Essex & Suffolk Gliding Club

Ground Operations

Version 4.0

17 October 2019

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1 General Safety

Safety must be a priority of everyone on the airfield. The gliding club does not have the same concepts of "airside" and "landside" as most power airfields where there are clearly defined fences and gates to allow or deny transition from one side to the other. For this reason we must consider anything on or near the runway to be "airside" and maintain a higher level of vigilance for our (and other people's) safety in this vicinity.

1.1 Mobile Phones

Anyone using a mobile phone when near the runway should disassociate themselves from any glider-related activities. That means: keep well clear of any gliders that are not "parked" and specifically do not:

- Control a launch from the cabin.
- Control a launch from the glider wingtip.
- Drive a buggy.
- Assist with moving a glider.
- Drive the tow-out vehicle(s).
- Drive the winch.

1.2 Visitors, farm workers and pedestrians

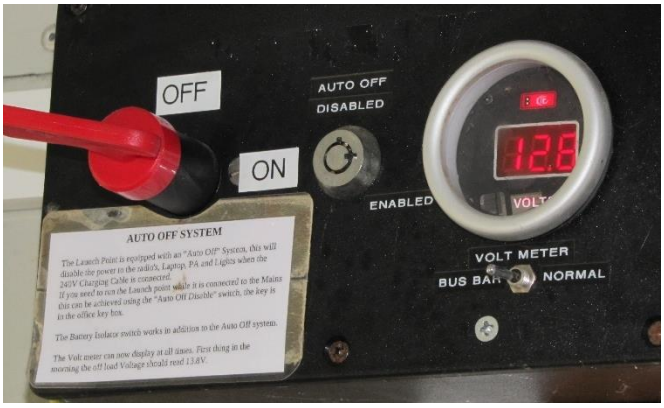
Anyone who is not a club member is unlikely to comprehend the dangers when "airside" and so should be accompanied and/or thoroughly briefed before they are allowed near to the runway.

Be aware that farm workers or pedestrians may stray onto the runways without realising the dangers.

2 Launch Point

The main power switch to the cabin may be turned on using the red key. Note that you can expect to see a battery voltage of around 13V (12.8V in the pictures) or more when the battery is fully charged. Anything less than 12V indicates that the battery is "tired" and will not last long. At the end of the day, this red key switch should be turned **OFF** and the cabin should be returned to near the South-Eastern corner of the hangar where it can be plugged in to the mains to recharge the batteries.

2.1 Launch point power



The main power switch in the launch point cabin is located on the wall opposite the door. Turn this "on" (red key horizontal) to enable the radios and PA system. Ensure that it is turned "off" (red key vertical and may be removed) when the launch point cabin is returned to the hangar for re-charging. The external plug and socket should also be connected to re-charge the internal batteries.

2.1.1 Auto off

Note that when plugged in to external power the "Auto off" function switches off the launch point equipment (like the red key). As explained by a note next to the main switch, if it should be necessary to power the launch point from the external socket, the "auto off" may be disabled with a key that is kept in the office.

3 Log Keeping

3.1 We need to keep logs:

- For our records and administration.
- For BGA (British Gliding Association) records.
- For badge claims.
- In case of emergency (lost aircraft).

Hence: Records must be accurate!

The log is maintained on a computer at the launch point. Most fields in the log are self-evident, and for the majority of normal club flying it is possible to fill in the log with a little training; however, there are a number of complications when adding new members in different categories for trial lessons etc., any such errors may require significant administrative effort to correct; so please do not attempt to use the log system without reading the relevant document or having a thorough briefing from an appropriately qualified club member.

The launch point cabin contains the two methods of communicating with the winch.

1. The PBR radio.
2. The light system.

The BGA require that the lights must be available to stop a launch if the radio fails.

3.2 Keep the noise down!

It is very important to remember that the launch cabin is used to control launches, it is not just a refuge from the weather or a place to relax. It is vital that the noise level in the cabin is kept low so that the launch point controller may communicate clearly and easily with the winch and aircraft; so loud chatter, telephone conversations, music etc. are not acceptable because they might mask a vital message.

3.3 Radio Operation (PBR & VHF)

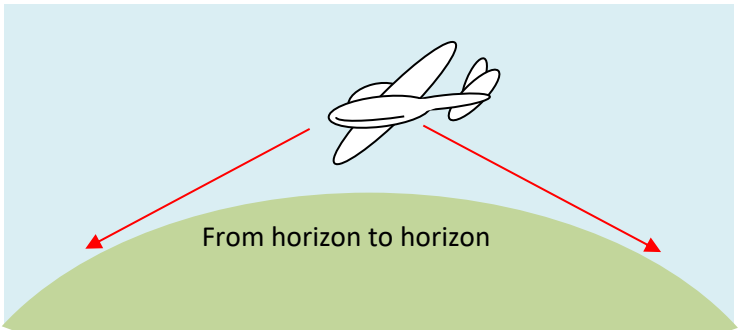
3.3.1 VHF – Very High Frequency (radio).

Used to communicate with gliders and other aircraft.

Please DO NOT use the radios unless you have received one-to-one training on the use of that radio. Incorrect use of a radio could cause an accident.

Glider pilots are allowed to use some of the "Air Band" frequencies that are used for all aircraft communication. Channel numbers are used to identify airband channels that are similar to (but **not** the same as) the frequency tuned.

Air band radios use channels spaced at 8.33 kHz apart, but remember that a radio displaying "129.980" is showing a channel number, not a frequency. The BGA has a special dispensation to allow glider pilots to use a few of these channels without an RT license (Radio Telephony). Note that all other pilots must have an RT license if they wish to transmit on the air band. Remember that VHF transmission is "line of sight" so an airborne glider at Wormingford can probably transmit to most of East-Anglia and Kent.
The ground station, which probably has a greater transmitting power, may easily reach any aircraft at a similar distance.



All gliding clubs may use the same frequencies, so they, and any airborne gliders, will also hear your "chatter"! So be concise and precise. A typical radio call from you should follow this format:

1. Who you are calling
2. Who you are
3. What you want

Use callsigns:
Glider registration (using the phonetic alphabet)
e.g. Golf Delta Delta Oscar Alpha
"Wormingford" (or "Wormingford base")

Your reply to a message should be constructed similar to

1. Who (callsign) you are replying to.
2. Your brief reply.
3. Your callsign (which signifies the "end" of your transmission).

There is preferred terminology and phraseology when transmitting on air band. Remember that other users may have had RT training and they will be using and expecting standard messages. It is beyond the scope of this introduction to explain exactly what to say and how to say it; but please do not use the VHF radio like a telephone!

Avoid transmitting "err" and "um" (or silence), so compose your thoughts before pressing the "transmit" button.

3.3.2 PBR – Public Band Radio

Used to communicate with the winch.

Please DO NOT use the radios unless you have received one-to-one training on the use of that radio. Incorrect use of a radio could cause an accident.

We are obliged to use a different radio system to talk to the winch because none of the air band channels are allocated to "ground to ground" communication.

The PBR transmissions will not be heard by any aircraft, and so the communication may be less formal, but it is still helpful to keep messages as brief as possible and use callsigns. For instance:

Phrase: "Winch. Kia. The weak link has broken"	
Winch	Who I'm calling so that they are "alerted", and the "launch point" know that I am not calling them.
Kia	Who I am.
This weak link has broken	My message

This is similar to**: "Winch!** This is the **Kia:** Just to let you know: **The weak link** at the this end **has broken".** You could say this, but the abbreviated phrase is clear.

3.4 The VHF radio

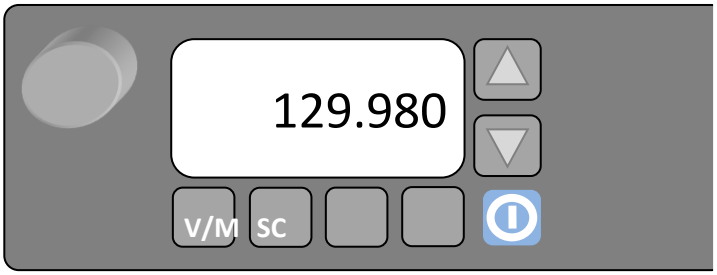
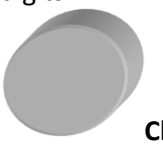


Illustration of the main controls:

On/Off: This push-button is coloured blue and has the conventional "power" symbol on it

Volume: If turned "up" too far the sound from the speaker may be distorted. The up and down volume buttons to the right of the display have triangular symbols on them; and the volume level is displayed as a bar below the channel digits.



Channel selection: The channel may be changed using the rotary control to the left if the display. The radio operates in several different modes, but this controls the selected channel in all of them. The VHF radio is usually tuned to channel **129.980** to communicate with traffic in the Wormingford circuit (but you will hear transmissions from further afield too). Other VHF radios may be tuned to **130.105** (or see the table of channels to the left) when gliders are on "tasks" and going cross-country.

Channel	Primary Use	Secondary Use	Notes
129.905	Ground Retrieval	Parachute/Hang-glider	Shared channel
129.980	Common Glider Field Frequency within 10NM radius and up to a height of 3000ft above certain approved airfields		No secondary use
118.685	Common Glider Field Frequency within 10NM radius and up to a height of 3000ft above certain approved airfields		No secondary use
130.105	In-flight Situational Awareness		No secondary use
130.130	In-flight Situational Awareness		No secondary use
130.535	Cloud Flying	In-flight Situational Awareness	
129.890	Competition	Coaching	
130.405	Competition	Coaching	

Never change the channel! Even if you do not make an illegal transmission on another channel it is quite likely that the next person to use that radio will, because they will not be expecting it to be on the "wrong" channel and probably will not check the channel selection before transmitting.

Unfortunately, people sometimes change the channel when they assume that the rotary control adjusts the volume, so try to check the displayed channel before transmitting.

SQL **Squelch:** This control is not common on "domestic" radios. It adjusts the sensitivity of the receiver, so if it is too low you will only hear very strong (nearby) transmissions. If it is too high the receiver will emit continuous hissing (white noise) sounds. Generally, it is best to turn the squelch "up" until hissing is heard, and then "down" until the receiver just becomes silent when there are no transmissions. Pressing the "SQL" button allows the squelch level to be adjusted; you will see something between "SQ 01" and "SQ 25" displayed as the rotary control changes the level. Pressing "SQL" again returns to the normal (channel selection) mode.

The other buttons provide additional functionality: "V/M" changes the channel selection to "memory" mode, "SCAN" allows the receiver to scan several frequencies rather than remaining set to one channel, and "PRI" allows a "Priority" channel to be selected in conjunction with the scanning. These buttons (modes of operation) should not normally be needed.

Transmitting: When transmitting a "TX" symbol will appear in the top-right of the display. To transmit the button on the side of the hand-held microphone should be pressed, and you may then speak normally into the microphone. Listen to ensure that you will not "break in" to another conversation; hold the microphone a few inches from your face, slightly to one side so that you do not "blow" into it and press the transmit button momentarily before speaking (to ensure that you do not "clip" the beginning of the first word). . You can avoid blowing into the microphone if you hold it to one side and speak "across" it. Pass your message and release the transmit button to allow the radio to receive.

The VHF radio is located (with the PBR radio) on the overhead shelf in the cabin.

3.5 The PBR radio: Base Station

Actually, this is a "mobile" radio but we use it as a base station.

Main controls:

Volume: The rotary control on the left adjusts the volume.

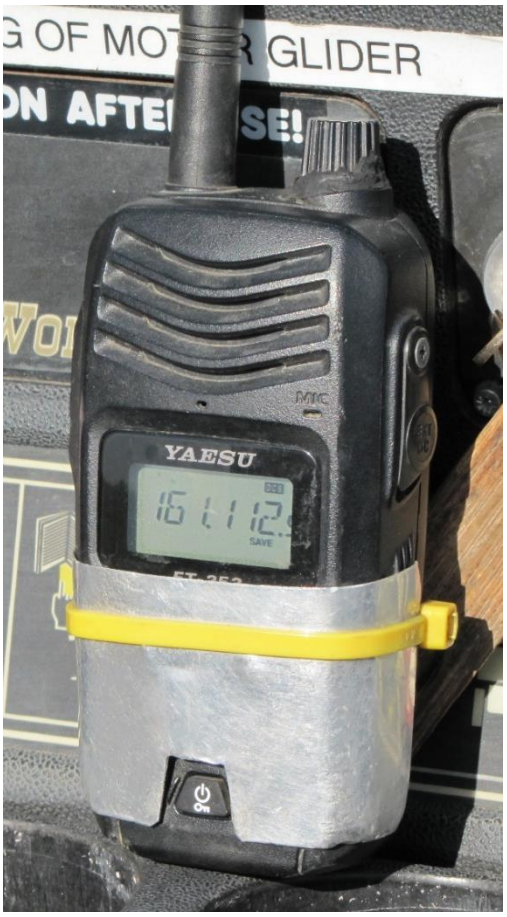
Power to the cabin is controlled by the main power switch (illustrated in the previous section), which should be turned on using the red key.

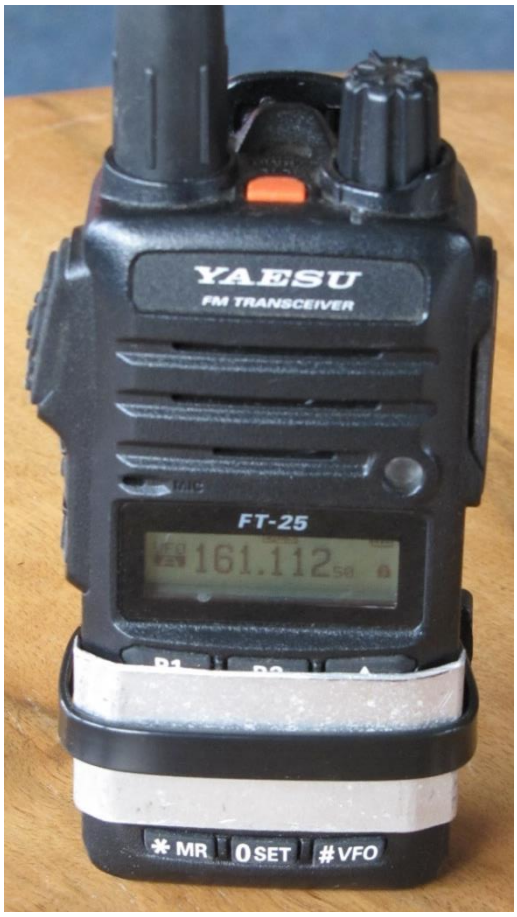
Transmit using exactly the same procedure as with the VHF radio, speaking clearly but normally into the microphone, which should be held a comfortable distance from your face, and slightly to one side

Please note that the correct frequency for this radio is **161.11250** and it should not be used if the display is showing anything else.

