SHALBOURNE GLIDING

WINCH DRIVER'S MANUAL

INTRODUCTION

The purpose of this manual is to provide advice, information, and guidance to all those involved in the daily operation and maintenance of the club winches. It does not attempt to deal with the pilot's perspective of winch launching which is covered more fully in the BGA Instructors' Manual. You should discuss the correct method of flying the glider during the launch, including coping with launch failures, with a qualified instructor.

The manual has been derived from the BGA Winch Operators' Manual, a publication that was compiled from first-hand experience, from manufacturers' data and from qualified expertise. The BGA manual was based extensively on experience with high-powered Tost winches at Parham, Bicester, and Lasham. This manual is an adaption which has been edited and expanded to cover the specific equipment used by Shalbourne Gliding and to identify issues which require attention in the context of operations on the Rivar Hill site.

Throughout the text the authors have endeavoured to explain the principles upon which advice is given and recommendations are made.

Nothing in this manual takes precedence over the current issue of Laws and Rules. All winch drivers must be familiar with and adhere to the operational regulations of the BGA.

This manual is not a substitute for supervised training. It is intended to guide a trainee during training and as a reference for trained winch drivers.

SAFETY

Safety is paramount in all aspects of winch operation and cable handling. A moving cable respects no-body and can rapidly maim or injure a person or do extensive damage to property. THINK before operating the winch, handling the cable, or undertaking any work on the winch or cable. If in any doubt it is usually safest to stop and do nothing – don't start until you are completely sure it is safe.

When correctly undertaken winch operating is a safe activity – the UK gliding movement makes over 200,000 launches per year with few non-aircraft incidents. Do not attempt to develop your own procedures or methods which go against the advice of this manual. Talk to experienced operators and instructors.

WINCH DRIVING

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Section 1
DAILY INSPECTION (DI)

***BGA Operational Regulations* state:-**

All equipment used for launching, including the wire, rope, or cable must have been inspected and approved as serviceable each day before being used. Winches and tow cars shall, as a minimum be checked for sufficient fuel, oil and water for the proposed launches and for serviceability of the cable cutting or releasing mechanism.

Check the Equipment serviceability board in the clubhouse for the availability of the club's winches and any special warnings about their use.

Before the first launch of the day all winches to be used are to be given a daily inspection in accordance with the following schedule:-

Item	Action
Guillotines	**Check** test date, complete monthly or annual tests if due (see below). Check blades are in the loaded position and free of obstruction, release bolts fully in and operating levers in the forward position
Coolant	**Check** coolant level and for absence of leaks. Top up if necessary with 30% dilute coolant from labelled tub in generator house
Engine Oil	**Check** level in engine. If necessary top up to high mark on dipstick with engine oil from drum in generator house
Auto Transmission Oil	**Check** level and top up if necessary with Dextron ATF from drum in vehicle container. Dispensing jug and funnel in red container
Fan belt	**Check** tension (max 15mm deflection)
Engine	**Check** transmission lever is in neutral, start engine and allow to warm up
Tow Out Brakes	**Check** operation of drum/pull-out brakes. and of foot (transmission) brake if fitted. Adjust leverage of brake pressure weights if necessary
Warning lights and gauges	**Check** warning lights and gauges for correct indication and function
Signal lights and rotating beacon(s)	Check **serviceability**
Radio	**Collect** from parachute cupboard and install in cab
Signal bat	**Available** Normally on hook in cab
Winch cabs	**Check** clear of broken cable and other debris. All controls accessible and free
Pay-on gear: all rollers and pulleys	**Check** free from debris, serviceable and free to move
Cable cutters and repair equipment	**Examine** Ensure serviceable and adequate stock of correct size ferrules. Place in winch tow vehicle
Tyres	**Visual Check** of inflation and freedom from damage
Drogue Chutes	**Check** serviceability – lay out and check traces, check U bolts tight and locking wire in place, shock rope not fraying and no missing links. The drogues are considered to be part of the cable so they should

	be placed in the winch tow vehicle or cable trailer to be taken to the winch and given a final inspection as the last part of the cable DI (full inspection as part of the cable DI)
Fill up Gas Tank	**N.B.** Switch off engine and attach earth lead. Wear gloves and safety goggles provided. NO SMOKING
General	**Check** for obvious oil leaks from engine(s), transmission, drums, pay on gear and brakes.

