1976 Cessna A185F Seaplane N185AS

Airspeeds

Vs0	41*- 40 degrees flaps
Vs1	55
Vx	80
Vy	90
Vfe	120
Va	118
Vno	146
Vne	182
Best Glide	80

*All speeds in Knots

Engine Specs

Continental IO520 D (Horizontally Opposed, 6 cylinder, Air Cooled)
300 HP @ 2850 RPM
Max RPM- 2850 RPM
Oil Type: Phillips X/C 20W50 or W100 Aeroshell
Max oil Capacity: 12 U.S. Quarts
Normal Operations: 9-10 U.S. Quarts

Propeller Specs

Manufacturer: McCaulley
Prop Type: Constant Speed
Number Blades: 2
Prop Diameter: 86

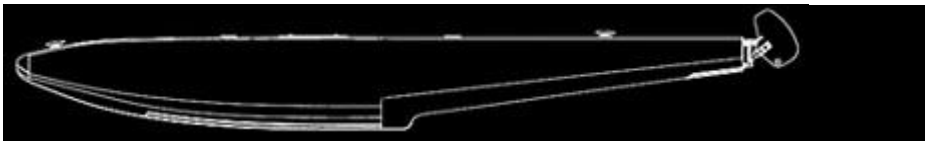
Fuel

Capacity:	80 U.S. gallons – 40 each wing
Usable:	74 U.S. gallons
Fuel Burn:	16 Gallons Per Hour (average)
Fuel Type:	100/130 Aviation fuel or 100 LL

Floats

Manufacturer:	EDO
Model:	582-3430
100% Bouyancy per Float:	3515 lbs.

Float	Airplane	Bouyancy	Max Floatation	Weight
3430	C185	3515 lbs.	3905 lbs.	460 lbs.*



