Husky Seaplane Training Guide- Water Wings Seaplane School:

Training Outline

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Seaplane Syllabus- Water Wings Seaplane School: **Training Detail**

The Airplane

The Aviat Husky Floatplane you will be flying soon is a 2000 model A1-B. Huskies are utility airplanes with high lift wings and great short field capabilities. Huskies are a reinvention of the Piper Super Cub and they make excellent float planes. We have a 180hp Lycoming O-360 under the hood to lift us off the water.

You will notice that there is an added dorsal fin under the rear fuselage. The dorsal fin restores some positive yaw stability to the airplane making up for the large amount of float area forward of the center of lift. (More on that later.)

The floats are Wipline 2100s. This means that each float can float up to 2100lbs. To be legally certified, each float must displace or float at least 85% of the max gross weight of the airplane which gives a good degree of safety in case one or both floats are damaged. Each float contains a number of water tight bulkheads, each with its own pump-out port. These adds s degree of safety in case of damage, and adds strength, but also keep any water in the floats from shifting fore or aft in flight, which could easily throw the plane out of C.G. limits. Each compartment should be pumped out prior to the first flight of the day and after any significant number of landings or significant time on the water. In cold weather they should be pumped at the end of the day as well to prevent freeze damage. The floats are constructed of aluminum and thousands of rivets, and

should be mostly watertight while not in motion. The pounding of landing and waves will force some water through the seams and the rivets. Since the aluminum is thin the floats must be taken care of. Rocks, stumps, and logs will easily wreck a float, thus you should always be cognizant of your path and the waters around you. The keel of the float is actually very strong and provides much of the rigidity of the float system. It is even possible to make a grass landing with the floats, with the wheels up, and do little if any damage. A hard runway landing is also possible in an emergency but I imagine the sound would be terrible. You will soon come to realize how important the suspension of a land plane is. The float to airframe connection is extremely rigid. All forces are transferred from the floats directly to the airplane. This is the reason for the extra bracing and beefiness in the airframe. It will also teach you to avoid hard landings as the spine-airplane connection is also rather rigid.

{Insert annotated Airplane drawing here}

Specifications	
Gross Weight	2200 lbs
Rate of Climb	750 fpm
Fuel Capacity	50 gallons
Oil Capacity	6-8 qts
Propeller	M-T Constant Speed
Engine	Lycoming 0-360 180hp
Wing span	36 ft 1 in
Length	24 ft 11 in
Height	11 ft
Vs-Stall Speed Clean	61 mph
Vx-Best Angle of Climb 0/30degrees Flaps	61/55 mph
Vy-Best Rate of Climb 0/30degrees Flaps	62/61 mph
Vfe-Max Flap Extended Speed	80 mph
Vno-Max Structural Cruising	104 mph
Vle-Max Landing Gear Extended Speed	133 mph
Vlo-Max Landing Gear Operating Speed	133 mph
Vne-Never Exceed Landing Speed Cruise Climb	133 mph
Va-Maneuvering Speed	64 mph

Weight and Balance

{Insert table here}

Take off and water handling performance will suffer greatly with increased weight.

Fuel Considerations

As an amphibious plane we have lots of options for fuel at airports. In an emergency or if we were on straight floats most planes will operate on boat gas

from a marina. Be wary of boat or automotive gas that may be old or contain alcohol. If in doubt, then make a new plan. If you need to dock at a marina, or anywhere else, be aware that people at marinas are not aware of the dangers of airplane propellers and they will not know your maneuvering challenges. They will try to grab onto all of your fragile control surfaces and yank to HELP you. When planning a cross countries on straight floats, you must consider lake drop-ins for fuel. In a higher performance seaplane where Avgas is required it would be wise to call ahead along your route to have fuel brought to you. Larger planes can carry extra gas in tanks in their float compartments. Always allow time after refueling for crud and water to settle to the sumps. Marina gas can be iffy so always drain the sumps and check for water and debris. Insist on doing the fueling yourself as gas dock personnel are not used to dealing with airplanes.

