Solo Course

Cypress Soaring

Flight Training

Flight Training Record

	Introduced	Practiced	Proficient for SOLO flight	Private Pilot Proficiency
1. Control Effect				
Pitch - Roll - Yaw	☐	☐	☐	☐
Spoilers	☐	☐	☐	☐
2. Ground Handling				
Tiedowns - Flight Time Log	☐	☐	☐	☐
3. Aircraft Preflight	☐	☐	☐	☐
4. Airspeed Control				
Attitude Flying	☐	☐	☐	☐
Trim	☐	☐	☐	☐
Airspeed Indicator Covered	☐	☐	☐	☐
5. Speeds to Fly				
No Wind - Upwind - Downwind	☐	☐	☐	☐
In Turbulence - In lift - In Sink	☐	☐	☐	☐
6. Straight Glides	☐	☐	☐	☐
7. Turns				
Shallow (15°) 90° Turn	☐	☐	☐	☐
Medium (30°) 180° Turn	☐	☐	☐	☐
Steep (45°) 360° Turn	☐	☐	☐	☐
Very Steep (60°) 720° Turn	☐	☐	☐	☐
8. Coordination				
Roll Into and Out of 180° Turns	☐	☐	☐	☐
Turn to Turn 90° Turns	☐	☐	☐	☐
Turn Rollout on a Point	☐	☐	☐	☐
9. Slow Flight				
Straight	☐	☐	☐	☐
Turning	☐	☐	☐	☐
10. Stalls				
Clearing Turns	☐	☐	☐	☐
Imminent Straight - immediate recovery	☐	☐	☐	☐
Imminent Turns - immediate recovery	☐	☐	☐	☐
Full Stall & Recovery - Straight	☐	☐	☐	☐
Full Stall & Recovery - Turning	☐	☐	☐	☐
With Spoilers Open	☐	☐	☐	☐
From a Slip	☐	☐	☐	☐
11. Takeoff				
Pre-takeoff Checklist	☐	☐	☐	☐
Rudder Control	☐	☐	☐	☐
Aileron & Elevator Control	☐	☐	☐	☐
Crosswind	☐	☐	☐	☐

	Introduced	Practiced	Proficient for SOLO flight	Private Pilot Proficiency
12. Aerotow				
High Tow Position	☐	☐	☐	☐
Through the Wake - Low Tow Position	☐	☐	☐	☐
Box Wake ☐	☐	☐	☐	
Steering Turns	☐	☐	☐	☐
Slack Rope	☐	☐	☐	☐
13. Spoilers				
Glide Path Control	☐	☐	☐	☐
Rapid Descent - Spiral	☐	☐	☐	☐
14. Slips				
Forward	☐	☐	☐	☐
Sideslip Left & Right	☐	☐	☐	☐
Slipping Turns Left & Right	☐	☐	☐	☐
15. Pattern				
Right	☐	☐	☐	☐
Left	☐	☐	☐	☐
Abbreviated	☐	☐	☐	☐
16. Landing				
Normal	☐	☐	☐	☐
Low Approach - No Spoilers	☐	☐	☐	☐
High Approach - Spoilers & Slips	☐	☐	☐	☐
Altimeter Covered	☐	☐	☐	☐
Crosswind	☐	☐	☐	☐
Downwind	☐	☐	☐	☐
Short Field - Land & Stop In Box	☐	☐	☐	☐
17. Spins & Spiral Dives				
Incipient - Immediate Recovery	☐	☐	☐	☐
Full Spin & Recovery	☐	☐	☐	☐
Spiral Dive	☐	☐	☐	☐
18. Emergencies				
Below 200 ft. - Emergency Plans	☐	☐	☐	☐
Rope Break - 200 ft. agl	☐	☐	☐	☐
Towplane Waveoff - 200 ft. agl	☐	☐	☐	☐
Recovery From Unusual Attitudes	☐	☐	☐	☐
19. Judgement				
Scanning for Traffic	☐	☐	☐	☐
Flexibility - During Flight	☐	☐	☐	☐
- During Landing	☐	☐	☐	☐
- During Emergencies	☐	☐	☐	☐
Flight planning - Staying Upwind	☐	☐	☐	☐
Awareness of Lift & Sink	☐	☐	☐	☐
20. Thermalling Techniques	☐	☐	☐	☐

Contents
Solo Course Notebook

Student Solo Course Assignment Record

Assignments:	*Assigned*	*Done*
1. • Read pages 1-27 • Do Chapter 1 Test (to be done prior to first flight)	_____	_____
2. • Read pages 31-48 • Study Pre-Takeoff Checklist • Do Chapter 2 & 3 Tests	_____	_____
3. • Read pages 50-53 • Study Preflight Checklist • Do Chapter 4 Test	_____	_____
4. • Read pages 56-68 • Do Takeoff Techniques Test • Do Soaring Signals Test	_____	_____
5. • Read pages 69-84 • Do Chapters 5 & 6 Tests	_____	_____
6. • Read pages 91-117 • Study Landing Pattern Diagram • Study Landing at Skylark and Radio Operations • Do Chapter 7 Test & Landings Test • Do Test on Landing at Skylark	_____	_____
7. • Read pages 85-88 • Do Thermalling Test	_____	_____
8. • Read pages 89-90 • Study Slack Rope Recovery page • Do Test on Slack Rope Recovery	_____	_____
9. • Read pages 127-140 • Do Test on Slips and Crosswind Landings	_____	_____
10. • Read pages 119-126 • Study Emergency Procedures page • Do Test on Emergency Procedures	_____	_____
11. • Study Spins and Spiral Dives page • Do Test on Spins and Spiral Dives	_____	_____
12. • Study 14 CFR Federal Aviation Regulations • Study Krosno and/or 2-33 Flight Manual • Memorize Glider speeds • Study “Speed to Fly” sheet • Study Student Pilot Rules • Do Pre-Solo Exam	_____	_____

CYPRESS SOARING, INC.
Glider Solo Course Outline

Before first lesson

Read pages 1 through 27, in Glider Basics and do Chapter 1 Test on page 29 of your notebook. (Copies of all the chapter tests are included in the notebook so you will not have to mark up your book.) After doing the test, look up the answers on page 148. Do you understand them? If they aren't clear, be sure to ask your instructor about them in your preflight briefing.

Phase I

First Lesson - Glider Fundamentals (one flight)

Your instructor will sit down with you to discuss what you have read. This is the time to bring up your questions. You need to have a clear understanding of the fundamentals before your first flight.

Now you are ready to take to the air. You and your instructor will move the glider to its starting point. Your instructor will show you how to get in and how to fasten the safety belt. He will explain the controls and the instruments. Then the towrope will be attached and the towplane will move forward, taking up the slack in the rope. While this is happening, your instructor will be going through the pre-takeoff check list. There is a copy of this on the instrument panel—follow your instructor as he goes through it. Finally, the rope will be tight, the wingman will lift the wing, and your instructor will "wig-wag" the rudder as a signal that the glider is ready to go. The wingman will swing his arm in a circle to tell the tow pilot to start the takeoff. And off you go!

After your flight, your instructor will review the main points of the lesson. Be sure to ask him to explain any part of the lesson that you do not understand. Before you go, your instructor will enter your first flight in your log book.

Second Lesson - Stability and Turns (Two to three flights)

Before this lesson, reread pages 1 through 27 of Glider Basics, and then read pages 31-48. Do Chapter 2 Test - Stability on page 30 (notebook) and Chapter 3 Test - Shallow, Medium and Steep turns on page 31 (notebook), then look up the answers on page 149. Skip the "cockpit checklist" on page 43 of the textbook. We use a different one called a pre-takeoff check list. A copy of this is on page 9 of your notebook. Make notes of questions you want to ask your instructor.

Before starting this lesson, your instructor will go over the tests with you and answer your questions. He will then review what you learned in your first lesson and explain what you will be learning in this one. He will explain the reasoning behind the pre-takeoff check list.

Now you are ready to fly. Put the glider in position; get in and fasten your belts— go through the pre-takeoff check list (with your instructor explaining what to do); give the wingman a "thumbs-up" signal; and when the wings are level and the wingman indicates that traffic is clear by a "thumbs-up" signal, "wig-wag" the rudder and away you go.

After your flights, your instructor will review the lesson with you and answer your questions. He will fill out your log book, noting the maneuvers you have practiced.

Glider Solo Course Outline

Third Lesson — Check Lists and Aerotow (Two to three flights)

Your reading assignment for this lesson is pages 50-53. Do the Chapter 4 Test– Preflight on page 32 (notebook). Look up the answers on page 150. Make notes of any questions you want to ask.

Your instructor will go over the test with you, and will quiz you on your knowledge of the pre-takeoff check list. A copy of this is on Page 9 of your notebook and you must memorize it.

Remember: A - A - B - B - C - C - C - D - D - E.

Now go to the glider. Your instructor will demonstrate how to preflight the glider using the preflight check list you will find in the glider or in the equipment box. A preflight checklist for the Krosno is also on Page 7 and for the 2-33 on Page 8 of your notebook. After you are satisfied that the glider is airworthy, you and your instructor will move it into position for takeoff.

Now get ready to fly. Go through the pre-takeoff check list. You must go through the check list before every takeoff. After takeoff, your instructor will ask you to be aware of the altimeter and say "200 feet" out loud when you reach that altitude above the ground. You will be asked to do this on every takeoff and it must become a habit, so you will do it without having to think about it.

By now you will be gaining confidence in keeping the glider at the right level (controlling pitch) behind the towplane while your instructor keeps the wings level. Now he may ask you to take over the job of keeping the wings level (controlling roll) also. It will be difficult at first, but your instructor will coach you, and will be ready to take over if you get too far out of position. Don't worry– we've all gone through the same thing!

After release, you will practice turns as before. You will find that your coordination will be improving noticeably. When you have descended to about 1500' above the ground your instructor will have you fly the glider to the I.P. (Initial Point) and then coach you around the landing pattern. Perhaps you will make the landing yourself. If not this time, it will be soon!

Fourth Lesson - Signals, Takeoffs, Aerotow (Two to three flights)

Your reading assignment for this lesson is pages 56-68. The information on aerotow is very good except for one thing– the towplane rarely holds still long enough for you to keep the top of its rudder in line with the top of its cabin! Your instructor will already have shown you an easier method. Study the Soaring Signals on page 10. Your instructor will already have told you how we use the signals. Do the Test on Soaring Signals, page 39, and the Test on Takeoff Techniques, page 36, in your notebook. Go over your answers with your instructor.

From now on, your instructor will ask you to do the daily preflight inspection. Use your preflight check list.

On these takeoffs, your instructor will have you control the pitch attitude. He will coach you through the takeoff. Don't forget to call out "200 feet". You will be doing more of the flying on tow now. After release, you will practice more turns - turns - turns!

Glider Solo Course Outline
Phase I I

Fifth Lesson: Stalls (two to three flights)

Your reading assignment for this lesson is pages 69-84. Do the Chapter 5 Test— Forward Stalls on page 33 (notebook), and the Chapter 6 Test– Turning Stalls on page 34 (notebook). Look up the answers on pages 151 and 152. (The author goofed on the answer to question #5 of Test 5– ask your instructor.) Make notes on questions you want to ask.

On these flights, you will do as much of the takeoff and tow as you can. Your instructor will be coaching you. After release, your instructor will demonstrate and have you practice stalls at a safe altitude. There is nothing dangerous about stalls when you are not close to the ground. He will also the demonstrate the sensation of "reduced G" which can occur without stalling. In addition, you will continue practicing turns and straight flight, working on improving your "stick and rudder" coordination.

Sixth Lesson: Pattern and Landing (four to five flights)

For this lesson, we skip ahead in Glider Basics to pages 91-117. This is a very important section and you should reread it several times. It covers everything involved in landing a glider safely. Do the Chapter 7 Test– Landings, on page 35 (notebook), and look up the answers on page 153. Also study notebook page 12, Landings. Do the Test on Landings, page 40 (notebook). Then study the pages which explain landing at Skylark Field and Radio Operations at Elsinore, (pages 14-16 in your notebook) and do the Landing at Skylark Test (page 41 notebook). Have plenty of questions ready for your instructor.