3.6 The PBR radio: Hand-Held

3.6.1 main controls:





On/Off The push button at the bottom of the older radios turns them on and off. The newer (FT-25) radios have an **on/off – volume** rotary control on the top

These mobile radios should always be put into buggies (etc.) at the beginning of the day. They should all be returned to the clubhouse for recharging each evening. Place them in the chargers and note the LED illuminates to confirm that it is charging. Please remember to **turn all of them off before returning them to their charger bases** because they do not recharge if they are left on.

Please note that the correct frequency for these radios is **161.11250** and they should not be used if the display is showing anything else. Also, the DCS code is **255** (the FT25 shows "DCS" above the ".112").

3.7 The PA system

The PA system is not a radio but is located beside the radios on the overhead shelf. The microphone for this is located in a holder between the windows.

The controls to the PA system rarely need to be adjusted. It is normally left switched "on" (the switch on the right-hand side is "up", with the microphone volume set to about ¾. There is also a "FOG/SIREN" switch which causes a loud, attention grabbing, noise to be made.

To make an announcement to the club members near the launch point, turn the switch on the microphone "on" and speak clearly. Remember to turn the switch "off" again.

3.8 Light Signals

There are three light signals:

Signal		Meaning
Dashes of one second duration and three seconds interval.		Take up slack
Quick dots at one second interval.		All-out
Continuous: Steady light		Stop

The launch point lights are controlled by a set of push-buttons at the launch point which cause the signal light to be off, on, or flash at an appropriate rate. The signal switch box makes a "beep" sound when the signal lamp is illuminated.
There are four main buttons; one for each signal: There is also an **on/off** button (which is often left in the "on" position) which displays an orange dot when "on". The "tow out" button may be used to illuminate a light for the tow-out vehicle to use as a "target" and so drive directly towards the launch point. This is only necessary if the vehicle driver is unsure of the launch cabin position because it is "over the horizon".

The light signals can only work if the light is pointing towards the winch. Whenever the winch or launch point cabin is moved it will be necessary to re-align the light so that it is clearly visible from the winch. This is usually done by using the radio and getting the winch driver to say when the "stop" signal is most visible while slackening the clamp and rotating the light appropriately.

3.9 Launching

The launch is one of the more demanding and critical phases of a flight. Consequently, correct techniques and procedures are essential for safe operation. Please do not even attempt to help with a launch unless you have received specific training and are fully conversant with the required procedures. If you have any doubts then do not launch or assist with a launch.

The same person operates the radios and lights to launch a glider. They are usually responsible for using the computer to keep the log too.

Once the glider pilot has accepted the launch cable the wing-tip runner controls the launch.

Anyone may stop a launch by shouting "stop" and raising a steady hand, overhead. The glider pilot may release the cable to initiate a "stop" and should do so if a launch is stopped by anyone else. This will prevent any power being applied to the glider, even if the winch driver has not yet received the message.

The person controlling the radios and lights is only relaying the signals from the wing-tip runner to the winch. Of course, they may stop a launch if they consider the situation is unsafe but must not initiate any signals before a positive signal from the wing-tip runner.

The light signals are the primary means of communication between the launch point and the winch during the launch process.

The launch normally proceeds as follows (note that this is focussing on the actions of the launch point control and does not fully describe the actions of the wing-tip runner or winch driver):

	Wing-tip runner	Launch point control	Winch
1		It is necessary for the launch point to call the winch shortly before a launch to tell the winch driver what the "next" glider type is.	Prepares for that glider
2	Signals "Take up slack"		
3		Push the "up-slack" light control button to start the light flashing the "take up slack" signal. At the same time call the winch with the phrase "take up slack". Sometimes, the launch point will advise the winch driver of the glider type at this time. Commonly: "Winch, Launch point *(pause)* K13 *(pause)* take up slack". Or: "Winch, Launch point *(pause)* take up slack". In either case, the "take up slack" should be three distinct words.	
4			Starts to reel in the cable
5	Signals "All out"		
6		Push the "all-out" light control button, to signal "all out", and call "all out" as two distinct words on the radio. This is often transmitted as: "all out *(long pause)* all out", which adds a confirmation of the signal in case of poor reception at the winch for whatever reason.	
7			Launch power
8		At any time: If the launch should be stopped, Push the "stop" light control button and call "stop" on the radio. Again, for clarity, the radio call is often: "Stop *(long pause)* Stop *(long pause)* Stop".	
9		When the glider is "in flight" and has gained more than about 100 feet in altitude the winch driver can then see the glider clearly and their attention will be on that rather than the signal, so the light signal may be stopped by Pushing the "off" light control button.	

The verbal launch signals are:

Take up slack
All out
Stop

Note that these phrases are three, two and one words. This is the reason why the words should be pronounced distinctly and independently, so that if there is noise in the message transmission the number of words also indicates the meaning.

After the "all out" call, it is the responsibility of the pilot or winch driver to abort a launch. Do not "stop" a launch that is already in progress, because doing so could cause an accident.

3.10 Launch Point: Tow-out light

The signal light may be illuminated to assist the tow-out vehicle driver to take a direct path towards the launch point. Occasionally, this may be necessary if the launch point is "over the horizon" from the winch and the tow-out driver is unsure of the correct direction to start off. Pressing the "Tow Out" button will illuminate the light. It will turn itself off after about 30 seconds.

3.11 Launch point Wi-Fi link

There is a Wi-Fi link to the launch point. Aerials on the clubhouse and launch point cabin provide a connection. Note that there are two aerials on the roof of the cabin which point in different directions. If one of these is not pointing towards the clubhouse then the connection may fail. This will be indicated when the light on the launch point desk illuminates.

If this occurs, then it may be necessary to re-orientate the entire cabin to establish a link, however, before doing so it is prudent to check that no-one has changed the switches controlling this. These three switches, located on the back wall of the cabin, are shrouded with red covers and should be left in their default settings, but may caught inadvertently if items (personal bags etc.) are stored in that corner.

3.12 Launch point batteries

Access to the batteries is via the outside door. The square "key" to

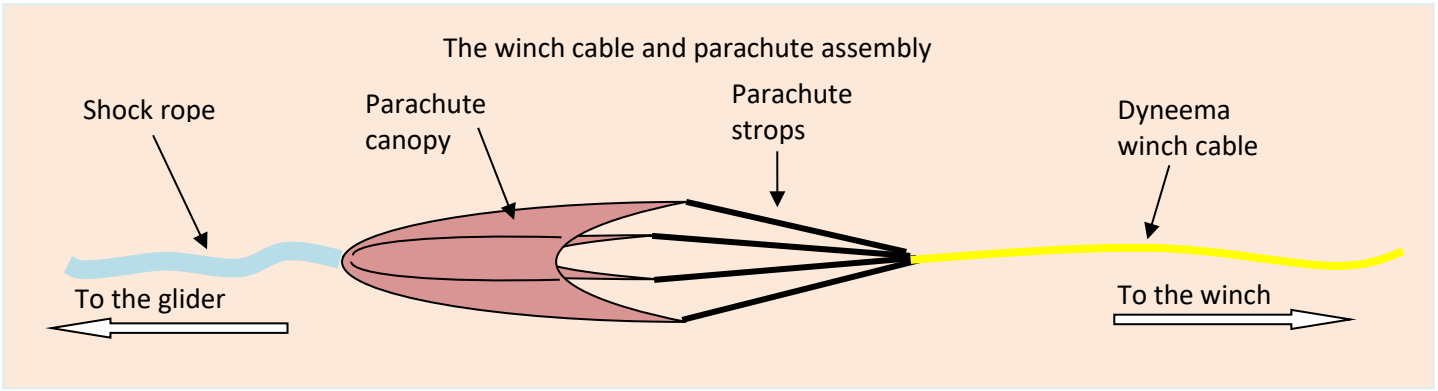
open this door hangs near the main power switch.

At regular intervals, the level of fluid in these batteries should be checked and topped-up if it begins to get low (as with any lead-acid battery).

4 Cable Handling:

4.1 Safety aspects.

- Always treat the cable as though it is "live" (as though the winch is powered on and the cable you are touching is selected through the transmission). Do not wrap the cable around your hand or arm. Try to "hook" the cable in an open hand between you and the winch, so that if it did snatch for any reason, it would be pulled out of your grasp, and not "towards" you. (Consider the possibility of a farm vehicle crossing the runway unexpectedly and "collecting" a cable).
- Never pull on any part of a cable without ensuring that no-one else is touching it. If you need to pull the cable "out" to the glider with any force at all, then use the radio at the launch point to confirm that the winch driver is clear. If the winch driver releases the brake then the operation will be easier anyway, and they can ensure that the cable drum does not "overrun" when you stop pulling.
- Do not handle the second cable until the **winch driver** has confirmed that the cable used for the first launch is retrieved and safely clear of the second cable.
- Always keep the cables further "up" the runway, ahead of the launch, than any people.
- Always keep people "behind" the launch, so that there is no possibility of either cable or the glider hitting them.
- Ensure that the cables are laying parallel between the winch and launch point and that there is no possibility that they are crossed.



Be alert to:

- fraying cable, particularly at connectors.
- loose or damaged connectors (shackles etc)
- "crossed" parachute strops
- knots in the shock rope
- damaged weak links

Any of which could cause a launch failure.

- Correct potential problems before allowing the launch to proceed.
- Do not handle any part of either cable or their associated parachute assemblies if you believe that the winch is "in gear".

4.2 Weak links:

Weak links are used to protect the glider. They have different colours and a number stamped into them.

Number	Colour	Strength daN	
1	Black	1000±100	
2	Brown	850±85	
3	Red	750±75	
4	Blue	600±60	
5	White	500±50	
6	Yellow	400±40	Not used at Wormingford
7	Green	300±30	

daN = **d**eca-Newton.

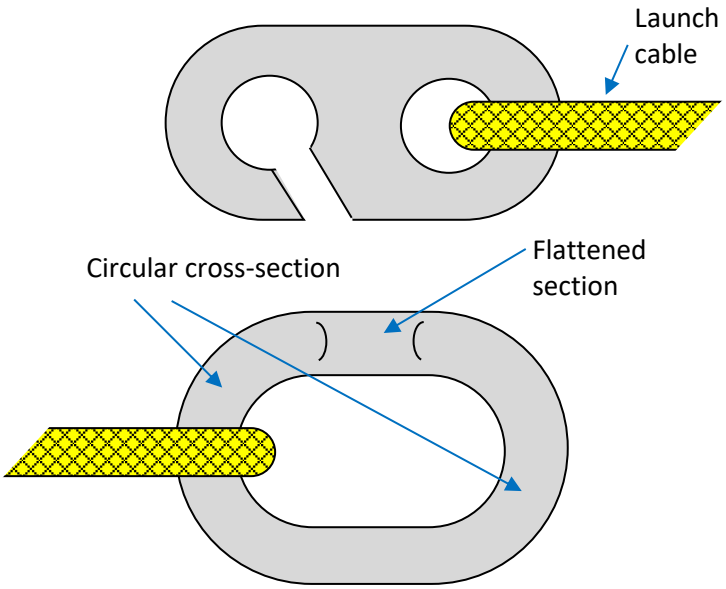
Deca = Multiply the value shown by ten.

Newton = The force required to accelerate a mass of one kilogram by one meter per second per second.

- If you attach a link that is "too strong" then the glider structure could be damaged if the forces exceed the design limits.
- If you attach a link that is "too weak" then there will almost certainly be a launch failure, with the potential for an accident.
- If you attach a link that is damaged then it will probably be too weak, with the increased possibility of a failure.
- Weak links are protected by similar length of "square U section" aluminium bar which has an attachment hole at one end and slot at the other, so all of the force is transmitted through the weak link. Any distortion to the fittings or attachments could affect the link strength and may make the link "unserviceable".
- Check that the central hole in the weak link is circular. Oval distortion shows that the link is damaged and should be replaced.
- Many gliders (but not all) have a coloured patch near the cable release (attachment point) to show that they need that colour weak link.
- The pilot should always ask the person attaching the cable for the correct colour weak link. If possible, show the correct link to the pilot prior to attaching it, and check the colour against the patch on the glider. The pilot may have made a mistake!

Weak links are normally stored on a rack on the outside of the launch vehicle. Please replace them there when not in use, this will prevent them from being lost, help us to keep them clean and available for use, and avoid them being damaged when run over by one of the vehicles
We attach the weak link rope to the rest of the cable using a quick-connect hook and ring mechanism. The ring is an oval with two short straight sides. Most of the ring is circular in cross-section, but one of the straight sides is

flattened to give a similar flat-sided oval cross-section.



The hook is made from a flat plate with a slot machined to be just wide enough to slide over the flattened cross-section of the ring. The main hole in the hook is wider, so that the ring may be rotated to the "pulling" orientation (along the axis of the main oval) which prevents it from disengaging, because the circular cross-section of the majority of the ring is too big to slide through the jaws of the slot in the hook.

Be alert to the gap in the hook wearing. If it becomes enlarged then there could be failures or loss of equipment if it disengages inappropriately (for instance just after the glider has released).

4.3 Parachutes

The purpose of the cable parachute is to open and provide some "drag" whilst the winch is reeling in the cable, after the glider has released. This helps the winch to draw the cable in smoothly and without loops or kinks.

The winch cable is attached to the parachute strops, and the shock rope is attached between the apex of the parachute canopy and the glider, so the tension in the cable keeps the parachute closed during the ascent. This means that all of the power is transmitted through the parachute to the glider, so it is important that the parachute strops and canopy are undamaged, because any point of weakness can quickly lead to a rip and consequently a launch failure.

Ensure that:

- The parachute strops appear sound and well attached at both ends.
- The strops are not twisted and tangled. They are never manufactured that way!
- The parachute canopy is not fraying.

