SeaRey
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SeaRey Amphibian
Training Syllabus

Flying the *SeaRey* Amphibian Type Specific Features:

Retractable Landing Gear - Tail Wheel - Floating Hull

We thank the Author, Rob Loneragan of SeaRey Australia, and Bill Canino for generously making this safety manual available

This Training Syllabus has been prepared by Waterbirds LC, the central US dealer for *SeaRey* Amphibian Experimental Aircraft and *SeaRey* Australia. It is issued for the benefit of owners and pilots of *SeaRey* Amphibian type aircraft. A knowledge of (but not limited to) the material referred to in this syllabus forms part of the training required to qualify for a flight log endorsement on the *SeaRey* Amphibian.

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Table of Contents

SYLLABUS STRUCTURE

The special design features of the *SeaRey* Amphibian require the Pilot to have endorsements for Tailwheel operation, and complex system training for the Retractable Gear. Due to unique the operation characteristics the of the Floating Hull, type specific training is mandatory for safe operation.

This syllabus is structured to provide an introduction to the aircraft; it's systems and an overall familiarization with the *SeaRey* operations. It incorporates the training required so that the Pilot may qualify, upon completion of the appropriate training, for specific flight log endorsements. Ground training is integrated with flight training in order to maximize the learning process. An outline of the syllabus is set out below:

GROUND TRAINING

Lesson	*Subject*	*Briefing*	*Duration*
#1	**Aircraft Systems & Flight Manual**		
	Ground Briefing	B1	1 hr
#2	**General Handling - Land & Flight**		
	Ground Briefing	B2	1 hr
#3	**Retractable Gear, Tailwheel & Patterns**		
	Ground Briefing	B3	1 hr
#4	**Launching, Water Handling & Beaching**		
	Ground Briefing	B4	1 hr
#5	**Water Take-Offs & Landings**		
	Ground Briefing	B5	3/4 hr
#6	**Advanced Water Take-Offs & Landings**		
	Ground Briefing	B6	1/2 hr
#7	**Glassy Water Operations**		
	Ground Briefing	B7	1 hr
#8	**In an Emergency - Water Operations**		
	Ground Briefing	B8	1/2 hr
#9	**Airmanship, Seamanship & Seaplaning**		
	Ground Briefing	B9	1/2 hr
#10	**Seaplane Regulations**		
	Ground Briefing	B10	1/2 hr

Total No of Briefings		**10**
Total Time of Briefings		**8 3/4 hrs**

FLIGHT TRAINING

Lesson	*Subject*		*Duration*
#1	**Aircraft Systems & Flight Manual**		
	Practical Session at the Aircraft.	PS1	1 hr
#2	**General Handling - Land & Flight**		
	Flight Training	F1	1 hr
#3	**Retractable Gear, Tailwheel & Patterns**		
	Flight Training	F2	1 hr
	Flight Training	F3	1 hr
	Flight Training	F4	1 hr
	Flight Training	F5	1 hr
	Total Lesson Time		**4 hrs**
#4	**Launching, Water Handling & Beaching**		
	Flight Training - on water	F6	1 hr
	Flight Training - on water	F7	1 hr
	Total Lesson Time		**2 hrs**
#5	**Water Take-Offs & Landings**		
	Flight Training	F8	1 hr
	Flight Training	F9	1 hr
	Flight Training	F10	1 hr
	Flight Training	F11	1 hr
	Total Lesson Time		**4 hrs**
#6	**Advanced Water Take-Offs & Landings**		
	Flight Training	F12	3/4 hr
	Flight Training	F13	3/4 hr
	Total Lesson Time		**1 1/2 hrs**
#7	**Glassy Water Operations**		
	Flight Training	F14	1 hr

Total Flight Training	**14 Lesson Plans**
Total Flight Time	**13 1/2 hrs**

* Note: The practical flying training hours set out above are to serve as a guide. The actual time required will vary depending on the individual pilot level of skill, aptitude and experience.

In the case of a Pilot who has no previous skill/s or endorsement/s in a particular design feature, the hours indicated are considered the minimum required.

GROUND TRAINING & FLIGHT TRAINING
The content of the Ground Briefing and Flight Training contained in each lesson is set out in detail in the following pages. This format has been used to act as a guide for

training and also to provide a checklist. The additional information as covered in the Study Guide, provides reference material for general theory and principals. The Flight Manual is used for type specific data.

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LESSON #1 Aircraft Systems & Flight Manual.

GROUND BRIEFING: B1 **Duration 1 Hour.**

Date: / / Time - Start: Finish:

Objectives: To provide the Pilot with a thorough understanding of all the aircraft systems together with a good general knowledge of the aircraft Flight Manual.

Briefing Content:

Systems

- ☐ Review Lesson #1 in the Study Guide.
- ☐ Fuel - Drain, Filter, Primer or Starting Carb, Pump(s).
- ☐ Engine
- ☐ Lubrication & Coolant
- ☐ Electrical & Ignition, Battery & Generator.
- ☐ Instruments - Flight & Engine
- ☐ Gear
- ☐ Braking
- ☐ Flight Controls (primary & secondary)

Flight Manual - General Overview

☐ Aircraft General Data	Reference Section 1.
☐ Limitations	Reference Section 2.
☐ Emergency Procedures	Reference Section 3.
☐ Normal Procedures	Reference Section 4.
☐ Performance	Reference Section 5.
☐ Loading Data (Weight & Balance)	Reference Section 6.
☐ Aircraft & Systems Description	Reference Section 7.
☐ Aircraft Handling, Service & Maint.	Reference Section 8.

PRACTICAL SESSION: PS1 **Duration 1 Hour.**

Objectives: To provide the Pilot with a thorough understanding of the location, installation and operation of the aircraft systems, including the pre-flight inspection.

With Aircraft

- ☐ Review relevant sections of Flight Manual relating to systems.

☐ Pre-flight Inspection	Reference Section 4.
☐ Cockpit & Forward Fuselage	Reference Page 4.3
☐ Starboard Wing	Reference Page 4.3
☐ Engine	Reference Page 4.4
☐ Empannage	Reference Page 4.4
☐ Port Wing	Reference Page 4.4

- ☐ Equipment for Water Operations.

Knowledge & Skill Standard: The Pilot should possess a sound knowledge and understanding of the aircraft systems. The pilot should be able to demonstrate this by carrying out a pre-flight inspection in accordance with the flight manual and in the process describe the location and function of the various systems.

LESSON #2 General Handling - Land & Flight.

GROUND BRIEFING: B2 **Duration 1 Hour.**
Date: / / Time - Start: Finish:

Objectives: To give the Pilot a sound theoretical knowledge of the ground and flight handling characteristics in normal flight, stalls, limitations, procedures (Emergency & Normal), performance and weight & balance of the *SeaRey* aircraft.

Briefing Content:

☐ Review Lesson #2 in the Study Guide.

☐ Stalls: Discussion of level flight intentional stalls, departure and landing stalls, lack of electrical stall warning, variations of indicated airspeed during stalls at various weights and bank angles.

Flight Manual - In Detail

☐	Limitations	Reference Section 2.
☐	Emergency Procedures	Reference Section 3.
☐	Normal Procedures	Reference Section 4.
☐	Performance	Reference Section 5.
☐	Loading Data (Weight & Balance)	Reference Section 6.

Knowledge Standard: The Pilot should be able to:

1. Satisfactorily understand why an airplane can stall at any altitude, weight, speed or attitude and the effect of the SeaRey swept wing on stall characteristics.

2. Demonstrate a thorough understanding of the material covered in this lesson, as referenced from the *SeaRey* Flight Manual.

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LESSON #2 General Handling - Land & Flight.

FLIGHT TRAINING: F1 **Duration 1 Hour.**

Date: / / Time–Start: Finish: Landings: G_____W_____

Objectives: To familiarize the Pilot with the general airborne handling characteristics of the *SeaRey* aircraft, in normal flight.

Air Exercise:

Pre-flight Inspection

- ☐ Weather Conditions suitable for planned flight operations.
- ☐ Pre-flight Preparation & Aircraft Inspection. Ref Flight Manual Section 4.
- ☐ External & Internal checks completed.
- ☐ Equipment carried is suitable for flight & operations.
- ☐ Weight and Balance check completed.

Start Up

- ☐ Cockpit familiarization.
- ☐ Checklist procedures.
- ☐ Carry out start up procedure. Ref Flight Manual Section 4.
- ☐ Engine fire on ground. Ref Flight Manual Section 3.
- ☐ Hand starting.
- ☐ Hot & Cold starting.
- ☐ Engine operation within limits. Ref Rotax Engine Manual.
- ☐ Airmanship - Engine & Propeller, care in operation & within limits.

Taxi Airplane

- ☐ Taxiing & general ground handling. More in Lesson #3.
- ☐ Safe Taxiing speed.
- ☐ Use of Brakes - non-differential techniques, wet brakes.
- ☐ Use of Throttle.

Pre-Take-Off

- ☐ Pre-Take-Off checks. Note: Water variations. Ref Flight Manual Section 4.
- ☐ Aligned with Take-Off Direction.

Take-Off & Climb

- ☐ Take-Off power, smooth application, fully applied, Turbo response time.
- ☐ Directional control maintained, Yaw, "P" factor.
- ☐ Attitude & stick pressure.
- ☐ Instrument check.
- ☐ Rotation speed (+5 -0 mph).
- ☐ Climb out established.
- ☐ Rate of climb & speed.
- ☐ Retract landing gear at safe height.
- ☐ Flap setting - reduce to 10° at safe speed & obstacle clearance altitude.
- ☐ Power setting.
- ☐ Aircraft balanced & trimmed
- ☐ Engine Failure - During Take-Off Run. Ref Flight Manual Section 3.
- ☐ Engine Failure - Immediately after Take-Off. Ref Flight Manual Section 3.

Flight Training F1 - Continued next page.

LESSON #2 General Handling - Land & Flight.

FLIGHT TRAINING: F1 - Continued.

Cruise

- ☐ Level flight - Normal cruise - Nose/horizon attitude.
- ☐ Control & maneuver aircraft at reduced speed, power/flap settings.
- ☐ Effect of different power settings - Pusher configuration.
- ☐ Simulated flight in limited visibility.
- ☐ Use of trim in various configurations.
- ☐ Instrument & cruise checks.
- ☐ Effect of flaps & landing gear.

Turns

- ☐ Use of Rudder.
- ☐ Level (normal) turns, 20, 30 degrees of bank.
- ☐ Steep turns.
- ☐ Climbing turns 20° of bank.
- ☐ Descending turns 30° of bank.

Stalls (Intentional, level entry, 1 mph/sec) Note Speeds

Typical Stall Recovery - Simply release back stick pressure and make correction for roll or yaw with rudder, where necessary.

- ☐ Clean configuration with Power. _____ mph
- ☐ 10° flap with Power. _____ mph
- ☐ 20° flap with Power. _____ mph
- ☐ Clean configuration Power Off _____ mph
- ☐ 10° flap with Power Off. _____ mph
- ☐ 20° flap with Power Off. _____ mph
- ☐ Check loss of height & recovery technique.

The above stall sequences to be completed a minimum of 3 times each until the Pilot is proficient in stall entry, execution and recovery, from coordinated flight. Ground discussion of uncoordinated, bank and pitch entry, recovery.

Emergency Procedures - In flight

- ☐ Engine Failure - During Flight. Ref Flight Manual Section 3.
- ☐ Forced Landings. Ref Flight Manual Section 3.
- ☐ Emergency Wheels Up Landing. Ref Flight Manual Section 3.
- ☐ Ditching. Ref Flight Manual Section 3.
- ☐ Fires. Ref Flight Manual Section 3.
- ☐ Icing Ref Flight Manual Section 3.
- ☐ Electrical Ref Flight Manual Section 3.
- ☐ Engine - Rough running or Loss of Power. Ref Flight Manual Section 3.
- ☐ Engine restart in Flight. Ref Flight Manual Section 3.

Descending

- ☐ Normal descent. Ref Flight Manual Section 4.
- ☐ Glide descent - Idle power, 70 mph.
- ☐ Trim setting
- ☐ Instrument (engine temperatures) & descent checks.

Flight Training F1 - Continued next page.

LESSON #2 General Handling - Land & Flight.

FLIGHT TRAINING: F1 - Continued.

Demonstration Normal Landing Pattern

- ☐ Refer to Standard *SeaRey* pattern - see next page
- ☐ Returning to & entering the pattern.
- ☐ Downwind checks.
- ☐ Base checks.
- ☐ Final approach - Note: Check speed, flaps & gear (overcenter lock).
- ☐ Note: Gear Position **Down** & Locked (incl **overcenter lock**) for **Ground** Landing. Verification check **(x 3) Downwind - Base - Final**.
- ☐ Normal Landing.
- ☐ Taxiing.
- ☐ After landing checks.
- ☐ Shutdown & De-brief.
- ☐ Airmanship - Keeping a systematic lookout - See & be seen, maintaining appropriate speeds, altitudes & attitudes, terrain clearance, engine & airframe limits etc.

Skill Standard: Pilot should know the normal and emergency checklist procedures and additionally, be able to competently handle the aircraft in flight, in the following sequences:

- Emergency Procedures
- Normal Procedures
- In flight Handling
- Stalls

SeaRey – Standard Pattern

Power Settings for Rotax 912.

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

GROUND BRIEFING: B3 **Duration 1 Hour.**

Date: / / Time - Start: Finish:

Objectives: To provide the Pilot with:

1. A good theoretical understanding of the various retractable gear systems used in this aircraft.
2. A full understanding of the *SeaRey* retractable Gear system and how it varies from other aircraft.
3. A sound understanding of the principals and the operation of tailwheel equipped aircraft.
4. A familiarization with the typical handling and operational characteristics of the *SeaRey* in the landing pattern.

Briefing Content:

☐ Review Lesson #3 in the Study Guide.

Retractable Landing Gear Systems

☐ Hydraulic Systems.
☐ Electric Systems.
☐ Manual Systems.
☐ Landing Gear Control.
☐ Landing Gear Position Indicators.
☐ Emergency procedures & gear extension.
☐ Extension & operating speeds. Vlo & Vle.
☐ Anti-retraction devices. Overcenter devices & micro electrical circuits
☐ Developing a good operational "Habit". e.g. Check-list etc.
☐ Gear Checks - Involving the senses - Physical, Visual & Auditory.

