



301 AVIATION TRAINING FLIGHT



AEROTOWING OPERATIONS MANUAL BATHURST AAFC GLIDING OPERATION

VH-KLZ, VH-ORL, VH-TNE & VH-PPC

*Without Tug Pilots
301 Flight is a static display and glider pilots are pedestrians*

Sponsor: CFI 301FLT

The intent of this manual is to supplement the GFA Aerotowing Manual with procedures that are specific to 301FLT Gliding Courses. It does not attempt to cover material already covered in the GFA Glider Towing Manual. Therefore both this manual and the GFA manual should be read in conjunction with each other

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Part 1

LINES OF RESPONSIBILITY

AAFC Gliding courses provide training for Cadets with varying stages of experience (Basic, Intermediate, Solo and Badge), and as a tug pilot it is imperative that towing operations are conducted in a safe manner. In the case of non-solo rated pilots, the aim is to provide an aerotow that will allow the student to acquire the skills required for progression to solo flight.

The standards required are in accordance with this Operations Manual and the GFA Aerotowing Manual. These two manuals expand on the minimum requirements for operations and standards, as laid down by the Civil Aviation Safety Regulations and the Civil Aviation Orders.

The recency requirements and qualifications are described in Parts 2 & 3 of the GFA Aerotowing Manual.

When operating as a tug pilot, you are responsible for satisfying yourself that all procedures are safe. You must refuse to be a party to any operation where safety, in your opinion, may be compromised.

Part 2

NORMAL OPERATIONS

2.1 Flight Notification

All VFR aircraft are exempt from flight notification and reporting for individual flights, provided that:

1. The aircraft remains outside controlled airspace (OCTA)
2. A listening watch is maintained on the CTAF as appropriate

The airspace around Bathurst Aerodrome is a CTAF, and it is unlikely that controlled airspace would be encountered during normal operations. However, when flying to and from Pipers Field, the gliding frequency of 122.7 should be selected if Bathurst Gliding Club are operating.

2.2 Preparation

2.2A License and Towing Permit validity and recency

Although your pilots license is permanently valid, your medical is not. You are not permitted to exercise the privileges of your license unless your medical certificate is valid. You are also required to have current flight review and to have this recorded in your Pilots Log Book.

In addition, be aware of the recency requirements as laid down in the GFA Ops Manual, as there are additional requirements regarding Outlanding Retrievals. In short, if you are not formally approved you must only operate from a recognised landing field.

If your license, medical, flight review or towing recency is not up to date, then you will not be permitted to tow gliders. The club would not be covered by insurance and you would not be covered by insurance. Both would be open to liability and you would probably be charged by CASA for several breaches of the regulations.

301FLT requires all tug pilots to have reached solo standard within gliding unless waived by the CFI. It is also recommended to try and keep current in gliding.

301FLT also requires that all tug pilots operating towing aircraft are current GFA members.

2.2B Daily Inspection

Each of the 301FLT Club Pawnees have a schedule in the front of the Flight Manual, which provides a satisfactory guide for carrying out a pre-flight inspection.

Areas which require particular attention are as follows:

- a. Check around the exhaust manifold for tell tale leaks
- b. Check exhaust pipe and muffler for security
- c. Check engine mounting bracket for cracks (Note: check maintenance release requirements in respect to engine mounts)
- d. Take a fuel sample ensuring no water is present in the fuel
- e. Check inspection panels are all installed
- f. Inspected makeshift fabric repairs and fabric in general
- g. Inspect the bungies for fraying
- h. Tail wheel must be greased once daily

2.2C Refuelling the Tug

There are two main sources of fuel used for glider towing operations during AAFC gliding courses.

- a. BP Commercial Bowser
- b. AVGAS dispensed at the Bathurst Flying Club bowser

Fuel obtained from either pump is subject to stringent quality controls, however the events in December 1999 proved that these controls are not infallible. Considering the quality controls for AVGAS, pilots should be wary of the problems that could arise through the use of MOGAS. Always be alert to the possibility of bad fuel.

