

Gliding Australia Training Manual

Trainer Guide



Unit 20A

Launch Emergencies (Aerotow)

AIM

The aim of this GPC unit is for the student undertaking an aerotow to:

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

Competency in this unit is a prerequisite to first solo flight using aerotow.

PREREQUISITE UNITS

- 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

There are no complementary units for this GPC Unit

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describes the range of launch emergencies and immediate actions.	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ Possible launch emergencies that may occur with ground run, initial climb (to 500 feet AGL) and during full climb above 500 feet. ○ Actions the pilot can take to reduce the risks of launch emergencies. ○ Causes of towplane upset and the actions to prevent it.
2. Ground roll emergencies.	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ Appropriate action if the towplane has engine failure during ground roll. ○ Causes of Pilot Induced Oscillation (PIO). ○ How to prevent loss of directional control. ○ How to prevent a Wing drop. • Demonstrate: <ul style="list-style-type: none"> ○ Correct reactions to launch failures hand, visual and verbal signals on the ground. ○ Appropriate actions to take on: <ul style="list-style-type: none"> • Loss of directional control. • Occurrence of Pilot Induced Oscillation (PIO). • Wing drop, possibly due to cross wind.

3. Initial climb emergencies	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ Causes of Tug upsets and actions to prevent these. ○ Suitable landing areas off the airfield for emergency use. ○ Appropriate actions to Towplane problems including low power issues. ○ Options with Launch failure (rope break or engine failure) below 500 feet AGL. • Demonstrate: <ul style="list-style-type: none"> ○ Responding quickly and assertively to tow plane signals. ○ Calling out options on climb out on all flights. ○ Taking appropriate action with simulated launch failure below 500 feet AGL, including landing on airfield or turnback.
4. Full climb emergencies.	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ Required actions in the event of a double release failure. • Demonstrate: <ul style="list-style-type: none"> ○ Taking appropriate actions to simulated launch failure above 500 ft AGL. ○ Recognition and correct response to release failure during launch (hook up).

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.

LESSON PLANNING AND CONDUCT

Classroom Briefing

Ground 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), they hold both hands vertically above head.

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- O for Options in ABC CHAOTIC pre-flight check list identifies alternative actions at stages of launch if failures occur.
 - In practice, the various stages should be called out on all flights as the launch occurs after this classroom briefing, (e.g. runway, runway, straight ahead, paddock there, paddock there, safe height modified circuit).

On ground roll:

- Release rope.
- Simultaneously maintaining directional control.
- Apply full airbrake and wheel brakes.
- If overtaking tug, avoid it to the right hand side or ground loop right while sufficient speed remains for control effectiveness.

Airborne, runway remaining:

- Lower nose to adopt safe speed.
- Release rope.
- Land straight ahead on runway.
- If overtaking tug, avoid it to the right hand side or ground loop to the right while sufficient speed remains for control effectiveness.
- If over-running the end of the runway, ground loop prior to hitting fence while sufficient speed remains for control effectiveness.

Airborne, no runway remaining:

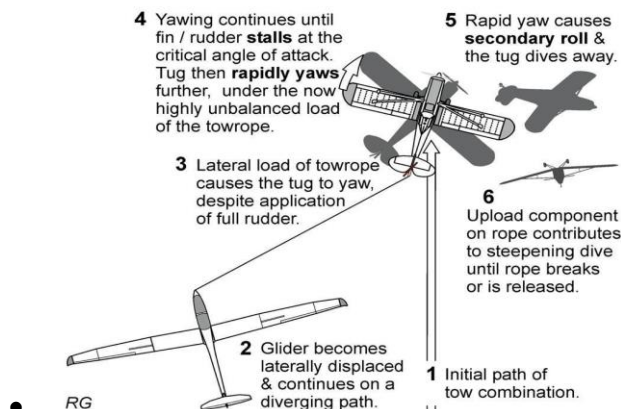
- Lower nose to adopt and maintain safe speed.
- Release rope.
- Outland straight ahead or within 30 degrees either side of straight ahead.
- If above safe height either 180° turnback or modified circuit to a runway depending on aircraft type, aerodrome layout and/or weather conditions.
- Aerotow low-level rope break with 180° turnback can be simulated at altitude which shows students that they don't need to rush their actions at low level when the adrenaline is racing. This avoids the common error of turning before safe speed has been established.