The *SeaRey* Retractable Gear System

☐ The *SeaRey* retraction system. Ref Flight Manual Section 7.
☐ Checking during Pre-flight inspection.
☐ The over-center locking device (Anti-retraction).
☐ Operating the *SeaRey* System.
☐ Land operations.
☐ Water operations - More in Lesson #4.
☐ The correct operational "Habit" for the *SeaRey* type.
☐ Identification of Gear position.
Verification check three times, **Downwind - Base - Final**.
☐ *SeaRey* Emergency Gear Procedures. Ref Flight Manual Section 3.
☐ Emergency Gear Up Landing.
☐ Difference between *SeaRey* & other aircraft types.
☐ Vlo & Vle for *SeaRey*. Minimum performance affect.
☐ Tips on maintenance of the *SeaRey* Gear.

Ground Briefing B3 - Continued next page.

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

Briefing B3 Content: Continued

Tailwheel Type Aircraft

- ☐ Tailwheel aircraft & weathervaning tendency.
- ☐ Weathercocking around CG & general theory of aircraft control.
- ☐ Difference between Tailwheel & Nosewheel aircraft.
- ☐ Ground looping.
- ☐ Taxiing - safe speed
- ☐ Taxiing - maintaining visibility, turns & yawing for visibility.
- ☐ Taxiing - ground control in strong winds, crosswind & downwind.
- ☐ Take-Off - "P" factor, yawing & directional control - Use of Rudder.
- ☐ Take-Off - raising the tail, attitude & technique.
- ☐ Landings - attitude, round out & touchdown.
- ☐ Landing - wheel landing.
- ☐ Landing - 3 point landing.
- ☐ Ground control in the landing roll & airflow over the rudder.
- ☐ Elevator use & positive control on the steerable tailwheel.
- ☐ Crosswind Landings & the tailwheel.
- ☐ Difference between the *SeaRey* & other tailwheel type aircraft.

The *SeaRey* - Tailwheel Aircraft

- ☐ The *SeaRey* tailwheel & retraction mechanism.
- ☐ The steerable tailwheel.
- ☐ The Breakaway tailwheel feature.
- ☐ The tailwheel retraction cable - avoiding damage.
- ☐ Returning from water operations.
- ☐ General handling characteristics.
- ☐ Wake turbulence considerations.

Patterns

- ☐ Good pattern - e.g. maintains runway heading, touchdown point etc.
- ☐ Go around & The Touch & Go.

  Note: Set Full up Trim before applying Take-Off power.
- ☐ Busy Airport operations – Pattern, faster aircraft & traffic separation.

  Crosswind Conditions
  - ☐ *SeaRey* crosswind limitation - 15 knots.
  - ☐ Crosswind Take-Off.
  - ☐ Crosswind Approach.
  - ☐ Correcting for drift - Wing low method or crab approach.
  - ☐ Runway alignment in crosswind touchdown.
  - ☐ Crosswind Landing.
  - ☐ Use of runway width - reducing cross wind affect.
  - ☐ Crosswind & Gusty wind landings - use of flaps.
  - ☐ Use of brakes.
- ☐ Turbulent air approach.
- ☐ Maximum TO weight – loading - temperature – density altitude considerations.

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

FLIGHT TRAINING: F2 **Duration 1 Hour.**

Date: / / Time - Start Finish: Landings: G_____W_____

Objectives: To review general aircraft handling and develop in the Pilot, the practical skills required to safely & competently:

1. Operate the retractable Gear systems in the *SeaRey*.
2. Operate the *SeaRey* in the tailwheel, land configuration.
3. Handle the *SeaRey* in the various pattern procedures.

Air Exercise:

Retractable Gear

- ☐ Pre-flight Aircraft Inspection.
- ☐ Inspect in detail the overcenter locking device (Anti-retraction).
- ☐ Start-up & Taxi.
- ☐ Pre-Take-Off checks. Note: Mention water variations - More in Lesson #4.
- ☐ Normal Take-Off.
- ☐ Retract Gear.
- ☐ Carry out Patterns.
- ☐ Practice cycling of Gear in pattern.
- ☐ Develop correct "Habit" for operation of retractable Gear.
- ☐ Note: Gear Position **Down** & Locked (incl **overcenter lock**) for **Ground** Landing. Verification check **(x 3) Downwind - Base - Final**.
- ☐ Identification of Gear position. **Look, Touch & Voice (say)**
    1. Retract Handle.
    2. Visual check of Gear leg & wheel position.
    3. Overcenter lock.
- ☐ *SeaRey* Emergency Gear Procedures. Ref Flight Manual Section 3.
- ☐ Normal Landing.
- ☐ After landing checks.
- ☐ Taxiing.
- ☐ Shutdown & De-brief.
- ☐ Airmanship - Demonstrates awareness & vigilant practice of correct "Habit" for operation of retractable gear and systematically includes in all appropriate checklists.

SeaRey

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

FLIGHT TRAINING: F3 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

☐ Practice & consolidate procedures & skills learned in **F2.**

Tailwheel Operations

☐ Pre-flight Aircraft Inspection.
☐ Checking the tailwheel mechanism.
☐ Start-up & Taxi.
☐ Taxiing - safe speed
☐ Taxiing - maintaining visibility, turns & yawing for visibility.
☐ Taxiing - pivot turns using breakaway tailwheel feature.
☐ Taxiing – aileron and elevator positions
☐ Taxiing - ground control in strong winds, crosswind & downwind.
☐ Pre-Take-Off checks. Note: T F F (**T**rim, **F**uel, **F**laps.)
☐ Demonstrate normal Take-Off.
☐ Take-Off - "P" factor, yawing & directional control - Use of Rudder.
☐ Take-Off - raising the tail, attitude & technique.
☐ Retract Landing Gear.
☐ Demonstrate normal Landing.
☐ Demonstrate correct "Habit" for operation of retractable Gear.
☐ Note: Gear Position **Down** & Locked (incl **overcenter lock**) for **Ground** Landing. Verification check **(x 3) Downwind - Base - Final**.
☐ Carry out Patterns - Practice tailwheel Take-Offs & Landings.
☐ Landings - attitude, round out & touchdown.
☐ Demonstrate & practice Wheel Landings.
☐ Demonstrate & practice 3 point Landings.
☐ Tailwheel breakaway check when returning from water operations.
☐ Ground control in the landing roll & use of rudder. (Fly the airplane.)
☐ Elevator use & positive control on the steerable tailwheel.
☐ After landing checks.
☐ Shutdown & De-brief.
☐ Airmanship - Demonstrates essential understanding & awareness required for safe tailwheel operation.

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

FLIGHT TRAINING: F4 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

☐ Practice & consolidate procedures & skills learned in **F2** & **F3.**

Patterns

☐ Pre-flight Aircraft Inspection.
☐ Start-up & Taxi.
☐ Pre-Take-Off checks.
☐ Normal Take-Off.
☐ Retract Gear.
☐ Carry out Patterns.
☐ Review Downwind, Base & Final Approach pre-landing checks.
☐ Check approach & late final speed.
☐ Land on selected touchdown point.
☐ Demonstrate correct "Habit" for operation of retractable gear.

Normal Pattern Procedures

☐ Three (3) Point Landings.
☐ Wheel Landings.
☐ *SeaRey* pattern-traffic separation at busy airports.

Other Pattern Procedures.

☐ Glide approach.
☐ No Flap Landing.
☐ Short Field Take-Off.
☐ Short Field Landing.
☐ Perform go around from late final approach. Note: Trim & power settings.
☐ Perform touch and go.
Note: Apply Full up Trim during ground roll before applying Take-Off power.

Crosswind Operations.

☐ *SeaRey* crosswind limitation 15 knots.
☐ Crosswind Take-Off.
☐ Crosswind Approach.
☐ Drift correction - Wing low method or crab approach.
☐ Runway alignment in crosswind touchdown.
☐ Crosswind Landing - ensure touchdown on into up-wind wheel with no drift.
☐ Use of runway width -Take-Off & Landing - reducing cross wind affect.
☐ Crosswind & Gusty wind landings - use of flaps.
☐ Use of brakes.

Lesson Conclusion

☐ Normal Landing.
☐ After landing checks.
☐ Taxiing.
☐ Shutdown & De-brief.
☐ Airmanship - Demonstrates sound and systematic use of checklists, correct procedures and vigilance in the pattern. Displays well developed "Habit" for safe operation of gear retraction procedures.

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LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

FLIGHT TRAINING: F5 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

☐ Review, practice & consolidate procedures & skills learned in **F2**, **F3** & **F4.**

Retractable Gear, Tailwheel & Patterns - Consolidation.

☐ Pre-flight Aircraft Inspection.
☐ Start-up & Taxi.
☐ Pre-Take-Off checks.
☐ Carryout Patterns.
☐ Review & carryout Downwind, Base & Final Approach pre-landing checks.
☐ Check correct "Habit" for operation of retractable gear.
☐ Note: Gear Position **Down** & Locked (incl **overcenter lock**) for **Ground** Landing. Verification check **(x 3) Downwind - Base - Finals**.
☐ Carryout Forced Landings - Simulated Engine Failure.
☐ Carryout Normal Landings.
☐ After landing checks.
☐ Taxiing.
☐ Shutdown & De-brief.

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LESSON #4 Launching, Water Handling, Beaching & Docking.

GROUND BRIEFING: B4

Date: / / Time - Start: Finish:

Objectives: To ensure the Pilot has a comprehensive theoretical understanding of what is required to launch, beach and handle the *SeaRey* on the water, in mild conditions. **Important**: One of the primary elements of this lesson will be to emphasize the importance of handling the *SeaRey*. Emphasizing the correct nose attitude while operating at speed on the water.

Briefing Content:

- ☐ Review Lesson #4 in the Study Guide.

Pre-Launch

- ☐ Pre-flight Aircraft Inspection.
- ☐ Surveying the prevailing wind and water conditions - what to anticipate.
- ☐ Determining wind direction: Current/Tide, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks, wind waves/lets, smooth water in lee.
- ☐ Hull design, water conditions, speed, surface tension, suction.
- ☐ "The Spoon Demonstration".
- ☐ Waterway rules Relating to:
  - (1) Safe Passing Distance.
  - (2) Distance off.
  - (3) Navigation channel markers. See pages in Lesson #4 Supp. Info.
  - (4) "Mandatory" Equipment. See pages in Lesson #4 Supp. Info.
- ☐ Environmental assessment. People, animals, consequences of prop blast.
- ☐ Policy on use of Inflatable Life Jackets during water operations.

Launching

- ☐ Start up.
- ☐ Checklist procedures.
- ☐ Forward water entry.
- ☐ Reversing water entry. Avoiding elevator & tailwheel retract cable damage.
- ☐ Gear Retraction in water. Gear operations in water.
- ☐ No brakes, inertia & anticipation. What's different?

Water Handling

- ☐ The 5 Phases from Idle to Flight. Ref Lesson #4 - Page 23 Supp Info Man.

  Idle water taxiing/displacement mode.

  - ☐ Passenger Briefing. Safety & Emergency. The 3 H's + life jacket.
  - ☐ Effects of currents.
  - ☐ Wind direction & water spray on windscreen - affect on visibility.
  - ☐ Idle water taxiing.
  - ☐ Swell, waves & wind.
  - ☐ Maneuvering in moorings & tight spots - LH turns better than RH turns.
  - ☐ Dealing with large watercraft & wake.

Ground Briefing B4 - Continued next page.

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LESSON #4 Launching, Water Handling, Beaching & Docking.

GROUND BRIEFING: B4 - Continued **Duration 1 Hour.**

Water Handling - Continued

Plough taxiing

- ☐ When & why to use plow taxi in displacement mode.
- ☐ The tear drop, "P" or momentum turn.
- ☐ Propeller - damage. Water erosion. Note - especially downwind.
- ☐ Plowing turns.

Step taxiing

- ☐ Pre-Take-Off checks.
- ☐ Getting up on the Step.
- ☐ Applying Power & elevator input.
- ☐ Increased back stick pressure to maintain correct nose attitude.
- ☐ Various flap settings & affect on attitude & center of lift.
- ☐ 0° flap setting.
- ☐ 10° flap setting.
- ☐ 20° flap setting.
- ☐ Trim position - varies with Weight & Balance - Always full up for TO.
- ☐ High speed taxiing - Step taxiing 25 - 35 mph.
  Note: Speed across water Relative to IAS Into or Down wind.
- ☐ Correct Nose Attitude on the Step: The Sweet Spot – a level attitude.
  Ref. See AOPA Page in Lesson #4 Supp. .
- ☐ Dangers of Nose Down Attitude.
- ☐ Porpoising - when can this occur.
- ☐ Surface conditions for Step Turns - Sideways dig in.
- ☐ Step Turns & Cross controls, speed reduction, application of power.
- ☐ Submerging the wing float in step turns.
- ☐ Downwind turns - Winds not in excess of 7 mph. Note reduction of lift, tendency to settle off step.
- ☐ Swells & Chop. Dealing with this at speed.
- ☐ Glassy water, treat it as an emergency - more in Lesson #7
- ☐ Fresh water, weight, altitude, & nose attitude -The danger cocktail!
- ☐ Take-Off & Landing - Transitions between step taxiing & flight.
  Note: Developing the habit of correct nose attitude while in the step/high speed taxi mode is essential from the outset.

Beaching

Rule No#1 for approaching the beach/shore/mooring/pontoon - ***DO IT SLOWLY***.

- ☐ Approach speeds for Beach, Dock, Boat etc. Hatches Headsets & Harness.
- ☐ If unsure about beach/shore conditions, walk it in.
- ☐ Beaching - Full Nose Up trim, Full Up elevator - application of power.
- ☐ The Beach/dock, people & the environment.
- ☐ Assessing the beach - The case for Gear Up or Down.
- ☐ Wind direction when beaching - Sailing/Power.

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LESSON #4 Launching, Water Handling, Beaching & Docking.

FLIGHT TRAINING: F6 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Objectives: To ensure the Pilot has a comprehensive practical understanding of what is required to launch, beach and handle the *SeaRey* on the water, in mild conditions.

Water Exercise:

Pre-Launch

- ☐ Pre-flight Aircraft Inspection.
- ☐ Check equipment necessary for operation.
- ☐ Assessing the prevailing wind and water conditions - what to anticipate.
- ☐ Determining wind direction: Current/Tide, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks.
- ☐ Environmental assessment. People, animals, consequences of prop blast.

