SINGLE-ENGINE-SEA (SES) Training Guide

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Welcome

This Guide is intended to assist in your transition training and not intended to replace either official or privately published material on the subject

Geographic locations, local weather, aircraft, and water conditions vary dramatically in different parts of the country. This Guide and your training will focus on the basics and techniques appropriate to our location. Focus on the FAA Airman Certification Standards will be spent in preparation for the successful outcome of the FAA Practical Test for the addition of “Airplane Single Engine Sea” to your pilot privileges.

Be prepared for a wonderful discovery. The world of flight will open up from an airport to airport operation to seeing new opportunities with two thirds of the earth's surface...Water!

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SECTION 1. INTRODUCTION AND COURSE OVERVIEW

Ground School Day 1

Note All ground school subjects will not necessarily be covered in one classroom sit down but will take place throughout the day while taking breaks on a beach or dock or
having lunch.

Ground school, subjects covered will include regulations, maritime rules, Invasive Species, and charts and publications pertaining to seaplanes operations. You will learn about seaplane design and operations including taxi, sailing, takeoffs, and landings, and the various methods of securing the seaplane. We will over characteristics of water and the effects of wind.

We will then discuss the description of your aircraft used in training including specifications, wt and balance, and performance and survival equipment and checklists.

Flight Training Day 1

Preflight preparations and inspections will be introduced along with cockpit orientation.

Introduction and practice throughout the day will include taxi, sailing, different types of take offs and landings depending on water and wind conditions and different methods of securing the Seaplane.

Arrival, reconnaissance of landing areas will be introduced and practiced along with abnormal occurrences and emergencies

Flight characteristics of the airplane will be tested such as slow flight and stalls.

Ground School Day 2

Questions from day 1 will be cleared up and any subjects not covered will be introduced. Throughout the day a review of subjects will take place with emphasis on knowledge areas for the Practical Test

Flight Training Day 2

Questions will be cleared up from day 1 flying and Skills not introduced from day 1 will be introduced and practiced. Day 2 will emphasize practice in all areas as necessary in preparation for the Practical Test

Ground School Day 3

Questions from day 2 will be cleared up and any subjects not covered will be introduced. Throughout the day a review of subjects will take place with emphasis on knowledge areas for the Practical Test.

Flight Training Day 3

Questions will be cleared up from day 2 flying and Skills not introduced from day 2 will be introduced and practiced. Day 3 will emphasize practice in all areas as necessary in preparation for the Practical Test.

SECTION 2.

REGULATIONS, MARITIME RULES, INVASIVE SPECIES, PUBLICATIONS, CHARTS

REGULATIONS AND MARITIME RULES

The same regulations that apply to land plane pilot privileges and operating rules apply to seaplane pilots and seaplanes. We will look at a couple things that can affect your privileges after adding a Airplane Single Engine Sea rating.

Airplane is a Category and Land or Sea is a Class. So for a Flight Review (FAR 61.56) only needs to be accomplished in one of the Categories and Classes you hold.

Recent experience requirement for the purpose of the carriage of passengers is Category and Class specific (FAR 61.57). This is the 3 take off and landings in a 90 day period. A scenario for example are your current landings in a land plane but haven't flown a seaplane in 6 months you would need 3 takeoffs and landings before taking a passenger in the seaplane.

One regulation that may be new to you is FAR 91.115 Right of Way: Water operations. This deals with seaplanes on the water surface.

Right-of-way rules: Water operations. FAR 91.115

(a) ***General***. Each person operating an aircraft on the water shall, in so far as possible, keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right-of-way by any rule of this section.
(b) ***Crossing***. When aircraft, or an aircraft and a vessel, are on crossing courses, the aircraft or vessel to the other's right has the right of way.

SECTION 2.

(c) ***Approaching head-on***. When aircraft, or an aircraft and a vessel, are approaching head-on, or nearly so, each shall alter its course to the right to keep well clear. (d) ***Overtaking***. Each aircraft or vessel that is being overtaken has the right-of-way, and the one overtaking shall alter the course to keep well clear. (e) ***Special circumstances***. When aircraft, or an aircraft and a vessel, approach so as to involve risk of collision, each aircraft or vessel shall proceed with careful regard to existing circumstances, including the limitations of the respective craft.

Keep in mind even though we need to know Right-of-Way Rules in practice we are going to give way to everybody! The Seaplane has limited visibility, no brakes or reverse.

Another scenario we'll look at is Right of Way during landing at an airport. You're probably familiar with the landing aircraft has right of way.

Right-of-Way Rules Except Water Operations FAR 91.113 (g)

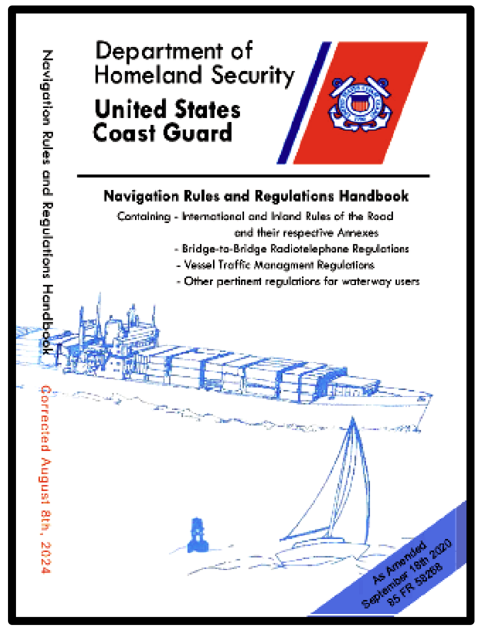
Landing. Aircraft, while on final approach to land or while landing have right-of-way over other aircraft in flight or operating on the surface

In practice though with Seaplanes the landing Seaplane will give way to the Seaplane on the water. While landing at an airport the landing aircraft can only land on the runway. Additionally, the departing aircraft holds 90 degrees short to the final approach and has full view of the landing aircraft. On the water the departing seaplane at rest is weather vaned into the wind preparing to takeoff and may not see the arrival approaching. The landing Seaplane is not restricted to the confines of the airport and can reset and land at another location on the water or simply go-around

A final regulation that directly affects Seaplane operations is FAR 91.107(a)(3) For Seaplane and float equipped rotorcraft operations during movement on the surface, the person pushing off the Seaplane or rotorcraft from the dock and the person mooring the Seaplane or rotorcraft at the docks are exempted from the preceding seating and safety belt requirements.

MARITIME RULES

There is a multitude of maritime rules. The Coast Guard distinguishes between operating in International Waters and Inland waters in which we normally operate.

