

## CHAPTER 7

### THE WINCHING OPERATION

(and Winch Operating Manual - S.S.S.A. ARO)

#### WINCH LAUNCH - GENERAL

##### 1 Winch Rated Instructors

- 1.1 Instructors must be checked and cleared by CFI, Flying Panel or an approved deputy.
- 1.2 Instructor's Brevet must be signed for winch launching.
- 1.3 Instructors are required to remain current on all types of launch for which they are cleared.

##### 2 Winch rated Pilots

- 2.1 Pilots solo on aero tow will be converted to winch launch.
- 2.2 To remain current, one winch launch per one month for student pilots.
- 2.3 To remain current, one winch launch per three months for pilots with a GPL.

##### 3 Passenger carrying

- 3.1 Only PAX rated pilots may carry passengers.
- 3.2 Pax normally carried in back seat with stick removed. CFI or duty instructor may relax this requirement.
- 3.3 For PAX rating to include winch launch, a minimum of 10 solo launches and CFI, Flying Panel or Full Instructor approval required.
- 3.4 A logbook entry is mandatory.

##### 4 Winch Drivers

- 4.1 Winch drivers are required to be solo pilots on winch launching.
- 4.2 Winch driving instructors must demonstrate competency in a variety of weather conditions and must be approved to instruct by the CFI, Flying Panel or an approved deputy.
- 4.3 Winch drivers must drive under the supervision of a winch-driving instructor until cleared to drive solo. A minimum of five unassisted but supervised launches in differing wind conditions are required before a winch driver is cleared to drive solo. A log book signature is mandatory.
- 4.4 Pilots trained at other clubs must undergo a winch driving check with a Cape Gliding Club winch instructor and be cleared to drive solo.

##### 5 Retrieve Vehicle Drivers

- 5.1 The cable retrieve vehicle drivers are to be cleared to drive by any person qualified to drive the vehicle or the CFI, Flying Panel or an approved deputy.

##### 6 Circuit

- 6.1 Circuit direction is as at present.
- 6.2 Winch launched gliders to land on winch runway unless it is the stated intention of the pilot to land on the main runway.
- 6.3 Winch launches must be delayed until tug aircraft, other power aircraft and gliders are clear of the launch area.
- 6.4 The winch runways are referred to as "Winch Runway 33/15" and **not** "33/15 Left/Right" or "Runway 33/15 Winch".

#### Operation of the Cape Gliding Club double drum "EPO" Winch

by Ian Forbes  
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This manual is intended as a guideline and training aid for winch drivers of the “EPO” Double Drum winch. Note winch drivers should be suitably qualified, and receive proper training before attempting to use the winch. An adequate level of airmanship is required on the part of drivers, pilots and ground crew when winching to maintain safety standards. This cannot be taught from a manual.

Note this manual does not cover maintenance of the winch.

### 1. At the start of the day – in the hanger.

1. Check petrol level and double check with dipstick,
2. Parachute and snake in good condition
3. Chain in RV.
4. Cable hook in RV.
5. Splice set in winch.
6. New cable cutter in winch.
7. Check engine oil level before starting
8. Check transmission fluid level with engine idling after 2 to 3 minutes in idle to warm up. Stop engine to add ATF if required.
9. Check radiator water level
10. Pump tires if necessary
11. Check guillotines are armed. (Notch in the horizontal position).

### 2. At launch point.

1. Apply hand brake fully (foot brake is o/s).
2. Move drive/winch transmission select to “winch”. Do not force. If it won't engage:
  1. run engine in “Drive”,
  2. cut motor and “feel” the selector into gear as the rotation stops.
3. Position chocks behind rear wheels
4. Hammer earth spike into ground
5. Lift radio antenna
6. Check that the guillotines are armed.

### 3. Before towing cable out.

1. Place drum selector in neutral. If you do not do this the differential and transfer box are rotated during pull out which

adds to wear etc and the tow out vehicle has a “heavy” load.

2. Place gearbox in neutral too.
3. Select a nominal 6 notches on the drum brake lever(s) (adjust if required during tow)
4. Check that the drum(s) can rotate freely and that there are no cable hang-ups.
5. A suitable weak link (loop of thin rope) should be used
6. between the tow out vehicle and the cable.

