

## Minutes of the Minnesota Soaring Club Tow pilot Safety Meeting, March 17, 2001

Red Haines conducted a tow pilot safety meeting with excellent attendance by tow pilots and prospective tow pilots.

Attending were:

Steve Adkins\*, Mark Cleare, Chris Cooper, Ron Donner, Steve Fischer\*, Hank Geissler\*, Red Haines, Jim Hard\*, Clarence Hines, Dave Klatt\*, Tom Kuhfeld\*, Vince Lange, Roger Payne\*, Marty Pegelow\*, Si Peterson\*, Loren Swanson\*, Mike Willey, Marty Wirth\*, and Andrew Wood\*.

\* These pilots submitted pilot information records, which will be used to insure pilots who do not meet all the standard requirements of MSC's policy and to remind pilots when they need a flight review, new medical certificate, or currency flight.

### QUESTIONS AND ACTION ITEMS FROM THE MEETING:

Adkins – Help Dale Johnson test our club rope for breaking strength

Can we get our own frequency? Or use one of the “glider” frequencies (towplane need a duplex radio?) - ANSWER All aircraft operating in the pattern shall communicate on the Common Traffic Advisory Frequency, in accordance with AIM 4-1-9.

Oil usage - ANSWER Although Lycoming states that the engine may be operated with 2-6 quarts of oil, MSC practice shall be to operate with 4-5 quarts, to avoid operating with too little or too much. Add a quart when the oil level is at 4 to 4 1/2 quarts. Record addition of oil in the daily log (the yellow book in the airplane) on a page dedicated to that purpose and wherever Stanton Sport Aviation requires recording purchasing oil. Recording in the daily log, on a dedicated page, will permit each pilot to observe trends in oil consumption, if we are faithful in recording.

Minimum oil temperature at takeoff - ANSWER We will placard this value near the oil temperature instrument after accumulating some data. It is not expected to be a problem unless we operate on an unusually cold day.

Minimum cylinder head temperature at takeoff - ANSWER We will placard this value near the CHT instrument after accumulating some data.

Chris Cooper – Get Lycoming's recommended rate of cooling \_\_\_\_ degrees per \_\_\_\_ unit of time.

Online SSF-CAP certificate for all tow pilots - ANSWER New tow pilots will be required to complete the SSF-CAP tow pilot test and provide a copy of the certificate for MSC files. Current MSC tow pilots are encouraged to do the same.

Comment: On a hot day, leaning can provide 50 to 100 more rpm. RESPONSE. While this is correct information, it is **incorrect procedure**. Reference Lycoming. **Adequate cooling** is more important than maximum power. If the engine is delivering more than 75% of rated power, the only way to adequately cool it is with a rich mixture. If the density altitude is high enough to limit maximum power to less than 75%, it is permissible to lean to maximum power, indicated by maximum RPM.

**Do not** attempt to save a few gallons of fuel or gain an extra 50-100 RPM at the expense of damaging the engine.

How about clearing the plugs following a bad magneto check? - ANSWER Given a bad mag check (rough running, excessive mag drop, or excessive difference between mags), it is permissible to operate at 2000 RPM, on both mags, with the mixture leaned to slightly less than maximum power (on the lean side, slightly, no serious misfiring), for one minute, to attempt to clear fouled spark plugs, as indicated by a passing mag check. **Do not launch** unless the mag check is OK!

## MEETING MINUTES

During the discussion of operating the new engine, particular emphasis was placed on:

**Operate in a standard way!** If we experience an engine problem, we need to know how it was operated so we can change something to try to prevent that problem from happening again. It may be very difficult to find the problem if different pilots operate the engine differently. Please abide by the standard. It's OK to discuss changing, but **don't change until its agreed** that we should all change.

Maintenance costs have been excessive for several years, mainly due to cracked cylinders. The cylinders were replaced with used cylinders, whose service history was unknown. Old cylinders may have been part of the problem.

In addition, the cooling seals were deteriorated. When we added a CHT instrument, we found the cylinder head temperature was within Lycoming's max limit but above the recommended limit. Repairing the seals, part way through the 2000 season, reduced the maximum temperature but did not get it down to the recommended limit.

Although a standard procedure for operation following glider release was recommended, it may not have been emphasized to every tow pilot and there is evidence that not all followed the same procedure. At the end of the season, two cylinders were cracked.

New cooling baffles and seals were installed with the new engine.

