

FTSC 2016/2

WING RUNNER TRAINING

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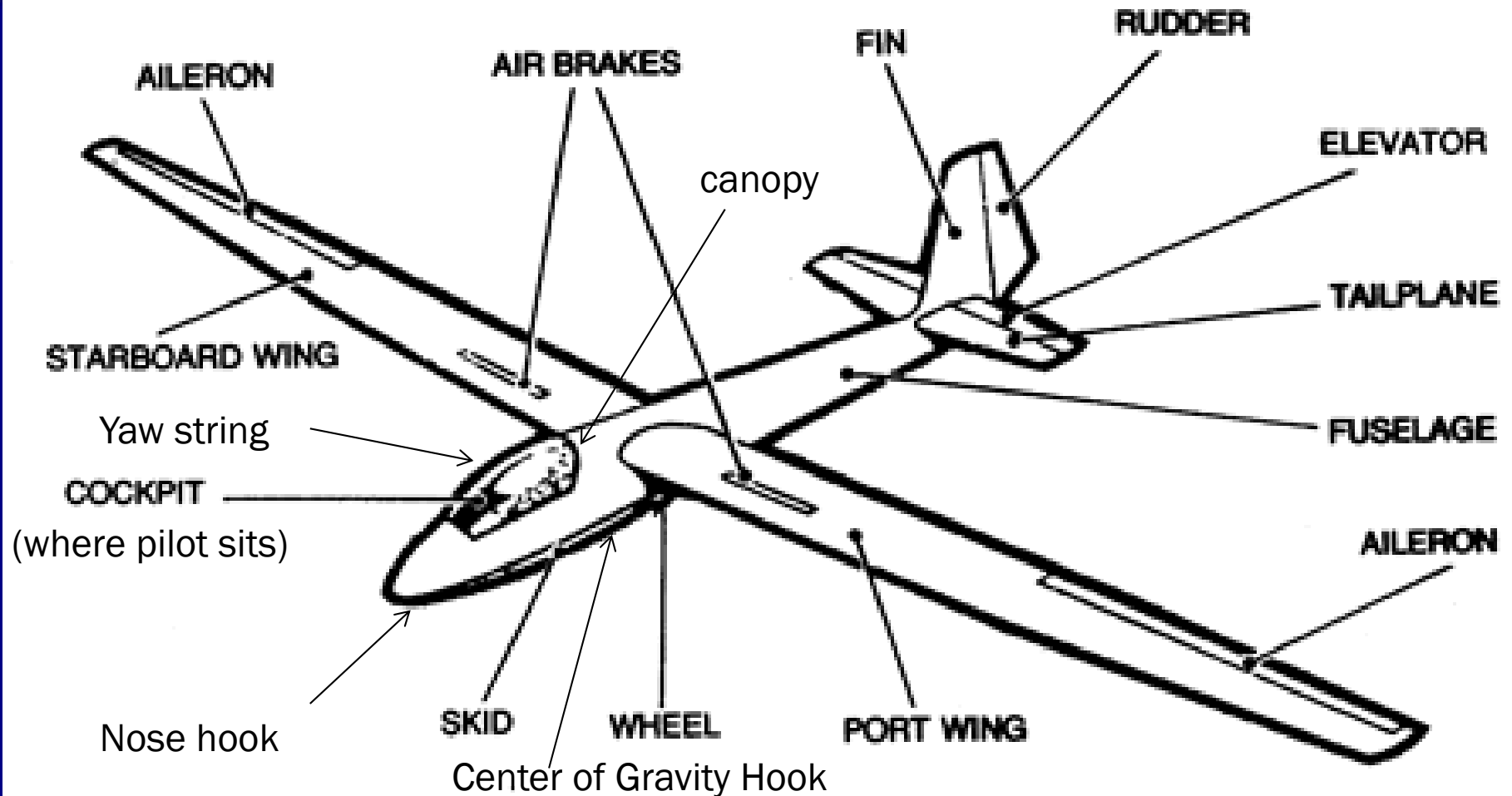
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INTRODUCTION

The club instructors will train wing runners. Wing runners can be glider, power pilots, students, family members, friends or guests provided they are trained and supervised. They should observe the procedures set out in the clubs operations manual and read this training guide and be able to ask questions to an instructor. After a few supervised launches and OK from a club instructor they can identify themselves as trained. Note there have been several accidents as a result of poorly trained or non trained persons running wings. This training does not include ground handling of aircraft, hooking up the gliders or assisting pilots with positive control checks (PCC) and critical assembly checks (CAC). Further training is required to perform these tasks. The wing runner does not just run the wing, they are an integral part of the safety system and key in providing double checks before launch.