In this lesson, your instructor will have you "walk through" a simulated traffic pattern to be sure you understand the TLAR system.

Your flights in this lesson will be what are called pattern tows. Your instructor will explain the method of signaling to the tow pilot what kind of tow you want. When you signal for a pattern tow, the tow pilot will tow you to an altitude of a little over 1000' AGL and close to the Initial Point. When the right altitude has been reached your instructor will ask you to release. You will then fly to the I.P., enter the pattern, fly the pattern, land, and roll out.

Phase III

(It is expected that up to 17 more flights will be needed to complete the course.)

Seventh Lesson: Thermalling

Your reading assignment for this lesson is pages 85-88. Your instructor will discuss the general philosophy of thermalling with you. You may already have done some thermalling with your instructor, and he will try to catch a thermal on all your ''high tow" (3000' AGL) flights, both to familiarize you with the techniques and to extend the flights to provide more time to practice maneuvers. Do the test on Thermalling Techniques (page 37, notebook). Check your answers with your instructor.

Eighth Lesson: Slack Rope Recovery

Your reading assignment for this lesson is pages 89-90. The author really doesn't go into enough detail. Read Recovery From Slack Rope (page 17, notebook). Do the test on Slack Rope Recovery (page 42, notebook). Check your answers with your instructor.

Glider Solo Course Outline

Ninth Lesson - Slips and Crosswind Landings

Your reading assignment for this lesson is pages 127-140. This covers slips, crosswind landings, steep turns, and ground reference maneuvers. Do the test on Slips and Crosswind Landings (page 38, notebook). Check your answers with your instructor.

Tenth Lesson: Emergency Procedures

Your reading assignment for this lesson is pages 119-126. The author calls this subject "Premature termination of the tow". It's best to think of it as "EMERGENCY!" In addition to the book assignment, study the sheet on Emergency Procedures (page 18 notebook), and then do the Test on Emergency Procedures (page 43, notebook). Talk this over with your instructor. You might save yourself an embarrassing and costly experience.

By this point in your course, you will be doing all the flying, and your instructor will be monitoring your performance, giving advice, and only taking the controls when necessary. You will be taking some high tows, to practice maneuvers, and some pattern tows, to practice landings. Your instructor will surprise you with simulated rope breaks, where he will release the tow rope to check your reaction to the unexpected release, and he will arrange to have the tow pilot rock his wings, which is the signal for you to release immediately.

Phase IV

Eleventh Lesson: Spins and Spiral Dives

Your assignment for this lesson is to study the page on Spins and Spiral Dives, (page 19, notebook). Do the Test on Spins and Spiral Dives (page 44, notebook). This should give you lots of questions to ask your instructor. For the flying part of this lesson, your instructor will demonstrate the type of spin entry that can be caused by a skidding turn, and will have you practice immediate recovery. He will also demonstrate a spiral dive, and have you make the recovery.

Twelfth Lesson - Pre-solo Examination

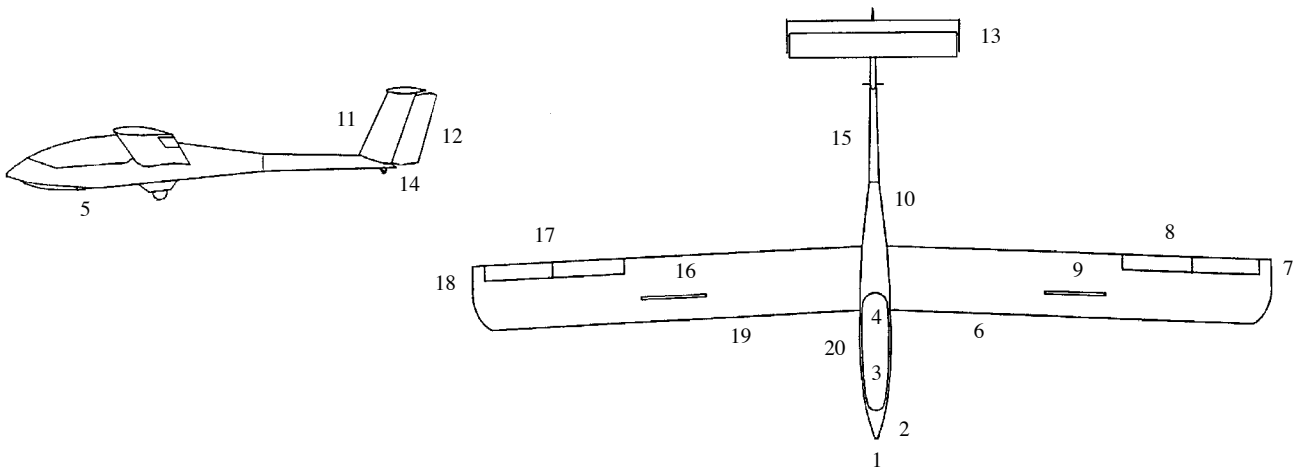
Study the condensed copy of the C.F.R.s (Federal Aviation Regulations) (pages 21-27 notebook) to become familiar with certification and flight rules which are pertinent to student solo flights. You should by now have obtained a Krosno Manual and a 2-33 Manual, and and be familiar with it's contents. Memorize the Glider Speeds, (notebook, page 9) and study the sheet on Speed-to-Fly (notebook, page 20).

Do the Pre-solo Examination– Glider. The study of Glider Basics, the Course Outline, the Glider Manual, and the study materials in your notebook, plus your experience in flying the glider, should make this a snap. Your instructor will go over this with you to be sure you get it right.

By this time, your instructor should not be having to say anything at all to you on your flights. This will give you a chance to get used to the quiet.

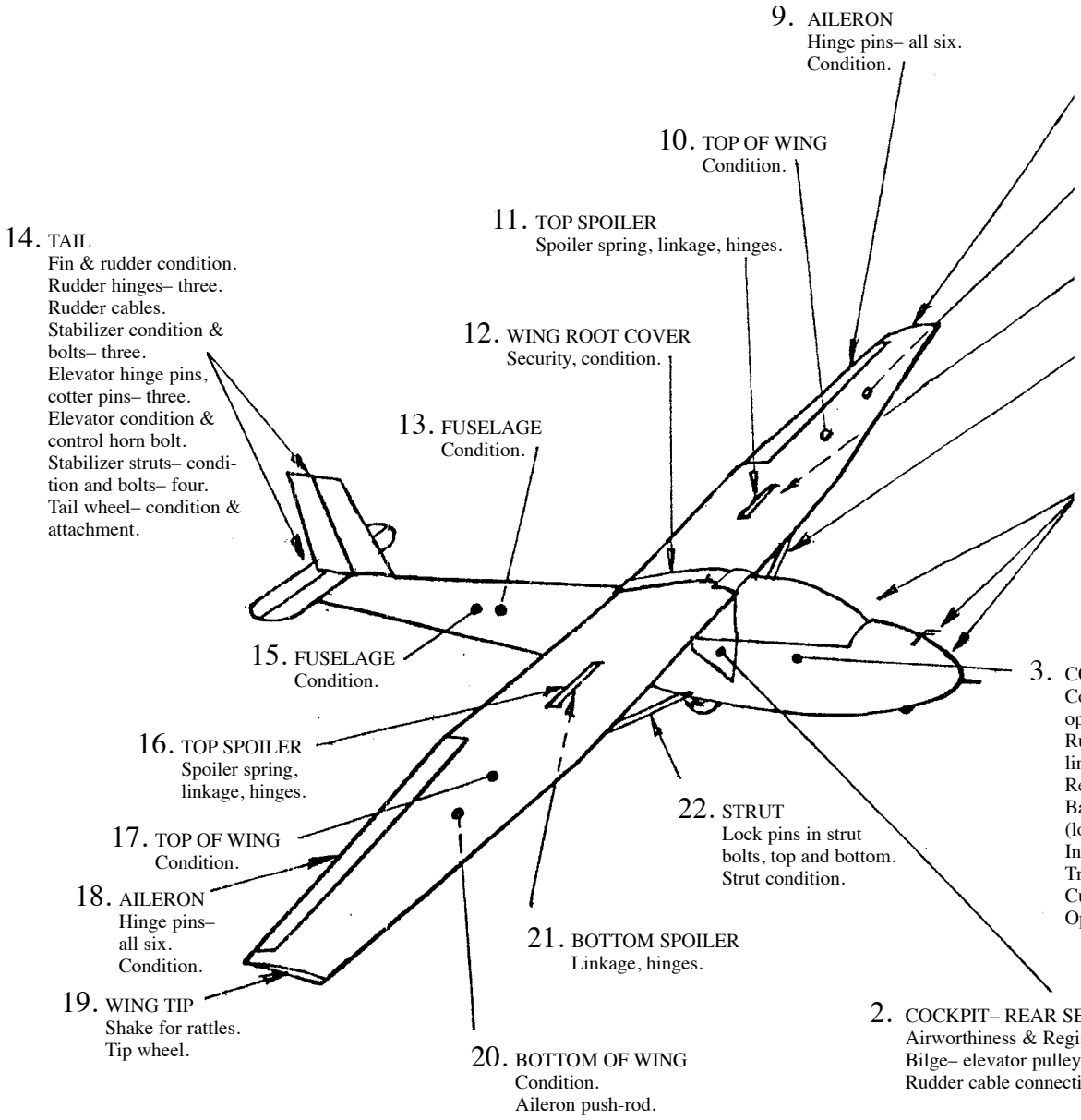
Now...
SOLO! Congratulations!

Krosno Preflight Checklist



1. AIR VENT— Clear
   NOSE CONE— Check condition & screws
   PITOT TUBE— Clear
2. STATIC PORTS— Left & right clear
3. CANOPY & LATCH— Operative
   CANOPY RESTRAINT CABLE— Secure
   CERTIFICATES— Airworthiness, registration & placards— In cockpit
   CONTROLS— Free & operative
   SPOILERS— Proper operation
   BRAKE— Test
   ELEVATOR TRIM— Operative
   TOW RELEASE— Check cable & operation, front & rear
   BALLAST— Inspect & calculate wt. & bal.
   ALTIMETER— Set
   VARIOMETER— Operative
   AIRSPEED INDICATOR— Operative
   COCKPIT— Check front & rear for loose objects
   SEAT BELTS/SHOULDER HARNESSES— Condition & secured
4. REAR SEAT ADJUSTMENT— Position & secured
   WING BOLTS— Secured & safety wired
   AILERON DRIVE CONNECTION— Secure
   SPOILER DRIVE CONNECTION— Secure
5. TOW HOOK— Condition
   SKID— Condition
   WHEEL WELL & TIRE— Condition
6. LEFT WING— Leading edge, fabric condition, conformity
7. TIP SKID— Condition
8. AILERON HINGES, CONTROL ROD— Secure
9. SPOILER HINGES, OPERATING ROD, CAP— Secure
10. LEFT FUSELAGE— Conformity
11. VERTICAL STABILIZER & RUDDER— Conformity & fabric
12. RUDDER HINGES— Secure
    HORIZONTAL STABILIZER— Conformity
    HORIZONTAL STABILIZER BOLTS— Secure & safetied
13. ELEVATOR & COUNTERBALANCE RODS— Secure, fabric
    ELEVATOR HINGES— Secure
14. RUDDER LINKAGE— Secure
    TAIL SKID— Condition & secure
15. RIGHT FUSELAGE— Conformity
16. RIGHT SPOILER HINGES, OPERATING ROD, CAP— Secure
17. AILERON HINGES, CONTROL ROD— Secure
18. TIP SKID— Condition
19. RIGHT WING— Leading edge, fabric condition, conformity
20. CANOPY HINGES— Condition & secured

2-33 Preflight Checklist



9. AILERON
Hinge pins– all six.
Condition.

8. WING TIP
Shake for rattles.
Tip wheel.

10. TOP OF WING
Condition.

7. BOTTOM OF WING
Condition.
Aileron push-rod.

11. TOP SPOILER
Spoiler spring, linkage, hinges.

14. TAIL
Fin & rudder condition.
Rudder hinges– three.
Rudder cables.
Stabilizer condition & bolts– three.
Elevator hinge pins, cotter pins– three.
Elevator condition & control horn bolt.
Stabilizer struts– condition and bolts– four.
Tail wheel– condition & attachment.