Landing Considerations

When planning a trip you must consider whether the lake or stream that you plan to land on will accept airplanes. Many areas specifically restrict airplane use. The penalty for landing in a restricted lake can be severe. Some places will not let you take off, meaning that your wings are coming off and the airplane will have to be trucked to another place. At best you may get a warning or a fine. Some places are restricted because the water is not conducive to seaplane activity due to currents or under water hazards. Others are restricted because of intense boat traffic. Still others are restricted because some other seaplane operator may have angered residents. Whatever the reason it is important to know where you are welcome. The Seaplane Pilots Association (SPA) publishes an annual Seaplane Landing Directory which lists good and bad bodies of water and the people who control them. This is also on their website at www.seaplanes.org. If in doubt you can contact the controlling authority, which is also listed in the Seaplane Landing Diretory.

Night Operations

Night operations in a straight (non amphibious) aircraft are emergency procedures at best. If caught in the air after dark or even near dark your safest move would probably be to head to a lighted airport and take your chances on the hard lighted runway, rather than risk ending up upside down and sinking in an airplane in the dark. It is nearly impossible to judge your height above the water at night. Everyone should walk away from the runway landing. The best idea is to not be in a straight float seaplane after dark.

Boaters and Residents

Each lake is different but lake residents are often people who are trying to relax. They did not choose to live next to an airport. We must be careful not to draw their attention in a negative way. Try not to loiter in one area doing landing after landing-- spreading the joy is the best way not to offend anyone. It is also important not to continually fly low over the same areas. It is especially important not to climb out over houses at full power and high rpm. The nature of our sport is to fly low over the water and land on it. This is fine as long as no one

feels annoyed or threatened.

Boaters have no clue as to how maneuverable we are. Sadly on the water our airplanes make pretty poor boats. We cannot turn sharply, we cannot slow down terribly quickly, we cannot stop, and we cannot back up . Seadoos and Jet-Skis are really fast and maneuverable with a tendency to change directions at random. The operators of SeaDoos are often kids and they all have tunnel vision straight ahead. All boaters tend to focus mostly in what is in front of them. They will not see you and they probably cannot hear you. Avoid near contacts at all costs, and make sure your take off and landing path will remain clear for the duration of your procedure, and be ready to cut power on take off or go around on landing should the situation turn iffy. Always have an out.

Pre-Flight Activities.

As always it is a good idea to check weather. Storms can develop very fast in our area turning the lake into a really inhospitable place to be and the air even uglier. A check of the Weather Channel and a call to flight service is never a bad idea. Next a look at the water and the wind speed and direction will tell you which way the plane will blow when freed of the beach or dock. Remember you have no brakes and the plane will begin moving immediately when freed of its ties. The airplane will immediately weathervane into the wind and begin drifting backward until the engine starts. There is also the possibility that the engine will not start, thus blowing you into whatever is in the path of the tail of the plane. Remember the front of the plane is reasonably well armored while the back end of the wings and tail are really fragile and expensive
to fix. Your planning and contingency planning must start here.For example, I like to hold onto a rope tied to the dock so that if the engine does not start then you can recover.

Now that a successful unmooring and flight seem possible you can preflight the airplane. The preflight is similar to a land plane in most respects with the addition of the floats and the attachment gear. Your standard pattern around the plane may need to be amended as some parts of the plane may be hard to reach from the dock. Optimally you can preflight the Husky on the ramp. Do not let this challenge cheat you of a thorough preflight. Each float compartment must be pumped out. It is not necessary to get 100% of the water out, but pump until you are getting mostly air. If any particular compartment seems overly full you may want to consider further investigation before flight. As you are going around the plane look at all of the external cables and pulleys. Look for chafing, fraying, and sticking. If the water rudder cables bind, the air rudder will bind as well. You will want rudder control on taxi, take off, and landing. Look for cracks and gashes in the float skins. Pay particular attention to the pitot tube opening and the static ports. Bugs love to nest in these prefab condos. You will also want to take a good deep look into any engine compartment openings you can see into, looking for bird's nests and the like. Bird nests will quickly catch fire when exposed to the heat of an aircraft engine that is being starved for cooling air by the nest. You may have to rotate the plane at the dock to get at all of the airframe to do your inspection. It is critical that all gust locks are removed prior to pushing off the

dock. Lack of rudder control in a seaplane can be very traumatic as you drift / blow into what ever is out there. Remember brakes are not an option on the water. Once you depart your mooring / dock you will be in motion. When you push off from the dock you will want to get the plane started fairly soon.

