Wisconsin Soaring Society (WSS) Standardization Manual

Last updated: April 9, 2025

This manual is a reference for WSS learners, rated pilots and instructors to improve safety and standardization of training procedures.

Always verify and follow the appropriate FAA documentation, aircraft POH, limitations and checklists. In case of discrepancies, use the official manufacturer and FAA documentation as the primary reference.

Table of Contents

References & Useful Links:

- **Code of Federal Regulations:**
  https://www.ecfr.gov/current/title-14/
- **FAA Aeronautical Information Manual:**
  https://www.faa.gov/air_traffic/publications/atpubs/aim_html/index.html/
- **FAA Glider Flying Handbook:**
  https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/glider_handbook/gfh_front.pdf/
- **Soaring Society of America:**
  www.ssa.org/
  www.ssa.org/wing-runner-course/
- **Private Pilot (Glider) Practical Test Standards:**
  https://www.faa.gov/training_testing/testing/acs/private_glider_pts_22.pdf/
- **Commercial Pilot (Glider) Practical Test Standards:**
  https://www.faa.gov/training_testing/testing/acs/commercial_glider_pts_23.pdf/
- **Recommended glider Study Book(s):**
  https://www.gliderbooks.com/
  http://www.bobwander.com/catalog.pdf/
- **Progress Records and Phase Checks:**
  https://www.gliderbooks.com/books#!/FREE-Downloads/c/33664046/
  https://www.gliderbooks.com/books#!/Phase-Check-Materials-Downloadable/p/131646107/
- **Glider Simulator Software (optional, but highly recommended):**
  https://www.condorsoaring.com/
- **WSS Members Handbook**

Blue sections: intended specifically for the learner pilots

Purple sections: intended for instructor pilots

Green sections: are the standardized methods and procedures

Log Entries and Phase Checks

METHODS -

- We will be using the **Flight Training Manual for Gliders (FTMG) by Russell Holtz** for the private pilot training programs at WSS.
- Learners will use a **glider logbook** to record each flight and ground entry, preferably immediately after each session. The flight instructor that conducted that training (flight or ground) will sign and date that entry along with appropriate log-entry remarks.
- Separately, we will use the **FTMG Progress Record** sheet to record and monitor learner's progress. Ideally, we will use an online version of this record (e.g., using Google Sheets), but if necessary, we can also use a paper version.
- The learner is responsible for making sure all logbook and progress record entries are correct and up to date.
- We will also use a **phase check process** as learners progress through their primary training program.
    - **Phase Check I**
        - Phase Check I - consists of a short, written test, and one flight. The purpose of the Phase I check is to make sure the learner has the basic skills and knowledge to safely pilot the glider through the takeoff, tow, pattern, and landing.
    - **Phase Check II**
        - Phase Check II - consists of the Pre-Solo Written Test, and three flights. If successfully completed, the learner will be able to perform a solo flight following the 3rd phase check flight.
        - Two different instructors may conduct Phase Check II to positively determine the learner's solo readiness.
    - **Phase Check III**
        - Phase Check III - consists of a written test, followed by a simulated "Practical Test" consisting of 1-2 hours of oral questioning and three flights. When the student successfully completes this phase check, they should be ready to pass the FAA Practical Test.

Progress Records (From FTMG)

Flight Training Progress Record

Student Name:_____

		1 - Orientation, Pre/Post-Flight	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	1.1	Primary Flight Controls									
I	1.2	Secondary Flight Controls									
I	1.3	Using the Flight Instr.									
II	1.4	Ground Handling									
II	1.5	Preflight Inspection									
II	1.6	Positive Control Check									
II	1.7	Tow Rope Inspection									
III	1.8	Securing the Glider									
III	1.9	Area Familiarization									

		2 - Takeoffs	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	2.1	Takeoff Checklist									
I	2.2	Takeoff Proc. and Signals									
I	2.3	Takeoff									
II	2.4	Crosswind Takeoff									
III	2.5	T.O. w/o a Wing Runner									
III	2.6	Downwind Takeoff									
III	2.7	High Density Altitude T.O.									

