

Gliding Australia Training Manual

Trainer Guide



Unit 14A

Takeoff (Aerotow)

Unit 14A – Takeoff (Aerotow)

AIM

The aim of this GPC Unit is to develop and demonstrate the skills and knowledge required to prepare and then safely fly an aerotow launch ground roll, separation, initial climb and then transition into the normal aerotow climb position.

PREREQUISITE UNITS

- GPC Unit 2 Ground Handling, Signals
- GPC Unit 7 Straight Flight, Various Speeds, Trim
- GPC Unit 8 Sustained turns all controls
- GPC Unit 9 Lookout Procedures
- GPC Unit 10 - Use of ancillary controls
- GPC Unit 13A – Aerotow Launch and release.

Note to Trainers: Correct control and operation of the aircraft is an essential pre-requisite.

COMPLEMENTARY UNITS

This unit can be read in conjunction with:

- Unit 19 Crosswind Takeoff and Landing
- Unit 20 Launch Emergencies

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COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Preparation for takeoff.	• Describe: ○ Threats associated with an aerotow launch through the separation and initial climb. • Demonstrate: ○ Pre Boarding and Pre Take off checks with options for launch emergencies identified (ABCD-CHAOTIC). ○ Connection of aerotow rope to aircraft. ○ Obtaining airspace clearance for launch confirmation from the ground crew. ○ Locate and identify yellow release handle and hand in close proximity to it. ○ “Ready for takeoff” signal to the wing runner.
2. Ground run and separation.	• Demonstrate: ○ Independent non coordinated control inputs whilst on the ground: • Glider is kept straight behind the tug using rudder; • Wings are kept level using aileron; • Elevator is used to balance the glider on the mainwheel in the correct takeoff attitude. ○ Aircraft is allowed to separate from the ground, held in position no higher than the height of the tug’s fin. ○ Use of coordinated control movements once off the ground. ○ Controlled transition to low tow when the tug is positively established in the climb at a safe height.
3. Initial climb.	• Demonstrate: ○ Position just below the slipstream of the tug. ○ Wings parallel to the tug wings. ○ Lookout for conflicting traffic. ○ Situational awareness. ○ Call out options for launch failure actions as each option becomes available (GPC Unit 20 refers).

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KEY MESSAGES

- Plan ahead. Anticipate possible emergency options.
- The Pilot in Command is responsible for confirming “airspace clear for launch” and “pilot ready - launch approved”.
- Keep wings level with aileron, nose pointed at towplane with rudder, takeoff attitude set with elevator, independently, until the glider is airborne.
- The tow pilot has a release and WILL use it if an unsafe launch is evident, or the towplane runs out of elevator authority.

LESSON PLANNING AND CONDUCT

Classroom Briefing

Ground run and separation:

- Before takeoff on aerotow the trim should be set forward as required during the cockpit check. The controls used independently to get the glider into the wings level takeoff attitude, from which it will separate naturally when flying speed is attained. The glider should not be abruptly “rotated” in the nose-up sense at the separation stage.
- At this stage the wings are kept level (or banked slightly into any crosswind) with aileron, position behind the tug is maintained with rudder and takeoff attitude maintained with elevator. Coarse control movements will be required until the glider gains speed.

Initial climb:

- Whether intending to carry out an aerotow in the high or the low tow position, the separation and climb-away stages are identical. The glider will lift off before the tug and should be held at a height of two metres / six feet above the ground (about the height of the tug’s fin) until the tug also separates. In this situation the glider will be just above the tug’s slipstream.
- If intending to carry out a high tow, this position above the slipstream is maintained as the combination climbs away. Remember that high tow is, by definition, just above the slipstream, not above the tug. The slipstream is the primary reference, not one of the fixtures on the tug.
- If intending to carry out a low tow, maintain station above the slipstream as the tug leaves the ground. When the tug is positively established in a climb, move the glider gently but positively down through the turbulence behind the tug until once again in smooth air (typically 100-300 ft AGL). The glider is now in the low-tow position. Once again, the slipstream is the primary reference. Do not go too low in relation to the slipstream - it is not necessary.

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Notes:

1. The glider going too low in the low-tow position results in the tug pilot needing more and more forward stick to compensate. Although this could get to the stage of running out of elevator power to keep the tug under control, it is rather unlikely to become this serious and in any case such a situation usually develops slowly enough for the tug pilot to release the glider before control is lost.
2. In contrast, **it is dangerous to go too high behind the tug in high tow**, because this situation can get out of control very quickly and the tug pilot may not have enough time to pull his release before a “tug upset” occurs. See GPC Unit 20 on “implications of glider going too high behind tug”. If the glider goes so high that the pilot loses sight of the tug, the glider’s release should be pulled **WITHOUT DELAY**.

PRE-FLIGHT BRIEFING

There are three parts to the briefing:

- **Glider and tug on ground.** Due to the slow acceleration of the tug/glider combination, the briefing should point out that the controls will be sluggish and unresponsive at the start of the launch and will become more responsive slowly. The glider should be placed in the flying attitude as soon as the controls are functioning and kept in this attitude until flying speed has been attained and the glider separates.
- **Glider airborne, tug still on ground.** When the glider lifts off, it will start to climb higher and higher as the airspeed continues to increase. This must be resisted by a progressive forward elevator pressure, holding the glider no higher than the towplane’s tail fin. **DO NOT LET THE STUDENT LET THE GLIDER GO HIGHER THAN THIS AS YOU PULL THE TUG’S TAIL UP ON ITS GROUND RUN.**
- **Both glider and tug airborne.** When the tug lifts off, maintain the glider in a position above the slipstream until the tug is positively established in a climb. Then move gently but positively down through the turbulence of the slipstream until the glider is once again in smooth air.

FLIGHT EXERCISES

Ground run, separation, initial climb

- As a prolonged ground-run is normal with aerotowing, it may be expected that a student will initially have difficulty in keeping position behind the tug. However, they must be allowed to practice and make mistakes. It is unlikely that a clean separation will occur on the first attempt, but the trainer should not interfere unless absolutely necessary.
- When the tug separates, it is likely that the student will have difficulty in moving cleanly into the low-tow position. Once again, errors will have to be permitted, provided they are not gross enough to endanger the combination.

Trainer demonstrates:

- Trainer demonstrates and explains the process.
- Then invites the student to come on controls to feel the stick and rudder movements.

Student practices under supervision and guidance.

- Trainer intervention will likely be required in the first attempts.

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- Take over and advise the student to leave their hands and feet on the controls.
- Hand back once stable.

COMMON PROBLEMS

Problem	Probable Causes
• Wings are not kept level.	Student may not identify that one wing is lower, they need to identify this through reference to the horizon ahead and through peripheral vision. Insufficient control movement at low speed, aileron and rudder. Student will need to intervene early and use rudder secondary effect as necessary at early stages of the launch.
• Very fast taxiing on ground run with unstable handling	The student has failed to adopt the takeoff attitude – advise to ease the stick back more to run the aircraft on the main wheel only.
• Glider continues to climb after separation	Student is not compensating for the increasing effectiveness of the elevator.

THREAT AND ERROR MANAGEMENT

- Loss of control on ground run. Timely guidance is required.
- Not separating from the ground.
- Ballooning after separation due to improved elevator effectiveness.
- Banking too close to the ground after takeoff, be defensive in posture to prevent wing strike.

TRAINING MATERIALS AND REFERENCES

- GPC Pilot Guide Unit 14A
- Australian Gliding Knowledge (AGK) pages 106-8, 111.
- Gliding Handbook: FAA 2013
- GFA MoSP 2 Operations
- BGA Instructors Manual 2017