Realizing that you forgot the keys can be really frustrating as you blow towards the rocks backwards. A pre-push off checklist may be a good idea. If you are taking passengers now is the time to do a thorough briefing, while they can move around the plane and see what you are talking about and they can hear you. It is easier to talk about prop safety while the machete isn't actively spinning. You might want to point out no-pull and no-push zones on the plane if your passengers are going to help with docking. This also gives passengers a chance to back out while you are talking about emergency exits and sinking airplanes. Now that the preflight is complete it is time to shove off.

Water Start and Water Taxiing

Once free of the confines of shore it is time to get the water rudders down and the engine started. This should be done before seat belts and headsets. You can use your preflight time to get all of those things ready, but once the plane is drifting it is more important to get forward motion, thus control, established. The lack of a seatbelt and headset may actually help if the engine won't start and you need to start paddling. Be sure your path is clear and maneuverable before you start the engine. Once started, you will steer the airplane with your rudder pedals. Less power = smaller turning radius in a seaplane, much as in slow flight. You can use one magneto and carb heat to further reduce RPM if need be for short periods of time (i.e. when approaching a dock). It is really important to keep engine RPM at or below 1000 while idle taxiing and to keep the stick/yoke all the way back. This will minimize water damage to the prop, by keeping the propeller from sucking water out of the lake and by keeping speed slow enough to keep spray from the floats under control. You should be mindful of aileron position if there is any kind of medium crosswind, and you should use the same positioning as you would a land plane. You can use this taxi time to put on headsets and seatbelts and finish any leftover passenger briefing details. If the water is weed infested it may be prudent to pull the rudders up every few minutes to clear the weeds that may have collected. Directional control will suffer noticeably when the rudders are fouled with weeds. In a strong wind taxiing up or downwind will be easiest and safest. Seaplanes tend to be top heavy and tippy in a stiff breeze. While taxiing to your takeoff starting point you might want to complete your run up.

Water Run Up

1. Stick Back
2. Mixture Rich
3. Area Ahead Clear. (Nose will be high during runup)
4. Engine to 1900 RPM
5. Mag Check
6. Carb Heat Check
7. Engine to 1600 RPM

8 Cycle Prop quickly
9 Engine gauges and vacuum check
10 Back to Idle
11 Set DG to Magnetic Compass
12 Set Altimeter to 0. Unless you will be landing in another lake, or taking off from an airport on wheels, set altimeter to read “0” at lake level.

When you reach your take-off start point simply cut power to idle, pull up the water rudders, and the plane will weather vane into the wind. If all has worked as planned you will be pointed towards lots of clear, deep, unobstructed water ahead.

Normal Water Take Off—Into the wind of 3-9 Kts

1. Set Flaps 2 notches
2. Mixture Rich-unless at high density altitude (> 5000ft)
3. Prop to High RPM
4. Carb Heat Cold
5. Area Clear
6. Water Rudders Up
7. Verify Gear Up for water take off
8. Stick all the way back
9. Full Power
10. Use significant Right Rudder to maintain straight path.
11. You will notice an initial rise with power added . There will be a pause of a few seconds, then there will be a second rise. When this rise stops, push forward on the stick until you reach a more level attitude. If porposing begins pull back some on the stick. At this point you will have to adjust the amount of right rudder you are holding. Select a point on the nose and keep your path straight.
12. Adjust your pitch angle for least drag.
13. Allow the plane to fly off the water.
14. Once the plane is out of the water it will accelerate briskly in ground effect.

Keep it in ground effect until airspeed reaches Vx or Vy, being very careful not to let the plane settle back into the water.

15. You may make any turns necessary to avoid obstacles once airborne.
16. Retract flaps and set climb power when appropriate.

Glassy Water Take-Off

Wind Calm to 3kts Glassy water makes very high water drag. The wavelets that occur in a normal take off allow air to get under the floats reducing drag. In glassy water there is complete float contact and thus more drag. It may be advantageous to step taxi back and forth in your takeoff area to create some small waves on the water. Since there is little or no wind you may take off in whatever direction gives the longest and safest run. Begin the take off just like a normal take off. Once on step use the ailerons to lift one pontoon slightly out of the water and use rudder to maintain your path, if you need to continue on

straight, otherwise a slightly curved path will be okay. Once you have the first float out of the water, acceleration will be brisk and flying speed will be achieved almost immediately. Once free of the water you must maintain a positive rate of climb. A decent back in to the glassy surface could be very messy considering the high water drag. It is also nearly impossible to judge your height above the water.

