

Gliding Australia Training Manual

Trainer Guide



Unit 13W

Launch & Release (Winch)

Unit 13W - Launch & Release (Winch)

AIM

To develop and demonstrate the skills and knowledge required to safely fly a winch launch, from the initial climb stage through to release.

Note that this aligns with the normal training sequence and risk profile for these units. Upper air aspects of launch are taught first, then initial climb, full climb, and then crosswind conditions. Several launches may be required to demonstrate competence and underpinning knowledge.

Whilst the precursor for launch emergencies is discussed here (speed out of tolerance) the actual briefing and handling of the emergency is covered in GPC unit 20.

PRE-REQUISITE UNITS

- GPC 7 – Straight Flight various Speeds & Trim
- GPC 8 – Sustained turns, all controls
- GPC 10 – Use of Ancillary Controls
- GPC 12 – Slow flight & Stalling

COMPLEMENTARY UNITS

- There are no complementary units for this GPC Unit

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COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Conduct of Winch launch from Initial Climb through Full Climb	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ The stages of a winch launch from Initial Climb upwards. ○ The airspeed limitations on the aircraft during a winch launch. ○ The actions of the pilot in each stage of the launch. ○ The risks associated with winch launch during the stages of initial climb, full climb and release. • Demonstrate: <ul style="list-style-type: none"> ○ Correct handling of the aircraft in the initial and full climb stages of the launch. ○ The actions to take when there is a significant crosswind during the launch.
2. Winch Launch Release	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ How to release the winch cable from the glider. • Demonstrate: <ul style="list-style-type: none"> ○ The release of the cable without significant tension. ○ The required post release actions.
3. React to airspeed changes during the Launch	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ When to provide a signal to the winch driver and what signals are permitted. ○ The airspeed criteria for entry into full climb. • Demonstrate: <ul style="list-style-type: none"> ○ Clearly recognisable too fast signals at initial and full climb stages. ○ Regaining safe airspeed in full climb stage.

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KEY MESSAGES

- Winch stages occur quickly – pilot must remain ahead of the aircraft.
- Always remain in the safe winch speed range for the aircraft.
- Use the too-fast signal prior to the speed exceeding the upper limit.
- When to use speed signals and when to abort a launch.
- Conduct launch work cycle continuously through the launch.
- Always abort the launch if the speed is unsafe (fast or slow).
- Winch upper limit may be exceeded by up to 10% in the initial climb stage only.
- Release should be performed manually with as little cable tension as possible.
- Never allow the winch launch to continue outside VMC.
- Risks associated with winch launching from initial climb stage.

LESSON PLANNING AND CONDUCT

Notes:

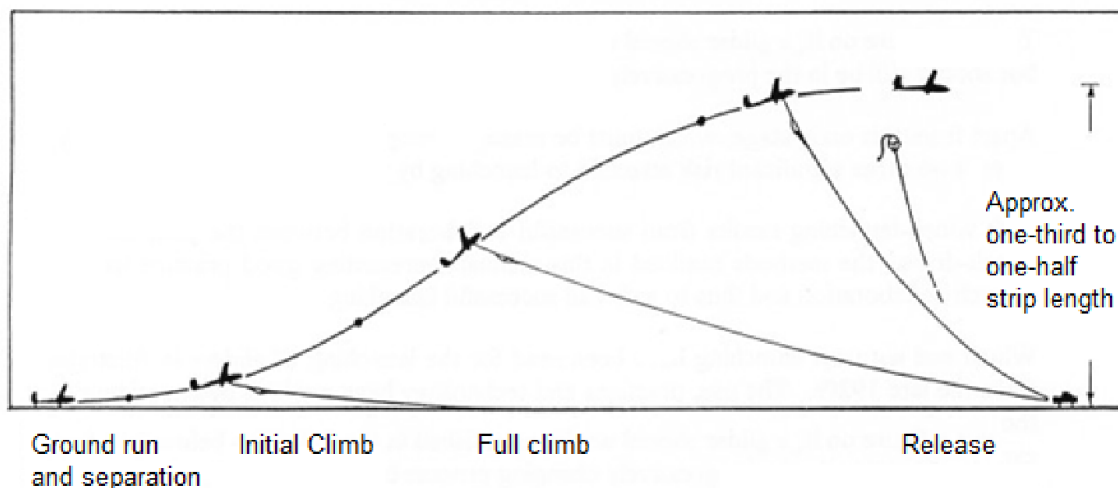
1. Different winches use different types of launch cables such as single wire, multi-strand cable and Dyneema rope.
2. Trainers must ensure that they tailor the training in this unit to the cable in use.

