Bognor Regis Gliding Club

Towing Operations Manual

Updated 20 August 2024

1 CONTENTS

SECTION 1 ORGANISATION

1.1 THE PURPOSE OF AEROTOWING

The basic purpose of aerotowing is to deliver the glider to a source of lift or a specific location. It is the glider pilot who decides when or where to release, the tug should continue climbing until the glider releases unless arranged otherwise. There is no requirement for the glider pilot to release at a previously requested altitude or position, or to give the tug pilot warning before releasing.

1.2 RESPONSIBILITIES OF THE TUG MASTER

The Tug Master is responsible for safe and efficient operations by monitoring and updating procedures as required; may appoint a deputy Tug Master; should carry out periodic refresher flights with club tug pilots; is responsible for updating of this manual.

1.3 APPROVAL TO FLY TUG AIRCRAFT

There is no minimum experience as such for being a club tug pilot; this is left to the discretion of the club Tug Master who may, of course, revoke or suspend any tug pilot's approval at any time. It is preferred that tug pilots are and remain current as glider pilots.

1.4 RESPONSIBILITIES OF THE TUG PILOT

It is the pilot's own responsibility to maintain a current licence, ratings and medical. The tug pilot should inform the Tug Master or deputy if they are aware of any possible operational improvements, concerns, incidents or damage to aircraft. The tug pilot is responsible for the safe operation of every flight. All tug pilots are required to keep themselves fully conversant with the latest safety information and operational changes involving the towing operation. This is done by being familiar with this manual; with BGA Laws and Rules; and with the BGA information on "Managing Flying Risk – Towing/Operating Tug Aircraft" found on the BGA web site > Member Area > Pilot Information > Towing Sailplanes.

1.5 CURRENCY AND CHECKS

This is at the discretion of the club Tug Master and can also depend on an individual's experience, but things must remain within the law. Anyone who has not flown within a reasonable period of time should fly a refresher circuit or more until they are confident in the operation of the aircraft again. This can be done solo, or with the Tug Master, his deputy or qualified instructor if possible.
Please note that 3 landings within 90 days are requirements to carry passengers.
It is suggested that each tug pilot should occasionally have a coaching flight with the club Tug Master or nominated deputy to include normal tows, general handling and emergency drills. The flight should be viewed as an opportunity to brush up on flying skills and practice unusual situations – it is not viewed as a test but a reasonable standard of operation should be expected.

1.6 REGULATORY INFORMATION

Part 21 TMG Tugs are subject to Part-SAO and non-Part 21 Tugs are subject to the Air Navigation Order (ANO). Further information can be found in the BGA and CAA websites.

SECTION 2 NORMAL OPERATIONS

2.1 HEALTH AND FATIGUE

Tug pilots should be familiar with the CAA's 'IMSAFE' checklist.

Aerotowing can be both physically and mentally demanding for the tug pilot. A duty during the summer can be long and in very hot conditions, during the winter it may be cold and sporadic. It is essential that every tug pilot is honest in monitoring his/her physical state. The accident report wouldn't read well if a lack of concentration could have been avoided simply by taking a short break.

Below are some simple steps each pilot is responsible for taking to ensure they are fit to fly:

- Don't fly when not feeling well
- Don't fly without sufficient rest
- Take regular breaks throughout busy days allowing another pilot to cover for a short period
- Do not dehydrate – drink sufficiently, be especially cautious on hot days
- Don't go hungry – eat sufficiently throughout the day
- Know your own limits – fly carefully

2.2 MANAGING RISK

The basic principle we would like to adhere to is that mitigating possible threats takes priority over convenience. The following are examples of this principle:

* As runway 23 is considerably longer than runway 19, and 19 can have turbulence and wind shadow issues to a greater degree than 23, runway 19 should not be used for normal tug operations. Tug landing on 19 should only be considered in the unlikely situation of landing on 23 being more problematic than landing on 19.
* On landing, low level manoeuvring should be avoided where possible. A straight final approach followed by a straight landing run is the easiest and safest option.
* Even if the rope is retracted it is advisable to choose a touch down point suitable for landing with the rope extended, in order to mitigate the threat of neglecting to retract the rope.
* Launching a glider from the tarmac threshold of runway 05 is acceptable if the ground leading up to that point is too soft, otherwise the take-off run should start from the full length of 05.