Launching

- ☐ Start-up.
- ☐ Checklist procedures.
- ☐ Launching - Water traffic, shoreline conditions, and effectiveness of brakes.
- ☐ Forward launch.
- ☐ Reverse launch - Rudder/Tailwheel opposite controls when floating.
- ☐ Reverse water entry - Avoiding elevator & tailwheel retract cable damage.
- ☐ Gear Retraction in water.
- ☐ No brakes, inertia & anticipation. What's different?
- ☐ Demonstrate technique for operation of retractable Gear in water.
- ☐ Carry out retraction & extension of gear.

Water Handling

Idle water taxiing/displacement mode.

- ☐ Passenger Briefing. Safety & Emergency. The 3 H's + life jacket.
- ☐ Hatches Headsets & Harness.
- ☐ Water spray & visibility. Chamois.
- ☐ Idle taxi familiarization - getting the feel of the water rudder.
- ☐ Swell, waves & wind.
- ☐ Waterway traffic.
- ☐ Maneuvering in moorings & tight spots - LH turns better than RH turns.
- ☐ Dealing with large watercraft & wake.
- ☐ Taxiing over the Take-Off path.

Plough taxiing

- ☐ When & why to use plow taxi in displacement mode.
- ☐ The teardrop or momentum turn.
- ☐ Avoiding Propeller damage from water erosion.
- ☐ Wind & it's affect. Weather vaneing. More in Lesson #6.
- ☐ Introduction to Plowing turns.

Flight Training F6 - Continued next page.

LESSON #4 Launching, Water Handling, Beaching & Docking.

FLIGHT TRAINING: F6 - Continued.

Step taxiing

- ☐ Pre-Take-Off checks - complete.
- ☐ Check waterway path for obstacles & traffic.
- ☐ Getting up on the Step.
- ☐ Application of Power & elevator input.
- ☐ Attitude & back stick pressure.
- ☐ Power, Trim & Flap settings.
- ☐ Demonstrate various flap settings & affect on attitude & center of lift.
- ☐ 0° flap setting.
- ☐ 10° flap setting. For Step Taxiing - Note Center of Pressure
- ☐ 20° flap setting. For Take-offs & Landings.
- ☐ Demonstrate various Trim settings.
- ☐ High speed taxiing/Step taxiing 25 – 35mph.
  Note: Relative Water Speed Vs IAS into Wind/Downwind/Current.
- ☐ Correct Nose Attitude on the Step. The Sweet Spot. - a level attitude
  Demonstrate Hands off below 30 mph.
- ☐ Porpoising.
- ☐ Step Turns & Cross controls, speed reduction, application of power.
- ☐ Surface conditions for Step Turns - Sideways dig in.
- ☐ Submerging the wing float.
  - ☐ Downwind Turns – 7 mph. Note reduction of lift, tendency to settle off step
- ☐ Swells & Chop. Dealing with this at speed. Note: Hazards of Nose down attitude.

Note: In the step taxiing section of this lesson, particular attention will be focused on demonstration and developing the correct nose attitude required for safe operation in the step taxiing & high speed taxi configurations. Attention will be focused on the handling techniques & characteristics experienced in the transition phases prior to lift & immediately following touchdown.

Beaching

Rule No#1 for approaching the beach/shore/mooring/pontoon - DO IT SLOWLY.

- ☐ Hatches, Harness & Headsets.
- ☐ Assess Wind & Water conditions for approaching the beach.
- ☐ Assess the Beach/shore/dock conditions - People & environmental.
- ☐ Selecting the beaching site - Determine Gear Up or Down.
- ☐ Approaching the beaching - Sailing & use of Power.
- ☐ Beaching - Wheels Up. If unsure about beach/shore conditions, walk it in.
- ☐ Beaching - Wheels Down - Full up trim & full up elevator.
- ☐ Docking - Boats, Jettys, Wharfs etc.
- ☐ After landing checks.
- ☐ Shutdown & De-brief.

☐ Securing the aircraft & security.

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LESSON #4 Launching, Water Handling, Beaching & Docking.

FLIGHT TRAINING: F7 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Objectives: To revise & consolidate with the Pilot, the practical skills covered in the Flight Training F6, with particular attention to step taxiing & correct nose attitude.

Water Exercise:

Pre-Launch

- ☐ Pre-flight Aircraft Inspection.
- ☐ Assessing the prevailing wind and water conditions - what to anticipate.
- ☐ Determining wind direction: Current/Tide, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks.
- ☐ Environmental assessment. People, animals, consequences of prop blast.

Launching

- ☐ Starting up.
- ☐ Checklist procedures.
- ☐ Launching.
- ☐ Gear Retraction in water.
- ☐ Carry out retraction & extension of Gear.

Water Handling

Idle water taxiing/displacement mode.

- ☐ Passenger Briefing. Safety & Emergency. The 3 H's + life jacket.
- ☐ Hatches & Harness.
- ☐ Idle taxi.
- ☐ Swell, waves & wind.
- ☐ Waterway traffic.
- ☐ Maneuvering in moorings & tight spots - LH turns better than RH turns.
- ☐ Large watercraft & wake.
- ☐ Taxi over the Take-Off path.

Plow taxiing

- ☐ The teardrop or momentum turn.
- ☐ Propeller care & avoiding water damage.
- ☐ Plowing turns.

Flight Training F7 - Continued next page.

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LESSON #4 Launching, Water Handling, Beaching & Docking.

FLIGHT TRAINING: F7 - Continued.

Step taxiing

- ☐ Pre-Take-Off checks - complete. Note: Gear **UP**.
- ☐ Check waterway path for obstacles & traffic.
- ☐ Application of Power & elevator input.
- ☐ Attitude & back stick pressure.
- ☐ Power, Trim & Flap settings.
- ☐ Step taxiing with 0°, 10° & 20° flap settings. Note the differences.
- ☐ High speed taxiing/Step taxiing 25 – 35mph.
- ☐ Correct Nose Attitude on the Step. The Sweet Spot – a level attitude.
- ☐ Step Turns & Cross controls, speed reduction, application of power.
- ☐ Downwind Turns - Not in excess of 7mph.
- ☐ Wings Level – Note: Dipping a wing float during a high-speed turn can cause the float to break loose.
- ☐ Swells & Chop. Dealing with this at speed.

Beaching

- ☐ Hatches, Headsets & Harness.
- ☐ Assess Wind & Water conditions for approaching the beach.
- ☐ Assess the Beach/shore/dock conditions - People & environmental.
- ☐ Selecting the beaching site - Determine Gear Up or Down.
- ☐ Approaching the beaching - Sailing & use of Power.
- ☐ Beaching - Wheels Up. If unsure about beach/shore conditions, walk it in.
- ☐ Beaching - Wheels Down - Full up trim & full up elevator.
- ☐ Docking - Boats, Jettys, Wharfs etc.
- ☐ After landing checks.
- ☐ Shutdown & De-brief.
- ☐ Securing the aircraft & security.

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LESSON #5 Water Take-Offs & Landings.

GROUND BRIEFING: B5 **Duration 3/4 Hour.**

Date: / / Time - Start: Finish:

Objectives: To familiarize the Pilot with the theoretical knowledge of the operational requirements for carrying out water Take-Offs & Landings.

Briefing Content:

☐ Review Lesson #5 in the Study Guide.

Preparation

☐ Review the 5 Phases from Idle to Flight as covered in Ground Briefing B4.
☐ Review of Flight Manual relating to water operations.
☐ Review appropriate operational checks-lists.
☐ The Pre-flight Aircraft Inspection prior to water operations.
☐ Assessing conditions, wind direction & strength - Forecast.
☐ Tides, Currents & operational considerations.
☐ Launching, Beaching Hazards.
☐ Waterway operational considerations.
Hazards in water - After rain – Wind lee.
☐ Aircraft weight & balance - effect on performance.
☐ Risk management – see comments in Study Guide.

Takeoffs

☐ Before Take-Off & Take-Off checks.
☐ Engine Run Up on water.
☐ Taxiing over the Take-Off path.
☐ Continuing verification of the wind direction.
☐ Application of Take-Off power
Stick pressure, thrust, trim, nose attitude in the take-off run.
☐ Step Taxiing - A transition to take-off & after touchdown.
☐ Nose attitude - in the transition.
☐ Normal Take-Off.
☐ No Flap take-off - performance implications if flaps not set.
If you forget - what are your options.
1. Cut off Power & Start again.
2. Pull on Flap but take care-watch for nose pitch down,
"Feel" for Flap don't **"Look"** for it,
Keep you eyes & attention on your nose **attitude**
☐ Take-Offs from confined spaces.
Downwind step taxi
360° take-off turns.
☐ Identification of take-off rejection possibilities

Ground Briefing B5 - Continued next page.

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LESSON #5 Water Take-Offs & Landings.

GROUND BRIEFING: B5 - Continued.

Patterns

- ☐ Downwind, Base & Final Approach pre-landing checks especially relating to the correct use of the retractable gear. Review Flight Manual.
- ☐ Note: Landing Gear Position
  - **UP** & Locked (incl overcenter lock) for **Water** Landing.
  - Verification check **(x 3) Downwind - Base - Final**.
- ☐ Evaluation of water conditions from air - Swell, rollers, chop, boat wake etc.
- ☐ Evaluation of wind conditions from air.
- ☐ Go around from late final approach. Note: Trim & power settings.
- ☐ The touch & go.
  - Speed reduction to under 35mph after touch down.
  - Apply **Full UP** Trim during step taxi phase **before** applying TO power.

Water Landings

- ☐ Downwind Landings. Avoid. e.g. change of wind direction.
- ☐ No Flap Landings. Avoid.
- ☐ Crosswind Landings. Avoid.
- ☐ Short water landings. 55 mph approach.
  - Stick back after 30 mph for most speed reduction.
- ☐ Landing on selected touchdown point.

Other Considerations

- ☐ Power lines. Power lines. Power lines, did we mention Power lines?
- ☐ Vigilance for obstacles on the waterway
- ☐ Fences.
- ☐ Water traffic & anticipation of their track toward your landing area..
- ☐ Air traffic.
- ☐ Use of the radio.
- ☐ Crosswind operations. More in Lesson #6.
- ☐ Gusty wind landings - use of flaps. More in Lesson #6.
- ☐ Wind, terrain & it's affect on water conditions. More in Lesson #6.
- ☐ Water/weather conditions & knowing your limitations.
- ☐ Learning & knowing **Your** Limitations & the **Aircraft** Limitations

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LESSON #5 Water Take-Offs & Landings.

FLIGHT TRAINING: F8 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Objectives: By the completion of Flight Training F8, F9, F10 & F11, the Objectives of Lesson #5, is to provide the Pilot with a sound familiarization & practical knowledge of the skills & handling characteristics required to safely carry out water Take-Offs & Landings in the *SeaRey*, in normal conditions.

Air Exercise:

Pre-Launch

- ☐ Pre-flight Aircraft Inspection.
- ☐ Assess the prevailing wind and water conditions - what to anticipate.
- ☐ Determine wind direction: Current/Tide, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks.
- ☐ Environmental assessment. People, animals, consequences of prop blast.

Launching

- ☐ Start-up. Checklist procedures. Ref Section 4 of Flight Manual.
- ☐ Launch.
- ☐ Gear retraction in water.
- ☐ Passenger Briefing - 3 H's.
- ☐ Briefing Pilot - Demonstrate first take-off, pattern & landing.
- ☐ Idle water taxi.

Water Takeoff

- ☐ Pre-Take-Off checks for water operations.
- ☐ Taxi over the Take-Off path.
- ☐ Verify wind direction.
- ☐ Check the Take-Off run and climb out path.
- ☐ Application of Take-Off power. On step maintain correct back stick pressure.
- ☐ Maintain correct nose attitude.
- ☐ Carry out normal lift off.
- ☐ Carry out normal climb out.

Patterns

- ☐ Carry out Normal Patterns.
- ☐ Carry out Downwind Pre-landing checks.
- ☐ Note: Gear position **UP** & Locked (incl overcenter lock)
  For **Water** Landing. Verification check **(x 3) Downwind - Base - Final**.
- ☐ Evaluate water conditions from air - Swell, rollers, chop, boat wake etc.
- ☐ Evaluate wind conditions from air.
- ☐ Evaluate waterway traffic from air.
- ☐ Remember other considerations e.g. Power Lines, floating objects, traffic, etc.

Flight Training F8 - Continued next page

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LESSON #5 Water Take-Offs & Landings.

Flight Training F8 - Continued.

Normal Water Landings

- ☐ Check approach & late final speed.
- ☐ Final check - Gear Up & locked for water landing.
- ☐ Holding off, bleed-off speed, gentle flare, touchdown.
- ☐ Carryout Normal full stop Landing.
- ☐ After landing checks.

Other Water Landings

- ☐ Short Landing.
- ☐ Glide approach.
- ☐ Go around from late final approach. Note: Trim & power settings.
- ☐ Carry out touch & go landing. Power & Speed reduction to under 35 mph
  Apply Full **UP** Trim during step taxi phase before Take-Off power.
- ☐ Emergency/Forced landing - idle power, simulated engine failure x 3.
- ☐ Land on selected touchdown point.

Lesson Conclusion

- ☐ Normal Landing.
- ☐ After landing checks incl. Hatches, Headset & Harness. (3H)
- ☐ Idle water taxi.
- ☐ The beach.
- ☐ Shutdown & De-brief.
- ☐ Airmanship - Demonstrates sound and systematic use of check-lists, correct procedures and vigilance in the pattern. Displays developed "Habit" in procedure for safe operation of retractable gear.

FLIGHT TRAINING: F9. **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

- ☐ Review, practice & consolidate procedures & water handling skills as covered in **F8.**

FLIGHT TRAINING: F10 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

- ☐ Review, practice & consolidate procedures & water handling skills as covered in **F9.**

FLIGHT TRAINING: F11 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Air Exercise:

- ☐ Review, practice & consolidate procedures & water handling skills as covered in **F10.**

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LESSON #6 Advanced Water Take-Offs & Landings.

GROUND BRIEFING: B6 **Duration 1/2 Hour.**

Date: / / Time - Start: Finish:

Objectives: To provide the Pilot with a greater awareness of the increased dangers and hazards that can be experienced in Wind, Weather and Water conditions that occur in wind conditions up to and in excess of 16 knots.