Classroom Briefing

General:

- Winch launch stages.
- Control actions during launch.
- Pre-launch lookout is critical.
- Always maintain positive control of the aircraft.
- Launch occurs quickly – issues need to be identified & resolved.
- Launch work cycle (airspeed – attitude – drift).
- How to recognize the top of launch – decaying airspeed, need to lower nose to maintain speed within range.
- Release sequence and post-launch check.
- Perform ground observation of launches from side to explain stages.

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Initial Climb:

- Starts at take-off attitude a metre or two above the ground.
- Do not proceed into full climb unless a positive rate of climb within airspeed is established.
- Do not climb steeply at low altitude.
- Smooth and continuous aft movement of control column to enter full climb.
- Advise whether the glider tends to self-steepen or self-shallow.
- Prevention of wing stall during rotation.
- Handling slow/fast speed at this stage.
- Management of cross wind drift.

Full Climb Stage:

- Required angle of wingtip to horizon.
- Use of aft pressure on the elevator to maintain a correct climb angle.
- Observation of wingtips to determine correct position for drift correction.
- Monitoring airspeed throughout.
- Consequences of exceeding maximum winch airspeed.
- If airspeed decays, lower attitude and gain airspeed.
- If airspeed increases, too-fast signal and if not effective, release.
- Management of cross wind drift.

Release:

- Lower attitude as airspeed decays.
- Locate - Identify - Operate release twice as nose attitude passes through horizon.
- Action to take on back-release.
- Perform post-release actions.

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PRE-FLIGHT BRIEFING

- Be prepared for a launch failure at any stage on every flight.
- Any launch emergency will be handled by the trainer.
- How to determine min and max speeds. Actions to take if airspeed approaches these limits. Note the ability to exceed max winch speed by 10% only in the lower third of the launch.
- Explain the operation of the cable rings in the release, including how back-release occurs.
- Brief the student to maintain their view outside the cockpit. Cover instruments if required.
- Initial handover will occur at height and progress lower in subsequent flights as student skills improve.

FLIGHT EXERCISES

Demonstration of Initial Climb & Full Climb Stages

Where possible, demonstrate the “too fast” yawing of the aircraft on a previous airborne demonstration.

Targeted and full scan:

- Look outside to obtain situational awareness.

Take-off:

- Aircraft will commence winch launch under control of the trainer, training sequence begins after separation.

Initial Climb:

- Trainer maintains a take-off attitude.
- Note the aircraft has a positive rate of climb with increasing airspeed.
- Maintain coordinated flight with aileron and rudder.
- Ensure airspeed increases to minimum winch speed.
- Commence smooth aft movement of the control column – at least 5 seconds to complete transition from take off attitude into full climb.
- Compensate for any cross wind drift.
- Reference wingtips for assessment of angle.

Full Climb:

- Maintain wingtip angle to horizon for full climb.
- Set angle of bank during launch according to expected/experienced crosswind.
- Continue the launch work cycle – Airspeed (in limits), Angle on wingtip, Drift (bank required to counter).

Speed Limits Approached:

- Continue to monitor airspeed during the launch work cycle.
- Action is taken if we see the airspeed approaching limits:
 - Slow – lower nose to regain airspeed;
 - Fast – too-fast signal

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- Monitor airspeed after action; if no improvement consider release.
- Do not allow the aircraft to fly into the Non-Maneuvering Area (NMA).
- Do not let aircraft exceed Max winch speed or fall below V_{WMin} / 1.3 Vs

Repeat the launch sequence as many times as needed. As the student improves in skill, reduce the height at which hand-over is performed until handover occurs just after separation.

Release Stage

Airspeed decays at top of launch:

- Note the reduction in airspeed on aircraft, hear less noise.
- Note the airspeed decay at top of launch.
- Smoothly reduce attitude to maintain safe airspeed and reduce tension on cable.

Operation of Release:

- Locate-Identify-Operate release twice as nose attitude passes through horizon.

Post Release Actions:

- Perform post-release actions.
- Transition from launching to soaring pilot.

Notes:

1. Once released, the pilot transitions from Launching Pilot to either Soaring or Landing Pilot and should configure the glider appropriately.
2. Gliding Australia does not mandate any single post-release action list or checklist.
3. Some clubs choose to apply local checklists, which may vary for particular sailplanes and prevailing local environmental conditions. e.g. FUST Flaps set as required or fixed, Undercarriage set as required or fixed, Speed as required and Trimmed for speed.

Repeat launches and progressively introduce student exercises. Where possible expose the student to launches in varying wind conditions.

Winch Speed Actions (Speed Approaching V_{WMin})

Change aircraft attitude to ensure airspeed remains above V_{WMin} .