LATERAL TOWPLANE UPSET

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

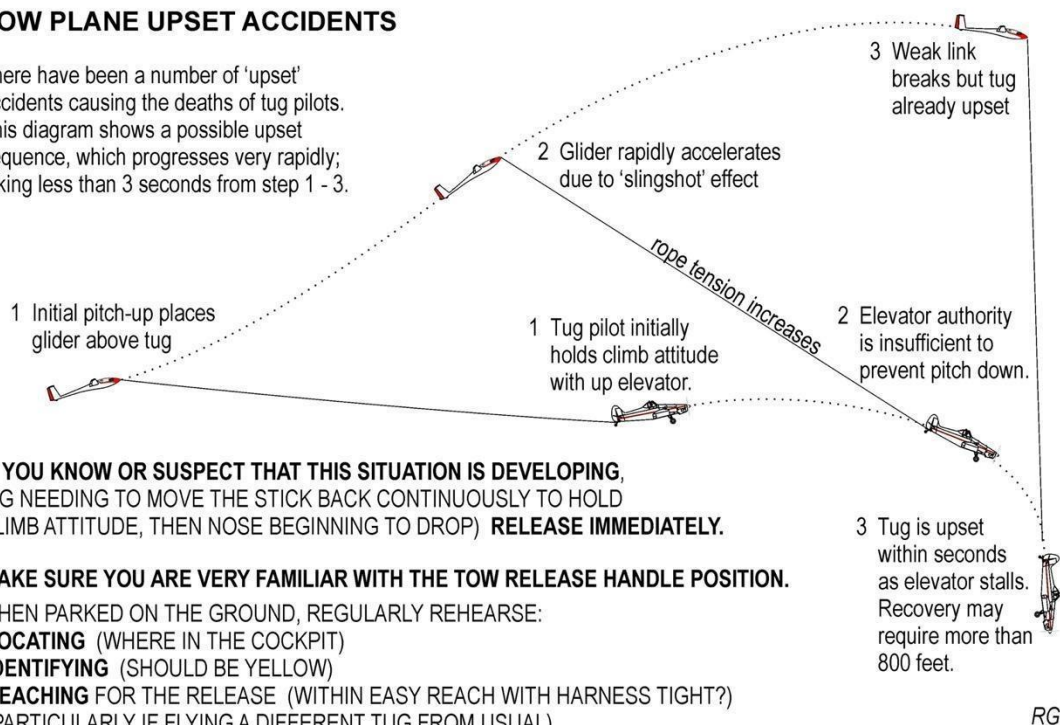
IF YOU THINK THAT THIS SITUATION IS DEVELOPING, RELEASE IMMEDIATELY.

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



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?)
(PARTICULARLY IF FLYING A DIFFERENT TUG FROM USUAL).

Tug Emergency:

- Explain Tug Emergency Signals Wing waggle, Rudder waggle.
- Engine failure (e.g. fuel starvation) tug descends without warning or signal and may disappear under nose:
 - Release IMMEDIATELY.
 - Maintain safe speed near the ground.

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- Land ahead if low or manoeuvre for circuit.
- Partial engine failure (e.g. mechanical, fuel vapourisation, magneto failure, carburettor heat selection) or about to enter cloud:
 - If Tug pilot signals wave-off by wing waggle, or disappears descending under the glider's nose - 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 (e.g. airbrakes 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 airbrakes open, lower powered tugs may not be able to maintain height.

Release Failure (Hook-up)

- In a real hook-up, if no communication received, fly to the left low tow position, try again to release.
- Maintain rope tension with yaw or/and smooth application of airbrake.
- 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 signalling to 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 airbrakes.
- Glider lands first in wheeler configuration with full airbrake and applies wheel brake as soon as possible.
- Tug pilot should not brake, allowing the glider to slow the combination.
- If overtaking tug, glider steers right or ground loops right to avoid.

PRE-FLIGHT BRIEFING

- Carefully brief the simulated launch failure to be demonstrated/conducted but note that a (real) failure may occur prior to this in the launch.
- Ensure the student is aware of who is in control of the aircraft at all times.

FLIGHT EXERCISES

Specific demonstration and practice required:

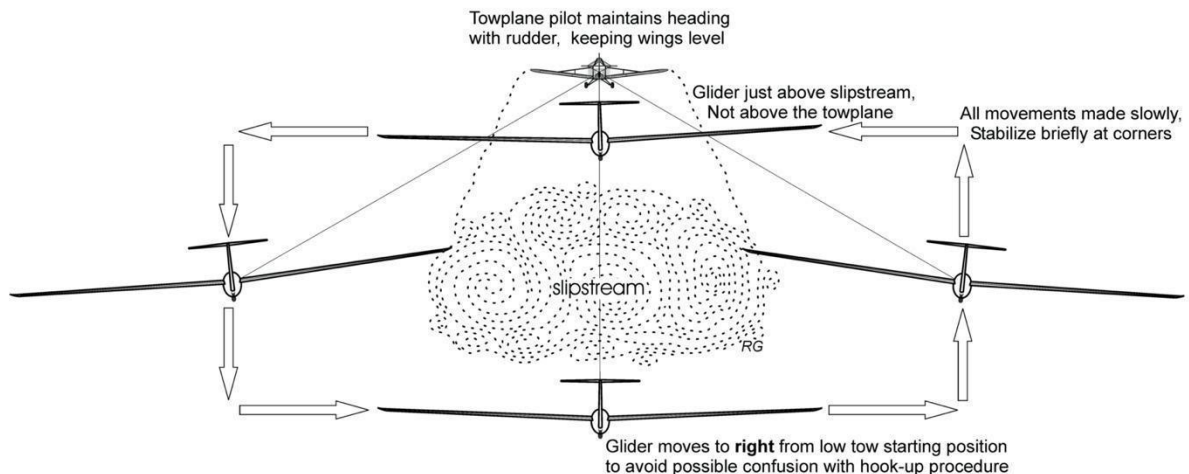
- Flying for this unit requires close coordination with the tug pilot pre-flight and in-flight.
- Tug Pilot should be briefed NOT to turn left while glider is out on echelon left during Hook-up procedure.
- Trainer must radio to Tug Pilot prior to commencing and ceasing Hook-up procedure.
- All configurations except outlanding off low level rope break practice and double hook-up are to be demonstrated by the student and observed by the trainer to be carried out safely and correctly.