6. BOTTOM SPOILER
Linkage, hinges.

12. WING ROOT COVER
Security, condition.

5. STRUT
Lock pins in strut bolts, top and bottom.
Strut condition.

13. FUSELAGE
Condition.

4. NOSE
Pitot tube, static ports, vent.
Tow hook, spring tension on latch.
Skid & skid plate.
Tire & axle.

15. FUSELAGE
Condition.

3. COCKPIT– FRONT SEAT
Controls– freedom & proper operation.
Rudder pedal adjustment & linkage.
Release linkage.
Ballast– in or out as needed (look under seat cushion, too).
Instruments & connections.
Trim spring.
Cushions & belts.
Open spoilers– check brake.

16. TOP SPOILER
Spoiler spring, linkage, hinges.

22. STRUT
Lock pins in strut bolts, top and bottom.
Strut condition.

17. TOP OF WING
Condition.

18. AILERON
Hinge pins– all six.
Condition.

21. BOTTOM SPOILER
Linkage, hinges.

19. WING TIP
Shake for rattles.
Tip wheel.

2. COCKPIT– REAR SEAT
Airworthiness & Registration.
Bilge– elevator pulley, elevator cable, trash.
Rudder cable connections.

20. BOTTOM OF WING
Condition.
Aileron push-rod.

1. BEHIND REAR PANEL
Spar bolts & lock pins– all four.
Aileron bell-crank pins & lock pins– two.
Spoiler push-rod pin & lock pin– one. Inside rear fuselage– animals, trash.

Pre-Takeoff Checklist

Memorize!

A Altimeter and Trim set

A Adjust pedals/Seat

B Ballast checked

B Belts secure

C Controls free

C Cable connected

C Canopy closed and locked

D Dive Brakes closed and locked

D Direction of wind

E Emergency

MEMORIZE!

Krosno

Performance and Limiting Speeds (knots)

	Solo	Dual
Stall	32	39
Minimum Sink	43	45
Best Glide	46	49
Pattern (min.)	48	48
	Plus 1/2 wind	Plus 1/2 wind
Maneuvering (Va)	80	80
Maximum Rough Air (Vra)	80	80
Never Exceed (Vne)	107	107
Maximum Aerotow	70	70
Maximum Spoilers Open	107	107
Maximum Crosswind	7.8	7.8
Maximum Tailwind	6	6

Weight and Balance Requirements	
Maximum All-up Weight	1190 lbs.
Maximum Crew Weight	397 lbs.
Minimum Front Seat Pilot Weight:	
- without ballast weights	145.5 lbs.
- Additional ballast weights required	121.5 lbs.

Ballast weights weigh 10.5 lbs. each. They are installed on the floor in front of the front seat, using the thumb screws to secure them. Pay attention to the shape of each weight because each will fit only in its own specific location.

MEMORIZE!

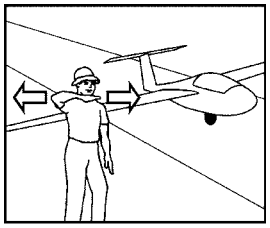
2-33

Performance and Limiting Speeds (mph)

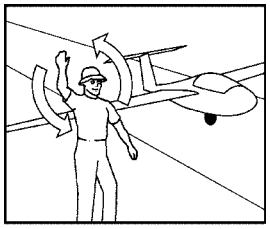
	Solo	Dual
Stall	34	38
Minimum Sink	38	42
Best Glide	45	50
Pattern (min.)	55	55
	Plus 1/2 wind	Plus 1/2 wind
Maneuvering (Va)	65	65
Maximum Rough Air (Vra)	65	65
Never Exceed (Vne)	98	98
Maximum Aerotow	98	98
Maximum Spoilers Open	98	98
Maximum Crosswind	n/a	n/a
Maximum Tailwind	n/a	n/a

Weight and Balance Requirements	
Maximum All-up Weight	(see placard)
Maximum Crew Weight	(see placard)
Minimum Front Seat Pilot Weight:	
- without ballast weight	(see placard)
- with ballast weight	(see placard)

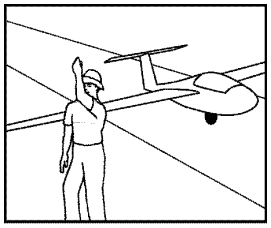
GROUND SIGNALS



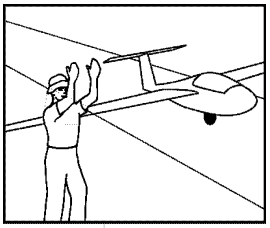
1. To towpilot:
no additional tow



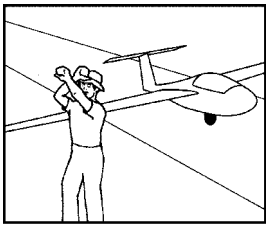
2. To towpilot:
glider wants tow



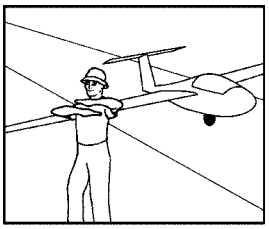
3. To towpilot:
1,000 ft. agl



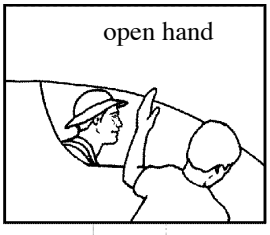
4. To towpilot:
2,000 ft. agl



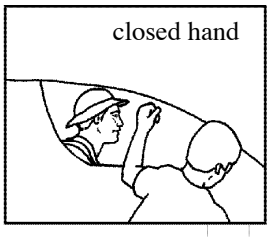
5. To towpilot:
3,000 ft. agl



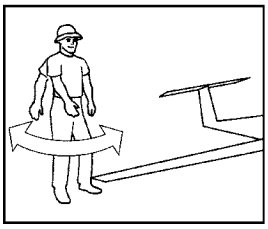
6. To towpilot:
4,000 ft. agl



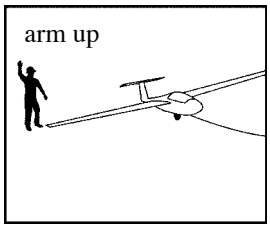
7. To gliderpilot:
open release hook



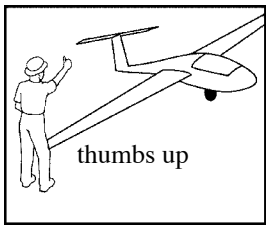
8. To gliderpilot:
close release



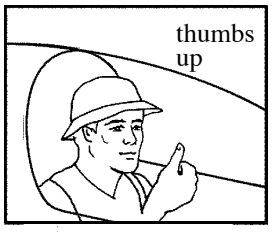
9. To towpilot:
taxi up slack



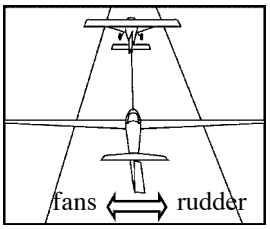
10. To towpilot:
stop, rope tight



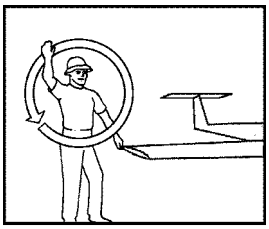
11. To gliderpilot:
clear to takeoff



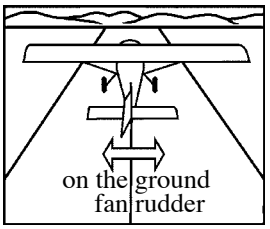
12. To line crew:
level wing



13. To towpilot:
start takeoff

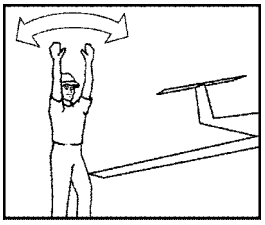


14. To towpilot:
start takeoff

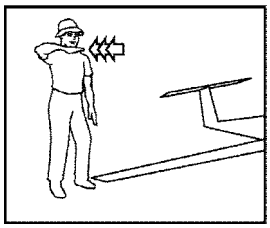


15. Acknowledges:
starts takeoff

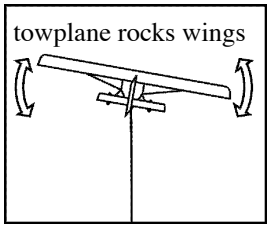
EMERGENCIES



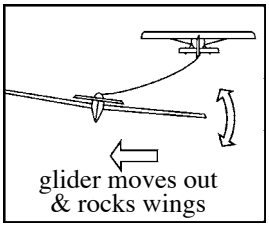
16. Stop! Abort!
Cut power! Release!



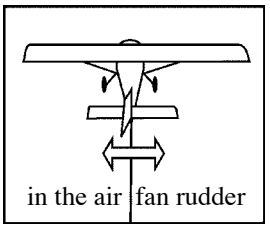
17. Stop! Abort!
Cut power! Release!



18. Glider release
immediately!

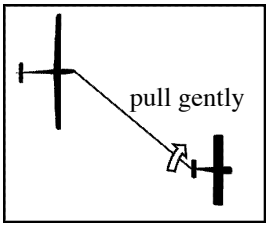


19. To towpilot:
please release glider

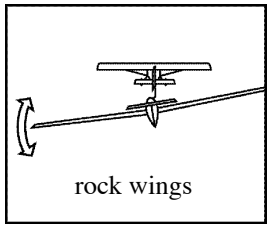


20. To gliderpilot: can't
release, land on tow
(in context of #19)

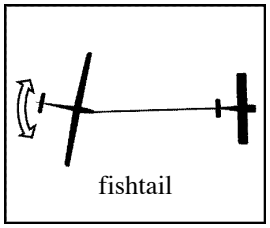
AIRBORNE SIGNALS



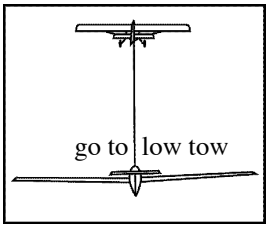
21. Towplane turn right
(opposite)



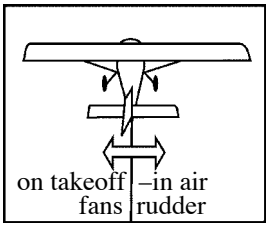
22. To towpilot:
please speed up



23. To towpilot:
please slow down



24. To towpilot:
fly level for wake
boxing



25. To gliderpilot:
wake up! Check
spoilers?

Landings

The Entry Leg

We use the following pre-landing checklist:

T – Check TRAFFIC

O – Look for OBSTACLES on the runway

W – Check WIND direction

A – Go to pattern AIRSPEED and set trim

R – RETRACTABLE gear

D – Check DIVEBRAKES

Pattern airspeed is the glider's recommended approach speed plus half the estimated velocity of the headwind. For the Krosno the minimum recommended approach speed is 48 kts. We recommend that you never fly slower than 50 kts. airspeed during any phase of the landing except touchdown.

The Initial Point (I.P.)

Instead of entering the pattern at the middle of the downwind leg, we enter at the Initial Point. The I.P. is the point at which we start the entry leg of the pattern. The altitude we want to have at the I.P. is 1,000 ft. above the ground at Krey Field, and 1,250 ft. above the ground at Skylark Field.

Judging Look-down Angles

The "look-down" angle is what you see when you look out and down to a point on the ground. It is the angle you would fly through the air to get to that point on the ground. The author calls them "glide angles" and "glide-slope" angles, which is all right if you are going to fly directly to that point, but we only do that on final approach. It will help a great deal if you will put out markers, as described on page 114, and become familiar with the appearance of 2:1 (30°), 5:1 (12°), and 10:1(6°) look-down angles.