Think about the glider and glider pilot and consider;

- Tow hook position.
- Low-experience pilot.
- Short tow rope.
- All flying tailplane.

- Lightweight glider pilot that might cause a rearward centre of gravity.
- Turbulence and windshear.
- Cross or slight tail wind.

A rule of thumb is that if you have three of these items, consider not launching that glider!

It goes without saying that tug pilots should be familiar with the aircraft flight manuals, particularly the abnormal and emergency procedures sections.

Before each take-off consider a point on the run where you could reject the take-off. If you are not airborne at this point or not going to adequately clear any obstacles, consider stopping ahead if there is enough room, bearing in mind the glider also has to stop behind you. If it is safer, consider releasing the glider and then getting airborne on your own.

Before every take-off have a Defined Minimum Manoeuvre Speed (DMMS) in mind = 1.4 times stall speed (1.3 stall safety margin + 30 degree bank, actually a factor of 1.404). Assume the engine will fail on every take off, when it does fail immediately push forward to keep speed at DMMS or above. Going light in the seat will be required for a sudden loss of power. For example, suggested DMMS for the EUROFOX are 55kts flaps down and 60 kts flaps up.

Footwear. There have been a number of occasions both at BRGC and elsewhere, where inappropriate footwear has caused accidental operation or obstruction of the rudder and/or brakes. It is therefore prohibited to operate as tug pilot wearing footwear such as hiking boots or thick soled trainers. Only thin-soled footwear should be worn. In addition, there have been occasions, particularly with the EUROFOX, where shoe laces have looped over the adjacent rudder pedal causing an obstruction to rudder operation. Therefore, be aware that laces need to be tied in such a way as to mitigate this threat.

Passengers. Carrying of passengers while towing should be avoided for two reasons. Firstly, distractions add to slips and lapses which can lead to more significant incidents. Having a passenger is a significant distraction in a situation where we are responsible for two aircraft and up to four individuals. Secondly, as tug pilots we accept the slightly increased statistical risk of being in the tug. We do not want to be subjecting passengers to the increased risk, however slight the increased risk may be.

Tow rope. At the start of the day the tow rope should be pulled out to its full length and inspected. More information is available on the club web site, Pilot's Zone, Technical. See, "Tost Winch manual Ultralight" and "Eurofox winch knot – Double overhand Stopper". The latter has been found more reliable than the Overhand Knot suggested in the Tost manual.

Lookout. The local area can be busy with traffic from neighbouring airfields in addition to BRGC aircraft. The S80 instrument is a valuable aid when set to the traffic screen and should be regularly but briefly added to the outside visual scan. The coast is a popular route for light aircraft traffic, lookout carefully when crossing or in the vicinity of the coast. The view forward in the EUROFOX is poor when towing so, when possible, avoid flying straight for more than a minute or so to be able to check the area ahead. Turning also makes the tug/glider combination more visible to passing traffic. When not on tow, steep turns in the EUROFOX enable a lookout in the direction of the turn by looking through the transparent roof.

2.3 NOISE ABATEMENT PROCEDURES AND AWARENESS

Continual towing or descent over the same area may cause considerable nuisance and irritation to our neighbours. However, we can also spread the load by thoughtful and varied tow-out patterns. Variation therefore should help form the basis for noise abatement procedures.

When towing, the following general points should be considered:

a) Make full use of all airspace available to you.
b) It is not always necessary to drop upwind; a tow made for the most part downwind of the site and then terminating overhead or slightly upwind of the site can also be used.
c) Remember that when turning, the focal point of your turn (the lower wing will be pointing at it) will be subjected to a concentration of tug noise, adjusted by wind
d) Noise drifts downwind
e) A soaring pilot may be happy to be towed directly away from the site; this should be done when the opportunity arises.

2.4 FUEL AND OIL

The fuel quantity remaining should be recorded on the tug log after every tow. In addition, the Grob 109T tank should be dipped and the level recorded whenever the tug pilot leaves the cockpit. Aircraft fuel gauges can be unreliable, being aware of how many thousands of feet of climbing on tow has been done acts as a gross error check.