Refer to Section 3 for DI of cables and parachutes

Safety Checks	• Guards securely fitted around winch drums • Earth stake serviceable • Wheel chocks available
D.I.Book	Complete **and record any defects outstanding**. Leave a note on the clubhouse whiteboard of any issues reducing serviceability

MONTHLY GUILLOTINE SERVICEABILITY CHECK

To ensure correct operation the guillotine requires regular serviceability checks. The BGA recommend that a non-cutting test is carried out **no more than a month before use.** Satisfactory operation is to be recorded in the DI book.

If the visual appearance of the guillotine gives rise to any doubts about its serviceability, for example because of an accumulation of grass or dirt, then a serviceability check **must** be carried out regardless of the time since the last check.

The BGA recommended check is

Check full range of movement and operation of the guillotine assembly and mechanism (without cutting cable).

ANNUAL FULL FUNCTIONAL GUILLOTINE TESTS

A guillotine full functional test is to be carried out at least annually. Excessive testing should be avoided as it is vital to protect and preserve the cutting edge in order to maintain effective operation. The level of usage of our winches usually means that some maintenance is required in addition to the functional check, therefore is the annual check is due within the next four weeks please notify the Ground Equipment Officer. If the checks are already due it would be preferable to use the other winch to avoid delays in being ready to launch.

Instructions for annual guillotine checks are on the club web site at
http://shalbournegliding.co.uk/members/wiki/index.php5?title=Annual_guillotine_checks

Section 2
SETTING UP THE WINCH

BGA Operational Regulations:

If the cable runs are nearer to each other than 60 metres, only one glider may be attached to a cable at any one time and after every launch the cable used must be drawn in to the winch before another cable is used.
(Refer to Laws and Rules Part 8)

A. Selection of Winch Location

1. Advise the Duty Instructor of the winch serviceability status and determine his requirements regarding the positioning of the winch and the sequence in which the cables are to be used. It is usual to site the winch a safe distance from the upwind boundary and to have the launch point diagonally opposite, thus minimising any crosswind component. If there is a cross-wind then the downwind cable should normally be used first. However in selecting the winch location consider:

(a) The likely fall of the cable, both normally and after a cable break especially if the cable breaks close to the winch. In particular consider the risk of the cable and/or parachute falling on the public road, fences, in adjacent trees or in crops. In some circumstances it may be necessary to reduce the length of the run to minimise risk. Remember that in the event of a cable break the winch cannot control the descent of the parachute and cable. Consider the possibility of variations in the wind direction and glider flight path when assessing the dropping zone.

(b) The necessity to achieve a completely straight pull-out from the winch to a marked position (using traffic cones) between the two launch lines Do not require the retrieve driver to make any deviation, however small, around cultivated ground or other obstructions.

If there is any problem in siting the winch as requested then discuss the matter with the Duty Instructor. It is particularly important to advise the instructor if you believe that the cable is likely to pose a risk to the public. If conditions change during the day and re-siting is advisable inform the Duty Instructor immediately.

B. Siting the Winch

2. Tow the winch slowly to the selected site and align it with the nominated launch point. Correct alignment is necessary to ensure that the winch signal lights can be seen by the retrieve vehicle and the launch point.

3. Apply the handbrake securely and position wheel chocks behind the wheels.

4. Press the earth stake firmly into the ground in a position where it will not be a hazard to personnel or is liable to be ensnared by a broken cable.

C. Final Checks

5. Switch on the radio and check communications with launch caravan Ask launch caravan to give a Stop signal so that lamp alignment can be checked as satisfactory. Ensure the caravan can see the winch's stop light. (If no one is available in the caravan this check may be carried out later but not while the cable is being pulled out.)

6. Ensure that the retrieve driver is fully aware of the pull-out and cable break procedures (see "Retrieve Driving")

7. Obtain Duty Instructor's permission to pull out cables to the launch point.

8. Place traffic cones where cables are expected to be delivered

9. Carry out cable and parachute daily inspection, including drogue chutes. (see section 3)

10. When inspections are complete and cables have been pulled out for launching
    (a) apply winch drum brakes
    (b) ensure transmission is disengaged
    (c) warm up engine to operating temperature

D. Bridleway

11. All winch drivers should be aware that a bridleway runs the length of the airfield at Rivar Hill. Details of the route can be found in the control caravan. A copy of the information should also be kept in each winch. Members of the public on foot or on horseback are entitled to use the bridleway without restriction at any time. Note that bridleway users are invited to take an alternative route along the edge of the airfield. Also be aware that other visitors, such as farm workers, may enter the airfield unannounced.