<---------- 21' ---------->

* without optional items

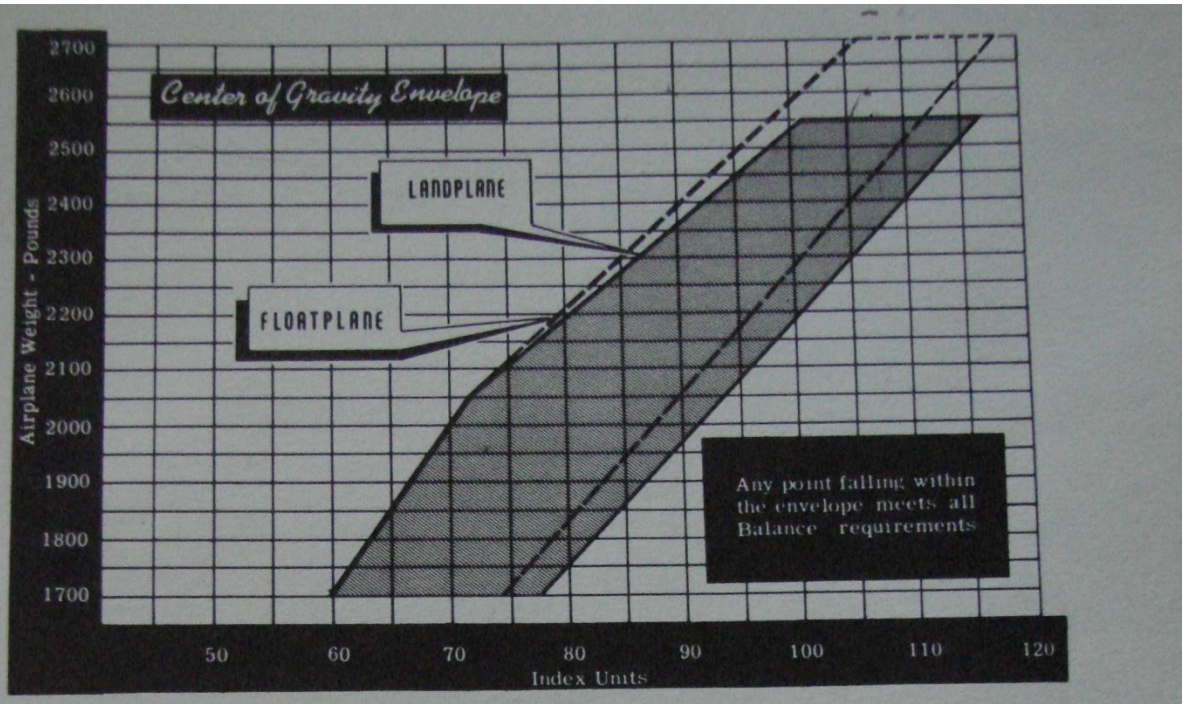
Weight and Balance

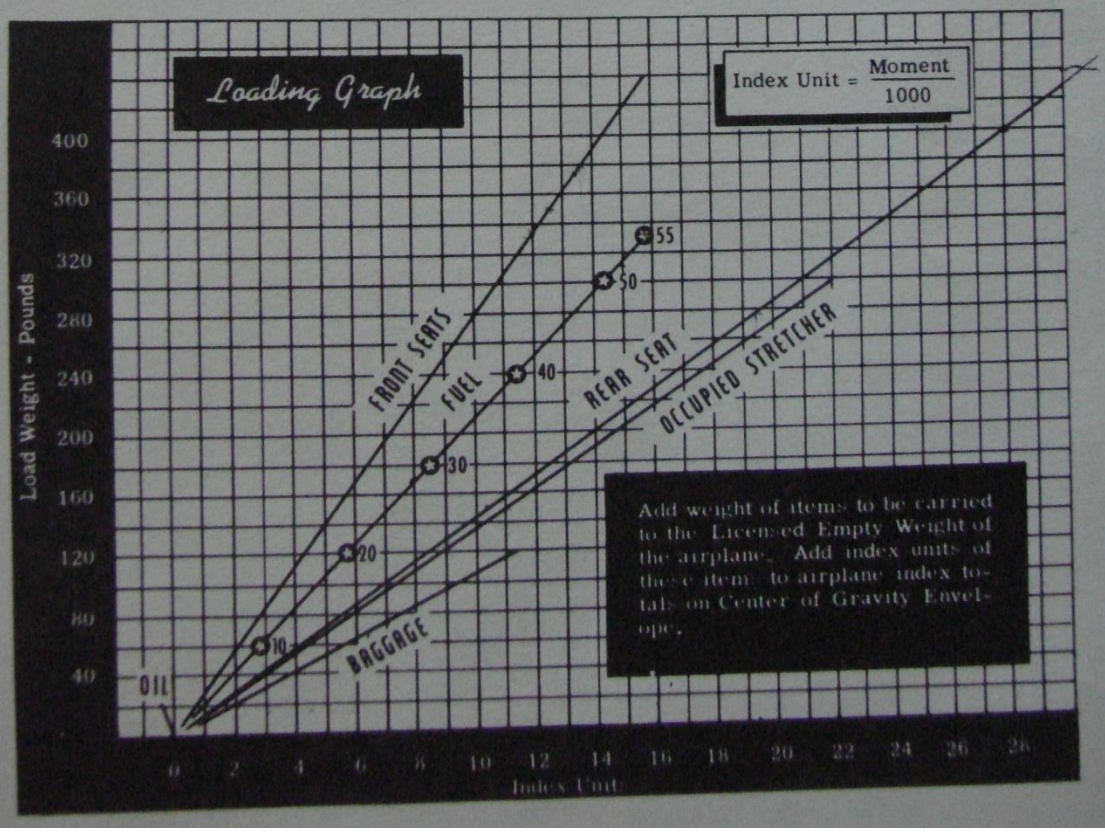
Gross Weight: 3525 lbs.
Empty Weight: 2156 lbs.
Useful Load: 1369 lbs.

