Foilboard

A **foilboard**, also known as a hydrofoil board or foil surfboard, is a type of board used in water sports; it is distinct from surfboards in that it has a hydrofoil rather than fins mounted underneath.[1] This hydrofoil design allows the surfboard and its rider to rise above the water's surface, allowing for fast speeds and increased maneuverability in a wide range of surf conditions.[2] Foilboards are becoming increasingly popular across many water sports, including surfing, kiteboarding, and wakeboarding.[3] Foilboards have also been used in competitions, with riders reaching speeds of up to 30 km/h while performing acrobatic maneuvers such as flips, twists, and more.[4]

History

In the late 1990s and early 2000s, Laird Hamilton, an influential big wave surfer and waterman, began experimenting with attaching hydrofoils to surfboards, with the aim of achieving faster speeds and smoother rides on large waves.[5] Laird Hamilton later discovered the foilboard's capability to harness swell energy with the use of a jet ski, pulling the rider into a wave.[6]

In 1999, Mango Carafino, a prominent waterman of Maui North Shore, big wave Jaws tow-in surfing, designed and manufactured the first Hydrofoils out of Maui for kitesurfing and created the discipline of Hydrofoil Kitesurfing.

Design and components

The design of a foilboard consists of two primary components: the board and the hydrofoil. The board is usually made from lightweight materials such as carbon fiber or foam, making it easier to lift above the water.[7] Attached to the bottom of the board is the hydrofoil, which consists of the mast as well as the front and back wings.[8] The front wing is responsible for providing lift, while the back wing helps with stability and maneuverability.[9] The mast, usually made with carbon fiber, connects the bottom of the board with the hydrofoil, keeping it submerged in the water in order to generate lift.[10] Foilboards also typically have foot straps or pads for the riders to secure their feet to the board so they can control their balance as they approach higher speeds and move with greater agility.[8]

Hydrofoils work by generating lift as they move through water, lifting the board out of the water and reducing drag.[11] As water flows over the hydrofoil, it creates a pressure differential that causes the water to push up on the foil, generating lift.[12] Adding a hydrofoil to a board can significantly increase the speed and efficiency, allowing the rider to reach greater speeds proportional to the lift generated; because of this, hydrofoils are extremely popular in racing and high performance applications.[11]

Types of hydrofoils

Foilboards can be categorized into three main types based on the shape of the hydrofoil wing, each of which catered to different ability levels.[13]

Flat-wing

Flat-wing hydrofoils have a straight, flat wing profile that are known for their stability and ease of use, making them ideal for beginners or recreational users.[14] They are relatively inexpensive compared to other types of hydrofoils and are also commonly seen on yachts, boats, and surfboards.[15]

Kiteboarding

Hydrofoil kiteboards allow the rider to achieve the same result with the use of a kite.[16] The hydrofoil minimizes the effects of choppy or rough conditions. Due to the hydrofoil's underwater characteristics, the rider can angle higher into the wind than on traditional kiteboards which ride on the surface of the water.

On the Island of Maui, Mango Carafino began the development of fabricating hydrofoil boards for riding with the use of a kite. Carafino later went on to fabricate Carafino Hydrofoil foil boards in China, at the Jin Li factory, with the assistance of Maurico Bauldi and Paulo Iannetti. For over ten years, the world laughed at Carafino, calling him a kook for introducing a board too futuristic for the industry to accept.

Carafino introduced the hydrofoil in 2008 in Frejus, Cote 'd Azur, France. There the French began to race with the Carafino Hydrofoil board, creating the competitive aspect of Hydrofoil Kite Board Racing. The sport later went on to experience back yard designers tweeting the foils to garner more speed when racing. Finally, the Olympic sailing federation incorporated the Hydrofoil Kiteboard into the Olympic class. In 2014 Carafino left the industry, apparently as a result of the flood of competition and knockoffs of his design. Laird Hamilton innovated the use of the board riding in swells with the assistance of expert waterman Terry Chun of Kauai, North Shore.

Windsurfing

Rush Randle, a noted acrobatic surfer and big wave windsurfer, is credited with being the first ever to mount a hydrofoil to a windsurfing board, performing forward loops with the hydrofoil mounted below on the outer reefs of Maui.

Foils are used on wind-surfboards through design development from Neil Pryde Maui, inventors of hydrofoil sailing "windsurfing" boards. Using a moderately sized sail, a foil windboard can achieve speeds over 6 knots faster than the apparent wind. With advancements in hydrofoil design the energy required to stay on foil was reduced to levels achievable by human power alone. Kai Lenny pioneered a technique now called "pumping" in which the rider shifts their weight over the axis of rotation, driving the foil through the water column which generates lift.[17]

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