## Factory New, 160 hp Lycoming Engine

We installed a factory new, 160 hp engine with a Supplemental Type Certificate to minimize maintenance, improve performance, and make the airplane compatible with the more commonly available 100 octane fuel. Please observe required differences in

operating procedures, the new engine's fuel requirements, and increased fuel consumption (we will obtain figures and make them available, meantime, be aware that it will burn a bit more.

Call attention to any unusual operation you may notice, so we can recognize any problems and establish what is normal operation of this new engine.

We hope to change to a longer propeller for better towing with this engine when the money becomes available. That will require changing to larger tires for ground clearance.

### **The 160 hp engine REQUIRES the following:**

Use **100 octane** fuel. 80 Octane fuel will seriously damage the engine if used even briefly. The fuel must be **blue** or **green**; blue is preferred, to minimize plug fouling.

If 80 octane fuel is mixed with 100 octane fuel, the color will be clear. Colorless fuel must be drained and replaced before operating the engine. Don't take a chance on damaging the engine, and possibly the airplane, to save the expense, time, or nuisance of draining suspect fuel from the airplane.

Use oil provided by Stanton Sport Aviation. Initially, it will be non-additive, mineral oil. More information to come.

Start on the **left magneto only**. Lycoming confirmed this in a phone call from Bill Goetchel. The left mag has an impulse coupling, which provides retarded spark timing for starting to avoid damaging the starter or engine. The right magneto does not have an impulse coupling. The new starter cranks the engine very fast and the right mag, if turned on during starting, is likely to fire and may damage the engine or starter.

Climb at full throttle and full rich mixture. The extra fuel at full rich mixture cools the engine and is **essential** at power above 75% of rated maximum.

### **Starting the Lycoming Engine**

This procedure is not mandatory, but generally works well, especially for starting a warm engine.

Assure that radios are off, so that starter voltage transients don't damage them.

Clear the area, for persons, animals, and anything that your prop blast might damage or blow dirt into.

Start on **Left Mag only**, as discussed above.

Stroke throttle from idle to full throttle twice

Close throttle completely

### Engage starter

Open throttle moderately aggressively after 2 blades pass (one revolution) and regulate RPM as the engine starts. If fails to start immediately after opening the throttle, start over.

After the engine starts, switch on the right mag, confirm that oil pressure is increasing, and confirm that alternator is functioning. Shut down immediately if the oil pressure is not normal within 30 seconds. Do not fly if the alternator is not functioning.

Operate the engine at 1,000-1,200 RPM while stationary to minimize fouling the spark plugs. Idle the engine while taxiing to limit speed; do not ride the brakes while taxiing with the engine operating above idle speed. If it won't idle, don't fly it!

It is not necessary to turn the prop by hand to loosen the engine before starting. If you need to turn it to reposition the prop, turn it backwards. There is no vacuum pump or any other accessory on this airplane that will be damaged, and turning the engine backward greatly reduces the possibility that the engine will fire or start.

## **Hand Propping to Start the Engine**

It is an absolute rule that no one shall turn the prop forward for any reason unless a certificated pilot or maintenance person is at the controls **or** the airplane is securely tied so that it cannot move even if the throttle linkage is defective and the engine starts at full throttle.

No one shall attempt to prop the engine unless that person has been taught proper procedure for hand-propping.

## **Move the Throttle Gently**

Always move throttle slowly, in accordance with Lycoming recommendations, to prevent damaging the crankshaft counterweight bushings (called 'detuning the crankshaft'). This applies to both advancing the throttle and retarding the throttle.

## **Maximum Cylinder Head Temperature (CHT)**

Lycoming specifies a limit of 500° F; they recommend not over 435° F for maximum service. Last year, it went to 470° initially. Repairing the cooling seals dropped it to about 460°.

Note its typical value and stop flying if it changes. Never operate with a lean mixture unless the power is reduced to 75% or less and the temperature is below 435°. Any time the temperature goes up, use a full rich mixture. We will try to get more data on power and RPM with this engine and propeller combination and ask all pilots to share their observations while we learn more about our new engine.

## **Upon Glider Release and During Towplane Descent**

Confirm that the glider released, by seeing it turn away. If you aren't sure and can't see the glider, try to retrieve the rope with the winch. If the winch runs and brings in the rope, the glider has released. Make sure the glider is released before reducing power, turning, or anything else if the glider is not in sight.

Reduce throttle to 2200 rpm while turning left, away from the glider.

Maintain speed below 80 mph (Vfe).

Extend flaps to increase drag and descent rate.

Start the rope rewind winch.

Use moderate turns during descent for better visibility and collision avoidance.