Rough Water Take Off – 10+ Knots of wind.

Rough water is very tough on the plane, the floats, the prop, and your spine. The idea is to spend as little time on the water as possible and to keep the nose a little higher than normal to avoid the floats digging in and to keep the prop out of the spray.

1. Carefully get the airplane to the start of the take off run, being very mindful of your crosswind technique. Keep the throttle back to idle to avoid prop damage. Avoid step taxi.
2. Apply 2 notches of flaps
3. The plane will quickly weathervane into the wind when the water rudders are retracted.
4. Begin takeoff as normal.
5. Once on step, keep a higher attitude than the normal take off.
6. The plane will fly off the water when it is ready.
7. If you bounce off of a wave hold your attitude. Do not try to dive for the surface or keep level with the water. Hitting the water nose up will be safe. Hitting the water nose down will not be safe.
8. Do not try to ride the waves. Keep a consistent attitude.
9. Once free of the water level the plane a bit to build airspeed.
10. Once positive rate of climb and a safe airspeed is achieved reduce flaps to 1 notch or less, and continue climb.
11. If in doubt about your abilities to handle rough water, wait until it gets better. 12. During summer boating season some areas of the lakes will be particularly rough and unpredictable. Boat wakes can be very painful and damaging to the plane and the pilot.

Crosswind Water Take-Off

Fortunately crosswind takeoffs are a rarity for seaplanes since lake tend to be wide in many directions, and in narrow bodies of water and rivers there are usually trees or mountains blocking most of the breeze. If you get into the situation where you must fly and there is a significant crosswind you must us the variable weather vaning tendency of seaplanes. More on this later but essentially if the bow is low you will weather vane into the wind and when the nose is high you will weather vane down wind. Thus there is a point in between high and low nose attitude that the weather vaning tendency will equalize. As you might expect this is a finesse maneuver and will be covered late in your training. It is

only covered here briefly to close out the take off section.

Land Taxiing

This airplane taxis just like any nosewheel airplane that does not have steerable nose wheels. Use your brakes and rudder pedals for directional control. Since the nose wheels are free castering you can turn the plane very sharply with the brakes, but once this is done it takes a little skill and patience to get those wheels straight again. Be aware that you are very tall and wind can get you into trouble.

Runway Take off

One Notch of flaps.
Trim set to between Neutral and Up.
Line up and go.
Rotate at 60.
Climb at 70mph.

Flying Characteristics

A seaplane in the air will fly very similar to a land plane. There is much more drag
involved and a bunch of extra weight, especially in amphibian aircraft. You will see this in cruise speed reductions of 10-20 knots. The floats actually provide some lift which is why most float equipped planes have an increase in max gross weight over the land plane versions of the same aircraft. They also need the extra gross weight to counter the weight of the floats. You will notice that floatplanes have less yaw stability than a land plane. You will have to hold more rudder in a climb and coordination in turns will be a bit more touchy. Many seaplanes have an added dorsal fin to compensate for the lost yaw stability which is caused by the large amount of side surface area forward of the C.G.

Before Landing

Chances are that all of your landings have been on official runways that have been designated by the FAA or some private individual who has actually made multiple successful landings. Every water landing is unique. The area and the surface will never be exactly the same. Even the act of landing changes the surface. Unless you are landing at an official seaplane base that has defined water lanes (even most of these are not marked on the water), you will have to learn to pick a suitable area, picture a runway, make up and fly a pattern, and maneuver the airplane down an untried final approach to an imagined landing spot. All of that may sound like a bunch to conquer, but we will break it down into the components and if you do enough seaplane landings you will feel confined when you have to land on a paved runway. During and before World War II, and the advent of hundreds of paved runways, most pilots were used to always landing into the wind on a field with no precisely defined and marked runways. Crosswind technique was far less important than soft field technique.

Wind Direction and Speed.

Since very few lakes have weather reporting capabilities and even the airports near lakes that have AWOS will report different conditions than the actual lake wind conditions, it is important to be able to read the water to determine wind direction and speed. First of all, if the water is glassy and mirror like, you have a low wind or calm condition and direction does not matter, otherwise you will notice that close to one shoreline the water will appear glassy and against the opposite shoreline the water will be rougher. The wind will be coming from the glass/y shore. It takes 4-5 knots of wind to make this effect.