		3 - Aerotow	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	3.1	Intro. to Flying the Tow									
I	3.2	Flying the Tow									
I	3.3	Release from Tow									
I	3.4	"Soft" Release (Optional)									
II	3.5	Shifting Through Wake									
II	3.6	Steering Turns									
II	3.7	Aerotow Signals									
II		Speed Up									
II		Slow Down									
II		Glider Release Failure									
II		Rudder Waggle									
II	3.8	Boxing the Wake									
II	3.9	Slack Rope on Tow									
II	3.10	Slack Rope in a Turn									

		4 - In-Flight Maneuvers	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	4.1	Transferring Control									
I	4.2	Scanning for Traffic									
I	4.3	Pitch/Speed Control									
I	4.4	Using the Trim Control									
I	4.5	Shallow/Med. Bank Turns									
I	4.6	Precision Turns									
I	4.7	Airbrakes in Flight									
II	4.8	Steep Turns									
II	4.9	Circling Flight									
II	4.10	Crabbing									
II	4.11	Stalls in Level Flight									
II	4.12	Stalls in a Turn									
II	4.13	Slow Flight									
II	4.14	Stalls with Airbrakes									
II	4.15	Side Slip - Alignment									
II	4.16	Side Slip - Crosswind									
II	4.17	Forward Slip									
II	4.18	Low-G Maneuvers									

Completion of Phases I and II required before solo.

		4 - In-Flight Maneuvers (Cont.)	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
III	4.19	Selecting Cruise Airpeed									
III	4.20	Deep Stalls									
III	4.21	Chandelle									
III	4.22	Incipient Spins									
III	4.23	Spins									
III	4.24	Rapid Speed Changes									
III	4.25	High-Speed Flight									

		5 - Landing Patterns	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	5.1	Landing Checklist									
I	5.2	Intro. to the Pattern									
I	5.3	Glide Slope Control									
II	5.4	Radio Use									
II	5.5	Crosswind Patterns									
II	5.6	Unusual Patterns									
II	5.7	Forward Slip w/Airbrakes									
II	5.8	Turning Slips									
II	5.9	Side Slip in the Pattern									
III	5.10	No Altimeter Pattern									
III	5.11	No Alt./Airspeed Pattern									
III	5.12	No Airbrake Pattern									
III	5.13	Full Airbrake Pattern									

		6 - Landings	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
I	6.1	Intro. to the Landing									
II	6.2	Precision Landings									
II	6.3	Crosswind Landings									
II	6.4	Landing Over an Obstacle									
II	6.5	Sim. Off-Field Landing									
III	6.6	Downwind Landings									
III	6.7	High Wind Landings									
III	6.8	High Altitude Landings									

		7 - Flying in Lift	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
II	7.1	Thermaling									
II	7.2	Mountain Wave									
II	7.3	Ridge Lift									
II	7.4	Convergence/Shear									

		8 - Emergency Procedures	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
II	8.1	Premature Tow Release									
II	8.2	Simulated Rope Breaks:									
II		Straight Ahead									
II		180° Turn									
II		Abbreviated Pattern									
II	8.3	Rock Off									
II	8.4	Power Loss During T.O.									
II	8.5	Power Loss at Altitude									
II	8.6	Simult. Release Failure									
II	8.7	Spiral Dive Recovery									
III	8.8	Unusual Attitude Recovery									
III	8.9	Intercept Procedures									

		9 - Aeronautical Decision Making	Read	Questions	Instruction	Demo	Level 1	Level 2	Level 3	Responsible	Proficient
II	9.1	Situational Awareness									
II	9.2	Judgment									
II	9.3	Self-Discipline									

Takeoff and Landing Checklists
(repeated for quick reference)

TAKEOFF CHECKLIST:

A	Altimeter set and checked
B	Belts checked for all occupants
B	Proper Ballasts in place and secured
C	Controls are checked (elevator, aileron, rudders, spoilers, and trim)
C	Canopy closed
C	Cable connected (usually the last item to be completed for safety)
D	Direction of wind determined
E	Emergency Procedures briefed

PRE-LANDING CHECKLIST:

U	Undercarriage (landing gear) down or confirmed fixed gear.
S	Approach speech per the POH and wind conditions
T	Trim set for approach speed
A	Airbrakes checked and returned to the desired position
L	Look and clear the landing area, listen to the radio, and check winds
L	Land safely following the procedures.