Do NOT slip during the descent from glider release. This was debated. It used to be practiced. It is no longer recommended. Slips at higher speeds, like cruise speed,

stress the windows, fuselage, and empennage braces. Worst of all, slipping reduces visibility and increases the chance of a mid-air collision. Slipping on final approach is OK.

Use the towrope rewind winch as a timer for further power reduction. Don't reduce power below 2,200 RPM until the rope is in **and** the cylinder head temperature (CHT) is under 400 degrees. Then, reduce power in small steps, like 100 RPM per minute, to more gently cool the engine. We intend to take data on the rate of cooling the CHT and may alter this part of the procedure after we analyze the data.

Starting to descend while a glider is on tow may become hazardous. A descending tow plane may initially appear to a less experienced glider pilot as merely his or her failure to maintain position and the glider pilot may delay releasing until rope slack is growing fast, with the possibility of fouling glider controls or otherwise damaging the glider.

It is better to climb without a glider in tow than to descend with one in tow! If in doubt, keep towing. Safety first!

If you are not sure whether the glider is still on the rope, maintain stable flight while looking for the glider. Then try to start the rope retrieve winch. The tension of a glider on tow will immediately turn-off the winch.

The highest priority task is **collision avoidance!** Look before turning and scan the airspace with your eyes focused to discern distant details. Don't let your eyes relax to an empty-field, near distance focus condition.

Si Peterson, Tom Kuhfeld, or Chris Cooper may get further recommendations from Lycoming regarding the recommended rate of reducing CHT.

### **Minimum Power During Descent**

Reducing power so that the air is powering the prop causes ring flutter which damages the ring lands of the pistons and breaks piston rings. This practice is emphasized as a No-No by Lycoming.

At indicated air speed (IAS) greater than 90 mph, maintain at least 1,800 RPM.

At IAS 70-90 mph, maintain at least 1,600 RPM

In the traffic pattern, at IAS less than 70 mph, use throttle as necessary for the desired descent.

### **Temperatures at Takeoff**

Do not take off until the oil temperature instrument shows increasing temperature.

We may recommend a minimum CHT later.

## GOOD PRACTICES – PILOT's RECOMMENDATIONS:

Clarence Hines: Don't listen to a glider pilot ... act like the PIC, pilot in command

Mark Cleare: Questioned use of flaps for take-off and flap retraction after take-off, to avoid losing altitude during or after retraction.

RESPONSE - One notch of flap will get the towplane off the ground before reaching the hump at the center of the airport and, when retracted optimally, will get the towplane and glider higher at the end of the runway or over the highway. HOWEVER, it takes practice to develop and maintain the skill to remain close to the ground while accelerating to 50-55 mph, then pitching up while retracting the flaps to avoid losing altitude. It is recommended that pilots who are not familiar with and proficient at this maneuver seek instruction from one who is, and then use the flaps, especially when density altitude and low headwind make the runway lengths marginal.

Hank Geissler: His RV has an EGT that flashes if you exceed a rate of cooling greater than 50 degrees per \_\_\_\_? Sounds like a good idea. We should get more info from Hank.

Mike Willey: Make certain you can communicate. Know the signals, confirm that flight line personnel and the glider pilot know the signals, use radio to supplement visual signals, and confirm that radios are working and on the correct frequency.

Andrew Wood: Keep your hand on the release handle to 500 feet. Andrew knew 2 pilots involved with kiting gliders; one hit the ground in time to survive; the other didn't. There is almost no time to respond if a glider kites and pulls the towplane tail up.

Discussion:

A bump, with a hand on the release, may cause a premature release

Some pilots report trouble reaching the release handle, especially if the shoulder harness is too tight.

Negative G's, if the glider kites, will make it hard to find and reach the release.

There was discussion at the conference in Indianapolis of placing the release handle in a better location. Perhaps we can extend the release handle, for starters.

If you lose power, **release** immediately!

HUMAN NATURE: We try to minimize the inconvenience (replacing a rope) even when it risks a life. If in doubt, **release**!

Andrew Wood: If you have full up elevator and the nose of the towplane is pitching down, **release!**

Dave Klatt: See who is in the glider ... know the glider pilots, be more alert when a less skillful pilot is controlling the glider. Know the glider and the pilot. Be kind to less experienced and less skilled glider pilots. Be especially alert regarding glider pilots known to sometimes fly less skillfully or to do unexpected things. If unfamiliar with either the glider or the pilot, brief before launching (FAR 91.309 (a)(5)).

