Gliding Australia Training Manual

Trainer Guide

Unit 15

Break Off & Circuit Planning

Unit 15 - Break Off & Circuit Planning

AIM

The aim of this GPC unit is to enable the student to:

- Decide when a flight is to be terminated - to transition from soaring pilot to landing pilot.
- Identify a circuit pattern appropriate to the airfield, weather, traffic and other factors.
- Determine location of the circuit joining area, based on the selected circuit pattern.
- Configure the aircraft for circuit and determine when to use the pre-landing check.
- Demonstrate good lookout and traffic separation in the terminal area.

PREREQUISITE UNITS

- GPC Unit 7 Straight Flight Various Speeds, Trim
- GPC Unit 9 Lookout Scan Procedures
- GPC Unit 10 Use of Ancillary Controls

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 16 Circuit Joining and Execution
- GPC Unit 19 Crosswind take-off and landing
- GPC Unit 20 Launch Emergencies
- GPC Unit 21 Radio Use and Endorsement

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Make the decision to land.	• **Describe:** ○ Factors appropriate to the break-off decision that enable arrival at circuit joining with enough height for normal circuit entry. ○ The factors to consider in the decision to commit to landing. ○ *NOTE: Full competence on this element may not be demonstrated till close to solo. Do not sign this off too early.*
2. Determine appropriate landing area, circuit pattern and associated circuit joining area.	• **Describe:** ○ Options of where to join the circuit. • **Demonstrate:** ○ Identification of a clear landing area on airfield or suitable alternate if insufficient height to reach the airfield. ○ When to return to the landing area with sufficient height to join circuit on arrival. ○ Appropriate circuit direction and circuit joining area in accordance with airfield procedures, weather conditions and aircraft performance.
3. Transit to Circuit Joining Area.	• **Demonstrate:** ○ Configuration of the aircraft for landing. ○ Positioning of the aircraft in circuit joining area at appropriate height. ○ Maintenance of situational awareness of traffic & environment. ○ Assessment of feasibility of original landing plan. ○ Safe speed below 1000ft AGL
4. Clearance and traffic separation during transit to circuit.	• **Demonstrate:** ○ Clearance of obstacles and restricted airspace. ○ Adjustment of flight path to maintain separation with other traffic. ○ Ability to communicate with other traffic as required.

KEY MESSAGES

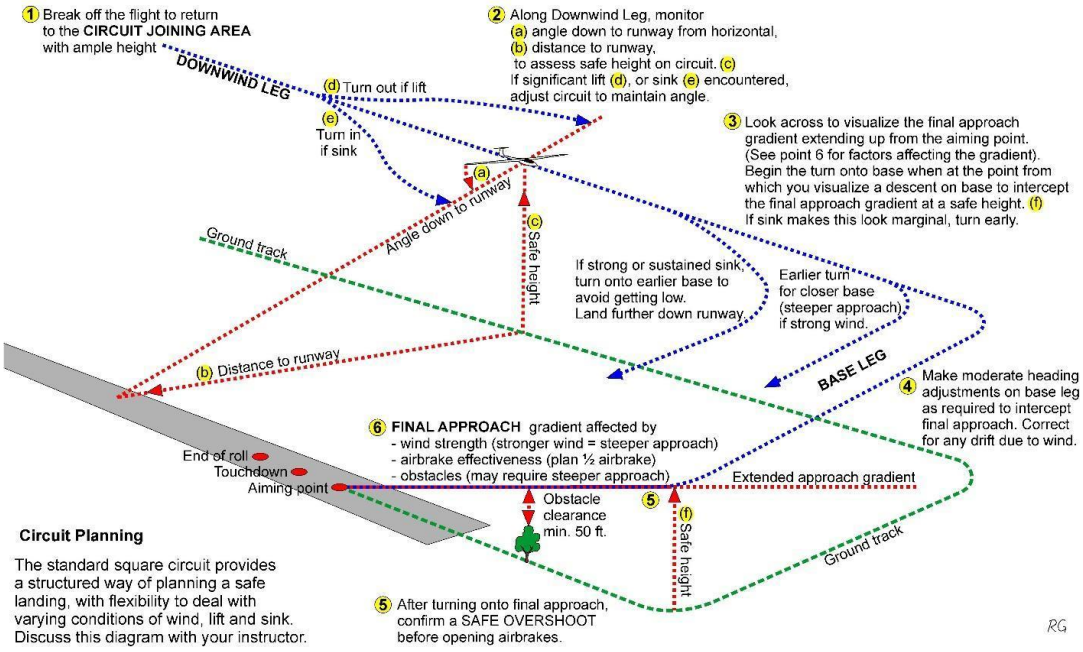
- Break off from soaring flight with enough height to return safely to the chosen landing area.
- The circuit is the flexible tool which helps make a good approach. The main benefit of flying a standard circuit is that it allows time for progress to be judged, alternatives considered, and the necessary action to set up a good approach and complete a safe landing; and the pilot maintains a good view of the airfield and landing area.
- Landing is a high-workload phase of flight – ensure distractions minimized and aircraft configured correctly at height.
- Identify options for joining a circuit with other traffic (refer CASA AC91-10 https://www.casa.gov.au/sites/default/files/2021-10/advisory-circular-91-10-operations-vicinity-noncontrolled-aerodromes.pdf).
- Landing areas are generally high traffic areas – Situational awareness of traffic is critical.
- Maintain separation from obstacles and restricted airspace.
- Be prepared to modify the circuit plan if circumstances – traffic, weather, etc. – require.
- Be prepared to land off-field within the selected circuit area if necessary because of meteorological reasons, runway blockage or pilot error of judgement.

