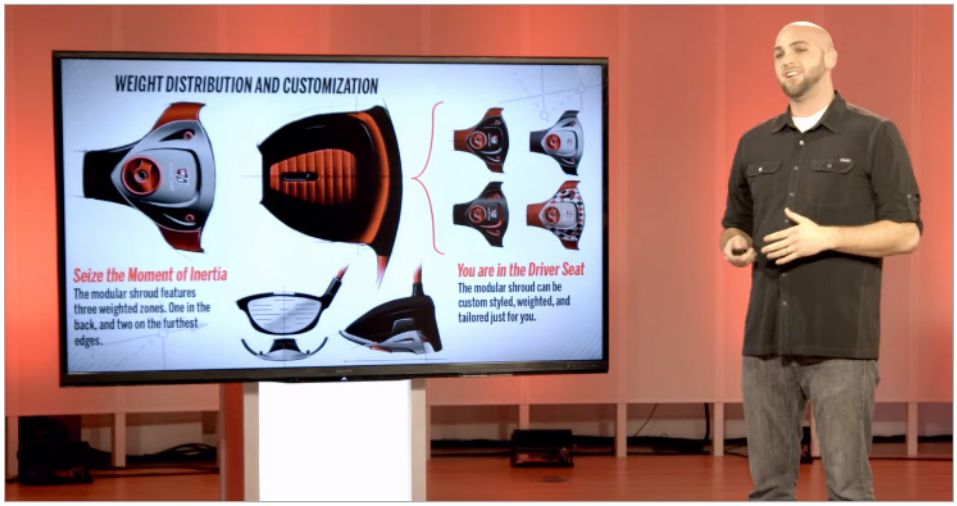
Altair | ProductDesign

Innovation in Golf Club Design for Wilson's Driver vs. Driver Competition



Wilson®

Key Highlights

Industry
Consumer Goods

Challenge
Support contestants on a golf driver design television show.

Altair Solution
Leveraged virtual design technologies to rapidly explore concepts and optimize aerodynamics.

Benefits
- Designs verified earlier in development
- Enhanced aerodynamics performance

Wilson Sporting Goods Co., a subsidiary of Amer Sports Corporation, is one of the world's leading manufacturers of high performance sports equipment, apparel and accessories. The company is based in Chicago, Illinois and has been focused on helping athletes everywhere reach their true potential since 1914. By studying the relationship between athletes and their equipment, and keeping that in mind throughout the development process, Wilson invents, designs and engineers game-changing products using state-of-the-art sports technologies and expertise.

Increased levels of competition in the sporting industry has caused sports and leisure equipment developers to rethink the way they create products. There is a higher demand for faster, lighter, stronger items, so companies are relying on innovative design thinking and turning to computer-aided engineering (CAE) to assist in improving product designs in ways never done before. It is now standard practice to experiment with materials, aerodynamics, alternative designs, etc. with the help of simulation, optimization and design software to weigh the pros and cons of any given changes. As a result, sporting goods are becoming highly technical, but developed in less time and with fewer liabilities. The golf club industry is no exception, with highly sophisticated engineering technologies used throughout the development of clubs required to meet the high level of expectation the consumers have for their look, feel and performance.

Challenge

Wilson developed a concept for a television competition to encourage innovation in the golf industry. Driver vs. Driver, as the concept came to

Keywords: Virtual Wind Tunnel, VWT, CFD Analysis, Design, solidThinking Evolve

Wilson Golf Success Story

"Having Altair's expertise at the Driver vs. Driver contestants' disposal was invaluable. The knowledge and intelligent technologies Altair brought to the show made it easy for them to virtually test, visualize and adjust their designs to help ensure the clubs had outstanding aerodynamic performance and consumer appeal."

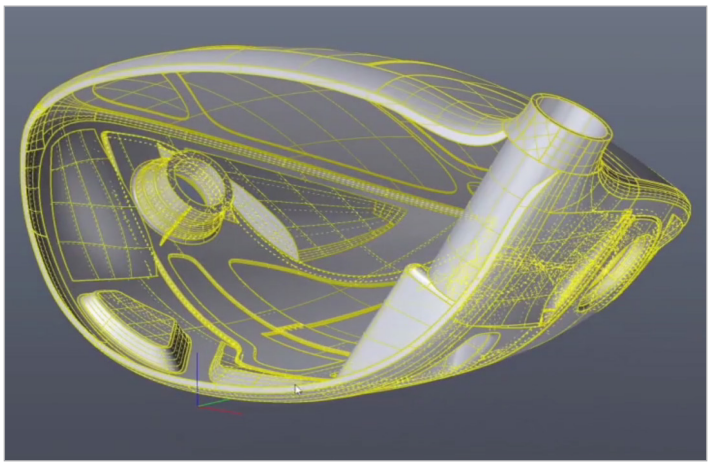
Doug Thiel
Global Marketing Director
Wilson Golf

be known, followed aspiring golf club designers competing to develop a winning design that would ultimately end up being Wilson's next driver in production.