If you have more than 7 knots of wind and a decently wide piece of lake streaks will form on the water. The more wind the more pronounced this effect will be. These streaks will run precisely parallel to the wind. Combined with the glassy shore effect you can determine direction. Other easy indicators are dock flags and smoke to verify your water assessment. At 12-15 knots you may notice small white caps on the lake. Over 20 knots the white caps will be very prevalent and your landing will be quite rough.

Selecting Your Landing Spot

Knowing the wind conditions on the water you can now choose an area to land. You will want to find spots that has the following characteristics.

1. Enough length. Seaplanes have a fairly short landing roll, and a somewhat longer take off roll. You want to be sure that you can get out of what ever you can get into.
2. Obstacle Fee. Both your approach and your landing zone should be free of power lines, towers, islands, bridges, etc. Power lines can be particularly hard to spot. It is easier to see the poles. Narrow channels are a favorite spot to stretch the lines.
3. Boat and Sea-Doo free. While you are surveying your spot keep an eye on all the boat traffic. Boaters cannot generally hear you and they are not accustomed to looking into the sky for incoming aircraft. If they do notice you they may try to get a closer look by cruising into your path or trying to race the airplane. In any case, they rarely understand the limited maneuverability of airplanes during landing. Fortunately you are generally faster than boats and you have really good control in the air. Large boats make large wakes which are to be avoided. Sea-Doos and Jet Skis are really fast and extremely maneuverable. They can and will change direction at random. Give them a wide clearance.
4. Wake free. Large boat wakes are extremely hard on the plane and potentially dangerous. Encountering a wake head on will be painful. Encountering a wake parallel will create a really disconcerting side to side rocking motion. Generally avoiding heavy boat traffic will help in wake avoidance, but occasionally a rogue wave from a far away boat may enter the area. Be vigilant and it may be necessary to extend your flair to fly over a big wave or just go around and wait for the wave to change. Boat traffic is cyclical. A spot may be really busy one minute and completely clear in 10 minutes..
5. Underwater Obstacle Free. A low pass over the proposed landing zone will help in determining the safety of your water runway. The seaplane does

not need much depth but the float skins are very fragile and stuff just below the surface can ruin a float and your day. Be especially vigilant on rivers since the water may be very murky and the bottom can change rapidly. A submerged tree may have washed into what was a safe spot yesterday.

6. Finally, if your intention is to dock or beach somewhere, planning your landing to minimize taxi distance will limit overall wear and tear on the plane.

7. Compatibility. If multiple touch and goes are planned, and houses are present, try to move your practice area so as not to annoy any particular group of lake dwellers. Spread the joy.

Once all characteristics are in place it is helpful to imagine the runway and the landing spot. This will simplify the pattern, the approach, and the landing.

The Seaplane Pattern

The seaplane traffic pattern is a rectangle like the land based traffic pattern only flown at 500 feet AGL instead of the typical 1000 feet, and the rectangle is smaller in width. The object of the seaplane pattern is to keep the plane within gliding distance of the water and to allow a better view of the landing zone. Downwind is just like in a land plane. Once abeam your landing point reduce power, apply carburetor heat, mixture rich, verify that wheels and water rudders are up. At the 45 degree angle to the touch down point, turn base. Base leg is very short. It consists of a 90+ (into the wind) degree turn, level the wings, check your approach path, begin your turn to final. On final normal landing power should be at or near idle, Carburetor heat cold/off (in case a go around is needed), final check of the landing area, verify gearl position (up). In the Husky you must maintain at least 70 mph on approach or flair will be impossible and a hard landing will follow. Land the plane. Remember that this is a pattern of your own making. The FAA has not guaranteed any obstacle clearances and the residents of the area did not choose to live near an airport, so be mindful of towers, mountains, poles, and the neighbors.

Normal Landing

Okay. This is the really fun part. Your area is clear and you have a 7 knot breeze down the length of the lake. You are setup on final approach at 70 mph,

1. Verify that the gear is up for a water landing by looking at the lights and the actual indicators on the floats.
2. Flaps 2 notches. Any more in a Husky will make a go around more complicated
3. Mixture Rich
4. Water Rudders Up
5. Carb Heat Off/Cold. In case of a go around. We used it on base leg to clear any potential ice.
6. Prop Control on High RPM. Area still clear.
7. 70 mph
8. Power at or near idle.