The procedure for refueling at Bathurst Flying Club's Mobil bowser is as follows:

- a. Position the tug at an appropriate distance from the pump
- b. Earth the tug
- c. Position the steps
- e. Swipe the CARNET Fuel Card and press NO on the bowser key pad (located on the back of the pump)
- f. Refuel the tug after earthing the nozzle
- g. Replace the hose, earth lead and steps
- h. Record the figures on the 301FLT tug pilots log sheet

- i. Check oil (note: oil is entered on the 301FLT log sheet, in addition it should be recorded on the maintenance release) Maximum 9 litres (10 quarts)
- j. Take a fuel sample to ensure no water is present. (Fuel samples must be taken following each refuel and prior to the first flight of the day)

2.2D Fuel Contents

Although the tug usually remains within the area of the field, it is still a legal requirement to land with a minimum of 45 minutes reserve of fuel. This equates to about 45 litres, therefore you should have at least 45 litres *plus* the fuel you require for the aerotow. As a general practice the tug is completely filled in the evening and refilled during the day as required.

A good method to “keep tabs” on the fuel is to use a combination of the following 3 methods. Items a & b should be rigidly observed, while some latitude is allowed with item c.

- a. Watch the fuel contents gauge (it is red lined -under no circumstances should the tug launch with a reading below the red line.
- b. Record Tacho Time at each refuel and limit time to a maximum of 2 Tacho hours
- c. Usually in the region of 15 x 200 foot tows can be carried out on a full tank of fuel.

Do not be bullied into a launch if you are concerned about the fuel status. This usually happens about the last flight of the day when the tanks are low. Remember that there never has and never will be a suitable reason for fuel exhaustion. It is entirely your responsibility.

2.2E Tow Rope

Tow ropes are generally of manufactured fibres such as terylene, polypropylene, polyethylene, etc... The Gliding Federation of Australia recommends a tow rope length of 60-65 metres, and at no time (under normal circumstances) should tow ropes be less than 40 metres.

Special consideration may be given for shorter tow ropes in situations such as paddock retrievals and double towing. A short rope is identified and available for paddock retrievals, but make sure the glider pilot is experienced enough to handle the short rope. If in doubt, use the normal tow rope.

2.2F Release Mechanism

(AD/Sup/8 inspection) - Approved release installations will permit the pilot to release the tow rope while it is carrying a load up to the weak link specifications. Since the glider may under some conditions reach extreme positions in relation to the tug, the release installation must be operable with this load applied in any direction up to 20 degrees from the normal towing direction. The tug pilot must satisfy him/her self that they can easily reach the tow release lever and obtain full movement. A release check is to be carried out prior to the first flight of the day ensuring it operates at all angles.

2.2G Rope Weak Link

If the breaking strength of the rope is more than 750kg, a weak link with a breaking strength of not greater than 750kg must be interposed between the rings and the rope at the tug end, or the weak link specified in the glider/tugs Flight Manual must be used. When a weak link is used it shall be placed at the tug end so that it NEVER drags on the ground. It must be as short as practical so as not to drag on the ground. No evident visible deterioration in its condition is acceptable.

2.2H Rear Vision Mirrors

The tug is fitted with mirrors which should be adjusted so that the tug pilot can see the glider at all times when the glider is in a normal relationship to the tug.

2.2I Radio Check

Prior to the first launch of the day, call another aircraft to confirm that the radio equipment is serviceable. All gliders are fitted with radios. Use this valuable tool to gain the maximum benefit that it can provide without cluttering up the airwaves. Short, meaningful communications can greatly reduce any confusion between aircraft, provide essential information (particularly in an emergency) and provide situational awareness to everybody in the area.

2.2J Warm up

Just as shock cooling of the engine during descent can cause enormous damage, shock heating can be just as damaging. It is not the actual temperature of the engine that is of concern (within the normal limits); it is the rate at which the temperature changes that causes the damage. Large temperature variations within the engine cause damage such as cracked cylinders, stretched crankcase through bolts, stuck valves and a whole heap of other nasties.

On start at (1200rpm) check for oil pressure once this is within the green maintain the rpm up to between 1000 and 1400rpm this will not cause any harm and will help the oil progress to its optimal viscosity.

Engine RPM at all times once engine is at normal Temperature should be kept at or above 1200 RPM to avoid plug fouling. The engine is not to be idled unnecessarily below those indicated at any time.

2.3 Towing Procedure

Standard ground signals are used (as detailed in the GFA Aerotowing manual), however if in doubt it is best to use the radio to eliminate any confusion.

The "Bathurst Traffic" call should be given prior to taking up slack in the rope, and on receipt of the "all out" signal the throttle should be eased forward to gain full RPM. A straight path should be maintained when waiting for the aircraft to lift off (do not attempt to haul to aircraft off the ground before it is ready to fly).