Parts of a Glider

Do not push or pull on any control surfaces such as ailerons, rudder or elevator. Moving a wing forward or backward when nose or tail on ground can damage glider.



THE GLIDER AND ITS COMPONENTS

Aeronautical Definitions and Terminology for Gliding

Active Runway

Any runway or runways currently being used for takeoff or landing. When multiple runways are used, they are all considered active runways. When an aircraft is landing or taking off on an airport surface other than a runway, the direction of flight will determine the active runway.

Aerodrome

Any area of land, water (including the frozen surface thereof) or other supporting surface used or designed, prepared, equipped or set apart for use either in whole or in part of the arrival and departure, movement or servicing of aircraft and includes any buildings, installations and equipment in connection therewith.

Airport

An aerodrome in respect of which a Canadian Aviation document is in force.

Airport Traffic

All traffic on the manoeuvring area of an airport and all aircraft flying in the vicinity of an airport.

Air Traffic

All aircraft in flight and aircraft operating on the manoeuvring area of an aerodrome.

Apron

That part of an aerodrome, other than the manoeuvring area, intended to accommodate the loading and unloading of passengers and cargo; the refuelling, servicing, maintenance and parking of aircraft; and any movement of aircraft, vehicles and pedestrians necessary for such purposes.

Ballast

Lead or other weights put into gliders nose or tail to balance the center of gravity for airworthiness. Water ballast can also be added to the wing tanks to increase weight of glider (wing loading) to increase best glide speed.

Ground Loop

Rotation of aircraft about the vertical axis occurring when wing touches ground or rudder control lost on the ground often damaging the aircraft.

Low Approach

An approach over an airport or runway following an instrument or VFR approach, including the go-around manoeuvre, where the pilot intentionally does not intend to land.

Manoeuvring Area

That part of an aerodrome intended to be used for the taking off and landing of aircraft and for the movement of aircraft associated with takeoff and landing, excluding aprons.

Movement Area

That part of an aerodrome intended to be used for the surface movement of aircraft, and includes the manoeuvring area and aprons.

Preferred Runway

When there is no active runway the preferred runway is considered to be the most suitable operational runway taking into account such factors as the runway most nearly aligned with the wind, noise abatement or other restrictions which prohibit the use of certain runway(s); ground traffic and runway conditions.

Stop-and-Go

A procedure in which an aircraft lands, makes a complete stop on the runway, and then commences a takeoff from that point.

Straight-In Approach – VFR

Entry into the traffic pattern by interception of the extended runway centre line (final approach course) without executing any other portion of the traffic pattern.

Threshold

The beginning of that portion of the runway usable for landing.

Touch-and-Go

An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

Dihedral

is the upward angle from horizontal of the wings or tailplane of a fixed wing aircraft. The tips being higher than the root for positive dihedral.

The Aerotow Launch

The aerotow launch is an efficient method of taking a glider to altitude and more common in North America. It involves connecting the glider to a tow plane via a specialized rope, taking to the air under tow, following the tow plane to a pre-determined altitude, and releasing the glider from the tow rope. Using this method, the glider and tow plane pilots collaborate to position the glider appropriately so that it will be in or near to thermal lift at release.

At the flight line, the glider must be inspected by the pilot again before each and every flight. This inspection is not as detailed as the daily inspection; it is used to determine that after the last flight that the glider is safe to fly again. This second pre-flight inspection by pilot is called a “walk around”.

Once it is determined that the glider is ready to fly, it can be positioned on the flight line if not already positioned such that it is nose into the wind. Personnel must be familiar with moving gliders safely as they can be easily damaged. Take directions from the pilot and let them know you are unfamiliar with glider handling.

