

# **Glider Towing Procedures Guide**



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## Section 1 Towplane checklists

### 1. Before Start Checklist:

<b>Radio / electricals :</b>	off
<b>Master Sw:</b>	on
<b>Fuel selector:</b>	on
<b>Boost pump:</b>	on
<b>Mixture:</b>	rich
-Confirm All Clear-	
<b>Magnetos:</b>	left magneto only
<b>Throttle</b>	open ½ inch

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<b>Start</b>	both magnetos ON after start
<b>Check</b>	oil pressure within 30 seconds
<b>Other Electricals:</b>	as required
<b>Oil Pressure:</b>	in the green arc*

### 2. Run-up:

<b>1800 rpm</b>	
<b>Check Mags:</b>	max drop 125 rpm with a max. difference of 50 rpm
<b>Check Carb Heat:</b>	noticeable drop in rpm
Throttle back slowly to 800 rpm.	Leave Mags on BOTH, Carb Heat COLD

### 3. Pre-Takeoff Checklist:

<b>Fuel:</b>	on, at least ¼ full*
<b>Fuel Pump:</b>	on
<b>Flaps:</b>	no flaps
<b>Magnetos:</b>	both
<b>Other Electricals:</b>	as required
<b>Oil Pressure:</b>	in the green arc*
<b>Temperatures:</b>	in the green arcs
<b>Carb Heat:</b>	cold
<b>Doors</b>	locked
<b>Straps:</b>	tight and secure *
<b>Controls:</b>	free
<b>Traffic:</b>	clear
<b>Emerg Rope Release</b>	locked*

Notes:

*\*min 25 psi for idle*

*\*never trust the gauges... always dip the tanks prior to first flight*

*\*if you prefer straps locked, ensure you can reach emergency release lever*

*\*there is never a valid reason to leave this lever out of the locked position.*

## Section 2 Towing Procedures

- At: TAKE-UP-SLACK
  - Check: **Mirrors, Mags, Mixture**
  - Make sure tow-rope is taut **before** applying full power.
  - Check tachometer & airspeed alive within 5 seconds of applying full power: minimum RPM should be 2300 (*under load*) Max RPM with Hoffmann 115 pitch Prop is: **2575 rpm**.
  - After lift-off, remain in ground effect to establish the required towing speed. Ground effect will help establish this speed sooner. Towing speed: 80 mph in first few seconds to ensure glider has safe speed, then 75 or 70 mph as desired. (*Cowling should be parallel with earth. If not, make very smooth adjustments*).
  - Allow the tow-plane to drift slightly downwind after lift-off to facilitate an into-wind teardrop turn by the glider in the event of a rope-break. Note that noise-sensitive areas should be avoided wherever possible
  - When clear of the airfield, and noise sensitive areas, tow the glider to a direction that is upwind of the field (unless instructed otherwise) to the requested tow height. *Always try to ensure that your climb profile is such that the glider has sufficient altitude to return to the field in the event of premature release.*
  - Take every advantage of any lift encountered during the climb! If possible when encountering lift, try to circle to the left. Should the glider pilot elect to get off, there would be less chance of conflict.
  - At about 100' below the requested release altitude, climb straight until the glider releases. Ascertain release with a visual check to ensure positive separation. Turn left and slowly apply the letdown procedures.
  - After a normal release, glider will turn away from the tow-plane to the right.
  - During descent maintain a careful lookout for other aircraft, especially the released glider.

## Section 3 Letdown Procedures

### ▪ When glider releases:

- Reduce to 2000 rpm over 4 – 5 seconds
- Select full flap
- Do not exceed 80 mph (90 mph on warmer days).
- At 2000 rpm the Cyl temp starts to decrease.
- Begin a slow and careful reduction in power to approximately 1500 rpm.  
*(Lycoming identifies shock-cooling as more than 50 degrees F / (28 C) per minute.)*
  
- During this phase the aircraft may climb as much as 250 feet.