LESSON PLANNING AND CONDUCT

Classroom Briefing

General

- In every flight the pilot will need to cease soaring flight and proceed to a selected landing area.
- Objective is to identify a suitable landing area, a circuit direction and final approach path that enables a safe circuit and landing with safe margin over obstacles.
- Use the diagram of the circuit to identify each leg, joining options and associated circuit joining areas.



- The landing area may be a runway on an airfield or a selected outlanding field/paddock.
- Ensure there is sufficient height to fly to the circuit area and then conduct a circuit & landing.
- The pilot must adopt the mental approach of a ‘landing pilot’ and configure and operate the glider accordingly.
- Good circuit planning and good flight management below 2000’ AGL makes a significant contribution to a good circuit and safe landing.
- Monitor any decline in personal performance levels that may impact decision making and flying performance, possibly due to the human factors of fatigue, stress or dehydration etc.
- Good planning and situational awareness assist in reducing stress on the pilot in the landing sequence.
- Situational awareness includes location, traffic, terrain and environment – in particular wind & areas of lift/sink.
- Lookout remains essential – the pilot is entering a potentially high traffic area.
- Break-off points and circuit joining areas are almost always different for each flight and not fixed locations over the ground.
- For various reasons the landing area used when returning to an airfield may be different to the take-off location.

Break Off

- We make a conscious decision to break-off the flight – changing from a ‘soaring pilot’ to the ‘landing pilot’ mindset.
- Criteria used for determining when to cease soaring flight and return to the circuit include:
    - Sufficient height to transit to the circuit.
    - Changing weather conditions.
    - Potential hazards such as sun glare.

  - Traffic density, pilot fatigue and hydration.
  - Time limits for flight.
  - The height required to return safely to the circuit area in current conditions.
- The pilot must make a number of important decisions:
  - Determine the wind strength and direction (check the windsock if at an airfield) and consider the likely effects of wind and gradient.
  - The circuit direction and the location for the circuit joining area — a stronger wind might need a circuit joining area further upwind.
  - Determine the effect of crosswinds on the circuit. A crosswind away from the airfield might mean a circuit joining area closer in and a shorter base leg, whereas a crosswind towards the field would suggest a circuit joining area further out and a longer base leg.
  - Assess the landing area. There is no point in starting a circuit to one that is unsuitable or blocked.
  - Determine an 'Approach Speed' for the conditions (1.5Vs plus ½ wind speed).
- Actions required to configure the glider in preparation for landing can be undertaken at height:
  - Straps are tight.
  - Water ballast dumped in gliders so equipped.
  - Engine configuration set.
  - Radio is on the correct frequency, that volume and squelch are correctly set, and that the microphone is positioned for best performance.
  - Flaps set.
  - Undercarriage lowered. Check lever against placard.
  - Speed required at circuit.
  - Trim to an appropriate speed for the downwind leg.
  - Adoption of safe speed attitude below 1000' AGL.
- Brief the threats posed by reverting to 'soaring pilot' mode after making the break-off decision.