You will learn how to attach the glider to the tow rope.

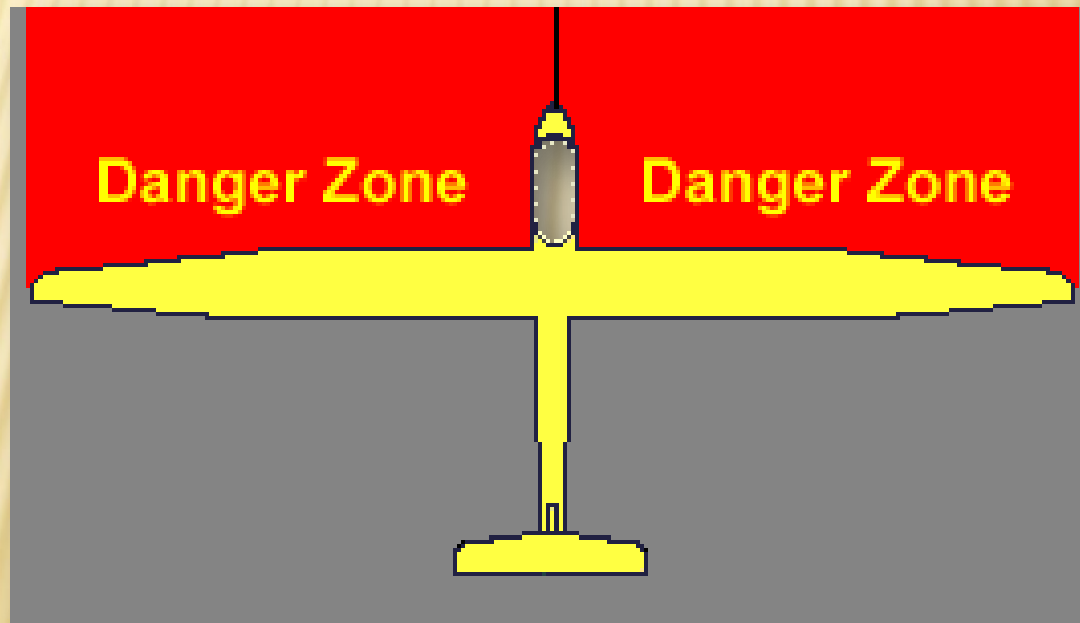
The Launch

Glider launch can be accomplished using a couple of methods. Either a tow plane or a winch can be used. Both types of launch methods require special training which you should receive. The tow plane will take the glider to a desired altitude. The winch will take the glider typically to 1500' to 2000' AGL. Winching is often used as it can be faster and is less expensive than using a tow plane.

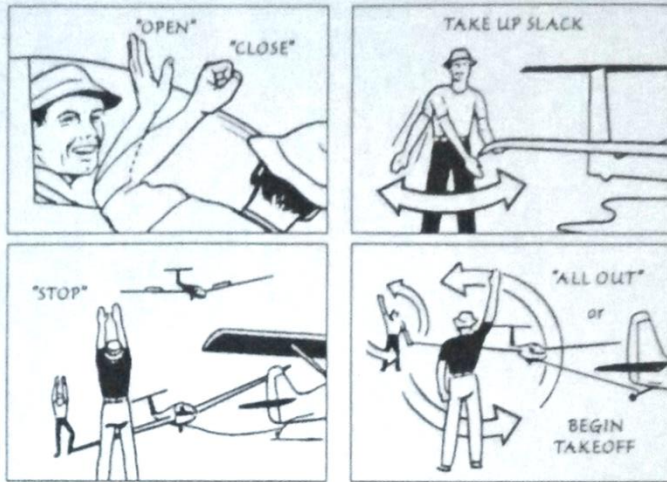
Since gliders have really long wings balanced on a centre line tire(s), the wings must be held level for launch by a “wing runner”. This person holds the wing and runs a short distance with it once the glider starts to move under tow. The distance is short as aileron effectiveness doesn't require much speed and the pilot will be able to keep the wings level within a few seconds of being underway. If the wing touches the ground on take off the pilot should release the tow.