We must always aim to land with at least 30 minutes fuel remaining. Minimum fuel for both the Eurofox and Grob before flight: final reserve 30 mins; say 10 litres plus 1.5 litres per 1000 feet tow height.
Suggested absolute minimum quantities before a 3000 feet tow are, in litres rounded up;

	30min	unusable	3000tow	headertank	**total fuel in main tank(s)**
Eurofox	10	1	5	+6	**10**
Grob 109	10	2	5	N/A	**17**

The oil level must be checked at every DI.

The oil level indication in the EUROFOX will be incorrect if the engine has not been turned over by hand sufficiently for the oil system to gurgle. In winter this can take up to 100 compressions. The oil level increases once this has been done, therefore oil should not be added until a true reading has been obtained and do not add oil until the level is close to minimum. Be aware that the difference between Min and Max oil level is only half a litre in the Eurofox, and three quarters of a litre in the Grob 109T.

2.5 START UP, TAKE OFF, CLIMB

Refer to the flight manuals, the following are clarification and reminders.

Regarding towing speed in the climb, in general a tug needs to fly 5 kts faster than the speed the glider pilot requests in order for the glider ASI to indicate the requested

speed on tow. 70kts in the tug works well for most gliders. For heavier gliders such as RV use 75kts, or as requested by the glider pilot.

EUROFOX
After engine start and at all times on the ground (except landing roll) minimum of 2000 rpm. 2500 rpm must not be exceeded until 50 degrees oil temperature is reached.

EUROFOX
- Both ignition lanes can be turned on at the same time.
- Engine rpm should not go above 2500 rpm until 50 degrees oil temperature is reached.
- The power check can be done at 2500 rpm.
- Use half flap for take-off. (BRGC policy)
- On lift off hold the aircraft at about two metres above the ground until around 60 kts is reached then smoothly transition to climb at 70 kts or requested speed.
- Be aware that the ASI static vent is in the cockpit. As a result, there is a significant difference in IAS between having both the door scoop air vents open and pointing forwards or backwards.
- After take-off when above around 500 feet retract the flaps.
- Above around 2,500 feet it will be necessary to progressively throttle back to keep the engine rpm at or below the maximum continuous limit of 5,500 rpm.

2.6 RELEASE AND DESCENT

EUROFOX
If the glider releases under tension when at full power the aircraft rapidly lurches and pitches upwards. This behaviour is not a problem and is easily controlled with forward stick and reduced power. It is possible this release behaviour increases the likelihood of a knot in the rope, but these knots are easily seen and untied.
If the release height is known, reducing power by two or three hundred rpm before release makes the release less dramatic. However, the glider pilot is perfectly entitled to release without warning at any time they choose, and turn in any direction they choose.

After release;

- Immediately reduce power over a period of 3 to 5 seconds to a minimum of 3,000 rpm while turning away.
- Check in the mirror for lateral separation from the glider.
- Ensure the speed is below 75 kts and push the rope retract switch.
- After retraction check for a green light.
- Ensure flaps are up before increasing speed.
- At higher speed reduce throttle to keep rpm at a minimum of 3000rpm.

Separation from the glider takes priority. If the glider is not seen in the mirror on release keep a good lookout all around while immediately increasing speed. Once separation is ensured slow down again to retract the rope.

Water cooled cylinder heads are advantageous for towing operations; however, the cylinders are air cooled so sympathetic engine management in the descent is required.

The circuit joining radio call should include “Green Light” after checking again the retract light is illuminated.

GROB 109T
After release;

- Open the airbrakes.
- Reduce throttle to manifold pressure of 30.
- Increase IAS to 90 kts.
- Gradually reduce manifold pressure to 20.

2.7 APPROACH AND LANDING

One of the threats of operating from a narrow airfield is that tugs and gliders sometimes need to use the same final approach track. Mitigate this threat by;

- Attempt to keep a mental picture of where all the gliders are at all times.
- Look all around the usual glider circuits before arriving near the circuit.
- Anticipate the obstructed view the high wing or low wing provides by checking areas which will be obstructed in advance.
- Use the radio to listen/ask if any gliders are in the circuit. If in doubt the launch point can also be asked.
- Remember to frequently check immediately below and above.

EUROFOX. A tidy landing using full flaps is achieved with a fully held off landing. If preferred, less than full flaps can be used for landing.

