

Bewinched

By Jim Bicknell

If your gliding activities to date have depended on aero – tow launches and you are interested in furthering your gliding skills, why not gain a winch launch rating? You will find it is much easier on the pocket, may even help you save for some Mighty River shares.

Your first action should be to read the GNZ MOAP section on winch launching followed by the excellent articles and video clips that appear on the web under glider winch launches.

Some suggested titles that can be downloaded and kept in a ring binder that is readily available to all members of a winching operation.

WINCH LAUNCH TRAINING GUIDLINES by Bill Daniels.

FARIBAULT WINCH OPERATIONS. Details ground crew operations.

WINCH OPERATORS MANUAL by BGA . This 20 page publication was printed in 2002.

WINCH LAUNCHING MANUAL by GFA. This 60 page publication was printed in 1998 and has not been updated but still contains a lot of useful information.

Also strongly recommend, SAFE WINCH LAUNCHING found on the BGA web site.

If you are still serious about taking this step, commit yourself to several launches with an experienced and current winch rated instructor from one of the winch equipped clubs that are dotted around the country. If you have become comfortable behind the club tug your first winch launch may shake your confidence just a little. Please persevere it gets better when you keep your eyes open.

First impression will be that everything happens so rapidly. Within three or four seconds of the instructor's ALL OUT, ALL OUT command, depending on the wind speed, the glider will have completed the ground run and be airborne. Airspeed will be about sixty knots and the aircraft will have rotated into the initial climb. At about 300 to 400 ft AGL the climb will steepen to about forty five degrees and the airspeed should be within the aircrafts recommended range. As the launch proceeds the winch driver will steadily reduce the winch RPM in response to the pilot's radioed airspeeds. As the aircraft nears the end of the launch and starts to level out the winch driver will ease off the power and start a five second count back so the pilot can lower the nose and pull the release without any tension on the launch rope. The glider is now in free flight.

Unlike an aero-tow it is not easy to instruct during a winch launch that can be completed in less than a minute so the briefing and de-brief will be thorough. The first launch or two may just be a demonstration but after that is over you could be invited onto the controls and serious training can begin. If you already have a rating for the type of glider that is being winched then five or six

launches may be sufficient for your winch rating. That will be up to the instructor. You will of course have to experience at least three simulated cable breaks and demonstrate the recovery procedures. In all probability several training sessions will be required to master the launch techniques.

2.

A SAFETY TIP--Prior to your first solo winch launch, request that additional ballast weight be installed in the glider to compensate for the unoccupied rear seat. Even with extra ballast fitted you could be surprised how quickly the glider may try to pitch into a nose high attitude at the start of a launch.

Most recent converts to winching after many years of aero-tow launches find difficulty in maintaining a nose high attitude and frequently level out just after liftoff. This can be very disconcerting for the winch driver and a little dangerous for the pilot who will quickly overfly the winch and find he has barely enough altitude to complete the circuit. Another problem is the airspeed radio calls to the winch driver. If the pilot is under stress the information is often called before the transmit button is fully pressed. Push the button take a breath and speak.

As you gain experience in winching I suggest you keep referring to Bill Daniels Winch Launch Training Guidelines and the other material listed earlier. In NZ much greater use is made of VHF radio to co-ordinate the actions and reactions of the pilot and winch driver. It is also quite safe during the early stage of the launch for the glider to exceed the recommended winch launch airspeed (Vw) provided the correct weak link is fitted. This provides an additional margin of safety should a launch failure occur at low altitude. The extra speed can be turned into height. Once the glider has settled into the main climb the placard speed should be established. The driver can alter the airspeed at anytime during the launch in line with the pilot's radioed requests.

Communications.

When GWR commenced operations in 1989 the winch line was 3.5mm single strand high tensile steel wire that because of its conductive properties provided a path for the radio signals between the glider and winch. Early in 2000 Gliding Wairarapa switched to Dyneema, which is non conductive, radio contact between the winch and glider at times failed about halfway through the launch. However experience enabled the winch driver to keep the desired launch speed and most of the time the glider pilot heard the count down at the end of the launch. This loss of communications at a critical stage of the launch had me baffled for a while until I realised what was happening. This brought to mind an incident that happened shortly after the end of the WW2. The Transport dept equipped patrol cars with ex-military HF transceivers and long vertical whip antennas. Traffic officers soon discovered that communications between cars or base was more effective if they parked on railway lines when making radio calls. This practice was strongly discouraged when one officer was shunted by a freight train just south of Dannevirke.

Vertically polarised antennas are universal in aviation because they are mainly broadside radiators and non directional. The radiation pattern from a vertical half wave antennae, if it was visible, looks a bit like a plump doughnut when viewed side on. Almost no radio frequency energy is radiated or received in line with the ends of the antenna. Most gliders have a vertical half wave aerial fitted in the fin.

(One wave length in the air band spectrum is about 85 inches and a half wave is 42 inches.)

3.

At the start of the launch the winch antenna and the glider antenna although about a mile apart are broadside to each other allowing a maxim transfer of signals. During the launch the glider rotates into a 45 degree climb and by the time it reaches 1000 feet AGL both antennas are more or less end on to each other. Once the glider has flown over the winch it has passed out of the blind spot and good radio contact returns. The communication problem was resolved by installing a three element full wave loop antenna on the winch aimed at the glider launch point and a single element loop aimed at the release point above the winch. Both antennas are matched into a single cable to the vhf transceiver and communications have improved 100%.