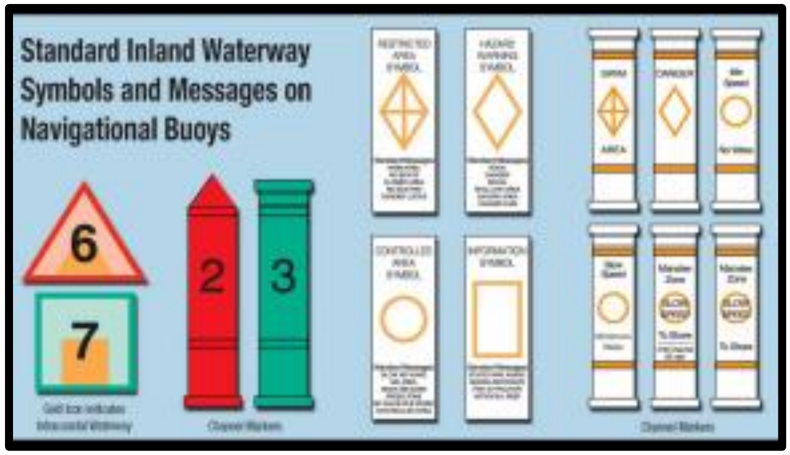


The Coast Guard Navigation Rules and Regulations Handbook can be read or downloaded from the Coast Guards website at ***https://www.navcen.uscg.gov***

CHANNEL MARKERS AND BUOYS.

As with airports signs and markings at the airport we should be familiar with some basic Channel Markers and Buoys that we may encounter while operating on the water.

Arriving or departing a channel-colored buoy system may be encountered.

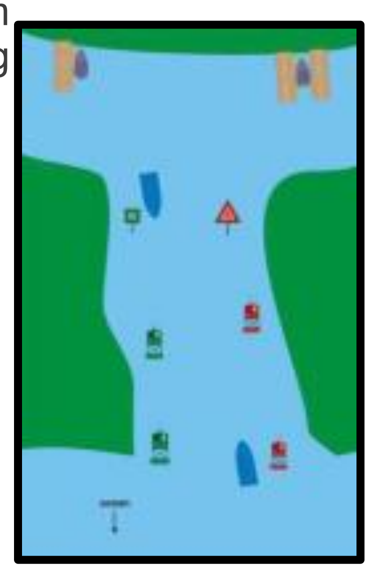


Channel markers can be thought of as painted lines on a taxiway. They can channel the flow of traffic and keep us away from hazards. Red and green colored markers are used.

Buoys can be thought of as signs both regulatory & advisory.

SECTION 2.

While in a channel and encountering a red and green marker the key to remembering is the red marker. When we are returning from open water an old memory aid is "***red right return***" meaning we would keep the red marker to our right and the green to our left.



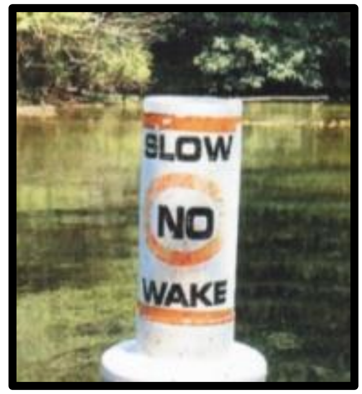
When leaving out to open water we would keep the red marker to our left and the green marker to our right. So, borrowing from the old memory aid "***leaving on the left***" keeping the red marker to our left.

Of the many buoys we will look at the regulatory no wake buoy.

Operating in recreational water we are sharing with boaters, swimmers and general recreation. These tend to be found near marina's, docks, anchorages, and swimming beaches. In waters marked by these buoys we want to idle taxi so as not to produce a wake or any "white water".

During takeoff and landings the seaplane produces a wake so we want to remain clear of a no wake area. So on our arrival and conducting a reconnaissance of our landing area we want to identify no wake areas.

By identifying a marina, dock, anchorage, or a beach where human activity is observed and we observe buoys or a line of buoys near these locations, chances are there are no wake areas. These areas are avoided in our decision making in setting up our approach and landing.



Besides, in the interest of safety we don't want to take off or land near people or vessels anyway

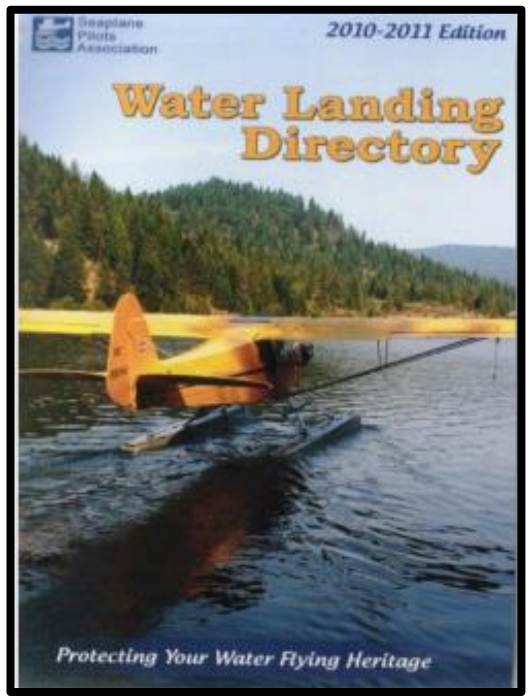
SECTION 2. Publications and Charts

WHERE WE CAN OPERATE

One best source of information about access to water operations for seaplanes is a publication produced by the Seaplane Pilot Association.

The Water Landing Directory published by the SPA contains information by State listing open and closed waters for Seaplane operations. Additionally, the SPA has developed the Directory on an app for IPhone, iPad users and an online version.

Information can be found at *https://www.seaplanepilotsassociation.org*



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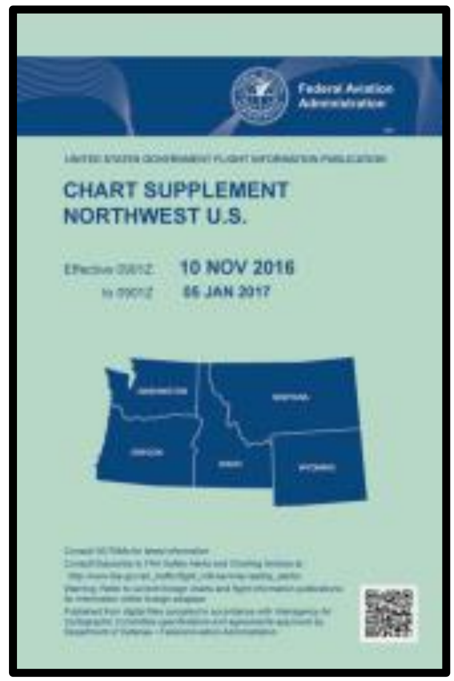
WHERE WE CAN OPERATE

Another source that has limited information is the FAA published Chart Supplement that contains a Airport Facility Directory. The Chart Supplement contains limited amount of information on published seaplane Bases. Seaplane bases can also be identified on

Sectional Charts with use of an anchor symbol. The anchor depicts Seaplane operations, an anchor surrounded with a circle represents a Seaplane Base and an anchor circled that has tick marks represents a Seaplane Base with services. A double Circle would reflect a military base.