Float Storage Lockers: 100 lbs. maximum each side

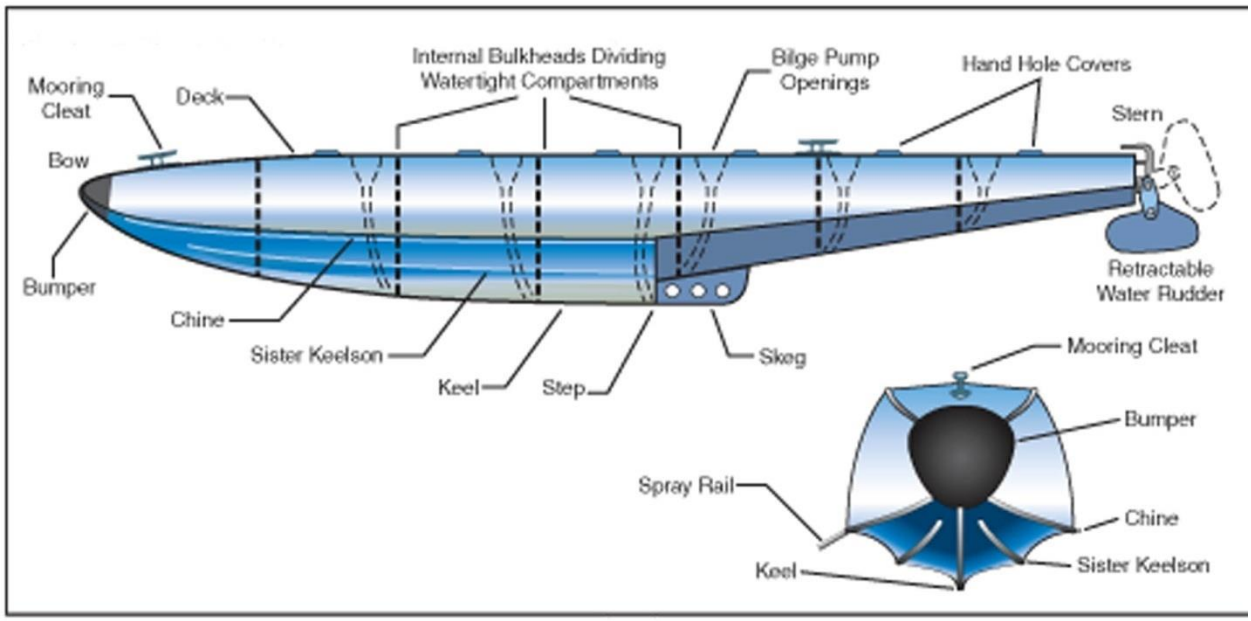
Sample Weight and Balance

	Weight	**Arm**	**Moment**
Empty Airplane	2156.15	40.40	87113.40
Front Seats	400		15500
Rear Seats	0		0
Baggage Area 1	10		2000
Baggage area 2	30		3000
Float Compartments	0		0
Fuel	300		14000
Totals	2896.15	41.99	121613.4


Center of Gravity Envelope
LANDPLANE
FLOATPLANE
Any point falling within the envelope meets all Balance requirements
Airplane Weight - Pounds
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
50
60
70
80
90
100
110
120
Index Units


Loading Graph
Index Unit = Moment / 1000
Load Weight - Pounds
400
360
320
280
240
200
160
120
80
40
FRONT SEATS
FUEL
REAR SEAT
OCCUPIED STRETCHER
BAGGAGE
OIL
10
20
30
40
50
55
Add weight of items to be carried to the Licensed Empty Weight of the airplane. Add index units of these items to airplane index totals on Center of Gravity Envelope.
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Index Units

EDO 3430



FAA Regulations

- Each float must have 4 compartments minimum
- Each float must support 90% of gross weight (both floats support 180%)
- Must be able to support the aircraft with two compartments flooded

Note: The model number "3430" refers to the buoyancy of each float. Each Float will displace 3515 lbs of fresh water.

Preflight

- The preflight inspection of the airplane itself is accomplished same as the land-plane as described in the pilot's operating handbook for that aircraft (usually involving a walk around inspection checking fuel, oil, lights, control operation, etc.) Carefully inspect the propeller for damage as water picked up under power is very harmful to an airplane prop (appearance is similar to gravel damage from a soft runway.)

- The floats should also be looked over carefully during a walk around inspection of the aircraft. Visually check the floats for any sign of damage that may have occurred while docking, beaching, ramping, or moving the aircraft in or out of the water using a seaplane dolly. Check water rudder(s) and cables for damage and proper operation. Inspect all float attach points to the main fuselage as well as spreader bars and flying wires. Also check each water tight compartment for water using the bilge pump supplied with the aircraft. Be sure to reinstall all pump out plugs tightly as these can get thrown loose on rough water.

Engine Starting

- For startup, it is important that the pilot leave all seatbelts, shoulder harnesses, headsets, etc. off and out of the way. These items can prohibit the quick exit from the airplane if it becomes necessary to save the airplane from drifting into something. Although this may seem like a violation of an FAR, it's not. FAA regulations allow the pilot and/or required crew members to leave seatbelts off for the purpose of docking and undocking a seaplane.
- If departing from a dock the wind conditions must be carefully taken into consideration. Remember that an airplane on the water always tends to "weathervane" into the wind. Leave the dock facing into the wind if possible. Water rudders should be lowered prior to startup. Since floatplanes have no brakes, it is important that the pilot complete the preflight and prepare the engine for startup before the airplane is untied from the dock, not after. Utilize a dock helper if available. If not, usually a gentle shove away from the dock prior to starting the engine is satisfactory. Holding a dock line while starting the engine is generally discouraged by Adventure Seaplanes staff; damage to water rudders, etc. can result if the line is not thrown clear of the airplane after startup. Rubbing up against the dock while taxiing away should also be avoided as damage to the sides of the floats may result.
- If departing from a beach with the heels against the shore, be sure that the plane is floating enough to allow the airplane to power itself off the sand. Do not use high power to free the airplane from shore. Be considerate of persons and property on shore.

Use of Checklists

SECURE - Doors – Windows - Seatbelts

A commonly used floatplane checklist is **FTFARS.**

Fuel - check
Trim- set
Flaps- 20
Area- clear of traffic
Rudders- up
Stick- *all the way back

Taxiing

There are three ways to taxi a seaplane:

- Idle (displacement) Taxi
- Plow Taxi
- Step Taxi

Idle Taxi

In most cases idle taxi is the preferred taxi method. It generally allows the easiest maneuvering of the airplane in tight areas, around docks, boats, other seaplanes etc. For idle taxi:

- **F**uel……check
- **T**rim……set
- **F**laps……up
- **A**rea……clear
- **R**udders……down
- **S**tick……full aft
- Throttle……800 RPM
- Lean mixture 1" out for idle taxi