9. 20 Feet above the surface begin a gradual flair

10. 10 feet above the surface you should have a positive attitude. Nose slightly high.

11. Continue to bleed of airspeed and touch down above stall. A slightly nose high attitude and slow (above stall) airspeed is critical to safety. A low nose will allow the floats to dig in possibly flipping the airplane. Too high a landing speed will cause excessive water drag on the floats, possibly flipping the airplane. A stall with too much height will cause the nose to drop and thus a nose low touch down, possibly flipping the airplane. We really want to avoid flipping the airplane.

12. Once on the water pull back on the stick throughout the landing roll and set power to idle use rudders to keep the plane straight. If you feel porposing from the rear ease off on the stick a bit. Under no circumstances let go of the stick or press forward.

13. The airplane will come to a fairly quick idle taxi speed. You may then drop the water rudders and remove flaps. The stick should remain full aft while taxiing.

Problem areas.

1 Too high a pitch on touch down. An extremely high pitch on touch down can
cause the back of the floats to hit the surface first causing a nose down pitching moment.

2 Airspeed (thus water speed) too high on landing. This will cause high water
drag on landing thus a nose down pitching moment.

3 Stall before landing. This will cause a nose down pitching moment. 4 Nose low on landing. Floats may dig in flipping the plane.

Rough Water Landing

The object of a rough water landing it to keep the nose a little higher than standard to keep the prop well clear of spray and the float tips will clear of digging into the waves. The other primary goal is to keep landing speed as low a possible to limit the severity and duration of the waves pounding on the floats. This is most analogous to a soft field landing in a land plane. Set up for the rough water landing will be just like a normal landing with the following exceptions.

1. Flaps still at 2 notches. This will add drag and help slow the plane once on the water

2. On flair add a bit of power. 11 inchces of MP should work This will compensate for the down pitching of the flaps and lower the overall stalling speed, and allow precise control of the touch down. Since there is probably more wind your landing roll should be short anyway so you can use more runway in the flair.

3. On touch down pull back on the stick to maintain a nose high attitude.

Glassy Water Landing

While glassy water is picturesque and great for water skiing and a smooth boat ride, it can strike fear into even the more experienced seaplane pilots. We as pilots are really used to seeing the ground rush by faster and faster as we get close to it on landing. There are multiple cues at an airport. The trees and runway get bigger etc as we approach a landing. On glassy water all of those cues are gone. We have a mirror to land on and objects in a mirror are always twice as close as they appear.

There are multiple techniques that can be used to avoid the situation. You can go to another area of the lake that may have some wind. You can land behind a boat that has stirred up the surface some, however be ever vigilant that you are faster than the boat and he may stop at any minute, thus give him lots of room and have an escape plan. Finally you can land next to a reference, such as a bridge or trees along the shore. Finally you can use the glassy water landing technique, which strives to avoid the double danger of hitting the water unexpectedly at a higher than normal touch down speed in a lower than normal attitude. The nature of glassy water is high drag anyway since there is high surface tension with no waves. This procedure MUST be followed precisely to avoid flipping the airplane.

1. Plan your approach to allow for a nice shallow final approach over a low shoreline which will be used as last height reference, followed by really long stretch of clear deep lake. In the Husky 2 notches of flaps should be used.
2. The object of the exercise is to be as low over the last visible reference point as practical in landing configuration, and at near minimum controllable airspeed, at a 100-150 ft/min decent rate. Once over this point your positive landing attitude should be set on the physical horizon and not changed. Power should be set to 16 inches M.P.
3. Continue your descent using power to control the rate of descent until you touch down. Do not feel for the surface. Do not look at the surface near you. Look at the horizon and manage your airspeed above stall. It is a good idea to practice this slow flight descent at altitude, to get the feel and to know the power settings and attitudes required.
4. Once you touch down, which will be softly or hard as a rock depending on your descent rate, it is imperative to cut power and pull back on the stick. Water drag will be a major factor. DO NOT LET THE NOSE DROP.
5. Done properly this can be one of the best feeling landings possible in a seaplane.

Crosswind Landing.

There may be occasions where the body of water doesn't allow an upwind landing.