Jim Hard: MSC uses a non-standard procedure in taking-up slack before launch (take-up slack with glider wing up). But don't change now!

#### DISCUSSION:

Standard, as we saw on the tape, is take up slack with the wing down.

NOTE (following the meeting): The current SSA Soaring Flight Manual states that, upon the glider pilot signaling with a thumbs-up to take up slack, the "Wingrunner signals the tow pilot by leveling the sailplane's wings."



Tow pilot: Use both mirrors to assure that the rope is all out and is taut before commencing tow.

Advance the throttle slowly to accelerate a Schweizer (or any glider for that matter) without smacking the tail into the ground.

Glider pilot's duty to pull the release if any slack or any other problem develops.

Don't assume even a certificated glider pilot new to this club knows our procedures and signals.

We can climb with the dive brakes ON, so don't do the rudder waggle until at a safe altitude! It has been demonstrated that some pilots will release on the rudder waggle!! (stated by persons present and was emphasized the SSA convention this year.) A low altitude release with dive brakes extended and the pilot unaware may cause a serious accident.

Haines and Mattsson tested and demonstrated that out towplane, with 150 hp, did climb with two persons in either the ASK-21 or the Ka-7 with dive brakes extended. Kieffaber demonstrated that it will climb with two persons in the Owl with dive brakes extended. Slowing to 55 mph and, if necessary, extending one notch of flap assures the climb.

Loren Swanson: While waiting to launch, practice reaching the release several times. Repeat that just before advancing the throttle.

Marty Pegelow: If the glider is empty, release the rope (true for golf cart too). Correct procedure anytime launch preparations must be interrupted.

Kent: Move the release handle to a position ahead of the throttle. Do your own preflight if you relieve another tow pilot; he has found the oil low.

If in doubt, change the rope.

If in doubt, don't fly.

Chris Cooper: When things go wrong, exercise good judgment; get to safe altitude; and, keep towing.

But, if in doubt, release!

Saw a case where releasing the glider may have placed the glider in the roadside ditch, potentially injuring or killing the glider occupants.

Si Peterson: How do we know we are compliant with Part 91.309 regarding rope strength?

Discussion:

According to the SSA Soaring Flight Manual, the average tensile strength of 1/4" polyethylene rope, which MSC uses, is 1200 pounds.

The PA-18 is STC'd to 1200 pounds maximum rope strength.

Thus, the largest glider the PA-18 can tow is 1500 pounds max CERTIFIED weight (not actual weight).

And the smallest glider must exceed 600 pound max CERTIFIED weight

(Or the glider pilot must provide two weak links and we use a rope on the Schweizer hook instead of the rope on the winch)

(The 1-26 is certificated for 600 pounds.)

If the tow pilot sees a strange glider, ask about max certificated weight, tow speed, etc.

Radio congestion:

Get our own frequency (for CTAF at SYN)

If you have a manual squelch, as in the ASK-21, adjust it to hear only local traffic.

Marty Wirth: Signal to stop taking up slack ... so that the glider isn't dragged and skewed.

Tom: Wish-washy hand signals and attitude by starter and wing runner.

Procedure for no wing runner

Close canopy to take up slack (per SSA Soaring Flight Manual)

When slack is out, rudder signal for launch

If airbrakes are open, tow pilot queries on radio.

If the glider wants to confirm ... close, then open the airbrakes

Roger: Don't assume a qualified pilot in contests.

Adkins: Remember the Greenville when pressured to rush.

Fischer: Coach wing runners on best rope position relative to sun light so that tow pilot can see the rope and know when slack is gone.

Do during FOO/Tow pilot pre-briefing.

Red: Don't hand prop without a qualified pilot or mechanic at the controls.

Fuel reserve: 1 tow + 30 minutes and time for diversion to Faribault (enough to work through a problem).

Discussed "can't release" signals and procedures.

Land in formation (is Faribault better than Stanton? Is a long open field best?)

Need 20 inches of overlap for an "eye" splice and 40 inches total for a rope repair.

No cross-weave required.

Don't splice the tow rope unless you are checked-out.

Inspect rope upon: first use, landing with rope out, and notice of knotting

New ropes can be frayed or have a void ... repair or don't use.

Watch for the new latch on the upper door section ... very nice job by Stanton.

The towplane will be within the CG limits if the weight is at or under the maximum gross for either normal or utility category. Baggage cannot be carried during towing operations.

We will enforce the rudder signal before launch this year ... last year we started regular use.