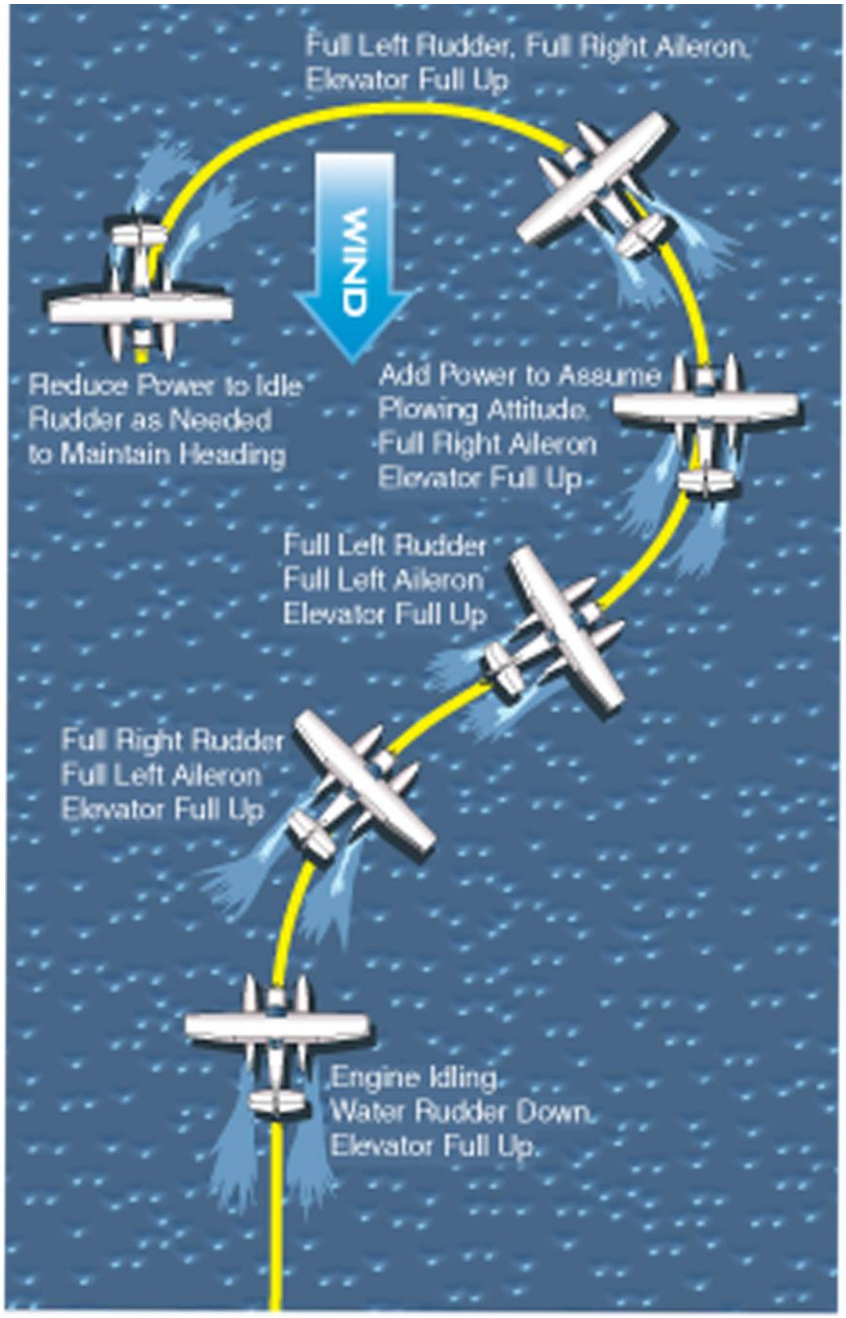
Plow Taxi

Plow taxi is considered to be the least desirable taxi method and is rarely used. Plow taxi is only used to conduct a "plowing turn" to turn the airplane downwind in high wind conditions (when it becomes difficult to overcome the weathervane tendency of the airplane.) Plow taxi creates a potential spray problem which could quickly cause damage to the prop. Plow taxi also provides insufficient engine cooling and poor visibility due to the nose up attitude during plow taxi. Always consider power-off sailing as a better alternative to plowing turns.

If it becomes necessary to perform a plowing turn:

- **F**uel……check
- **T**rim……set
- **F**laps……up
- **A**rea……clear
- **R**udders……down
- **S**tick……full aft
- Throttle……2000 RPM
- Rudder……full left
- Aileron……into the wind
- Throttle……800 RPM when downwind

*Note: Always perform plowing turns to the left due to torque and p-factor.