5 Launching Gliders

"Flight time" is defined as the time between the moment a glider starts to move on launch until it halts after landing. Correct launching technique is vital to the safety of the flight. A person assisting with a launch can endanger the flight by inattention or carelessness, so do not attempt to help if you have not been fully briefed and supervised on the procedure previously.

5.1 Pre-launch checks

It is common for the person who attaches the cable to the glider to be the same person that subsequently runs with the wing tip and they can be starting their "all clear ..." scan whilst collecting and attaching the cable. Even if they are not then the view back from the point of attachment is different from the view from the wing tip (different sections of the circuit may be obscured from view by the launch cabin), so the person attaching the cable may contribute to safety by keeping a good lookout.

As already mentioned, the cable should not be handled if there is any risk of it being "live" and it certainly should not be attached to the glider if the winch is not prepared for the launch.

The cable should be attached to the glider last. In other words, you must not connect the weak link rope to the glider and then connect the other end to the launch cable. The pilot is "ready" for the launch when they accept the cable being attached. If a period of time elapses between that attachment and the actual connection then their attention may be elsewhere when the launch actually commences!

When attaching the cable to the glider check:

- That the cable, parachute and shock rope look serviceable and untangled, and specifically that there are no knots in the shock rope or weak link rope.
- That the correct weak link is fitted. Ask the pilot if they do not request a specific colour and double-check if there is a coloured patch near the release.
- That "the rings" that actually attach to the glider do not appear to be worn or distorted. If the attachment ring is not circular then the release mechanism may not work correctly, and if the ring has worn "thin" as a result of a lot of use then it could release prematurely.

Also:

The aircraft is the pilot's responsibility, but you may notice that they have not completed their checks correctly. For instance

- you might be able to see that the canopy is not correctly fastened or
- the airbrakes are not locked, when the error is not obvious to the pilot.
- Similarly their straps could be badly placed or adjusted, or
- an object could be insecure on a rear shelf.
- The pilot should have removed the tail-dolly, and may ask you to confirm its absence. Even if they do not prompt, you should check that nothing is attached to the tail.
- The tyre may be under-inflated, but the fault was not obvious until the pilot was on board.
- Check the wind direction. Are we still launching "into wind"? Has it changed recently?

If in any doubt, ask the pilot.

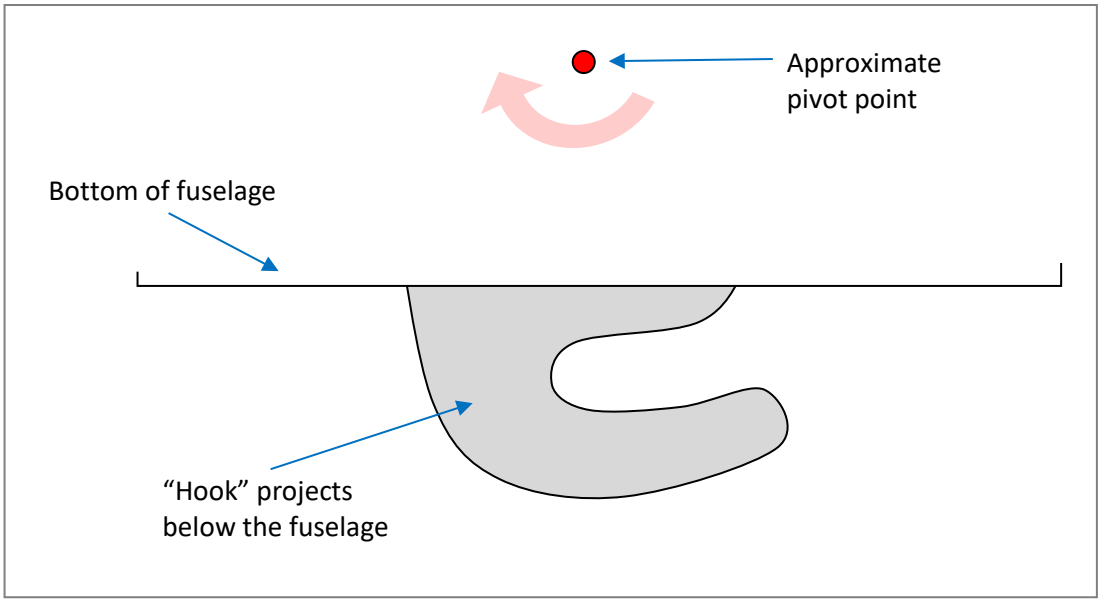
If you have any spare time whilst waiting to attach the cable then scan the sky into which the launched glider will go, and the circuit (both sides) so that you are aware of the location of any "local" aircraft, and gliders preparing to land. This will help you to form a "picture" of the traffic and possible conflicts prior to the actual launch taking place.

5.2 Attaching the cable:

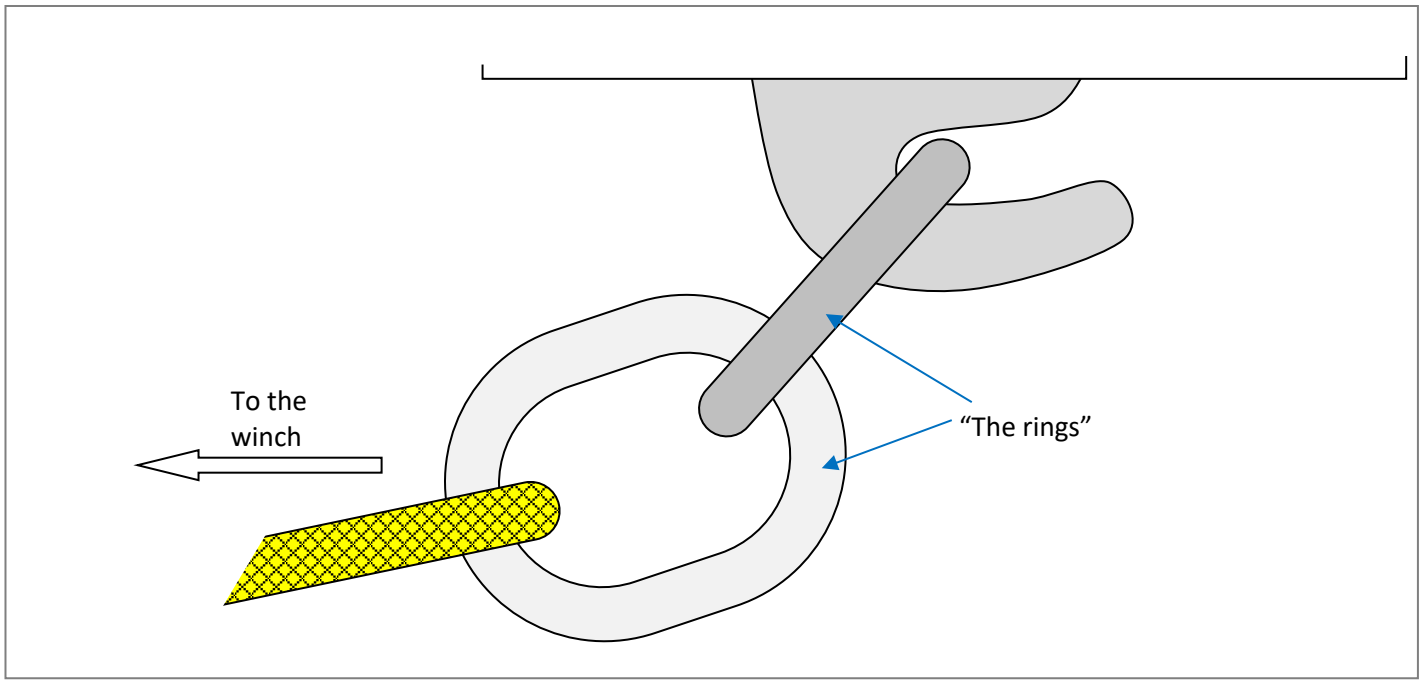
The cable is attached to the glider by putting “the rings” into “the hook”.

“The rings”: are two interlinked rings on the end of the cable. There is a larger oval one that has the cable through it, and a smaller round one that fits into the hook on the glider.

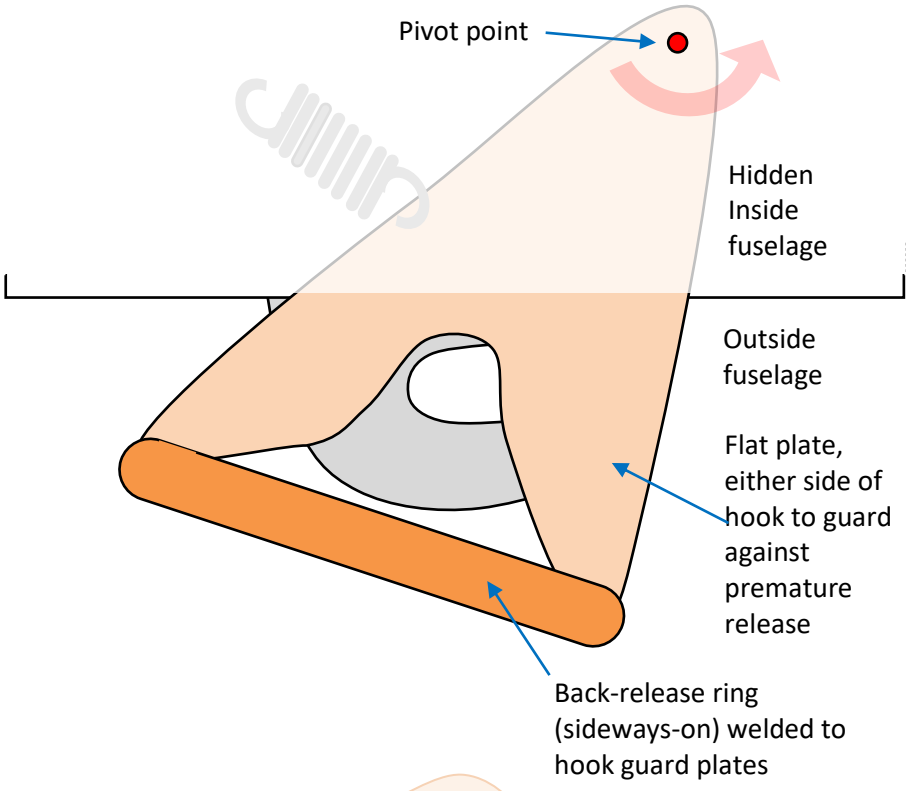
“The hook”: Is the mechanism found usually on the bottom and possibly left (port) side of the glider. Many gliders have more than one hook, with another mounted near the nose for aero-tow. But it is the rear-most one (usually near the main wheel) that must be used for winch launching. The aero-tow hook usually has the back-release mechanism disabled, so that it can never back release.



“The hook” is much more than just a hook. It incorporates the release mechanism operated by the pilot and a back-release mechanism that allows the ring to detach if it is not pulling the glider forwards.

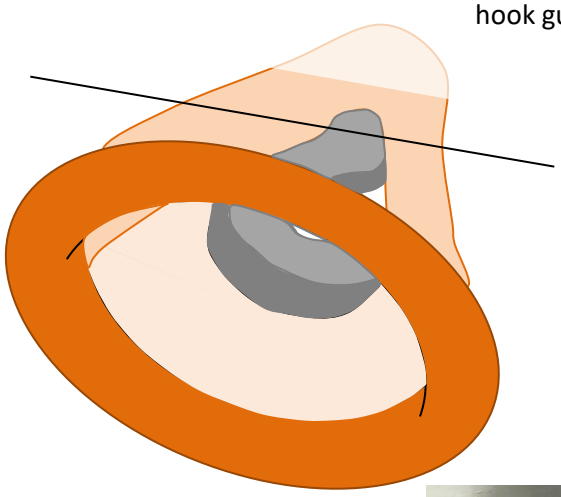


The hook itself engages with the ring to allow the glider to be pulled forwards and aloft. In most gliders it projects just below the bottom surface of the fuselage. It is encircled by the back-release ring and side plates which effectively "close" the opening in the hook, preventing the cable rings from detaching inadvertently. This back-release ring is often nearly parallel with the bottom surface of the fuselage, or slightly inclined "forwards", and is held in place by a spring. The strength of that spring is sufficient to prevent "the rings" attached to the cable from opening the gap and falling from the hook under their own weight.



When the pilot operates the release, the hook rotates forward and up into the fuselage, thus "dropping" the ring attached to the rope.

If the glider launches past the winch, the launch cable begins to pull backwards slightly, transferring some pressure onto the back-release ring and guard plates; this overcomes the light spring and allows the cable ring to detach from the hook.



Perspective view from one side and below

A few gliders have the release hook mechanism shielded by two plates, one either side, which project below the fuselage and are aligned parallel fore-and-aft. This can make the mechanism difficult to see, and more care is needed when engaging the rings to attach the cable.

5.3 Attaching the cable: - Normal procedure when launching

- Allow the pilot to through the “pre-launch checks”.
- Check the cable is not knotted and the condition of all of the links.
- Be aware of nearby gliders, particularly those within the circuit or in the range of a launch.
- Do not distract the pilot from their pre-take-off checks.
- Do not attempt to hurry the pilot into accepting the cable. Wait for the pilot to be ready to accept it.
- This is a pilot-controlled operation. Never attach the launch cable using the back-release mechanism.
- The pilot should prompt you for the correct colour (grade) of weak link. If they do not then announce which colour you have when they request the cable to be attached, and preferably show the pilot the weak link as further confirmation.
- Some people prompt the pilot with “Brakes closed and locked?” before attaching the cable. This is not a BGA requirement, but it is common at some other clubs: This prompt should be unnecessary, and is not required, but the pilot usually responds with a similar affirmative statement.

5.3.1 Open

When the pilot asks for the cable they will often call out “**open**”, when they open the release mechanism. If not then you can make the same prompt for them to do so. When crouched low to attach the cable it is often impossible to see the pilot, so a loud “**Open!**” request is often the best way to communicate. Some people supplement this with an “open hand” gesture with their raised free hand.

5.3.2 Close

The smaller (round) ring is placed into the open hook mechanism as previously illustrated., and the person attaching the cable calls “**Close**”, possibly accompanied by a “clenched fist” gesture. The pilot releases the mechanism at that command and the hook springs shut.