Assuming the crosswind is within the maximum demonstrated crosswind component of your airplane, the rare crosswind landing can be accomplished safely. These usually occur on a narrow body of water so, a rough water technique should not apply and by the nature of there being a crosswind the glassy water landing should not be a factor. Your only worry is sideways movement on landing, or landing in a yaw. Float design assumes direct forward

motion and thus are designed to track straight. A side load could tip our top heavy little airplane. The answer is to land in a side slip into the wind. We will have a normal landing approach adding a side slip just enough to compensate for the wind and tracking straight down our runway. We will land on the upwind float and continue to compensate for the breeze with aileron and rudder.

Engine Out Landing

The good news is that seaplanes fair well on land or water in an engine out landing.

There is significant structure under the plane and in front of the C.G. to keep the plane from flipping. The keel of the floats is rather strong and can stand some abuse. You would still rather put down on water than land in most cases. The less good news is that the seaplane will not glide as far as a land plane.

Other things to consider... Keep your airspeed up on final approach as this is your only tool to flair with. (70 mph in the Husky) Select a landing zone that will allow you to drift or sail to safety. Right in front of a dam may be a poor choice.

Night Water Landing

The best method here is avoidance. If you find yourself in flight after dark in a straight float seaplane (No Wheels), and you don't have enough fuel to make it till dawn your safest bet would be to find a lighted grass strip. Your next safest move is to find a lighted paved strip. Float damage should be minimal. Occupant damage should be none. If you really know your landing area well, and you have a lighted final ground reference to use a glassy water landing is your only hope. Even on a highly moon lit night your height above the water will be impossible to judge.

Water Maneuvering

Center of Buoyancy -- Managing weathervaning

Much of your on the water activities will involve the management of wind. As we have stated the airplane in level attitude really wants to weathervane into the wind. Sometimes we need to travel downwind or crosswind. In calm 0-5 knots the water rudders will handle most of our needs. Airplanes with dual water rudders will be easier to manage than planes with only one rudder. Even then it is a good idea to keep your ailerons properly positioned to keep wind from getting under and lifting a wind. Gusts happen.

Plow Turn -- Turning the plane downwind in a stiff breeze.

So let's assume the situation is not ideal and we have a 15 knot breeze. We need to taxi to the other end of the lake for take-off The wind is too strong to get the airplane turned around to taxi downwind. As we mentioned earlier, the weathervaning tendency of the airplane can be reverse (tail into the wind) by shifting the center of buoyancy aft. This is done by applying power to raise the nose and using water rudder and ailerons to initiate a turn. Turns to the left will

be easier (p-factor)

1. Water rudders down.
2. Stick Full Aft. (As Always when taxiing)
3. Turn the airplane 15 degrees to the right with the rudders. Ailerons to the left to hold the left wing down in the wind. (We will use the initial weathervaning to get a
turning moment the to the left)
4. Add Power (about 2000 rpm)
5. Initiate a turn to the left with full left rudder. The weathervaning tendency will reverse when the nose comes up.
6. Neutralize ailerons when directly up wind and then reverse them. (Left)
7. When facing downwind go to idle and neutralize ailerons and rudder.
8. Now you need to very mindful of you rudder control. The airplane will continue to idle directly downwind, but stability in minimal. Any deviation will cause the plane to want to weathervane into the wind.

If you need, you can use a plow taxi to straighten things up again. Extended plow taxi should be avoided due to high engine heating / low engine cooling and excessive prop spray. Step taxi should be avoided to in these severe conditions due to float pounding and over turn potential. Realistically this is a rare maneuver. If the wind is that strong, the waves are going to be hard on the plane and there is a strong over turning danger.

Plow Taxi – Very stable.. Reverse weather vaning

Plow taxi is another rare maneuver, because it is really hard on the engine and prop.
Speed is relatively slow, power is high, spray is plentiful, and visibility over the nose is nonexistent.

1. Clear the area in front of you. You will not be able to see in this attitude.
2. Gear Up
3. Water Rudders down
4. Stick all the way back.
5. Add enough power to get the nose high
6. Continue only as long as necessary

This is what you experience at the beginning of a take off run, before the nose goes over.

Step Taxi & Turns —For calm water to get somewhere efficiently without lifting off.

Step Taxi is often used to get to the other end of the lake for take off. Speed will be decent, visibility okay, and engine cooling okay. Spay will be aft of the prop. Step taxi is essentially a take off run with the power reduced once on step.