The wing runner must recognize the hazard that exists once the towline is connected to the glider. If the pilot of the tow aircraft/winch initiates the takeoff before the area around the glider is cleared of all ground crewmembers and spectators, serious injury can occur. To prevent this type of occurrence, the pilot and the ground crew must ensure that no one is allowed to walk or stand between a taxiing tow aircraft/winch and the glider once the tow rope is connected. When in doubt about safety the pilot should pull the release and it will stop the launch procedures.

The most effective way to prevent this from hazarding the wing runner is to move out beyond the wingtip of the glider immediately after the towline is connected. By doing so, the wing runner will not be struck in the event of the glider being inadvertently moved forward. The wing runner should always consider the region in front of glider that has been connected to a towline, whether the launch is being made by winch or aero tow, to be a **danger zone**. The winch tow presents a particular danger as the rate of glider acceleration is much greater than that of the tow plane.



Standard Signals Used in Glider Operations



To initiate the launch, the pilot, wing runner and tow plane/winch operator need to communicate. Winch operations are usually handled via radio communications between the winch operator and the launch supervisor as the winch is about 3000' or more from the glider's position . Tow plane operations can be handled by radio too, but hand signals are commonly used. Such hand signals are also used in winch operations. **You must learn the hand signals in the image at the left.** "Open/Close" describes opening or closing the tow hook on the glider.

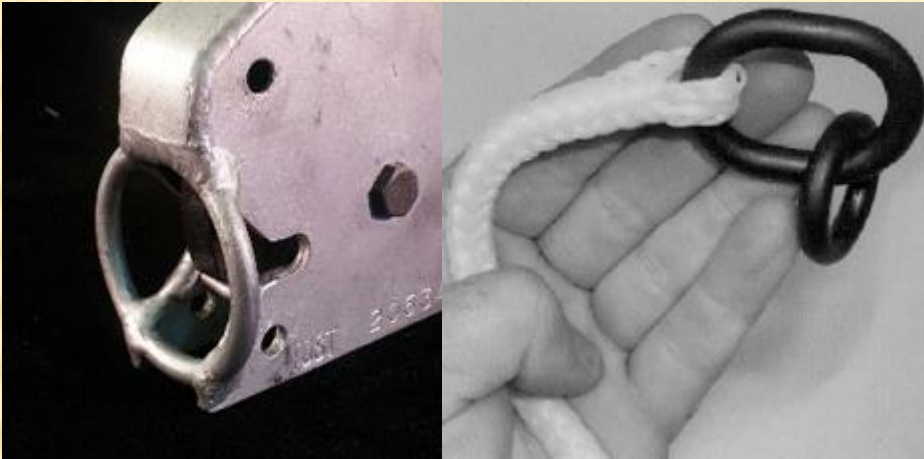


Once cable connected to glider, the wing runner moves to the wing tip and scans the circuit for traffic and if clear says "all clear above and behind, check canopy and air brakes locked" the pilot signals the wing runner with a "thumb up" meaning ready to fly. Wings can be leveled on the glider. If the runway is still clear ahead the take up slack signal can be given by the wing runner, or stop signal after lowering wing again if there is a safety problem. As the slack goes out and the rope becomes taut the wing runner gives the "all out" signal for the tow plane to accelerate and they run the wing until the glider is too fast to support.