If possible, when the release is closed, try to rotate the ring slightly around its own circle, or move it gently within the opening of the hook, to ensure that it is actually seated properly into the hook, and not just pinched in the jaw of the hook and back-release ring.

When standing, move ahead of the glider, grasp the shock rope, and pull firmly in the same direction that the winch will be pulling to further confirm that the ring is seated correctly in the release hook.

Place the rope on the ground so that it is relatively straight and running away from the glider (generally towards the winch) for the first few feet (or metres).

Walk clear of the launch.

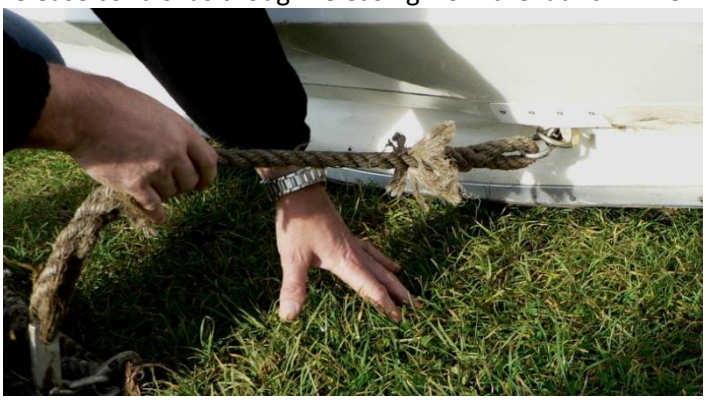
5.4 Attaching the cable:- normal procedure when attaching a "buggy" to tow the glider

- Never attach a cable to tow a glider until all parties are ready to undertake the tow.
- You may use the same "open" and "close" commands with another person operating the release mechanism (they are usually standing alongside the glider).
    - Ensure that the canopy is open, and that the person operating the release is not doing so by reaching through the "clear view" (or "direct view") window.
- Alternatively, the cable may be attached by pushing the back-release mechanism rearward, whilst sliding the ring through the opening thus made, onto the hook. On many gliders, this can easily be done by one person from outside the glider (often one handed); but there are a few gliders where the release is more awkward to access.
- Check the attachment for security.
- Stand clear of the tow cable.

5.5 Attaching the cable:- Cable checks

Usually prior to the first launch of the day, but occasionally at other times, the pilot may request "**cable checks**".

There are three checks which may be accomplished in any order:
Free fall: The cable is attached using the same sequence as for a normal launch. The person attaching the cable then observes the release mechanism and calls "**free fall**" to the pilot. The pilot operates the release, and the rings and cable should fall to the ground under their own weight.
Back release: The cable is attached using the same sequence as for a normal launch. The person attaching the cable then grasps the cable near the rings, and pulls down and back towards the tail of the glider. Usually whilst calling "**back release**". The cable should be released with little effort, and without the pilot pulling the release control.
Under tension: The cable is attached using the same sequence as for a normal launch. The person attaching the cable then grasps the cable ahead of the attachment and in line with the winch if possible, and pulls firmly, whilst calling out "**under tension**" (you may hear just "**tension**" or "**1... 2... 3... tension**") at which point the pilot pulls the release control as though releasing from the launch. The rings and cable should fly from the release freely.



Obviously; if any of these checks fails for any reason the launch should be stopped and the failure investigated.

5.6 Lookout

5.6.1 "All clear … Above and behind"

This is the phrase that the signaller (probably the wing tip runner) should call out to the pilot prior to signalling. This means that the signaller has:

- Checked the airspace that the glider is about to launch into. There must be
- No aircraft in that area.
- No aircraft moving towards that area.
- Checked above and behind the launching glider, in the areas that the pilot probably cannot see. Again it must be clear of conflicting aircraft.
- Checked the circuit and base legs for aircraft that are about to land. If there is a possibility that a landing glider may run ahead of the launching one, or if there could be a problem with a broken winch cable "drifting" across a landing aircraft, then it is unsafe to launch.
- If the signaller cannot see part of the circuit (for instance behind the launch vehicle cabin) they should ask someone else to check that area.

Also:

- Check the wind direction (again).
- Look ahead. Is there a farm vehicle that could snag the cable if it broke? (wind direction)
- Is there a pedestrian or vehicle on the track that no one else has seen?
- Consider the path that the glider will follow on its ground run. Remember that it may swing "towards" the cable, or weathercock into-wind. Is there anything on the ground, such as a wing-weight bag, or the other cable parachute? If the departing glider wing tip drops to (near) the ground then any obstruction may have very serious consequences.
- Look at the ground ahead. Is there anything (like a wing weight) that you might trip over during the launch?

If in doubt, do not proceed with the launch. It must be:

"All clear ... Above and behind"

5.7 Wing running: Normal, light into-wind conditions

The objective, when "running the wing", is to hold the glider wings level until there is sufficient airflow for the controls to become effective enough to allow the pilot to keep the wings level.

When "running the wing" you must attempt not to either hold the wing tip back nor to push the wing tip forward, because either of these will cause the glider to yaw.

Hold the wing tip lightly at the tip, preferably behind the “thickest” part of the wing, or towards the trailing edge. Avoid resting your hand on top of the leading edge with your fingers wrapped around the leading edge, because if the glider moves quickly you will almost certainly hold that wing tip back.

Some gliders have “handles” attached to the tip, or holes through which a picket rope may be tied. Do not put your fingers in these openings, or they may depart with the glider!

Keep a good lookout, even if you are not signalling, and watch for activity from the winch and any movement of the cable, so that you are ready to move with the glider.

If, at any time, there is any significant “up” or “down” force on the wing tip: Stop the launch. This is vitally important because if the force still exists when the glider begins to move, there is a strong possibility that the glider will “roll” and a wing tip could come into contact with the ground; which in turn may lead to a ground-loop.

As the cable becomes taut, check to see that the glider has not lurched forward and overrun the cable. It is possible that if the glider does overrun, the cable could wind around the wheel or axle, and therefore be unable to release. If in doubt, stop the launch and confirm that there is no problem. Similarly, if the glider runs forward, creating a small amount of slack in the cable, then when the winch applies launch power (with the “all out” signal), the cable will snap straight and jerk the glider forward which could result in the pilot losing control, or something breaking with the strain.

Be prepared to take a few steps forward with the glider when the cable becomes tight, but the “all out” signal is not yet been communicated to the winch driver.

When “all out” is given, the glider normally accelerates rapidly, and it is not possible to “run” with the wing tip for more than a few steps. Try not to hold onto the tip too tightly, so that it can pull away from you without restriction (retardation). However, if the winch driver is being cautious (for instance, with a light glider), the acceleration may be more gentle; in which case you may need to run some distance, whilst keeping the wings level.

If the glider is carrying water ballast, then it is important to keep the wings level at all times prior to the launch, and the added weight may make the ground-run a bit more sluggish.

Once the glider has departed, it is helpful if you continue to observe the launch in case the cable or weak link breaks, when you may be able to see the broken section falling and help to locate it on the ground. You may also be asked later for “feedback” on how the launch went, either by the winch driver or the pilot. This feedback can be particularly valuable when the launch does not proceed perfectly and can help to analyse what went wrong.

5.8 Wing running: Strong, into-wind conditions

All of the points outlined in “Wing running: Normal, light into-wind conditions“ apply, but when the wind is stronger, the wing runner has less to do, because the glider pilot can gain control with very little ground speed, so there is less need to run.

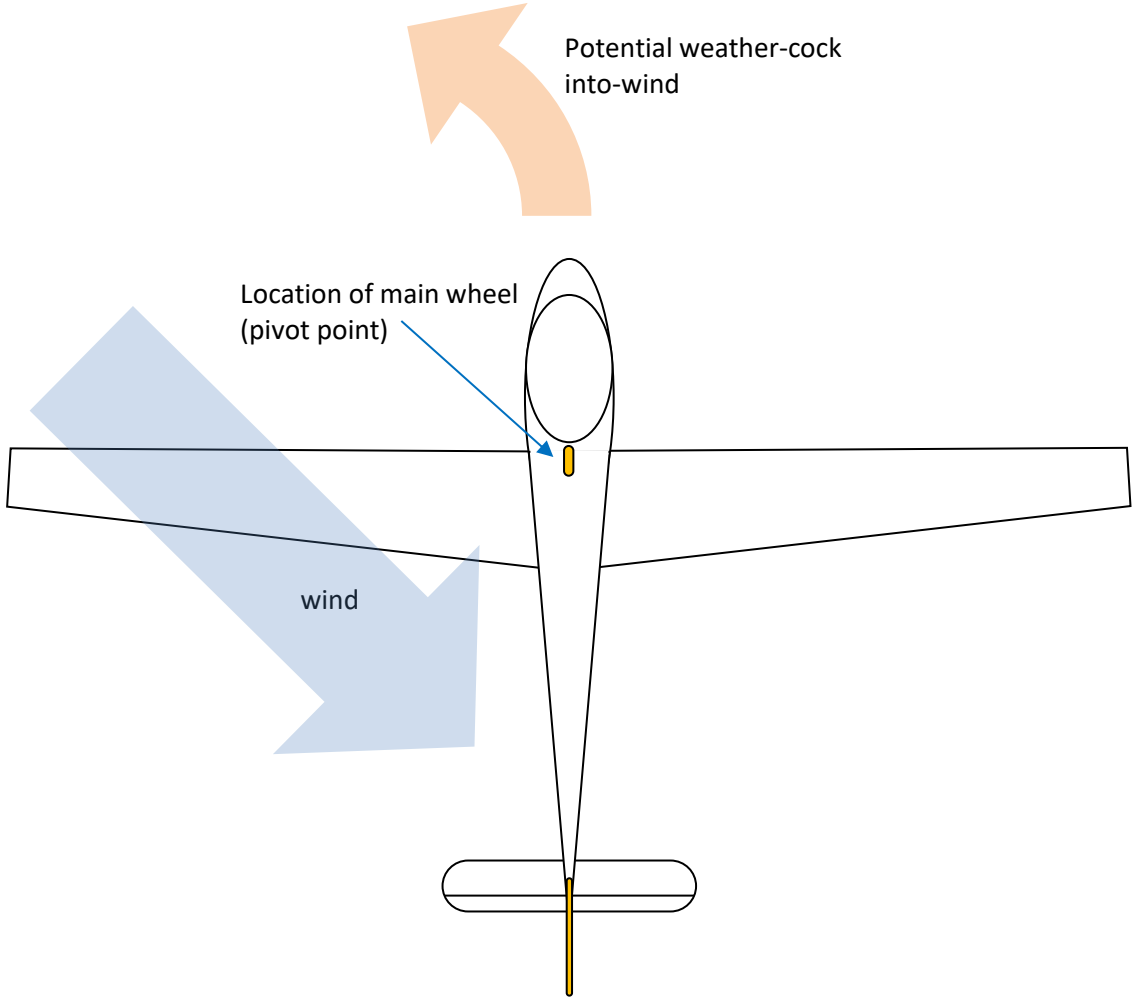
However, It may be necessary to hold on to the wing tip quite firmly until the glider actually moves, particularly if the conditions are at all blustery. If this is the case then you must be extra careful not to push or pull on the wing tip when the glider moves off.

“Full and free” movement of the controls is part of the glider pilots pre-take-off checks. If they use a large control deflection in a strong wind it may wrench the tip from your hand, so you need to be alert to this possibility. Similarly, you will find that many pilots “exercise” the controls in anticipation of the launch. Again you need to be prepared to “hold on” when they do this.

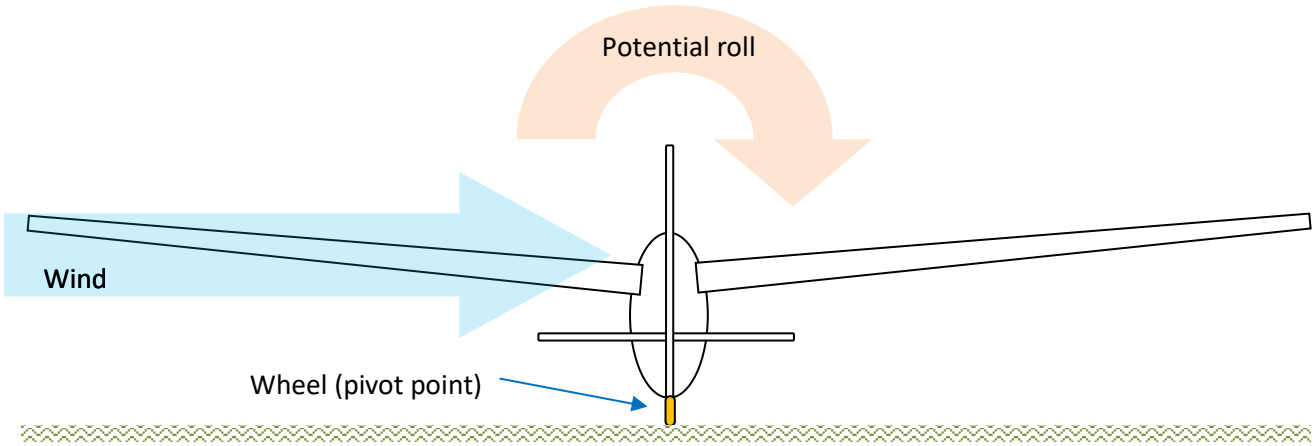
Also, you need to be more aware of consistent “up” or “down” forces on the wing tip, due to the pilot having the aileron deflected; in which case there is a danger that the glider will roll rapidly as soon as you let go. Try to draw the pilot’s attention to this well before the cable moves, so that they can correct the problem, but do not distract the pilot if there is any possibility that the glider might move, because they need to be looking forwards and not sideways then. . Remember to stop the launch if you become aware of these forces to prevent the possibility of a ground-loop.

5.9 Wing running: Cross-wind conditions

When there is a cross-wind, the previous "Wing running" points apply, but there are two more possibilities: The glider may weathercock, and the glider may roll.



The cross-wind hitting the tail surfaces of the glider (which are a long way behind the main-wheel pivot point) will cause the glider to tend to turn to face into the wind. The ground friction when the glider is at rest , may prevent this tendency, but it will become more apparent as soon as the glider begins to move. As the wing runner, there is not a great deal that you can do to help the pilot counteract this, but try not to add to the problem!



