how as a club designer you try to factor in feel. Where does feel come from? How does it play into the equation?

**CL:** Well, we have a lot of choices these days. We know a lot more about all this than we did 35 years ago. I mean, you can have plastic inserts now—like, a white Odyssey with a really soft feel and click. You can use a milled putter with a flat face without much of a tool mark on it. And that gives you a nice click. You can make the face rough. You can put up a deep tool mark in it or rough up the face, and that that'll dig into the cover and make a softer click. And there are all kind of things like that. And then, of course, an aluminum putter feels differently than a stainless putter. Mallets, sometimes mallets can have a different feel, a different click to it than a blade. And then, there are multi-piece putters, like a Spider or something where you're bolting stainless and aluminum together and stuff like that. I mean, there's all kinds of issues there, trying to get the harmonic of the impact to be right, not to ring or have a funny sound. I make some putters with a rough face for a softer feel, and then some that are flat and have a louder feel. And then I've got a new insert that I've put in that has this kind of in-between sound and feel.

But you can't please everybody with one impact sound. You've got different people that like different stuff. Some people like a soft sound, some people like a harder sound. That's one of those kinds of things you get to understand as

time goes along, you can't please everybody with one thing. So don't get your feelings hurt if somebody says, "I don't like the feel of that," because somebody else will love it.

**LINKS:** It's interesting that you talk about sound. I've never thought about the differences in sound when it comes to putters. It was always about, what does that impact feel like in my hands? But sound is actually something that you think about.

**CL:** We technical folks consider sound as feel. And if you want to, you can test that really easily. You can get a couple of putters that you think feel differently and put earplugs in your ears and go hit some putts with it and see if you can tell a difference. That'll show you how big a role your ears play when it comes to feel. And that's kind of a black art in and of itself. Just like it is for the driver trying to get the sound right.

**LINKS:** Looking ahead from where we are today—maybe not necessarily what's going to show up at the next PGA Show, but 10 years from now, 20 years from now, what do you think the putters of the future are going to look like?

**CL:** Good question. I don't know, although I would expect that over time, we'll see putters maybe evolve a little bit more in the direction of... how would I say this... maybe pure functionality as opposed to some of the more traditional barriers that we face today.

**LINKS:** In terms of aesthetics, do you mean?

**CL:** Well, yeah. For instance, if I'm designing a putter, I'll start out and say, okay, I'm going to design a putter. It's going to be stainless steel. And so I've got 350 grams of stainless steel and I can shape it in any way I want to shape it. That's what I got to work with. It's like taking a ball of metal modeling clay with a certain displacement, and say, "Hey, here you go. Just mash that around however you wanna do it, but that's it, that's all you got." And you know if you get it too thin, it'll ring, it won't sound good. And so you're inhibited there. And so, ultimately, at the end of the day, when you design it that way, you're kind of boxed in a lot of ways.

So if I make it maybe partially out of stainless steel and partially out of aluminum, which, you know, we see some stuff like that, then I've got some more opportunity to design a little differently, but I got to make sure it sounds good. And then, if I start putting plastic in there somewhere, some polymer, then that opens up some more doors...

But in today's market, if I gave you a plastic putter, you'd say, "Well, this is a cheap putter. This is not a high-end putter." Either plastic or it's got plastic pieces on it, you know? But in reality, I might be able to make you a really good putter if I used metal where metal needs to be and lightweight plastic in places where I didn't need any heavy material. So if I design that way and I don't limit myself to the current-day perception of what a good putter ought to be or how it ought to be made... well, it's kind of like the Response, you know. I mean, here's a giant aluminum putter. Well, that doesn't look very traditional. That doesn't look like all the other good putters on the market in that day and time. Well, no, it didn't, but you know what? It worked better.

I wouldn't be surprised to see people put their heads down and go, "Why does the siting system on my putter have to be metal?" Why does it need to be metal? It just needs to be a siting system and to be able to see it. It doesn't have to be metal or aluminum. It doesn't have to be all one piece.

I'm going to guess that as we go forward, we may see stuff like that. And of course, the key will be, does the Tour use it? If the Tour uses it, then it'll fly for sure.