General Expectations

LEARNERS -

- Actively help in flight operations. They should arrive early to help get the gliders and towplane ready for launch and/or stay late until to put away all equipment and secure the hangar.
- When not actively training, learners should assist with ground operations such as launching and retrieval of the gliders.
- Contact and coordinate an instructional time slot with the instructor in advance of the lesson and before reserving a glider.
- Bring their glider logbook to every lesson, along with their up-to-date training records (paper or electronic).
- Have completed the SSA wing-runner course (https://www.ssa.org/wing-runner-course/) each season.
  Note: per the WSS Handbook, all members must complete this course each year.
- Have completed their pre-readings that are pertinent to their level of training and the expected lesson for that day.
- Come prepared with their goals and objectives (after a few lessons) for the day and actively collaborate with the instructor to accomplish those as appropriate.
- Become familiar with the appropriate FAA Practical Standard (PTS) and know the standards to which they are training for.
- Become familiar with the aircraft Pilot Operating Handbook (POH), weights & balance (W&B), and any other relevant aircraft information.
- Become familiar with the pertinent Parts 61 and 91 of the Codes of Federal Regulations (CFRs).
- Obtain a weather briefing from an approved source (phone or online) for the intended flight, seeking instructor help as needed. When conducting flights outside of the Hartford area, you must obtain weather and all relevant information for the intended course/destinations. This includes runway closures, surface conditions, TFRs, NOTAMs, etc. Pay special attention to the planned duration of the flight, accounting for unexpected deviations and changes.

INSTRUCTORS -

- Serve as role models, coaches, and mentors, actively sharing their knowledge, experiences, and skills.
- Answer questions from the learners utilizing industry best practices and the most effective and efficient methods.
- Guide learners to achieve their best every time and help them reach their goals and objectives while meeting or exceeding all FAA and WSS standards.
- Conduct all operations compliant with all applicable laws, regulations, policies, and safety standards.
- Coordinate with other instructors to ensure learners are receiving consistent instruction and to discuss student progression.

Ground Operations

LEARNERS -

- Always demonstrate and practice safe ground handling of the aircraft. If not sure, they should discuss with an instructor or an experienced WSS member and continue to improve their knowledge and skills.
- Know and be able to explain how terrain and wind affect ground handling.
- Know and demonstrate how to park the aircraft safely and securely, whether during operations or at the end of the day.
- Follow directions from the flight instructor or the Field Operations Officer (FOO).

INSTRUCTORS -

- Ensure the tow vehicle rope is longer than at least half the glider wingspan.
- Ensure the tow vehicles have an illuminated, flashing beacon and working radio.
- Close and secure the glider canopy before movement.
- In high wind conditions, and ideally always, have a wing walker on each wingtip.
- While towing with a single wing walker, ensure the wing walker is on the side of the glider with any obstructions.
- While towing, maintain situational awareness by listening to and observing other traffic and ground operations on the radio.
- Stop and clear for any traffic in the pattern before crossing any runway.
- Park gliders with the spoilers deployed, the downwind wing down, and at a safe distance from the runway.
- When parking a glider, keep at least a one and a half wingspan distance between gliders.
- Do not stage a glider on the runway until the glider and towplane pilots are ready.

Preflight inspection

LEARNERS -

- Demonstrate a thorough preflight inspection based on the POH.
- Check for all required documentation.
- Demonstrate knowledge of what to do if you encounter any issues.

INSTRUCTORS -

- Verify performing a ground inspection of the aircraft following the outline in the aircraft's POH.
- Double check the aircraft for required paperwork- airworthiness certificate, registration, operating limitations and weight and balance and explain how to display these items in the cockpit.
- If you find any issues, remove the aircraft from service and contact the maintenance team.
- Ensure learners are attentive and actively participating in increasing their knowledge and skills along the way.

Pre-take-off checklist & briefing

LEARNERS -

- Brief the desired tow and any on-tow maneuvers with the towplane pilot.
- Calculate weight and balance and demonstrate they are within the approved limits for the configuration.
- Verbally complete the ABBCCCDE checklist before every flight and demonstrate knowledge of potential problems.
- Brief the instructor on the anticipated emergency plan based on the current conditions.

INSTRUCTORS -

- Verify that the plane is within CG and maximum gross weight limits for the current occupants, double check for any installed ballast.