Briefing Content:

☐ Review Lesson #6 in the Study Guide.

Wind & Weather

☐ Review of the Wind Force Table. See Study Guide.
☐ Checking the wind direction - current, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks.
☐ Wind strength, weathervaneing & water handling
☐ Wind strength & wave height.
☐ Wind strength & its affect on the Take-Off & Landing run.
☐ Sharpening our wind reading skills.
☐ Water & Wind conditions in the Lee of terrain. - The + & - trash.
☐ Trash in the Lee of higher terrain, river banks, hills etc - **The Danger Zone**. In the lee of terrain, the stronger the wind the more dangerous the trash.
☐ 3 Gusts - 1. Leading Edge (Lift, turbulence etc) 2. Float. 3. Sink.
☐ Down drafts - Where to expect them? How to deal with them?
☐ Wind direction when beaching - Sailing, Idling & use of Power.

Water

☐ Fresh water, altitude, aircraft loading, no wind, glassy conditions.
☐ Water and Basic Hydrodynamics.
☐ Waterways and Topography.
☐ Assessing the take-off run - being prepared - Surprises, trash, jetskis, alligators!
☐ Sea Conditions - rollers, swells, waves * Bouncing to premature flight.
☐ Speed across the water relative to airspeed & windspeed - Up & Downwind.
☐ Waves, wind & wave height.
☐ Wind speed & it's affect on water - wave height - white caps, swells etc

Flight & Water Handling in Heavier Conditions

☐ Gusty winds - Identifying & being prepared.
☐ Gusty winds - Taxiing & Use of flight controls.
☐ Landing in Gusty Conditions - Reduction of Flaps.
☐ Sailing.
☐ Taxiing in Rough conditions.
☐ Plowing turns & The "P" Turn (TearDrop Turn) in stronger winds.
☐ Step Taxiing - no downwind turns above 5 knots.
☐ Turning downwind in stronger or gusty winds.
☐ Pre take-off - conditions assessment.

☐ Pattern: Assessment of the water conditions & location for landing.

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LESSON #6 ***Advanced Water Take-Offs & Landings.***

FLIGHT TRAINING: F12 **Duration 3/4 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Objectives: To familiarize the Pilot with the various handling skills required to safely operate the aircraft in Wind, Weather and Water conditions that occur in wind conditions up to 16 knots. This lesson will serve as a further opportunity to practice & consolidate, in more difficult conditions, the procedures & skills learned in **F8, F9, F10 & F11.**

Air Exercise:

Pre-Launch

- ☐ Pre-flight Aircraft Inspection.
- ☐ Assess the prevailing wind and water conditions - what to anticipate.
- ☐ Determine wind direction: Current/Tide, boats at anchor, funneling, birds, flags, smoke, weather vanes, shutting down, streaks.

Launching

- ☐ Starting up.
- ☐ Checklist procedures.
- ☐ Launching.
- ☐ Gear Retraction in water.

Water Handling & Take-Off

- ☐ Passenger Briefing. Safety & Emergency. The 3 H's + life jacket.
- ☐ Idle taxi in choppy, wind (10-15 kts) affected water, note weathervaning.
- ☐ Taxiing & Use of flight controls in windy conditions.
- ☐ Dealing with swell & waves in wind (10-15 kts) affected water.
- ☐ The "P" or momentum turn in choppy, wind (10-15 kts) affected water.
- ☐ Plowing turns in choppy, wind (10-15 kts) affected water.
- ☐ Step Taxiing in wind (10-15 kts) affected water.
- ☐ Turning downwind in stronger or gusty winds.
- ☐ Pre-Take-Off checks - complete. Note: Gear **UP**.
- ☐ Pre take-off - assesses conditions and the take-off run - anticipate.
- ☐ Sea Conditions - rollers, swells, waves * Bouncing to premature flight.
- ☐ Speed across the water relative to airspeed & windspeed - Up & Downwind.

Flight & Patterns

- ☐ Observe waterways and topography that can affect conditions.
- ☐ Identify & anticipate for gusty wind conditions.
- ☐ Water landings in Windy/Gusty Conditions - Reduction of flaps.
- ☐ Carryout Take-Offs & Landings in wind (10-15 kts) affected water.
- ☐ Pattern. Assess water/wind conditions & identify touchdown point.
- ☐ Downwind checks. Further assessment of water conditions.
- ☐ Note: Gear Position **UP** & Locked (incl overcenter lock)

For **Water** Landings. Verification check **(x 3) Downwind - Base - Final**.

Flight Training F12 - Continued next page.

LESSON #6 Advanced Water Take-Offs & Landings.

FLIGHT TRAINING: F12 - Continued.

Flight & Patterns - Continued

- ☐ Water & Wind conditions in the Lee of terrain. - The + & - trash.
- ☐ Trash in the Lee of higher terrain, riverbanks, hills etc - **The Danger Zone**.
  Note: In the lee of terrain, the stronger the wind the more dangerous the trash.
- ☐ 3 Gusts - 1. Leading Edge (Lift, turbulence etc) 2. Float. 3. Sink.
- ☐ Down drafts - Where to expect them? How to deal with them?
- ☐ Base check. Continue assessment of conditions & touchdown point.
- ☐ Final check - Gear Up & locked, wind & water conditions.
- ☐ The Touchdown. **Note: Correct Nose Attitude.**
- ☐ After landing run.
- ☐ Emergency/Forced Landings. Simulated Engine Failure.
- ☐ Re-cap other water hazards. e.g. Fish, turtles, surprises!

Beaching

- ☐ Hatches, Headsets & Harness.
- ☐ Assess Wind & Water conditions for approaching the beach.
- ☐ Assess the Beach/shore/dock conditions - People & environmental.
- ☐ Sailing, (Drifting, Idling & use of Power) in choppy, wind (10-15 kts)
- ☐ Beaching in choppy, wind (10-15 kts) affected water.
- ☐ Shutdown & De-brief.
- ☐ Securing the aircraft & security.

FLIGHT TRAINING: F13 **Duration 3/4 Hour.**

Objectives: To review, further develop & consolidate with the Pilot, the handling skills learned in the previous Flight Training F12, session.

Air Exercise:

- ☐ Further practice & consolidate procedures & water handling skills as previously covered in **F8, F9, F10, F11 & F12.**

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LESSON #7 Glassy Water Operations.

GROUND BRIEFING: B7 **Duration 1 Hour.**

Date: / / Time - Start: Finish:

Objectives: To give the Pilot a clear understanding of the operational difficulties and dangers associated with taking off and landing on glassy water and what methods and skills can be employed to most safely carry out such operations.

Briefing Content:

- ☐ Review Lesson #7 in the Study Guide.
- ☐ Review "How to Fly Floats" Video - Glassy Water operations.

GLASSY WATER OPERATIONS -Two Landing Approach Methods.
Neither of these two methods uses the surface of the water as a reference.

METHOD 1 APPROACH
The Constant Attitude/Constant Rate of Descent Method.
Descent rate 150' ft min, 20° flap, @ 55 mph - long distance and nose up.
METHOD 2
The Visual Method.
Use of shoreline as reference.

Glassy Water - Background

- ☐ The dangers of glassy water operations.
- ☐ Identifying the hazards of operations in glassy water.
- ☐ Surface tension & Drag - affect on performance.
- ☐ Glassy water and no wind = increased/higher water speed & greater surface tension.
- ☐ **The danger cocktail** = Higher take off weight + density altitude + fresh water
  Important Note: The pilot must be critically aware of the dangers of a nose down attitude when operating in glassy conditions. This particularly applies to water handling, the take-off, the approach, touch down & after landing run.

Pre Take-off from Glassy Water

- ☐ Glassy water and the increased take-off run required.
- ☐ Step taxiing - not in excess of 35 mph.
- ☐ Glassy water pre take-off preparations. Surface conditions.
- ☐ Pre Take-off - techniques for "getting un-stuck".

Take-off from Glassy Water

- ☐ Applying Take-Off power.
- ☐ Maintaining positive back stick pressure.
- ☐ Maintaining correct nose attitude.
- ☐ Lack of wind - settling back onto surface after lift off.
- ☐ Night take-off procedures. Positive ROC.
- ☐ Make positive lift-off and maintain climb out attitude.

Ground Briefing B7 - Continued next page.

LESSON #7 Glassy Water Operations.

GROUND BRIEFING: B7 - Continued.

Glassy Water Landings

- ☐ Water landings using Method 1 approaches.
- ☐ Water landings using Method 2 approaches.
- ☐ Overflying & assessment of the waterway for landing.
- ☐ Creating water disturbance by dropping, pebbles, life vest or other objects.
- ☐ Down wind checks & waterway assessment. Deciding the touchdown point.
- ☐ Note: Gear Position **UP** & Locked (incl overcenter lock)
  For **Water** Landing. Verification check **(x 3) Downwind - Base - Final**.
- ☐ Base checks.
- ☐ The approach. Setting/holding the descent rate.
- ☐ Final check. Check nose attitude.
- ☐ The Touchdown. **Note: Correct Nose Attitude.**
- ☐ The after touchdown run.
  1. Maintain Positive Back Stick Pressure.
  2. Reduction of Speed.
  3. Maintaining Correct Nose Attitude.
  4. Settle into displacement mode.

NOTE:

THE MOST.DANGEROUS PART OF GLASSY WATER OPERTIONS IS THE ATTITUDE.OF THE PILOT.

SOME PILOTS LACK RESPECT FOR THE SERIOUSNESS OF THIS SITUATION.

IF DONE CORRECTLY, YOU WILL NOT KNOW WHEN YOU ARE ON THE WATER UNTIL THE WATER DRAG AND NOISE IS APPARENT.

THEN KEEP 'FLYING' WITH A NOSE-HIGH ATTITUDE UNTIL SETTLING INTO THE DISPLACEMENT TAXI MODE.

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LESSON #7 Glassy Water Operations, an Emergency.

FLIGHT TRAINING: F14 **Duration 1 Hour.**

Date: / / Time - Start: Finish: Landings: G_____W_____

Objectives: To fully familiarize the Pilot with the safe operational techniques for water handling, takeoffs, approaches and landings on glassy water.

Air Exercise:

Pre Take-off

- ☐ Water taxiing on glassy water.
- ☐ Step taxi on glassy water - Note suction feel & handling characteristics.
- ☐ Taxiing over the Take-Off run.
- ☐ Assess the Take-Off run & consider increased take-off run required.
- ☐ Glassy water pre take-off preparations. Surface conditions. 360° Turns.

Take-off from Glassy Water

- ☐ Complete Pre-Take-Off checks.
- ☐ Apply Take-Off power.
- ☐ Maintain positive back stick pressure.
- ☐ Maintain correct nose attitude.
- ☐ Make positive lift off.
- ☐ Climb out - Note nighttime Take-Off & climb out technique. Positive ROC.

Glassy Water Landings

- ☐ Carry out water landings using Method 1 approaches.
- ☐ Carry out water landings using Method 2 approaches.
- ☐ Overflying & assess the waterway for landing.
- ☐ Creating water disturbance pebbles buoyancy vest.
- ☐ Down wind checks & waterway assessment. Deciding the touchdown point.
- ☐ Note: Gear Position **UP** & Locked (incl overcenter lock)
  For **Water** Landing. Verification check **(x 3) Downwind - Base - Final**.
- ☐ Base checks.
- ☐ The approach. Setting/holding the descent rate.
- ☐ Final check. Check nose attitude.
- ☐ The Touchdown. **Note: Correct Nose Attitude.**
- ☐ The after touchdown run.
  1. Maintain Positive Back Stick Pressure.
  2. Reduction of Speed.
  3. Maintaining Correct Nose Attitude.
  4. Settle into displacement mode.

Lesson Conclusion

- ☐ After landing checks incl. Hatches, Headset & Harness.
- ☐ Idle water taxi.
- ☐ Beaching.

☐ Shutdown & De-brief.

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LESSON #8 - Water Operations in an Emergency.

GROUND BRIEFING: B8 **Duration 1/2 Hour.**

Date: / / Time - Start: Finish:

Objectives: To create an awareness in the Pilot of some of the types of emergencies and circumstances that the seaplane pilot may experience as a result of an unplanned landing or mishap on the water.

Briefing Content:

☐ Review Lesson #8 in the Study Guide.

Operational

☐ Review passenger safety briefing.
☐ Flight Manual - Review Emergency Procedures.
☐ Ditching techniques.
☐ Emergency/Forced landings. Land vs. open water/ocean.
☐ Wearing a floatation device in normal flight.
☐ Survival gear. ELTs, Cellular phone, (in waterproof plastic bag).
☐ Hypothermia.
☐ First Aid.
☐ Emergency equipment – bailing/floatation equipment.
☐ Types of Emergency - Becoming inverted on the water etc.
☐ Aircraft hull or wing float damage.
☐ Aircraft recovery/salvage.

Passengers

☐ Safety Briefings - Making it a pre-flight habit to brief passenger.
☐ Hatches, Headset & Harness.
☐ Life jackets, stowage & use.
☐ Can the pilot & passenger swim?
☐ Disorientation - upturned, sinking or submerged aircraft. Harness orientation.
☐ Evacuating the aircraft.
☐ Remain with the aircraft.

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LESSON #8 - Water Operations in an Emergency.

GROUND BRIEFING: B8 **Duration 1/2 Hour.**

Date: / / Time - Start: Finish:

Objectives: To create an awareness in the Pilot of some of the types of emergencies and circumstances that the seaplane pilot may experience as a result of an unplanned landing or mishap on the water.

Briefing Content:

☐ Review Lesson #8 in the Study Guide.

Operational

☐ Review passenger safety briefing.
☐ Flight Manual - Review Emergency Procedures.
☐ Ditching techniques.
☐ Emergency/Forced landings. Land vs. open water/ocean.
☐ Wearing a floatation device in normal flight.
☐ Survival gear. ELTs, Cellular phone, (in waterproof plastic bag).
☐ Hypothermia.
☐ First Aid.
☐ Emergency equipment – bailing/floatation equipment.
☐ Types of Emergency - Becoming inverted on the water etc.
☐ Aircraft hull or wing float damage.
☐ Aircraft recovery/salvage.

Passengers

☐ Safety Briefings - Making it a pre-flight habit to brief passenger.
☐ Hatches, Headset & Harness.
☐ Life jackets, stowage & use.
☐ Can the pilot & passenger swim?
☐ Disorientation - upturned, sinking or submerged aircraft. Harness orientation.
☐ Evacuating the aircraft.
☐ Remain with the aircraft.