### 4. During tow out.

Beware that when the tow out vehicle stops that the drum(s) do not continue rotating and cause a snarl up.

1. Be ready to apply foot brake
2. Advise tow vehicle to decelerate very gently
3. Use a little more drum hand brake if necessary.
4. After the tow vehicle has unhooked the cable, ensure that the drum(s) is/are free to rotate. Check if you suspect a drum overrun and/or snarl up.
5. Before the first launch of the day, the cable should be inspected and if necessary, worn splices replaced.

### 5. Before launch.

1. The cable cutter should be at hand in the winch cab before launch, as they may be required to cut the cable in the event of a guillotine failure.
2. In a cross wind conditions, the downwind cable must be launched first.

3. Cable to be used first must be agreed by arrangement with the launch point.
4. Select appropriate drum on the drum selector lever. **DO NOT FORCE:**
  1. Release drum hand brake and place transmission in Neutral
  2. If possible get an assistant to turn the drum while selecting.
3. **Otherwise**
  1. Start the motor, select Drive on the gearbox
  2. Cut the motor and feel the selector into position as the rotation stops.
5. Ensure that the drum brake is released, and that the drum brake on the second drum is applied.
6. Check that the guillotines are armed.
7. Check that the safety mesh hatch on the “sun roof” is closed.
8. Place gearbox in Neutral
9. Place foot on firmly on appropriate drum footbrake.
10. Start motor
11. Wait for the radio call from the glider. (*Eg “Worcester traffic, Glider GUU, K7, two people on board, attached to yellow cable, about to commence winch launch”*)
12. Confirm that the cable attached to the glider is the same as the one you have selected.
13. Give a confirmation radio call, confirming glider type, number of occupants and which cable is about to be launched.
14. After receiving “take up slack” light signal select Drive and proceed with launch.

## 6. Launching.

1. Check that the circuit and runway are clear and that the area around the winch are clear of pedestrians and vehicles which could be damaged by a flying cable.
2. Release foot brake
3. Confirm cable is moving slowly
4. Apply a little throttle if required.
5. If signal lights go out, apply foot brake and wait.

6. On seeing “all-out” signal:
  1. Open throttle steadily over 3 seconds, if the engine begins to hesitate STOP
  2. Do not hesitate
  3. NEVER close or reduce throttle, this will cause an overrun with a possible cable snarled in the wheel.
  4. If there is any hesitation or loss of tension in the cable which may have resulted in an overrun, stop the launch.
  5. The actual opening position required is dependent on weight and type of glider, number of occupants, and wind conditions. Judgment is required to determine this.
  6. Monitor lights for emergency stop signal
7. Hold the throttle position until glider is seen to rotate.
  1. If an problem arises after the glider has rotated, the driver should continue launching if possible to give the pilot the choice of options as to if and when to abort the launch.
8. Steadily reduce throttle to “climb” power over one second.
  1. Judgment is required to determine climb power position.
  2. Observe the glider and monitor for speed signals (“too fast” or “too slow”).
  3. Make slow adjustments to the throttle, over one second, when responding to these signals.
9. After launch is about 2/3 complete, slowly reduce the throttle so that by the time it reaches release height the throttle is near idle but leave a little throttle so a clear throttle chop can be made to signal release.
  1. Judgment is required to determine timing and rate of throttle reduction.
10. Radio calls can be used to guide the pilot:
  1. to correct for cross wind drift. (eg “Left wing down”)
  2. to advise him to release (“Drop cable”) - particularly in strong winds as he may not notice the cut in power at the top of the launch.
11. If the glider fails to release the cable, the cable must be guillotined before the glider passes overhead the winch.
  1. Be sure to operate the correct guillotine.
  2. Firm pressure is required to operate the guillotine – use two hands if required.
  3. If the guillotine fails to sever the cable, climb out the cab with the cable cutter and cut it by hand.

