

Utah Soaring Instructor Meeting

Lynn Alley

April 5, 2016

Agenda

- Approved club instruction materials, recordkeeping requirements review
- Twin Astir checkouts
- Spring checkouts
- Becoming an approved instructor
- Winch operations
- Avoiding Grob 103 PIOs
- Thoughts on pattern bank angles
- Fatal Accident Causes – Launch and Pre-Launch
- Slack line recovery standardization

Approved Materials and Recordkeeping

Approved Teaching Materials

For primary students:

- Holtz, Russell: *Flight Training Manual for Gliders*
- Holtz, Russell: *Glider Pilot's Handbook of Aeronautical Knowledge*
- Available at SSA online store or at www.gliderbooks.com

For transition students:

- Knauff: Thomas, *Transition to Gliders*
- Available at SSA online store or at www.eglider.org

Recordkeeping Requirements

- Holtz Training Requirements, as amended by the USA in May, 2011
- Excel spreadsheet and PDF forms available

Twin Astir Checkouts

What is different about the Twin Astir?

- Ground handling
- Tailwheel glider
- Retractable landing gear
- Weight and balance and performance specifics

Suggested Checkout

- ☑ Weight and balance considerations
- ☑ Performance speeds
- ☑ Preflight per POH, including items specific to that aircraft
- ☑ Ground handling
- ☑ Takeoff differences in tailwheel gliders
- ☑ Managing landing gear retraction (don't do it when workload is high)
- ☑ General handling, coordination
- ☑ Stall series
- ☑ Pre-landing checklist
- ☑ Proper touchdown attitude
- ☑ Tailwheel glider rollout and braking
- ☑ Proper tiedown

Spring Checkouts

Motivation for Spring Checkouts

- Pilots seem to be prone to errors – especially errors of omission – after a prolonged period of inactivity. Springtime is what Tom Knauff refers to as “the Silly Season”, because so many “silly mistakes” are made.
- A spring checkout gives a pilot the opportunity to “knock off the rust” under an instructor’s supervision.

Club Policy

9. Check Out Policy

- A. All Members (other than USA designated instructors with passenger carrying currency) are required to accomplish a Check Out each season prior to flying solo or carrying passengers in a USA glider.
- B. Any Member that has not flown a glider for six consecutive months will be required to regain glider passenger carrying currency with a USA designated Instructor.
- C. During the Check Out, the instructor will determine that the Member is proficient to exercise the privileges of his or her pilot certificate in gliders.
- D. Members must notify the Board of Directors upon completion of a Check Out by completing the online checkout form or other means approved by the Board of Directors.
- E. Notwithstanding paragraph A above, a designated USA instructor may fly solo in order to establish currency.

(<http://www.utahsoaring.org/Content/FlightOperatingRules.pdf>)

Spring Checkout Suggestions

- Focus on things that mitigate against errors, such as pre-takeoff and landing checklists
- Make sure basic skills are intact (launch, towing, coordination, airspeed control, landing)

Approved Instructor Status

Club Policy

10. Instructor Approval

- A. The Chief Instructor is appointed or reappointed by the Board on an annual basis.
- B. In order to obtain instructor privileges in club equipment, an applicant must first make application to the Board. Once approved by the board, the candidate must pass a proficiency check administered by the club Chief Instructor.
- C. The Chief instructor will maintain a list of currently approved instructors. The Chief Instructor and/or Board will periodically review the list, and may revoke the approval status of any Instructor for any reason at any time.

My Proficiency Check Goals

1. To verify (by a flight examination) flight proficiency at the Commercial Pilot and Flight Instructor levels;
2. To verify (by oral examination) knowledge and ground instructional proficiency; and
3. To verify (by flight examination, oral examination, and/or review of the applicant's experience) competency to instruct in club equipment at a specific site, including knowledge of local operating procedures, potential hazards, and demonstrated soaring ability at that site. At sites other than Morgan, this portion of the proficiency check will be administered by my designee.