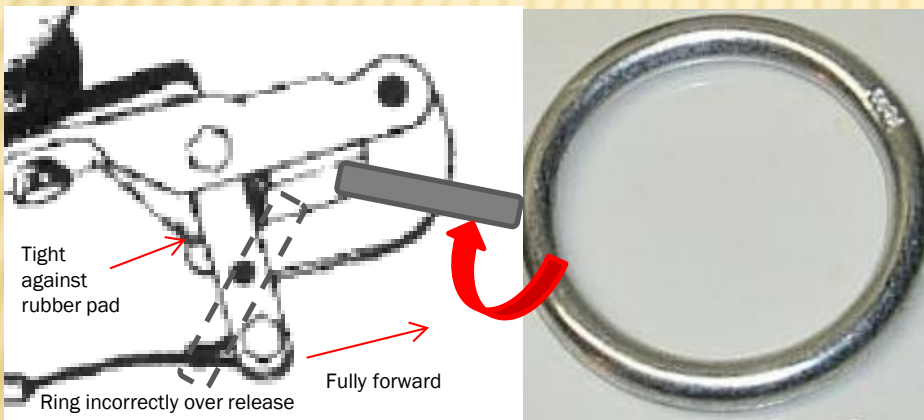
LAUNCHING PROBLEMS

- ✘ Wing runner gives take up slack but waits until glider moves before giving all out. Glider can lurch forward and create slack again and the towplane will sling shot glider possibly losing control. More prominent on paved surfaces or soft ground.
- ✘ Wing runner gives take up slack and gives all out too soon before slack is gone and sling shot glider forward.
- ✘ Wing runner lets go of glider wing too soon and wing drops to ground causing ground loop.
- ✘ Wing runner holds on to wing tip too long and yaws glider off runway centerline possibly causing loss of control.
- ✘ Gives all out when obstacles on runway in front of glider.
- ✘ Clothes catch in wing during launch.
- ✘ Lift wing before getting thumbs up from pilot.
- ✘ Launch glider with air brakes or canopy visibly open or tail dolly on.
- ✘ When using multiple ropes allows one rope to cross over other rope creating hazard.
- ✘ Uses incorrect or damaged weak link.
- ✘ Connects rope to incorrect attachment point on glider.

TOW HOOKS



TOST release and TOST ring shown here are most common on gliders. Round ring on rope is inserted horizontally in ring on release inside jaw.



Schweizer release and larger ring are used on some older gliders or tow planes. The release can be problematic if not connected properly leading to jamming or early release

Instructor will show you how to properly connect the tow rope to gliders

WEAK LINKS



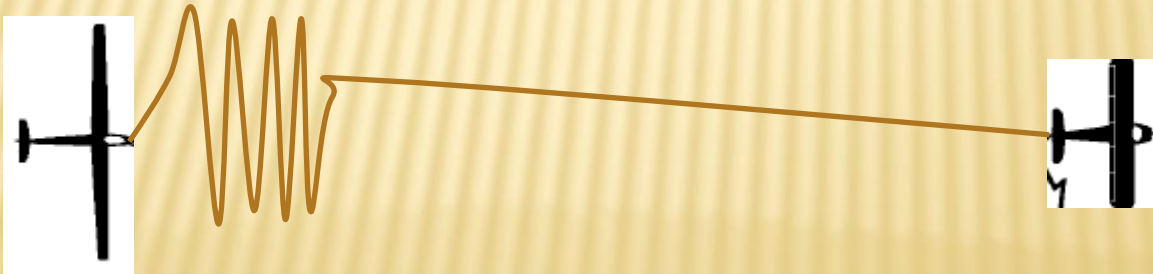
Most common weak links are a short piece of synthetic rope of various strengths which are designed to break at the glider end before aircraft damage can occur. Usually there is one for two seat (heavier) gliders and single seat (lighter) gliders. Often they are different colours or thickness to make identification easier on the flight line. It is the pilots responsibility to select the correct weak link for their glider.

Some other weak links are mechanical with metal inserts that will break at specific weights. Whatever you club uses you will be shown which ones to show the pilot before hook up.

TOW LINE SAFETY



Winch operations require several pieces of safety equipment. The quick release hook is in place to allow releasing the cable from the parachute so that if the wrong cable is reeled in it will not inflate the parachute causing a hazard in the launch area.



Flaking out the towline is a method of preventing knots for occurring when slack is taken up by tow plane. Do not walk or drive over tow ropes.

SOME ADDITIONAL SAFETY POINTS FOR WING RUNNERS ALSO SHOULD BE MENTIONED :

- ✘ Footwear – bare feet are not acceptable nor are flip flops. Wing runners have injured feet or dropped wings as a result. Running shoes or well secured sandals are more appropriate.
- ✘ Wing runner must not attempt to push or pull the wing and just let it slip out of their fingers gently. This has led to yawing the glider causing collisions or ground loops.
- ✘ Horse play around launch site has led to missed communications and is not acceptable.
- ✘ Wing should be held slightly lower on the into wind side, otherwise held level by looking at other wing tip height above ground. Note most wings have dihedral (wing tips higher than at fuselage).
- ✘ It is best to hold tip from side or back of wing so that it slips out of hand easily.
- ✘ Watch for loose clothing catching in the wing tip; do up zippers/buttons so this does not happen.