Circuit Preparation

- List options for joining a circuit with other traffic (CASA C91-10) & Pilot Guide.
- Cover positioning to join on Base, Final, from a 45° angle onto Downwind and Crosswind.
- Need to maintain separation from traffic, other obstacles and remain outside restricted airspace.
- Continual evaluation of alternates – if other traffic appears, if wind changes, if lift/sink occurs etc.
- Discuss options for emergency off-field landings within the circuit area due to meteorological or human factor reasons taking into account:
  - Wind direction considerations.
  - Minimum field length requirement.
  - Ground looping rather than going through a fence.

PRE-FLIGHT BRIEFING

- Need to consider angles and altitudes – break-off points and joining areas are almost always different for each flight and not a fixed location over the ground.
- Student should be assessing the position of aircraft relative to selected landing area when below 2000’ AGL.
- Explain that the circuit is planned to land into wind in almost all circumstances

FLIGHT EXERCISES

Demonstration of Break-Off Point

- Lookout - FULL SCAN outside to maintain situational awareness.
- Consider angle back to the chosen landing area.
- Targeted scan for conflicting traffic.

Transit to Circuit Joining Area

- Locate a clear landing area and identify the best return path. Set direction and angle to the airfield.
- We need adequate height to return to the airfield in these conditions.
- Determine appropriate Circuit Joining Area and determine expected circuit direction to be used for selected landing area.
- Demonstrate break-off and circuit preparation from various points around the airfield. This should show different circuit joining options and demonstrate where to join the circuit as height varies.
- Transit must not conflict with circuit direction – avoid potential head-on situation.
- Assess original circuit plan during transit as to whether it requires amendment, replan as required.
- Consider tracks over the runway or on the dead side of the circuit if appropriate for site. Not with winch launching in progress.

Demonstration of Circuit Preparation

- Manoeuvre aircraft towards the circuit joining area.
- Do not return to soaring flight.
- Adoption of safe speed attitude below 1000’ AGL.
- Configure Aircraft for landing:
    - Straps are tight.
    - Water ballast dumped in gliders so equipped.
    - Engine configuration set.
    - Radio is on the correct frequency, that volume and squelch are correctly set, and that the microphone is positioned for best performance.
    - Flaps set.
    - Undercarriage lowered. Check the lever against placard for DOWN.
    - Set approach speed

    - Trim to required airspeed for the downwind leg.
- Reassess landing area feasibility and consider emergency options within the circuit area. Identify obstacles, restricted airspace, high traffic areas.
- Conduct TARGETED SCAN of circuit area and periodic FULL SCAN to maintain situational awareness.

Student exercises

- Student practices break-off judgement by:
    - Identifying environmental wind.
    - Choosing landing area.
    - Estimating angle to landing area and associated margin for return.
    - Predicting what height they will arrive at the circuit joining area.
- Student practices determination of circuit:
    - Selects landing runway.
    - Selects circuit direction.
    - Selects and can navigate to the circuit joining area.
- Student adopts safe speed 1.5Vs below 1000' AGL. Student determines the Approach Speed 1.5Vs + ½ Wind speed.[1]
- Student configures the aircraft for landing.
    - Straps are tight.
    - Water ballast dumped in gliders so equipped.
    - Engine configuration set.
    - Radio is on the correct frequency, volume and squelch are correctly set, and the microphone is positioned for best performance.
    - Flaps set.
    - Undercarriage lowered. Check the lever against placard for DOWN.
    - Speed required at circuit
    - Trim to an appropriate speed for the downwind leg.
- The Trainer may do the radio calls in the early training for circuit planning until the student becomes more proficient.
- As Student becomes more proficient, the trainer can ask:

[1] **Determine Approach speed** (1.5Vs + ½ wind speed) at the break-off point.