On shutting down G-CMJH while waiting for the next tow, the Master Switch can be turned off and the bottom two avionics switches can be left on to power those instruments. Unique to G-CMJH, the bottom two avionics switches are also supplied by a rechargeable battery. If the wait is likely to be more than around ten minutes then all switches should be turned off.

2.8 OUT OF POSITION EXCERCISES

‘Out of position’, exercises should be pre briefed by the instructor and tug pilot. Such exercises must not be carried out below 1000ft AGL.

2.9 STRAIGHT AND LEVEL AND DESCENT ON TOW

When a long transit is required with a glider on tow, or if a descent on tow is required as dictated by the weather, airspace, or the glider’s training requirements, the following must be considered. All power changes must be made as slowly as possible to allow the glider pilot the time to adjust their position or configuration to maintain position. Many gliders will require the use of their airbrakes to descend on tow and in this case, the airbrakes open signal is not required.

2.10 END OF THE DAY

It is the tug pilot’s responsibility to:
Refuel the aircraft.
Wash the aircraft.
Transfer tow heights to the launch log.

Complete the aircraft log book as appropriate.
Inform the Tug Master or Deputy of any defects.
File the tug log in the office.

SECTION 3 ABNORMAL AND EMERGENCY OPERATIONS

3.1 GENERAL

Always remember that in any abnormal or emergency situation the order of priorities is;
AVIATE attitude/speed/trim/release glider?
NAVIGATE safe flightpath/landing area etc.
COMMUNICATE radio/visual signals

3.2 COMMUNICATIONS/SIGNALS

The use of radio is usually the most simple and concise method of communication during an abnormal or emergency situation. However, glider radios can be unreliable and transmissions can be missed. To remove ambiguity, there are visual signals that can be flown by each aircraft:
From tug to glider; 'wave off'; left to right lateral rocking of the tug's wings (min 30 degrees AOB with a high rate of roll) signals glider to release immediately. *
From tug to glider; rapid side to side movement of the rudder signals the glider that their airbrakes are open **
From glider to tug; left to right rocking of the glider's wings whilst to the left of the normal tow position signals the tug that the glider cannot release.
*Below 1000ft AGL if a serious emergency occurs, the glider should be released immediately due to the risk of loss of control during a 'wave off' manoeuvre close to the ground.
**Refer to section on glider airbrakes open.

3.3 TUG UPSET

Two or more of the following factors result in an increase in risk of an upset:

- Tow hook position.
- Low-experience pilot.
- Short tow rope.
- All flying tailplane.
- Lightweight glider pilot that might cause a rearward centre of gravity.
- Turbulence and windshear.
- Cross or slight tail wind.

Locate the cable release before each launch. If at any stage of the tow you are unable to prevent a nose down pitch, release immediately.

To recover from the subsequent nose low attitude:

Close throttle

Roll wings level
Pitch to normal attitude

3.4 ENGINE FAILURE/PARTIAL FAILURE

In the event of an engine failure/partial failure during flight, the primary concern is the control of the aircraft. If an engine problem occurs while towing a glider, the glider must be released or waved off. The aircraft should then be trimmed to the normal glide speed. In the case of a partial failure, if altitude cannot be maintained, a normal forced landing should be carried out. If power is sufficient to maintain altitude, or even climb, the aircraft may be able to reach a more suitable landing area, or even return to the airfield. However, it must always be assumed that a partial failure will result in a complete failure at any moment. If time permits, a 'mayday' call can be made announcing the nature of the problem and your intentions. It is prudent where possible, when carrying out towing operations, to climb and descend in an area where, in the event of an engine failure, a glide approach to a suitable location can be flown.

3.5 ENGINE FIRE

Should an engine fire be suspected at any point, the prime objective should be to abandon the aircraft. If the fire occurs on the ground, the aircraft should if time permits be brought to a halt orientated so that the wind will direct fire and smoke away from your exit, the engine shut down and the brakes set. The aircraft should then be abandoned.
Should a fire occur in flight, the priority remains abandoning the aircraft. An engine fire will soon develop into an airframe fire with disastrous consequences. It may be more appropriate to land the aircraft in a field than to return and attempt a landing at LEC airfield. In any case, control of the aircraft is paramount.

