

PORTSMOUTH NAVAL GLIDING CENTRE



Winch Operators Manual

First Edition

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AMENDMENT RECORD

When you receive any amendment sheet(s) please change the page(s) concerned and sign below to say that you have received and completed the amendment.

Amendment No.	Date Received	Signed	Amendment No.	Date Received	Signed
01			06		
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INTRODUCTION

The Portsmouth Naval Gliding Centre (PNGC) operates a SKYLAUNCH 2 winch for providing glider winch launches. It is a two drum winch, powered by a V8 LPG engine driving a single drum at a time, via an automatic gearbox, and drum selector.

This manual has been approved by the Chief Flying Instructor (CFI) and Winch Master as the training and reference manual for WINCH OPERATORS at the PNGC.

Winch launching is an important part of the operation of PNGC. It typically accounts for 60% of the total launches achieved. It generally provides a cost effective launch method. However the launch heights, and consequently the value for money, vary due to a variety of factors. Also the Launch Rate is controlled by a number of factors. Some factors are uncontrollable (E.g. the wind velocity) others rely on the skill of the Winch Operator and Glider Pilot, and the management at the Launch Point.

Part of the reason for this manual is to optimise the skill of the Winch Operator, so that the launches provided meet the satisfaction of the Club Management, the Winch Master, and the Chief Flying Instructor, etc. and also, last but not least, the pilot of the glider who is paying for the launch.

In Accordance with:

BGA Winch Manual
RNGSA Instructions
Skylaunch Manual

TRAINING WINCH OPERATORS

All PNGC solo pilots are required to be trained as Winch Operators.

Winch Operators are trained and signed off by a Winch Trainer. These are appointed by the Winch Master and approved by the CFI. A Register is kept by Winch Master, containing the names of Winch Operators and Winch Trainers. Only Winch Operators and Winch Trainers are allowed to operate the winch.

Requirements:

- You must be a member of Portsmouth Naval Gliding Centre
- You must be a Solo Glider Pilot with at least 10 flights in a single seater
- You must be signed off as a **Cable Retrieve Vehicle driver**

You are Qualified as a Winch Operator when:

- You have read and understood this manual, and have signed to confirm this.
- You have satisfied a Winch Trainer that you are competent in all aspects of winching, and he has signed you off in the Register.

You are Qualified as a Winch Trainer when:

- You have satisfied the Winch Master that you are competent and have been signed off in the Register.

Winch Operator Job Description:

- Safety issues
- Daily Inspection
- Positioning and preparing the Winch for launching
- Providing satisfactory and safe launches
- Radio communications with Launch Point and Retrieve Vehicle
- Expedient Cable repairs
- End of day duties

SAFETY

Remember that the winch is a powerful machine, and a driven cable is potentially lethal. **A driven cable can easily saw a tractor in half very quickly, so be warned.** Treat the winch cable with the utmost respect with this in mind. The area around an operating winch is a most dangerous place to be. Your safety and that of all personnel on the airfield are of paramount importance. The procedures contained in this manual, therefore, must be complied with and taken seriously.

As Winch Operator you must ensure the following:

General Safety

- Whilst towing the winch with a tractor no person is permitted to stand on the platform attached to the tractor or the side platforms on the winch, but a person may ride in the Winch with the doors closed.
- No personnel apart from the Winch Operator (and those under training) and the Retrieve Driver are to be at the Winch during Winching Operations.

Safety at the Winch

- When launching is in progress, no vehicle or person is to be in front or alongside the Winch. Vehicles are to be 10 metres behind the winch and personnel are to be undercover i.e. in the vehicle.
- The Winch Operator is to be in the Winch when retrieving the cable(s).
- Whilst working on the drums or cables the winch engine is to be switched off at the main isolating switch.
- No loose objects are to be left on the ground at the winch area. Handles, Cable Cutters etc are to be secured in the relevant receptacles etc.
- All covers and guards must be in place whilst the drums are turning.

Safety at the Launch Point

- Cables at the Launch Point must NOT BE MOVED without clearance from the Launch Point.

Main SKYLAUNCH Control Levers

The main driving controls which the Winch Operator needs to know about are set out in the table below. The Control Names are used throughout this manual for clarity:

Control Name	Colour	Type	Function
SELECT DRUM	Black	3 way	Selects Left, neutral (none) or Right Cable Drum
GUILLOTINE	Red	OFF / ON	To Chop cables in an emergency
DRIVE	Blue	Drive / Neutral	Engages engine to drive selected drum
THROTTLE	Blue	Variable	Increases power from the engine
BRAKE	Blue	Variable	Applies brakes to cable drums
TOW OUT BRAKE	Black	On / Off	Applies a small amount of BRAKE to cable drums.