METHODS -

- Talk to the towplane pilot and brief the flight - intended release height, intended direction of release, what maneuvers you will be attempting while on tow (e.g., slack rope or box-the-wake), desired tow-speed, etc.
- Ensure all occupants have their belts fastened; controls are reachable; all loose items are secure, and the area and ground crew are ready to launch.
- On dual flights, brief the planned flight maneuvers, who is the PIC, the protocol for positive exchange of flight controls, etc.
- On dual flights with passengers, brief the use of seatbelts and canopy release and discuss what they can and cannot touch within the cockpit, and ensure nothing is loose in the cockpit.
- Verbally, and clearly announce the A-BB-CCC-D-E **checklist**

  A – Altimeter set
  B – Belts on
  B – Ballast as needed
  C – Controls checked (elevator, aileron, rudder, spoilers, and trim)
  C – Canopy closed, locked and checked
  C – Cable hooked (do this at the end, just prior to signaling readiness)

D – Direction of wind (clearly call out direction – left or right, and velocity)
E – Emergency procedures and radio check

- If rope breaks (or other issues) happen **under 200 ft AGL**, land straight ahead (+/- 20 degrees). Discuss and point out potential emergency fields outside the airport to consider in an emergency.
- If rope breaks (or other issues) happen **>200 ft AGL**, turn into the wind, perform a 180 degree turn and land on the downwind runway. (keep headwinds in mind that would turn into tailwinds)
- If rope breaks (or other issues) happen at **>400 ft AGL**, assess the best plan and land safely. Options include U-turn, crosswind runway, an abbreviated pattern, and a (near) full pattern.
- Discuss how wind strength, other traffic in the air and on the ground, and other factors may affect the emergency plan.

- If anything is not right before initiating takeoff, pull the release if already connected to the towrope
- If anything is not right during the takeoff roll, immediately pull release and stop
- Ensure the cross-runway and taxiways are clear of traffic
- When ready, signal "thumbs up" to the wing-runner to raise the wing and take out any additional slack in the tow line
- When ready for departure, waggle the rudder a few times in quick succession, and if practical, announce "glider ready" on the radio
- **Special note** for solo student flight:
  - Ensure that the rear seat cushions are either removed or secured
  - Ensure the rear belts are secure and are unable to interfere with the controls
  - Ensure you have closed the rear door (2-33) or that the rear canopy is down and locked (L-23)

While on tow

LEARNERS -

- Properly announce critical altitudes during climb out.
- Able to maintain proper positioning behind the towplane.
- Able to box the wake.
- Able to discuss and demonstrate slack-line recovery.
- Display knowledge of standard in-flight tow signals and respond appropriately when they encounter such signals.
- Demonstrate proper release procedures.

INSTRUCTORS –

- Demonstrate maneuvers as required while talking through them.
- When appropriate, allow the learner to practice, helping as needed.
- When appropriate, allow the learner to maneuver without much assistance.
- Be ready to take controls over and ensure safety at any time.

METHODS -

- Track directly behind the towplane, crabbing as needed for crosswind correction
- Verbally and clearly announce when crossing “100 ft”, “200 ft”, “1000 ft” altitudes (AGL).
- Attempt to place the main gear of the Pawnee in line with the horizon for a normal, high-tow position.
- Keep in mind the yaw string is unreliable due to the prop wash from the towplane.
- Maintain constant light positive pressure on both rudder pedals and modulate rudder pressure as needed to achieve the desired yaw.
- Use rudder only to correct left or right deviations. If deviating to the right, use the left rudder, and vice versa. Avoid over corrections.
- Match the bank angle of the towplane with a corresponding bank of the glider using ailerons. Avoid the tendency to overbank.

- While turning, keep the nose of the glider pointed towards the outer wingtip of the Pawnee while still being able to read the inner N-number..
- Watch the towplane's flight and anticipate what the glider will do. With a tow speed of 60 knots, the glider travels approximately 120 ft each second. With a 200 ft tow rope, the glider will go through the same air mass (lift, sync, turbulence, etc.) approximately 1.5 seconds after the Pawnee.
- When making positional corrections, anticipate the glider reaching the desired position and begin to remove the correction before reaching the desired position to prevent overcorrection.
- Maneuvers while on tow:
    - If performing slack rope or box-the-wake maneuvers, wait until at least 1500 ft AGL, and allow the towplane to fly straight. (Brief this plan with the towplane pilot ahead of time).
    - Radio the towplane before beginning the box or slack maneuvers for added safety, and ensure the area is clear (up, down and around the glider).

Towplane wave-off

LEARNERS -

- The student should recognize, without prompting and without expectation, a towplane wave-off.
- The student should release immediately upon recognition of the wave-off and proceed safely.

INSTRUCTORS -

- Coordinate with the towplane pilot ahead of time to discuss the wave-off and desired altitude and positioning.
- Verify the learner recognizes a towplane wave-off and takes appropriate actions. If not, be ready to take controls over to maintain a safe flight.
- If it is an actual emergency, immediately take control of the flight and execute appropriate maneuvers to maintain safety.

