

Gliding Australia Training Manual

Pilot Guide



Unit 20A Launch Emergencies (Aerotow)

Unit 20A - Launch Emergences (Aerotow)

WHAT THIS UNIT IS ABOUT

To:

- describe types of aerotow launch emergency;
- demonstrate the actions to safely handle a launch failure; and
- demonstrate approaches to prevent these emergencies, and safe actions in the event of them happening on the ground and in the air

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- GPC Unit 13 Launch and release
- GPC Unit 14A Take-off (aerotow)
- GPC Unit 16 Circuit Joining and execution
- GPC Unit 17 Stabilised approach and landing

COMPLEMENTARY UNITS

- Nil

KEY MESSAGES

- Launch emergencies are easily resolved provided thought and planning takes place.
- At all times maintain safe speed near to the ground.
- At all times maintain situational awareness, aircraft control and safety.
- Locate, identify, and operate controls correctly during all phases of practice emergencies.
- Verbalise options for launch failure on all flights, dual or solo.

PILOT GUIDE FOR THIS UNIT

There are a number of potential Aerotow launch emergencies that pilots need to be aware of, and have a plan to address them should they occur: As part of your pre-take-off check you should be considering your actions in case any of these emergencies should occur.

Signals to Abort Launch Prior to Ground Roll.

- Anyone outside can abort launch – Shouting “STOP! STOP! STOP!” and holding both hands vertically above head.
- Pilot hearing STOP call to immediately release the rope.
- Pilot wishing to abort shouts “STOP! STOP! STOP!” transmitting on the radio and simultaneously releasing the rope.
- Wing-runner, shouting “STOP! STOP! STOP!” and holding both hands vertically above head.
- If a forward signaller is present (recommended), holds both hands vertically above head.

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Ground Roll Emergencies

- During the early stage of the ground run the airspeed is very low hence there is minimal airflow over the wing and control surfaces, reducing controllability.
- Large control movements are usually required but control movement must reduce as the airspeed increases.
- If the wing drops to the ground, you may be able to pick it up again with large aileron control movement, but do not persevere beyond a few seconds. Release and use airbrake and wheel brake to stop the glider.
- Conflicting traffic, check "airspace clear for launch"
- When Pilot requests an "airspace clear for launch" check, ground crew need to ensure there is no conflicting traffic, looking ahead, above and behind the launch. Check for aircraft on approach, aircraft performing an emergency landing, and also any weather issues such as a thermal crossing the runway, or storm gusts.
- Note that launching aircraft must give way to landing traffic. If unsure, do not proceed.
- Pilot Induced Oscillation
- Incorrect Separation – ballooning

Separation

- It is important to establish the two-point take off attitude suitable for your glider. This typically requires running on the main wheel with the tail just off the ground.
- When the tail wheel lifts, the glider may also weathercock or yaw as it rolls along the ground. You correct this using the rudder pedals. See Unit 19 Crosswind Take-off and Landing
- If you hold the stick back with the tail hard on the ground, then the glider will leap into the air as it exceeds the speed required to fly which will leave you with a difficult task of getting it back under control.
- If you don't have enough back stick, then the glider will stay on the ground for a long time and control becomes more difficult.
- With the glider balanced on the main wheel, in the 2-point attitude, the glider will just separate from the ground as it reaches flying speed.
- As the glider accelerates and the controls become more effective, you must relax the back pressure on the stick so that the glider does not continue to climb higher than required.
- The glider will lift off before the tug and you should let it climb until it's about 3 metres or just above the tug's fin. You must not go too high as you risk raising the tail of the towplane putting the nose/propeller very close to the ground.
- When the glider is airborne, the stick and the rudder are moved in a coordinated fashion.

PIO (Pilot Induced Oscillation)

- You should not make large elevator control inputs during the separation stage, Separation requires gradual changes in back pressure.
- Pulling the stick backward will cause it to climb fairly steeply putting you and the towplane in a difficult position.

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- If you then push the stick forward you will likely force the glider in a dive and strike the ground. This bounces you into the air and the G-Forces will cause you to pull the stick back and up you go again.
- If uncontrolled, this may escalate into quite an aggressive oscillation with the glider hitting the ground very hard, potentially causing damage.
- This is called a Pilot Induced Oscillation (PIO) and must be avoided. If you just apply small pressure changes to the elevator control rather than jerky control movements you will just separate quietly and smoothly.

In flight

- Conflicting traffic, check "airspace clear for launch". Maintain situational awareness.
- Loss of power
- Rope break
- Tug upset

Tug engine Failure whilst on Ground

- Avoid the towplane by using rudder to steer away – typically you will steer to the right, but just give way to the towplane. Use airbrake and wheel brake to stop the glider.

Tug engine failure after separation

- Maintain safe speed, and avoid the towplane. Depending on your height you may decide to delay using airbrake so that you can overfly the towplane or deviate to the right to avoid the towplane which may be blocking the runway. Once you have a clear path use a small amount of airbrake to descend to the ground, round out and land normally.