The Downwind Leg

You will judge the distance from the runway at which you should turn onto the downwind leg by the look-down angle that you see as you approach the runway on the entry leg. The look-down angle should be approximately 2:1, which is a 30° angle, as recommended by the author on page 119.

While on downwind leg you must be constantly checking the look-down angle to the runway, and when past the downwind end of the runway, the angle back to the end.

We do not use the "A" and "B" points. If you are too far from the runway, which can happen if you have unusual sink, or crosswind, on the downwind leg, the "B" point could cause you to fly too far beyond the runway before turning onto the base leg.

You must also monitor the variometer, to be sure that you are always descending while in the pattern. Lift is nice where you can use it, but in the pattern you must use spoilers if necessary to maintain a constant descent.

Turn onto base leg

This is the critical event in the pattern. If you choose the right time, the rest of the pattern will be routine. The turn onto base leg should be started when the look-down angle back to the end of the runway is approaching 5:1. When you level the wings after the turn, it is very important that you immediately judge your height by checking the look-down angle to your intended touch-down point. If it is approximately 5:1, then TLAR. If not, immediately start to make the necessary correction.

The base leg

This is where you correct your height if necessary. If you have made the turn onto base at the right height, you should need to use some spoilers on base. If you were too low, you may be able to correct by not using spoilers until you have come closer to the final approach path. If too high, you may need to use full spoilers for awhile. In cases of gross error in timing your turn, you may need to turn in towards the runway or out away from it, as illustrated on page 118. Never fly past the approach path and then turn back to it to lose height (see page 120). this is known as the "buttonhook", or "suicide" approach.

Final approach

Now it is very important to keep your pitch attitude and airspeed constant. As long as you do this, you will be able to determine the exact spot where you flight path will intersect the ground by finding your "aiming point" as described on pages 127 and 128. You will use your spoilers to stay on the correct glide path.

Roundout

When you get close to the ground, you will start leveling out so you will not fly into the ground. The change from flying down the glide path to flying level, just above the ground, is called "rounding out".

Touchdown

It will take some practice, but you will soon get the "feel" of where the ground is, and be able to touch down gently. It is a great morale builder when you finally make a smooth landing.

Rollout

Remember, your flight is not over until you have stopped. Keep the wings level and steer. You may or may not need to use the wheel brake to slow down, and you usually will want to hold the nose up until you have slowed.

Landing At Elsinore/Skylark Field

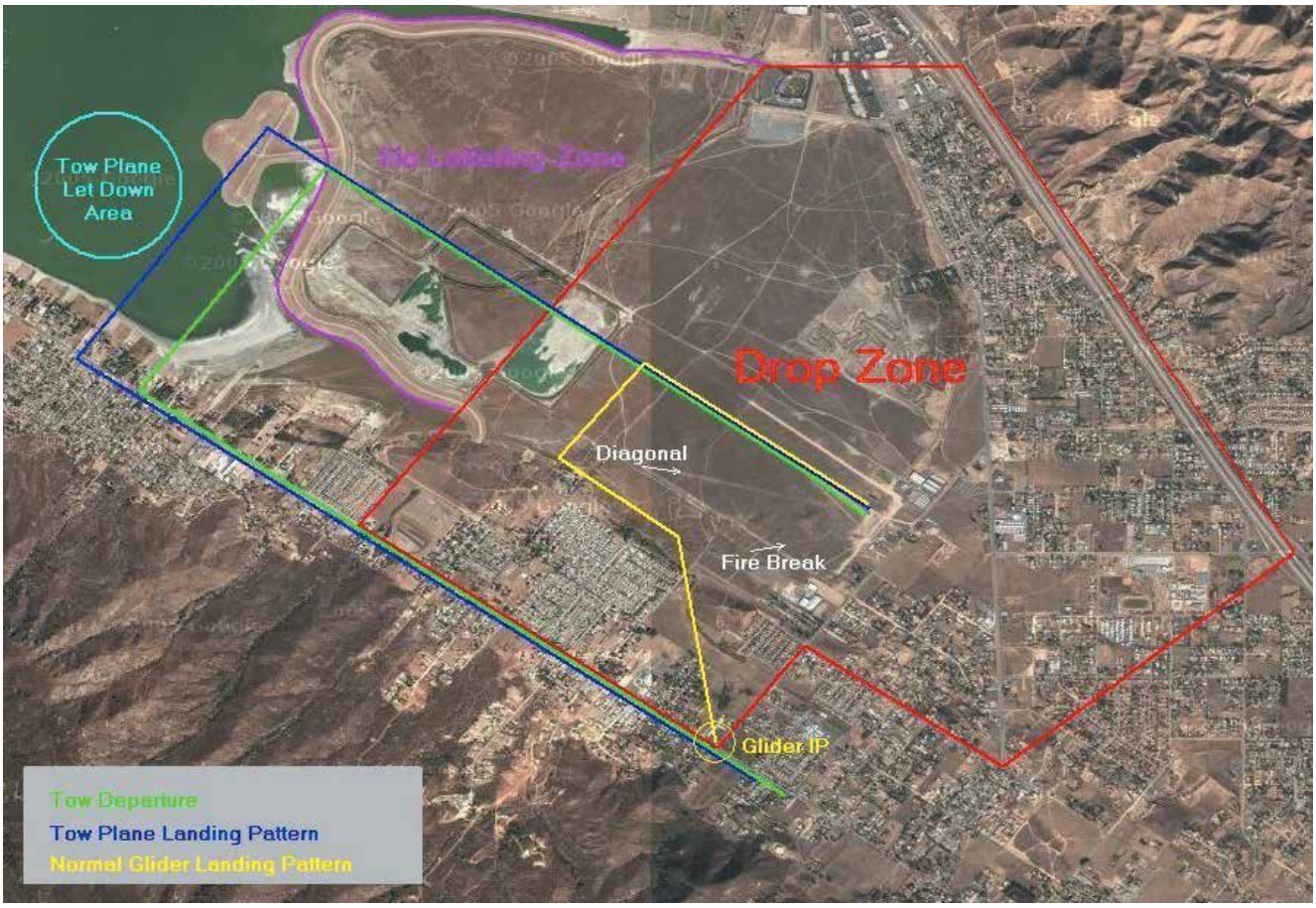


Figure 1

In order to preserve safe operations with the adjoining jump operations, an agreement is in place regarding glider utilization of airspace at Skylark Field. Areas shown in Figure 1 have been designated as "The Drop Zone" or "DZ" and the "No Loiter Zone" or "NLZ".

Glider and tow plane operations are permitted in the DZ only during launch and landing. Gliders may transit the NLZ, however at no time shall any glider thermal within the confines of the DZ or NLZ. When transiting the NLZ, do so with caution. This area is utilized by the tow and jump planes in their departure and recovery patterns. **Keep alert and your radio tuned to 122.9** and take any reasonable action requested by the jump plane while transiting the NLZ, or at any time for that matter.

In case of emergency and a non standard arrival is required, announce your intentions on 122.9 MHz (Multicomm) and take appropriate action to resolve your emergency. Please refer to the Skylark Traffic Pattern and Radio Procedures sections for further clarification. Be prepared to explain your actions to both the landlord and the Safety Officer. **NOTE: Radios are considered required equipment aboard club ships**. Failure to use and monitor the radio on the required frequencies is considered a serious safety violation and can lead to suspension of flying privileges.

The only exceptions to these rules are when the Skydive Center is not in operation, prior consent has been obtained or in an emergency. Be advised, it is never a good idea to be in the area of the departure end of 29L/R.

The DZ is defined by the following boundaries (refer to Figure 1):

From the intersection of Corydon Road and Grand Avenue westerly to a point just beyond Rome Hill.

From that point across the Bird Sanctuary to the baseball stadium and extended to the I-15 freeway.

From that point in a southerly direction along the freeway to the Bundy Canyon interchange.

From Bundy Canyon interchange directly across to the "Y" (passing the High School), the intersection of Mission Trail and Palomar roads.

Up Palomar road to Corydon Avenue, then along Corydon to the intersection of Grand Avenue.

The NLZ is defined by the boundary of the dyke as depicted.

Remember, the Jump Center can change the DZ boundaries at any time. If at any time you are requested to move out of the area you are operating in by the Skydive operation or LESC ground operations, do so immediately unless a safety issue is at stake.

Skylark Field has two main runways designated as 29L/11R and 29R/11L. 29R/11L is reserved for Skydive operations and should not be used by glider operations except in an emergency. 29L/11R should be used for glider and tow operations.

Normal landings by gliders will be on runway 11R. 29L (over the wires) may be used depending on wind conditions.

All tow launches will be from runway 29L. In the event of blocked runways, tow recovery may take place on 11L with prior radio announcement. Glider recovery in the event of blocked runways should utilize the firebreak and diagonal.

IP (Initial Point) and Traffic Patterns:

AT NO TIME SHALL ANY AIRCRAFT OVER FLY THE SERENITY HOUSING DEVELOPMENT! This is an extremely sensitive over flight area.

The IP for all glider approaches (except in emergencies) to Skylark Field will be the Minimart located at the corner of Corydon and Grand Ave. Enter the IP at 2500 ft. MSL (1,250 ft. AGL) then fly a standard 45° entry leg, downwind, base and final.

When tailwind conditions exceed practical use of 11R, an "over the wires" recovery on 29L is authorized. Pattern for 29L after the "IP" is a left base down Corydon to final over the wires.

The target touchdown point is the set of tires closest to the lake for landings on both 11R and 29L.

Roll out and stop within the runway boundaries unless safety necessitates otherwise.

Do not park your glider within a wingspan of the runway.

Power Traffic:

Please be aware that power traffic is continually utilizing 29R/11L from a variety of patterns. Also be aware that power traffic occasionally utilizes 29L/11R without regard for established patterns and sometimes without announcement.

Radio Operations at Elsinore

The following are radio and announcement procedures in place for gliders flying at Skylark Field. Refer to AIM (Airman Information Manual) Chapters 4-1-9, and 4-2. You are required as a pilot to know and understand radio procedure.

All aircraft operating at Skylark will have functioning two-way radio communication. Failure to use and monitor the radio on the required frequencies is considered a serious safety violation and can lead to suspension of flying privileges.

Tow pilots will announce before departure on 122.9 MHz. Glider being towed will monitor 122.9 MHz until off tow, announcing "off tow" is not mandatory but sometimes polite after a "soft" release, (i.e., "8246H, glider 231 off tow". Any emergency announcements will be made over 122.9Mhz by the tow pilot, Line Manager, or Pilot In Command. Keep traffic on 122.9 MHz to a minimum, as it is a busy Multi-comm frequency. No chatter.

Monitor 122.9 MHz well before pattern entry. Some aircraft call in on approach for landing from several miles out, so keep both ears and eyes open, and your head on a swivel when in or near the airport pattern and anytime you are flying…remember, "see and be seen". Not just around the airport, but everywhere.

When in the vicinity of the airport area you should listen carefully for the Jump Plane call of "skydiving in progress". From 14,000 feet it takes about a minute for chutes to start opening around the DZ… be aware, they don't always drop right on top of the grass area. Don't hesitate to land on one of the Diagonals or anywhere appropriate to safely avoid the falling human "traffic".

Everyone will use the "Self-Announce Position and/or Intentions" procedure outlined in the AIM 4-1-9g, whereby pilots broadcast on 122.9 MHz their intentions for landing when approaching the IP.

Examples:

1. "ELSINORE TRAFFIC, GLIDER '231' AT THE IP ENTERING A RIGHT 45 FOR LANDING RUNWAY 11 RIGHT, ELSINORE."

2. "ELSINORE TRAFFIC, GLIDER '88W' ENTERING ON A LEFT BASE FOR LANDING RUNWAY 29 LEFT, ELSINORE."

At Skylark, tow recovery should announce base leg, and gliders announce the "IP" or "45", or "base" as appropriate. 122.9 is a busy Multi-comm frequency, and the normal downwind, base and final self-announcements are not required nor encouraged unless the situation dictates.