Set approach speed from the break-off point but at the latest, before the pre-landing checks, (which is early on the downwind leg).

Although some people argue that this may result in a high airspeed on downwind, this is a secondary consideration compared to ab-initio students' workload and the complexities of changing speed/attitude/re-trimming after the pre-landing checks.

- What would you change in the event of traffic or wind changes?
- What action would be taken if the chosen landing area is no longer reachable?

Debrief

- Students should always be made “self-critical” of their performance in circuit judgement.
- Ask the student to analyse how the circuit and landing went immediately following each flight, as often deterioration in performance can be identified early and remedial actions taken with relation to their:
  - Appropriate circuit pattern and joining area selection.
  - Amount of height available to transit to circuit joining area and complete proper circuit.
  - Usage of pre-landing check items as a checklist.
  - Ability to locate and coordinate separation with other traffic in the terminal area.
  - Ability to maintain situational awareness regarding traffic, landing area location, circuit joining area.

Notes:

1. Ensure lookout is maintained by all aircrew. Cover instruments in the student’s view if necessary, to discourage looking inside the cockpit.
2. Remove all distractions from the exercise, for instance mute audio variometer once transition to landing pilot mode has occurred.
3. Ensure the pre-landing check is called that - it is NOT a ‘FUST’ check.
4. Students may need to build skills in individual competency elements on separate flights.
5. Students must be competent at basic flying skills (coordinated turns, straight & level flight and use of trim) at this stage to avoid overloading the student.

COMMON PROBLEMS

Problem	Probable Cause
• Student transits through active circuit area, over runway (if winch club) or other inappropriate path to joining area.	Fixation on joining circuit may result in failure to maintain adequate situational awareness of where aircraft is in relation to airfield. Incorrect decision as to where to locate the circuit joining area – where possible it should be located such that flying over the strip is not required.
• Inadequate height for aircraft to return to chosen landing area	Student has not estimated angle back to chosen landing area correctly.
• Student selects same joining area regardless of height or location.	Student may be flying by rote – using the same pattern as done previously in the belief it will still work.
• Fixation on particular circuit direction or landing area.	Student may be failing to employ judgement and relying on geographical features (site bound) regardless of current circumstances, reinforce need for adapting circuit plan to fit with available height, wind, traffic etc
• Too slow to configure for landing resulting in late checks and rushed planning	Give the student time to plan the circuit; get them to rehearse the actions and checks when not training.

THREAT AND ERROR MANAGEMENT

- Pilot focus on instruments for speed and height. Cover instruments if required and brief for maintaining view outside the cockpit.
- Heavy sink and lift in the area requires appropriate and timely circuit adjustment.
- High traffic level (particularly in circuit areas): consider taking the radio operating and delegating flying to the student while directing them to separate with other traffic.
- Cockpit distractions – radios, varios, internal expectations – minimise as much as possible.
- Threat of distraction which can result in wheels up landing. Emphasise checking lever against placard.
- Proximity of geographic obstacles, mechanical turbulence and/or restricted airspace to/in circuit area.
- High student workload if asked to undertake multiple tasks – manage student workload by taking back tasks if overload is detected.
- Non-standard circuit procedures – insist on a high standard of procedures. Demonstrate first.

TRAINING MATERIALS AND REFERENCES

- GPC Pilot Guide Unit 15
- GFA MoSP Part 2 Operations
- Australian Gliding Knowledge pages 116-120

- AC 91-10 v1.1 Operations in the vicinity of non-controlled aerodromes https://www.casa.gov.au/sites/default/files/2021-10/advisory-circular-91-10-operations-vicinity-noncontrolled-aerodromes.pdf