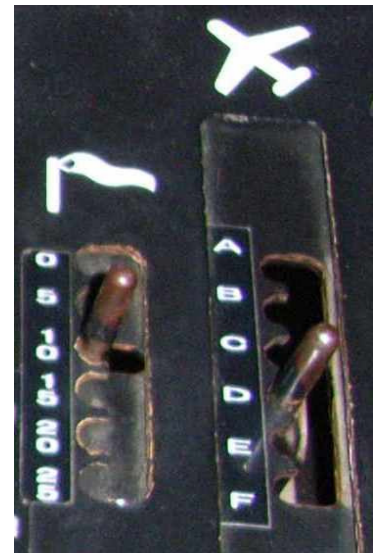
It should be noted that all the control levers move away or towards you, the operator, except the SELECT DRUM which moves sideways.

Note also that the levers are consistent in the sense that they all need to be pushed forward to “GO”, and pulled towards you to “STOP”.

Settings:

Before launching a glider the wind speed and glider type are set to control the THROTTLE GATE. This is a ‘soft stop’ position to limit the THROTTLE for the particular wind and glider type. It is designed to be correct for the MAIN CLIMB PHASE of the launch only. Note that the THROTTLE may be pushed through the GATE to provide more power if required.

The wind setting should be estimated from observations, and experience from earlier launches. Note this setting is the wind speed in the direction of the launch, so if there is a 15 knot crosswind at 90° to the launch direction, then the correct setting would be ZERO.



The glider type setting is taken from a table of types, kept in the Winch.

Daily Inspection

ENGAGE GUILLOTINE Safety Lock before the Daily Inspection

Before towing the winch to the launch point, check:

- All Cable Rollers (6 in each roller box) rotate freely, are free from excessive bearing or surface wear, and are free from damage or debris.
- Guillotine linkages are free from damage and secure
- Check fuel is sufficient for the day's operation, fill if required
- For fluid leaks from Engine, Transmission, Final Drive, Brake system, Engine and Transmission Cooling System
- Tyres have no obvious damage
- TOW OUT BRAKE is applied, and the cable is tight on the drums.
- Place radio in the cab.
- Sign log book.

Repairs to the Winch and Manufacture of Strops &

Wires

As a Winch Operator you are not necessarily authorised to perform repairs to the winch, or to manufacture Strops and Wires Etc. Please consult the Winch Master for advice.

Positioning the Winch

- Seek advice from the Duty Instructor regarding the positioning of the winch
- Before moving the winch, check that the TOW OUT BRAKE is on, that the cable is tight on the drum and not dragging on the ground.
- Position the winch pointing towards the Launch Point, and with the tow hitch jack on hard standing, if possible.



- Lower the wheel chocks
- Place the earth spike into the ground
- Attach the parachute assemblies to the cables

Cable Inspection:

At PNGC the cables are inspected periodically at the discretion of the Winch Master (or his representatives). To inspect the cables, they are towed out from the Winch to the Launch Point without the launch gear attached. Two tyres are then attached to each cable to keep them taut when winding them back to the Winch. The inspection then takes place at the Winch as the cables are being slowly wound in. The winding in is stopped if a defect is seen, and repaired there and then. All inspections are recorded in the Winch Log Book.

Note that this is the only time a person is close to the cables at the winch while cables are being wound in. That person must keep clear and not step over the cables unless the winch engine is stopped.

Controlling the Cable on Retrieve Tow Out:

Before cables are towed out from the winch, the BRAKE lever should be worked two to three times and then apply the TOW OUT BRAKE. SELECT DRUM neutral. Any problems with the tow out (cable spills etc) are to be reported in the Winch Log Book.

Communications

Communications between the three places of Winch, Retrieve Vehicle, and Launch Point is essential to winching operations.

PNGC use three identical handheld radios, one for each place. (See Laws & Rules for Glider Pilots for other methods of signalling)

When the radios are switched on they are in listening mode, with volume control. They transmit when a button is pressed, and revert to listening mode again when the button is released. When transmitting, speak normally into it about 6 inches away.

The Launch Point uses the radio to instruct the Winch to launch gliders. There are three commands issued to do this:

1. **TAKE UP SLACK.** The words use maybe: “WINCH, LAUNCH POINT, RUNWAY CABLE, K13, TAKE UP SLACK”.
2. **ALL OUT.** When the cable slack has been taken up and the glider is moving forward. The command is “ALL OUT, ALL OUT”
3. **STOP.** This is given as necessary. The command is “STOP, STOP, STOP” and may be initiated by anybody.

The Winch Operator will use the same three commands to the Retrieve Vehicle when the cable is being towed back to the Launch Point.

Additional use of the radio by all holders is to communicate with each other when sorting problems. E.g. Cable Breaks, Cable on the runway etc.