12. Winch drivers may be approached for advice at any time. Explain our activities and advise the walkers of the safest route to follow. Seek their co-operation in clearing the operational area without undue delay. If necessary advise the launch point of a hold in operations until the users of the bridleway are clear.

13. **Never commence a launch under circumstances where persons unfamiliar with our operations could feel that they are at risk.**

Section 3
DAILY INSPECTION OF CABLES AND PARACHUTES

BGA Operational Regulations :

While work is being carried out on a cable the engine should not be run nor should any return mechanism be used unless additional safety measures are in place to prevent injury. (Refer to Laws and Rules Part 8)

Notes: 1. This daily inspection is MANDATORY. The purpose is a visual inspection to ensure serviceability of the whole length of all cables, including parachute assemblies, to be used.

2. If commencement of flying is delayed, e.g. because of poor weather, the cable inspection can be carried out with the winch in any convenient location from which the full length of cable can be drawn out.

CABLES AND DROGUE PARACHUTES

1. Inspect the cable for damaged strands, kinks, crushing damage, badly worn or damaged ferrules, and closely spaced ferrules (which could indicate ferrule slippage). Cut out the damaged portion and make a new join. See joining procedure in Section 8: “Cable Repairs”.

2. If a new length of cable is required refer to the instructions in Section 8.

3. At the glider end of the cable nylon buffers are fitted to protect rollers from the drogue chute linkages being ingested. These should have one ferrule each side which will be pulled apart if the buffer hits the rollers with force. Check for signs of excessive wear on the buffers as well as for failures around the ferrules.

4. For the purpose of daily inspections the cable is defined as including all components up to the launching rings on the strops and therefore include the drogue parachutes,

5. Select drogue chutes appropriate for the day. It is preferable to use large chutes because they can be “flown” back to the winch. This avoids damage from being dragged along the ground and through crops or over fences, It speeds up the launch cycle, and lower engine revs are required it is less demanding on the winch. If there is a strong easterly crosswind, in particular a south-east wind, then the smaller chutes reduce the risk of the cable being carried over the public road.

6. Inspect the drogue chute canopy for wear, tears, and security of shroud attachments

7. Check for tangled, twisted or broken shroud lines. If the parachute is defective, obtain a replacement from the vehicle container. Inform Ground Equipment Officer of the problem.

8. Inspect all shackles, connectors for security, wear and damage and ensure that they function freely and correctly. Check that all shackle pins are fully tightened and wire locked. The wire serves two functions – a back-up lock to the pin being tightened, and a tell-tale for pin slackening. If the wire is missing or broken assume the pin is slack – re-tighten it and fit new locking wire. Use a shackle key or pliers to re-tighten, not simply fingers!

9. Inspect the Shock Rope for wear and signs of fraying or unwinding. Check that the splices at the connector hook and parachute are serviceable

10. Connect the drogue chutes to the cables and tighten the connectors with a spanner

11. Remove any broken tow out links, replace if necessary

STROPS AND WEAK LINKS

BGA Operational Regulations state:-

The glider end of all launching cables must be fitted with linked rings designed to fit the release mechanism of the glider. Distorted or cracked rings may not be used.

1. Check the condition of the strop and weak link assemblies. You should look for damage which might prevent cable release from the glider, damage to the glider or injury to handlers, or could result in the weak link failing at the wrong load. Check in particular that
   - the linked rings are free of wear and/or distortion
   - the weak links have not been stretched, bent or damaged in the vicinity of the centre hole.
   - the jaws of the carrier are not distorted as this could prevent the link failing at the correct load
   - the shackles are free to rotate and are not clamping the link to the carrier. If the bolts are tight this will increase the load required to break . (Leaving the nut about 2/3 turn slack usually gives acceptable results)
   - the notched ring is undamaged

Carry out any necessary repairs or renewals

2. . Place the strops at the launch point to one side the cable run

Each weak link assembly must contain only one weak link at a time. We do NOT use the reserve link system of two slightly different links.