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LESSON #10 Seaplane rules and Regulations.

GROUND BRIEFING: B10 **Duration 1/2 Hour.**

Date: / / Time - Start: Finish:

Objectives: To familiarize the Seaplane Pilot with some of the rules and regulations governing seaplane operations.

Briefing Content:

☐ Review the regulations included in Lesson #10 in the Study Guide.

Regulations:

☐ Right-of-way rules. FAR 91.115
☐ Airspace Rules: National Parks and Wild Life Refuges.
☐ Equipment requirements: US Coast Guard Regulations, Part 175
☐ State and Local Governments: See appropriate Aeronautical Authority.
☐ Additional information: See Seaplane Pilots Association.

SeaRey
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SeaRey Amphibian
Study Guide

This Manual has been prepared as a reference document for use during Type Specific Training
(Retractable Landing Gear - Tail Wheel - Floating Hull)
&
General Familiarization With the *SeaRey Amphibian*

This Training Syllabus has been prepared by Waterbirds LC, the central US dealer for *SeaRey* Amphibian Experimental Aircraft, and *SeaRey* Australia. It is issued for the for the benefit of owners and pilots of *SeaRey* Amphibian type aircraft. A knowledge of (but not limited to) the material referred to in this syllabus forms part of the training required to qualify for flight log endorsement on the *SeaRey* Amphibian.

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A TRAINING PHILOSOPHY

The Following Points are Offered in the Interest of Establishing a Framework for Training which Promotes Communication and Understanding.

Within this Framework, the objective is to Achieve Accelerated Learning, Effective Flight Training and a Sound Familiarization with the SeaRey Amphibian.

1. There is no such thing as asking dumb question. However, a dumb question is the one that didn't get asked.

2. The Pilot shall be free and encouraged to ask as many questions as necessary to facilitate the learning process. If unclear at any time - ask a question. Lack of clarity will impair on-going learning.

3. The Instructing Pilot will respect "where the Pilot is at", at all times. There is plenty of time to get it right.

4. The Instructing Pilot will strive to provide an atmosphere in which the Pilot feels relaxed and safe in which to learn.

5. Effective learning takes place when there is a two-way communication.

6. The Instructing Pilot will seek to understand the Pilot's most preferred and receptive learning mode. i.e. Audio, Visual or Kinesthetic.

7. Any mistakes will be seen as "opportunities to learn".

8. Learning to fly is a process that never ends. Therefore, as part of the training program, the Instructing Pilot, together with the Pilot, is engaged in a process of continued learning.

9. The Pilot is asked to respect that "it will take as long as it takes" to complete the type specific training.

10. Flying the *SeaRey* is fun. Training is an excellent excuse to do more flying.

Continued on next page.

TRANSITION TO OTHER AIRCRAFT: Different airplanes are as different as people and the only sure and safe way to know them is to be properly introduced.

In the case of aircraft, the following important points are suggested as the key points for a good introduction:

1. **Before Flight**. In particular, the pilot must first study and understand the aircraft flight and operations manual. It is essential that the pilot have a thorough knowledge and understanding of:
   - The Fuel system
   - Electrical and/or hydraulic system
   - Normal and emergency landing gear operation
   - Maximum CG limits
   - Loading effects on performance
   - Pre-flight inspection
   - Normal aircraft operations
   - Aircraft limitations

2. **Learn the Cockpit Arrangement.** Study of the location and layout of engine and flight controls; engine and flight instruments; fuel management controls; wing flap and landing gear controls and indicators; and radio equipment.

3. **Engage a Check Pilot.** The pilot should obtain the services of an appropriate check pilot who is fully qualified in the type aircraft. The check pilot should not only be well qualified but should be capable of communicating effectively to the pilot, the techniques essential for the safe operation of the aircraft.

4. **Learn the Flight and Operating Characteristics.** Familiarization should not be limited to practice of takeoffs and landings. "V speeds", stalls, minimum control characteristics, emergency procedures and all normal operating procedures, should be studied and mastered in detail.

These points are the foundation upon which this training manual has been prepared.

INTRODUCTION TO SEAPLANE FLYING

Welcome to the amazing world of seaplane flying. This area of aviation brings together the two elements of air and water to introduce new experiences and excitement for the seaplane pilot.

The operation of flying an airplane from water is somewhat *different* than operating from land. But is no more *difficult* if the pilot acquires the essential knowledge and skill in the techniques involved. This is particularly important because of the widely varying and constantly changing conditions of the water-landing environment.

Sailing, power boating, & water skiing, or even windsurfing: all this experience will be a considerable advantage for the pilot, when it comes to handling a seaplane.

A seaplane is defined as "an airplane designed to take off from and land on water". Seaplanes can generally be classified as either floatplanes or flying boats. Those that can be operated on both land and water are called amphibians.

The floatplane is ordinarily understood to be a conventional landplane equipped with floats for water landings, in place of conventional wheels. A flying boat uses the hull to serve the dual purpose of providing buoyancy in the water as well as space to accommodate the pilot passengers and cargo.

The float-equipped aircraft is the more common type of seaplane. Although there is considerable difference between handling a floatplane and handling a flying boat, the principal upon which the majority of techniques are based, is similar.

The major difference between the two types of seaplanes is that the floatplane, which is primarily a land plane which has been fitted with floats for water operations. It is heavily penalized in performance, with speeds and weight carrying capacity the two most significant characteristics affected. Peter Gash, a highly experienced Australian seaplane pilot, says that the "floatplane is neither a good aircraft nor a good boat".

The flying boat, on the other hand, being specifically designed for the water, tends to be more streamlined and performs better from land and water than the float equipped aircraft. The flying boat also, generally has better water handling characteristics than the floatplane.

Nevertheless, as Kerry Richter, the designer of the *SeaRey* says, "you can't sink a seaplane on the runway". Therein lies the subtle importance of understanding and developing the skills necessary for the safe operation of a seaplane. By the time the pilot has completed the floating hull component of the *SeaRey* training, the important basic elements of water flying will have been covered and experienced. They will provide the pilot with a foundation upon which he/she can commence the process of building a greater understanding and experience of water flying.

Important

Safe flying calls for discipline. In observing discipline, one key element for a pilot's attention is **awareness of the variables**.

INTRODUCTION TO SEAPLANE FLYING continued

The environmental variables for take-off & landing in most land based flying are relatively few. For example, whether a pilot flies from Orlando, Oshkosh, LAX or his/her home airport, the taxiways rarely change, the runway surface and direction stay the same, the approaches and departure geography stay the same. Even the traffic and weather conditions are somewhat predictable at these locations. In daylight operations, the most significant variables are wind direction, strength and the runway surface, (e.g. wet, dry, icy).

However, water flying introduces a multitude of variables that most pilots have not previously experienced in aviation. The surface **conditions are constantly changing;** the direction for take-off or landing is rarely the same; the exact location for each take-off and landing might vary enormously. Even the environmental and surrounding conditions are constantly in a state of change.

It would cause a land based pilot little concern to see a ground vehicle displaying a flashing light, moving on a taxiway or adjacent to a runway. One could be fairly safe to assume that the vehicle is authorized to be there, is aware of your aircraft's presence and knows the 'rules of the road'. An element of predictability and responsibility goes with this type of operation.

How entirely different is the following scenario. It is summer holiday time and you are taxing in preparation for take-off on a river. You complete your pre take-off checks, you have checked the waterway and the take-off run, all is ready as you open the throttle for departure. All of sudden, as you are gathering speed across the water, a young boy on his jet ski, appears at full speed from a group of boats moored up ahead. He is moving into your take-off path. Has he seen you? Has he heard you? What are you going to do? As you are assessing the situation, around the bend ahead comes a speedboat with a water skier in tow, heading quickly in your direction. You have some decisions to make!

They don't string power lines across your local airport, but they do across water. They don't put fences across your runway but they do sometimes they become obscured from view when a river or lake is in flood. They don't usually leave logs and debris on the tarmac but a waterway can be littered with floating and partially submerged obstacles after a heavy downpour. Even after the rain, litter can be trapped in what used to be a favorite, safe and secure water landing area.

These circumstances are to say the least, highly variable. As is the entire water flying environment. This environment needs to be understood, expected, and trained for to ensure safe flying.

It will be our primary focus to create a highly acute awareness of these variables and potential hazards that accompany the discipline of water flying. Water flying is fun and easy, however it can be most **unforgiving**.

INTRODUCTION TO THE *SeaRey*

The *SeaRey* is without doubt, an extraordinary little aircraft, with an all round performance that is simply quite outstanding. Understanding the *SeaRey* makes it a very safe aircraft to fly and in both the land and water configuration, it is stable and predictable when flown correctly.

For newcomers, the *SeaRey* is on the lighter end of the weight scale compared to general aviation aircraft. Probably the most important thing to keep in mind is that *weight and loading*, plays the most important part in the performance and handling of the aircraft.

A pilot will definitely feel the difference between flying solo and dual. Of course, fuel and baggage, also play a part in the performance of the aircraft. This difference is most pronounced in the take-off and landing configuration. It is here that awareness of speed and the attention to changes in aircraft performance must be more acute.

Before attempting any water flying, the pilot should spend as much time as it takes flying from the land to become at home with and truly "plugged into" the *SeaRey*. This will take anything from around 10 hours, up to 30 hours or more, depending on the individual experience of the pilot.

In any event, the attention and concentration required of the pilot while learning how to fly from the water, especially in the first few hours, can be quite demanding. Learning water operations, with all it's variations and peculiar differences, is load enough on the pilot. Being unfamiliar with the *SeaRey*, is an unnecessary pressure to be avoided during early water flying training.

It is strongly recommended that you take your time in becoming fully familiar and comfortable with perfecting your land based operations before beginning any water flying. You will find this a great help when the time comes to make your water debut.

Up in the air, the *SeaRey* is much like any other aircraft, except that when making turns it helps to lead with some rudder input. In most GA aircraft we tend to become lazy with minimal or no rudder being required. Not so with the *SeaRey*, the rudder assists the rate of roll and helps considerably with coordinated aileron input, to bring about greater turn response. Coordinated control input is critical to the safe operation of any aircraft.

Well, you are poised at the threshold of one of the most exciting and enjoyable aviation experiences possible. The *SeaRey* offers you the unique opportunity of engaging in what well might be, *the ultimate fun in flying*. As a final note, lock in the answer to these Questions! What is probably the most important thing that has the most impact on the performance and handling of the *SeaRey*? The answer is in paragraph 3. What is the most important requirement for safe SeaRey operations? A proficient, careful, courteous pilot!

Good luck and now lets go and have some fun.

SEAPLANE OPERATIONS - AN OVERVIEW

It is recommended that all seaplane pilots become a member of the Seaplane Pilots Association (SPA). Their website location (www.seasplanes.org) contains information on training, study materials, the “Seawings” safety program and contacts for local representatives. The association is there to help and support all seaplane pilots and provide a central source of information and advice.

Courtesy and respect for the other users of the waterways is essential and will do much to promote goodwill and image, both for yourself and for other seaplane pilots. Going out of your way to "mix in" with the locals, will pay handsome dividends and is of particular importance for your acceptance in your local area of operation.

The SPA is also developing a code of operation. So if someone approaches the pilot with a complaint or challenge to the right of a seaplane to operate on a waterway, a copy of the code can be presented. This code will be of assistance in supporting the basis upon which the responsible seaplane pilots conduct operations with particular reference to following the rules of the Air and Waterways and an overall respect for our environment.

SeaRey

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LESSON #1 Aircraft Systems & Flight Manual.

INTRODUCTION - BRIEFING

Our course will begin with a general overview of the *SeaRey* with particular attention to it's systems, limitations, handling and performance characteristics and what we need to know to take the *SeaRey* flying. This lesson will involve approximately 1 hour of ground briefing and 1 hour of practical time with the aircraft.

For this lesson to be truly effective and as a prerequisite for any flying training, it is essential that the Pilot thoroughly study the *SeaRey* Flight Manual.

OBJECTIVES

To provide the Pilot with a thorough understanding of all the aircraft systems together with a good general knowledge of the aircraft Flight Manual.

LESSON CONTENT

GROUND BRIEFING B1

1. Systems.
2. Flight Manual - General Overview.

PRACTICAL SESSION PS1

1. At the Aircraft check that all required documents are aboard.
2. Carry out a detailed Pre-flight inspection.
3. Identify and discuss the various aircraft systems.
4. Discuss and explain the condition and security of the exhaust system. **Warning:** Loss of exhaust component integrity can damage the propeller with subsequent extreme engine vibration.

LESSON COMPLETION

The lesson will have been completed when the pilot can:

1. Satisfactorily provide appropriate answers to questions on aircraft systems.

2. Demonstrate a thorough understanding of the above by describing or carrying out the above tasks or functions, as referenced from the *SeaRey* Flight Manual.

NOTES FROM LESSON #1

LESSON #2 General Handling - Land & Flight.

INTRODUCTION

This lesson consists of an initial briefing of approximately 1-hour followed by a practical flight training session of approximately 1-hour. The flight training session will be primarily focused on a general familiarization. The majority of this lesson will be conducted so the Pilot can have ample opportunity to get a good feel for the aircraft in the air. This will include an extensive segment on stalls and the general flight handling characteristics of the *SeaRey*.

OBJECTIVES

Principally, to familiarize the Pilot with the general airborne handling characteristics of the *SeaRey* aircraft, in normal flight.

LESSON CONTENT

GROUND BRIEFING: B2

1. Flight Manual
   - Limitations •See Section 2 of the Flight Manual
   - Emergency Procedures •See Section 3 of the Flight Manual
   - Normal Procedures •See Section 4 of the Flight Manual
   - Performance •See Section 5 of the Flight Manual
   - Loading Data •See Section 6 of the Flight Manual
   - Stalls and Spins •See Section 3 of the Flight Manual
     - Stall and Spin recovery
     - Departure Stalls
     - Landing Stalls
     - Accelerated Stalls
     - Variation with aircraft weight
     - Effects of bank angle
     - Effects of uncoordinated flight
     - Lack of electric stall warning system

This Table to be completed by the Pilot as part of the pre-flight briefing.