Rope Break - Airborne, Runway Remaining

- Lower the nose to adopt safe speed, Release the rope and Land straight ahead on the runway. If runway length is minimal, use a lot of airbrake and then wheel brake. If over running the runway, ground loop prior to hitting fence

Rope Break - Airborne, no Runway Remaining

- Lower nose to adopt and maintain safe speed
- Release rope
- Outland straight ahead or within 30 degrees either side of straight ahead. You should be aware of possibilities for outlanding and select the most appropriate
- If above 200 feet you may do a 180° turnback and land back on the runway, looking out for other traffic.
- If sufficient height you can perform a modified circuit to a runway depending on aircraft type, aerodrome layout and/or weather conditions

Tug Emergency

Engine Failure (e.g. fuel starvation) Tug descends without warning or signal and may disappear under nose

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- Release IMMEDIATELY
- Maintain safe speed near the ground
- Land ahead if low or manoeuvre for circuit

Partial Engine Failure (e.g. mechanical, fuel vaporisation, magneto failure, carburettor heat selection) or about to enter cloud

- Pilot should identify the problem and determine safest option. Don't release if you don't have a safe option
- If Tug pilot signals wave-off by **Rocking the wings**, Release IMMEDIATELY and avoid the tug – tow-pilot has a bigger problem than you do.
- Maintain safe speed near the ground.
- Land ahead if low or manoeuvre for circuit.

Low rate of climb tug pilot attributing to glider (eg dive brakes may be out)

- Tug pilot signals by rapid **Rudder Waggle**.
- Do **NOT** release.
- Check glider configuration and correct if necessary.
- If correct already communicate with tug by radio and watch for possible Wing Waggle.
- High powered tugs (e.g. PA25s) can usually maintain 250-300 fpm climb rates with a two-seater with dive brakes open, lower powered tugs may not be able to maintain height.

Release Failure (Hook-up)

- In a real hook-up, if no radio communication received, fly to the left low tow position, try again to release.
- Maintain rope tension with yaw or/and smooth application of dive brake.
- When Tug pilot acknowledges by hand waving, glider returns to low tow astern, maintaining rope tension and keep attempting to release.
- Tug Pilot flies to suitable area close to landing area.
- Glider climbs to high tow position which signals to the tug pilot that they are ready to accept the rope.
- Tug Pilot releases the rope.
- Glider makes a high approach ensuring rope clearance with any obstacles on approach and usually landing farther up the runway
- Note the possible risk of the rope tangling in wheel/axle on landing roll.

Double Release Failure

(In the unlikely event of it ever happening)

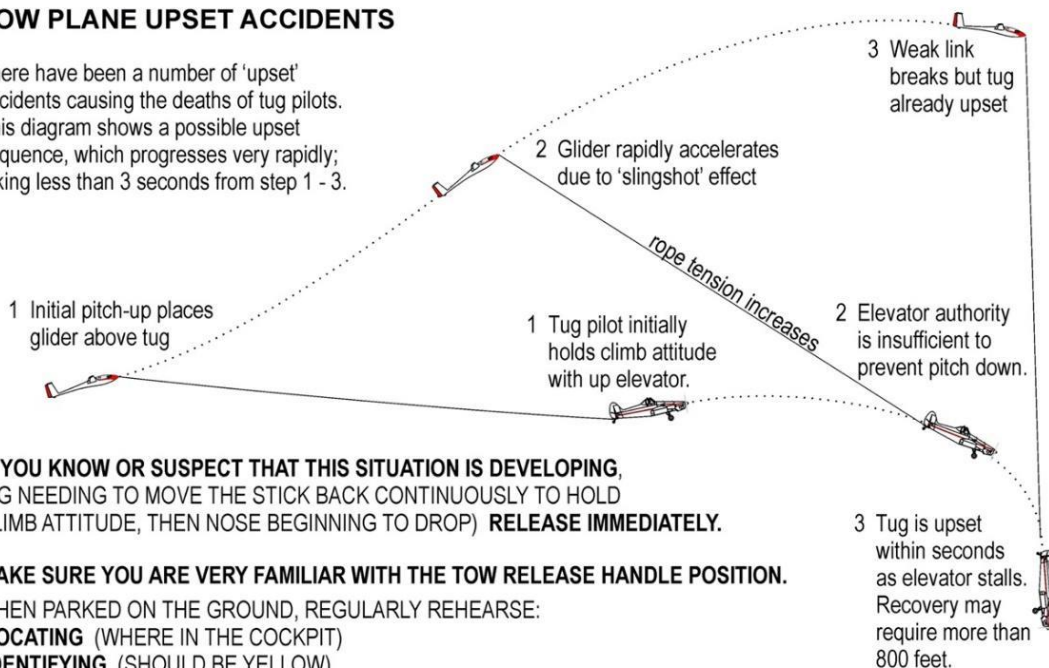
- Tug pilot communicates failure by radio (or by thumbs down hand signal)
- Glider adopts low tow position.
- Tug descends to circuit height and approach with glider maintaining low tow position and rope tightness with dive brakes. Glider controls the descent to the ground through using airbrakes.

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- Glider lands first in wheeler configuration then applies full dive brake and applies wheel brake as soon as possible.
- Tug pilot should not brake allowing glider to slow the combination.
- If overtaking tug, glider steers right or ground loops right to avoid.