Section 4
LAUNCHING

Safety Note:

If there is any jerk or hesitation in power at the commencement of the launch, the winch driver must terminate the launch and wait for a fresh set of signals before re-starting. If the pilot suspects over-running or other failure at the start of the launch, he should release the cable at once and treat as a launch failure. (Refer to Laws and Rules RP.6)

Introduction

The objective is to accelerate the glider smoothly and rapidly to its optimum launch airspeed whilst avoiding any snatching which overstresses the cable or tailbanging which overstresses the glider. Slamming the winch throttle open gives little extra height on the launch but greatly increases the risk of damage.

Method

1. **Confirm which cable is to be used**, if not already notified by the Duty Instructor. Ensure no slack cable has run off drum

2. **Ensure that the engine is warmed up**
   If the engine has not been run for some time run it at a fast idle with the main gearbox in neutral and the drive clutches disengaged (to prevent inadvertent cable movement). Particularly in cold weather the engine should be kept warm by running it for 10 minutes per hour. This helps prevent oil sludging and increased engine wear.

3. **Engage Drum**
   Turn on the engine and ensure the gear box is in neutral, the drive shaft, viewed through the window in the floor should be rotating, apply the footbrake to stop it, then while pulling the clutch lever towards the engaged position allow the drive shaft to rotate slowly until the drum engages. (Note that if the shaft is allowed to rotate too fast the dog clutch will not engage easily and will suffer progressive damage.) When the clutch is fully engaged and the latch is released the lever will lock in position. If the lever does not lock in position there is a defect and attention is required.

4. **Skylaunch control box**
   On receipt of preparatory radio call, or if the glider to be launched is known by other means, set the control box for the glider type using the table in the winch. If the radio call was unclear request confirmation of the glider type if possible.

5. **On receipt of TAKE UP SLACK**
   If you have concerns about commencing a launch, for example because a glider has landed long and may not be visible from the launch point, then give this

information to the launch point. DO NOT COMMENCE A LAUNCH IF YOU ARE NOT SATISFIED THAT IT IS SAFE TO DO SO.

If bystanders are present call “Clear Winch” before starting the engine and launch procedure. Any visitors should be briefed to remain in a safe area.

CHECK that airfield is clear of people, gliders, and vehicles both in front of and to the side of the winch. Particular risks are users of the bridleway (see Section 2) and cars entering or driving down the field without clearance! Check also that there are no gliders on final approach or aircraft in flight about to cross the site at low altitude. Do not rely on the launch controller being able to see all conflicting traffic – he needs your help.

Engage drive on main gearbox and allow cable to wind in gently. Monitor both cable movement or the rotation of the winch drum and the launch signal. If drum does not rotate increase revs slowly, take care not to take up slack too rapidly.

6. **On receipt of ALL OUT**
When you are satisfied that the slack has been taken up open the throttle smoothly and progressively. If a light glider is being launched use a rate which would require from 3 to 5 seconds to achieve full movement. Do not continue to open the throttle after the glider becomes airborne. Do not allow the cable speed to rise once the glider is rotating in to the climb.

If the engine rev limiter operates during the take-off run or initial climb ***do not throttle back.*** Normal running should resume once the glider is climbing. If limiter operation continues after the glider is fully established in the climb close throttle very slowly until misfiring just ceases.

The red light on the tachometer indicates that the engine speed is close to the point at which the limiter will operate.

7. **Maintain the power setting** until the glider is established in the climb. Once established adjust power to suit glider type, signals from the glider and general impression of speed, rate of climb, etc. The bow in the cable is a very good indicator of correct power setting. Where the Skylaunch control box is in use remember this is only a guide to the correct speed and adjustments may be needed due to the conditions on the day.

8. **Progressively reduce power as the glider approaches the top of the launch** to avoid overspeeding the glider. Close the throttle enough to ensure that the launch is terminated well before the vertical position is reached and without releasing under tension. Full or rapid throttle closure is rarely necessary and can give problems with slack cable forming loops on the winch drum.

9. **Immediately the glider is seen to release**, smoothly but rapidly increase power sufficiently to deploy the parachute, maintain a slight tension in the cable and prevent the cable from touching the ground. This ensures that the cable wraps

evenly on to the drum with no loose looping. If the opening of the throttle is delayed or is too slow there is a risk of loops forming on the drums. These may catch on the winch structure during the wind in or subsequent pull-out.