SAFETY POINTS CONTINUED

- ✘ Wing runner should run as fast as possible and it will likely only be a few meters before glider accelerates faster than running pace. Persons with health or mobility issues or injuries should not run wings.
- ✘ Wings with water ballast need a longer run and are more susceptible to wing runner errors. If you don't run well find another person to wing run.
- ✘ If a wing runner trips, let the wing go.
- ✘ Know the proper hand signals. (See Hand Signals)
- ✘ Keep area between the towplane and glider forward of glider wings clear of traffic/persons (danger area).

**I HAVE BEEN ASKED TO BE A WING RUNNER.
WHAT COULD GO WRONG WITH THE LAUNCH?**

Wing runners should be alert to potential take off emergencies and stop a launch and alert the pilot.

List provided by Tom Knauff's safety newsletter.

TAKEOFF EMERGENCIES

*

1. Rope Break*.
 2. Canopy not latched*.
 3. A control not connected*.
 4. Wing drop (ground loop)*.
 5. Air brakes opening*.
 6. Flaps in wrong position*.
 7. Tow plane power failure.
 8. Tow speed too slow or fast.
 9. Being towed too far downwind.
 10. Controls hooked up backwards*.
 11. Tire blow out, wheel brake stuck in the on position.*
 12. Tow rope will not release.*
 13. Glider becomes too high.
 14. Someone or something (deer/bear) moves onto runway.*
 15. Incorrectly installed component*.
 16. PIO.
 17. Frozen or jammed controls.
 18. Turbulence.
 19. IMC (Icing).*
 20. Inability to recover from low tow position.
 21. Knot in Tow rope catches on something at beginning of launch*.
 22. Slack rope / rope wrapping around glider.*
 23. Improper rope.*
 24. Over running the tow rope.*
 25. Traffic conflict / mid-air collision.
 26. Wing runner error.*
 27. Airspeed indicator not working.
 28. Altimeter not adjusted properly.*
 29. Tail chute opens.*
 30. Water ballast disconnects and spills into cockpit.*
 31. Snake / Bee / Wasp in cockpit.*
 32. Unbalanced water ballast in wings.*
 33. Seat belts undone.*
 34. Pitot / Static ports clogged.
 35. Smoke in cockpit.
 36. Panicky passenger.
 37. Pillows / seat ballast moves.
 38. Controls restricted (control locks, rudder pedals too far forward.)*
 39. Tail dolly on.*
 40. Canopy fogs up.*
 41. Bird Strike.
 42. CG out of limits – maybe due to water or ice collected in the tail.*
 43. Shoe laces caught in Rudder Pedal mechanism or canopy frame.*
 44. Shirt sleeve or shoe laces trapped in canopy when it is closed.*
 45. Glove catching on canopy opening mechanism, etc.
- Number 46 would be, "Anything I didn't think of."

* How many of these can be attributed to an improper assembly, improper preflight inspection or improperly conducted pre-takeoff checklist?

About half.

HOW CAN WING RUNNER HELP MITIGATE?

- ✗ Be alert to other air traffic entering the landing pattern.
- ✗ Before the pilot enters the glider, bystanders should be told to move away to avoid distractions. Do not distract a pilot doing pre-flight checklist unless it is an urgent safety requirement.
- ✗ Look for the sign-off initials on the wing tape (if done at club) indicating the Critical Assembly Check has been performed. If not, ask pilot if the Critical Assembly Check and Positive Control Checks have been performed.
- ✗ Tail Dolly and control locks removed?
- ✗ Pay attention to what the glider pilot is doing when entering the glider. You may notice a missed checklist item!
- ✗ Weight and balance (cockpit load) and checklist performed. Ballast in place or removed? You can observe pilot or ask if not observed before launch.
- ✗ Dive brakes locked? (note some gliders may start with air brakes open to increase aileron control or activate brake to prevent glider rolling forward – check with pilot if observed open)