### ▪ When Cyl Head temp is reduced to 300 F:

- Power can be removed
- Flaps can be selected up
- Mixture lean. *(as a guide, monitor the analyzer and notice the cylinder head temp dropping at slightly less than 1 degree per second).*
- Avoid tight turns to lose height. *(This always attracts unwanted attention and appears as a form of aerobatics to non-aviators).*

### Joining the circuit:

#### **CARs 602.19 (1) - right of way:**

- a power-driven, heavier-than-air aircraft shall give way to airships, gliders and balloons.
- a power-driven aircraft shall give way to aircraft that are seen to be towing gliders or other objects or carrying a slung load

Join the downwind leg between 1200' and 1400' AGL *(Note: circuit is set at the beginning of the day. The powered aircraft circuit will be opposite to the glider circuit : i.e. if the glider circuit of the day is south side, then the power circuit will be north side).*

**Broadcast intentions:** "Tottenham traffic, towplane Alpha Bravo Charlie joining right downwind for rwy ..." *(or other message as appropriate) on 123.4 MHZ to inform other traffic of your intentions.*

#### **CARs 5.8.2 Ground Stations - General :**

- The aerodrome name as published in the CFS is used to form the call sign to the associated ground stations.
- When the aerodrome name is different from the community (location) name, it will be published following the community (location) name and will be separated by a diagonal (/).

- **Down-wind Check:**
  - **Mags:** Both
  - **Carb Heat:** Hot
  - **Check Wind Speed and Direction**
  - **Flaps Full**
  
- **Short-final Check:** *(200 feet +/-)*
  - **Mixture:** Full Rich
  - **Carb Heat:** Cold
  
- **Landing Rollout Procedure:**
  - **Flaps** Up
  - **Mixture** Lean
  
- **Abbreviated T/O checklist if another tow is imminent:**
  - **Mirrors** check
  - **Mags** both
  - **Mixture** rich

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- **Shut-Down Checklist:**
  - Check for ELT signals on 121.5 MHz; re-set radio to 123.4 MHz
  - Radio, all electrical off
  - Live mag check
  - Power up to 1200 rpm
  - Mixture to idle cut-off and slowly advance the throttle to evacuate all fuel from carb.
  - Throttle is to be left closed
  - Mags and Master off
  - Parking brake set as required
  - Controls locked, secure aircraft, pitot covers, fuel vent covers, engine & canopy covers

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4. In the event of a go-around, there exists the risk of the towrope fouling any object, thus, the towrope must be released as part of the go-around procedure if in close vicinity of the active runway.
5. The pilot performing the first flight of the day must complete a thorough Daily Inspection, Engine Run-up and, (if required) fly one circuit before starting towing operations.
6. Calculate the need to re-fuel prior to taxiing back to the take-off area. (When 25,000 feet of towing has been completed, the aircraft will have consumed about 80 – 90 litres. *Total tank quantity is 136 litres*). **Rule of thumb: The Pawnee will burn 3.78 Litres per 1,000' of towing.... Therefore,... calculate 4 litres per 1,000 and go for fuel using this conservative calculation.** *Again.... Never trust the gauges!*
7. The taxiway to the fuel pumps must be kept clear of parked aircraft.
8. Monitor the rate of fuel usage of each tank. When fuelling, verify that each tank requires similar amounts of fuel. If not, check that fuel vents are clear of obstruction.
9. After refueling, move the fuel hoses and grounding wires behind the pump to prevent them being picked up by a spinning propeller or otherwise interfering with aircraft taxiing in the vicinity of the pump.
10. After one to one-and-a-half hours of uninterrupted towing, the pilot should seek relief for a suitable rest period. Be aware of fatigue, and do not continue towplane operations for extended periods, especially if other tow-pilots are available and willing to tow.
11. The pilot flying the last flight of the day must ensure that the pilots' towcard is completed and placed in the designated box.
12. Note any snags on the snag sheets on the daily towcard.
13. When grounding a tow-plane as unserviceable, place a note in a conspicuous place (control column, panel, etc.) indicating the reason for the grounding, the date and the pilot's name.
14. When taxiing, ensure that the Carb Heat is in the **Cold** position (intake air is unfiltered when Carb Heat is in the Hot position).
15. Noise footprint: We try to avoid repeated flights over the same houses as much as possible. Please be aware of the "no-fly" zones.
16. Under NO circumstances shall the aircraft engine be left running unless the seat is occupied. Therefore, a crew change will be conducted only after the engine has been shut down and mags confirmed OFF.