10. **Adjust the power to "fly" the parachute back towards the winch**, clear of the ground. (If small drogue chutes are in use then it will not be possible to fly the parachutes for long) During the descent watch out for any possibility of the cable landing on an obstruction such as trees, fences, or public road and adjust power accordingly. As the parachute nears the ground reduce power and apply the drum brake if necessary to avoid the weak links etc. hitting the ground at high speed. Aim to have the parachute land gently with no forward speed at least 50m from the winch. If the cable could have fallen over any obstruction, immediately shut down and clear it by hand – do not wind the cable and chute through fences, trees and assorted scrap vehicles! Otherwise once on the ground the parachute may be drawn closer to the winch VERY SLOWLY. Take great care not to draw the parachute and fittings into the paying on gear.

11. **Disengage drive.** If no immediate launch is expected allow engine to idle for twenty seconds before stopping.

12. **Set clutches and brakes** ready for next launch or cable pull-out as appropriate

Section 5
CABLE PULL-OUT

Note:

It is essential that the retrieve driver is well briefed on the pull-out procedure. Refer to the Retrieve Driving section. The winch driver should advise the retrieve driver of any special limitations on speed due to the particular winch in use. It is frequently found that an inexperienced driver should be reminded of the routine to be followed.

It is vital that the drum clutches are disengaged during cable pull-out. If either clutch is left engaged the automatic gearbox will be driven by the drum and expensive damage will result.

TWO CABLE OPERATION

1. The cables must be wound in to the winch at the end of each launch.

2. Disengage the drum clutches, put the transmission out of gear, and set the pull-out brakes.

3. When the retrieve vehicle is correctly positioned in front of the winch, attach the cables using the pull-out weak links at the top end of the chutes.

4. Return to the winch and give the “take-up slack” signal to the retrieve driver. When both drums are rotating steadily give the “all out” signal.

5. Monitor the progress of the retrieve vehicle. If it is seen to wander to the extent that the cables may have crossed then notify the launch caravan at the end of the pull out. Have the retrieve drive back down the cables to check separation, if in doubt whether the cables can be used without crossing have a tyre put on the end of one cable and wind it in to the winch.

SINGLE CABLE OPERATION

6. Under favourable conditions a single cable need not be wound in to the winch. After the glider releases, use only enough power to ensure that the cable falls well within the airfield boundary and that there is no slack on the drum or lying on the field. The subsequent retrieve can be considerably quicker than if the cable is wound in to the winch.

7. When the parachute is on the ground disengage the drum clutch, put the transmission out of gear, and set the pull-out brake. Stay at the winch.

8. Once the retrieve driver has attached the cable, signal “take-up slack”. Continue signalling until the drum is revolving steadily, then give an “all out” signal.

ALL PULL-OUTS

9. Monitor the cables during the pull-out, adjusting the brakes gently, if necessary, to avoid any over-running of the drums and consequent thrown loops of cable. When the brakes are correctly set the cables should touch the ground about 25 – 50 metres from the winch.

10. Do not release the pull-out brakes or engage a drum clutch until the retrieve vehicle is seen to move clear of the cables. Be prepared for the cables to move at any time, even if the retrieve vehicle has moved away from the launch point.

11. If the retrieve vehicle stops early, for example because a glider is landing, then visually check that there are no loose turns which could cause problems. Use the light or bat to signal to the retrieve driver when it is safe to take up slack again. If there is a problem leave the Stop light on and stand next to the winch with the bat raised until the retrieve vehicle returns to the winch.

12. As soon as the pull-out is complete and the retrieve vehicle is clear check all drums for loose turns of cables. If any are found notify the launch point, then pull cable off the drum until the loose turns are eliminated. Wind in the resulting slack by hand.

13. If a towing link breaks during the pull-out then the retrieve driver should continue to the launch point with the remaining cable. If you want him to stop put the Stop light on and signal with the bat. The driver should seek your advice, by coming to the winch or by radio, before collecting the dropped cable. Do **NOT** attempt to work on the cable or drum if there is any possibility that it will move.

OPERATING WITHOUT A RETRIEVE DRIVER

It has become common practice for one person to act as both winch and retrieve driver. While this can be useful if short of people at the launch point, it is usually faster to use a separate retrieve driver if possible. It is also a good way of introducing new members to what happens at the winch.

With no one at the winch, setting the brakes is particularly important. When pulling away carefully monitor the cables to ensure they are not overrunning.

Section 6
EMERGENCIES

The winch driver is responsible for understanding how to use the emergency cable cutting equipment.

