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GOLF JOURNAL

Drive the Ball Like It's a Lamborghini, Maybe

Not Your Father's Persimmon: Callaway's Latest Assault on the Tee Box Is a New Material Called 'Forged Composite'

By
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Lamborghini's Sesto Elemento concept car, the hit of last month's Paris Auto Show, would not seem at first glance to have much in common with Callaway's new Diablo Octane and Octane Tour drivers. But both are made using an ingenious new material called forged composite that the companies developed together.

Callaway hopes that forged composite, which is as strong or stronger than titanium but only one third the density, will be the next big thing in driver clubhead construction, superseding titanium the way titanium superseded steel, which superseded persimmon. Lamborghini expects to use the material extensively in future generations of its sports cars. The new Callaway drivers hit golf stores Thursday at $299 each.

The Lamborghini Sesto Elemento is not yet available to buy. *LAMBORGHINI*

There's no way of knowing whether five years from now forged composite will be standard equipment or just a forgotten experiment. I hit a few balls with the clubs and couldn't tell much. They felt solid on impact, didn't sound dramatically different, and if they were lighter or speedier, I couldn't perceive it (but it's not supposed to be obvious—the speed claim is only 1-2 miles per hour over the company's shorter,

all-titanium predecessor club, the Diablo Edge.)

The Lamborghini-Callaway alliance is about trading marketing sizzle as well as collaborating on technology. When it comes to clubs and balls, the industry focuses on products that can be pitched as longer, straighter and easier to hit. Companies strive to come up with a "new and improved" model as often as possible—just like selling fall fashions or repackaging laundry detergent. Complicating matters is that the clubmakers must do this while constrained by the rules. Since the late 1990s, the U.S. Golf Association, alarmed by galloping increases in driving distance, began imposing tighter restrictions on the length of shafts, the size of clubheads and the so-called trampoline effect in clubfaces.

For Lamborghini, the Sesto Elemento can zoom from zero to 60 miles per hour in 2.5 seconds. That's almost a full second faster than the Italian automaker's current speed champ, the $240,000 Superleggera, and the difference is entirely due to weight. Both cars use the same 570-horsepower, four-wheel-drive drivetrain, but by building the Elemento's chassis almost entirely of forged composite, engineers were able to reduce its curb weight by nearly a third, to an anorexic 2,072 pounds.

"The power-to-weight ratio is more like a motorcycle's," Lamborghini's chief executive, Stephan Winkelmann, told me recently in New York. Unfortunately for speed freaks, the Sesto Elemento in its current form isn't destined for the sales floor, Mr. Winkelmann said. But after more proving-ground analysis of the vehicle, including how it wears over time and responds to collisions, he expects forged composite to begin working its way into production Lamborghinis within a few years.

The weight-saving in Callaway's new drivers, which deploy forged composite only in the crowns (the bottom half of the clubheads is still made of titanium) is only 10 grams. But 10 grams isn't nothing. The weight loss up top gives designers more flexibility in how they distribute mass around the bottom, to help create more desirable ball flight characteristics and improve forgiveness for off-center hits.

It also allows them to lengthen the shaft by an inch or half inch over previous drivers, to 46 inches, without making the overall club heavier. That promotes faster clubhead speed and, in theory, distance—leaving aside the issue that longer clubs are always going to be more difficult to hit accurately than shorter clubs. Callaway says that human testers were hitting drives an average of eight yards farther with the Diablo Octane than with the Edge.

The partnership between Callaway and Lamborghini began two years ago, when researchers from the two companies met during a materials science conference at the University of Washington and realized they were barking up the same tree. "The collaboration has been great," said Callaway Chief Executive George Fellows. "The DNA of both companies, pushing for a technological edge in performance-oriented consumer products, is very similar." But the markets they serve are dissimilar enough to make full cooperation feasible.

The key quality that distinguishes forged composite from the graphite composites already used in golf clubs and high-performance automobiles is the size of its fibers. They are much smaller (500,000 per square inch) and intertwine every which way, instead of predominately in one direction. That makes the material more uniformly strong, like metals.

The new Diablo Octane driver, which went on sale Thursday, contains some of the same forged composite. *CALLAWAY GOLF*

Just as important, the companies say, is that the new material is easier than others to mold, or forge, into whatever odd shape engineers desire to improve performance. Lamborghini's chief of research and development, Maurizio Reggiani, said that the material can lead to "very significant" reduction in manufacturing costs and design turn-around times.

At Callaway, the advantages are more about precision. "We can think about shapes with forged composite that were never possible before. Wall thicknesses (in clubheads) can be specified down to 1/1000th on a inch," said Alan Hocknell, chief of research and development. Future driver and fairway-wood clubheads made entirely of forged composite are a certainty.

Callaway isn't the only golf equipment manufacturer seeking competitive technological advantage. Nike Golf has just come out with what it calls a "compression channel" located about a half inch behind the clubface in its new drivers and fairway woods. Super-slow-motion video shows the channel crunching a bit at ball impact and springing back. The effect is to spread the allowable trampoline effect over a greater area than just the middle of the clubface, to help balls hit off-center go farther.

Adams Golf has been focusing on sleek aerodynamics to increase clubhead speed, Ping on maximizing forgiveness and TaylorMade on its path of helping golfers to alter shot shape by fiddling with weights embedded in the clubhead.

Another huge focus, by almost every company, is making it simpler and faster for players to be custom-fitted into clubs exactly right for them.

"It's hogwash, this idea that there is no more room to innovate," said Mark King, the chief executive at TaylorMade. "Golf can deliver new technology as fast as any other business sector."

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