Before transmitting a message, listen to ensure no one else is transmitting, then press the button. Say who you are calling, followed by who you are. E.g.: If you are want to call Retrieve, and you are the Winch, you would say “Retrieve, Winch” followed by your message. Release the button after transmitting otherwise you will not hear a reply.

The Winch has a light on the cab top, which may be used as a secondary signal saying STOP. For example if you have already used the radio to say that you are working on a cable drum at the Winch, the light should also be switched on as confirmation STOP. A continuous WHITE light is an official STOP signal. Cables must not be moved.

Launch Procedures

Safety Note:

If there is a jerk or hesitation in power at the start of a launch, stop and wait for further instructions.

Introduction:

The object is to accelerate the glider smoothly and rapidly to its optimum launch airspeed whilst avoiding any snatching which over-stresses the cable, or tail-banging which over-stresses the glider.

Method:

“Prepare” Phase. When a launch is imminent (glider wings level):

- Ensure engine is warmed up. Check the temperature gauge.
- Check the wind speed setting on the throttle gate.
- Unlatch the guillotine safety lock.
- Release the TOW OUT BRAKE.

“Take Up Slack” Phase. Wait for “Take Up Slack” from Launch Point, then:

- Set the glider type on throttle gate.
- SELECT DRUM.
- Engage DRIVE, to “Take Up Slack”

“All Out” Phase. Wait for “All Out” from the Launch Point then:

- Push THROTTLE smoothly and progressively taking about 2/3 seconds pushing well through the throttle GATE until the glider has just reached the main climb phase of the launch. At this stage THROTTLE back smoothly to the gate, and maintain power for the main climb phase of the launch.
- Adjust THROTTLE to **SIGNALS** from the glider and general impression of speed, rate of climb etc. throughout the main climb.

Note: The THROTTLE GATE is a theoretical guide to the setting for the MAIN CLIMB phase of the launch only. Additionally you must watch the bow in the cable, and the glider in order to make THROTTLE adjustments as required.

Terminating the Launch

It is your job as Winch Operator to ensure that the cable lands safely away from obstructions, and certainly not on top or behind the winch.

Also if a glider is not compensating for a cross wind drift which is compromising the safety of the cable, the launch should be terminated by reducing power to zero.

The normal procedure to terminate the launch is:

- **Reduce THROTTLE as the glider approaches the top of the launch**, and then close the THROTTLE fully **WELL BEFORE** the vertical position is reached.
- **Immediately the glider is seen to release**, smoothly increase the THROTTLE enough to deploy the parachute, and maintain a slight tension in the cable, enough to prevent the cable from touching the ground. This ensures a clean wrap onto the drum with no loose looping.
- **Adjust the THROTTLE to “fly” the parachute back to the winch**, clear of the ground. Once on the ground, the parachute may be drawn closer to the Winch but **VERY SLOWLY**, with reduced THROTTLE.
- **Be careful to stop the parachute assemble in good time** to avoid it jamming in the winch rollers.

When stopped:

- DRIVE neutral
- TOW OUT BRAKE on
- SELECT DRUM neutral
- Re-engage the guillotine safety lock

As Appropriate:

- Check the parachute etc. are clear of the other cable if ready for the next launch
- Prepare for the next Launch
- Arrange for Cable Retrieve
- Arrange for another Winch Operator
- Pack up and have a pint

Emergency Procedures

Safety Note:

A stationary or falling cable does little damage. A driven cable is potentially lethal.

- **Failure of Glider to Release the Cable:**

Provided that the THROTTLE is closed to terminate the launch at the appropriate point, the cable should back-release before it is carried into 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:

1. Operate the GUILLOTINE immediately
2. DRIVE neutral
3. BRAKE on
4. SELECT DRUM neutral
5. Switch engine off

6. STAY INSIDE CAB UNTIL EMERGENCY IS OVER

7. Inform the Launch Point

- **STOP. If you ever hear “STOP” in any form:**

1. DRIVE neutral
2. BRAKE on
3. SELECT DRUM neutral.
4. Do nothing else until the Launch Point gives you further instructions.

- **Do not launch if you notice any possible conflict or hazard**, regardless of any signals you may receive. It may have gone unnoticed by the Launch Point. Tell the Launch Point, and do not proceed until the hazard is clear to your satisfaction.

Cable Breaks & Launch Failures

Following any Cable Break or Launch Failure:

- The THROTTLE must be reduced immediately to bring the cable to rest, and avoid any possible conflict between the glider and the cable/parachute assembly. Apply the BRAKE and select DRIVE neutral.
- On no account should the cable be winched in until it is safe to do so.
- If the glider lands ahead, DO NOT wind in the cable until you are CERTAIN that the cable is clear of the glider and crew.
- If the glider is high enough it will turn away from the launch line and you may wind the cable in, keeping an eye on the glider. The glider may still do a truncated circuit and land in front of the winch, or across the launch line. If you have any doubt then STOP.