LAUNCH EMERGENCIES

In certain circumstances an immediate reaction is essential to ensure the safety of both pilots and glider. Launch emergencies can be considered under the following four categories:-

1. Launch failures, including simulated launch failures

2. Failure of the glider to release on completion of the launch

3. Launch obstruction

4. Winch power failure

1. Launch Failures

Provided that the cable daily inspection has been completed correctly and that there has been no incident which has caused a cable fault, the majority of actual launch failures will be due to the failure of the weak link. If the weak link is between the parachute and strop (our standard arrangement) then the parachute will remain attached to the “live” cable and will deploy when the break occurs. Some tension will be maintained in the cable and the cable will lie straight.

A break elsewhere in the cable will mean that, due to spring-back, there will be an unknown length of “dead” cable, complete with parachute, which has floated down somewhere between the launch point and the winch. There will also be a length of “live” cable, still attached to the winch.

As subsequent actions are dependent upon where the break has occurred, it is important that this should be quickly identified.

If possible, the launch controller should advise if a simulated cable break exercise is to be carried out, especially if planned to occur below 200 feet.

Launch Failure Procedures

(a) Because it is often difficult to determine whether the failure is a weak link or cable break, reduce power immediately and apply the brake to bring the cable to rest and avoid any possible conflict between the glider and the cable/parachute assembly. **On no account should the cable be winched**

in until it is safe to do so. Closing the throttle and applying the brake will cause the chute to collapse and the cable will fall to the ground. If you apply power the chute may fly in front of the glider in an unpredictable manner.

If the cable falls well below the glider and the glider turns clear it is possible to resume winding in. If however the glider aims to land ahead **do not attempt to wind in the cable** until the glider has landed and you have checked that the glider and any retrieve vehicle(s) are well clear of the cable.

(b) If a weak link has failed, the cable should be wound in ready for the next pull-out. Collect the notched ring from the hook connector. When the strop is retrieved the failed link should be replaced.

(c) If the cable has failed, the retrieve vehicle should retrieve the broken end and return it to the winch. See “Cable Repairs” for recommended procedures.

(d) Check the winch drum for loops or thrown turns before winding in a stopped cable or before the pull-out if the cable was wound in without stopping.

Note:
It is strongly advised that following any cable looping or kinking – or if the second cable has been caught or fouled during a launch – a full inspection should be carried out on the cable(s) in question. This may appear to be time-consuming but the delay ensures continuing cable integrity. The time taken for an inspection is far less than can be required to sort out a break or a cat’s cradle of wire around the drum!

2. Failure of Glider to Release the Cable

Providing that the throttle is closed to terminate the launch at the appropriate point, the cable should back-release before it is carried to the vertical position by the glider. Once the cable has reached or passed vertical, it may be assumed that the glider is unable to release the cable. If this happens:-

Engine out of gear

Apply brake

Operate appropriate guillotine

Disengage drive

Stop engine

Remain safe - STAY INSIDE CAB UNTIL EMERGENCY IS OVER

3. Launch Obstruction

If at any time there is reason to believe that there is an obstruction or the risk of obstruction by people, animals or vehicles, the launch should immediately be stopped and no further cable movements made until confirmation is received from the launch controller that it is clear to proceed.

Prevention is better than cure. Do not take action on receipt of a “Take Up Slack” signal without first checking for potential obstructions, either on the ground or in the air.

Safety Note:

A stationary or falling cable does little damage. A running cable respects neither people nor property and is potentially lethal.

4. Winch Power Failure

If any loss of power is experienced during a launch, other than due to the rev limiter, the cause must be investigated before another launch is attempted. If the loss of power is serious the launch should be abandoned immediately. (Note that in light winds some gliders may require more power than is available, this is not a power failure.)

Be prepared to cut power immediately if the glider abandons the launch with a risk of the drogue chute overflying the glider.

OTHER EMERGENCIES AND FAILURES

5. STOP Signal

A “STOP” signal must always be obeyed immediately. It will be given by the launch point whenever a potentially hazardous situation is seen. The existence of the hazard may not be evident to the winch driver.

Acknowledge the STOP signal by switching on the winch signal lights. Do not resume winch operation without a clear instruction from the launch point that it is safe to do so.

6. Cable Picked Up During Launch

This will not happen if the pull-out is straight and the cables are not subsequently disturbed. If it does happen the priority is to ensure that the glider can make a safe landing. Abandon the launch at the earliest opportunity; if the tangle reach the paying on gear the launch will end abruptly, probably leading to damage to the winch.