Trainer demonstrates:

- Note: Trainer to demonstrate all emergencies including at least one low level rope break to a modified circuit on glider type prior to the student practicing them.
- If student shows reticence or nervousness during practice, more demonstration by the Trainer is advised.

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:
 - If the student has problems controlling the glider during the hook-up procedure;
 - Then practice “boxing the slipstream” until competent (See GPC Unit 27 for explanation).



Advice to trainer regarding their responsibility to maintain safe flight.

- Do not exceed your own limitations when setting difficult tasks for the student. They may just say to you – ‘you have control’.
- Emphasize to the tow pilot during briefing that the tug should not turn during hook-up practice.
- During hook-up procedures don't let the rope develop a loop, intervene with yaw and/or smooth application of airbrake to tighten rope:
 - Release rope before the loop gets anywhere near the wing.
 - In the event of a large bow in the rope occurring, resulting from a poorly exercised and supervised procedure, the rope may wrap around the wing and on re-tension result in damage to the wing or flight control.
 - This could result in an inability to release or worse; a reduction in, or loss of, control.
 - The trainer must be on their guard to ensure that the above does not eventuate.
- Respond correctly to GFA emergency signals at all times (no practice signals without taking correct action).
- Maintain safe speed near the ground at all times.
- Maintain currency with modified circuits/ turnback procedures.
- Maintain at all times situational awareness, aircraft control and safety including action on losing sight of the tug.
- Ensure student locates, identifies and operates correctly controls and equipment during all phases of operation during practice emergencies.
- During a real (not practice) emergency, the trainer will take command.

Safety Aspects

- Set and don't exceed personal minima.
- MAINTAIN SAFE SPEED NEAR THE GROUND.
- Monitor the student closely for overloading and don't hesitate to take over if necessary.
- A thorough ground briefing must be undertaken to emphasise the dangers to the student of the tug upset.
- It must be understood that high tow position is virtually line astern (behind) of the tug.
- The student must understand that on losing sight of the tug at any time during the exercises, the glider must release immediately.
- The primary reference for low or high tow is the slipstream. When the correct station is established, reference to a feature on the tug will assist maintaining that station.
- The tow pilot may at any time release the glider if the tug is placed in danger:
 - The rope and weak link may add further airworthiness implications should the rope fly back at the aircraft, such as control jamming or impact damage depending on the position or station when the rope is released.

Notes:

1. Don't dramatise exercises; adopt a matter of fact approach to reassure the student and to instil confidence.
2. Students can practice calling out actions sitting in a parked glider responding to trainer calls locating, identifying and operating controls.
3. Don't practice low level rope break exercises in busy circuit traffic sequences.
4. Hook-up early student practice should avoid turbulent conditions.
5. Remember to brief tug pilot and ground crew fully prior to practicing emergencies.
6. Don't organize practice rudder waggles below circuit height as student may misread the signal and release the rope.

COMMON PROBLEMS

Problem	Probable Cause
<ul style="list-style-type: none"> Student unskilled so unable to handle the extra workload. 	Unit commenced too early
<ul style="list-style-type: none"> Student just repeats common phrases without assessing if there is sufficient room to do what is stated 	Not understanding how much room is required to land straight ahead or turn back.
<ul style="list-style-type: none"> Incorrect decisions following rope break 	Insufficient situational awareness
<ul style="list-style-type: none"> Student makes basic flying errors under emergency practice 	Unskilled. Needs more practice.

THREAT AND ERROR MANAGEMENT

- Do not exceed personal minima.
- If uncurrent on type with some of these exercises undertake refresher practice with your CFI or a more experienced trainer prior to conducting instructing in this unit.
- Student may react much more slowly than you expect, if too slow - take over.
- Don't underestimate the amount of height loss in turnback procedures.
- Turnback or low level rope break practices should not be carried out in busy circuit traffic sequences.
- Watch the rope go before manoeuvring after release is called.
- If sight of the tug is lost at any time, release immediately!!!
- During hook-up procedures watch out for the tug pilot commencing a left turn when the glider is manoeuvring into the left echelon position.
 - This will cause the rope to develop a bow rapidly if the glider does not mirror left turn immediately.
 - Release rope before loop gets anywhere near the wing.

TRAINING MATERIALS AND REFERENCES

- Whiteboard
- Model aircraft
- GPC Theory Lesson 6 – Launch failures
- Video demonstrations
- GPC Pilot Guide Unit 20A
- Australian Gliding Knowledge (AGK) pages 142 - 144
- Simulator (if available).