**7. Cable retrieve.**

1. Confirm that the glider has released.
2. Note the lifting arms will fall immediately after the glider releases
3. Open the throttle as required to control the decent of the chute
4. Close the throttle and apply brake foot brake to stop the drum before the chute lands but don't brake too hard as the cable may continue to rotate on the drum after it has stopped.
5. NEVER drag the chute on the ground. Replacement is expensive.

**8. After launch.**

1. Stop motor
2. If the chute lands in rough ground:
  1. Wait for an assistant to remove chute and attach a chain to cable
  2. Start motor and drag the cable in at idle speed until the cable is near the winch, then stop motor
3. Select Neutral on gearbox
4. Select Neutral on drum selector. DO NOT FORCE. If it is tight:
  1. Ensure gearbox is in neutral
  2. Ensure drum hand and foot brakes are released
  3. Get an assistant to pull out the cable slowly to cause the drum to rotate
  4. Apply gentle pressure on the lever and it should move into neutral.
5. Ensure first cable is safely out of the way before launching the second cable.

6. Proceed with cable tow out for next launch.

**9. After flying.**

1. Remove chutes
2. Place drum selector in neutral and wind up remaining cable by hand.
3. Apply hand brakes on drums.
4. Remove chocks and replace on their hanging brackets
5. Remove earth spike and replace in its bracket.
6. Lower radio antenna.
7. Place winch/drive selector in drive. NB Do not force. If it is tight:
  1. Start motor and place gearbox in Drive
  2. Stop motor
  3. Move the selector as the rotation stops.
8. Drive to hanger

**10. In hangar.**

1. Park and leave room to work at workbench
2. Put into Park, apply lever brake, switch off engine
3. Check log book entries have been entered and signed.
4. Switch off master switch and remove key
5. Coil snake and hang up. Hang chute, if damaged hang in repair bay.

*ADDENDUM*

**SSSA A.R.O** (extracted from SSSA Website)

**WINCH OPERATION MANUAL**

**WINCH OVERVIEW**

- Only winches built specifically for that purpose and having adequate reserves of power shall be used for the purpose of launching gliders.
- The winch must be secured by the means most suitable for the type of winch used so that it is unable to move during the launch.
- All winches must be approved by the SSSA.
- The winch control system shall be such that the driver at all times retains full control over the cable speed.
- Multiple drum winches shall be so constructed that only one drum can be operated at any one time.

## EQUIPMENT

- a) Severing device able to sever simultaneously all winch cables (approved by the Commissioner for Civil Aviation)
- b) An alternative means of severing the cable must be kept permanently in an easily accessible place on the winch, e.g. bolt cutter.
- c) Safety glass or safety cage to protect driver
- d) Secure stabilising jacks or stabilisers
- e) Operators manual
- f) List of certified operators
- g) Daily inspection checklist and DI inspection logbook (to be signed off before and after operations)
- h) Adequate contact with launch point either
  - Lights
  - Signal system
  - VHF radio
  - Other
- i) Suitable earthing system .

## INSPECTIONS

### Daily

Before each flying day the communication system, cable-severing device, brake operation, weak links, cables, and shock cords will be inspected to ensure safe condition and operation.

### Monthly

At intervals of not more than one calendar month the daily checks will be carried out and amplified by a physical check of drums, brakes and all accessible moving parts such as linkages, Bowden cables and propeller shafts.

Wear and tear shall be noted and where necessary remedied.

The cable-severing device will be inspected and tested in a manner appropriate to its operation (e.g. cutting postcard by lowering blade with reset lever) although it is unnecessary to actually cut cables where this will result in blade damage.

### Annually

At intervals of not more than one year a monthly inspection will be carried out and amplified by checking the drum brake pads, testing the cable severing device by actually cutting three parallel cables or wires and carrying out a full maintenance service on the brakes, engine and transmission.

### Log-books

Each winch shall have a log-book in which all of the above checks shall be entered together with any relevant observations or additional checks required

by individual clubs. Each entry shall be dated and shall be signed by a competent person approved by the club.

### Winch Drivers

- Trainee winch drivers shall be nominated by the CFI.
- Trainee winch drivers shall be instructed by and shall carry out twenty (20) launches under the supervision of a qualified winch driver.
- Trainee winch drivers shall be examined with regard to winch driving, inspection of equipment and emergency procedure before being appointed as a qualified winch driver. The CFI or his nominee will carry out such examination.
- To remain current, qualified winch drivers will carry out not less than ten (10) launches in any period of three (3) months.