Example of a plowing turn initiated by a slight turn off the wind in the opposite direction

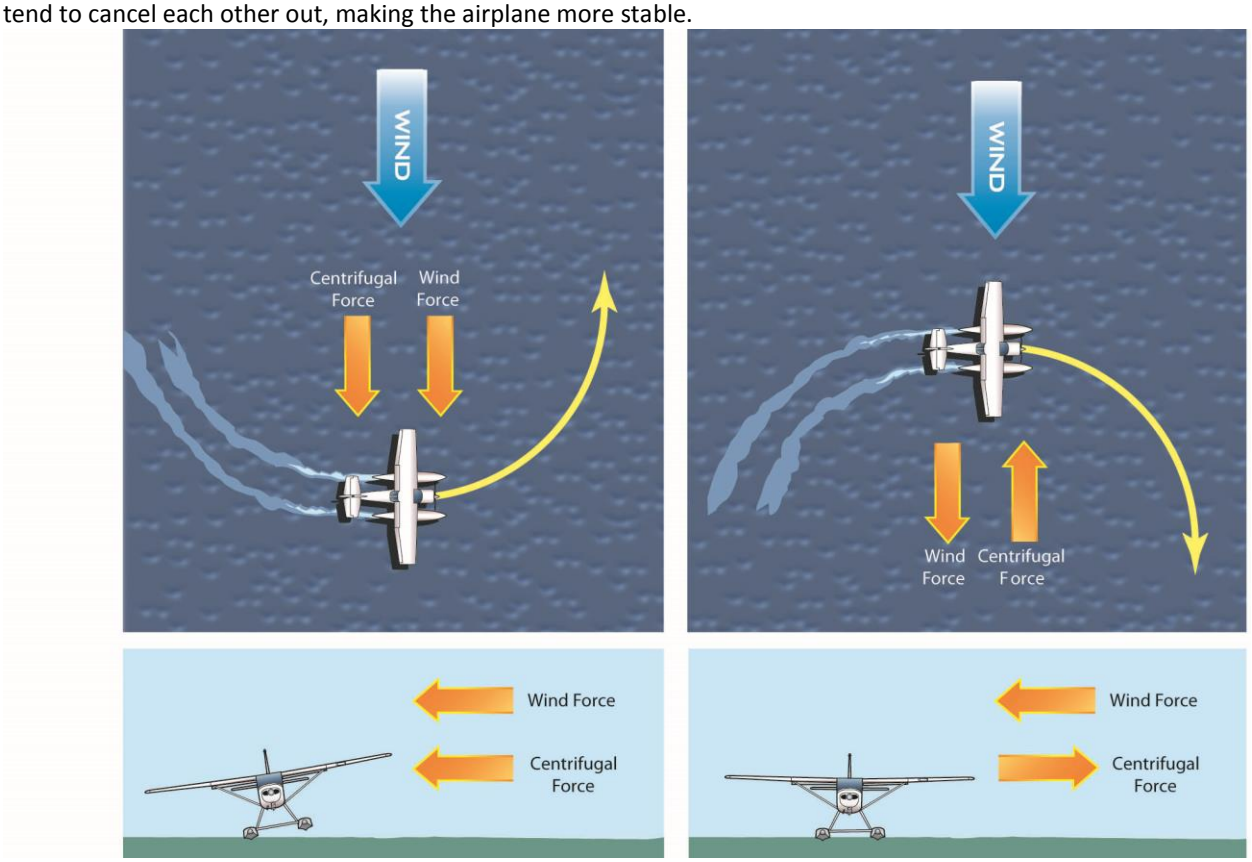
Step Taxi

Step taxi is used under ideal wind conditions to cover long distances across the water. There is little or no spray problem when the floats are planning or "on the step," and the attitude of the airplane provides adequate engine cooling and good visibility. When the airplane is on the step the elevator control is used to find the "sweet spot" which is the optimum planning angle at which the water drag on the floats is at a minimum. An experienced seaplane pilot can easily locate this position by feel, but beginning seaplane pilots may find it easier to note the position of the top of the engine cowling in relation to the horizon when demonstrated to them. The airplane should always be facing into the wind before beginning step taxi. Also, step taxiing should not be used on rough water or in high wind situations.

For step taxi:

- **F**uel……check
- **T**rim……set
- **F**laps……up
- Area……clear
- **R**udders……up
- **S**tick……full aft
- Throttle……full power then 2200 RPM after your on step
- Stick……adjust for "sweet spot"

Step taxi turns require a much larger turning radius then idle taxi turns and should be done with caution. Avoid making step taxi turns from downwind to upwind. The reason for this is the centrifugal force of the turn and the wind are both acting in the same direction making the airplane very unstable and more likely to capsize. Turning from upwind to downwind these forces act in opposing directions and tend to cancel each other out, making the airplane more stable.



Normal Takeoff and Climb

DOORS AND WINDOWS CLOSED, SEATBELTS FASTENED

- **F**uel……check
- **T**rim……set
- **F**laps……20 degrees
- **A**rea……clear
- **R**udders……up
- **S**tick……full aft
- Throttle……full open
- Stick……adjust for sweet spot
- Airspeed……accelerate to 70 after airborne
- Flaps……retract to 10 degrees
- Airspeed……80
- Flaps ……0
- Airspeed……90
- Prop……2500 rpm
- Throttle……25 inches manifold pressure
- Level off……22 squared

Rough Water Takeoff and Climb

Rough water operations are conducted similar to soft field techniques used in land-planes. The objective of a rough water takeoff is to get the airplane off the water at a lower airspeed, then remain in ground effect while accelerating to VX.