**602.09**

No person operating an aircraft shall permit the fuelling of the aircraft while an engine used for the propulsion of the aircraft is running.

**602.10 (1)**

No person shall start an engine of an aircraft unless:

(a) a pilot's seat is occupied by a person who is competent to control the aircraft.

(b) precautions have been taken to prevent the aircraft from moving.

## **Section 6**

## **Emergency Procedures**

1. Engine failure or low power :
  - Wave off glider if towing. (rock wings)
  - Full carb heat
  - Throttle closed,
  - Mixture check,
  - Mags check,
  - Boost pump check,
  - Fuel valve check.
  - Set up glide at 83 mph.
  - Select suitable landing area,
  - Attempt re-start if possible.
  - Broadcast intentions (Mayday x 3 / Panpan x 3).
  - Land asap.
  - Activate Emergency Exits if necessary,
  - Take (floor mount) fire extinguisher while exiting aircraft.
  
2. Engine fire:
  - Wave off glider if towing. (rock wings)
  - Throttle closed,
  - Mixture cut-off,
  - Mags off,
  - Boost pump off,
  - Fuel valve closed,
  - Set up glide at 83 mph( if fire out).
  - Select suitable landing area(if possible),
  - Do not Attempt re-start.
  - Broadcast intentions (Mayday x 3 / Panpan x 3).
  - Consider opening cockpit overhead vent for pressurized air source.
  - Land asap (use sideslip if necessary).
  - Activate Emergency Exits if necessary,
  - Take (floor mount) fire extinguisher while exiting aircraft.
  
3. Door opens on tow (or anytime during flight):
  - Fly the airplane! Airspeed indications may be erroneous Fly the attitude:  
(nose cowl parallel to earth)
  - Do not attempt to close the door until glider is released.
  - Sideslip away from open door.
  - At a safe altitude, reduce speed, attempt to close door.
  
4. Low RPM on take-off:
  - If the engine does not develop at least 2300 rpm within a few seconds of applying full power, immediately release the glider (while still on the ground) and slowly close the throttle so that the glider does not catch up with the tow-plane. (Towplane shall move to the north side ... glider shall move to the south side).

5. Glider release:
  - *Should the glider activate his/her release late in the tow, but still on the ground, the towpilot may consider continuing the take-off and conduct a circuit while the glider is brought to a stop on the remaining runway.*
6. Climb performance:
  - *If a normal rate of climb cannot be achieved, check the glider in the mirror(s) to ensure that its spoilers are not open. If so, call "CHECK SPOILERS",.... If unable to use radio: signal this situation to the glider pilot by rapidly fanning the rudder.*
7. Towplane malfunction:
  - *In the case of tow-plane trouble, advise the glider to release or signal the glider by rocking the wings until the glider releases.*
8. Releasing Glider:
  - *Release the glider from the tow-plane only if you feel that you or the tow-plane are in danger. If the glider is not visible in the mirrors (and no prior arrangements have been made for a "low tow" or "boxing the wake" exercise), you are in danger, and you must release the glider immediately.*
9. Unable to release:
  - *If the glider pilot is unable to release the rope from his/her end, he/she must attempt to advise the towpilot via radio. If unable, the glider will fly out to the **RIGHT** of the tow-plane & rock the wings. On this signal, the glider must be towed over the airfield and the rope shall be released from the TUG end. Ensure the glider is maintaining a position higher than the towplane to reduce any risk of the rope contacting the glider.*
10. Total failure to release:
  - *If both the glider and the tow-plane are unable to release, an attempt can be made to break the rope. If possible, communicate the decision via radio. (Again, it is strongly suggested that the glider place itself a little higher than the towrope. Should the rope be higher than the glider there is a risk that it may snap back and drape over the glider).*
11. Still unable to release
  - *If both the glider and the tow-plane are still unable to release, initiate a slow descent (200 to 300 feet per minute), avoiding steep turns. Fly a wide circuit and make a long final approach at 60 to 65 mph. Avoid sudden deceleration during the ground roll.*