Establish a towing attitude of 60-65 knots in the Pawnee and maintain that attitude at all times during the tow. Should you be towing a high performance glider (which may have water ballast on board) or a low performance glider, check with the pilot for the required towing speed and fly the attitude which that speed relates too.

Fly attitude at all times to elevate slack in the rope.

2.4 Towing Pattern

The tug should comply with normal rules of the air and circuit procedures when towing gliders. The tug should normally climb straight ahead to 500 feet before making a turn. A modified pattern may be desirable depending on the position of the sun or the suitability of the overshoot area for the glider landing due to rope break or tug emergency etc...

It is desirable to keep the glider within gliding distance of the airfield or a suitable landing area. Gliders should not be towed downwind unless requested by the glider pilot. With inexperienced glider pilots, turns should be made gently and at reasonable bank angles.

Remember to look for sources of lift whilst towing. Only attempt to circle in thermal lift if you know the capabilities of the glider pilot you are towing, and there are no other aircraft in close proximity. Remember to keep a good lookout for gliders and other aircraft.

2.5 Release and Descent

Establish that the glider has released from the rope. LOOK OUT to the left, TURN LEFT, gradually reduce power to 2000RPM, close cowl flaps and establish a descent speed of 95-100 knots. Do not dive away to the left until you are satisfied that the glider has been released.

2.6 Circuit Pattern

Observe other aerodrome traffic for the purpose of avoiding collision. Conform with the pattern of traffic formed by other aircraft in operation. Make your downwind checks and downwind radio call. This period in the circuit pattern is the most dangerous from a mid-air collision point of view. Keep a vigilant outside watch and listen for other aircraft.

Gliders are extremely difficult to see when approached from the rear, and generally your speed is 30-40 knots faster than theirs. Also your rate of descent is usually much greater and you could easily descend on top of a glider without seeing it. SEE and AVOID principles have many physical limitations, due to the inability of your eyes to focus at the correct distance, and because your eyes usually only see things that are moving relative to you. If you approach a glider from the rear, it is normally stationary in your field of vision and you may not see it.

ALERTED SEE and AVOID is much better, because you are also using your ears (via the radio) and forming a mental picture of what is around you. It gives you much greater situational awareness and, even if you can't see the glider, you will know it is there. However, this knowledge is only useful if you use it. If you believe there is a glider close (on the same leg of the circuit as you) then do something about it! Do not fly on regardless hoping you may eventually see it. Leave the circuit, confirm its location (over the radio or visually) and then rejoin the circuit.

A close-in base leg is acceptable, providing you do not baulk another aircraft on finals. REMEMBER that there may be aircraft being flown by student pilots. If the glider has released in a simulated or real rope break, give the glider right of way. Depart the circuit if necessary. A simulated rope break is carried out to train a new student. The student is therefore anxious about the whole situation. If you cut him/her off or even appear in his/her field of vision, it is adding another concern to an already high workload.

Keep a careful look out for gliders or other aircraft conducting non-standard circuits. Look out for gliders on long final.

2.7 Landing

Ensure the landing area is clear of obstructions, use normal approach speeds for finals (70 knots).

Use flaps as required. Remember the tow rope trails below the flight path, so ensure it clears obstructions on approach. Only use wheel brakes when necessary, and then only when all 3 wheels are firmly on the ground. Turn off to clear the runway upon reaching walking pace, and taxi off to tow another glider / to the parking area.

Do not turn in front of an approaching glider or a glider-tug combination in the process of launching.

2.8 Taxiing

When taxiing in the glider area, always be conscious of the proximity of people to the moving propeller, particularly visitors. Do not leave the tug with the engine on, near another moving aircraft or forward of a launch in progress. Be aware of where the tow rope is (do not drag it over gliders or around people). When taxiing upwind of gliders, be particularly careful of where your propwash is aiming. Propwash can do serious damage to gliders and canopies.

If possible, avoid turning in a direction that will point the tail of the tug into wind, even at just taxi speed. A gust of tail wind or a random thermal may lift the tail causing a prop strike or roll over. Approach the gliders from the other side (if possible) so the tug is pointing in to wind. If required request assistance of handlers at the rear lifting handlers and on the wingtips and allow for the help by taxiing at a slow walking pace. This will be necessary in high wind and tailwind conditions.