Local glider communications are on 123.5 MHz. Once off tow and in the local vicinity of Skylark, you must monitor 123.5 MHz. Remember that other sailplanes could be in the area and they may be on 123.3 MHz. You must monitor 123.5 once off of 122.9 as this has been established as the means the jump plane will contact any glider that may conflict with operations. You don't want to be the offending glider without your radio on.

Recovery From Slack Rope

You undoubtedly will encounter slack in the tow rope during your tows. There are times when the turbulence is strong enough to induce slack. The slack may occur due to the tow plane hitting sink while the glider is still in strong lift. The glider pilot has to lower the nose of the glider to avoid getting too far above the tow plane, and as a result, the glider will pick up speed and catch up with the tow plane momentarily, resulting in slack. It is also possible to induce slack by getting outside the towplane on a turn, and moving back in too quickly, as described by the author.

When slack develops in the rope, you will see a downward curve in the rope instead of the normally straight line. Severe slack will cause a large sag which may even result in loose rope coming back to and below the glider. THIS IS DANGEROUS!

Our method for recovering from slack rope concentrates on never allowing the slack in the rope to endanger the glider. As long as the glider is even with, or above the tow plane, the loose rope will be below the glider and harmless. It is only when the glider pilot allows the glider to descend below the tow plane that there is a possibility of the rope catching on the glider.

When you see slack forming in the tow rope:

a. Immediately raise the nose of the glider to normal glide pitch attitude. The slack probably formed because the glider was "diving" on the tow plane. Get your wings parallel to the wings of the tow plane.

b. If you have descended below the tow plane (judge this by the horizon if the tow plane is above the horizon, it is above you) immediately raise the nose of the glider enough to climb back up to the towplane's level.

c. WATCH THE TOW PLANE. As long as you are even with or above the tow plane, you are in no danger from the rope.

d. Wait for the rope to come tight. Remember, as soon as the rope became loose, the glider started slowing down (unless you continued to dive). Also, the tow plane probably speeded up. So the rope will come tight—it's only a matter of time.

e. When it comes tight, it will speed you up with a jerk. Because the rope is attached near the bottom of the glider, this will tend to make the nose of the glider rise up. If you allow it to, you will climb up above the tow plane and probably get more slack. Hold the nose down when the rope comes tight. This is a skill you will learn from practice.

f. Because of the jerk, you will be speeded up and will get some more slack, but if you have held the glider level, it will be much less than the first slack. We call these "bounces". If you continue to hold your glider level, the bounces will damp out and you will have recovered from slack rope.

g. If the rope is allowed to come tight with a hard jerk, the rope might break. To help soften the jerk, the glider pilot may yaw the glider away from the rope with the rudder just before the rope comes tight. When the rope does come tight, it will pull the nose of the glider around which helps absorb the shock.

If you yaw the glider too early, or apply dive brakes while maintaining position, you will cause the glider to slow down too much, which could cause the rope to break.

Emergency Procedures
Rope Breaks

Always, always remember: NOSE DOWN! Keep flying speed! MAKE DECISION!

Before Takeoff:

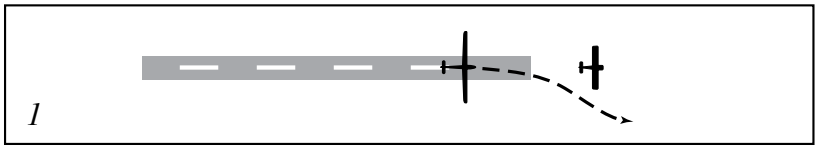
1. At an unfamiliar field, ask locals about the emergency landing areas available in case of rope break. If possible, walk through these areas checking for obstacles, ditches, etc.

2. At a familiar field, think about the condition of those emergency landing areas (rain, mud, freshly plowed, etc.).

3. In your pre-takeoff check list, call out "***wind direction"*** noting ahead of time which way you would turn if you had a rope break at 200' AGL or higher.

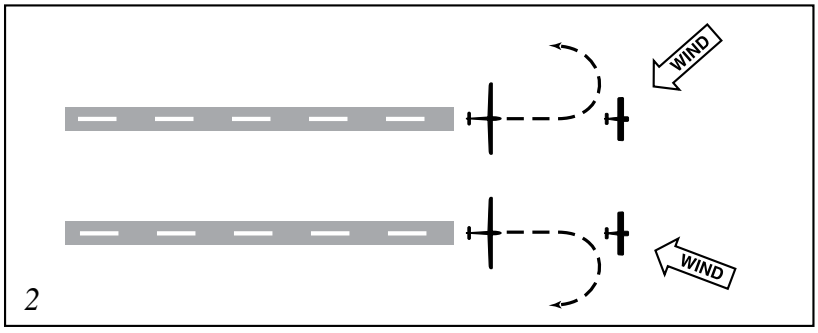
Takeoff:

Call out ***"200 feet"*** (AGL), always remembering that until you have actually said "200 feet", you are going to land straight ahead (or slightly off to the right or left if there is an obstacle). *(figure 1)*

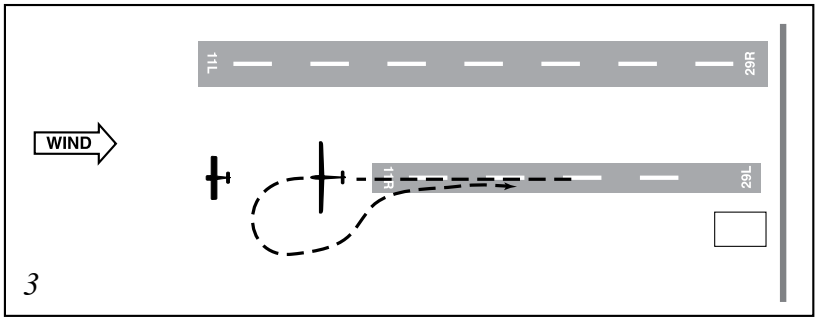


200' AGL and Above:

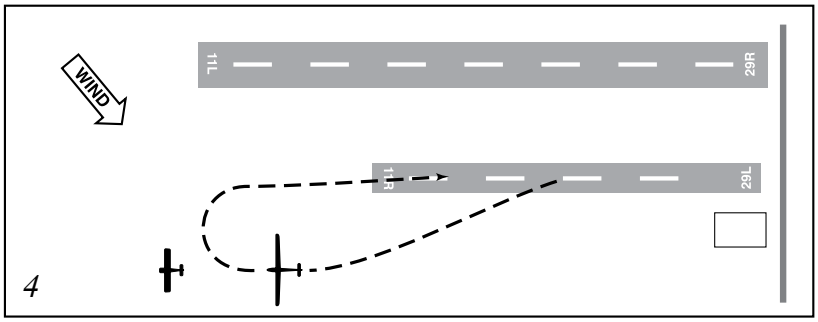
If you are NOT at an airport with a parallel runway, turn into the wind to make a 180° turn and downwind return to the field. *(figure 2)*



If you ARE at an airport with a parallel runway (like Skylark), you should NOT turn toward the other runway (right) *(figure 3)*



If you are off to the left, AND have a strong crosswind, you can turn right for your 180° downwind approach at a safe distance from the parallel runway. *(figure 4)*



Spins And Spiral Dives

A "spin" is defined as a prolonged stall in which a glider rotates about its center of gravity, usually with its nose well down.

An unrecoverable spin is one in which the glider can not be unstalled, usually because the C.G. (Center of Gravity) is behind the rear limit. With the center of gravity too far to the rear, the spin may become "flat", that is, the glider may get into a more nose-up attitude. If this happens, the elevator will become ineffective, and the glider pilot will not be able to unstall the glider and stop the spin. This is the reason it is very important to never fly a glider without the required weight in the cockpit.

The farther aft (to the rear) the C.G. is, the easier it will be for the glider to enter a spin, and the harder it will be to recover from the spin.

In a spin, the airspeed will stabilize (quit increasing) which is the primary means of determining that you are not in a spiral dive. Also, the yaw string will be way off to the side, since the glider is yawing severely in a spin.

The normal spin recovery procedure is: full opposite rudder, move stick forward, pause until rotation stops, neutralize rudder, recover to level flight. If rotation persists after applying opposite rudder and moving the stick forward, move it farther forward. You must unstall the glider. Some gliders require:

Full opposite rudder;

Full forward stick;

Wait for rotation to stop.

The minimum altitude for practicing spins is that which will allow you to recover from the spin without going lower than 1500' AGL.

An accidental spin is most likely to occur close to the ground. The pilot's instinctive reactions may cause him to use the controls incorrectly, resulting in the spin. A skidding turn is most dangerous because the controls are being held in the "spin" position to make the turn.

In a "spiral dive", the glider is rotating and the nose is well down, but the glider is not stalled. The definition of a spiral dive is a bank so steep that full up elevator will not hold the nose up, resulting in the nose-down attitude. You will know you are in a spiral dive instead of a spin if the airspeed keeps increasing. Also, the yaw string will be only slightly off. If a spiral dive is allowed to continue, the glider is likely to be over stressed. (Might break!)

The spiral dive recovery technique is: opposite aileron to level the wings, then recover to level flight. During the recovery you may find yourself approaching V_{ne} speed (redline). Apply the dive brakes smoothly and gently raise the nose.

AS A STUDENT PILOT, YOU MUST NOT PRACTICE SPINS WHILE FLYING SOLO.

Speed To Fly

Speed-to-fly is the name given to the airspeed which will give you the flattest glide, which means the most distance over the ground. In still air (no wind, no vertical air motion) speed-to-fly is the same as best L/D speed. However, against the wind, or in sink, the glider must go faster than best L/D speed to obtain the flattest glide over the ground. It is difficult for inexperienced glider pilots to "speed up" when necessary, because it means pointing the nose of the glider down and descending even faster. Therefore, it is vitally important for the student to understand the concept of speed-to-fly and to practice it until it becomes an automatic reaction.

Speed-to-fly has two varieties: speed-to-fly <u>in wind</u> and speed-to-fly <u>in sink</u>.

When flying against the wind, your ground speed is less than your air speed by the speed of the wind. For example, in still air at a 27:1 glide ratio, you would travel 54 nautical miles for each 2 miles of altitude lost (54/2). Suppose you had a 40 knot headwind: instead of traveling 54 miles, you would only travel 14 nautical miles (54-40), but you would lose the same amount of altitude: 2 miles (12,000 ft.). Your glide ratio over the ground would only be 14/2, or 7:1.

Speed-to-fly in <u>wind</u>: add 1/2 the headwind to your best glide speed.

Let's see how this would help you. Half of the wind speed is 20 knots. Add this to your best L/D speed of 49 knots. This means speeding up to 69 knots. Hard to do, when you know this will make you descend faster, but look: at 69 knots, using the L/D Dual curve on the graph on page 5.5 of your Krosno Flight Manual, you see that the glide ratio only decreases to 22:1. In one hour, you would descend 69/22 or about 3.1 miles (18,600 ft.), but you would trave 29 miles (69-40), instead of 9 miles (49-40). Your glide ratio over the ground then is 29/3, or 9.6:1. This is a 37 percent improvement, which could make the difference between getting back to the airport, or landing out.

When flying in sinking air, your ground speed is not reduced, but your descent is increased. Suppose you are in air that is sinking at 400 FPM. At 49 knots, in still air, at best L/D speed, your descent rate would be approximately 200 FPM, so you would see 600 FPM descent on your variometer. In one hour, then, you would travel 49 miles, but your descent would be 600 feet times 60 minutes = 36,000 feet divided by 6,000 feet = 6 miles. Your glide ratio over the ground then is only 49/6 or 8:1.

Speed-to-fly in <u>sink</u>: add 5 knots to best L/D speed for each 100 FPM descent more than 200 FPM (when observed at best L/D speed).

Let's see how this would help you. For the extra 400 FPM, add 20 knots (400/5) to your best L/D speed of 49 knots. This means speeding up to 69 knots. Very hard to do, when this makes you descend even faster. But look: your glide ratio only decreases to 22:1, (from the same curve as in the preceding example) which means that in one hour, or 69 nautical miles, you will descend 69/22 or about 3.1 miles (18,600 ft.). Add to this the 400 FPM descent of the air, or 400 x 60/6000 = 4 miles, and you have a tot:al descent of 7.1 miles (42,600 ft.). However, you will have traveled 69 miles. Your glide ratio over the ground then is 69/7.1 or 9.7:1.