Take-off	Power_____RPM	Flap_____°	Speed_____mph
Climb	Power_____RPM	Flap_____°	Speed_____mph
Cruise	Power_____RPM	Flap_____°	Speed_____mph
Descent	Power_____RPM	Flap_____°	Speed_____mph
Base Leg	Power_____RPM	Flap_____°	Speed_____mph
Final Leg	Power_____RPM	Flap_____°	Speed_____mph
Landing	Power_____RPM	Flap_____°	Speed_____mph

Continued next page

LESSON #2 Continued General Handling - Land & Flight.

FLIGHT TRAINING: F1

1. Pre-flight inspection.
2. Start up.
3. Airplane Taxiing.
4. Pre take-off Checks.
5. Take-off and climb.
6. Cruise.
7 Turns.
8. Stalls - Departure and Landing.
9. Emergency Procedures - In Flight.
10. Descending.
11. Demonstration - Normal Pattern.

LESSON COMPLETION

By the conclusion of this lesson the Pilot should be able to:

1. Satisfactorily explain the appropriate answers to questions based on the above ground and flight demonstrations.

2. Demonstrate a thorough understanding of the material covered in this lesson, as referenced from the *SeaRey* Flight Manual.

3. Additionally the pilot should be able to demonstrate that he/she can safely handle the aircraft in the following procedures:

   - Emergency procedures.
   - Normal procedures .
   - Airborne maneuvers, in particular stalls.

Important Note:

It is strongly recommended that the Pilot consolidate, over several hours, what has been learned in this lesson, before commencing water training.

After around 10 hours (again depending on the individual Pilot) of ground based operations, the Pilot should begin to feel confidently familiar with the aircraft. This knowledge will greatly assist the Pilot when commencing the water flying training.

Power Settings for Rotax 912".

NOTES FROM LESSON #2

LESSON #3 Retractable Landing Gear, Tailwheel & Patterns.

INTRODUCTION

This lesson consists of an initial briefing of approximately 1-hour followed by 4 practical flight training session of around 1 hour each. The first hour focuses on Retractable Gear, the second hour on Tailwheel Operations, the third hour on Traffic Patterns and the fourth hour is to consolidate what has been learned in the previous 3 sessions. Further practical flight training sessions may be required to complete this lesson, which will depend on the skill and experience of the individual pilot.

OBJECTIVES

To provide the Pilot with:

1. A good theoretical understanding of the various retractable Gear systems used in aircraft.
2. A full understanding of the *SeaRey* retractable Gear system and how it varies from other aircraft.
3. A sound understanding of the principals associated with the factors affecting operation of tailwheel equipped aircraft.
4. A familiarization with the typical handling and operational characteristics of the *SeaRey* in the pattern.

OBJECTIVES

Pilot will acquire the skill to qualify for tailwheel (conventional) and retractable gear endorsements.

LESSON CONTENT

GROUND BRIEFING: B3

1. Retractable Landing Gear Systems.
2. The *SeaRey* Retractable Gear System.
3. Tailwheel (Conventional) Type Aircraft.
4. The *SeaRey* - Tailwheel Aircraft.
5. Traffic Patterns.

FLIGHT TRAINING: F2

1. Retractable Landing Gear.

FLIGHT TRAINING: F3

2. Tailwheel Operations.

FLIGHT TRAINING: F4

3. Traffic Pattern patterns.
   - Normal Traffic Patterns.
   - Other Traffic Pattern Procedures.
   - Crosswind Operations.

FLIGHT TRAINING: F5

4. Retractable Gear, Tailwheel & Traffic Patterns - Review & Consolidation.

Continued next page

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns
Continued.

INTRODUCTION TO RETRACTABLE LANDING GEAR
Many aircraft are equipped with retractable landing gear; primarily to reduce the drag created while it is extended in flight. Obviously, in the case of an amphibious seaplane, it is essential to be able to retract the gear on contact with the water.

Some landing gear retract rearward into the wing and some sideways into the fuselage and some into the engine nacelles. The retraction and extension mechanism may be operated manually, hydraulically or electrically. Various warning devices are typically provided to show the pilot when the wheels are either up or down or are part way in mid cycle. In nearly all installations, systems for emergency operation are provided.

Hydraulic System
Devices used in a typical hydraulically operated landing gear retraction system include actuating cylinders, position selector valves, uplocks, downlocks, sequence valves, tubing and other conventional hydraulic components. These systems are designed and interconnected to permit properly sequenced retraction and extension of the landing gear, the landing gear doors, and fairings if installed.

When the landing gear control in the cockpit is moved to the UP or DOWN position, the landing gear retracts or extends as selected, by the force of hydraulic pressure which is applied to the up or down side of the gear actuator. The gear actuator applies the force required to raise or lower the gear. A locking mechanism secures the gear in the desired up or down position until the pilot operates the landing gear control.

Electric System
The electrically operated system is typically a screw-jack electric motor driven system for raising or lowering the landing gear. When the landing gear switch in the cockpit is moved to the UP position, the electric motor operates. Through a system of shafts, gears, adapters, an actuator screw and a torque tube, a force is transmitted to the landing gear strut. Thus the landing gear retracts and locks. If the switch is moved to the DOWN position, the motor reverses and the gear is moved down and locks.

The sequential operation of fairing doors and landing gear is similar to that of the hydraulic landing gear system.

An emergency extension system installed in the aircraft gear system permits the pilot to lower the landing gear if the main hydraulic or electrical system fails. The emergency gear extension systems include designs so that hydraulic fluid or compressed air can provide the necessary pressure, while others use a manual system for extending the landing gear under emergency conditions.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns Continued.

Retractable Landing Gear Control
In aircraft fitted with hydraulic and electric retraction mechanisms, the control for operating the landing gear is a switch or lever, often in the shape of a wheel to differentiate from the flap control which usually has an airfoil shape.

When the control is moved to the DOWN position, the gear will extend. When it is moved to the UP position the gear will retract. In addition to this operating control, an indication or warning light/s, usually located on the instrument panel, shows the position of the gear. Typically a RED light, or a BLUE light (for water) in some seaplanes, will indicate the gear is in a retracted position and a GREEN light/s (for grass) will indicate the gear in the down and locked position.

The landing gear should only be operated when the airspeed is at or below the aircraft's maximum landing gear operating speed (Vlo). Operating of the gear above this speed may cause damage to the operating mechanism. When the gear is down and locked, the aircraft should not be operated in excess of the aircraft's maximum landing gear extended speed (Vle).

It is extremely **important** that the pilot form the habit of *Positively identifying*:

1. That the landing **gear control** is the control you wish to use before attempting to use it to raise or lower the gear. Otherwise the pilot may inadvertently use the flap control and operate the flaps instead of the gear or visa versa.

2. That you have verified the landing gear **POSITION** before and after operating the landing gear control, (especially in the downwind and pre-landing checks) in order to avoid landing with the gear in the wrong position.

3. **Warning**: The *position of the gear* is critically important. In a land plane you can reinforce a good habit to continually check that the gear is down prior to all landings. With a seaplane, you will land with the gear up *and* with the gear down. Therefore, in a seaplane you must change that habit to continually check that the gear is in the **proper position for each landing**.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

THE *SeaRey* RETRACTABLE LANDING GEAR

GENERAL: The *SeaRey* landing gear is of the conventional tail-dragger configuration. The main gear and tail wheel are designed to retract for water operations. The main gear swings upward and outward while the tail wheel swings forward and upward when retracted

HOW THE *SeaRey* RETRACTABLE SYSTEM DIFFERS

Principally, the two main points by which the *SeaRey* system differs from most other retractable Gear systems are:

1. The Gear has been designed to be retractable for the exclusive purpose of raising the gear legs and wheels clear of contact with the water during water operations. In nearly all other aircraft with retractable gear, this feature has been incorporated to clean up the profile of the aircraft in order to improve performance and cruise speed.

   In the *SeaRey*, no speed advantage is gained since that the gear legs and wheels remain in the airflow, whether the gear is raised or lowered. No Vlo or Vle speed limitations apply to the *SeaRey*.

2. The *SeaRey* standard gear system is operated by a mechanical mechanism. It relies entirely upon the Pilot's physical input when selecting the UP or DOWN position. On some SeaRey aircraft a hydraulic system is installed. See the Flight Manual for details.

   Other points that distinguish the *SeaRey* different from other systems:
   - There is no emergency extension system.
   - The Gear legs and wheels do not retract inside the aircraft.
   - There is not aerodynamic affect on performance when operating the *SeaRey* retractable Gear in the UP or DOWN position.
   - The performance of the *SeaRey* is not affected if the gear is extended or operated during flight.
   - If the braking mechanism is wet, braking performance can be adversely affected when returning to land operations from water operations.
   - Prior to a gear down landing, the rudder should be moved left and right to assure that the tailwheel is in a steerable position.

. NOTE: The tail wheel is extended down by a stainless steel cable linked to the gear system. Care should be taken when reversing i.e. rolling the aircraft backwards, as damage may result if excessive pressure is exerted on the cable. Excessive pressure can be placed on the cable if for some reason the tail wheel becomes fixed (stopped by a chock, falls into a rut, comes up against some obstacle that prevents further aft movement) while inertia or a force continues to move the aircraft backwards.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

THE *SeaRey* MANUAL RETRACTION MECHANISM: The manual landing gear is operated by the use of a "Johnson Bar" style handle located forward and center of the seats. The Gear Retract Handle is connected by a main push-pull tube to the gear torque tube. The torque tube arms are connected to each gear leg by a small push-pull rod, which raises or lowers the gear. Rubber boots are provided at the two openings in the hull sides where the main gear legs extend out from the retraction mechanism.

THE *SeaRey* OVER-CENTER LOCKING DEVICE - ANTI-RETRACTION

The *SeaRey* manual gear mechanism incorporates an over-center locking device, which secures the Gear in the Up and Down position. The over-center locks must be released prior to moving the gear with the Gear Retract Lever. A secondary over-center lock is also used as an additional safety feature.

This feature also serves as an anti-retraction safeguard. Whenever the over-center device is in the locked position, the weight of the aircraft bearing on the gear mechanism, prevents the gear from retracted accidentally. When on the ground, it is not possible for a person to inadvertently select “Gear Up” since the leverage required to "crack" the over-center lock through the Gear Retraction Handle is beyond the strength of most pilots. However it would be possible during taxiing as the weight of the aircraft shifts over the ground surface. In either case, don’t try it. You are entering the experimental test phase again. The secondary over-center lock will help prevent gear activation when the aircraft weight is off the gear.

THE *SeaRey* GEAR RETRACTION:

To retract the landing gear, first release the secondary over-center lock. Then reach forward to the **Gear Retract Handle** and squeeze the **Gear Retract Lever**, which is located on the handle. Squeezing this lever releases the over-center locks. As the over-center lock releases, the handle is pulled back in a rearward motion. Once the handle is about half way back, the Gear Retract Lever is released and the cycle of raising the Gear is completed by pulling the handle all the way back in a positive motion until the gear locks in the "UP" position. The over-center lock/ indicator is then pushed fully forward to make sure that the gear is fully up and locked. (If one or both of the over-center lock/indicator cables are under tension and are not fully forward, this indicates that a gear leg is not fully locked.) Then the secondary over-center lock is engaged. Note: It is essential to check the over-center lock/indicator as part of the procedure when checking either the Gear UP or Gear Down position.

THE *SeaRey* GEAR EXTENSION:

To extend the gear down, first release the secondary over-center lock. Then squeeze the Gear Retract Lever to release the over-center locks. Then in a forward motion, pus the Gear Retract Handle iand at the same time release the Gear Retract Lever while continuing to push the Gear Retract Handle all the way forward until the gear locks in the "down" position. The over-center lock/indicator is again checked by pushing it fully forward. This indicates and ensures that the gear is fully down and locked. Finally the secondary over-center lock is engaged.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

IDENTIFYING THE *SeaRey* GEAR POSITION:

The Gear Retract Handle is in the full forward position when the Gear is "DOWN". When Gear Retract Handle is in the full rearward position the Gear is "UP". A placard marking on the lower center cockpit tube, clearly identifies the correct position of the Gear Retract Handle for the Up or Down position.
To positively determine the position and security of the *SeaRey* retractable Gear, the following steps are the correct procedure.

1. Physically & Visually Check the position of the Gear Retract Handle.
2. Visually check by looking out the left and right side canopy windows and observe the position of the gear leg and wheel. When in the Up or Down position, both the gear legs and wheels are clearly visibly from the cockpit. A mirror installed on each float will allow you to check the tailwheel position.
3. The over-center lock/indicator should be visually and physically checked for both gear legs in the Up or Down locked position. Do this by pushing the indicator handle fully forward to confirm both over-center locks are engaged.
4. The secondary over-center lock should be engaged.

Note: The Pilot should use all visual, physical and hearing senses during the checks for gear position. Look, touch and say out aloud, the UP or DOWN position selected follow it by stating what landing surface is anticipated. Listen to what you have said and compare it to what you see ahead..

STANDARD PATTERN GEAR OPERATING PROCEDURE

Gear Extension/Retraction - During the briefing and training sessions, particular emphasis and attention will be focused on developing a good procedural "Habit" for operation of the retractable gear. It is good practice to retract the gear after every land takeoff and leave it retracted during flight. The gear check procedure used while operating the *SeaRey* and will be referred to throughout the briefing and training documentation and flying operations as follows:

WATER OPERATIONS

For a **Water** Landing.

Gear Position **UP** & Locked (incl **overcenter lock check**)
Verification check **(x 3) Downwind - Base - Final**.

WARNING: Make absolutely certain that the Gear is in the **"UP"** and locked position at all times for water landings. **Serious personal injury and aircraft damage may result if this is not observed.**

LAND OPERATIONS

For a **Ground** Landing

Gear Position **DOWN** & Locked (incl **overcenter lock check**)
Verification check **(x 3) Downwind - Base - Final**.

Note: Even with the gear retracted the *SeaRey* may be landed with minimal damage on hard surfaces. If a gear up landing is necessary and sufficient time/fuel/facilities exist, attempt to land on a sod runway.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

INTRODUCTION TO *Tailwheel* FLYING

Tailwheel aircraft have a tendency to "weathervane" or turn into wind while being taxied. This tendency is much greater in tailwheel aircraft than nose wheel type aircraft. The tendency is greatest while taxiing directly crosswind; consequently directional control is more difficult. The greater the cross wind strength, the more difficult it is to maintain directional control.