## **Section 7** **Radio Procedures**

### **General**

The radio is a safety feature, not a convenience, and all pilots should bear the following in mind:

1. **THINK BEFORE YOU TALK** (know what you want to say before you say it).
  2. **LISTEN BEFORE YOU TALK** (don't step on anyone else's transmission).
  3. **KEEP ALL TRANSMISSIONS BRIEF AND TO THE POINT** (formulate your transmission in your mind first, for brevity and clarity - standard phraseology should be used whenever possible.)
  4. **MAKE AS FEW TRANSMISSIONS AS POSSIBLE**  
(the frequency is crowded.... No "ums" allowed!)
  5. **THE RADIO IS NOT A SUBSTITUTE FOR MAINTAINING A PROPER LOOKOUT AT ALL TIMES.**
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#### **1. Back-seat Drivers:**

If the glider pilot starts telling you which way to go on tow, remember that safety and operational considerations take precedence over the glider pilot's convenience. However, calls from the glider pilot for additional (or less) speed on tow should be considered a safety priority and implemented if possible.

#### **2. Mandatory downwind calls:**

Tow-planes should call ("Tottenham traffic, tug ABC, downwind rwy ....") when entering the downwind, to give the other pilots a spatial reference to where the tow-plane is. In addition, if you are unsure of another aircraft's position at any time, additional calls, reporting **your** position are acceptable (e.g. "ABC climbing over Beeton at 1,500 feet"). Note: **this is no substitute for maintaining a good lookout.**

#### **3. Unusual Tows:**

Any unusual tows (simulated rope-breaks, etc.) are to be discussed on the ground between the instructor / glider pilot and the tow-pilot before the flight, not over the radio.

#### **4. Information Calls:**

Information calls are acceptable (e.g. "ABC re-fueling after this tow" or "ABC, practice rope-break"), but should be kept to a minimum.

## **Section 8**

## **Piper PA-25 Pawnee Check-out**

Pawnee checkouts are to be conducted by the Chief Tow-Pilot or Assistant Chief Tow-Pilot only.

Checkouts consist of the following:

1. Walkaround inspection.
2. Briefing on towcard completion. (fuel, hobbs, )
3. Briefing on Towropes: condition, stowage etc.
4. Briefing on Tow signals, Emergency signals, Special circuit procedures
5. Briefing on Noise Abatement and Noise Sensitive areas.
6. Briefing on Special procedures: boxing the wake, rope break practice
7. Briefing on Landing Attitude (*p 16 of Pa 25 manual suggests simulating the attitude by placing the tail on a stand*).
8. Briefing on off-airport landings, emergency egress
9. Briefing on handling door opening in flight
10. Briefing on engine cooling, propwash, use of brakes, fueling/grounding safety
11. Briefing on airspace: location of YYZ TRSA
12. Briefing on Emergency Response Plan

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13. Familiarization Check-list as follows:

Fuel: 36 U.S. gallons useable (136 Litres) 100 LL (blue) octane rating

Top up every 25,000 feet of towing or sooner.

Note location of fuel vents(2)

Note location of fuel drains (5) check for dirt / water.

*(usually no fuel from vent line drain)*

Oil: 9 quarts. *(location of oil & other supplies).*

Engine Inspection & demonstrate fasteners

Engine Covers

Cockpit doors and latches

Emergency release

Entry into cockpit: handles and bars

Seat: adjustment

Seat Belts: securing and locking devices, including inertial reel lock

Cockpit ventilation: overhead, front and rear air-inlet

Control column

Elevator trim

Rudder pedals and toe-brakes

Throttle: RPM for full throttle at 70 mph is 2300

Mixture: Full Rich for take-off, idle cut-off for shutdown

Fuel Pump: always ON for towing.

Carburetor Heat: use aggressively if carb ice encountered.

Parking Brake: not normally used, however set if needed.