Will gladly provide details if someone wants to use a similar system.

Training pilots and winch drivers.

During the pioneering period of winch operations the single seat primary gliders were dragged over the ground until the trainee pilots managed to get some feel for attitude and altitude control. This process continued until the trainee pilots developed more confidence and ability that resulted in higher launches. I am not sure when or who introduced the yaw and wing rocking manoeuvres to signal the winch driver the need for more or less speed. This method is still in use by some clubs around the world. By the time two seat trainers had appeared, air band radio communications were being developed and winch launch procedures started to become co-operative efforts.

With the introduction of load cell technology in winches it is now possible for the operators to continuously monitor the amount of launch energy that is being offered to the glider pilots. Even though the winch is on the ground the operator has become part of the flight crew, rather like a flight engineer.

Many experienced aero-tow pilots find it difficult to rotate into a full climb when they first start winch operations and frequently need some encouragement from the driver to raise the nose. A nose high attitude during the launch obstructs forward visibility and the aircraft can drift off course making cable recovery difficult. Another hazard although rare is aircraft flying into the launch area. The duty pilot can radio a warning and even abort the launch if the flight paths are converging. Course corrections should be radioed from the winch with reference to the cardinal points. Instead of calling go left or right. Call go East or West and if you wish include the degrees of correction. eg. Go East, go East 10 degrees.

Ideally all pilots should make an effort to train as winch operators. It can be just as much fun as big game fishing. Calm or light wind conditions should be chosen for driver initiation and preferably with a two seat trainer flown by an experienced pilot. After several launches have been observed allow the trainee to recover the parachute and cable. This should quickly produce a sense of throttle and brake control. The next stage is to let the trainee rest a hand on the throttle during a launch so the subtle control movements can be experienced. Once this has been mastered allow the student driver to initiate the launch with the instructor handling the radio calls until the student can handle

this task as well. Training should be spread over several sessions. During quiet periods between launches explain emergency and safety procedures.

4.

Ok so far, now let us view the anatomy of a launch by alternating first from the cab of the Winch then the cockpit of the Glider.

W. The winch driver has received a radio call that Glider FI is preparing for a launch in two minutes. Included in the call is the wind speed, aircrafts weight and required airspeed, also the names of P1 and P2. This data including the take-off time is entered into the winch log and the radio call acknowledged. The winch engine is started and the load cell display zeroed. A visual check is made of the airstrip and the immediate area around the winch.

G. At the launch point the pilot has completed the cockpit checks, is satisfied that P2 is ready and has called "Hook open". The Duty Pilot checks that the correct weak link is fitted then places the tow ring into the belly hook and calls "Hook closed," shakes and pulls the shock line attached to the tow ring to check that the coupling is satisfactory. The Duty Pilot then lifts the port wing level, checks that there are no obstructions on the airstrip and there is no inbound traffic. The Duty Pilot then declares "All clear above and behind" and commands the Pilot to "take up slack." The Pilot then radios, "Winch, Glider Foxtrot India, take up slack, take up slack".

W. The driver responds "Glider Foxtrot India, take up slack, take up slack". The gear selector is moved to the Launch position and the slack is slowly reeled in. The load cell will display a reading between 30 to 70 pounds depending on the airstrip surface and the length of tow line. When the slack has been recovered the load cell reading will climb to about 200 pounds if the glider is resting on a nose-skid. If the aircraft is fitted with a nose wheel it may be necessary to apply the wheel brake to prevent the glider from over riding the launch cable.

G. "All out, All out". Is the radioed command from the pilot.

W. "All out, All out ". Is the response from the winch driver as the throttle is gently advanced to the required power setting. Very quickly the glider will rise above the horizon and start rotating into a climb. A quick glance at the load cell display will show an initial reading of over 1200 pounds that will drop to about 300 or 400 pounds as the glider becomes airborne. The load cell reading will again increase quite quickly as the glider rotates into the full climb.

G. The Pilot has the stick forward as the glider surges forward and within seconds has reached flying speed. The pilot's left hand is close to the release knob should a launch failure occur. A few more seconds have elapsed and at an altitude of 300 feet the Pilot can start rotating into a steeper climb. The airspeed can be radioed to the winch at this stage. Say each number separately and repeat twice eg five oh five oh instead of fifty fifty. Some pilots have a tendency to hold the radio open during the launch. This procedure is not encouraged because the winch driver may need to transmit information to the pilot. As the launch continues the winch power is steadily reduced. Increasing downward pressure from the cable causes the aircraft to level out. The driver will start a five second count back as the winch is throttled back. "Five, Four, Three, Two, One" . At the start of the count

back the pilot will lower the nose and pull the cable release twice on the count of one. The aircraft is now in free flight. The cable parachute has deployed and the winch driver is now recovering the line in preparation for the next launch.

5.

In summary the advantages of Winch launch operations.

- A. Flying training is more affordable. An important consideration for younger members.
- B. A winch trained pilot will possess a high level of alertness, be up with the action and will quickly develop soaring skills.
- C. Club culture is more interactive.
- D. Generally winch operations are more environmentally friendly.

So may I on behalf of the winch equipped clubs extend an invitation to anyone who is interested to try a new airborne experience.

The choice is yours.

Jim Bicknell, GWR. 9/9/2012