Directional control in tailwheel aircraft requires greater vigilance than in a nose wheel type aircraft. The main reason for this is because in tailwheel aircraft the center of gravity (CG) is behind the main wheels. The affect of wind on the fuselage and vertical fin in a tailwheel aircraft, has a much greater affect on the directional control of the aircraft with the result that the aircraft is much more likely to “weathervane” as the aircraft pivots around the forward gear and the aft CG.

In a tricycle or nose wheel aircraft with the CG forward of the main gear, directional control or stability is much more manageable and predictable.

In a tailwheel type aircraft, loss of directional control on the ground may lead to an uncontrolled tight turn commonly referred to as a "ground loop".

The combination of centrifugal force acting on the CG and ground friction of the main wheels resisting it during a ground loop may cause the aircraft to tip or lean enough for the outside wingtip to contact the ground. Such actions may also impose sufficient sideways load that could cause the main gear to collapse.

On most tailwheel aircraft, directional control is facilitated by the use of a steerable tailwheel which operates along with the rudder. Most tailwheel aircraft also have a "break away" tailwheel feature which allows the tailwheel to full swivel when turning at a greater angle is required. The aircraft may thus be pivoted within it's own length, if desired, yet is fully steerable for more gentle turns while taxiing forward.

Tailwheel Taxiing

Since a tailwheel aircraft rests on the tailwheel, it assumes a nose high attitude when on the ground. In most cases, especially with tractor mounted engines, the engine cowling is placed high enough to restrict the pilots forward vision. As a result, objects immediately and directly ahead of the aircraft are difficult or impossible to see. To observe and avoid colliding with any objects or hazards, the pilot should zigzag or make a series of short S turns while taxiing forward. This must be done slowly, smoothly, positively and cautiously.

Tailwheel Down wind Taxiing

When taxiing downwind the tendency to weathervane is increased, due to the decreased the effectiveness of the flight controls from the tailwind. This requires a more positive use of rudder and brakes, especially in stronger wind conditions.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

Taxiing and Ground Control in the *SeaRey.*

Effective ground control while taxiing is accomplished through a combination of the steerable tail wheel and to a lesser extent the rudder, using the rudder pedals. When a rudder pedal is depressed a spring tensioned stainless steel cable (which is also connected to the rudder and water rudder) will turn the steerable tailwheel. The ailerons should also be positioned in accordance with the wind direction.

Tailwheel **Normal Take-off Roll**

Upon application of maximum allowable power, a tailwheel aircraft with trim set for take-off, will normally assume approximately the correct take-off pitch attitude of it's own accord when sufficient speed has been attained. That is, the tail will rise slightly. This attitude can then be maintained by applying slight back stick (up elevator) pressure. To keep the aircraft aligned with the runway, rudder pressure must be used promptly to counteract any yawing forces that occur due to **"P" factor** or cross winds. The so-called "P" factor is a resultant yaw due to the torque forces created when power is generated from the engine and propeller. This yawing affect is usually most pronounced at the beginning of the take-off roll as power is fully applied. To maintain directional control during the early stages of take-off roll, a positive use of tailwheel/rudder is more important than in nose wheel type aircraft. These initial control inputs are required until there is sufficient airflow to provide rudder authority.

Take-Off Roll in the *SeaRey.*

When take-off power is applied in the *SeaRey*, the aircraft will tend to pull forward and yaw to the left due to the pusher configuration of the engine and the "P" factor. The yawing in most cases is mild in the *SeaRey* with only modest right rudder input being required to counteract the yaw and maintain a straight path down the runway. For higher-powered aircraft, it may be necessary to slowly and smoothly apply power.

Tailwheel **Normal Landings**

In tailwheel aircraft the round-out and touchdown should be so timed that the main landing gear wheels and the tailwheel touch down simultaneously. This is called a **3-point landing** and requires timing, technique and judgement of distance/altitude.

> Note: Because of the break-away capability of the tail wheel, a tailwheel can be pushed off center as a result of forces incurred during water operations. When returning to land operations, the rudder pedals should be pushed left and right after gear extension. These actions will re-engage the locking device of the tailwheel and ensure it is steerable

In a 3-point landing, when the wheels of the aircraft make contact with the ground, the elevator should be carefully and progressively eased back to hold the tailwheel on the ground. This provides more positive directional control of the aircraft equipped with a steerable tailwheel and prevents any tendency for the aircraft to nose over.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

Tailwheel **Normal Landings** - Continued.

Care must be taken, if the tailwheel is not on the ground, when easing back on the elevator control which may cause the aircraft to become airborne again. As the tail goes down the change of attitude will increase the angle of attack and produce enough lift for the aircraft to fly.

In the case of higher wind conditions or the requirement for even greater directional control, a **wheel landing** can be made. This type of landing takes place at a higher speed than a 3-point landing and as a result the increased airflow over the rudder surface provides greater directional authority. In a wheel landing the aircraft is flown onto the runway in a more horizontal attitude with the main gear wheels making contact with the runway surface first. When the main gear wheels are on the runway and the power and speed has been reduced, the tailwheel will then settle to the surface.

It is particularly important that touchdown occur with the aircraft's longitudinal axis exactly parallel to the direction in which the aircraft is moving along the runway. Directional control should be maintained by positive rudder inputs. Be vigilant to anticipate any deviations from the runway centerline. Failure to accomplish this may allow a sudden change of direction in the landing roll, which not only imposes severe sideloads on the landing gear, but also imparts groundlooping tendencies. To avoid these side stresses or a groundloop, the pilot must never allow the aircraft to touch down while in a crab attitude or while drifting sideways.

Normal Landings in the *SeaRey.*

Prior to landing, the Pilot must maintain sufficient airspeed (energy) to allow the SeaRey to assume a level attitude just above the runway. As the speed bleeds off, the attitude can be adjusted to a 3-point attitude. Remember that the speed will drop rapidly due to the airplane's drag. Failure to maintain adequate energy (airspeed) to attain a stable, level attitude may result in a very "firm" arrival.

> Note: In the event of a "bounce" during which the aircraft will be at a low airspeed prior to the second touchdown, power may be added to stabilize the subsequent decent. Do not add full throttle in a burst of power since it may destabilize the approach.

When carrying out a 3-point landing in the *SeaRey*, the landing attitude to be adopted during the flare is very similar to the normal climb out attitude. It is almost the same as the attitude of the aircraft when sitting at rest with its wheels on a level surface. Unlike other tailwheel type aircraft that typically have a very high nose attitude when taxiing or touching down, the *SeaRey* has a much more horizontal attitude with a mild taildown

attitude. The SeaRey lands best with some power remaining to assure airflow over the tail surfaces. For most aircraft with Rotax engines about 3,000 rpm is adequate.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

Tailwheel **Normal Landing Roll**

Tailwheel aircraft are most susceptible to ground loops late in the after landing roll because rudder effectiveness decreases with the decreasing flow of air along the rudder surface as the aircraft slows.

The rudder serves the same purpose on the ground as it does in the air. It controls the yawing of the aircraft. The effectiveness of the rudder however, is dependent on the airflow, which of course, depends on the speed of the aircraft. As the speed decreases and the tailwheel becomes in contact with the ground, the steerable tailwheel provides more positive directional control.

With tailwheel aircraft the elevator control should be held back as far as possible and as firmly as possible until the aircraft stops. This provides more positive control of the tailwheel steering, tends to shorten the after landing roll and prevents bouncing and skipping. However, always consider the wind direction in the displacement of controls.

Normal Landing Roll in the *SeaRey.*

Because of its relatively low landing speeds, the *SeaRey* also is less susceptible to ground looping. Its directional control and ground handling characteristics are predictable and easy to master.

> Caution: Excessive braking on hard surface runways could raise the tailwheel and push the aircraft over on its nose.

Tailwheel **Crosswind Operations - General**

Wind acting on an aircraft during crosswind landings is the result of two factors. One is the natural wind, which acts in the direction the air mass is travelling, while the other is induced by the movement of the aircraft and acts parallel to the direction of movement. Consequently a crosswind has a headwind component acting along the aircraft's ground track and a crosswind component acting 90° to its track. The resultant or relative wind is somewhere between the two components. As the aircraft's forward speed decreases during the after landing roll, the headwind component decreases and the relative wind has more crosswind component. The greater the crosswind component the more difficult it is to prevent weathervaning.

Tailwheel **Crosswind Approaches**

In order to maintain longitudinal direction with the runway centerline, the best approach technique is the wing low method as opposed to the crab method.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

Tailwheel **Crosswind Landing and After Landing Roll**

Upon touch down and particularly during the after landing roll, special attention must be given to maintaining directional control by the use of rudder or tailwheel steering while keeping the upwind wing from rising by using aileron. Characteristically an aircraft has a greater side profile surface area behind the main landing gear than forward of the main gear. With the main wheels acting as a pivot point and the greater surface area exposed to the crosswind behind that pivot point, the aircraft will tend to turn or weathervane into the wind.

Though it is characteristic of most aircraft, this weathervaning tendency is more prevalent in tailwheel aircraft because the aircraft's surface area behind the main landing gear is greater than in nose-wheel type aircraft.

While the aircraft is decelerating during the after landing roll, more and more aileron must be applied to keep the upwind wing from rising. Since the aircraft is slowing down there is less airflow around the ailerons and they become less effective. At the same time the relative wind is becoming more of a crosswind and exerting a greater lift forcing on the upwind wing. Consequently when the aircraft is coming to a stop, the aileron control must be held fully toward the wind.

Application of differential brakes may also be used to assist in maintaining directional control but caution must be exercised when applying brakes to avoid over controlling. The standard *SeaRey* is not equipped with differential braking.

Tailwheel **Turbulent-Air Approach and Landing**

Landing approaches in severe turbulence should be such that touchdown is made with the aircraft in approximately level flight attitude. The touchdown should be made smoothly on the main wheels with the tailwheel held clear of the runway. This is called a "wheel landing" and requires very careful timing and control to prevent bouncing. Wheel landings can be best accomplished by holding the aircraft in level flight attitude until the main wheels touch, then immediately and smoothly retarding the throttle and holding sufficient forward elevator pressure to hold the main wheels on the ground. The aircraft should never be forced onto the ground by excessive forward pressure.

Care should be taken to avoid touchdown at too high a rate of descent because if the main wheels strike the ground too hard the tail will also be forced down by it's own weight. In turn when the tail is forced down, the wing's angle of attack increases resulting in a sudden increase in lift and the aircraft may become airborne again. This can precipitate porpoising, which usually intensifies despite the pilot trying to stop it. The best action if this occurs is to abort the landing and execute a go-round.

Continued next page.

LESSON #3 Retractable Landing Gear, Tailwheel & Traffic Patterns. Continued.

LESSON #3 COMPLETION

The lesson will have been completed when the pilot can:

1. Satisfactorily complete the relevant answers in the Searey Airplane Questionnaire, relating to the above.

2. Demonstrate a theoretical and practical understanding, which includes the safe handling of the aircraft in the sequences covered in this lesson, including ground handling, taxing, takeoffs, landings and crosswind operations.

Note: Before operating any other retractable gear and/or tailwheel aircraft for the first time, any Pilot who completes this *SeaRey* training syllabus, should also be checked out by an appropriately approved and experienced instructor pilot. The pilot should review the flight and operations manual for that particular aircraft and be thoroughly conversant with all aspects (including emergency procedures) of the aircraft's retractable gear and/or tailwheel system.

NOTES FROM LESSON #3

LESSON #4 Launching, Water Handling & Beaching.

INTRODUCTION - BRIEFING

This lesson will commence with a 1 hour briefing of the various operational and handling characteristics of the *SeaRey*, relating to launching of the aircraft, water taxiing, step taxiing, step turns and concluding with beaching and mooring.

The briefing will be followed by 2 practical water based training sessions of approximately 1 hour each. The lesson will be conducted in light to mild conditions with more advanced techniques in water handling in heavier conditions, being covered in Lesson #6.

OBJECTIVES

To ensure that the Pilot has a good understanding of the various techniques and practices for operating the *SeaRey* on the water, at different speeds and in various configurations, in mild conditions.

OBJECTIVES

To introduce, demonstrate and have the pilot experience the various performance characteristic and configurations associated with Entry, Operation on and Exit from the water.

LESSON CONTENT

GROUND BRIEFING: B4

1. Passenger briefing, use of emergency equipment, flotation devices, etc.
2. Pre-Launch.
3. Launching.
4. Water Handling.
   - Idle Water Taxi - The Displacement Mode.
   - Plow Taxi.
   - Step Taxi.
   - Beaching/Docking/Mooring.

FLIGHT TRAINING: F6

1. Pre-Launch.
2. Launching.
3. Water Handling.
   - Idle Water Taxi - The Displacement Mode.
   - Plow Taxi.
   - Step Taxi.
   - Beaching/Docking/Mooring.

FLIGHT TRAINING: F7

1. Pre-Launch.
2. Launching.
3. Water Handling.
   - Idle Water Taxi - The Displacement Mode.
   - Plow Taxi.

- Step Taxi.
- Beaching/Docking/Mooring.

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LESSON #4 Launching, Water Handling & Beaching.

THE 5 PHASES OF WATER HANDLING UP TO FLIGHT

PHASE 1 - Idle Taxi in the Displacement Mode	0 - 5 mph
PHASE 2 - Plowing Taxi	5 - 15 mph
PHASE 3 - Step Taxiing	15 - 35 mph
PHASE 4 - Transition to Takeoff	35 - 45 mph
PHASE 5 – Takeoff/Touch Down	45 +/- mph

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
0 - 5	5 - 15	15 - 35	35 - 45	45 & Over

PHASE 4 - Transition to Takeoff.
Of all the phases in water handling, this one is the most critical. This is simply because the faster the hull passes across the water, the greater are the risk factors.

When operating from water in both the Take-off and Landing stage of operation, we should spend the minimum time possible in the **Phase 4 Transition Phase**. At best and under normal operations, we should only spend a few seconds in this phase on our way to becoming airborne or after touchdown.

RELATIVE WATER SPEED

During familiarization and learning about water operations and in particular general water handling in **PASES 3 & 4**, it is most important to develop and understand a clear appreciation of the significance of HULL speed across the water.

The IAS (Indicated Air Speed) while operating on the water does not always indicate the HULL speed across the water. Since HULL speed is a critical (especially at higher speeds) factor in safe water operations, we will spend time on this area in order for you to develop a clear understanding and awareness of this important factor.