## GENERAL PROCEDURE:

- The "snake" or protected (hosepipe or other) section of the cable between the parachute and the glider should be no less than 25m. An additional 10 Meters of cable extension before the parachute is recommended.
- When wire is used for launching, 100 Meters of the glider end of the cable must be multi-strand to prevent coiling and backlash onto the glider in the event of a wire break.
- The second cable must be removed from the parachute and "snake" to minimise any danger from a cable "pick-up".
- Parachute size should be matched to the winch but not able to cause a back release if it blossoms.

- Typical size is 750mm diameter
- The parachute mass should be sufficient to prevent it lifting into the glider if it blossoms in the initial part of the launch, if the snake tension is low.
- A Launch Marshall must give all signals so that in the event of an emergency the launch may be terminated by the Marshall immediately.
- Breaking Strength.  
The breaking strength of the cable/wire should be approximately the equivalent of double the weight of the heaviest glider being launched.
- The pulling cable will be attached to the glider by means of steel rings specifically designed and approved for the tow-hook fitted to the glider. It must be noted that Otfur and Tost equipment is not always interchangeable.
- A weak link of suitable rating will be fitted between the pulling cable and the shock-cord. The specifications are provided by the glider manufacturers
- Tow hooks fitted to gliders will have an effective and operative automatic back-release mechanism.
- Cables should be laid out in smooth, but not necessarily straight, lines.
- On multiple drum winches cables should be laid out in such a way as to eliminate cables crossing one another, either during launch or during layout. This is achieved by using a spreader of at least 3 meters to separate the cables.
- On multiple drums or multiple winch launching facilities, only one glider should be attached to a cable at any time.
- On multiple drums or multiple winch facilities the cable should be fully wound in before proceeding with the next launch.
- Winches and all ancillary equipment, including wire shall be inspected, and made and approved serviceable, before each day's flying. Particular attention will be given to wire, fuel, and cable cutting equipment.
- The club Technical Officer should establish an approved method of splicing cables and only the approved method or methods should be used. Only properly trained personnel should splice cables. Clubs should ensure that adequate equipment for splicing is available.
- No work shall be carried out on any part of a winch, while the engine is running.
- At any point during the launch up until the aircraft is airborne the winch driver will stop the launch should he have reason to consider that to continue could be dangerous. Such reasons shall include, but not be limited to, suspicion that wires are crossed, loops on the winch drum, power instability, or a dropped wing.
- After the glider is airborne termination of the launch shall be at the sole discretion of the pilot.
- After termination or interruption of a launch the winch driver will not resume pulling until instructed to do so.
- A landing glider has right-of-way and a retrieve driver must take such action as to ensure that pilots are afforded adequate air and ground space with respect to retrieve vehicles during landing.
- During pullout the retrieve driver is under the command of and must obey the instructions of the winch driver. If a pullout is interrupted it shall not be resumed without the permission of the winch driver.

## **GENERIC OPERATIONS:**

### **Signals:**

- An adequate STOP signal, which can be transmitted irrespective of equipment failure, must be available at all launch points. It is therefore recommended that at least one bat be available to a delegated person so positioned as to be able to see and be seen from both launch point and winch. There must be clear radio or telephone communication between the launch point and the winch operator. Light or bat methods of signaling should only be used as a temporary substitute means of communication.
- The launch point marshall is signalling to the winch on behalf of the glider pilot to be launched, and should therefore face the glider and not the launching mechanism, so that throughout the launch he can see that nothing is going wrong, or can interfere. He continues to be responsible for the safety of the launch until the glider is released.
- The only signal, which can be initiated by anyone other than the pilot of the glider being launched, is the STOP signal, which should be initiated by anyone recognizing a danger to the launch.
- During the launch, should the pilot consider the speed excessive, the pilot should yaw the glider from side to side with the rudder.
- During the launch, should the pilot consider the speed insufficient, he should lower the nose to a safe attitude and release the cable if sufficient speed is not achieved.