2.9 Shut down Procedure

Turn off the radio, allow the engine to stabilise a good example of the engine stabilised is the egt gauge reading zero, then pull the mixture to idle cut-off. Ensure the rope is off the runway. Ensure that the magnetos and master switches are off.

2.10 Double Towing

The towing of 2 sailplanes by 1 tug may be carried out under the conditions laid down in the GFA Aerotowing manual, by appropriately rated tug and glider pilots.

Part 3

EMERGENCY PROCEDURES

All emergency procedures are in accordance with the GFA Aerotowing manual, with the following additional information.

3.1 Engine failure, loss of power, control problems etc during ground roll

During the ground “take off” run, if the tug suffers either complete or partial loss of power, or the glider becomes dangerously out of station, proceed as follows:

- Release the tow rope (if the glider has not already done so)
- Reduce power (if still available) and come to a halt gradually, straight ahead.
Note: In some circumstances, when flying speed has been attained, full power is available and the glider has been detached, it may be prudent to continue with the take off and conduct a normal circuit and landing.

If the glider gets vertically out of station (prior to the tug lifting off) and pulls the tail of the tug up, the tug pilot should release AS SOON as the condition starts to develop. Should you delay this action and full back pressure is required on the control column to maintain attitude, the tug will not lift off. If the glider is released at this point, the tug will most likely cartwheel and end up on its back. This is an EXTREMELY DANGEROUS situation and you must release the glider IMMEDIATELY after feeling it begin to develop.

3.2 After lift off and below 500 feet AGL

If for any reason continuation of a tow is hazardous, WAGGLE WINGS to signal the glider pilot to release. If the glider does not release, the tug must do so IMMEDIATELY. Aim to detach the glider from the tug at the earliest possible moment.

If the emergency is an engine malfunction, do not reduce power prior to release (better a ruined engine than injuries or deaths). If possible, substitute speed for height (maintain a safe speed) to enable a safe forced landing.

If the malfunction is total engine failure, drop the nose to maintain a safe air speed, waggle the wings, release and land straight ahead or within 15 degrees either side of your heading. **DO NOT ATTEMPT TO TURN BACK TO THE AIRFIELD.**

Your options during an engine failure at Bathurst are few (especially when operation from RWY 17). If faced with this situation, the main thing that will help you is to be in control of the aircraft when you touch down. If you attempt severe manoeuvres or lose airspeed, you will probably lose control of the aircraft and your outcome.

3.3 On tow above 500 feet AGL

If the continuation of a tow is hazardous above 500 feet AGL, the tug pilot is to waggle wings vigorously. On seeing this signal, the glider pilot must release immediately, whether in high or low tow. Having seen the rope go, the glider should execute a clearing turn to the right (except where circumstances do permit). If the glider does not do so immediately, pull the release lever to release the glider from the tug. If the emergency is total engine failure, institute normal forced landing procedures.

GENERAL:

An emergency which has not been prearranged between the tug and glider pilot is for real.

Every practice must be clearly and specifically prearranged between the tug and glider pilots. In any flight, if ONE emergency procedure is arranged, the SECOND one is FOR REAL and so on.

During landing and tow practice, prearrangement MUST spell out clearly that it is to be either:

FULL STOP landing or TOUCH AND GO

Take nothing for granted in practicing emergency procedures.

Part 4

OPERATIONS AT BATHURST AERODROME

Gliding operations may be conducted from any of the grass runways parallel to runway 17 - 35 and runway 08 - 26.

In general, for normal operations, circuit directions for the grass runways are as follows:

Landing Areas	Circuit Direction
17GR	RH
35GL	LH
08GR	LH
26GL	LH

The tug and glider shall use the CTAF frequency during the entire launch and also the QNH on the Altimeter is to be set before flight (ALT 2450)

Taxiing broadcasts prior to take-off are mandatory.

Maintain a listening watch throughout the flight, and a downwind call should be given on joining downwind.

Part 5

OPERATIONS INTO AND OUT OF PIPERS FIELD

Tug flights to and from Pipers Field are conducted in the following circumstances:

- a. Collection of the Bathurst Gliding Club tug for ferry flight to Bathurst Aerodrome
- b. Collection of Bathurst Gliding Club gliders for ferry to Bathurst Aerodrome
- c. Return of Bathurst Gliding Club tug from Bathurst Aerodrome on completion of course
- d. Return of Bathurst Gliding Club gliders on completion of course

The most commonly used runway at Pipers Field runs 03 - 21 direction, and since there is a considerable slope favouring a landing towards 03, a landing downhill into 21 should not be attempted (unless there is a significant wind favouring downhill landing).