Finally, lacking other information we can research and contact the responsible authority for the body of water and determine any restrictions, procedures, obtain permission, etc. We also can find out information about Aquatic Invasive Species for that body of water.

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INVASIVE SPECIES

In recent years Invasive Species has become a problem in freshwater systems throughout the U.S.

Invasive species are non-native plants and aquatic animals thriving after being transported to a body of water. These species pose a risk to native aquatic life, people and vessels using that body of water.

As a Seaplane Pilot we can be proactive in the prevention of the spread of Invasive species. Before leaving a body of water for another there are some steps we can take to avoid transporting any species

Before departing to another body of water We can remove obvious vegetation from water rudders, cables, lines, etc. Any debris should be bagged and thrown in the trash and not on the dock or returned to the water. With a long handle brush scrub on the outside of the floats.

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We can pump out the bilges and compartments in the floats. We can spray a bleach solution into compartments and bilges After takeoff, fly over the same body of water and cycle the water rudders up and down to release any debris lodged in the rudders, fittings and cables

SECTION 2.

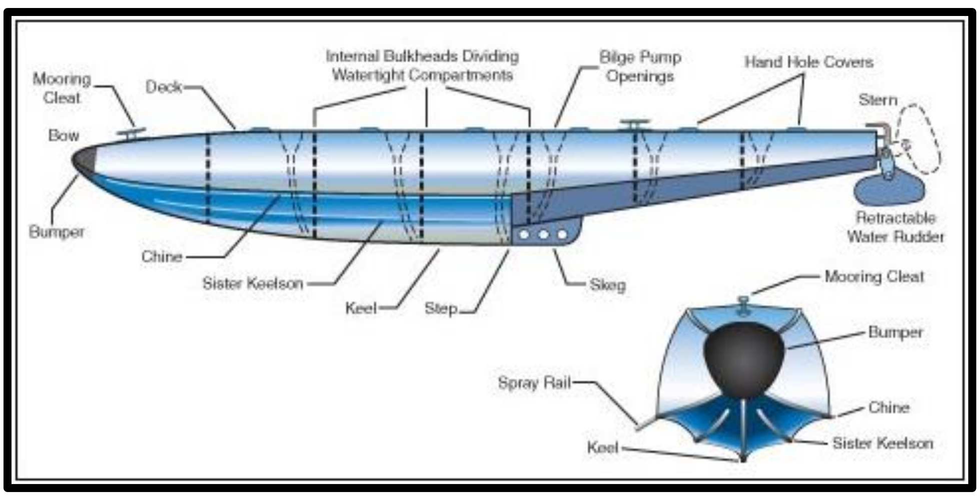
INVASIVE SPECIES TRAINING FOR SEAPLANE PILOTS

Additional training for Seaplane pilots is provided by the the Seaplane Pilots Association website. http://www.seaplanepilotsassociation The online course consists of watching a video that lasts approximately 20 minutes then take a short test that you can retake You then can print out a Certificate of completion of the course that you can carry with you

SECTION 3. CHARACTERISTICS OF FLOAT AND HULL DESIGN

This next section covers basic design of seaplanes. The main focus will be on float design because this is what your training and test will be in. We will cover some design on hull type seaplanes.

COMMON TERMS



AMPHIBIAN-Seaplane with retractable type landing gear that can be extended to allow landings to be made on land

AUXILIARY FIN-An additional vertical stabilizer installed on some float planes to offset the increased surface area of the floats in front of the center of gravity

BILGE-The lowest point inside a float, hull, or watertight compartment

BULKHEAD-A structural partition that divides a float or hull into separate compartments

CHINE-The longitudinal seam joining the side and bottom of the float. The chine serves a structural purpose, transmitting loads from the bottoms to the sides of the floats. They also serve a hydrodynamic purpose, guiding water away from the float, reducing spray, and contributing to hydrodynamic lift.

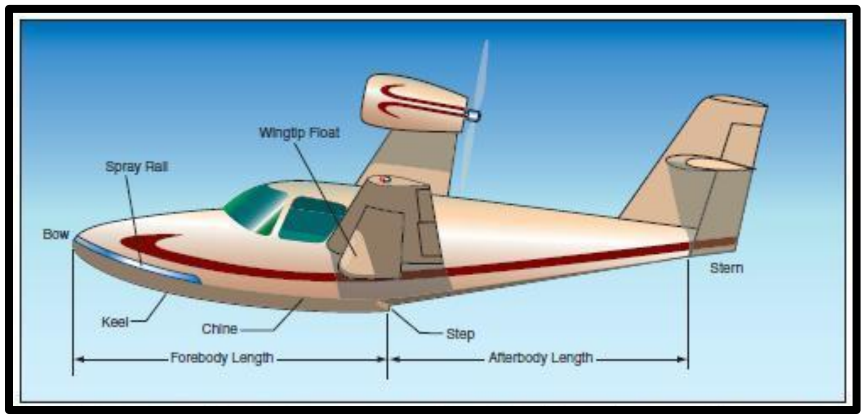
DECK-The top of the float, which can be served as a step or a walk-way. Bilge, pump openings, hand hole covers, and mooring cleats are typically located along the deck

FLOATPLANE-A seaplane equipped with separate floats to support the fuselage well above the water surface.

FLOATS-The components of a floatplane's landing gear that provide the buoyancy to keep the airplane afloat

FLYING BOAT-A type of seaplane in which crew, passengers and cargo are carried inside a fuselage this is designed to support the seaplane on the water

KEEL-A strong longitudinal member at the bottom of the float or hull that helps guide the seaplane through the water, and, in the case of floats, supports the weight of the seaplane on land



SEAPLANE-An airplane designed to operate from water. Seaplanes are further divided into flying boats and floatplanes

SISTER KEELSONS
Structural members in front of floats lying parallel to the keel and midway between the keel and the chimes, adding structural rigidity and adding to directional stability when on the water

SKEG-A robust extension of the keel behind the step which helps prevent the seaplane from tipping back on the rear of the float

SPONSONS-Short wing like projections from the sides of the hull near the waterline of a flying boat. Their purpose is to stabilize the hull from rolling motion when the flying boat is on the water, and may also provide aerodynamic lift in flight. Tip floats are sometimes known as sponsons

SPRAY RAILS-Metal flanges attached to inboard forward projections of the chimes to reduce the amount of water spray thrown into the propeller.