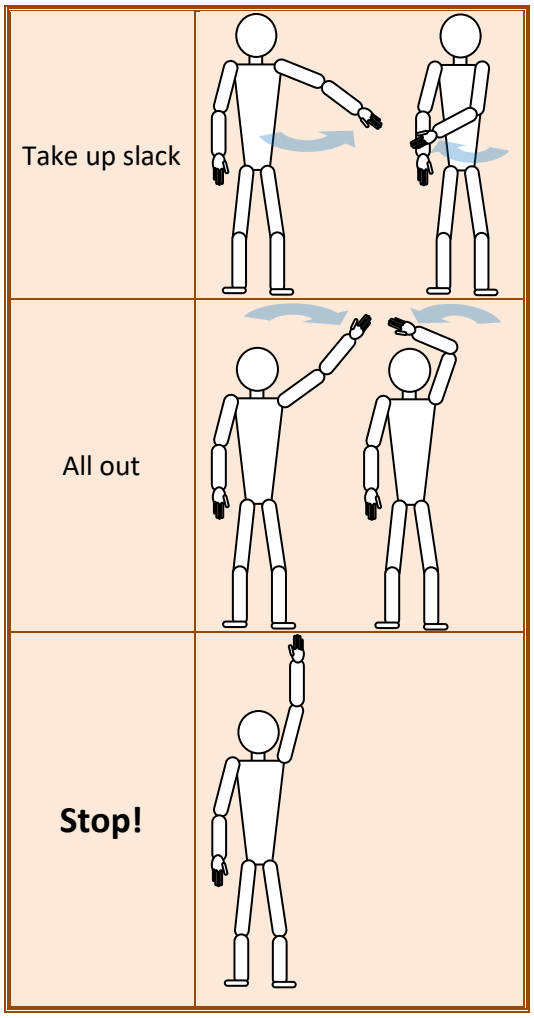
Gliders with a "higher" wing are quite susceptible to being rolled "with" the wind, as the wind gets under the into-wind wing. Once this starts it can be quite difficult to stop if the ailerons have insufficient airflow to provide the necessary restoring force. It can be beneficial to hold the into-wind wing "low", to help to prevent this condition from starting, but only do so with the agreement of the pilot.

5.10 Launch Signals

The launch signals are the same, whether for aero-tow or winch launching.

By accepting the cable, the glider pilot has consented to launch, and responsibility for signalling and controlling the launch is then passed to the signaller (who is often the wing runner too). At any time the pilot may abandon the launch by releasing the cable and calling "stop".

Refer back to the "Lookout" topic. It is imperative that no signals are given until it is certain that it really is clear to launch. The signaller should then call out **"All clear; above and behind"** to confirm that they have looked, and to give anyone else the opportunity to intervene if they have spotted a potential conflict.



5.10.1 Take up slack

The signaller then calls out **"Take up slack"**, and confirms this call with the hand signal, where the arm is swung from the shoulder (or elbow), side-to-side in a low arc like a pendulum. This signal is primarily to the launch point controller (in the cabin), and so the signaller should try to stand in a position that allows the signal to be seen clearly from the cabin. Any pedestrians in-between should be asked to move if there is not a clear line of sight. On rare occasions it may be necessary to ask a third person to relay the signal if that line of sight cannot be established for operational reasons.

Note that the advantage of calling "Take up slack" verbally as well as giving the hand signal is that:
The glider pilot is aware of the progress without looking and
Other people at the launch point are alerted to a launch in progress.

5.10.2 All out

The signaller should maintain a good lookout, and watch as the cable becomes tight. When the glider just moves slightly the cable is tight and the signaller calls **"All out".** All out is confirmed with the hand signal where the hand and arm is swung clearly, from side to side above the shoulder.

5.10.3 Stop

The "**Stop"** signal may be given at any time, by anyone who believes there is a reason to stop the launch. An arm raised straight up and stationary above the head is the hand signal (you may see both arms raised and held stationary), and a loud and clear "Stop" shout should be made. The "Stop" is often repeated with a pause: "Stop ... Stop ... Stop" for emphasis. These repeats are not necessary, but confirm the command. On hearing the "Stop" call, the glider pilot should immediately release the cable in case the winch is still active and has not received the signal.

5.10.4 Signal Clarity

It is important that all signals are bold, clear and unambiguous. For this reason it is insufficient to emulate the Queen and just waft a hand from the wrist, and verbal calls should be loud and distinct.

All hand signals should be continued all the time that they are current; so

- the "take up slack" signal should be continued until the "all out" signal is given, and
- the "all out" signal should be continued until the glider is clearly on its way.
- If you signal briefly and then stop, the person in the cabin will not be sure that the signal is still "in force" and may stop the launch.
- Similarly, to stop a launch, you should **continue** to signal and shout "**Stop**" until you are certain that everyone has got the message.

5.11 Observing the launch

Once the glider has departed, it is helpful if you continue to observe the launch in case the cable or weak link breaks, when you may be able to see the broken section falling and help to locate it on the ground. You may also be asked later for "feedback" on how the launch went, either by the winch driver or the pilot. This feedback can be particularly valuable when the launch does not proceed perfectly and can help to analyse what went wrong.

You may be able to gain some insight into the wind conditions aloft, for instance the existence of wind shear. You may also be able to assess the cross-wind component, and how effectively the launching glider "lays off" into the cross wind.

5.12 Actions on cable break

- Try to watch any broken "bits" of cable to see where they fall, so that you can go and fetch them or direct someone else to their location.
- Check with the winch driver to see if they need assistance to sort out the mess at the winch.
- Do not "set off" down the runway until your actions have been agreed at the launch point and with the winch.
- Do not obstruct the runway for landing gliders.
- The cable parachute and any weak link components should be retrieved if at all possible. However, if they have fallen in a field you should make every effort to avoid damaging crops by walking down the tractor tracks. Vehicles should never be driven into the fields.

Often, the easiest way to remove the parachute from a field is to carry the canopy etc. and drag the remains of the dyneema cable behind, assuming that the cable is sliding easily across the ground. If there is resistance then the cause of that must be investigated. Once the parachute is placed back on the runway, the rest of the cable can be pulled from the field and laid in a straight line or series of non-overlapping arcs or loops.

If the cable is not broken locally, then it may be more effective to "hop" the cable across the field, rather like a giant skipping rope. To do this it may be necessary to repeat the operation at various stations along the cable.

At no time should Dyneema cable be dragged forcefully, because any friction around sharp stones or other fixed objects may do further damage to the cable.
Once the cable and parachute have been returned to the runway, the broken end can be pulled slowly back to the winch where the break will be repaired.

6 Glider Manoeuvring:

6.1 Personnel requirements for conditions

In most light wind conditions at least two people are needed to manoeuvre a glider. One to hold the wing tip, and another to push or pull. The person holding the tip is "steering" and should also keep a good lookout.

If a buggy is used to tow the glider then a third person is required to drive it. In this case, the person on the wing tip is still steering, and the other person should walk near the fuselage so that they can act as a brake to stop the glider if necessary, and they may release the towing rope, either using the back-release, or by pulling the release control. Note that (usually) only the winch hook has a back-release mechanism, and so towing from this provides more possibilities for quickly releasing the tow-rope.

As the wind strength increases more people may be required. Another person at the rear fuselage (where the handles are positioned on a K13) can help to prevent the gliders tendency to weathercock when being towed cross-wind, either by resisting the sideways force or by keeping the tail in contact with the ground until the glider needs to be turned.

Controls slamming: When the glider is positioned across or tail-on to the wind, then the control surfaces will be deflected to their full extent by the wind, which will then continue to strain that control against its end-stop. In these conditions, getting someone to hold the control in a neutral position or fitting a control lock (when available) will reduce the possibility of damage. This is even more true in gusty conditions when the control may be slammed repeatedly against its end stop.

When towing-out gear is attached, and the glider towed backwards using a solid tow-bar it is practical to manoeuvre the glider with fewer assistants. For instance if a wheel is attached to the wing, the glider may be towed the full length of the runway (in light to moderate wind conditions) with only the buggy driver required; however when in the proximity of fixed objects or other aircraft, it is prudent to seek the assistance of others to ensure good clearance; and it is also necessary for the final (manual) positioning.

6.2 Wing holding protocol

Always hold the into-wind wing.

Normally, only one wing tip is held. The person doing so is responsible for "steering".

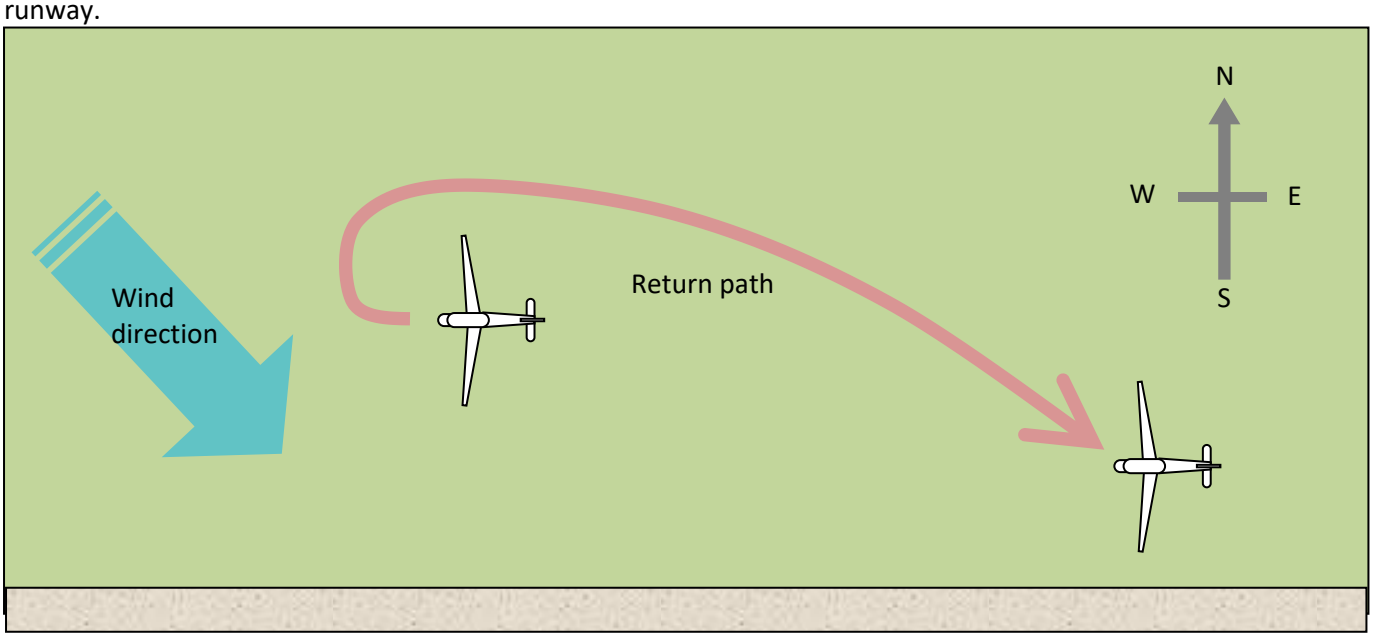
If another person is taking control of the glider at the other wing tip call out "**Your wing**" to them. You should receive the acknowledgement **"My wing"** from them. Do not let go until you are sure that they have taken hold of the wing. Similarly, if you wish to take control, take hold of the wing tip and call out "**My wing**" to the other person who should respond "**Your wing**" as they release control to you.

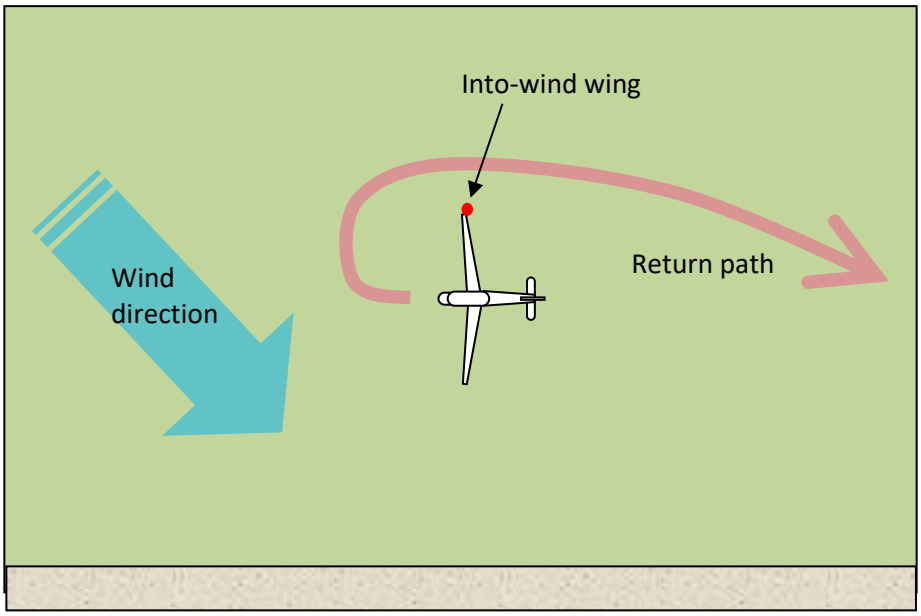
6.3 Changing wings and wind direction

The term "changing wings" is an abbreviation for "changing which wing is being held" and the **"my wing" / "your wing"** protocol should be used in this operations.

Always hold the into-wind wing.