This is a 20 percent improvement, which could make the difference between getting back to the airport, or landing out.

Note The preceding examples are the solutions to questions 5 & 6 on the pre-solo test.

Because you speed up, you lose your reference point of 200 FPM of glider descent. Also, the. vertical speed of the air constantly changes. The above rule-of-thumb is only good when flying at best L/D speed. Therefore, after speeding up to the rule-of-thumb speed, follow the variometer needle. If it keeps going down after you have sped up, it means that the sink has increased. Lower the nose some more. Do this in steps, so you will not be pushing the needle down. If the needle moves up while your speed is stabilized, raise the nose a little. If the needle keeps moving up, raise the nose some more. Do this in steps, so you will not be pushing the needle up. When you are back to best L/D speed, and the vario is back to 200 FPM descent or less, you are out of the sink

14 CFR (FEDERAL AVIATION REGULATIONS)

(Condensed for Student Glider Pilots)

PART 43 - MAINTENANCE

43.3 Persons authorized to perform . . . . preventive maintenance . . .

(g) The holder of a pilot certificate may perform preventive maintenance on any aircraft owned or operated by him that is not used in air carrier service.
(NOTE: This provision does not include the holder of a Student Pilot Certificate. See 43.7(f))

43.7 Persons authorized to approve aircraft . . . for return to service . . .

(f) A person holding at least a private pilot certificate may approve an aircraft for return to service after performing preventive maintenance under the provisions of 43.3(g).

PART 61 - CERTIFICATION: PILOTS

61.3 Requirements for certificates. . . .

(a) Pilot certificate. A person may not act as pilot in command . . . of a civil aircraft . . . unless that person (1) Has a valid pilot certificate. . .in that persons physical possession... (2) Has a photo identification that is in that persons physical possession...

61.51 Pilot logbooks.

(a) Each person must document and record the following time...: (1) Training and aeronautical experience used to meet the requirements for a certificate, rating, or flight review... (2) The aeronautical experience required for meeting the recent flight experience requirements of this part.

(d) *Logging of solo flight time*...a pilot may log as solo flight time only that flight time when the pilot is the sole occupant of the aircraft.

61.83 Eligibility requirements for student pilots.

To be eligible for a student pilot certificate, an applicant must:

(b) Be at least 14 years of age for the operation of a glider. . .

61.87 Solo requirements for student pilots.

(a) *General*. A student pilot may not operate an aircraft in solo flight unless that student has met the requirements of this section. The term “solo flight”, as used in this subpart, means that flight time during which the student pilot is the sole occupant of the aircraft...

(b) *Aeronautical knowledge*. A student pilot must demonstrate satisfactory aeronautical knowledge on a knowledge test that meets the requirements of this paragraph:

(1) The test must address the student pilot's knowledge of—

(i) Applicable sections of parts 61 and 91 of this chapter;

(ii) Airspace rules and procedures for the airport where the solo flight will be performed; and

(iii) Flight characteristics and operational limitations for the make and model of aircraft to be flown.

(2) The student's authorized instructor must—

(i) Administer the test; and

(ii) At the conclusion of the test, review all incorrect answers with the student before authorizing that student to conduct a solo flight.

(c) *Pre-solo flight training*. Prior to conducting a solo flight, a student pilot must have:

(1) Received and logged flight training for the maneuvers and procedures of this section that are appropriate to the make and model of aircraft to be flown; and

(2) Demonstrated satisfactory proficiency and safety, as judged by an authorized instructor, on the maneuvers and procedures required by this section in the make and model of aircraft or similar make and model of aircraft to be flown.

(i) *Maneuvers and procedures for pre-solo flight training in a glider*. A student pilot who is receiving training for a glider rating or privileges must receive and log flight training for the following maneuvers and procedures:

(1) Proper flight preparation procedures, including preflight planning, preparation, aircraft systems, and, if appropriate, powerplant operations;

(2) Taxiing or surface operations, including runups, if applicable;

(3) Launches, including normal and crosswind;

(4) Straight and level flight, and turns in both directions, if applicable;

(5) Airport traffic patterns, including entry procedures;

(6) Collision avoidance, windshear avoidance, and wake turbulence avoidance;

(7) Descents with and without turns using high and low drag configurations;

(8) Flight at various airspeeds;

(9) Emergency procedures and equipment malfunctions;

(10) Ground reference maneuvers, if applicable;

(11) Inspection of towline rigging and review of signals and release procedures, if applicable;

(12) Aerotow, ground tow, or self-launch procedures;

(13) Procedures for disassembly and assembly of the glider;

(14) Stall entry, stall, and stall recovery;

(15) Straight glides, turns, and spirals;

(16) Landings, including normal and crosswind;

(17) Slips to a landing;

(18) Procedures and techniques for thermalling; and

(19) Emergency operations, including towline break procedures.

(n) *Limitations on student pilots operating an aircraft in solo flight*. A student pilot may not operate an aircraft in solo flight unless that student pilot has received:

(1) An endorsement from an authorized instructor on his or her student pilot certificate for the specific make and model aircraft to be flown; and

(2) An endorsement in the student's logbook for the specific make and model aircraft to be flown by an authorized instructor, who gave the training within the 90 days preceding the date of the flight.

61.89 General Limitations

(a) A student pilot may not act as pilot in command of an aircraft:

(1) That is carrying a passenger;

(2) That is carrying property for compensation or hire;

(3) For compensation or hire;

(4) In furtherance of a business;

(6) With a flight or surface visibility of less than 3 statute miles during daylight hours...

(7) When the flight cannot be made with visual reference to the surface; or

(8) In a manner contrary to any limitations placed in the pilot's logbook by an authorized instructor.

Part 91–General Operating And Flight Rules

Subpart A–General

91.3 Responsibility and authority of the pilot in command

(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

(b) In an emergency requiring immediate action, the pilot in command may deviate from any rule of this subpart or of Subpart B to the extent required to meet the emergency.

91.7 Civil aircraft airworthiness

(a) No person may operate a civil aircraft unless it is in an airworthy condition.

(b) The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight.

91.9 Civil aircraft flight manual, marking, and placard requirements

(a) . . . no person may operate a civil aircraft without complying with the operating limitations specified in the approved . . Flight Manual, markings and placards . . .

(b) No person may operate a U.S. registered civil aircraft-

(2) For which a . . . Flight Manual is not required . . . , unless there is available in the aircraft . . . approved . . . markings and placards.

91.17 Alcohol or drugs

(a) No person may act or attempt to act as a crew member of a civil aircraft:

(1) Within 8 hours after the consumption of any alcoholic beverage;

(2) While under the influence of alcohol;

(3) While using any drug that affects the person's faculties in any way contrary to safety;

(4) While having an alcohol concentration of 0.04 or greater in a blood or breath specimen.

Subpart B–Flight Rules (General)

91.105 Flight crew members at stations

(a) During takeoff and landing, and while enroute, each required flight crew member shall–

(2) Keep the safety belt fastened . . . .

91.113 Right of way rules . . .

(b) *General* . . . . vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft . . .

(c) *In distress*. An aircraft in distress has the right of way over all other traffic.

(d) *Converging*. When aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so) the aircraft to the other's right has the right of way.

If the aircraft are of different categories:

(1) A balloon has the right of way over any other category of aircraft;

(2) A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.

(e) *Approaching head-on*. When aircraft are approaching each other head-on, or nearly so, each pilot of each aircraft shall alter course to the right.

(g) *Landing*. Aircraft, while on final approach to land, or while landing, shall have the right of way over other aircraft . . .

PART 91 - Continued

91.119 Minimum safe altitudes: General.

Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

(b) *Over congested areas*. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1000 feet above the highest obstacle within a horizontal radius of 2000 feet of the aircraft.

(c) *Over other than congested areas*. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

91.125 ATC light signals.

ATC light signals have the meaning shown in the following table:

Color and type of signal	**Meaning with respect to aircraft on the surface**	**Meaning with respect to aircraft in flight**
Steady green	Cleared for takeoff	Cleared to land
Flashing green	Cleared to taxi	Return for landing
Steady red and continue circling.	Stop	Give way to other aircraft
Flashing red	Taxi clear of runway in use	Airport unsafe—do not land
Flashing white	Return to starting point	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution

91.129 Operations in Class D airspace.

(c) *Communications* . . . Each person must establish two-way radio communications with the ATC facility...providing air traffic services prior to entering that airspace and thereafter maintain those communications while within that airspace.

91.l55 Basic VFR weather minimums

(a) . . . no person may operate an aircraft under VFR when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude in the following table:

VISUAL FLIGHT RULES		
Altitude	**Flight Visibility**	**Distance From Clouds**
1200 feet or less above the surface (regardless of MSL altitude) Within controlled airspace	3 statute miles	{500 feet below {1000 feet above {2000 feet horizontal
Outside controlled airspace	1 statute mile	Clear of clouds
More than 1200 feet above the surface but less than 10000 feet MSL Within controlled airspace	3 statute miles	{500 feet below {1000 feet above {2000 feet horizontal
Outside controlled airspace	1 statute mile	{500 feet below {1000 feet above {2000 feet horizontal
More than 1200 feet above the surface and at or above 10000 feet MSL	5 statute miles	{1000 feet below {1000 feet above {1 mile horizontal

Subpart C—Certificate Requirements

91.203 Civil aircraft: certifications required

(a) . . . no person may operate a civil aircraft unless it has within it the following:
(1) An appropriate and current airworthiness certificate. . .
(2) An effective U.S. registration certificate . . .

91.211 Supplemental oxygen

(a) *General*. No person may operate a civil aircraft of U.S. registry-
(1) At cabin pressure altitudes above 12,500 feet (MSL) up to and including 14,000 feet (MSL), unless the required minimum flight crew is provided with and uses supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration;
(2) At cabin pressure altitudes above 14,000 feet (MSL), unless the required minimum flight crew is provided with and uses supplemental oxygen during the entire flight time at those altitudes;

(3) At cabin pressure altitudes above 15,000 feet (MSL), unless each occupant of the aircraft is provided with supplemental oxygen.

91.215 ATC transponder and altitude reporting equipment and use.

(b) (4) All aircraft in all airspace above the ceiling and within the lateral boundaries of a Class B or Class C airspace area designated for an airport upward to 10,000 feet MSL...

Subpart D–Special Flight Operations

91.303 Aerobatic flight

No person may operate an aircraft in acrobatic flight–
(a) Over any congested area of a city, town, or settlement;
(b) Over an open air assembly of persons;
(c) Within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport;
(d) Within 4 nautical miles of the center line of any Federal airway;
(e) Below an altitude of 1,500 feet above the surface; or
(f) When flight visibility is less than 3 statute miles.

For the purposes of this section, aerobatic flight means an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.

91.307 Parachutes and parachuting

(a) No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type and has been packed by a certificated and appropriately rated parachute rigger—

(1) Within the preceding 180 days...

(c) Unless each occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft, carrying any person (other than a crew member) may execute any intentional maneuver that exceeds–

(1) A bank of 60 degrees relative to the horizon; or
(2) A nose-up or nose-down attitude of 30 degrees relative to the horizon.

PART 91 - Continued

91.309 Towing: gliders...

(a) No person may operate a civil aircraft towing a glider...unless–

(3) The towline used has breaking strength not less than 80 percent of the maximum certificated operating weight of the glider...and not more than twice this operating weight. However, the towline used may have a breaking strength more than twice the maximum certificated operating weight of the glider...if—

(i) A safety link is installed at the point of attachment of the towline to the glider...with a breaking strength not less than 80 percent of the maximum certificated operating weight of the glider...and not greater than twice this operating weight;

(5) The pilots of the towing aircraft and the glider...have agreed upon a general course of action including takeoff and release signals, airspeeds, and emergency procedures for each pilot.