7. Weak Link Failure During Pull-out

The retrieve driver should continue to the launch point with the remaining cable and contact the winch driver by radio, or return to the winch for instructions. Until he does so keep clear of the winch drums. Switch the signal lamps on to indicate STOP.

As soon as you are sure that the cable will not move, investigate the reason for the weak link failure. Do not attempt to wind in or pull-out the cable. If a turn has jumped or caught, free it before resuming the pull-out.

Unless the break is close to the winch it is usually best to have the retrieve driver pull out the cables individually, angling away from the original retrieve line so as to ensure that the cables do not cross.

Section 7
ADVERSE CONDITIONS

Nil Wind

1. If there is no head wind, or a slight tail wind, take special care to terminate the launch in sufficient time to avoid the cable falling on top of the winch. Do not continue with the launch until the glider back release operates.

2. If the cable does fall on the winch shut down immediately to avoid the cable becoming entangled in the drums, engine, or other moving parts.

3. Rev limiter operation is more likely to occur under these conditions because of the higher engine speeds needed to provide flying speed.

4. Do not try to wind in a cable that has fallen to one side and behind the winch. It will damage the roller box. Use a vehicle to tow the cable in front of the winch.

Crosswinds

4. Take special care when siting the winch under strong crosswind conditions, noting the risk of the cable falling across the airfield boundary and any obstructions near or on it. Remember that if the cable breaks you will have no control over the subsequent flight of the drogue chute. Problems are most serious when there is an easterly component and the cable could fall across the public road. If there is a significant risk of this happening then it is essential to re-site the winch or to cease launching.

5. Pilots should allow for the drift under crosswind conditions. If it appears that inadequate allowance is being made for the conditions then pass a message to the Duty Instructor.

6. If pilots do not allow for the drift and there is a serious risk of the cable becoming entangled in trees, across fences or falling on the road at the end of a full launch then terminate the launch early. It is most important not to let the cable fall across the public road.

Low Cloud

7. The decision to terminate the launch when low cloud is present rests primarily with the pilot. If a glider appears likely to enter cloud be prepared for an early release. Treat any such release as a cable break – close the throttle immediately and wait until the parachute is in sight and well clear of the glider before winding in. If you lose sight of the glider completely then close the throttle and terminate the launch. Wait for the glider to be visibly clear of the cable and drogue chute before winding in.

Section 8
CABLE REPAIRS

1. General

Experience has shown that most repairs occur at or near previous repairs. Old repairs are vulnerable to wear and loss of strength. Their weight can also result in a loop forming on the drum, this loop then hits the winch structure damaging the cable.

Do not make a new repair close to (say within 10m of) an existing repair. Cut out the short length of wire and have one repair rather than two!

2. Standard Method of Repair

The standard method of repair uses copper ferrules and the hydraulic press. It is usually most convenient to carry out these repairs at the winch. If a repair is found necessary during the daily cable inspection or due to a cable break proceed as follows:

- **(a)** cut out the damaged section or trim the broken ends using the cable cutters
- **(b)** slide one copper ferrule over each end, then overlap the two parts of the cable and feed the ends through the ferrules.
- **(c)** adjust the cable lengths so that the ferrules are about 125 – 150 mm (4 – 6 ins) apart and a tail of about 5 mm is visible beyond each ferrule
- **(d)** place one of the ferrules between the jaws of the press. Check that the cables are still correctly located, close the release valve, and operate the press to bring the jaws together
- **(e)** there is no benefit in continuing to operate the press after the jaws have met, no further compression of the ferrule takes place
- **(f)** unscrew the release valve and allow the jaws to separate sufficiently to move the cable
- **(g)** place the second ferrule between the jaws of the press. Check that the free end is still correct and that the two wires are of equal length between the ferrules. Repeat the swaging operation.

Hand crimpers are available as an alternative to the hydraulic press. The general repair procedure is unaltered but note the following points when using the hand crimper:

Always bring the handles <u>fully</u> together when compressing the ferrule
Make the first crimp in the centre of the ferrule
Make a further crimp on each side of the first, a total of three crimps per ferrule.
Tighten each crimp by crimping again with the next smaller jaws

3. Alternative Repair Methods

In the event of a temporary shortage of ferrules either of the following repairs can be used to maintain operations. Neither will give as good results as the method

described above, the repairs will need to be cut out and replaced after a relatively short time.