TOW PLANE UPSET ACCIDENTS

There have been a number of 'upset' accidents causing the deaths of tug pilots. This diagram shows a possible upset sequence, which progresses very rapidly; taking less than 3 seconds from step 1 - 3.



IF YOU KNOW OR SUSPECT THAT THIS SITUATION IS DEVELOPING,
(EG NEEDING TO MOVE THE STICK BACK CONTINUOUSLY TO HOLD CLIMB ATTITUDE, THEN NOSE BEGINNING TO DROP) **RELEASE IMMEDIATELY.**

MAKE SURE YOU ARE VERY FAMILIAR WITH THE TOW RELEASE HANDLE POSITION.

WHEN PARKED ON THE GROUND, REGULARLY REHEARSE:

LOCATING (WHERE IN THE COCKPIT)

IDENTIFYING (SHOULD BE YELLOW)

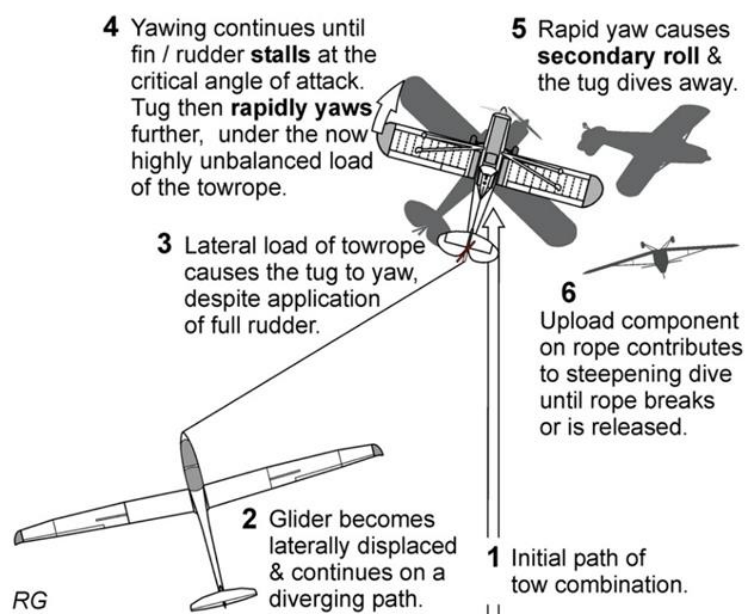
REACHING FOR THE RELEASE (WITHIN EASY REACH WITH HARNESS TIGHT?)

LATERAL TOWPLANE UPSET

THE DIAGRAM SHOWS A POSSIBLE UPSET SEQUENCE
(refer also to discussion in main text).

**IF YOU THINK THAT THIS SITUATION IS DEVELOPING,
RELEASE IMMEDIATELY.**

DO NOT APPLY LARGE RUDDER DEFLECTIONS
IN AN ATTEMPT TO COUNTER HIGH LATERAL LOADS.



FLIGHT EXERCISES FOR THIS UNIT

Flying for this unit requires close coordination with the tug pilot pre-flight and in-flight.

All configurations except outlanding off low level rope break practice and double hook-up are to be demonstrated by the student and observed by the instructor to be carried out safely and correctly.

Instructor Demonstrates

- Your Instructor will demonstrate all emergencies including at least one low level rope break to a modified circuit on glider type prior to the student practicing them.

Student Practice (under supervision)

- To call options on take-off run and climb out on all flights post classroom briefing.
- Rope break on take-off run, runway remaining.
- Low level rope breaks to modified circuit or turnback depending on club safety policy.
- Hook-up procedures.

THINGS YOU MIGHT HAVE DIFFICULTY WITH

- Be aware of potential problems and be prepared to take action.
- Your primary responsibility is to fly the glider and maintain a safe speed.

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- The simple solution is generally the best
- Maintain situational awareness at all times, aircraft control and safety including action on losing sight of the tug;
- Ensure you identify and operate correctly controls and equipment during all phases of operation during practice emergencies.

HOW DO YOU DEMONSTRATE COMPETENCE?

- Describes possible launch emergencies and their prevention.
- Maintain directional control and take appropriate action with a Wing drop
- Aware of causes of PIO and takes appropriate action
- Describes causes of Tug upsets and acts to prevent these.
- Responds to tow plane signals quickly and assertively.
- Identifies suitable landing areas off the airfield for emergency use
- Brief and call out options on climb out on all flights;
- Takes appropriate action with simulated launch failure, including landing on airfield, 180° turn, and explains options re outlanding.
- Describe and respond correctly to release failure and double release failure

RESOURCES & REFERENCES

- Australian Gliding Knowledge pp 104-109

SELF-CHECK QUESTIONS

Use these questions to test your knowledge of the unit.

- Describe potential launch failures on Ground roll, early climb and full climb
- How can you avoid a tug upset?
- What action would you take if the towplane rocks its wings
- Why shouldn't you release if the towplane waggles its rudder?
- If the towrope breaks at approx. 350 feet, what options do you have?
- Describe outlanding options for each runway if you experience a low level cable break.
- What actions do you take if your release does not work?