Grob 103 PIOs

Some statistics

- 51 Grob 103 Twin II and Twin II Acros registered in the US
- More than 20 of these have been involved in accidents that resulted in a broken tail boom
- The primary cause of more than half of these accidents has been loss of control during landing in a PIO-type event
- PIO accidents in 103s are rare in Europe

What is different about the Twin II?

What it is:

- Aft position of main wheel – makes the glider a joy for ground handling
- Pneumatic (bouncy) nose wheel contacts the ground at a shallow angle with a long moment arm

What it isn't:

- The glider is not particularly pitch sensitive
- It doesn't react unusually to speed brake changes

Sequence of a 103 “PIO”

- Initial contact occurs in a level or nose-low attitude substantially above stall speed, with less than perfect control of vertical speed
- Aft position of main wheel (behind CG) causes A/C to rotate forward; nose wheel strikes and bounces
- With rapidly increasing angle of attack, A/C flies again; tailwheel strikes and bounces
- With sudden pitch down, the second contact is often directly on the nose wheel, resulting in another, more energetic pitch up
- Pilot often exacerbates the situation with out-of-phase control inputs

The Solution

Proper touchdown attitude

- Initial contact should be made with the nose *above the horizon*
- Ideally, both main and wheel should contact together, or even slightly tail-first

Why this works:

- If the glider does not have enough energy to fly in a nose-high attitude *before* the initial contact, it can't fly in response to a nose wheel bounce *after* the initial contact
- If touchdown attitude is nose-high, no other mistake will result in a divergent pitch oscillation

What does Holtz Say?

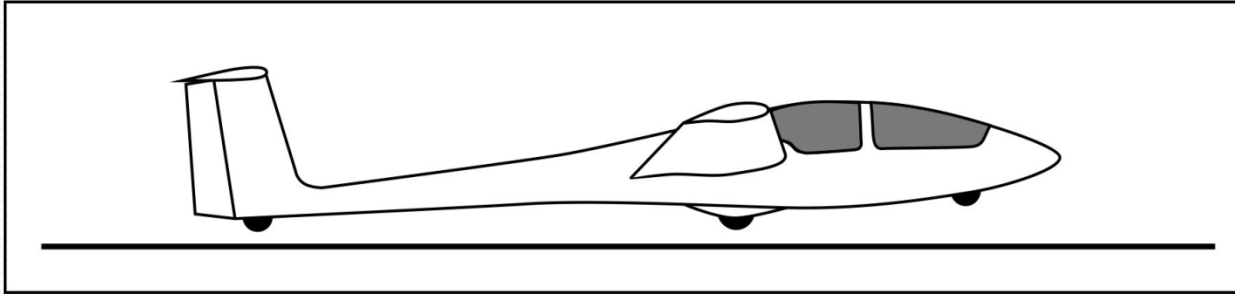


Figure 6.2 – Landing attitude, with the tail wheel level with the main wheel. The tail wheel should touch down at the same time, or slightly before the main wheel.

“Ideally, you will perform a “two-point” landing, with the main wheel and the tail wheel touching down simultaneously, or a tail wheel-first landing, with the tail wheel touching down slightly before the main wheel.”

Note: Students in Europe and the UK are required to demonstrate this landing technique as part of basic competency.

Instructing Ramifications

- Don't allow students to routinely land in a level attitude on the main wheel – the way many of our students do
- Dealing with overshoots:
 - Mostly not necessary – just roll out long with a red face
 - Don't force the nose down in an attempt to make the glider land
 - May be necessary to *gently and smoothly* increase airbrakes in ground effect; this should not be routine, but students should know how
- “Fixing” a PIO may not be possible., especially with student skill level. Try to hold still with the stick slightly aft

Pattern Bank Angles

Pattern Bank Angles – The issue

- In the power airplane world, it is not uncommon to hear instructors say “never more than 30° in the pattern”
- Many glider instructors (particularly those influenced by Tom Knauff) say “never less than 30° in the pattern”

Why the difference?