As a foundation, the following will help as an introduction to the subject.

1. Operating in no-wind conditions the IAS will be the same as the HULL speed.

2. Operating in a 10-knot wind and travelling into wind, then the HULL speed will be 10 knots less than the IAS. For example, if the IAS is 40 knots then the HULL speed across the water will be 30 knots.

   However, operating downwind in the same 10 knot wind conditions, when the IAS is 40 knots the HULL speed will be 50 knots, **a full 20 knots difference**. Therefore understanding the significance of the relative difference between IAS and water speed Upwind/Downwind is all-important.

CORRECT NOSE ATTITUDE & HULL WATER SPEED

The importance of the combination of the correct Nose Attitude and understanding the significance of the increased risks associated with high or excessive HULL water speed is critical to master in order to ensure safe water operations.

High Speed Taxi Risks –??????????????????Insert

A dramatic example of how it can all go horribly wrong is dramatically depicted in this sequence of photos.

LESSON COMPLETION

The lesson will have been successfully completed when the pilot is able to competently explain and safely demonstrate the necessary skills and techniques required in launching, water handling and beaching the *SeaRey*.

Of particular **importance**, the Pilot will be required to confidently demonstrate:

1. A sound understanding and mastering of the correct horizontal nose attitude required for operating the *SeaRey* on the water.

2. The skill of safely operating the *SeaRey* on the water while on the step.

3. The difference between relative speed between IAS and HULL speed across the water in various wind directions.

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NOTES FROM LESSON #4

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LESSON #5 Water Take-Offs & Landings.

INTRODUCTION - BRIEFING

In this Lesson, the Pilot will be introduced to the basic techniques employed in water take-off and landings, in mild conditions. More advanced techniques and skill demands will be covered in Lesson #6 and will serve to consolidate what has been learned in this Lesson and Lesson #4. The lesson will begin with a briefing of approximately 45 minutes and will be followed by a minimum of 4 practical flight training sessions of approximately 1 hour each, because of the importance of this section.

Additional flight training sessions may be necessary to complete this lesson, with the number of sessions being dependent on the skill of the individual Pilot.

OBJECTIVES

The Objectives of this Lesson is for the Pilot to learn how to safely control the aircraft during the take-off and landing phases of water operation, in mild conditions.

OBJECTIVES

To have the Pilot understand, experience and demonstrate water takeoffs, traffic patterns and landings to a competent level, in mild conditions.

LESSON CONTENT

GROUND BRIEFING: B

1. Preparation.
2. Take-Offs.
3. Patterns
4. Water Landings - See page "How to Make Perfect Water Landings".
5. Other Considerations.

FLIGHT TRAINING: F8

1. Pre-Launch.
2. Launching.
3. Water Take-Offs.
4. Patterns.
5. Normal Water Landings.
6. Other Water Landings.

FLIGHT TRAINING: F9, F10 & F11

Review, Practice & Consolidation of Procedures & Water Handling Skills learned in Flight Training F8.

LESSON COMPLETION

The lesson will have been successfully completed when the pilot is able to competently explain and safely demonstrate all phases of takeoffs, traffic patterns, and landings in the *SeaRey*.

NOTES FROM LESSON #5

LESSON #6 Advanced Water Take-Offs & Landings.

INTRODUCTION - BRIEFING

In this lesson, detailed attention will be focused upon the more challenging circumstances that will be experienced, both in flight and on the water surface, as a result of conditions created from increased intensity of wind and weather in association with waterways, terrain, and geography.

OBJECTIVES

To provide the Pilot with a greater awareness of the dangers and hazards of water flying associated with more difficult conditions.

OBJECTIVES

The key objective of this lesson will be:

A. To introduce the Pilot to some of the more difficult water flying conditions that he or she may encounter from time to time.
B. To identify the causes of such conditions.
C. To help the Pilot identify, experience and develop the necessary skills to be able to make assessments and decisions that promote safe operation.

LESSON CONTENT

GROUND BRIEFING: B6

1. Wind & Weather.
2. Water.
3. Flight & Water Handling in Heavier Conditions.

FLIGHT TRAINING: F12

1. Pre-Launch.
2. Launching.
3. Water Handling & Take-Off.
4. Flight & traffic Patterns.
5. Beaching.

FLIGHT TRAINING: F13

Review, further develop & consolidate with the Pilot the handling skills learned in Flight Training F12 session and also to act as a final re-cap of what was covered in Flight Training sessions F8, F9, F10, F11 & F12.

WIND

Wind is the Seaplane Pilot's greatest concern. It affects every aspect of water flying and it is often the determining factor when you are trying to decide whether to fly or not. In some respects wind is a more important consideration than weather. We can often fly at low level over the water in rain or poor visibility and even in these conditions still find a safe place to land. However if the wind gets up, even in fair weather, water surface conditions can be hazardous.

There are a number of things we can bank on when it comes to the wind.

1. The seaplane will act like a weather vane and always face into the wind.

2. The aircraft will drift downwind in the breeze.
3. The stronger the wind the more hazards we need to be alert to.

LESSON #6 Advanced Water Take-Offs & Landings.

WATER & BASIC HYDRODYNAMICS

Since water is a fluid the forces created when operating an airplane on water are more complex than those created on land. The water forces act along the entire length of a seaplane's hull or floats with the center of pressure constantly changing, depending upon the pitch attitude, dynamic hull or float motion and action of waves. At the same time the center of pressure of the wing (lift) will be at a different location.

Since the surface condition of water varies constantly, it is important that the seaplane pilot be able to recognize and understand these effects. These varied conditions of the water surface are further changed by tide, current, wind, land mass and topography.

Under calm wind conditions, a waveless glassy water surface is perhaps the most dangerous to the seaplane pilot requiring care and vigilance. Glassy water conditions present a set of challenges, all of it's own and require disciplined and precise piloting technique for conducting safe operations. For this reason, Lesson #7 is set aside specifically to address Glassy Water Operations.

TRASH - DISTURBED AIR, ROTORS & DOWNDRAFTS IN THE LEE

Regardless of the height of the shoreline, there will always be a band of smoother water extending out from the upwind shore that will be readily visible from the air. This will designate the leeward upwind side of the shore.

This wind around a leeward shore if not anticipated can be a cause for significant changes in the aircraft attitude when step taxiing downwind. Be vigilant and anticipate a change of wind velocity and direction as you move around the edge of the land mass near the shore.

This is also the location that trash will accumulate. The stronger the wind and the higher the terrain the more dangerous the trash.

LESSON COMPLETION

The lesson will have been completed when the pilot is able to:

1. Explain a clear & full understanding of the more demanding circumstances which will be experienced in stronger winds and rougher water conditions.

2. Demonstrate competency and required skills to safely handle the aircraft in more difficult wind and water conditions.

LESSON #6 Advanced Water Take-Offs & Landings.

Wind force table:

NOTES FROM LESSON #6

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LESSON #7 Glassy Water Operations.

INTRODUCTION - BRIEFING

Flat or Glassy Water, is probably the single most dangerous water condition a Seaplane Pilot can face. These conditions make it almost impossible to judge your height above the water surface. Ironically, Glassy Water is not something that is regularly encountered but it is a certainty that you will sooner or later be presented with the situation.

It is possible that during the SeaRey Training you might not get to fly much on Glassy Water. However, because of the hazards associated with this type of water flying, it is most important that we focus a great deal of emphasis on the special techniques required to deal with these conditions.

This lesson will involve a 1/2-hour briefing followed by a one-hour flight to experience the techniques used in Glassy Water flying.

OBJECTIVES

To have the Pilot understand and experience the various methods used to land and take-off in Glassy Water conditions.

OBJECTIVES

Carry out water takeoffs and landings employing the methods for Glassy Water operations in order for the Pilot to acquire the necessary skills to safely conduct flight in these conditions.

LESSON CONTENT

GROUND BRIEFING: B7

GLASSY WATER OPERATIONS -The Two Landing Approach Methods.

Neither of these two methods uses the surface of the water as a reference.

METHOD 1. The Constant Attitude/Constant Rate of Descent Method.

- Descent rate 150' ft min, 20° flap, @ 55 mph - long distance and nose up.

METHOD 2. The Visual Method.

- Use of shoreline as reference.

1. Glassy Water - Background.
2. Pre-Take-Off from Glassy Water.
3. Take-Off from Glassy Water.
4. Glassy Water Landings.

FLIGHT TRAINING: F14

1. Pre-Take-Off
2. Take-Off from Glassy Water.

3. Glassy Water Landings.

LESSON #7 Glassy Water Operations.

Risk Management Note: Unlike most float-mounted seaplane, the SeaRey offers alternative landing options. If water conditions are glassy, or too rough, an airport can be selected as an alternative landing location. Given the inherent danger and risks of glassy water operations, the SeaRey pilot has a safe and easy way out. Do not dismiss the dangers involved in glassy water operations, it is truly an emergency procedure to land in such conditions for recreational uses.

Note: Before operating any other float or floating hull aircraft for the first time, any Pilot who completes this *SeaRey* training syllabus, should also be checked out by an appropriately approved and experienced instructor pilot. The pilot should review the flight and operations manual for that particular aircraft and be thoroughly conversant with all aspects of the aircraft's float or floating hull operational characteristics. If it is an amphibian, the pilot should become fully acquainted with the retractable gear system including all emergency procedures relating to the system

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The Ultimate Fun in Flying

LESSON #7 Glassy Water Operations.

The Text Below is an Extract from a Float Flying Training Manual

NOTES FROM LESSON #7

LESSON #8 Water Operations in an Emergency

INTRODUCTION - BRIEFING

In this lesson we take a look at some of the issues that can arise if you are presented with a mishap or emergency. This briefing generally lasts around a 1/2 an hour.

If you are going to have an emergency, which forces you to land, statistics suggest that you are much better off to do this in a seaplane. While not necessarily a positive statement, this reflects the greater landing choices that you are presented by flying an amphibian aircraft. When landed on correctly, a watery runway is softer than terra firma and three-fourths of the earth is covered by water..

OBJECTIVES

To build an awareness of the type of emergencies that the Seaplane Pilot may be confronted with, how these may vary in nature from a land based aircraft and how to possibly address an emergency should it occur.

LESSON CONTENT

GROUND BRIEFING: B8

1. Operational.
2. Passengers.

Emergency & Operational

- Flight Manual - Emergency Procedures
- Wearing a floatation device in normal flight?
- Survival gear
- Hypothermia
- First Aid
- Emergency equipment - floatation equipment
- Types of Emergency - Becoming inverted on the water etc.
- Night Landings
- Aircraft hull or wing float damage
- Aircraft recovery/salvage

Passengers

- Safety Briefing
- Hatches, Headset & Harness
- Life jacket
- Can they swim?
- Possible disorientation
- Remain with the aircraft

NOTES FROM LESSON #8

SeaRey

The Ultimate Fun in Flying

LESSON #9 Airmanship, Seamanship & Seaplaning.

INTRODUCTION - BRIEFING

Water flying will take you to locations where, more often than not, a seaplane may rarely or never have landed. The location might well be your home base or a waterway that is considered the exclusive domain of fishermen, jet-skis, boaters, yacht owners, or conservationists.

Typically, these locations and the terrain you have flown over to reach your destination may well not be on the IFR or regular aviation navigation routes.

Ignorance and lack of experience with aircraft can often lead to unrest and misunderstanding between the local residents and the pilots who use these waterways.

Therefore, the following 1/2-hour briefing is dedicated to addressing some of the issues that you may come across and will be important for your safety, convenience and enjoyment.

OBJECTIVES

To bring an awareness to the Seaplane Pilots of some additional Safety and Environmental issues, that they will find useful in their future operations.

LESSON CONTENT

GROUND BRIEFING: B9

Flight Planning

- Emergency contingencies - remote landing, over night, etc.
- Endurance & Fuel Planning
- Aircraft Loading and other "creeping" load factors.
- Carrying an ELT

The Environment & Public Relations

- Respect the environment
- Keep friendly with the locals
- Water Patterns - mixing it up
- Noise abatement
- Join clubs and associations - volunteer US Coast Guard patrols, etc.
- Meet the local operators, boaters
- Handling complaints & objections
- Know the Rules & Regulations - Air & Water
- Seaplane Pilots Association (SPA) Membership
- Public Relations
- Help Others
- Be considerate of others
- Operating in other Seaplane Operation areas

NOTES FROM LESSON #9

IN CONCLUSION

6 RULES FOR SEAPLANE SAFETY

Rule #1	Exercise Good Judgement
Rule #2	Don't Rush into a Decision
Rule #3	Think through the Consequences of each Decision
Rule #4	Plan Ahead
Rule #5	When in Doubt, Don't
Rule #6	Know your own Limitations

SOME GOLDEN SAFETY TIPS

- If in Doubt? Go Around.
- Always plan "an out".
- You can't sink an airplane on the runway!
- Seaplane flying is Easy & Fun - but unforgiving if you break the rules.
- Always be Vigilant about the correct nose attitude when operating on the water.
- Remember the greater the speed across the water surface, the greater the hydrodynamic effect of water on the hull.

CLOSING NOTE

What you have learned during the SeaRey training is the minimum upon which to build experience. The training only makes it safe for you to fly. The real learning begins now.

From here, it is a matter of carefully building up your time and investigating your limitations and the limitations of your aircraft. Take time to enjoy your flying and go out in conditions with which you feel comfortable and you know from experience that you can manage.

To assist you in developing your experience and knowledge the following suggestions will be useful:

- Read books on Seaplane flying.
- Subscribe to Seaplane and flying magazines.
- Track down videos on the subject.
- Join the Seaplane Pilots Association.
- Speak to other Seaplane pilots and operators.
- Attend or organize social get-togethers with like interested Pilots.
- Arrange or attend weekend splash-inns etc.
- Go flying with another Seaplane Pilot.
- Set up a Seaplane e-mail network and establish regular communications.
- Link into the SOS forum(*SeaRey* Owners Support) group on the Internet.
  To join contact www.eqroups.com or Bill Canino at bill@waterbirds.com

Books

Seaplane Operations	Dale De Remer & Cesare Baj
Flying a Float Plane	C. Marin Faure

Seaplane Safety

The following Pages are extracts from a floatplane Training Manual.

Six Rules for Safety

Continued next page.

Six Rules for Safety - continued

Continued next page.

Six Rules for Safety - continued

RULE SIX - continued from previous page.