3.6 GLIDER AIRBRAKES OPEN

The glider's airbrakes opening close to the ground is a serious emergency. If a safe flightpath cannot be maintained (i.e. suitable margin above stall speed, clear of obstacles). The glider must be released immediately; rudder waggling at low speed/height could result in a catastrophic loss of control. If a safe flightpath can be maintained, the tow should be continued whilst attempting to communicate with the glider by radio. If the glider's airbrakes are then still deployed the combination should, if possible, be positioned to a point where the glider could carry out a full airbrake approach to the airfield, before visually signalling that the airbrakes are open (experience has shown glider pilots often misinterpret rudder waggling as a wave off).

3.7 GLIDER UNABLE TO RELEASE

If the glider pilot signals to the tug pilot that he/she is unable to release, consideration must be given to the situation the glider pilot will be left in once the tug aircraft releases the rope. This is not an emergency situation it is merely abnormal so time should be taken to prepare for the release. The glider should be towed to a suitable height of around 1000 feet above ground overhead the airfield and released there.

The tug pilot should not release the rope when over a built-up area in case the rope falls away from the glider on to people or property below. If the rope remains attached to the glider the extra drag and weight of the cable will degrade the gliders performance. The rope must not be released with the glider in low tow position as the rope could fall over the glider.

3.8 ABORTED TAKE-OFFS

Aborting a take-off while towing a glider is hazardous as the glider pilot will take time to react to the initial deceleration. The glider may also be airborne and will in any case catch up the tug aircraft quickly. It is likely that the glider pilot may fail to release his end of the rope and if he lands beyond the stopped tug aircraft, the rope may suddenly become tight again.
If a take-off has to be abandoned, the throttle should be closed and consideration given to releasing the rope. The brakes should be applied to stop the aircraft in good time, however, not hard enough that the glider runs into the back of the tug. The whole length of the take-off run may be used if necessary to allow the glider sufficient room to stop. Consideration should also be given to turning away from the take-off direction to allow the glider more room to stop. Aborted take-offs are not to be practiced with a glider connected for any purpose.

3.9 REPORTING OF INCIDENTS/ACCIDENTS

Following an incident/accident involving a tug aircraft the pilot involved must contact the Tug Master or Deputy as soon as possible, and before carrying out any further flying in BRGC tug aircraft. This should of course only be done at an appropriate time after emergency services, Air Accident Investigation Branch and the police have been informed should the incident be a serious one. The Tug Master will decide on the course of action to take and it may be appropriate for the pilot concerned to temporarily stop flying the tugs pending re-training or discussion with the Tug Master. If it is considered that the issue has been resolved, the individual may be allowed to return to towing following re-training.

SECTION 4 AEROTOW RETRIEVES

4.1 RETRIEVES FROM LEC AIRFIELD

If a glider from another club lands at BRGC they may request an aerotow to return to their home airfield. Before carrying out long distance retrieves involving a period of level towing, pilots should be familiar with the techniques described above for straight and level towing. When taking a tug away from BRGC for any length of time, the duty instructor should be consulted and thought must be given to the impact on the remaining gliders to launch. If a second tug aircraft and tug pilot are available this should be used to ensure continued operation at the launch point. If this is not available, the retrieve should be delayed until such time that it would cause no impact to normal operations. The glider pilot will release when they are confident of being able to reach their destination. Return to BRGC must be flown as expeditiously as practical consistent with normal engine handling.

4.2 RETRIEVES FROM OTHER AIRFIELDS

After due consideration for impact on normal towing operations, any tug pilot is authorised to carry out retrieves from other airfields if they feel confident to do so, after self-briefing regarding arrival and departure procedures and airspace at the destination airfield.

The tug pilot is responsible for ensuring he/she has permission to land and carry out the aerotow retrieve. Many smaller airfields and farm strips will require PPR from the landowner prior to arrival. The glider pilot may be able to organise this for you, but it remains the tug pilot's responsibility. Many airfields may also be significantly shorter than LEC airfield and the tug pilot must ensure sufficient take off distance is available.

EGKC - LEC - Bognor Regis - ARRIVALS - TMG, POWER and TUGS WITH TOW ROPE
Elevation 5ft Frequency 129.980 Mhz
RWY 05/ 23 Hard 610x18m Grass: 850x30m v 4.1 2021