- **F**uel……check
- **T**rim……set
- **F**laps……20 degrees
- **A**rea……clear
- **R**udders……up
- **S**tick……full aft
- Throttle……full open
- Stick……sweet spot or slightly nose high
- Airspeed……accelerate to 70 after airborne
- Flaps……retract to 10 degrees
- Airspeed……80
- Flaps……0
- Prop……2500 rpm
- Throttle……25 inches manifold pressure
- Level off……22 squared

Glassy Water Takeoff and Climb

Glassy water makes it more difficult to unstuck the airplane from the water due to maximum friction between the floats and the water. Rolling the aircraft up onto one float can be an effective technique for getting airborne in this situation.

- **F**uel…….check
- **T**rim……set
- **F**laps……..20 degrees
- **A**rea……clear
- **R**udders……up
- **S**tick……full aft
- Throttle……full open
- Stick……sweet spot
- Aileron…….raise one float
- Airspeed…….accelerate to 70 after airborne
- Flaps……retract to 10 degrees
- Airspeed……..80
- Flaps ……Up
- Prop……2500 rpm
- Throttle……25 inches manifold pressure
- Level……22 squared

Confined Area Takeoff and Climb

Confined area takeoffs can be performed in one of two ways. If significant wind is present, the best technique is to taxi the airplane to the end of the longest suitable portion of the lake that favors the wind, takeoff using the maximum recommended flap setting for takeoff (20 degrees for our airplane) and establish maximum rate climb after liftoff to clear any obstacles.

The other technique for getting the seaplane out of a confined area is to place the aircraft on the step traveling downwind then turn the plane upwind on the step. On the step the plane should already be close to flying speed. Once into the wind or intended takeoff heading, increase power to full throttle, lower flaps to 20 degrees and proceed with the takeoff. This should only be attempted in light wind conditions.

Normal Approach and Landing

A good landing checklist to use in a seaplane is **GUMPS**:

- **G**as……both
- **U**ndercarriage *(landing gear & water rudders)… up for water * Very Important*
- **M**ixture……full rich
- **P**rop…….Prop in on final or when under 15” MP
- Speed…….. 90 downwind, 80 base leg & 70 on final

CAUTION: Large displacement Continental Engines are very sensitive to sudden power changes. For cooling purposes reduce power by approx. two inches of manifold pressure at a time.

Downwind

- Throttle……20 Inches manifold pressure (18 inches mid-downwind)

Abeam intended Touchdown Point

- Throttle……16 Inches manifold pressure
- Flaps……..10 degrees
- Airspeed……..90
- Trim……as required
- GUMPS check

Base Leg

- Throttle……14 Inches manifold pressure
- Flaps……20 degrees
- Airspeed……80
- Prop……In

Final

- Flaps……30 degrees

- Throttle……1500 RPM (leave power on until touchdown)
- Airspeed……70
- Nose……to landing attitude 5-10 feet above water

After Touchdown

- Throttle……close after touch down
- Stick……slowly aft as seaplane falls off step

Note: DO NOT relax back pressure on the stick during touchdown. This is a common habit of pilots who learned in tricycle gear land-planes. This action causes the bows of the floats to submerge and can even flip the airplane onto it's back if done aggressively enough.

Rough Water Approach and Landing

Downwind

- Throttle……20 Inches manifold pressure (18 inches mid-field)

Abeam intended Touchdown Point

- Throttle……16 Inches manifold pressure
- Flaps……..10 degrees
- Airspeed……..90
- Trim……as required
- GUMPS check

Base Leg

- Throttle……14 Inches manifold pressure

- Flaps……20 degrees
- Prop……In
- Airspeed…….80

Final

- Throttle……1500 RPM (leave on through touchdown)
- Flaps……40 degrees
- Airspeed……65-70
- Nose……to landing attitude 5-10 feet above water

After Touchdown

- Throttle……close immediately
- Stick……aft

Glassy Water Approach and Landing

Glassy water can be one of the most dangerous situations facing a seaplane pilot. Even though it may look quite inviting, depth perception fails over the mirror-like surface of glassy water and has resulted in many accidents. Because of this problem, we have a special technique for landing on glassy water.