METHODS -

- If you observe an intentional wave-off from the towplane, release immediately.
- If appropriate, return to the airport to land, and if not, execute an appropriate off-field landing maneuver.
- If part of a lesson, the instructor will coordinate with the towplane pilot and the wave-off should occur no less than 1500 ft AGL.

Boxing the wake

LEARNERS -

- Able to transition through the wake while maintaining control.
- Able to recognize low and high tow positions.
- Able to make controlled movements around the wake and announce all corners.
- Able to avoid the wake during the maneuver with the exceptions of the initial and final transition.

INSTRUCTORS -

- Coordinate the maneuver with the towplane pilot ahead of time and ensure you are at a safe location and altitude before beginning.
- Verify the learner understands the maneuver, the standards, and the potential dangers of the towplane wake.
- Demonstrate as necessary, allowing the learner to perform with and without assistance.

METHODS -

- Brief the towplane pilot before takeoff of the planned maneuver.
- Beginning no lower than 1500 ft AGL. Clear the area, inform the towplane pilot, and wait for the straight and level flight.
- Begin with a gradual, yet deliberate descent into low tow, on a straight line, ensuring wings are level and the coordinating the glider.
- When passing through the wake (the glider will shake noticeably), announce “inside the wake,” while continuing the gradual and deliberate descent on a level and coordinated manner.
- Watch for the small rear-view/side mirrors of the Pawnee. Stop the descent when the side mirrors appear to line up with the horizontal stabilizer of the towplane. This is a good ‘low tow’ position. Another visual clue is when you can just see the underside of the towplane wings. Any higher, you will still be in the wake, and anything lower is too low.
- Maintain the low tow position momentarily, announcing “in low tow.”

- Now, shift your attention to the tail wheel of the Pawnee and the right main wheel.
- Begin a controlled and steady move to the left, by using the left aileron and adequate left rudder. It is vital to stay in low tow (side mirror looks lined up with the horizontal stabilizer). You will need appropriate elevator pressure to keep it level.
- Stop the left motion when the tail wheel of the Pawnee appears to line up with the right main gear. Hold this position momentarily, announcing “left bottom.”
- Then begin a slow ascend while keeping the tail wheel and the right gear visually aligned. It will be necessary to maintain a slight left aileron through this phase to avoid an unintended move towards the center (the taut rope will do this unless you keep the aileron to counteract the pressure). You will only need to relax the elevator pressure slightly as the rope will naturally pull you up.
- Stop the climb when you are back in the ‘high tow’ position on the left side. Announce “left top.”
- Begin a level right motion by relaxing the left aileron. Continue the right motion past the center of the towplane and continue until the tail wheel appears to align with the left main gear. Announce “right top.”
- Begin a controlled descent. Be sure to keep the right aileron to avoid an unintended move towards the middle (and therefore the wake).
- Stop at the right-low position (when the side mirrors line up with the horizontal stabilizer), announcing “low right.”
- Then relax the right aileron to return to the low tow position
- Finally, begin a controlled ascent through the wake, ensuring the wings are level, and the motion is steady and always controlled.
- Announce “passing through the wake.”
- When back in the normal high tow position, announce “maneuver complete.”
- **Note:** Steve Dee, an examiner is in favor of performing this maneuver more quickly than described, so we will practice it both ways.

Releasing from tow

LEARNERS -

- Keep the desired altitude in mind and verify 'ready to release' as described below.
- Recall the procedure if unable to release tow rope due to any malfunction.

INSTRUCTORS -

- Ensure everything is clear and appropriate for release and verify the learner has done the same.
- Recall the procedure if unable to release tow rope due to any malfunction.

METHODS -

- When 200 ft from the desired release altitude, carefully clear the left side for the towplane, and the right side for the glider. Verbally announce, "clear left" and "clear right."
- Release at the proper altitude, ensure the rope is free (by sight, sound or feel) and begin a level (or slightly climbing) right turn.
- Intently watch the released end of the tow rope (the ring) and announce, "rope is away."
- Continue the right turn by at least 90 degrees to provide adequate separation from the towplane (which will conduct a descending left turn).
- Carefully clear the area while on turn, announce "area is clear" and trim to the desired air speed.

Pre-maneuver checklist

Learners -

- Plan to complete all maneuvers no less than 1500 ft AGL.
- Perform a clearing turn and/or confirm area is thoroughly clear before beginning any maneuver.
- Begin the maneuver from straight and level, stabilized flight on a declared, initial heading.
- Remain alert throughout the maneuver, clearing for traffic throughout.
- Recall the PTS standards for the appropriate maneuver so the objectives are clear and fresh in their mind.