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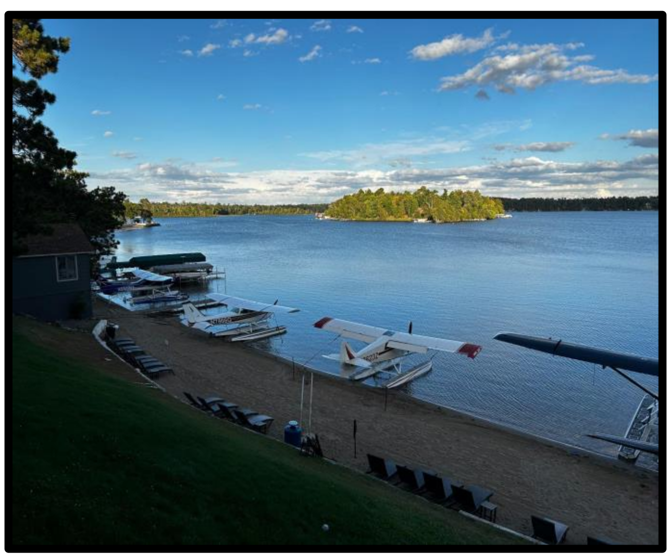
STEP-An abrupt break in the longitudinal float or hull, which reduces water drag and allows the pilot to vary pitch attitude when running along the water's surface

TIP FLOATS-Small floats near the wingtips of flying boats or floatplanes with a single main float. The tip floats help stabilize the airplane on the water and prevent the wing tips from contacting the water

TRANSOM-As it applies to seaplanes, the rear bulkhead of a float

WATER RUDDERS-Retractable control surfaces on the back of each float that can be extended downward into the water to provide more directional control when taxing on the surface. They are attached by cables and springs to the air rudder and are operated by the rudder pedals in the cockpit

WING FLOATS
Stabilizer floats found near the wingtips on a single main hull Seaplane. To prevent the wingtips from contacting the water, also called Tip Floats



SECTION 4. CHARACTERISTICS OF WATER As a seaplane pilot, we are typically taking off into the wind. We need to know how to determine direction and velocity. We also need to determine the condition of the water surface for planning the location of the landing and the type of landing.

As wind develops and begins pushing water there are some characteristics that can be observed as described below to help determine wind velocity.

SECTION 4.

Some techniques in determining wind direction are looking at the surface of the water and looking at wave movement. Wind runs perpendicular to waves and it “pushes” the water .

Another technique is to look for water that is glass like then disturbed water. The side with glass like water is where we would anticipate the wind direction as the shore or terrain is blocking the wind from striking the water, literally causing a shadow.

Strong winds can cause streaks and spray to break off the crest of the wave. The optics can appear the wind is blowing the streaks but paying attention to wave movement, that will tell us wind direction

SECTION 4.

Lack of wind causes a condition known as glassy water. The surface presents a mirror image.

COMMON TERMS

BEAUFORT WIND SCALE - A standardized scale ranging from 0-12 correlating the velocity of the wind with predictable surface features of the water

CHOP - A roughened condition of the sea surface caused by local winds. It is characterized by its irregularity, short distance between crests, and whitecaps.

CREST - the top of the wave

CURRENT - Horizontal movement of water

DOWN SWELL - Motion in the same direction the swell is moving

SECTION 4.

FETCH - An area where wind is generating waves on the water surface. Also the distance the waves have been driven by the wind blowing in a constant direction without obstruction

GLASSY WATER - A calm water surface with no distinguishable surface features, with a glassy or mirror like appearance, glassy water can deceive a pilots depth perception

HEIGHT-TO-LENGTH RATIO - The ratio between the height of the swell to the length between two successive crests(swell length)

LEEWARD - Downwind, or the downwind side of an object

PRIMARY SWELL - The swell system having the greatest height trough to crest

SEA - Waves generated by the existing winds in the area. These wind waves are typically a chaotic mix of heights, periods, and wave lengths. Sometimes the term refers to the conditions of the surface resulting from both wind waves and swells

SEA STATE CONDITION NUMBER - A standard scale ranging from 0-9 that indicates the height of the waves

SEAWARD - The direction away from shore

SWELL - Waves that continue after generating wind has ceased or changed direction. Swells also are generated by ships and boats in the form of wakes, sometimes by underwater disturbances such as volcanoes and earthquakes. The waves have a uniform and orderly appearance characterized by smooth, round, regularly spaced waves

SECONDARY SWELLS - Those swell systems of less height than the primary swell

TIDES - The alternate rising and falling of the ocean and other bodies of water connected with the ocean. They are caused by gravitational attraction of the sun and moon occurring unequally on different parts of the earth. Tides typically rise and fall twice a day

TROUGH - The low area between two crests

WINDWARD - Upwind, or the upwind side of an object

SECTION 5. CHARACTERISTICS

COMMON TERMS

ANCHOR - A heavy hook connected to the seaplane by a line or cable, intended to dig into the bottom and keep the seaplane from drifting

BEACHING - Pulling a seaplane up unto a suitable shore so that it’s weight is supported relatively by dry ground

BUOYANCY - The tendency of a body to float or to rise when submerged in a fluid

CAPSIZE - To overturn

CAST OFF - To release or untie a vessel from it’s mooring point

CENTER OF BUOYANCY - The average point of buoyancy in floating objects. Weight added above this point will cause the floating object to sit deeper in the water in a level attitude

CHINING (to chine) - The float is sideways in forward motion on the water causing the chine to dig in and lead to loss of directional control and or capsize

DISPLACEMENT POSITION - The attitude of the seaplane when it’s entire weight is supported by the buoyancy of the floats, as it is when at rest or during slow taxi. Also called the idling position

DOCK - To secure the seaplane to a permanent structure fixed to the shore. As a noun, the platform or structure to which a ramp lane is secured

HYDRODYNAMIC FORCES - Forces relating to the motion of fluids acting on solid bodies in motion relative to them

HYDRODYNAMIC LIFT - For seaplanes, the upward force generated by the motion of the hull or floats through the water. When the seaplane is at rest on the surface, there is no hydrodynamic lift, but as the seaplane moves faster, hydrodynamic lift begins to support more and more of the seaplane weight

SECTION 5.

IDLING POSITION - The attitude of the seaplane when it's entire weight is supported by the buoyancy of the floats, as it is when at rest or during slow taxi

MOOR - To secure or tie the seaplane to a dock, buoy or other stationery object on the surface

PLANING POSITION - The attitude of the seaplane when the entire weight of the seaplane is supported by hydrodynamic and aerodynamic lift, as it is during high speed taxi or just prior to takeoff. This position produces the least amount of water drag

PLOWING POSITION - A nose high powered taxi characterized by high water drag and an aft shift of the center of buoyancy. The weight is supported primarily by buoyancy, and partially by hydrodynamic lift

PORPOISING - A rhythmic pitching motion caused by incorrect planing attitude during takeoff

RAMPING - Using a ramp that extends underwater as a means of getting the seaplane out of the water and onto the shore. The seaplane is typically driven under power onto the ramp and slides partially into the ramp due to inertia and engine thrust

SAILING - Using the wind as the main motive force while on the water

SKIPPING - Successive sharp bounces along the water surface caused by excessive speed or an improper attitude when the seaplane is on the step

STEP POSITION - The attitude of the seaplane when the entire weight of the seaplane is supported by hydrodynamic and aerodynamic lift, as it is during high-speed taxi or just prior to takeoff. This position is also called the planing position.