More people on the field should be looking for traffic instead of (or while) BSing.

Discussed signals.

Discussed the new CAP online certificate ... four members have passed.

If the glider is out of site, take your feet off the pedals, let him steer.

Fire ... get down fast, cut mags, electrical and fuel. Use full flaps. Make certain it's really a fire and not just oil in the heater.

If the engine sounds rough, don't assume its OK. Proceed to a suitable landing site while diagnosing. If in doubt, release and land.

**Insurance requirements** relating to tow pilots, AV347 are (I hope you will read it; it's on the web page):

Must be member of MSC

For use other than towing sailplanes:

- Private or higher level certificate
- 250 hr PIC
- 50 hr PIC in single engine land, fixed gear, tail wheel, airplane
- 10 take-offs and landings in make and model

For use for sailplane towing not for hire:

- Private or higher level certificate
- 500 hr PIC
- 100 hr PIC in SEL, fixed gear, tail wheel, airplane
- 10 take-offs and landings in make and model
- At least 10 flights towing sailplanes

For use for sailplane towing for hire:

- Commercial or higher level certificate
- 500 hr PIC in powered aircraft (that can be airplane, helicopter, powered gyroplane, airship, powered lift aircraft, or motor glider, by FAA definition)
- 150 hr PIC in SEL, fixed gear, tail wheel, airplane
- 10 take-offs and landings in make and model
- At least 10 flights towing sailplanes

(I use the word 'sailplane' as it appears in the policy. The policy does not define 'sailplane', nor does the FAA. I assume it means glider, as defined by FAA, and I don't believe it makes any difference.)

It appears we cannot permit anyone who hasn't logged 10 take-offs and landings in a Piper PA-18 to fly the MSC towplane, except as a named insured.

Furthermore, it appears we cannot permit anyone who hasn't logged 10 tows to fly the MSC towplane, except as a named insured.

**FAR 61.69 requirements** are:

- Private or higher level certificate with 'powered aircraft' category rating (other parts require 'airplane' category rating to act as PIC of an 'airplane'.)
- 100 hr PIC in airplane, SEL
- Has logged instruction in ground and flight in gliders and is proficient in:
  - The techniques and procedures essential to the safe towing of gliders, including
    - airspeed limitations
    - Emergency procedures;
    - Signals used; and
    - Maximum angles of bank
- Has logged 3 flights towing a glider, accompanied by a PIC who met all

requirements, and have logbook endorsement of that experience

Has logged 3 flights towing, (if not as PIC, while accompanied by a PIC who meets all requirements), or logged 3 flights in a glider, within the preceding 12 months (doesn't say 'calendar months').

On the basis of this information, and in view of our need for more tow pilots, Red proposes the following qualification standard for new tow pilots:

### **MSC Tow Pilot Qualification.**

1. Meet all FAA requirements to act as PIC in tailwheel airplanes (FAR 61.31(i)). The FAR specifies operations for which the pilot has received training and has demonstrated proficiency and requires an instructor's endorsement in the pilot's logbook to that effect.
2. Demonstrate, to an MSC tow plane instructor, proficiency in all the operations and maneuvers specified in the Stanton Sport Aviation Tail-wheel Transition Syllabus (this exceeds the requirements of FAR 61.31(i)), and have a logbook endorsement to that effect.
3. Meet all FAA requirements of FAR 61.69, Glider Towing, including:
  - A. At least 100 hours PIC in single-engine land airplanes
  - B. Received ground and flight training in gliders from a glider flight instructor and have a logbook endorsement to that effect (61.31(a)(3)).
4. Complete 3 or more flights as the sole manipulator of the controls of the Super Cub while towing a glider or simulating towing a glider while accompanied by an MSC tow plane instructor and have a logbook endorsement to that effect.
5. Be endorsed by an MSC tow plane instructor to tow gliders in the MSC tow plane.
6. Passed the test in the CAP-SSF tow pilot course.
7. Demonstrate, to the MSC tow plane instructor, mastery of the material in the Burt Compton and Bob Wander handbook on towing.

If we do all this, I'm confident we have taken reasonable steps to assure our tow pilots are qualified to do the job, and hopefully, to convince Costello that they should be added to the policy as named insured even if they do not meet all the requirements of AV347.

I anticipate that item 1 will have to be accomplished in an airplane other than MSC's tow plane. I hope the insurer will permit completion of items 2 and 4 in the MSC tow plane, after otherwise qualifying to be insured while operating the tow plane.

Recorded and edited by Steve Adkins and Red Haines  
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