Instructors (Applies to All Maneuvers Below) -

- Ensure safe location and altitudes before beginning, keeping emergency plans in mind.
- Verify the learner understands the maneuver, the standards, and the potential dangers of the wake of the airplane.
- Demonstrate as necessary, allowing the learner to perform with and without assistance.

Methods -

- Ensure all maneuvers are (and can be) completed no lower than 1500 ft AGL.
- Verbally announce that you are going to clear the area using clearing turns.
- Clear the area by making turns to both sides, looking up, down and to the side. It is best to 'keep your head in a swivel' to make sure you look everywhere, and to make it clear to the examiner that you are, indeed, seriously looking for traffic.
- Note the heading and pick a distant landmark to aid in the maneuvers. Maintain proper air speed.
- If performing maneuvers in quick succession, look both sides and declare "area is clear."

Turns

LEARNERS -

- Begin the maneuver from straight and level, stabilized flight on a declared, initial heading.
- Clear the airspace in the direction of the turn and announce “Clear” before initiating the turn.
- Be able to hold a consistent bank angle and air speed throughout the turn (whatever the instructor requests).
- Stay coordinated throughout the turn.
- Remain alert throughout the maneuver, clearing for traffic throughout.
- Be able to exit the turn on a desired heading.
- Be able to discuss the relationship between bank angle and stall speed.
- Be able to discuss the dangers of, and recovery from, spiral dives.

METHODS -

- Ensure the area is clear.
- Confer with the instructor on the desired speed and bank angle.
- Maintain proper and consistent speed and bank angle throughout the turn.
- Maintain coordination throughout the turn using reference to the yaw string.
- Scan for traffic throughout the turn.

Slow flight

LEARNERS -

- Clear the airspace and announce “Clear” before practicing slow flight.
- Pick and maintain a heading when practicing straight and level flight at minimum controllable air speed (MCA).
- Gradually reduce air speed by adding back pressure to the stick and announce when at MCA.
- Display knowledge of the warning signs of an impending stall.
- Be able to hold minimum controllable air speed until told to return to normal flight.
- Be able to perform gentle turns with a constant, shallow bank angle while maintaining MCA.
- Display knowledge of the tendency and dangers of over-banking while turning at MCA.

METHODS -

- Ensure that the area is clear while maintaining an appropriate heading.
- Apply back pressure and slowly reduce speed.
- Continue reducing speed until you start to feel pre-stall buffeting.
- Upon reaching the minimum controllable air speed (MCA), maintain the air speed and heading.
- Note the warning signs of an impending stall- high pitch angle, back pressure on the stick, buffeting, poor control authority, the distinct sound of slow flight. Train yourself to identify these cues to help avoid stalls during normal flight.
- When making turns at MCA, keep under 15 degrees of bank and be alert for over-banking.

Stall series (straight & turning)

LEARNERS -

- Clear the airspace and announce “Clear” before practicing any stalls.
- Pick and maintain a heading when practicing straight ahead stalls.
- Be able to demonstrate a straight-ahead stall, recognize when the plane stalls, and recover to straight and level flight with minimum altitude loss.
- Be able to demonstrate a turning stall with recovery to straight and level flight with minimum altitude loss.
- Display appropriate turning stall recovery to prevent spin entry (stopping rotation with rudder, not applying opposite aileron, and neutralizing the stick to break the stall).

METHODS -

- Ensure the area is clear and maintain proper heading
- **Straight-ahead stalls**:
    - Upon establishing an appropriate heading, slowly reduce speed with a pitch angle of ~5-10 degrees above the horizon.
    - Continue to reduce speed using back pressure on the stick as you transition through the pre-stall buffet and eventual stall break.
    - Upon experience the ‘break,’ release the back pressure, allow the nose to drop, and establish normal cruise speed.
    - Do not over control the recovery, the goal is to come out of the stall with minimum altitude loss and without excessive speed.
    - Some gliders, like the 2-33, may require a more aggressive stall entry to get a defined break.
- **Turning stalls:**
    - Establish a shallow turn (~15 degrees of back) in the desired direction.
    - Slowly reduce speed with a pitch angle of ~5-10 degrees using back pressure on the stick.