WEATHERVANING - The tendency of a seaplane to turn until it points into the wind

SECTION 6. TAKEOFFS, ARRIVAL, APPROACH,LANDINGS, AND TAXI

This section is devoted to characteristics of seaplanes in water taxi, water takeoff and landings. Sailing techniques along with beaching, docking, ramping, mooring, and anchoring will be discussed.

Takeoff begins with the seaplane turned into the wind at the displacement idle position and takeoff checklist completed. The center of buoyancy (COB) is forward and the floats sit deep in The water in a level attitude and the bows on the floats are pushing water causing a small bow wave and a low spray pattern

Beginning at the idle position, the seaplane is transitioned from the idle position through the plow position to stabilize on the step position. The step position, is where the least amount of water drag occurs. Aerodynamic lift increases as the seaplane accelerates to a point the seaplane will lift off the water

To accomplish the takeoff, water rudders are up, the elevator in the full up position. Full power is applied. The bows on the floats begin to lift out of the water. The center of buoyancy begins moving aft as does the bow wave and the spray pattern is larger. The seaplane is now in the plow position

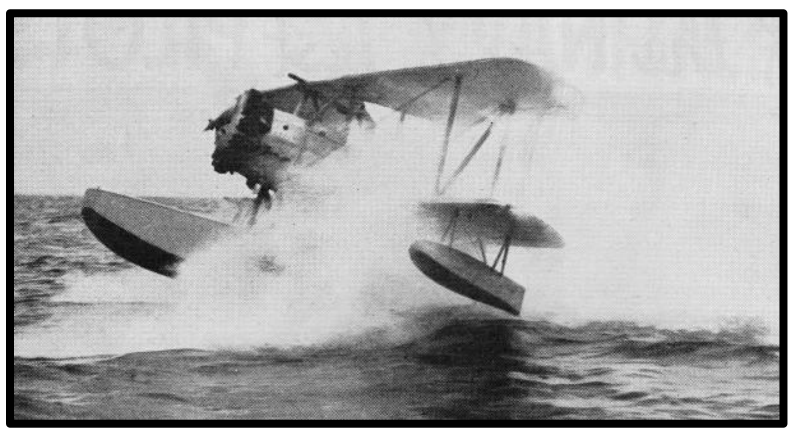
As we continue accelerating in the plow position the bows rise higher, the center buoyancy continues to move aft. The bow waves and spray pattern continues to move aft to the area of the step

After the bow wave has reached the vicinity of the step the elevator is reduced which lowers the bows of the floats and the pitch attitude is maintained to keep the bow wave and the spray pattern at the step planing position also known as being on the step. From the step note your sight picture of your pitch attitude. This will come into play during landing. Then allow the seaplane to accelerate until enough aerodynamic lift is produced and the seaplane lifts off. Climb out is done at Vy or a recommended cruise climb.

GLASSY WATER TAKEOFF

Glassy water can present an extended take-off distance. This is due to the smooth water causing a high amount of water drag with the floats. With a breeze striking the water and a wave pattern develops this breaks up the drag and shortens up the take-off run. Some techniques to overcome glassy conditions can include step taxi up and down the takeoff area to cause some chop to the surface. If there is enough room, step taxi in a large 360 deg circle returning to our own lake to break free. Also after on the step by lifting a float can cut the water drag in half allowing a lift off

ROUGH WATER TAKEOFF



Rough water conditions should be avoided. With no suspension system, the pounding of the floats and struts and fittings can cause damage. Additionally, failing to maintain a proper step attitude can develop into a premature lift off and return to the water with pitch up and pitch down attitudes known as porpoising.

This can lead to catastrophic results with an upset, along with water, spray, and mist can be thrown in the propeller causing erosion and damage.

SECTION 6.

During take-off as you contact the top of the waves control and maintain the step position attitude sight picture. When speed is near flying recommended flaps can be set to lift off. Staying in the ground effect accelerate to recommended climb speed, reduce flaps and continue the climb much like a soft field takeoff in a land plane

If during the takeoff run and pitch attitude cannot be controlled, simply abort and taxi to calmer waters or cancel the flight until conditions improve

CONFINED AREA TAKEOFF

Seaplanes can land in shorter distances than the distance required for takeoff. So care is given to selection of landing.

An increase in load, i.e. passengers, gear, fuel requires a longer distance and can turn a body of water you have previously conducted normal takeoffs from into a confined area takeoff.

Techniques for a confined area takeoff include a stabilized 360 deg step taxi then apply full power, takeoff then continue a circling climb until clear of obstacles and terrain.

Another technique is similar to a land plane short field takeoff with an obstacle. After takeoff, climb out at Vx until clear of terrain and obstacles then continue at Vy or recommended cruise climb.

SECTION 6.

CROSSWIND TAKEOFF

Crosswinds should be avoided or limited due to reduced or lack of headwind component, this causes a longer takeoff distance. Additionally, with lack of proper upwind aileron control can lead to a wing lifting causing a float to lift and weather vaning tendencies to turn the seaplane into the wind. Without proper rudder input potentially can cause a capsize or turn off a clear takeoff area into a hazard. Analysis of conditions and planning can reduce risks.

One scenario is plan using curving river bends to our favor where we begin the takeoff run with the crosswind and curve with the river until we're into the wind for the takeoff.

Another scenario is coming out of a protected cove to a main body of water with a crosswind, you can go from the step turn into the wind to complete the takeoff after entering the main body of water.

There are countless scenarios but assessing conditions and risks and proper planning a safe outcome is possible.

SECTION 6.

ARRIVAL, APPROACH, LANDING, AND TAXI

Arrival-High Reconnaissance

Upon arrival to a body of water of intended landing a "high reconnaissance" is conducted. This recon is accomplished at arrival altitude getting a general overview. Wind and water conditions may be determined and potential landing areas identified. Factors included in a landing area include looking for protected waters from wind and waves.

To land in a desired area an aim point will be selected to aid in the approach and landing phase. An aim point along a shoreline or a point of land to descend over will result in the touchdown taking place beyond in the desired area. An additional advantage of using the terrain is it will help with depth perception for height and sink rate information during the approach and water landing. Depth perception to water is difficult without ground references so we want to avoid landing in the middle of a main body of water. Other benefits of landing near a shoreline include protected waters are found there, if a mishap occurs, you're close to shore to swim there, and you're closer to rescuers.

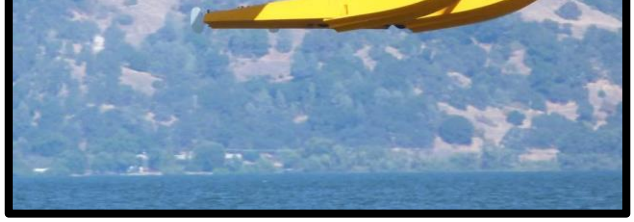
Low Reconnaissance

After completing a high reconnaissance, a descent in a rectangular pattern is flown to a low recon position at a pattern altitude.
An assessment of our landing area continues throughout the descent.