Cable Recovery:

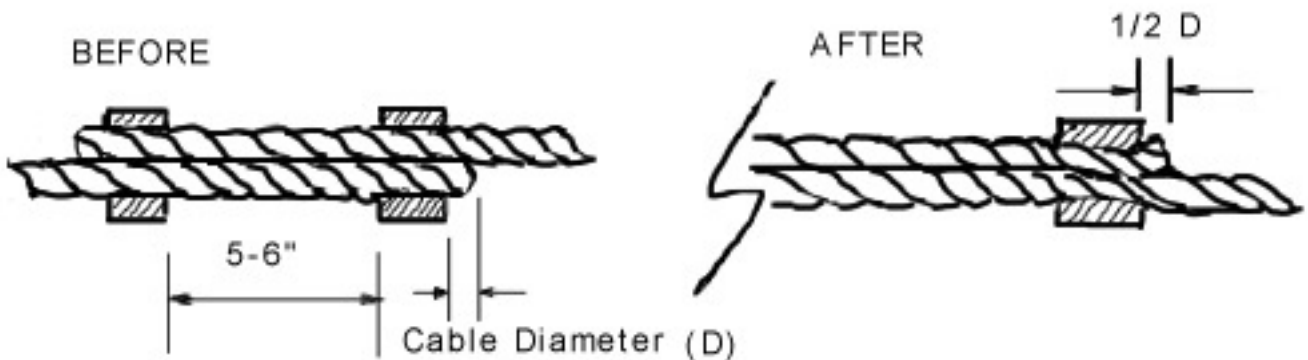
- If the cable is broken and the area is clear, use or instruct the Retrieve Vehicle to recover the broken end.
- If the cable has landed on the runway it should be cleared as quickly as possible provided that you are CERTAIN it is clear of the lights. If you are unsure, advise the Launch Point that there may be a cable on the runway and use or instruct the Retrieve Vehicle. Do not enter the runway without permission from the Launch Point.
- When the Retrieve Vehicle brings the cable back to the Winch it must drive past the winch (10m) to give enough cable to work on for the repair.
- If you are acting both as WINCH OPERATOR and RETRIEVE DRIVER there are times when you will need additional help from the Launch Point, particularly if you are dealing with cable recovery from around obstructions. E.g. Runway lights.

Cable Repair

Cables are joined together using two ferrules. These are crimped using a hand operated hydraulic press, mounted on the side of the winch. The procedure is:

Clean cut each end of the cable using the cable cutter provided.

Thread on two ferrules and overlap the cable by 125 – 150mm (5 – 6 inches) as shown in the diagram below: -



- Place one ferrule (with cable) between the dies of the press, vertically and centrally
- Close the release valve and operate the hand pump until the die faces just meet
- Open the release valve and extract the formed swage
- Repeat for the second ferrule, but see note below:

NOTE: Before crimping the second ferrule, ensure that the cables are straight between the two ferrules, and therefore of equal length. If one is shorter, only one swage takes the load, and so weakens the joint.

At the End of the Day

Before moving the winch at the end of the day, please ensure that you:

- Apply the Tow Out Brake.
- Remove the parachutes from the cables, & stow away.
- Secure the ends of the cable as shown:
- Wind the drums by hand to tighten cable.
- Stow the wheel chocks and earth spike.
- Stow the cable repairing gear.
- Scan the ground around the winch, and pick up any rubbish.
- Enter any defects and operating details in the Winch Log Book.



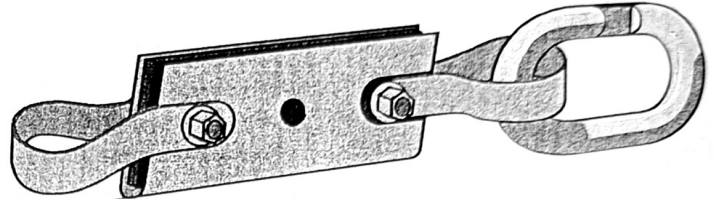
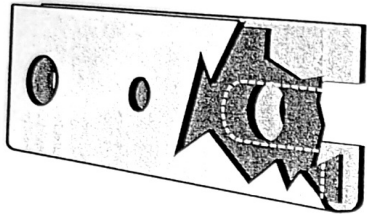
The winch may now be towed back, & then please:

- Re-fuel with LPG
- Return the winch to the parking area
- Apply the handbrake on the tow hitch
- Clear the cab of all grass and debris
- Put radio on charge. Check all three are there.
- Turn OFF the main isolation switch on the battery
- If it has been raining and the parachutes are wet, hang them up to dry

Look after the kit, and the kit will look after you when it is your turn to fly!

Assembly of the Cable Components

Weak link in section



Weak links to suit club A/C