Subpart E–Maintenance

91.409 Inspections

(a)...no person may operate an aircraft unless, within the preceding 12 calendar months, it has had-
(1) An annual inspection in accordance with Part 43 of this chapter and has been approved for return to service by a person authorized by 43.7 of this chapter;
(b) . . . . no person may operate an aircraft carrying any person (other than a crew member) for hire, and no person may give flight instruction for hire in an aircraft which that person provides, unless within the preceding 100 hours of time in service it has received an annual or 100-hour inspection and been approved for return to service...

49CFR Part 830–National Transportation Safety Board Rules

Subpart A–General

830.2 Definitions

As used in this part the following words or phrases are defined as follows:

Aircraft Accident means an occurrence associated with the operation of an aircraft . . . in which any person suffers death or serious injury . . . or the aircraft receives substantial damage.

Incident means an occurrence other than an accident . . . which affects or could affect the safety of operations.

830.5 Immediate notification

The operator of any civil aircraft...shall immediately...notify the nearest National Transportation Safety Board Field Office when:

(a) An aircraft accident or any of the following listed incidents occur:
(1) Flight control system malfunction or failure;
(2) Inability of any required flight crew member to perform his normal flight duties as a result of injury or illness;
(5) Aircraft collide in flight;
(6) Damage to property, other than the aircraft, estimated to exceed $25,000 for repair...

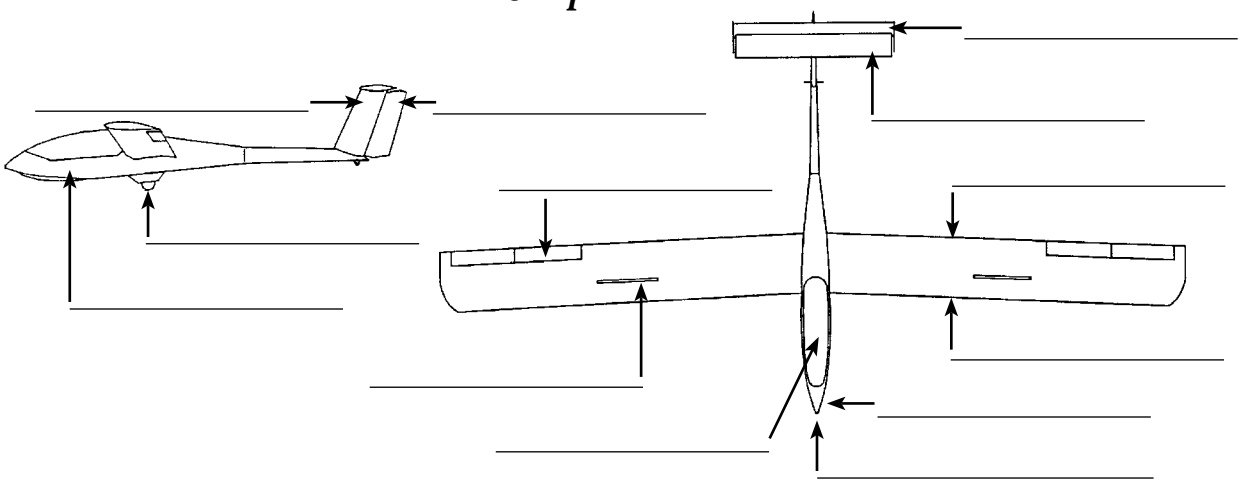
Student Pilots

Welcome! We're pleased you have chosen to soar with us. We ask that you please read and understand these simple rules. They have proven effective in ensuring your safety.

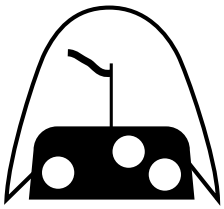
1. Please read and follow the Flight Rules and Standard Operating Procedures for Cypress Soaring. Some of our rules are more strict than the FARs. All these rules were created to improve safety and provide a means for everyone to get an equal opportunity to utilize the club's equipment.
2. Your Flight Instructor must list the model of sailplane you will fly on your Student Permit.
3. Cypress Soaring requires that you check in with a Cypress Instructor or other Club authorized Instructor, before soloing. Make sure they understand you are a STUDENT PILOT and that you are asking permission to SOLO.
4. The FARs require that you have a 90 day sign-off entered in your logbook for continued solo. There is no penalty for exceeding 90 days, but you must fly dual again before you may solo.
5. Additionally, Cypress Soaring requires that a dual flight be completed before soloing again, if you have not flown in the previous 30 days.
6. No slack line recoveries, spins, or simulated rope breaks may be practiced intentionally except with an instructor.
7. You must stay within 5 statute miles of the airport from which you took off. You must remain within final glide distance from the airport at all times, with enough altitude to return to the I.P. at a minimum altitude of 1,000 ft. agl.
8. We expect you to fly a full 1000 foot AGL pattern from the published initial point, at not less than best L/D speed.
9. REMEMBER, A TOWPLANE OR SAILPLANE MAY BE LANDING BEHIND YOU. LEAVE AN OPEN LANDING AREA AND DO NOT CUT IN FRONT OF ANOTHER AIRCRAFT.
10. You are responsible for the safe tiedown of your aircraft after your flight. Chains on each wing and at the nose and tail, along with gust locks installed, will make your glider secure.

PLEASE BE RESPONSIBLE

Chapter 1 Test



1. Nomenclature. Name all the above parts of the aircraft.
2. Why does an aircraft have:
   a. Ailerons?_____
   b. Elevator?_____
   c. Rudder?_____
3. What does the wing do?_____
4. What is angle of attack?_____
5. Name three things that happen when angle of attack is changed
   a. _____
___b. _____
___c. _____
6. Pushing on the left rudder pedal will cause the nose of the glider to yaw which way?
   _____
7. Why does a glider have a yaw string?_____
8. In the following drawing, which rudder should be pressed to straighten the yaw string?_____



9. Before making a turn, a pilot should always_____
10. What turns an aircraft?_____

Chapter 2 Test
Stability

1. Name the three axes of the glider
   a. _____
   b. _____
   c. _____
2. When the glider moves about any axis, it rotates about the
   _____ _____ _____.
3. The glider fuselage tends to fly streamlined through the relative airflow because of the _____and is thus stable about the yaw (vertical) axis.
4. The glider tends to fly with its wings level because the wings are mounted on the fuselage at an angle called _____.
5. Pitch stability is achieved by a balancing act between the horizontal stabilizer, wing lift, and the _____ _____ _____.

Chapter 3 Test

Shallow, Medium & Steep Turns

1. When a pilot "flies" an aircraft, only three things are being controlled. They are:

   a._____

   b._____

   c._____

2. In a shallow turn, the pilot will need to hold some aileron (into, against) the turn because of the_____ stability.
3. In a steep turn, the pilot will need to hold some aileron (into, against) the turn because of the_____tendency.
4. During all turns, some_____will be needed in the direction of the turn.

Chapter 4 Test

Preflight

1. What is meant by “popped” rivets?_____
2. What would cause a popped rivet? _____
3. What are some common signs of possible hidden damage? _____

_____

4. What should you look for when checking the tow release mechanism?

   _____

5. What would distorted hinges on the ailerons or dive brakes indicate?

   _____

6. What should a student pilot do if evidence of damage or excessive wear is found?

   _____

7. What documents are required in a glider?

   a. _____

   b. _____

   c. _____

8. What should you look for when checking the pitot tube?

   _____

9. How can you ensure that you check every important item?

   _____

10. Who is responsible for checking the tow rope before each flight?

    _____

Chapter 5 Test

Forward Stalls

1. What is a stall? _____
2. Name 6 signs of an impending stall in the order they occur:
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
3. Where on the wing does a stall first occur? _____
4. When the wing stalls, the glider pitches nose down. Why? _____

   _____
5. What is the minimum stalling speed of the glider you are being trained in? _____
6. Can a glider stall at a higher airspeed? _____ How?
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
7. Why is it important to practice stalls? _____

   _____
8. How is a normal recovery made from a forward stall?
   a. _____
   b. _____
   c. _____
9. If a wing starts to “drop” during a forward stall, how should that wing be raised?

   _____

   _____

Chapter 6 Test

Turning Stalls

1. Turning stalls are most likely to occur close to the ground. Why?

_____

_____

_____

2. Name the three occasions a turning stall is most likely to happen.

   a. _____

   b. _____

   c. _____

3. Without an abrupt control motion, a turning stall is most easily entered from a

   (circle one) a. shallow turn b. medium turn c. steep turn

   Why? _____

_____

_____

4. Give a step-by-step recovery procedure from a turning stall.

   a. _____

   b. _____

   c. _____

   d. _____

5. How do you prevent turning stalls close to the ground?

   a. _____

   b. _____

   c. _____

   d. _____

6. What is one control not to use during the first steps of a turning stall recovery?

   _____

7. From the standpoint of turning stalls, the most difficult angle of bank to stall a glider is a: (circle one) a. shallow turn b. medium turn c. steep turn

Chapter 7 Test

Landings

1. What is the dive brake open glide ratio of most sailplanes? _____
2. What is the maximum glide ratio of the Krosno glider? _____
3. Below 1000 ft. AGL a pilot should never _____
4. (skip)
5. What is the primary judgmental decision to be made during the downwind leg?

   _____
6. (skip)
7. What is the normal, desired sink rate during the downwind leg? _____
8. What should you do if you experienced excessive sink during the downwind leg?

   _____
9. What should you do if you encountered lift during the downwind leg?

   _____
10. How should the turn onto base leg be made?

    a. _____ b._____ c._____
11. Upon completion of the turn onto base leg, you realize that you are too high. What will you do?

    _____
12. You are on base leg ready to turn onto final and realize you are too high.
    There is one type of pattern that should be avoided. What is it?

    _____
13. On final it is important to maintain a constant _____ using the _____

    control, and "freeze" the desired touchdown point on the windshield using which control?

    _____
14. On final you realize that you are above the 5:1 glide slope. As a student pilot you should

    _____
15. As an experienced pilot, when might you find a TLAR method most useful?

_____

Test on Takeoff Techniques

1. If there is a crosswind, how should you hold your wing?

   _____

2. If the crosswind is from the left, should you be holding left or right rudder?

   _____

3. When you take off, how high should you go above the runway until the towplane leaves the ground? _____

4. If there is a crosswind, which way should you swing the nose of the glider after you take off and before the towplane leaves the ground?

   _____

5. There is a crosswind, and after the towplane leaves the ground the tow pilot "crabs" into the wind. What should you do then? _____
   Why? _____

_____

_____

Test on Thermalling Techniques

1. What happens if you turn too soon when you enter a thermal?

   _____

2. Why should you **not** reverse your turn direction after entering a thermal?

   _____

   _____

3. How long should you wait after entering a thermal before starting to turn?

   _____

4. As you enter a thermal, what indication **might** you get as to which way to turn?

   _____

5. If you enter a thermal and lose it due to turning the wrong way, what should you do?

   _____

6. If the vario reads 300 fpm up on one side of your circle but only 100 fpm up on the other side, what does this tell you?