Wind direction and water condition is confirmed for a headwind landing perpendicular to the waves. Along with identifying hazards such as power lines, debris in the water, water traffic, etc. The aim point is identified and a downwind leg of a traffic pattern is flown for a final approach to the aim point along with completion of the before landing checklist.

Approach

A stabilized glide path is flown on an approach over the aim point if approaching from land or abeam a shoreline aim point if the approach is parallel to the shoreline. Once stabilized on final verify there is enough unobstructed water beyond the aim point to complete the landing. If it’s in question reject the landing and go around.



SECTION 6.

LANDING- GLASSY, ROUGH, CONFINED AREA, CROSSWIND, AND EMERGENCY LANDINGS

On approaching short final while maintaining a constant airspeed and glide path, power is smoothly reduced while pitch is adjusted up to our sight picture for the step position attitude. Power then is added as necessary to control the sink rate to the water. Touchdown is made “on the step”, the point of least amount of water drag.

If it hasn’t been done yet power is then reduced to idle. Contact with the water causes water drag and slows the floats. As the seaplane slows aerodynamic and hydrodynamic lift reduces and the floats settle deeper in the water. As the floats settle lower in the water the bows begin to lower. Left unchecked the bows could dig in and cause a capsize. To keep the bows out of the water the elevator is moved up throughout the slowing by applying back pressure on the stick until the floats settle into the idle displacement position. The stick is then aft with full elevator. This also keeps mist and water spray out of the propeller. Water rudders are then lowered for directional control and the after-landing checklist is completed.

SECTION 6.

GLASSY WATER LANDING

The glassy water landing is different in that the water surface is mirror like and depth perception is deceived making judging of height and sink rate above the water difficult. The pattern and approach referencing the aim point is the same. The difference will be prior to crossing over or coming abeam the aim point the pitch attitude for landing is set, then referencing the VSI the sink rate is stabilized between 100 to 150 ft per min sink rate. The sink rate is adjusted with power by looking at the VSI and not looking outside at what we think we are seeing. Misperceptions could result in flying into the water or stalling above the water. With pitch set, the VSI is stable, the seaplane is allowed to land itself. We can think of it as Pitch, Power, and Patience. This will require a longer landing area and is factored in selecting a landing area.

SECTION 6.

ROUGH WATER LANDING

Landing perpendicular to the waves contact is made with the crests of the waves and a rough pounding might be experienced. As the floats slow and the bows rise the hulls begin striking the face of the waves bouncing might be experienced. To reduce the effect a slight lowering of the pitch attitude can allow the deeper V portion of the hulls to displace water and cut

through the crests of the waves to soften the effects of pounding and bouncing. Care must be given not to allow the bows to dig in when reducing the pitch attitude which can result in a capsize.

CONFINED AREA LANDING

Since distance required for takeoffs is greater than landing, a confined area landing should be avoided. Circumstances may require a confined landing such as mechanical issues, low fuel, weather, etc.

After a normal approach, when obstacles are cleared and without allowing speed to increase an increase in flaps and/or a forward slip can be introduced to increase the glide angle. At a safe height reestablish a stabilized configuration for a normal landing.

After landing and when speed has reduced and the floats begin to settle off the step position, increase the pitch to drag the aft portion of the floats, this will have a braking effect and reduce the landing distance.

SECTION 6.

CROSSWIND LANDING

To decrease the crosswind component, select a line for landing which will decrease the crosswind as much as possible. A possible scenario is instead of landing in a straight section of a river selecting a line across a curve in the river might provide a decrease in the crosswind.

On a lake decrease the crosswind by selecting a line as much into the wind as much as possible. This might take you away from your objective of the landing such as a dock, beach location, etc. and require a longer taxi distance.

Once the crosswind has been reduced as much as possible touchdown with a side slip. Touchdown in a crab can result in the water catching the chine and cause a loss of directional control or capsize. This is also known as “chining”.

EMERGENCY LANDING

Flight paths should take place near water that will allow a precautionary or an emergency landing. If landing on the ground is the only option then select a surface that is firm and as slick as possible such as wet grass, asphalt, etc. That will allow the floats to slide. Soft terrain could cause the floats to dig in and flip the seaplane.

A normal water landing can be done without power by using a few techniques. Additional airspeed will be carried above published L/D. Due to higher drag by the floats. The higher speed/energy will be used later to acquire the proper pitch attitude and control the sink rate for a normal anding.

Transitioning from the approach phase to landing phase begin with a level off above the water without ballooning. The seaplane will begin to slow and settle to the surface. As it settles control the sink rate by increasing the pitch. As it continues to settle and slow keep increasing pitch until the step attitude is acquired and maintained. The speed will continue to slow and then a normal landing can be accomplished.

Section 6.

TAXI- IDLE, PLOW, AND STEP

IDLE TAXI

note- lowered water rudders for the most part are used only for idle taxi

Idle taxi is what is used most of the time. The floats are in a level displacement position, the bow wave is forward and little spray is produced. Water rudders are lowered and directional control is with the rudder pedals.

During turns the floats pivot at the location of the center of buoyancy (COB). At idle the float rides level in the displacement position with the COB located midway on the floats. At the COB we can identify the same point on the fuselage. The distance aft to the tail area is a long arm. So when at the level displacement position and winds are present the seaplane wants to weathervane into the wind much like a barn weathervane.

PLOW TAXI

Anytime power is applied from idle, the floats are no longer in the displaced position. This is considered plow taxi. This is to be avoided because mist and water spray develops and can cause damage to the propeller. Visibility is limited by the high pitch attitude and engine cooling can be affected with high power and low airflow.

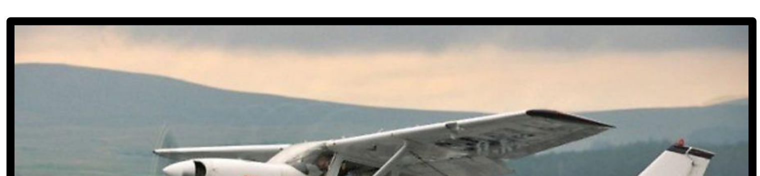
Plow taxi is used to overcome weather vaning that prevents a downwind turn in strong winds.

As power is applied with the stick back, the COB shifts aft as the bows rise out of the water. The COB location on the fuselage shifts aft and shortens the distance to the tail and the arm is reduced. This reduction of the weathervane arm distance allows the turn downwind to be completed. Once downwind return to idle taxi. Returning upwind, the turn is done at idle. As the turn begins, weather vaning will help turn into the wind. If circumstances permit, rather than a plow turn downwind to reach an objective exposing the propeller to water, the engine can be shut down and the seaplane can be sailed downwind of the objective. Once downwind of the objective the engine has started and idle taxied into the wind to the objective.