- Both viewpoints are motivated from a concern about inadvertent stall/spin during either of the last two pattern turns
- It is interesting to note that, starting from the same concern, the two groups come to the exactly opposite conclusion
- What is going on?

The Power Instructor's View

- Some power instructors teach avoidance of large bank angles in the pattern because, as everyone knows, stall speed increases with load factor, which in turn increases with bank angle
- Note, however, that the stall comes from a commanded increase in angle of attack in a misguided attempt by the pilot to maintain a slow airspeed or hold a nose-high attitude
- Left on its own, a well-behaved airplane will drop its nose and speed up in response to increasing load factor
- The temptation to pull back might be significant, and (with strong elevator authority) an inadvertent stall can happen fairly easily

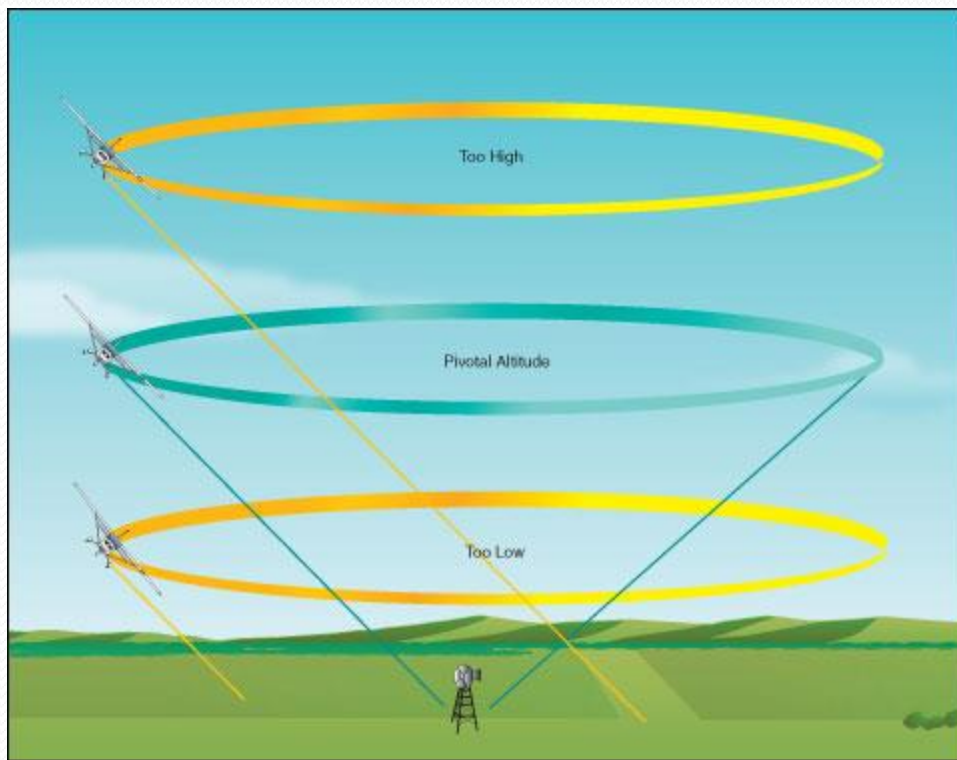
Why this isn't as much of a problem in gliders

- Modern type-certificated gliders are intentionally designed with weak elevator authority – most cannot be commanded to stall when normally loaded at bank angles much in excess of 45° (try this at altitude)
- Getting near a stall at bank angles near 45° requires substantial back pressure, giving the pilot more warning
- The EASA CS-22 (Formerly JAR-22) standard requires significant and increasing elevator control forces as bank angle is increased at constant airspeed
- Still possible to die this way – it just takes a bigger error

The Glider Instructor's View

- Shallow banked turns are inefficient – they consume lots of time and real estate
- If the pilot commits an error or experiences an emergency resulting in an approach below normal glideslope, efficient turns are a must
- In such situations stress can become even worse because of the unfamiliar sight picture when turning below pivotal altitude (see next page)
- The temptation to attempt to conserve altitude by raising the nose and accelerate the turn by adding inside rudder becomes *extreme*

Pivotal Altitude



- Below pivotal altitude, the projected line from the banked wings moves inside the turn center, resulting in an unfamiliar picture that makes normal banks appear very steep
- Pivotal altitude is about 300 feet at 58 kts TAS
- Rope break practice is normally below pivotal altitude.