- Significant cross control may be necessary to maintain a shallow bank angle.
- Once the stall occurs, stop any rotation with rudder input opposite to the direction of the turn and neutralize the stick.
- After any rotation has stopped and air speed has increased, remove the rudder and fly out of the spin back to straight and level flight using small control inputs.
- Do not over control the recovery, the goal is to come out of the stall with minimum altitude loss and without excessive speed.

Slips (forward & side)

LEARNERS -

- The student should clear the airspace and announce “Clear” before practicing any slips.
- The student should be able to differentiate between forward and side slips and discuss the proper usage for both techniques.
- The student should be able to execute forward and side slips in both directions.
- The student should pick and maintain a heading when practicing slips.
- The student should establish pattern air speed in straight and level flight before initiating the slip.
- The student should perform the slip, recover with the same heading, and air speed as before entry.
- The student should realize that the air speed indicator is not dependable during slips.
- The student should be able to determine the correct direction to slip given the conditions of the day.
- The student should be able to demonstrate slips at altitude and while on final approach.

METHODS -

- Ensure the area is clear and maintain proper heading- as this is a maneuver you would normally use during final; you should pick a “runway heading” with the goal of entering, maintaining, and exiting the maneuver on that same heading.
- Establish pattern air speed.
- **Forward slips**:
    - Determine the desired slip direction. In practice, you should slip with the upwind wing down but for practice at altitude, you can use either direction.
    - Initiate the slip by applying maximum rudder opposite to the direction of the slip (i.e., full right rudder for a left-wing low slip) while adding a small amount of aileron in the direction of the slip.

- You will only need to bank a small amount to offset the rudder yaw.
- Maintain full rudder during the maneuver, use minor changes in bank to adjust heading.
- Be aware that the air speed indicator is unusable during a slip, so hold air speed constant by paying attention to the pitch angle.
- Exit the slip by releasing the rudder while applying aileron to level the wings.
- The goal is to exit the slip on the same heading and at the same speed as you entered.
- Gross changes in heading are difficult during an established slip; if you lose heading during initiation, it is better to exit the slip, reestablish the desired heading, and restart the slip.

- **Side slips**:
  - Determine the desired slip direction. In practice, you should slip with the upwind wing down but for practice at altitude, you can use either direction.
  - Initiate the slip by applying a small amount of bank in the direction of the slip (i.e., left wing down for a left-wing low slip) while adding a small amount of rudder to maintain the initial heading.
  - Be aware that the air speed indicator is unusable during a slip, so hold air speed constant by paying attention to the pitch angle.
  - Exit the slip by applying aileron to level the wings while releasing the rudder.
  - The goal is to exit the slip on the same heading and at the same speed as you entered.

Before landing checklist

METHODS -

- Listen to the weather, if available, or check the windsock to best determine which runway to land on. In light and variable wind conditions, follow the runway usage of other traffic.
- Verbally, and clearly announce the USTALL pre-landing checklist

  U – Undercarriage - extend landing gear or declare “gear is fixed.”

  S – Speed (typically 50 or 55 depending on the glider)

  T – Trim to the approach speed

  A – Fully deploy air brakes, check, and close (wait until on downwind to check the air brakes in case of mechanical failure that prevents retraction)

  L – Look & listen for traffic

  L – Land safely per procedure

Standard pattern & Normal Landing

LEARNERS -

- Be able to identify the initial points (IP) for landings on runways 18 and 36.
- Be able to independently plan the flight so that they are at the IP at no less than 1000 ft AGL.
- Understand the difference between right and left traffic and be able to discuss the general traffic and movements of aircraft at Hartford.
- Be able to determine a safe pattern air speed and maintain that air speed throughout the pattern.
- Use the USTALL checklist every time during landing.
- Use clear and correct radio calls in the pattern.
- Demonstrate good coordination through all turns.
- Be able to independently use spoilers and slips, as necessary, to maintain a safe glide slope.
- Be able to discuss how sink, winds, and other meteorological factors can affect the pattern and landing.
- Display adaptability to any unexpected conditions.
- Demonstrate awareness of other aircraft both in the air and on the ground.
- Be able to designate a touchdown point and hit that point within a reasonable distance.

METHODS -

- Ensure that you are at the initial point (IP) no lower than 1000 ft AGL.
- Clearly announce on the radio that you are entering the pattern, leading and concluding with Hartford traffic and noting that you are on a right pattern and flying in a glider. For example (use your glider's tail number):

  "Hartford traffic, glider 30S is on a right-hand pattern for landing runway 18 full stop, Hartford".