STEP TAXI

When long distances need to be covered by taxiing. Rather than spending a long time at idle taxi or plow taxi risking damage to the propeller, step taxi can be used. On the step the propeller is free of water spray

Step taxi is done from the planing position. The planing position is also known as being on the “step”. The step



is the position prior to takeoff. To step taxi the takeoff procedure is used up to stabilizing on the step. Once stabilized on the step, power is reduced just enough to remain on the step and not take-off. The seaplane is now planing much like a speed boat. The water rudders are up and steering is done with the aircraft rudder. Care is given not to oversteer. Oversteering can force the floats to slide sideways on the surface of the water and cause chining. Chining can lead to a loss of directional control and/or a capsize. Once the objective is reached, power is reduced to idle and the elevator is held up to keep the bows up as the floats settle into the water. Once at the displacement position the water rudders are lowered and the seaplane is returned to idle taxi.

SAILING

Using the wind as a primary force for movement the seaplane can be sailed with limited directional control. Power off sailing is done downwind with the engine shut down. With the engine on, the seaplane can be sailed laterally and with limitations sailed upwind at an angle.

With power off sailing the seaplane is weather vaned into the wind moving rearward. Directional control is done by pointing the tail in the direction of the desired course. The seaplane sails in the direction the tail is pointed. To turn the tail to the right using the wind, the left aileron is placed down and left rudder is applied. The lowered aileron is pushed by the wind causing the seaplane to turn. The left rudder position uses the aerodynamics to help swing the tail to the right. To turn the tail to left, right aileron and left rudder is used. An easy memory aid is borrowed from backing up a car. Like a steering wheel. Place the stick or yoke in the direction you want the tail to go then put in opposite rudder.

Power can be used to sail to the rear, side and forward direction. The direction of movement is on the side the nose is pointed. The rudder controls pointing the nose. The aileron is placed down on the downwind side to help prevent Weather vaning into the wind. Idle thrust can stop the direction of unpowered sail and begin a rearward sail on the side the nose is pointed. By adding enough thrust to match the headwind will stop rearward movement and the wind will push the seaplane in a sideways direction. Adding more thrust than the headwind will result in movement forward in the direction the nose is pointed.

SECTION 7. SECURING THE SEAPLANE

Line Handling, Beaching, Docking, Ramping, Mooring, Anchoring

After landing the seaplane will be idle taxied to the destination which can be a beach, a dock, a ramp, a moorage, or anchorage. When approaching the destination a survey is made of wind, current, and obstructions. A plan is made on how best to make the approach including weather vaning tendencies after the engine is shutdown. Before committing, a plan for departure is evaluated. It is possible to get in somewhere that could prove difficult when the time comes to leave.

The approaches into the area are surveyed that will allow a go around from the approach if needed. After arriving the seaplane is secured with lines. Basic understanding of line handling, knots and hitches make not only tying up but leaving as a matter of little effort.

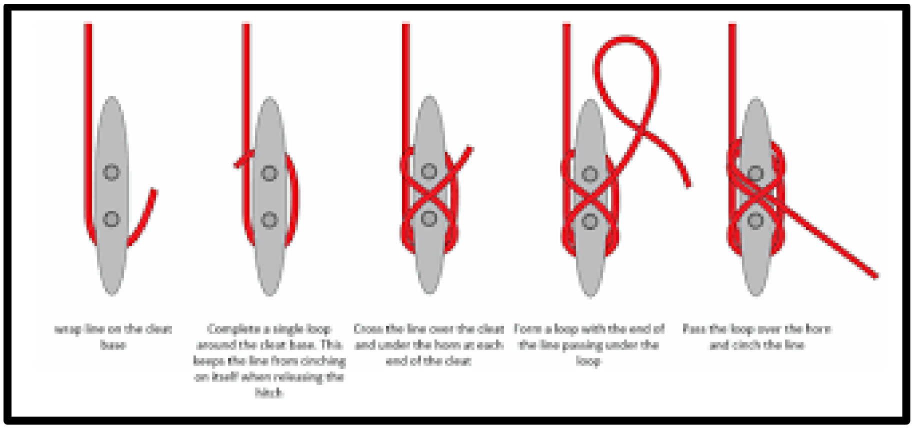
LINE HANDLING

Lines should be organized and managed for immediate use without fouling. This can be even more challenging if the lines become wet. One coil, knot, and hitch can get us through most scenarios.

COIL The line is coiled leaving a tail. The tail is wrapped around the mid section. The last of the tail is pulled through a loop and secured by pulling through one of the wraps Sometimes it may be necessary to throw a line to another person on shore, another vessel on the water, etc. Throwing a coil can become tangled and fouled. One alternative is to wrap the line much like a “yarn ball”. The ball is then thrown or lobbed. The ball unrolls without fouling.

CLEAT HITCH

A figure 8 hitch is used to tie off to a cleat either on a dock or on the seaplane.



A cleat hitch can tighten as the seaplane tugs on it with wave motion. The hitch is easily loosened and removed when preparing to depart. If it becomes wet it is still easy to remove

BOWLINE KNOT

If it's necessary to tie to a eyelet or around something like a tree or post a bowline knot can be used. When completed a fixed loop is made, it too is easy to loosen and remove if it's been tugged on or becomes wet.

SECTION 7.

BEACHING

Approach to a beach is done at idle taxi nosing in with the floats. One approach should be done for the purpose of surveying for any hazards such as rocks, tree stumps, sand bars, etc. If the survey shows a safe beaching can take place, turn out and idle taxi far enough that when you turn in enough room is given to stabilize the approach inbound.

Inbound, a point on the shore should be selected to aim at so that the ground track will bring the seaplane to the desired beaching spot. This is similar to in flight holding a heading that will give a desired ground track. Corrections should be made if drift occurs.

Next closure rate to the beach is monitored to judge when to shut the engine off. The shutdown should be done so the seaplane coasts up to the beach and either just gently "kisses" the beach or stops just short of the beach. This is to prevent damage to the floats.

After beaching nosed in, the seaplane can be floated and turned around and "heeled" up on the beach resting on the back of the floats. This will make for a straight out departure when the time comes to leave.

SECTION 7.

DOCKING

A stabilized approach at idle taxi to a dock is generally made at an angle tracking to a point just short of where the seaplane is to be stopped.

Engine shutdown is timed to allow the seaplane to coast to the dock and with minimum energy turn parallel to the docks edge. This turn bleeds off energy and brings the seaplane to a stop next to the dock

Depending on the design of the dock the seaplane can be turned around and secured. On a long dock, one exit strategy is to turn the seaplane around and walk it down to the end of the dock for tie down. This would prevent a boat from tying down and blocking a departure. A cable attached across the bows of the floats serves as a catwalk(with the engine off!) to access the other float without getting wet. Launching from a dock or beach anticipating weather vaning from winds is made. Once untied from the dock or floating off a beach the seaplane will want to rotate into the wind. A wing could strike obstructions. Additionally the nose could be pointed in a direction that would be hazardous at engine start. Since there are no brakes, once the engine starts the seaplane is moving.