- ✘ As tow plane taxis into position, check for flap position correct on tow plane, tires look properly inflated, control locks removed, tow rope looks OK, no knots visible or loops?
- ✘ Glider canopy(s) closed and locked. Nothing caught in canopy? Canopies should be closed and locked before hook up to tow ropes.
- ✘ Show tow rope end to pilot. Weak link and tow ring correct for glider, no knots? Connect tow rope to nose hook (C of G hook if no nose hook) and apply tension to ensure proper hook up and then walk to upwind wing tip or inactive side of runway if parallel runway operations. If not already tested, pilot may release rope under your tension to prove function. Ask pilot if they want this check.
- ✘ Look for runway and air traffic clear? Check for landing traffic. Give report “all clear above and behind” or “traffic in the circuit”.
- ✘ Wait for glider pilot to give signal to level wings with a thumbs up that they are ready for take-off.
- ✘ Take up tow line slack signals.(some clubs signal tow plane by radio not wing runner). Some clubs relay to another signaller forward of towplane.
- ✘ Wing runner gives all out signal (some clubs the pilot gives all out on radio but wing runner must stay alert.)
- ✘ Run wing until tip is accelerated out of hand without push/pull.

Items in wing runner visual checklist:

- ☐ Traffic on ground clear for hook up.
- ☐ Critical Assembly Check, Positive Control
Check completed? (ask pilot if no tape)
- ☐ Distractions (people) removed.
- ☐ Tail Dolly, control locks removed?
- ☐ Air brakes locked, Flaps in correct position
- ☐ Tow plane looks OK
- ☐ Tow Rope looks OK, release test completed?
Connected properly.
- ☐ Canopy closed and locked.
- ☐ Traffic in air no conflicts for launch.

Flaps deployed in landing position fully down and should not be deployed for take off



Stop launch and alert pilot flaps in landing position.

Tow plane flaps deployed 40° for landing and should not be fully deployed for take off (max 10° usual)



Air Brakes deployed for landing approach



Wing runner does not want to see these open before the take off (all out) signal an should stop launch until pilot acknowledges they are open!