Starter: left mag only for start

*(keep finger on right mag during start so no delay in selection to ON)*

Instruments:   Airspeed Indicator  
                  Vertical Speed Indicator  
                  Tachometer  
                  Oil Pressure Gauge  
                  Oil Temperature Gauge  
                  Ammeter  
                  Hobbs Meters  
                  Engine analyzer

Switches:       Master  
                  Magnetos  
                  Navigation and Landing Lights  
                  Fuel Light  
                  Stall Warning Horn  $V_{SW}$  (*Speed at which stall warning will occur*): 62 mph

Fuses:           Resettable circuit-breakers

Glider Release: Always check under load First Flt of day.  
                  Always leave Emergency Release lever engaged.  
                  (*when a rope is connected, it will be done at the towhook*).

Location of :   Towcards  
                  Towropes

During weekday operations, it is the responsibility of the                   towpilot to record all tows on the back of the towcard. (*i.e. Glider #, Pilot name, tow height*). The towpilot must also record all details of Aero-Retrieve and complete the towcard fields as required. The card is to be placed in the mailbox at the end of the day.

During weekday operations, it is the responsibility of the                   towpilot to select a towrope that is in safe condition for use. Ensure that the ends are not frayed and no knots or significant fraying in the rope. The rope is to be properly wound on a reel or stowed in an approved fashion at the end of the day.

## **Section 9**

## **Tow Pilot Minimum Qualifications**

1. The minimum requirements to act as pilot-in-command of any Great Lakes Gliding Club tow-plane (while not towing a glider) include all of the following:
  - Private Pilot License (minimum)
  - Current License Validation Certificate
  - Checked-out to fly type (see check-out book)
  - Member of SAC
  - Member in good standing of the Great Lakes Gliding Club
  
2. Transport Canada requires that tow-pilots are qualified in one of the three following ways:
  - Hold a valid Glider Pilot License
  - Hold a valid power license (minimum Private Pilot License)
  - Minimum experience of 5 hours on type
  - Minimum of 45 hours PIC
  - Minimum of 5 dual training tows

*or*

  - Hold a valid power license (minimum Private Pilot License)
  - Minimum experience of 5 hours on type
  - Minimum of 65 hours PIC
  - Minimum of 5 dual training tows

*or*

  - Hold a valid power license (minimum Private Pilot License)
  - Minimum of 100 hours PIC (may include 25 hours of glider PIC time)
  - Be thoroughly familiar with the operating limitations of the glider being towed, and with the necessary emergency procedures
  
3. In addition to the above, Great Lakes Gliding Club requires that the pilot be:
  - Checked-out to fly type (see check-out book)
  - Member in good standing of the Great Lakes Gliding Club
  
4. Great Lakes Gliding Club requires that all tow-pilots undergo an annual check-ride
  - or*
  - towpilot refresher briefing if such pilot has been deemed to be current.

## **Section 10**                      **Tow-Plane Maintenance**

1. Knowledgeable tow-pilots may perform the following maintenance functions:
  - a. Changing of light bulbs (navigation lights, beacon, etc.)
  - b. Replacement of landing lights
  - c. Replacement of blown fuses
  - d. Tightening of tailwheel spring components
  - e. Oil changes (see page one of the tow-plane daily log)
  - f. Inflation of tires
  
2. All other tow-plane maintenance must be approved in advance by the Maintenance Director.

## **Appendix 1**                      **Pawnee Specifications**

Gross Wt.	2900 Lbs
Empty Wt.	1523 Lbs
Useable fuel	136 Litres / 36 US gal
Tire pressure	Main: 25 Tail: 50 psi
Never Exceed Speed $V_{NE}$	156 mph
Yellow Arc $V_A$	124 mph
Green Arc	61 - 124 mph
Max Flap Extension Speed $V_{FE}$	109 mph
Stall speed $V_S$ (max gross wt., flap full)	61 mph
Stall speed $V_{S0}$ (minimum flight speed in landing configuration) 1900 Lb	46 mph
Stall speed warning $V_{SW}$ (at 1 g. load)	62 mph
Best Rate of climb speed (2900 lbs) $V_Y$	83 mph
Best Angle of climb speed (2900 lbs) $V_X$	73 mph
Take off dist. (ground roll)	730 ft.
Take off dist. (over 50 ft obstacle)	1250 ft.
Landing roll (at 2900 lbs)	850 ft.
Intentional spins are prohibited	
Doors must be closed for flight	