When operating on the normal runway, the macadam strip is only used for take-off. Pilots should also be aware that the threshold of 03 is significantly displaced.

A cross strip (locally referred to as "the caravan strip") may be used, but is not as well maintained as 03 - 21.

Fuel and Oil – If hiring tugs from Bathurst Soaring Club

An agreement with the Bathurst Gliding Club has been reached that the tug will have full fuel and oil on departure from Pipers Field, and full fuel and oil when returned. Any oil used should be recorded on the maintenance release. All aircraft engines have a point which the oil usage will be at its minimum filling the oil in an aircraft to its max point is unnecessary as usually at least 1 quart or so will be discharged overboard so monitor oil usage and within reason let it reduce to a point where it will stabilise. Maximum indicated oil level should not be above 9 quarts on the dipstick.

Tug Hangarage at Bathurst Soaring Club

Care should be exercised when opening the hangar doors. Each door consists of two sections, and the first section needs to be latched before the second section is opened. Hangarage must be sort when the tug is away from pipers. When putting aircraft into any hanger especially one with other owners aircraft in them great caution must be taken and any damage must be reported immediately.

ALWAYS put the propeller horizontal before putting tug in to the pipers tug hanger to prevent propeller damage.

Tug Times on Acceptance and Return – If hiring a Bathurst Soaring Club Tug

Since the AAFC is billed for aircraft hours by Tacho, it is important that an accurate record is kept of:

1. Tacho Hours and Air-Switch at Pipers Field (on acceptance)
2. Tacho Hours and Air-Switch at Pipers Field (on return)
3. These times are to be recorded at the start and end of each day. Ensure you have the correct sheets at the start or the days flying

Considerations when operating at Pipers Field

It is preferable that each pilot is briefed on the following prior to their first operation from Pipers Field:

- a. Runway selection
- b. Displacement of threshold - RWY 03
- c. Use of Macadam portion of RWY 03
- d. Opening and closing the tug hangar
- e. Moving the tug in or out of the hangar (Prop must be horizontal)
- f. Refuelling the tug
- g. Location of Pipers Field keys
- h. Location of limitations for ballast weight in Pawnee PPC
- i. Location of tow ropes (preferably use ONLY AAFC ropes)

Part 6

TUG SECURITY

On completion of the days flying, the tug pilot is responsible for ensuring the tug is securely tied down or hangared.

Attention should be given to the following:

- a. Aircraft refuelled
- b. Air-vent closed
- c. Master switch off
- d. Radio off
- e. Magneto switches off
- f. Aircraft chocked (if hangared)
- g. Control column tied back
- h. Flaps down
- i. Brakes off
- j. Cowl flaps closed
- k. Oil, Tacho time, A/S hours and number of tows entered in the maintenance release
- l. Side windows closed
- m. If in an unsecured area throttle lock in place
- n. During or close to spring all openings to the engine should be blocked to prevent birds nesting in engine bay.

Part 7

RECORD SHEET

As a tug pilot, it is your responsibility to maintain an accurate record of the following:

- a. Hours to next servicing
- b. Hours to other servicing (engine mount checks, oil/filter change etc...)
- c. Tacho hours on acceptance **AND DAILY TOTALS**
- d. Air-Switch hours on acceptance **AND DAILY TOTALS**
- e. Record of quantity of fuel received each refuel (Bathurst Aerodrome)
- f. Record of oil issued
- g. Total fuel used
- h. Total oil used
- i. Total tacho hours
- j. Total air-switch hours
- k. Number of launches each day
- l. Litres per hour used by the tug

Part 8

General Points

- a. Don't idle less than 1200rpm unless necessary to prevent plug fouling;
- b. Don't tow downwind unless for safety or requested by QFI on tow;
- c. Don't tow into the sun unless necessary for safety;
- d. Don't land with tailwinds unless necessary for safety;
- e. Don't taxi head on with parked gliders;
- f. Don't taxi over tow ropes;
- g. Don't over utilise brakes when taxiing and landing;
- h. Try to avoid wheeler landings as they take more runway and slow the operation;
- i. NEVER OPERATE OUTSIDE THE SPECIFIED DECENT PROFILE;
- j. If conducting a curve-a- linear circuit, roll flat mid base for lookout and continue approach; and
- k. Always operate aircraft with turret air vent open, even during winter.