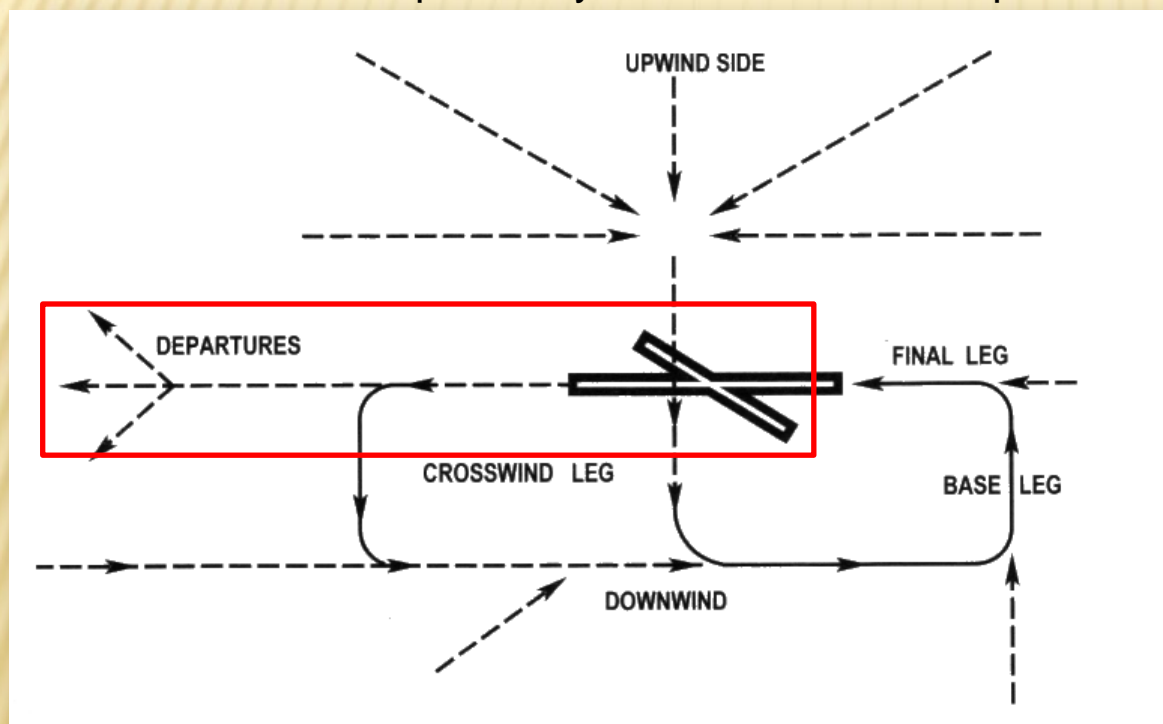
TAIL DOLLY & CONTROL LOCKS & COVERS

These must be removed if glider is in line for launch



The image below is a schematic of the circuit for uncontrolled airports with a standard pattern or circuit. Dashed line arrows depict possible routes of approaching aircraft at 1000' above ground level (AGL) to join the "circuit". Solid line arrows depict routes for aircraft "in the circuit". All turns in the circuit are about ½ km from the runway.

The takeoff and departure boxed in red below. Gliders will climb out straight ahead behind the tow plane until reaching 300' AGL before making any turns. At 300' AGL, the tow plane will make a turn to position you to return to the airport in the event of a tow rope break.



Note that there is an upwind and downwind side. The upwind side is the that side opposite the downwind landing side but its name has nothing to do with wind but whether the aircraft are flying all turns to the left (standard pattern) or to the right (non-standard pattern).

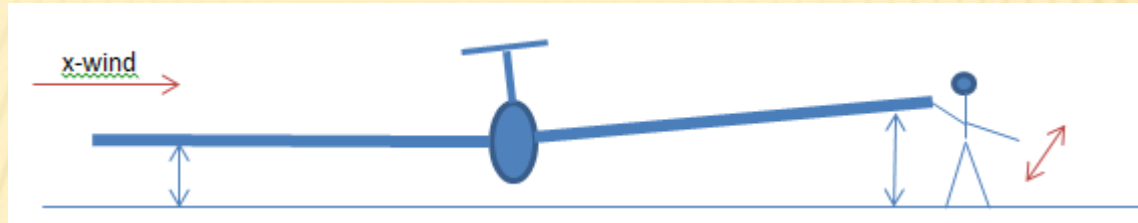
WATER BALLASTING

- ✘ If glider is water ballasted it may weigh 100-150 kgs more and will be slower to accelerate.
- ✘ Pilot may require wings to be held level for some time to balance water level between wings.
- ✘ Wing may have to be run further due to slower acceleration and if yawed will be difficult for pilot to correct.
- ✘ If major leaking is occurring notify pilot.

CROSS WIND TECHNIQUES



windsock



Wing runner will assess the wind direction from the wind sock and hold the into wind wing tip lower (approximately parallel to ground due to dihedral in wings) than the downwind wing tip. If the pilot is satisfied with the angle of bank he will give thumbs up or ask for a change. The wing runner then runs the wing with this angle until the glider accelerates faster than they can run.

PERSONAL SAFETY

- ✖ Wing Runners must maintain situational awareness at all times.
- ✖ Use extreme caution when crossing runways or aircraft maneuver areas. Have a look both ways and remember gliders make little noise.
- ✖ Never approach tow planes from the front and always be aware of moving or not moving propellers. Even pilots who know better have been struck.
- ✖ Do not run wings on the active side of runways.
- ✖ Watch your clothing does not get caught.
- ✖ Watch your zippers or belt buckles don't scratch the gliders. You don't want an angry pilot after you.

PROPELLER HAZARD



- Never approach a power airplane forward of the wing when the engine is running. Don't assume you will see the propeller.
- If the pilot is on board always assume the engine may start.
- If you hear "CLEAR" the pilot will be starting the engine. Move away clear of the aircraft prop.
- Never move a propeller as the magneto may be live and the engine could kick the prop over