Why aren't efficient turns as much of a concern in airplanes?

- Big approaches don't require efficient turns
- Power pilots can (and routinely do) recover from below-glide slope conditions by simply adding power
- This works perfectly without any pilot stress, as long as power is available

Instruction implications: the case for efficient turns

- In gliders, glideslope errors and/or emergencies (such as PTT) are inevitable; every pilot will encounter them at some point in a normal flying career
- In order to successfully cope, a pilot *must* have the skill to execute efficient, coordinated turns with proper airspeed control, even under stress and below pivotal altitude
- Transition students, in particular, must often be taught not to fear efficient bank angles when airspeed and coordination are maintained
- The laws of primacy, repetition, and recency all suggest that *every* approach be executed with efficient turns

Fatal Accident Causes Launch and Pre-Launch

10-Year Fatality Statistics

Phase	Number	Percent
Landing	15	30%
Hit Mountain	13	27%
Launch	11	20%
Medical	6	12%
Pre-Launch	4	8%
Mid-Air	2	4%

Source: Tom Knauff Safety Newsletter

Launch and Pre-Launch

Phase	Number	Percent
Launch	11	20%
Medical	6	12%
Pre-Launch	4	8%
Total	21	40%

Source: Tom Knauff Safety Newsletter

Instruction implications

- Teach medical factors
- Teach assembly and pre-takeoff checklists
- Teach weight and balance
- Teach pilot judgement
- Teach Premature Termination of Tow
- Teach CRM
- Train wingrunners and other crew

Checklists

Memorized:

- Variations on ABCCCD
- Variations on CB-SIT-CB
- May not be practical to standardize
- Should not supplant written checklist

Written:

- Should always be used
- Placarded in (type certificated) gliders

Tom's Pre-Boarding Checklist

- Ballast weights
- Batteries
- Camera
- Cell Phone
- Declaration
- Flight Recorder (memory erased?)
- Food
- GPS
- Hat
- Maps
- Microphone
- Oxygen bottle on?
- Parachute
- Pee system
- Sunglasses
- Sun block lotion
- Survival kit
- Tail dolly off
- Tape wings, ballast filled?
- Total energy probe
- Unzip Fly
- Wallet stowed
- Watch
- Water bottle
- Wing pin safetied?

Training Launch Crew

The Area

- Hazards (observers, cars, other aircraft)
- Pattern and runway clear

The Glider

- Condition, tires
- Assembly, positive control checks done
- Tail dolly
- Crew seat belts, canopies locked

The Tow Plane

- Rope checked and attached
- Condition, tires

The launch (walk to wingtip, but keep wing down until pilot signal)

- Airbrakes locked (except when pilot intentionally controlling)
- Flaps in logical position
- How to physically perform the run

Slack Rope Recovery Training Standardization

Slack rope recovery – several techniques in common use

- Yaw/Slip
- Pitch up/pitch down
- Use of high drag devices

Three phases of slack line recovery

1. Arrest increase in slack (slow the glider)
2. Remove slack (slow a little bit more)
3. Absorb the retensioning shock

Technique comparison

Technique	Advantages	Disadvantages
Yaw/slip	<ul style="list-style-type: none">• Relatively easy to teach• Generally effective• Works in turns	<ul style="list-style-type: none">• Less effective at absorbing shock in C/G hook gliders
Pitch up/down	<ul style="list-style-type: none">• Works in all A/C	<ul style="list-style-type: none">• More difficult to time/teach
High drag devices	<ul style="list-style-type: none">• Useful for large loops	<ul style="list-style-type: none">• Must be augmented with some way of absorbing shock

Q & A