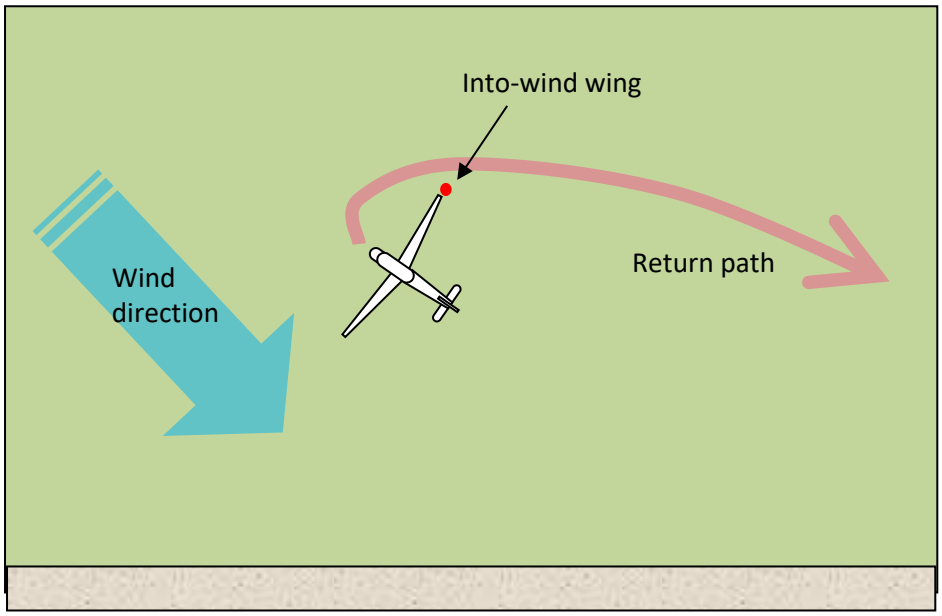
This means that as you manoeuvre the glider in different directions you will need to "change wings" (change which wing tip is being held) as the glider is turned. For instance, assume that a glider has just landed beyond the launch point in a westerly direction. The wind is from the North-West and the launch point is on the South side of the runway.



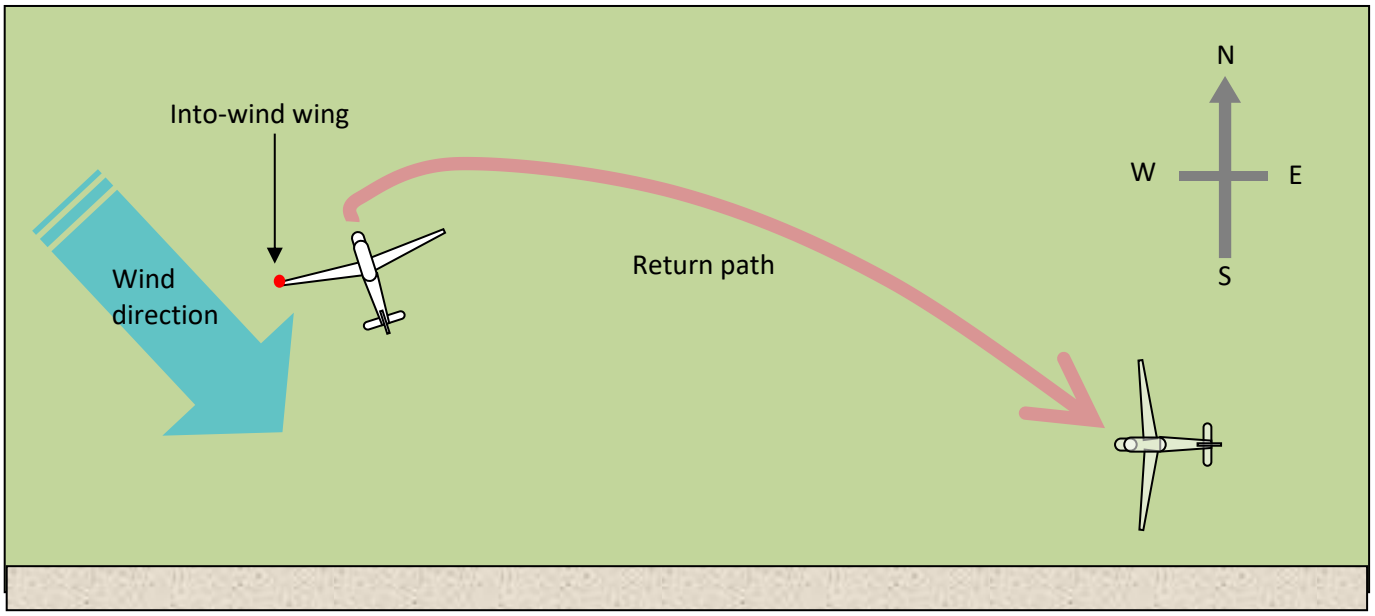


If the glider is going to be pulled forwards (by a buggy) back to the launch point, it will be necessary to turn it through 180 degrees to face back the way it has just landed, tow it back and then rotate it again as it is aligned with the launch point.

If we assume that it is facing due West initially, then the right (starboard) wing is "into" the North-Westerly wind, so that is the one that should be held. The buggy now tows the glider, turning right.



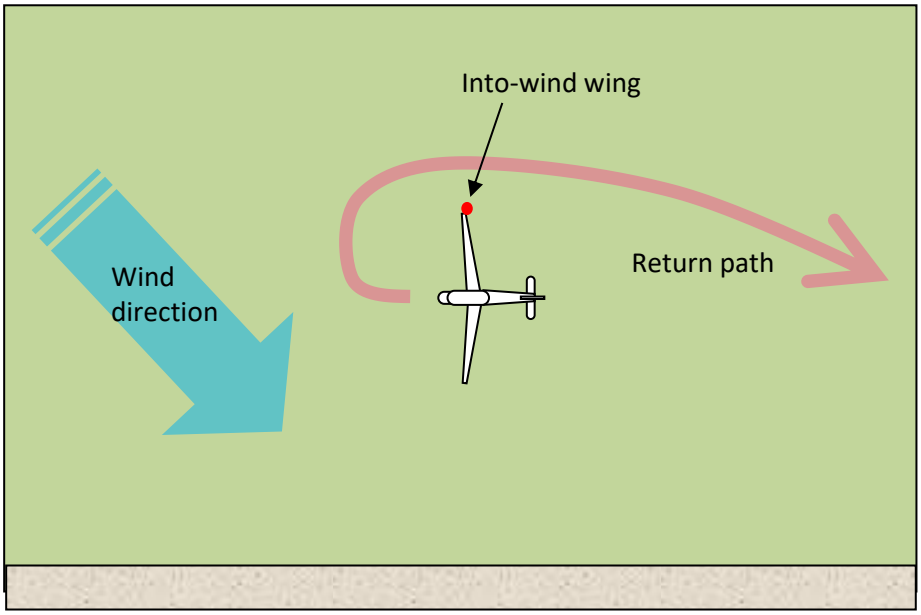
As the glider is rotated towards the North, it meets the prevailing wind more head-on until it has turned slightly more than 45 degrees to the North; at which point the person holding the wing should "change wings", so that as the glider is turned more towards the North and then the East, the into-wind wing is the one being held.

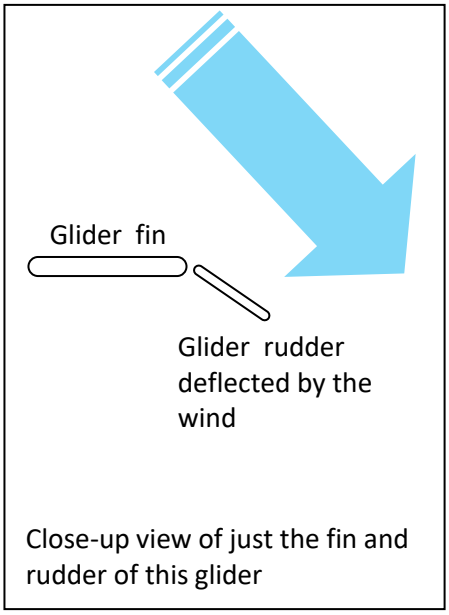


The tow back (Easterly) continues with the left (port) wing being held, but then the glider must be rotated again to line up for another launch. Again the buggy will be turning right to return towards the launch point, and this time, when the glider heading increases beyond South-East it will be necessary to change wings again, to ensure that the into wind wing is held.

If there are other parked gliders, or if you are near the launch cabin, the changing wings at this time will also bring the wing holder nearer the fixed object which should make judging the separation easier, however the buggy should be detached and the glider manoeuvred "by hand" for the last few yards (metres) to improve safety.

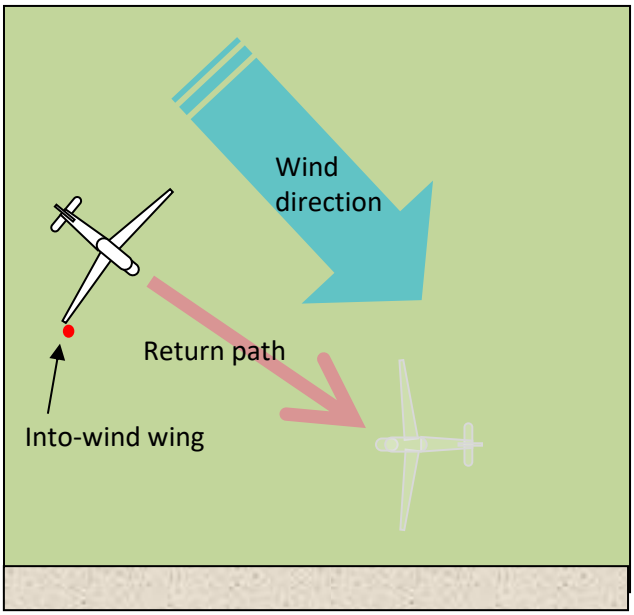
There is another potential problem at this point, particularly when the wind is strong. When the pilot got out of the

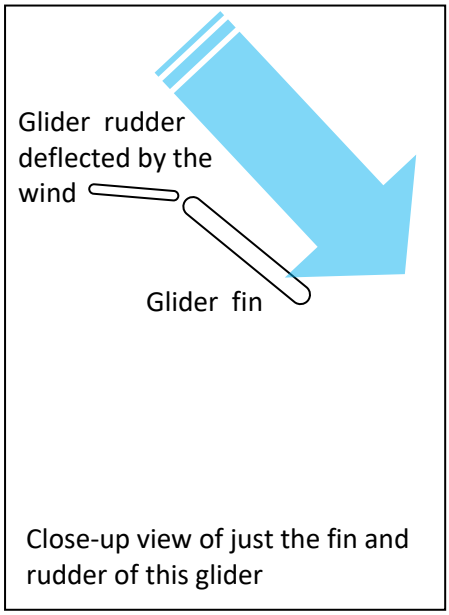




glider, it was facing West, the North-Westerly wind would have deflected the rudder to the left (port), then as the glider was initially turned right the airflow would have brought the rudder in line with the fuselage and then deflected right (starboard) for the tow back.

Now, back at the launch point, if the glider is aligned with the launch direction by turning it to the right (starboard) again, the wind will catch the rudder and slam it from full-right to full-left as the nose is turned through a southerly heading. For this reason it would be better to detach the towing buggy and rotate the glider left (to port) so that the nose (rather than the tail) passes through the "onto wind" direction. Alternatively, another person could hold on to the control surface to prevent this slamming.





6.4 Glider push/pull points

If you are not familiar with a specific glider then do not push or pull it!

Generally:

- The leading edge of a wing is relatively strong, so most gliders may be pushed backwards, by pushing relatively close-in to the fuselage on the leading edge.
- Some gliders have handles on the fuselage at points where they are designed to be pushed or pulled.
- There are usually stronger areas inside the cockpit where the seat back is attached, so a hand-hold on a cross member can often be found.

- The pilots' shoulder straps are attached to strong points but can be quite difficult to grasp firmly. However, they are often used to pull a glider forward.
- No force should ever be applied to the horizontal stabiliser tail surfaces.
- The trailing edge of the wing is relatively weak and so should not be used to push the glider forwards.
- If pulling from a point inside the cockpit, then care should be taken to hold the open canopy so that it is not caught by the wind. This is to prevent it from being blown shut, or from straining against its hinges (or end-stops). Remember that when shut, there are several points of attachment as well as the physical contact with the cockpit to take the strain, but whilst open there are relatively few hinge points, and forces may be applied in several different directions.
- Do not manoeuvre the glider with the canopy closed, but not locked.
    - Misaligned canopy fixings may be damaged.
    - The canopy may move and chafe.
    - The wind could catch and open the canopy.
- It may be inappropriate to push gliders with a tail skid until the tail is lifted from the ground (possibly by attaching a tail dolly). This is particularly true where the glider is fitted with a "spoon" shaped skid that may dig-in if the glider is moved in any direction other than forwards.
- Some gliders have a relatively soft layer immediately underneath a "skin". Applying pressure at points on these areas may create a permanent dent.

Many gliders have moulded surfaces (for example the nose cone of a K13) which are only designed to withstand "in flight" stresses. These may be damaged (like an eggshell) if inappropriate force is applied.

6.5 Safety of canopy/moving parts

Any canopy should always be latched closed or closely attended when open. If the canopy is not latched closed then changes of wind, or glider manoeuvring may result in the canopy being opened by the wind. More easily, if the canopy is open it may be blown shut.

When manoeuvring the glider, beware of putting any strain on the canopy because it could shatter if you inadvertently lean on it. Remember that even flapping clothing may scuff or scratch the relatively soft canopy.

Do not put your arm through the clear view (or direct view) panel opening. When attaching or releasing the cable to or from the glider, do so using the back-release mechanism or open the canopy and use the cable release handle. An arm through the opening (particularly if you are wearing winter clothing) may easily catch on an edge, or apply a twisting force as you reach for, or pull the release.

When manoeuvring the glider, always consider the effect of the airflow over the control surfaces. If the airflow is "head on" to the glider (or nearly so) then the controls will trail with the wind and gravity. When side-on or tail-on to the wind, the control surfaces will be caught by the air and deflected to their full extent. This may cause significant strain on the hinges and end-stops as well as the control surfaces. The situation is worse if the wind (or glider) is changing direction and causes the controls to move rapidly from full deflection one way to full deflection the other and impact the end stop. All of the control surfaces can be affected in this way. These problems may be mitigated by bracing the controls. Techniques commonly used are:

- Hold the control surface(s) externally (good for a brief intervention).
- Fit control locks (usually the best technique if they are available).
- Use the cockpit straps to tie the controls in one position.
- Get someone to sit-in and brace the controls.

If a detachable tail dolly is used for manoeuvring then it must be firmly attached. This means with all latches latched and any locking pins in place.

6.6 Towing points

Nose hook: The nose hook, although convenient for towing, does not provide a back-release possibility. For this reason, the winch hook is preferred for towing on the ground.