To counteract weather vaning and point the nose for an engine start a paddle can be used until enough sea room is established for a safe start. Once under power normal steering can be made through the water rudders at idle taxi.

RAMPING

Different types and designs of ramps can be used for securing and launching a seaplane.

An amphibious seaplane can taxi up a standard boat ramp to parking. Launching an amphibious seaplane can simply taxi down the ramp. Once floating, the landing gears are retracted. A seaplane on straight floats can utilize a ramp in a similar manner to beaching and launching from a beach.

A flatbed trailer can be used to ramp a seaplane and trailered to parking. Launching is accomplished by backing the trailer into the water and float the seaplane off, like launching a boat

MOORING

A mooring ball is a floating ball with a tie down ring or eyelet that a boat or seaplane can tie off too. The mooring ball is typically secured by cable or chain attached to a concrete block resting on the bottom.

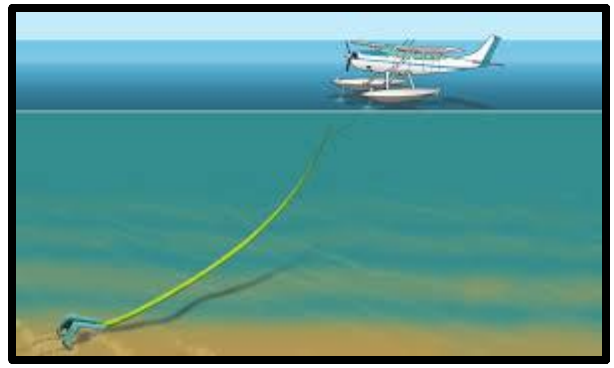
Approach at idle is made into the wind so no weathervaning takes place. Pulling alongside the ball using a boat hook the ball or cable can be captured and held until a line can be secured on it. The amount of line used should allow a 360 deg unobstructed swing for winds.

Departing from the mooring ball if a wind is present is untie then sail downwind for enough sea room for an engine start without running over the ball. In no wind after untying use a paddle to turn away from the ball for engine start.

ANCHORING

Anchor tackle can use a lot of space and weight penalties can make it impractical for use in a small seaplane. In a large seaplane anchoring can be a option.

Anchor tackle consists of enough anchor line to allow a 5 or 7 to one scope. Scope is a ratio of length vs depth. An example is if the depth to the bottom is 10 feet a scope of 5 would require 50 feet of anchor line. This allows the anchor to lie flat on the bottom and the anchor to dig in. Too short of line can cause the anchor to be lifted and send the seaplane adrift. A chain from the line attached to the anchor helps the anchor lie flat and absorbs forces against the anchor.



To set an anchor, it can be lowered down to the bottom paying attention how much line is used. Measurement marks can help. Then the amount of desired scope is played out and secured to a cleat. As the seaplane drifts downwind and the slack is taken up the fluke or blades dig in.

To leave an anchorage, take up line by pulling on the line bringing the seaplane forward. This lifts the shank or the arm the chain is attached to. Taxiing forward might need to be done in strong wind. As the seaplane moves forward over the anchor and slack is taken up the shank lifts up to a point that the flukes begin to rotate up off the bottom releasing the anchor. The anchor is then hauled in and secured.

SECTION 8. SAFETY

UPSET, EGRESS, SURVIVAL EQUIPMENT UPSET

In the event of an upset familiarity of egress out of the seaplane and use of survival

equipment is necessary.

Examples that can cause an upset that results in a capsize includes digging the bows of the floats in, chining the floats, and having a landing gear extended on a amphibious seaplane.

The weight of the plane is heavier than the floats so digging in, chining, or having a landing gear extended “trips” the seaplane flipping it upside down.

EGRESS

A capsize can be disorienting after the shock of the capsize and being upside down. The first action is to immediately release seatbelts so as not to become trapped. The next action is to open doors or hatches that will allow an egress. When the cockpit floods,
avoid panic and hold your breath. Exit the cockpit, once clear of the cockpit and free then inflate your personal floatation device (PFD). This will cause buoyancy and bring you to the surface. DO NOT inflate the PFD inside the cockpit !, this would cause you to float up trapping you inside the cabin.

SURVIVAL EQUIPMENT

The PFD vest has a yellow handle on your
right side that is pulled and a CO_2 cartridge inflates the vest. In the event the vest fails to inflate or leaks a blow tube for inflation is on the right. A whistle is provided for signaling help. **CAUTION AUTOMATIC INFLATABLE PFD’S MUST NOT BE USED !** Popular with boaters they are designed to automatically inflate when it comes in contact with water. For seaplane operations only manual inflation PFD’s are used. This prevents trapping the occupants inside the cabin o the seaplane.

SPOT SATELLITE TRACKER

A waterproof satellite GPS tracker is provided in the seaplane. It has many functions. There is an S.O.S. button that when pushed will initiate search and rescue. The GPS position is provided to rescuers. A basic first aid kit is located in the baggage compartment. A bag in the baggage compartment contains food, water, fire starters, paracord, ponchos, space blankets, ibuprofen, cortisone cream, antibiotic ointment, and bug repellent.

Weight / Balance & Equipment List Revision

Page # : 1

Lowe Aviation Services LLC - ETER699D
dba Gardner Lowe Aviation Services, PO Box 2749
Peachtree City, Ga 30269 Tel: 770-631-0650

A/C Tail # :	N307TG	**A/C Make :**	CESSNA
Register Name :	SHERIDAN PILOTS 307,LLC	**A/C Model :**	172M
Name 2 :		**A/C Serial # :**	17260863
Address 1 :	PO BOX 10	**WO Ref # :**	54310
Address 2 :		**WB Date :**	Aug-26-2024
City, State, PC :	SHERIDAN, WY 82801	**WB ID # :**	663

Previous data taken from document dated Jun-01-2022 Previous useful load = 714.74

Model # *Serial #*	**Description** *Part #*	(LB / IN)	**Weight**	**CG/Arm**	**Moment**
		Previous data ->	1835.51	36.16	66373.46
REMOVED ITEMS ----------					
ICOM 200			-1.50	15.00	-22.50
NARCO COM II			-1.50	15.00	-22.50
GTX-327	TRANSPONDER *011-00490-00*		-3.10	15.00	-46.50
IN346	CDI		-0.50	15.00	-7.50
REMOVED SUB TOTAL	4 Items @		-6.60	15.00	-99.00
INSTALLED ITEMS ----------					
GNX-375 *5GJ007892*	TRANSPONDER/ GPS NAV *011-04378-00*		3.20	15.00	48.00
GTR-205 *70E001555*	COM *011-05287-00*		2.80	15.00	42.00
GTR-205 *70E001629*	COM *011-05287-00*		2.80	15.00	42.00
INSTALLED SUB TOTAL	3 Items @		8.80	15.00	132.00
NEW DATA >>	NEW USEFUL LOAD = 712.54		1837.71	36.14	66406.46

Authorized Individual : ETER699D KARL H GARDNER