- Airspeed is monitored during the launch work cycle. If airspeed approaches lower limit, ease control column forward to maintain speed within the winch launch band.
- If airspeed continues to decay, continue to ease control column forward. Winch driver should notice flattening and increase power.
- If the control column is still easing forward and approaching the attitude of level flight, release and conduct a launch failure procedure.

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Winch Speed Signal (Speed Approaching V_{WMax})

Prior to providing a signal on launch, use free flight at altitude to practice the signal:

- Airspeed is monitored during the launch work cycle. If the airframe approaches the high end of the winch launch band, use the rudder pedals to demonstrate the too fast signal. Maintain wings level with aileron.
- Note the movement of the airframe.
- Explain that in a launch we monitor airspeed for improvement and repeat if needed or immediately release before exceeding max winch speed (V_{WMax}).

Allow the student to practice the signal in free flight, ensure that it is neither excessive nor insignificant.

Student exercises

- Student practices launches from different stages of the launch (commencing high and working lower):
- Instructor hands over to the student at appropriate height.
- Student:
 - Verbally identifies stage of launch.
 - Maintains correct launch attitude by reference to wingtips.
 - Holds wings level and counters drift.
 - Identifies different launch stages.
 - Identifies if airspeed is moving towards winch launch limits.
 - Practices release of cable:
 - Recognizes loss of power at end of full climb stage and reduces aircraft nose attitude.
 - Identifies release handle.
 - Releases cable with double pull on release handle.
 - Conducts post-release checks and adopts required attitude in stable flight.
 - Conducts FULL SCAN to maintain situational awareness.
- As skill is gained student monitors launch airspeed and takes appropriate action on recognition of:
 - Loss of airspeed by reducing aircraft nose attitude; and
 - Increasing airspeed likely to exceed permitted upper limit in AFM by providing effective too-fast signal.

Debrief

Review the student's ability with relation to their:

- Ability to smoothly control pitch at different launch stages.
- Monitoring of airspeed and actions taken if approaching winch launch limits.
- Monitoring of launch angle and corrective action taken throughout launch.
- Effectiveness of speed-signals provided.

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- Ability to recognize top of launch and release cable tension before operating release.
- Conduct of post-release actions.

Notes:

1. The student must have a relaxed grip on the control column and controls adjusted correctly for reach during flight. Ensure that the cable release is reachable, and the student can operate it fully whilst on the ground.
2. Ensure lookout is maintained by all aircrew. Cover instruments (other than ASI) in the student's view if necessary, to discourage looking inside the cockpit.
3. If the student is reacting negatively to G forces do not try to conduct launch training on highly convective days or where known significant turbulence exists.
4. Be careful with terminology and clarity of language. Make it clear when discussing control surfaces and control inputs (elevator, aileron, rudder), their effects in terms of motion (pitch, roll and yaw) and their effects in terms of attitude and flight path (attitude, bank angle, yaw angle or slip-skid angle).
5. Precision with terminology must be synchronised with demonstrations inflight. Patter must be concise and careful. Feedback from the student must be sought. "What did you see when...?"
6. Do not attempt to include all elements of this module in the first few launches. It is better to allow the student time for a good demonstration and opportunity for practice on a single learning outcome. Students are often overloaded when flying their first few winch launches.
7. Ensure that the student has been briefed on the correct hand-over/take-over procedure and their expected action and verbal response to each. There must be no confusion about terminology for transfer of control.
8. Remove all distractions from the exercise, for instance mute audio variometers.

COMMON PROBLEMS

Problem	Probable Cause
High negative G manoeuvre at release.	Student moving control column forward too quickly, possibly not monitoring nose attitude against horizon.
Excessive or insufficient climb angle in full climb.	Failure to monitor wing tips for correct climb angle.
Excessive rotation rate into full climb.	Over enthusiastic or nervous student – demonstrate correct technique and external references for correct climb angle for the aircraft.
Excessive deviation from runway.	Failure to keep wings level (or correct for cross wind) in the launch.

THREAT AND ERROR MANAGEMENT

- Highly anxious G sensitive pilot.
- Turbulent atmosphere or excessive crosswind during launch.

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- Launch cable/winch failure.
- High cockpit noise during launch.
- Lack of control by the trainer.
- Excessive rotation rate and yaw cause stall on entry to full climb creating flick roll.
- Ineffective communication between student & trainer (including distractions, hearing difficulties or English as a second language).

TRAINING MATERIALS AND REFERENCES

- Aircraft placard for winch speeds
- GPC Pilot Guide Unit 13W
- Australian Gliding Knowledge (AGK) pages 100-103
- The Glider's Aircraft Flight Manual
- GFA Winch Launching Manual Ops 0007 Issue 3 Nov 2015