### **Winch Launch:**

- All radio calls to the winch are given by the Launch Marshall not by the glider. Preferably this is done on the same radio frequency as that used for the circuit to ensure that all are aware of a pending winch launch. For example, if using VHF communication, the following is the type of calls that should be used:
  - Launch Marshall:** "Winch, glider type (e.g. Twin Astir), 2-up, cable identification (e.g. green), take up slack, take up slack".
  - Winch Acknowledgement:** "Taking up slack, glider type (e.g. Twin Astir), cable identification (e.g. green cable)".
  - Launch Marshall:** "All out, all out" Or "Stop, Stop, Stop".
 The object is to clearly inform the winch of the glider type, the cable colour and the instruction for taking up slack and all out.
- Signal for too fast - yawing the glider left and right.
- Signal for too slow - lower nose
- The wing-runner must not swing the glider on its ground run. The pilot gives a single finger signal to indicate the "take up slack" signal. The wing-runner responds using the half circular hand signal. The pilot returns his hand to within close proximity to the release knob and the "all out" signal is given by the wing-runner using the full circular hand signal.
- The winch profile is airspeed driven.
- The winch driver must allow for a controlled progressive acceleration during the ground run to allow this phase to be flown under full control.
- 4 Phases:
  1. Ground run in 2-point attitude, i.e. main wheel and tail wheel run together.
  2. Rise off ground and allow speed to build maintaining this attitude.
  3. Steep climb is initiated 30°; 50 degrees once sufficient speed is available and a safe height has been reached.
  4. Steep climb - sustain steep climb airspeed and release by resuming level flight - 3 pulls on release to ensure a release even if after a back-release. Check to ensure cable is free from glider by turning to observe it descends.

**NB!** Phases 1 and 2 require wings level and straight tracking and must be uncoordinated.

**NB!** Some winches accelerate slowly therefore a long ground run results and possibly the use of negative flap where available will assist in keeping wings level. It must be remembered however that a timely release must be effected when required.

**NB!** At any stage of the ground run if a ground-loop develops due to the wingtip touching or if an overrun occurs or if any part of the launch departs from the normal procedure an immediate release is critical.

**NB!** The Launch Marshall will monitor the launch and will terminate it when and if required by using the command **STOP, STOP, STOP** (if using VHF communication).

### **Cable Breaks**

- Order of events as follows:
  1. Restore safe flight with sufficient airspeed
  2. Release cable
  3. Decide on options available in the following order:
    - a) Land ahead
    - b) Perform 180 degree turn and land downwind
    - c) Perform an abbreviated circuit and land
    - d) Complete a normal but lower circuit and land
- Other options depending on circumstances:
  - e) S-turns
  - f) Use of a cross runway or other runway or suitable safe landing area.
- Be careful of teaching airfield specific options.
- To be taught:
  1. Low break
  2. Medium - after steep climb.

3. Medium-high - where landing ahead may/may not be an option
4. Check to ensure cable is free from glider by turning to observe it descends.
  - Method of cable break practice is to arrange the exercise with the winch and call for power reduction from the cockpit with a single command as the load on the release mechanism makes a simple release by the instructor more difficult and an over-run on the winch is likely.
  - The command for a cable break simulation should not be "STOP STOP STOP", as this is for emergency and has to be treated differently from a cable break simulation by the winch driver.

#### **Cable is not able to be released**

- In this case, once the glider is at the top of the launch it should be dived in spiralling turn (spiral dive) to allow the cable to coil up on the ground (preferably over clear ground) after which the glider is landed in the downwind direction or safely in a suitable area.
- This method is preferred even if the winch cuts the cable as the amount of cable may hook up if dragged by the glider.

#### **AUTO TOW LAUNCHING:**

- Generally the provisions Winch Launching apply to Auto-tow launching with the additions that:
  - \*) Except where reverse towing around a secondary drum is utilised a co-driver should be used to relay signals to the tow-vehicle driver.
  - \*) Preferably a tension meter should be fitted such that it can be directly read by the driver.
  - \*) Particular attention should be given to the siting of a Launch Marshal capable of transmitting a STOP signal at all times.



Ka 7 Launching from Runway 15