- From the IP, fly a 45-degree entry leg by aiming towards the center of the runway.

- When appropriate, turn onto downwind and complete your before-landing checklist.
- Fly the pattern and use spoilers as necessary to maintain the desired glide path.
- Many factors can influence the proper altitude including wind speed and direction, severity of lift or sink in the pattern, presence of other aircraft in the pattern or on the runway, etc.
- If safe to do so, announce your turns onto base and final; this can be hard without a boom mic:

  "Hartford traffic, glider 4PJ is turning right (base/final) for runway 18 full stop, Hartford".
- Be aware of the displaced thresholds and automobile traffic that may be driving across the northern end of the airport.
- Be especially cognizant of speed and coordination throughout the pattern.
- A good rule of thumb for pattern air speed is 150% of the glider's stall speed plus half the estimated wind speed.
- Be alert for wind shear, other wind shifts, and turbulence from ground obstructions especially when on final.
- If you encounter wind shear and your air speed drops, immediately close the spoilers, lower the nose to establish pattern air speed, and the redeploy spoilers as needed.
- Fly the glider all the way to the runway and be careful not to flare and lose air speed while too high.
- As you approach the ground, transition your gaze to the end of the runway to get a better sense of height and vertical speed.
- Once on the ground, apply full spoilers and use the skid (2-33) or wheel brake (L-23) to come to a stop.
- If clear, consider pulling off the runway during roll out to clear the runway.
- Keep wings level until fully stopped.
- Once stopped, expedite your exit from the glider to clear the runway as quickly as possible.

Crosswind and downwind Landing

METHODS -

- **Crosswind:**
    - Crosswinds affect you throughout the pattern (downwind, base, and final)
    - To maintain the desired ground track, you will need to crab the glider into the wind during downwind and final. Remember the relative direction of the wind will change as you make turns in the pattern.
    - Without a precise way of measuring wind speed and direction, you will have to crab using feel and use ground references to maintain the desired track.
    - If using a slip on final, slip with the upwind wing down.
    - Hold your crab until just before touchdown, but remove the crab right before touchdown to prevent applying stresses to the undercarriage
    - During roll out, keep the upwind wing slightly low.
    - Anticipate weathervane effect as your speed decreases and may lose rudder/tail authority.
- **Downwind landings** such as after a rope break, have unique dangers:
    - Expect a longer ground roll as ground speed will be higher.
    - Be aware of the illusion of speed. Subconsciously, you may be expecting visual indications of what your usual ground speed looks like when landing with a headwind. For the same air speed, your ground speed will be much higher with a tailwind, presenting an illusion that you are flying too fast. It may be tempting to reduce your air speed to an unsafe speed based on this illusion. Reference your air speed indicator and maintain proper air speed.
    - With a tail wind, you will lose control authority as you slow down, stay ahead of the aircraft during roll out and stop as quickly as possible.
    - Remember, especially when performing a downwind landing after a rope break, that you will use up the runway quickly. The most important thing is to get the glider on the ground as soon as possible as there is much you can do to stop once on the runway (brakes, nose skid, etc.). Treat such landings as an emergency, so style points are not important.

- **Stuck spoiler landing**
    - Spoilers or dive brakes can become stuck (open or closed) during a flight due to a variety of reasons. Examiners often test the learner's ability to land the glider safety with the spoiler stuck closes (i.e., unable to deploy the spoilers during the pattern phase).
    - If the spoilers are stuck closed (simulated or real), be prepared for the glider to descend slower, and 'float' longer in ground effect. For the first time practicing this maneuver, it is common for the learners to land long, or realizing the final approach looks extremely lower than normal.
    - As soon as they recognize this condition, learners should utilize various methods of losing altitude without spoilers. Such methods include forward slips (slipping to alternating sides as necessary), using a longer-than-normal final segment, and a lower-than-normal final segment.
    - It may be necessary to hold an aggressive forward slip lower to the ground, transitioning appropriately to a proper landing alignment just prior to touchdown.
    - It is crucial to maintain 'normal' landing air speed, keeping in mind that the airspeed indicator is not dependable during a slip maneuver.
    - In general, spoiler stuck 'open' is a bigger problem than spoiler stuck 'closed.' With the spoiler open, then the glider will descent steeper than normal, and it may be necessary to find and land off-field. It is not common for examiners to simulate 'open' spoiler, but if they do, they will initiate it at higher altitudes and expect you to immediately fly towards the nearest runway or another suitable landing location.