6.6.1 Winch hook ("belly hook")

The winch hook is normally positioned near but ahead of the main wheel. The tow rope may be attached and detached using the back-release mechanism, so there is no need to open and close the canopy to reach into the cockpit for the release mechanism.

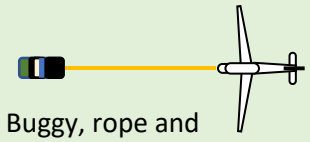
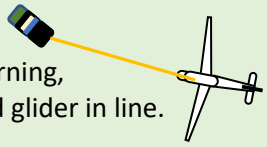
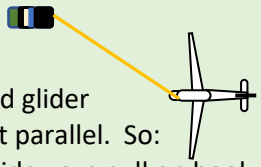
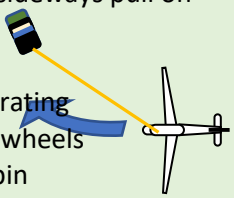
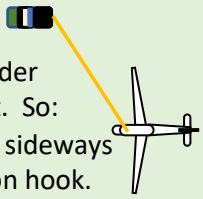
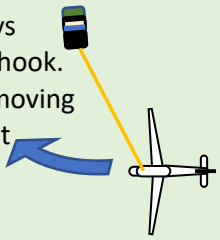
6.6.2 Tail dolly

Many gliders may be fitted with a tail dolly. This often has a towing bar either fixed to it or detachable. The bar usually has a fitting to connect it to a standard car tow-ball, as bolted to the back of the buggies. Towing a glider using the tow bar and tail dolly has the advantage that the buggy can brake as well as pull the glider.

6.7 Towing with buggies

- Do not attempt to tow one glider into a launch queue within inches of the glider in front. Stop short and manhandle the glider into position.
- Do not tow a glider using a short rope. Most tow ropes are longer than half a wing-span (that is: from wing tip to mid-fuselage), any shorter and the glider is more likely to collide with the towing vehicle.
- Do not drive the buggy (or any other vehicle) across the winch cable, doing so may damage the cable. This often means that when setting off from the launch point to collect a glider that has just landed, the best path to follow is behind the glider(s) waiting to launch.
- Do not drag the buggy tow rope unnecessarily. When finished towing stow it in the back of the buggy. A trailing rope could easily tangle with objects or people, and the next buggy driver may not notice that the rope is dragging behind.
- Tow gliders from the towing hook(s) or tail dolly towing arm.
- Secure the glider canopy, and controls where appropriate before towing. An unlocked canopy may "chatter" when the glider is towed across an uneven surface which may chip the canopy frame or crack the Perspex. Worse still, the canopy could blow open if caught by the wind.
- Only tow at a comfortable walking pace; even when a wheel is attached to the wing tip. Higher speeds may cause unnecessary jarring, and consequential damage if anything comes loose.
- Try to keep the buggy, towing rope and glider "in line" whenever possible.
- Look back frequently to ensure that the tow is "in line" and maintain communication with the people walking with the glider, checking that they are walking at a comfortable speed.
- Keep a good lookout.
- Ensure that any people walking with the glider can communicate easily with the buggy driver.
- Beware of the wingspan.
- The buggy driver should be a competent driver, paying full attention to the towing process, and not (for example) chatting to a passenger or using a phone.
- Disconnect the buggy towing rope from the glider if towing is not in progress. Do not leave the buggy or glider unmanned if the rope is still attached. Someone else might not realise it is attached and drive away rapidly.
- Avoid damaging the grass runway surface, particularly when it is very wet. If the buggy is not "in line" with the towing cable then it is far more likely to spin the wheels and lose traction.
- Never drive the buggies (or any other vehicles) into the adjacent fields. They are intended for use on grass surfaces and may easily "bottom out" on rough surfaces.

Towing with Buggies

Travelling straight	Turning	
 Buggy, rope and glider: In line	 Buggy turning, Rope and glider in line.	**Good**
 Buggy and glider offset but parallel. So: • Sideways pull on hook. • Shorter distance between buggy and glider.	Buggy turning. Glider not yet turning So: • Some sideways pull on hook. • Glider Accelerating • Buggy wheels may spin 	**Poor**
 Buggy and glider Far too offset. So: • Huge sideways pull on hook. • Very short distance between buggy and glider.	Buggy turned. Glider did not: So: • Huge sideways pull on hook. • Glider moving very fast 	**Unacceptable**

Note that in the above drawings, the rope length is similar to the wing span. With shorter ropes the effects illustrated are more exaggerated, the glider could collide with the towing vehicle and the speed at which the glider accelerates forward is faster when angle between the towing rope and the glider increases..

7 Glider Picketing:

7.1 Long term

It is usually best to put gliders away in the hanger or their trailer if possible!

Gliders may be picketed for several hours (or sometimes days). Always anticipate the weather conditions, and ensure that the glider is secure.
Consider the forecast wind direction (and strength) and try to ensure that the wind does not catch the glider head-on.
Choose a position that is sheltered in the lee of a building or hedge to minimise the wind strength on the picketed glider.

- Consider the implications of the glider being picketed in that position if the wind changes:
  - Will it still be safe?
  - Will it obstruct other airfield operations.
- **Tail dolly etc**. : The tail dolly and associated fittings should be removed and placed "away" from the glider, so that they cannot abrade glider if there is any movement.
- **Canopy**: The canopy must be closed, with the clear-view panel also closed, and an appropriate canopy cover fitted where available. Canopy covers could scratch the canopy if they are able to move with the wind (even if they are clean).
- **Brakes open**: It is usual to fix the air brakes in the open position. This reduces the amount of lift that the wing may generate. A common method for holding the brakes open is to tighten the straps around the cockpit control **Brakes open** lever, but the geometry of the cockpit layout does not always allow this.
- **Controls locked**: All flying surfaces should be immovable. Ideally, purpose-made rudder and aileron locks, should be used, but if these are not available then the controls may be wedged or bound with the straps to prevent their movement.
- **Flap settings**: If the glider is fitted with flaps then these should be set to minimise lift.
- **Objects on wing to destroy lift**: If very strong winds are expected then objects (such as old tyres) may be placed on the wing at intervals to destroy the lift generating shape of the surface, as well as weigh the glider down. Some wing covers have special pockets to contain objects designed for this purpose.
- **Wing-down or wings level**: It is generally thought better to picket gliders with their wings level, as this presents a lower profile to the wind. Sometimes trestles are used under each wing to brace them level, or just one to hold it "wing down". Care must be taken when using trestles, because the "up" force from them on the underside of the wing may cause damage.
- **Tail weight**: The tail surfaces are aerofoils which will produce lift. Weighs may be added to the tail to prevent it "lifting", but care should be taken not to stress the tail surfaces unduly and other methods of picketing the tail are preferable.
- **Picket points**: Many gliders have picket points built in. These may be in the form of a hole near the wing tip, or in the wing-tip skid, or there may be picketing rings (or eyes) that screw into special fittings. Similar fittings or handles may be provided near the tail. Ideally, a thick rope should be used to tie the picket point to something firmly attached to the ground, such as very heavy weights. When tying the second wing level, apply a modest "downward" force to the wing to take up the slack and prevent any subsequent movement. Similarly, the tail should be firmly picketed down, and if the glider has a nose skid (like the K13) then a tyre may be wedged under that to prevent the glider rocking on the main wheel.
- **Covers**: Fit weatherproof covers if they are available. These provide protection against the rain and the sun. Covers should be full and firmly fitted so that they cannot move and chafe the glider.

7.2 At the launch point: Waiting off-line

Gliders are often moved to "near" the launch point, but then left until the pilot is ready to fly. In this case the glider should be picketed (or at least parked) appropriately so that it cannot damage itself of any of its neighbours.

7.2.1 Positioning

Keep the glider well away from the actual launch line, where there is likely to be lots of activity and glider movement, which you should not obstruct with the parked glider.

Consider the flight path of landing aircraft. Ensure that you do not create an obstacle to a low approach.

Try not to block in other parked gliders, and do not obstruct the movement of other gliders to the launch point. Rotate "cross wind" if necessary: Normally, gliders near the launch point will be parked with their tail to the side of the runway so that they are parked at approximately 90 degrees to the take-off and landing direction, this normally means that they are parked "cross wind" (or "across the wind"). If parking like this may leave the glider susceptible to having the wing lifted by the wind then you should rotate the glider so that the wind is blowing onto the trailing, rather than the leading edge of the wing. A wind direction of about 45 degrees to the wing (from behind) and fuselage is suitable.

7.2.2 Overlapping

Try to avoid overlapping one glider with another, and certainly never park a glider where wings overlap in such a way that they may touch if the wind causes one to "change wings" (that is: change which wing is "down") if for instance the wing weight bag were to slip off. At busy times you will see gliders parked in a staggered fashion, with alternate gliders forward and back, so that their wings do not overlap, and the fuselage of one glider is beyond the wing tip of

the next.

7.2.3 Generally

Adopt as many of the "long term" picketing guidelines as possible: The glider may be parked for longer than originally expected! But certainly:

- Close the canopy
- Add wing weight(s).
- Remove tail and wing dollies.

7.3 At the launch point: Waiting in-line

Quite frequently, a glider will be left in the launch queue, unattended for a few minutes, whilst other launching is progressing. Obviously, in this circumstance, with the pilot nearby and the flight imminent, it does not make sense

to picket the glider as securely as if it were being left for several hours. Nevertheless the glider should be picketed so that it cannot be moved by the wind.

7.3.1 Tail dolly

The tail dolly and wing dolly (if present) must be removed to reduce the possibility of the wind weather-cocking the glider on a castoring tail wheel. Occasionally, a glider filled with water ballast will be left with a wing dolly in place to hold the wings level. Extra care should be taken, bearing in mind that the glider could move more easily as a result of the reduced friction.

7.3.2 Canopy

The canopy should never be left open and unattended.

7.3.3 Wing-down

Normally, the older ("wooden") gliders are parked with the into-wind wing down (on the ground) with a weight on it.

Generalising: Older gliders tend to be lighter and generate more "lift" at lower airspeeds, and often have the wing mounted higher on the fuselage than newer ("fibreglass") gliders. Putting the into-wind wing on the ground causes the airflow to hit the top of the wing, or at least, at a reduced or negative angle of attack, so the "lift" produced by the wing is reduced. There is also less danger of a stronger wind getting "under" the wing and rolling the glider over onto its back.

Newer gliders may be parked with the into-wind wing up. This assumes that the wing will not generate enough lift to flip the glider, partly due to its heavier weight, the higher flying speeds, the lower-mounted wing and the possibly

longer wing-span, which means that the “up” wing tip is not as high off the ground where the higher wind speeds might catch it. Note that it would probably be safer to park all gliders with the into-wind wing down.

7.3.4 Wing weight

The club provides wing weights, which are bags filled with rounded stones. These should be placed carefully on the stronger area of a wing tip. Obviously, dropping a weight on a wing could result in damage, and the trailing edge of the wing is thin and intrinsically “weaker” than the leading edge. The weight should be orientated so that as much of it is on the strong part of the wing and where it will not slide off if the glider moves slightly in a buffeting wind. You may see old tyres used for the same purpose (particularly at other clubs) but these tend to be dirtier and less secure, so the bags are preferred if they are available.

Take care not to put wing weights on fibreglass wing tips which might be crushed. Many gliders have a thin surface covering over a soft balsa wood (or similar) light filling material. Deforming the surface may permanently compress this material leaving a permanent distortion.

In stronger winds, more than one wing weight will be required. Remember that the wing is capable of lifting the entire glider and its occupant(s) with sufficient airflow over it. There is a trade-off between adding too little weight, and too much which may crush the wing structure. Rotate “cross wind” if necessary: It is less common to do this whilst waiting to launch, but it may become necessary to rotate “cross wind” if the wind strength increases. if you anticipate a squall of similar is approaching, or if the launch process in interrupted (delaying your launch).

8 Vehicles and fuelling:

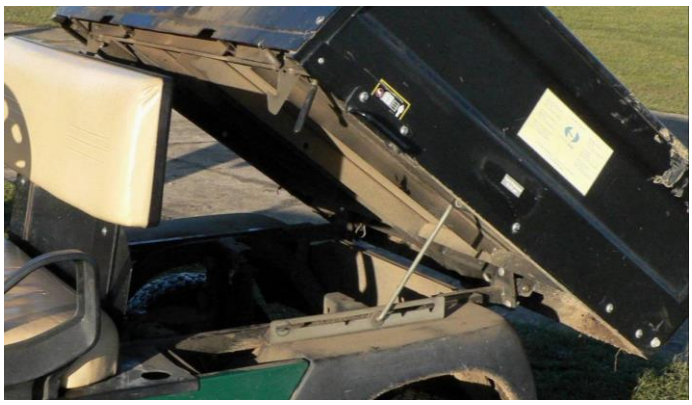
8.1 DI and fuelling buggies

"D.I." is the abbreviation used to mean "daily inspection". It is important to check the basics every day to prevent consequential damage, if something is already wrong. A DI on the buggy does not have to be equivalent to a car MOT test, nor are you expected to do a "full service". But looking over the whole machine using common sense to spot things that are (going) wrong may prevent problems later.

A DI should be done every day, before the buggy is used.

General Impression: Is there anything which appears to be "wrong"?
The buggies are very light, and their tyres are low-pressure, so they can appear to be quite reasonably inflated when they are actually very low. Press on the tyres themselves (with a foot or hand) to see if they are adequately inflated.
Whilst checking the tyres, look at the wheel nuts. These have come loose in the past!
Before going near the engine, ensure that the ignition switch is "off", remember that when "on" it only requires pressure on the accelerator to cause the engine to run.

The seat can be hinged forwards at its leading edge. Lift the seat, and rotate it forward against the steering wheel, but beware that it can easily overbalance and fall back to its normal down position, so keep one hand on it whilst it is raised. Alternatively, once hinged forward the whole seat may be lifted clear of the chassis, but this is more easily accomplished by two people.
If required, the rear "flatbed" section of the buggy may also be raised. There is a release lever and a handle on the driver side (port) using which it may be lifted. The stay should drop into a ratchet-like slot to prop it in the "up" position. As you will discover, this rear section is quite heavy, so ensure that it is securely propped before reaching underneath it. It is not necessary to raise the flat bed to check the fuel or oil.
The fuel tank and most of the engine is visible once the seat is raised. Again, a general impression should tell you if there is something wrong, look for oil or fuel leaks, or anything that looks loose or damaged.
Check the oil level on the dipstick. This is most easily done "first" before the buggy engine is run, because then the level is clearly visible on the dipstick, which has the normal sort of "low" and "high" marks on it. The oil filler is located on the top of the engine rocker-cover. And requires the flatbed to be raised for access.



