

# LEARN TO FLY

Learning to fly your Next Foil can be very easy or extremely difficult. The key to being successful is to understand the concept of flying. You will be flying an underwater wing. The hydrofoil is basically an airplane scaled down. Water is approximately 700 times denser than air so you must understand the concept of flying.

## Understanding the angle of attack is key.

Q. What is angle of attack?

A. The easiest way to explain angle of attack is if you are driving your car with the window down with your hand out the window, if you tilt your flat palm up the wind pushes your hand up. If you angle your hand down, the wind pushes your hand down. Think of your hand as the wing of your Next Foil and the wind as the water.

A foil with positive angle will keep rising until the front wing pierces the surface of the water and loses all lift. The board falls back to the water.

## Your angle of attack can be controlled using several methods.

1. **Body position on seat.** The further forward you sit on the seat, the more negative the angle of attack (harder to fly) The further back you sit on the seat, the more positive the angle of attack (easier to fly).
2. **Handle position.** By raising your hands, the angle of attack becomes negative and the board will go down; by lowering your hands you will get a positive angle of attack, which will lift you up. Moving the handle up and down affects lift by changing the leverage. Remember this: move the handle up to go down - move the handle down to go up
3. **Shoulders.** Leaning forward will put you in a negative angle of attack and you will go down. Leaning back will put you in a positive angle of attack and you will go up.

NOTE: It is important to understand angle of attack and how to change it. If you understand this concept you will learn much quicker.

Learning to fly a hydrofoil is a two-step process...

1. Learn How to Taxi
2. Learn How to Fly

These both require different body positions and different boat speeds.

## Step #1 – Learn To Taxi

Beginning riders must always use a deep-V rope. The V section of the handle cradles around the ski to help keep it pointed straight during the start. Riders should transition to a regular single handle as soon as they are proficient in deep-water starts.

The taxi position is when the board portion of your ski is riding on top of the water. This is done at a very slow speed (7-10 mph) with the body weight forward to keep the foil from generating lift.

When a rider is sitting at the end of the ski rope, the hydrofoil naturally is floating with a positive angle of attack. This is the biggest problem in learning. As soon as the boat picks up speed during the start the wing is already positioned with a positive angle of attack and the hydrofoil is going to want to fly. The problem is that you are going too slowly. The front wing stalls and you fall. The solution is to reposition the wings forward to a neutral angle of attack as soon as possible.

The key is to have the boat driver pull you very slowly (7–10 mph) and as you start planing, push your hands, reach forward, and lean forward. Do not pull on the rope by bending your elbows. Pulling on the rope will cause the foil to turn. Getting your handle up with straight arms and weight forward repositions the hydrofoil wings towards a negative angle of attack, and will keep the ski on top of the water. Now you can steer your hydrofoil by aiming your knees. Push your knees left and you go left. Push your knees right and you go right. This is where understanding angle of attack is very helpful. When you push your knees left the water pushes the vertical strut left, working on the same principle as angle of attack, but in the vertical plane. Instead of the front wing pushing you up or down by moving your shoulders forward and back, the vertical strut pushes you left or right by using your knees. (It's all about water pushing against the wings or strut.)

## **Step #2 – Learn To Fly**

When a pilot can successfully taxi the hydrofoil on the water in control, it is time to learn how to fly. While taxiing your front wing is at a negative angle of attack. The speed should now be increased about 3 mph (10-13 mph) To fly you need to SLOWLY bring your front wing to a positive angle of attack. Do this by slowly lowering your hands and sitting up. The key to successful flying is to be able to stop the positive angle of attack before the front wing pierces the surface. The body adjustments that control the angle of attack require small movements.

REVIEW: Raising and lowering your hands adjusts the angle of the pull (hands up to go down / hands down to go up). Sitting forward on the seat decreases lift, while sitting further back increases lift. Moving the shoulders forward decreases lift while moving them backwards increases it.

Taxi position (negative lift): sitting forward on the seat, leaning forward, and hands up. 7-10 mph

Flying position (positive lift): sitting further back on the seat, sitting up, and hands down. 10-13 mph

### **NO-NOs**

1. When learning how to taxi, don't sit up, or you will fall
2. DO NOT PULL ON The ROPE. Pulling on rope will make your shoulders go back and you will fall.
3. Do not push with your feet. This will push you further back on the seat, changing the center of gravity, putting the front wing at a positive angle of attack and you will crash.
4. Do not exceed 10 mph when learning to taxi or 13 mph when learning to fly.

### **BOAT DRIVER TIPS**

1. Start rider from neutral position. Do not leave boat in gear. If you do, the rider will pull the rope putting the front wing at a positive angle of attack, resulting in a turn.
2. Watch board tip. If tip goes in the water, do not accelerate; back off. Tip must stay up.
3. Do not pull rider over 10 mph.

### **ALWAYS**

1. Check butt position on seat after each fall to make sure you haven't pushed yourself back on the seat with your feet.

### **EQUIPMENT**

1. Always wear a Coast Guard approved flotation device.
2. When learning use deep-V rope. Place rope around tip of ski for straight start.
3. Always use a non-stretch rope to avoid dangerous handle recoil.