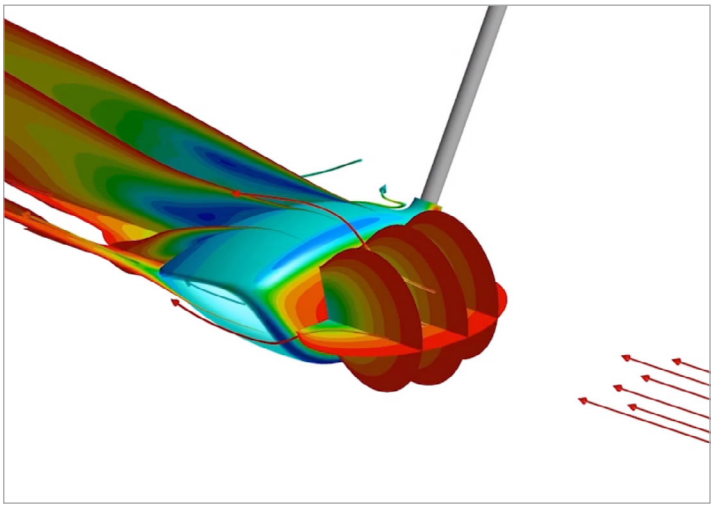
Wilson has a strong relationship with Altair, having worked alongside Altair ProductDesign on a number of successful projects in the past and valuing the broad range of simulation and design technologies available in the HyperWorks and solidThinking software suites. Altair's technical and industrial design teams were selected to assist in the development of the show, working under the direction of Wilson Labs.

Working Alongside the Contestants

To kick things off, a team of Altair ProductDesign industrial designers and computational fluid dynamics (CFD) experts headed to Chicago to get detailed information on Wilson's game plan. After the initial discussions, Altair compiled a group of designers from all over the globe to help each team participating on Driver vs. Driver bring their designs to life. The designers developed the contestants' initial designs through ideation sketches and 3D modeling in solidThinking Evolve, a design tool that allows rapid concept development and creation of digital models from sketches and ideas. Working within the compressed development timeframe, Evolve played a key role in enabling the contestants and the designers to explore multiple structural and aesthetic iterations in order to understand how these changes impacted critical technical aspects, such as club head volume, weight, center of



Virtually designing a club design in solidThinking Evolve



Simulating club aerodynamics in Virtual Wind Tunnel

Altair's team working with a Driver vs. Driver contestant

gravity, and moment of inertia. Evolve's integrated rendering also made it possible to see how the design would look in real life and make real-time edits to the models to optimize the designs. The Evolve models were also vital for producing 3D prints (or rapid prototypes) of the club heads, allowing the contestants to get hands-on with their designs.

Simulating Aerodynamics

The next stage involved analyzing the aerodynamics performance of the initial designs. When it comes to golf club design, even the smallest adjustments can have a huge impact on how the club head contacts the ball, the amount of force necessary from the user, how much control the user has, etc., largely due to how these adjustments affect the club head's aerodynamics. Having the ability to simulate these effects offers great insight into the process, allowing engineers to identify major issues early on in the design phase, and freeing up valuable time to focus on improving other areas of the club, which can make all the difference in the level of quality of the final product.

Altair HyperWorks' Virtual Wind Tunnel (VWT) is a CFD tool developed specifically to simulate and analyze the aerodynamics of a given object, and it played a big part in the development of the clubs on Driver vs. Driver. VWT was able to take the designs developed by each team and run them to quickly visualize how the club head interacted with the air it was moving through. The teams were able to gain insight into things such as how the radius of the crown of the club controlled much of its aerodynamics, as well as assess whether certain additions and/or subtractions would disrupt club performance.

Delivering a Cutting Edge Design

Throughout the project, the contestants were able to make significant improvements to their designs by having the opportunity to create digital models to evaluate the structural and technical details while simulating aerodynamic performance. They identified how much the radius of the crown impacted the air flow around the club head and as a result were able to modify it quickly in Evolve to reach the optimal shape. In addition, the simulation and digital modeling capability allowed the freedom to experiment with the designs and identify viable options more quickly, freeing up time to focus on other aspects of the club.

At the end of the show, Eric Sillies from Cincinnati, Ohio took home the $500,000 Driver vs. Driver prize with his driver design dubbed the Triton. The club features a white alignment stripe on the crown, two interchangeable sole plates and three adjustable weight ports, making it the most flexible and customizable driver in the industry. With its unmatched configurability, every player is able to find a combination to optimize their ball flight for maximum accuracy and distance.

The creative atmosphere fostered during the Driver vs. Driver show brought with it some fascinating new approaches to golf driver design thinking. Working under the guidance of the Wilson Labs team and in partnership with the Driver vs. Driver contestants proved a unique experience, with Altair's consultants successfully leveraging modern design and simulations technologies to collaboratively deliver a world class and highly innovative product to the golfing world.

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About Altair

Altair is focused on the development and broad application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance. Privately held and headquartered in Troy, Michigan, USA the company operates globally to serve customers in a diverse range of industries including automotive, aerospace, defense, meteorology, architecture and construction, energy, electronics, and consumer goods.

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About Altair ProductDesign

Altair ProductDesign is a global, multi-disciplinary product development consultancy of more than 800 designers, engineers, scientists, and creative thinkers. As a wholly owned subsidiary of Altair Engineering Inc., this organization is best known for its market leadership in combining its engineering expertise with computer aided engineering (CAE) technology to deliver innovation and automate processes. Altair ProductDesign utilizes proprietary simulation and optimization technologies (such as Altair HyperWorks) to help clients bring innovative, profitable products to market on a tighter, more efficient time-scale.

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About HyperWorks

HyperWorks is the most comprehensive open-architecture simulation platform, offering technologies to design and optimize high performance, efficient and innovative products. HyperWorks includes modeling, analysis and optimization for structures, fluids, multi-body dynamics, electromagnetics and antenna placement, model-based development, and multiphysics. Users have full access to a wide suite of design, engineering, visualization, and data management solutions from Altair and its technology partners.

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