(When the nose goes over and a level attitude is achieved). In the Husky a power setting of 19 inches will generally be effective in keeping the plane on step

without getting too much speed. Use the elevator to keep the attitude at minimum drag on the floats, just like on take off. The wings will be generating some lift and the plane will be rather unstable in turns. Use ailerons in turns to counteract the strong over turning tendency and keep turns really subtle. Never turn from downwind to up wind in a step taxi as over turning tendencies are strongest here. If you see that you are going to hit a large wave, pull power immediately and hall back on the stick to slow the plane. Step taxi is a calm water procedure. Water rudders should be up, there is plenty of air rudder authority, and the water rudders get a beating at that speed.

Sailing – Directing your drift

Used in stronger winds to avoid dangerous turns to downwind A seaplane actually makes a pretty good sail boat, accept for the fact that you must sail backwards. There are several good reasons to sail a seaplane.

1 It avoids trying to turn downwind in a strong breeze.
2. No wear on the engine or prop.
3. Good directional control
4. Completely safe

To sail a seaplane simply shut the engine down. Retract the water rudders. The wind will blow you straight backwards. If you want to go right then point the tail of the plane right using left rudder and right aileron. The adverse yaw of the ailerons helps to turn the plane and keeps the upwind wing down. Reverse the procedure to go left. Flaps are generally retracted, since they decrease airflow over the flight controls. Extending them will actually increase your water speed, but control suffers. Forward elevator may be necessary to keep the back end of the floats from digging in to the water and causing a capsizing potential.

Right Sailing

1. Shut down the engine.
2. Retract water rudders and flaps.
3. Stick forward
4. Ailerons Right
5. Rudder Left

Power On Sailing – Going sideways

You can also sail the plane with power on. This allows parallel parking in strong winds. In this case idle power is used to keep the plane's forward position constant. The rudder and aileron positions are opposite of power of sailing. Point the nose in the direction you wish to travel and cross control with ailerons. It is best to start sailing with the water rudders retracted then, once you get sideways motion, drop them to increase the yaw. Never idle taxi with more than 1000 RPM.

Post Flight Procedures.

Docking – A thousand ways to hurt your airplane.

The vast majority of docks are designed for boats. They have lots of posts

and
reasonably good protection for hulls that have bumpers above the water line. Very few boat hulls extend outward below the water line like float planes do. It is a good idea to know the dock you are approaching before committing. Many float planes have an elevator that extends beyond the width of the floats and they can be right at dock height Use common sense and scope out any potential hazards ahead of time. A straight in approach may be your only option, but that requires putting the prop where it can be most lethal or having a helper on the float, but the front of the floats is cushioned by the nose wheels for that reason and there are usually no airplane parts that can be damaged in the approach. General rules for approaching a dock.

1. Plan your approach to the dock up wind.
2. Organize yourself and your cockpit for the approach by getting headsets and seatbelts off. Go ahead and kill the radios. Have a rope at the ready.
3. Kill the engine way before you get close to the dock. 20-30 feet away is a good place to kill the engine by pulling the mixture. You can slow your approach even before killing the engine by using carb heat and / or running on one magneto. It is far better to have to paddle to the dock than to crash into it.
4. Approach the dock at a 45 degree angle. This gives you a good angle and you can check out the dock before committing. You can also abort the docking procedure easier for a go around
5. When you are about 10 feet from the dock begin the turn to parallel it. Remember you have no brakes.
6. Never let a passenger get in front of the wing strut. Keep them away from the prop even if it is “Off”

Beaching

Always approach a beach at a 45 degree angle. Look for stumps and rocks. A sandy beach is the only kind of beach to park a seaplane. The easiest way to beach a plane is to shut the engine down and pull the water rudders up and sail into the beach backwards. Never power onto a beach. Always leave yourself a way to abort the beaching, by using the 45 degree approach. Another benefit to using a downwind beach is you know your seaplane will not blow off shore causing and embarrassing swim to recover your airplane.

Ramping

Some seaplane facilities may have a wooden ramp extending into the water. This is the one instance where some power may help in mooring your plane. Approach the ramp straight on at idle power. When the nose of the floats contact the ramp hold the stick full back, retract the water rudders, and slowly add power to drive the plane up the ramp. When your position is good pull power to idle and secure the engine.