   _____

7. What is the procedure for "centering" in a thermal?

   _____

8. If you see another glider circling in a thermal and go over to join it, in which direction should you turn when you enter the thermal? _____

   ____

9. What is the steepest angle of bank normally used when thermalling? _____
10. What penalty do you pay for using a steep bank? _____
11. Why is it sometimes worthwhile to use a steep bank? _____

    _____

12. When should you use a shallow bank? _____

    _____

13. What is the minimum altitude for thermalling? _____
14. Why is it dangerous to thermal below that altitude? _____

Test On Slips And Crosswind Landings

1. What is a "slip"? _____

_____

2. What are two uses of a slip?

   a. _____

   b. _____

3. What are the two kinds of slips? _____ and _____

4. What is the difference between the two? _____

_____

5. How do you make a glider slip? _____

_____

6. Will your airspeed indication be accurate in a slip? _____

7. How will you determine and control your speed while slipping? _____

_____

8. Is it O.K. to slip in the last turn in the pattern, from base to final? _____

9. What are the two methods of handling a crosswind approach and landing?

   a. _____

   b. _____

10. What are the two things you must be sure to do before your glider touches down in a crosswind?

    a. _____

    b. _____

Test on Soaring Signals

1. How does the line man signal you to open the tow release when it is too noisy for you to hear him speak? _____
2. How does the line man signal to the tow pilot to take up slack? _____

_____

3. How does the line man signal to the tow pilot to "hold"? _____

_____

4. How does the line man signal "stop operation—emergency!" _____

_____

5. What information do you need from the line man before you can be ready for takeoff? _____

_____

6. How do you signal the tow pilot that you are ready for takeoff? _____

_____

7. How does the line man signal to the tow pilot to start the takeoff? _____

_____

8. What would the tow pilot be trying to tell you if he "waggles" the rudder during or soon after takeoff? _____
9. How would the tow pilot signal to you that he was in trouble on takeoff and you should "release now!" _____
10. When you are higher off the ground and the towplane rocks its wings, what does the tow pilot want you to do? _____
11. On tow, if you want the tow pilot to turn, how can you signal him? _____

_____

12. If you find you cannot release the tow rope, how do you signal the problem to the tow pilot? ____

_____

Test On Landings

1. What is meant by I.P.?_____
2. What minimum speed should you fly in the pattern? _____
3. When you start into the pattern at the I.P., what leg of the pattern are you on? _____
4. What are the six parts of the pre-landing checklist?
   a. _____ d. _____
   b. _____ e. _____
   c. _____ f. _____
5. How do you judge the distance from the runway at which you should turn onto downwind leg?

   _____
6. What angle should you see? _____
7. What must you constantly check while on the downwind leg?

   _____
8. What instrument, beside the airspeed indicator, must you always monitor while flying the pattern?

   _____ Why? _____
9. How do you judge when you should turn onto base leg? _____
10. What look-down angle to the end of the runway should you see immediately after turning onto base leg? _____
11. How should you correct your pattern if you see you are much too high on base?

    _____
12. How should you correct your pattern if yo see you are much too low on base?

    _____
13. What is the name of the approach you should never use to lose altitude? _____
14. Why is it very important to keep your pitch attitude and airspeed constant on final approach?

    _____
15. When is your flight over? _____

Test On Landing at Skylark

1. What altitude should you see on the altimeter at the I.P. for Skylark? _____
2. What is meant by the term “DZ”? _____
3. What is meant by the term “NLZ”? _____
4. Are you allowed to thermal in the “DZ”? _____
5. When are you allowed to fly in the “DZ”? _____
6. Where are you not allowed to fly in the “DZ”? _____
7. What runway is usually used for glider landings? _____
8. Under what circumstances can you land on runway 29L? _____

_____

9. What radio frequency must you monitor and use when taking off and landing? _____
10. What should you announce on the radio when you are preparing to land? _____

_____

11. Who is responsible for announcing the takeoff? _____
12. What radio frequency is used for local glider communications? _____

Test on Slack Rope Recovery

1. What are two ways a glider pilot can cause slack to form in the tow rope?

   a. _____

   b. _____

2. Can turbulence cause slack? _____ How? _____

   _____

3. What does slack in the tow rope look like? _____

4. Can it endanger the glider? _____ How? _____

   _____

5. How can the glider pilot prevent the slack from endangering the glider?

   _____

6. What is the first thing to do when you see slack forming in the tow rope?

   _____

7. What should you never allow, or should correct immediately, when there is slack in the tow rope?

   _____

8. What should you do while the slack is coming out of the rope?

   _____

9. What will happen when the tow rope comes tight?

   _____

10. What must you do when the tow rope comes tight?

    _____

11. What is a “bounce”? _____

    _____

Test On Emergency Procedures
Rope Breaks

1. What is the first thing to do if you have a rope break? _____
2. What is the second? _____
3. When flying at an unfamiliar field, what information should you be sure to get?

   _____
4. At a familiar field, what should you think about before takeoff?

   _____
5. Why do we have "wind direction" as part of the pre-takeoff check list?

   _____
6. What altitude (AGL) should you call out after takeoff? _____
7. If you have not said "200 feet", and you have a rope break, what should you do?

   _____
8. At airports without a parallel runway, when you are at 200' (AGL) and above, which way should you turn if you have a rope break? _____
9. At Skylark, which has a parallel runway, which way should you turn if:
   a. it is a normal climb-out, and there is NOT a STRONG crosswind from the right?

      _____
   b. the towplane drifts far off to the left during climb-out, and there IS a STRONG crosswind from the right? _____

Test On Spins And Spiral Dives

1. What must take place before a glider will spin?

   _____

2. What must you do to stop a spin? _____
3. Within the allowable limits, how does the C.G. position affect spin characteristics?

   _____

4. If you fly a glider with less than the placarded minimum weight in the cockpit, where is the C.G.?

   _____

5. If the C.G. position is behind the rear limit authorized for the glider, and you spin it, what might occur? _____
6. What are the steps for normal spin recovery: 1. _____

   2. _____

___3. _____ 4. _____ 5. _____

7. Suppose you are in a spin, and do steps #1, #2, and #3 above, and the rotation does not stop.

   What must you do? _____

   Why? _____

8. What do some gliders require for spin recovery? 1. _____

   2. _____ 3. _____

9. What is the minimum altitude from which spins can be practiced? _____

_____

10. Where would an accidental spin most likely occur? _____
11. From the standpoint of spins, which is more dangerous, a slipping turn or a skidding turn?

    _____

___Why? _____

12. What is the primary indication to the pilot that he is in a spin or a spiral dive?

    Spin: _____

___Spiral dive: _____

13. What is the spiral dive recovery technique? 1. _____

___2. _____

14. If a spiral dive is allowed to continue, what is likely to happen? _____

    _____

15. During the spiral dive recovery, you may find yourself approaching V_{ne} speed.

What must you do? _____

Student Pilot Pre-Solo Written Test

Student Name _____ Checked by _____ Date _____

Make and Model of the glider you will solo _____

Fill in the appropriate performance and limiting airspeeds for this glider:

	Solo	Dua1
Stall Speed (Vs)	_____	_____
Minimum Sink Speed	_____	_____
Thermalling Speed Range	_____	_____
Best Glide (L/D) Speed	_____	_____
Minimum Pattern Speed	_____	_____
Maneuvering Speed (Va)	_____	_____
Max Rough Air Speed (Vb)	_____	_____
Redline Speed (Vne)	_____	_____
Minimum Front Seat Pilot Wt.		
- without ballast	_____	_____
- with ballast	_____	_____

1. A glider sinks at the slowest rate at 'Minimum Sink Speed'. Why do we use 'Best L/D Speed' or 'Speed-to-fly' and not 'Minimum Sink Speed' when we are gliding in search of a thermal?

   _____

2. Describe the proper speed adjustment in sinking air:

   _____

3. Describe the proper speed adjustment for headwinds:

   _____

4. What do you accomplish by making these speed adjustments?

   _____

5. What best glide angle can you get with a 40 mph headwind? _____
6. What best glide angle can you get in airmass sink of 400 fpm? _____

7. What do all stalls have in common? _____
8. What do all spins have in common? _____
9. What is a "spiral dive"? _____

   _____

10. What is the most common type of accident in gliders? _____
11. What great hazard results from flight with less than minimum placarded solo pilot weight?

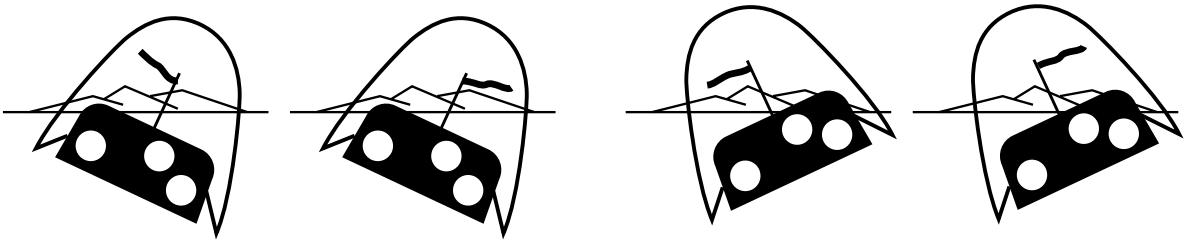
    _____

12. What physical force makes a glider turn? _____

13. Which coordination error should be most carefully avoided? _____

    Why? _____

14. Identify the skids in the following pictures by circling the 'yaw string'.



15. List the important considerations in selecting an off-field landing site:

    1. _____ 2. _____ 3. _____ 4. _____ 5. _____

16. On landing over a 100 foot obstacle, how far past it might a glider stop? _____

17. On a off-field landing, should you make your pattern high, normal, or low? _____

18. In a thermal, who determines which way to circle? _____

19. You are being pulled up into a building cumulus cloud base. How can you make the most effective emergency descent? _____

20. Can a pilot, no matter how skillful, maintain control in cloud without gyros? _____

21. For soaring and for safety, what is indicated by:

    1. Cumulus clouds? _____
    2. Cumulonimbus clouds? _____
    3. Lenticular clouds? _____
    4. Rotor clouds? _____
    5. Stratus clouds? _____

22. Describe which signal is used air-to-air for the following:

    Glider to towplane:

    Turn right _____

    Speed up _____

    Slow down _____

    Box wake (don't turn) _____

    Release me, I can't release! _____

    Towplane to glider:

    Get off now! _____

    Check spoilers, check everything! _____

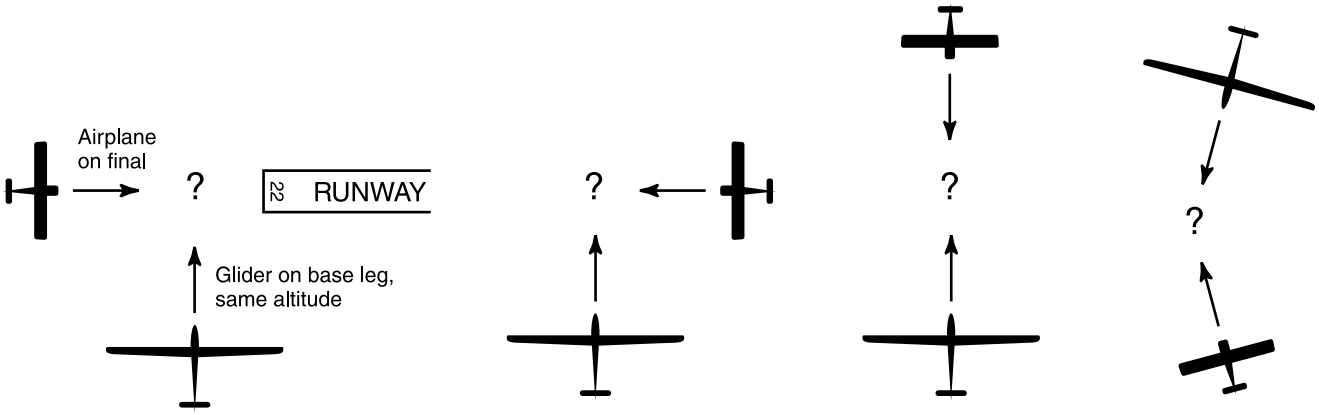
    I can't release! _____

23. What is the minimum and maximum tow rope strength required for a glider flying at 950 lbs. and with a maximum allowable gross weight of 1040 lbs. Min. _____ Max. _____

24. When do the F.A.R.s require parachutes? _____

___ _____

25. Circle the aircraft with the right of way (if any) and indicate with an arrow what each should do:



26. What is the maximum altitude permitted for VFR flight in the U.S.? _____
27. We must go on oxygen after 30 minutes between _____ feet and _____ feet, and at all times above _____ feet.
28. List the emergency frequency _____ and the two glider frequencies _____, _____
29. What must Student Pilots do to maintain their solo privileges as per FAR 61.87?

    _____
30. What else is required by Cypress Soaring? _____
31. Fill in the correct distance figures at each arrow, and the required flight visibilities: (student pilots fill in correct visibility figures per FAR 91.155)