(a) single ferrule repair. Proceed generally as above but use only one ferrule. Ensure that a free end of about 5mm is visible on each side before swageing

(b) double eye/reef knot. This has to be taught by demonstration! It is possible to form two linked eyes effectively forming a reef knot in the cable. Tape the joints to prevent the loose ends causing injury.

4. Cable Renewal

When fitting a length of new cable it is important to maintain the natural curl of the wire. Mount the new drum of cable on a horizontal spindle. Cable should be taken from the bottom of the cable drum to the bottom of winch.
The procedure should be supervised by someone familiar with the process, which can be found on the club web site at
http://shalbournegliding.co.uk/members/wiki/images/a/a3/Cable_change.pdf

Initial Launches

The first series of launches with a new cable are critical to its life; at least 20 launches must be carried out observing the following conditions:-

a. No low or simulated launch failures (advise the Duty Instructor)

b. No release under tension. Terminate the launch before a back release!

c. Maintain a normal cable load during the launch

It is also highly beneficial to have a swivel fitted between cable and parachute during early launches when considerable untwisting of the cable may occur under load.

5. Cable Break Procedure

Note: The winch driver is responsible for leading activities after a cable break. The retrieve driver's role is to assist the winch driver. The procedure below is a general strategy that the winch driver should modify if circumstances dictate. Experience has shown that whilst there are many ways to dealing with a cable break this strategy results in least hassle and consistently quick resumption of launching.

During all launches, the retrieve driver should observe the glider. If there is a cable break the winch driver will stop the winch and allow the broken cable to fall on to the airfield. The retrieve driver should note where the remaining elements of the launch cable land. Depending on the nature of the failure the strop alone may fall free, the strop and parachute may fall separate from the cable, or a length of cable complete with parachute and strop may be involved. Subsequent actions depend on where the broken end falls and where the break has occurred.

If the cable appears to have fallen close to or across the public road:

(a) the winch driver and retrieve driver should both immediately go to the place where the cable has fallen with the bolt cutters. A car should be available for this purpose as club vehicles are not fit for road use. If the road is obstructed then signal any traffic to stop and clear the cable out of the way and on to the airfield

(b) carry out cable recovery and repair as described below

If the strop alone falls free:

(a) as soon as it is safe to do so the winch driver will wind in the cable, complete with parachute and shock rope, to the winch

(b) the retrieve driver should collect the strop and take it to the winch

(c) the broken link should be replaced at the earliest possible opportunity – spare links and the necessary spanners are normally kept in the launch caravan.

(d) if the strop is not found immediately, remove the notched ring and broken link from the hooked connector and keep it safe and ready for re-use. Do not tow-out with the ring still in the shock rope hook (they can become detached and lost).

Under all other circumstances:

(a) as soon as it is safe to do so the winch driver should collect a tyre and follow the cable from the winch to the break. He should then tie the tyre to the end of the cable

(b) at the same time the retrieve driver should go to the parachute. If the cable has fallen across a fence, hedge, trees, or other obstruction it should be carried or dragged back on to the airfield. Detach the parachute from the cable rather than drag it through heavy vegetation!

(c) the retrieve driver should then follow the cable to the break, secure the cable to the retrieve vehicle, and slowly tow the free length back to the winch

(d) the winch driver should meantime return to the winch and, if safe to do so, wind in the length of cable still attached to the drum

(e) the cable is then repaired at the winch

(f) after repairs are complete the cable should be wound in fully, weighting the cable with a tyre to maintain cable tension. Refit parachute assembly and strop if they have been removed during the recovery.

Section 9
CLOSE DOWN PROCEDURE

At the end of flying the parachutes will be close to the winch. Do NOT attempt to wind them up to the guide rollers! Proceed as follows:

1. Switch the engine off

2. Disengage drive and drum clutches

3. Wind in the cables by hand. Remove parachutes, leaving the connector attached to the cables. Secure the free ends of the cable so that there is no risk of them becoming entangled in the road wheels. Check that there are no cable loops dangling from the drums

4. Apply the drum brakes

5. Switch off all electrical services including telephone

6. Stow wheel chocks (if used) and earthing spike

7. Return radio to its box and stow in the parachute cupboard.

8. Enter any defects in the DI book, notify major defects requiring early attention to the club ground equipment officer and leave a note on the clubhouse whiteboard.