When glassy water conditions exist it is safe to assume that there is little or no wind to affect the landing. The pilot should therefore select a long shoreline and land parallel to it using it as a height reference for the landing. In our Cessna 180 Seaplane, on final as the plane reaches the shoreline or object that the pilot has selected as a last visual reference, the airplane is pitched up to 65 miles per hour (approx. 5 degrees pitch up) and power set to 1900 RPM. This airspeed and power setting will place the airplane in slightly nose-up attitude in which it will settle into the water on it's own at a rate of approximately 100-150 feet per minute. The trick is to not change the pitch attitude after the airplane is set up at the appropriate airspeed and power setting. Using both the horizon and the angle of the wing in relation to the shore (while looking out the side) this proper pitch attitude can be maintained. This is not an instrument landing. Do not become fixated on the airspeed indicator or VSI. Also it is important not to change the power setting once set up on a glassy water approach.

Downwind

- Throttle……20 Inches manifold pressure (18 inches mid-field)

Abeam intended Touchdown Point

- Throttle……16 Inches manifold pressure
- Flaps……..10 degrees
- Airspeed…….90
- Trim……as required
- GUMPS check

Base Leg

- Throttle……14 Inches manifold pressure
- Airspeed…….80

Final

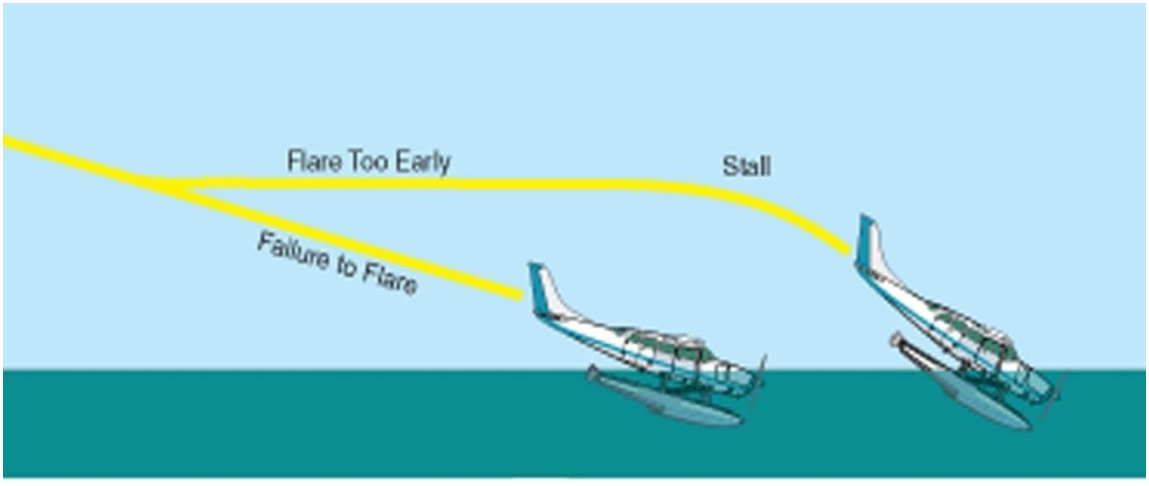
- Throttle……As necessary to allow low approach 50 feet or less
- Airspeed……70

After Shoreline/Last Visual Reference

- Nose up……65 mph
- Throttle……2000 RPM

After Touchdown

- Throttle……close
- Stick……slowly aft as seaplane falls off step



The consequences of misjudging height above the water

Confined Area Approach and Landing

Downwind

- Throttle……20 Inches manifold pressure (18 inches mid-field)

Abeam intended Touchdown Point

- Throttle……16 Inches manifold pressure
- Flaps……..10 degrees
- Airspeed……..90
- Trim……as required

Base Leg

- Throttle……14 Inches manifold pressure
- Flaps……20 degrees
- Airspeed……..80

Final

- Throttle…….As necessary
- Flaps……30 degrees
- Airspeed…….70

Forced Landing

At first sign of aa engine failure attempt to troubleshoot the problem using the memory items from the emergency checklist (carb heat, fuel quantity, fuel selector, mixture, primer handle, mags, etc.) If a restart is unsuccessful, an emergency landing site must be selected. Remember: Floatplanes have more drag than most wheelplanes; therefore they do not glide as far.

Water Landing

- Best Glide……. 80
- Flaps……30 degrees (after water can be made for landing)
- Stick……Full aft on touchdown
- Be careful not to flare to high!!!

Turf Landing

- Best Glide……..80
- Flaps……30 degrees (after turf landing can be made)
- Stick……Full aft on touchdown

Sailing

Power-off sailing is a technique that should be used when high wind conditions prevent maneuvering the airplane in idle taxi. In most cases, this is much more favorable than performing a plowing turn which can result in costly damage to the airplane.