Check the fuel level. The fuel tank is semi-transparent and the level should be visible on the side of the tank (do not rely on the electric gauge on the panel). Ideally there should be about half a tank of fuel. If there is less than a quarter of a tank then consider re-filling it, particularly if it might be used "a lot" throughout the day (if it might be a busy day). There is no point in filling the tank "to the brim" because it may then spill if bounced over rougher ground.

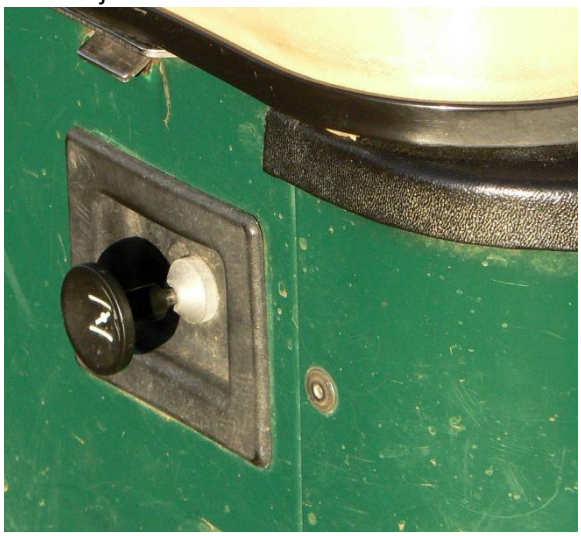
Fuel and oil supplies should be available in cans from the lock-up container (near the vehicle hangar) or vehicle hangar,

but if not then there's a petrol station in Eight-Ash Green! The treasurer will reimburse you or offset the cost against flying charges from a receipt.

Check that there are no "foreign objects" in the engine bay. Grass cutting of mud can accumulate quickly, so cleaning out the debris regularly helps to prevent overheating and allows you to visually check that everything looks "normal".

Check the condition of the main and starter drive belts.

The engine should spin rapidly and start easily maybe using the choke on a cold day, which is located just below the seat.



Always ensure that the path is clear before trying to start a buggy. It may require a relatively high engine rpm to keep it running (from cold) and the automatic clutch may engage the drive. There is a "neutral" position for the drive selector (located between the seats on the forward-facing panel); this is when the selector is vertical, although there is no positive stop for it in this position. If someone has parked the buggy facing toward something else then select

"reverse" or "neutral" before attempting to start. The "forward" position is towards the driver (**F**). The "reverse" position is towards the passenger (**R**) and in this position a warning sounder should operate.

If the buggy is gas fuelled, then refuelling is similar to the procedures

outlined for other vehicles and the winches in the following sections. The only way to determine the fuel level on these vehicles is to check the gauge on the gas cylinder (under the seat).

8.2 DI Land Rover or tow-out vehicles

The DI on the Land Rover or a tow-out vehicle is the same as is recommended that you check frequently on any car. As a minimum you should check the condition of the tyres, the oil level and the fuel level before the vehicle is used. Remember that when running on gas, the only meaningful fuel gauge is the one mounted on the tank itself.

As with the buggies, a general impression of the vehicle or anything that has changed since you last inspected it can reveal the onset of problems, so use DI books to record your comments and alert others to potential problems.

8.3 Fuelling Land Rover or tow-out vehicles

The gauge on the vehicle's gas tank might not read "full" when it cannot be filled any further. Commonly, a reading close to 70% is the maximum possible. Anything below 10% is certainly too low. Do not rely on these gauges, they give a reasonable idea of the level, but they may not be accurate. The vehicles should be refuelled routinely at the end of each day but check that this has been done in the morning. And check periodically throughout the day, particularly if the vehicle is being used a lot.

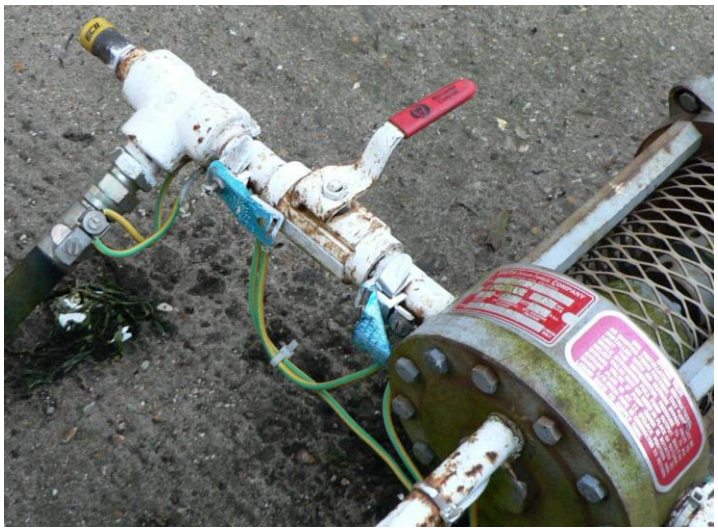
See the next section for more information about the LPG gas compound.

Some gas will be vented when any tanks are refilled, so common sense precautions to be taken to keep any ignition source well away from the gas compound during this procedure.

The gas tank is electrically bonded to the vehicle (to prevent any static electricity sparks) via a conductive pipe and nozzle. Check that they and the earthing wires are in good condition before refuelling.

The Land Rover and other vehicles have external gas filling valves. The vehicle must be manoeuvred close to the gas compound, and the gas supply hose extended to the vehicle. On the end of the hose is a cylindrical fitting with a screw thread that should engage easily with the fitting on the vehicle and should be tightened by hand until no more movement is possible.

The gas release trigger at the end of the pipe may then be pulled open and clipped in the “open” position, using the little S (or Z) shaped clip at the back of the red trigger lever. There may be a brief noise of gas release as the trigger is pulled but this should stop and there should be no evidence of a gas leak once the pressures equalise.



Fill the tank using the LPG compound controls as outlined elsewhere. When full, the noise from the pump will change abruptly as the gas flow stops when an internal valve shuts and the gauge on the vehicles tank will not go up any more.

Before disconnecting it is preferable (but not essential) to close the valve in the LPG gas compound.
The main outlet valve is closed when it is perpendicular to the pipe and open when it is in line with the pipe. Releasing the trigger back to the “closed” position will result in a burst of gas from the screw fitting, but this should be momentary, as the valves re-seat themselves.

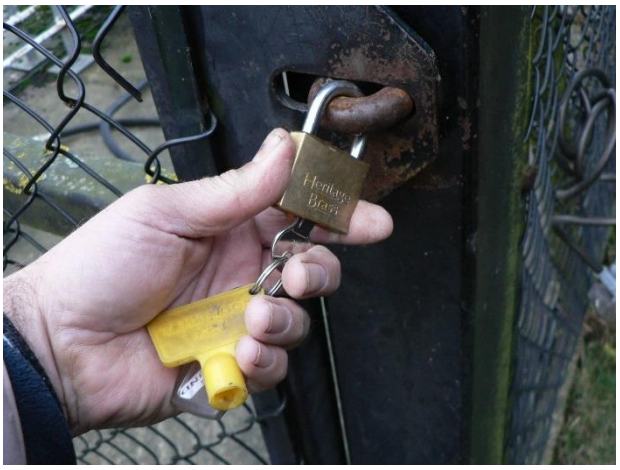
The fitting can then be unscrewed, and the pipe returned to the compound.

8.4 LPG compound and re-fuelling winch cylinders

Some gas will always be vented when refuelling, this is usually only a small amount, but care must be taken to ensure that nothing will ignite it.

Warning: Occasionally a valve malfunctions and liquid escapes. The rapid expansion and evaporation of the liquid will cause the nearby metal parts to become very cold.

The key to the gas compound is kept in the key box in the clubhouse.



The outlet valve is often left open. If not, then turn on the outlet valve by rotating the lever to be in-line with the pipe.

Screw the fitting on the hose end securely onto the cylinder or vehicle connection and open the trigger on the handle, as though dispensing fuel at a petrol station. The trigger may be locked in the open position as previously mentioned.

Ensure that the main electrical supply is turned on at the isolating fire switch on the side of the clubhouse. This photograph shows it turned "off" (the lever on the left is "up"). To turn it on, pull the pin on the right-hand side to allow the lever on the left to be pulled down to the "on" position.

The button on the compound wall turns the pump "on". This button must be held to continue pumping gas.

Continue monitoring the fuel gauge to determine when to stop filling and listen for an abrupt change in the pump noise which indicates that the automatic valve in the system has stopped filling anyway.

- Stop pumping
- Close the outlet valve.
- Release the nozzle trigger and unscrew the nozzle coupling.
- When all cylinder and vehicle refilling is completed, the fire switch may be turned off.

8.5 Driving of vehicles, radios and garaging

Do not drive any club vehicles unless you have been shown their specific idiosyncrasies. There are unique starting and operating instructions for all of them.

All club vehicles are well used and worked hard! Please try to drive them carefully and sympathetically, to avoid damage and minimise maintenance costs. For example, the perimeter track is deteriorating, and has been repaired in several places, and driving at high speeds across the uneven surface will stress both the vehicle and the surface.

The same is true if brakes are applied heavily, causing skidding. In general, try to keep speeds and engine rpm to moderate levels.

Club vehicles are often in a "less than perfect" condition. As a result, they often require a superior driving technique to compensate, and should only be driven by competent drivers.

The vehicles are equipped with hand-held PBR radios. These should be turned on when the vehicle is in use so that the driver is more aware of other airfield activities. They are most valuable when sorting out cable problems in "the middle" of the airfield for communicating with the winch, but they may be used at any time to clarify the situation. When the vehicles are put away, please check that radios and any other ancillary equipment is switched off to prevent them from draining the battery.

Vehicles are kept in the vehicle shed overnight. Keys for the shed are kept in the clubhouse with the other keys. It is probably best to get someone to show you how to unlock, and then open the roller doors. Please close the doors and turn off the lights before you leave the shed. Remember that if there is a westerly wind it there will be a significant wind pressure on the main roller door, which may make it difficult to open or close.

8.6 Retrieve of cables with the tow-out vehicles

It is beyond the scope of this document to fully detail the steps and procedures required to retrieve cables. But the following points should be considered:

- Retrieving cables is crucial to the operation of the gliding club.
- Incorrect cable retrieval technique can easily **damage equipment** and possibly **serious injury** cause.
- Retrieving cables requires skilful and careful technique, that should be **demonstrated and taught.**
- This task must not be delegated to "anyone that volunteers" if they have not received thorough training.
- When towing cables out, the vehicle speed must be kept below 30 m.p.h. and preferably less than 25 m.p.h.
- Any acceleration or deceleration should be **slow and progressive**. This means that anticipation is required, so that the vehicle can slow down smoothly over several hundred yards.
- The vehicle **must not deviate from a straight course**, because the cables may become crossed if the path varies. If the launch point or winch are not positioned adjacent to the concrete strip, then a diagonal path must be followed. If necessary, a light may be illuminated on the launch point to give the tow-out driver an aiming point.
- The tow out vehicle must remain alert to gliding operations and, any gliders "landing long" which may require the tow-out to be suspended.
- Never tow cables if there is a possibility that a person or glider is anywhere near the moving cable.

9 Packing the hangar

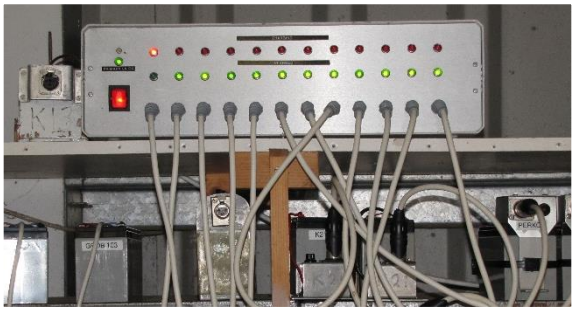
This is a vast topic so it impossible to do it justice briefy in this document. However, there are a few simple rules that should be followed.

- Do not attempt to pack (or unpack) the hangar unless you are sure that you understand the required procedures.
- It is strongly recommended that at least four club members move each glider, one watching each "corner".
- Make all glider movements slowly. That way, if one objet does make contact with another it will do so with minimal energy.
- Communication is the key: Do not assume that other club members know what to do or what you are about to do.
- There are recommended ways to fit all of the gliders into the hangar. Markings on the floor show the positions of wheels, trollies and wing tips. Use them!
- There are photographs on the hangar wall showing the gliders in their "packed" positions. Refer to these if you are unsure of the sequencing or positioning.

- Gliders should not be put away when they are wet. If necessary, remove excess rain etc. so that the surfaces have a chance to dry out overnight.
- Gliders should not be put away in a dirty condition: Wash mud from the undersides, clear grass (and mud) from the wheels and dead flies from all leading edges.
- Use the correct wheel dollies when packing.

Several of the wheel dollies look similar but they have different dimensions that are only appropriate for a specific model of glider.

- Take care to load the glider onto a dolly the correct way. Some gliders (e.g. K13 or Perkoz) must be pushed onto the dolly backwards, whilst others (Grob 103 III) are pushed on forwards. Using the wrong dolly or loading the glider the wrong way may result in damage to the gliders.
- Ensure that all parachutes are returned to the clubhouse storage room, where they will be kept drier than in a damp hanagar.
- Remove all batteries and put them on charge, so that they are recharged and available for the next day. The twelve battery charging outlets show a red light whilst charging is in progress and a green light when charging is completed.
- The test meter attached to the rack may be used to confirm that a battery is fully charged (the meter shows more than 12 Volts) and functioning under load (a light bulb is illuminated).
- Store any glider tow-out gear on the designated hooks on the hangar wall (not in a heap on the floor).



It may be more of an “unpacking” topic, but the canopies (as well as the gliders) should be clean, inside and out. There are detailed instructions on the cupboard, explaining the process, but warm soapy water (in a clean container) and a clean sponge make a good starting point. Never touch the canopy with a cloth that is not clean!