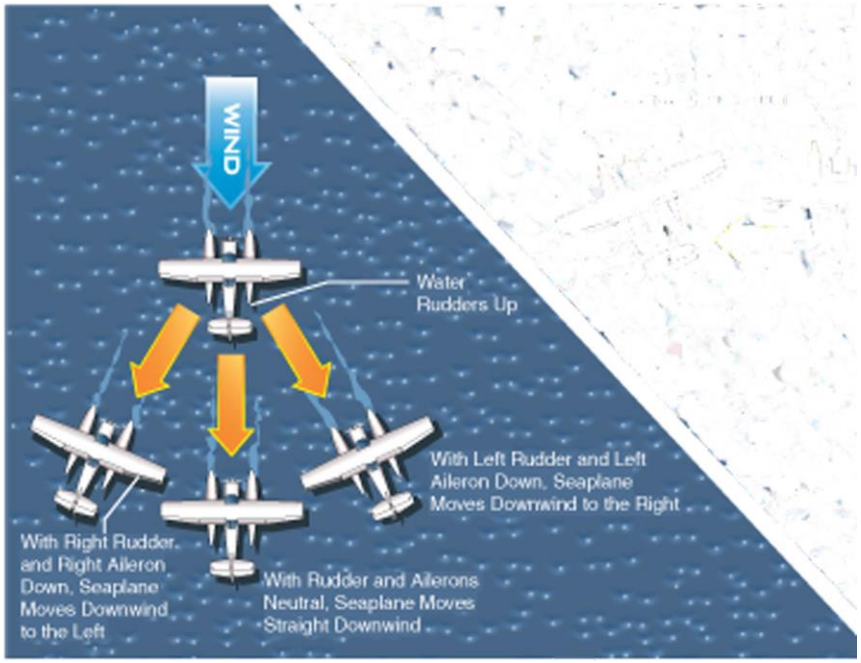
WATER RUDDERS ALWAYS UP FOR SAILING

Flaps 40 to create more wind drag

Lift flaps up if you want to see behind you where your sailing to

If you want the aircraft to sail Left - Yoke to left and Right Rudder or L-L-R to help remember

If you want the aircraft to sail Right – Yoke Right and Left Rudder or R-R-L to help remember


WIND
Water Rudders Up
With Left Rudder and Left Aileron Down, Seaplane Moves Downwind to the Right
With Right Rudder and Right Aileron Down, Seaplane Moves Downwind to the Left
With Rudder and Ailerons Neutral, Seaplane Moves Straight Downwind

Seaplane Parking

There are several ways we can secure the airplane on the water:

- Docking
- Beaching
- Mooring/Anchoring

Remember to remove seatbelts, headsets, and unlatch cabin doors before docking/beaching. It is up to you to catch the airplane!

Docking

When possible, the aircraft should always be docked into the wind. Docking with a crosswind must be done with extreme caution. The worst scenario is crosswind docking with the wind coming from the dock side because the airplane tends to turn (weathervane) into the dock rather than blow away from it.

Think of docking like flying a traffic pattern (downwind, base, final). This allows you to get the plane lined up with the dock long before you get to it. Do not approach the dock at a 45 degree angle. A seaplane is not a boat and no reverse or brakes. It is far less maneuverable than most boats and approaching the dock at an angle can be a recipe for disaster.

Beaching

Before attempting to beach the aircraft, be sure of the shoreline. Rocks can cause serious damage to the floats. Approach the beach straight on as slowly as possible. Cut the mixture before reaching shore depending upon wind conditions. Don't forget to turn the master switch and mags off before stepping out. Turn the aircraft tail-in towards shore and secure with ropes.

Mooring/Anchoring

In some cases where seaplane docks are not available and the shoreline is not suitable for beaching. It may be necessary to moor the airplane offshore. The line from the mooring buoy should be attached to the front struts of the floats or the propeller if you have a prop bridle rope.
For anchoring the plane use a ratio of 7:1 for the length of rope to the anchor for water depth.
Example- 10 feet of water use 70 feet of rope, but 50 feet will work as most ropes are 50 & 100'

1. What are the requirements for obtaining an Airplane Single Engine Sea (ASES) rating?
2. What must you do to keep your seaplane privileges current?
3. Name the three ways to taxi a seaplane.
    - Which of these is the least favorable? Why?
    - Which of these is the most favorable? Why?
4. The airplane's tendency to stay pointed into the wind on the water is called_____.
5. In theory, why does a plowing turn allow the airplane to turn downwind?
6. What is a better method than a plowing turn for getting the airplane to the downwind side of the lake?
7. Should you ever attempt to step taxi the airplane on rough water?
8. Which step taxi turns should be avoided and why?
9. What is the problem with glassy water?
10. Is it more favorable to perform a glassy water landing along a shoreline or out in the middle of the lake? Why?
11. How do you land on glassy water following an engine failure?
12. Who has the right of way (boats or airplanes)?
13. Do we have to carry PFDs (personal floatation device) in a seaplane?
14. What is the significance of red buoys and green buoys?
15. What is the significance of orange and white buoys?
16. What should you be careful of when landing on a river?
17. How can you find out if a body of water is open to seaplane operations?
18. How does a seaplane base appear on a sectional/WAC chart?
19. What color(s) is the beacon at a public seaplane base?
20. What type of floats is this airplane equipped with?
21. What does the model number of the floats usually mean?
22. What minimum water depth is needed for these floats?