Gliding Australia Training Manual

Trainer Guide

Unit 28

Sideslipping

Unit 28 - Sideslipping

AIM

To develop the student's knowledge and ability to confidently utilise a sideslip to increase their descent rate.

Instructors should review the Aircraft Flight Manual to verify that sideslipping is permitted, and if so what circumstances and restrictions apply.

PRE-REQUISITE UNITS

- GPC Unit 10 Use of Ancillary Controls.
- GPC Unit 12 Slow Flight and Stalling.
- GPC Unit 17 Stabilised Approach and Landing.

COMPLEMENTARY UNITS

- GPC Unit 19 Cross wind landings

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Knowledge regarding sideslips	• **Describe** ○ The effect of a sideslip. ○ Situations when a sideslip can be beneficial. ○ Risks associated with the use of a sideslip. ○ The control movements required to commence and leave a sideslip. ○ False airspeed indications in a sideslip.
2. Conduct sideslips	• **Demonstrate** ○ A controlled sideslip at height. ○ Maintaining a constant track across ground whilst in the sideslip. ○ Recovery from sideslip at the same speed as the entry. ○ A controlled sideslip on final approach (subject to local restrictions). ○ A sideslip and return to normal coordinated flight. Both to the left and right

Unit 28 - Sideslipping

KEY MESSAGES

- Sideslips are used to increase the glider's decent rate without increasing its airspeed.
- Sideslipping should only be introduced after the pilot can fly at a constant speed with good stick and rudder coordination and can conduct a stabilised approach and landing with effective use of airbrakes.
- Maintaining a sideslip to a low level just prior to round out is NOT recommended unless the pilot is very experienced, current at sideslipping and competent. This is not required for this unit of competency.
- Aircraft with effective airbrakes will rarely require the use of sideslip.
- Sideslip manoeuvres in some gliders in conjunction with particular control settings (such as airbrakes) can result in uncommanded pitch down manoeuvres due to tailplane blanking. Always check the Aircraft Flight Manual / Pilot Operating Handbook prior regarding the use of sideslips with other controls before flight.

LESSON PLANNING AND CONDUCT

Briefing

- A model glider is especially useful to illustrate sideslipping. If this is not available, ask the student to holding their arms out and imagine what is happening to the glider in a sideslip to assist them to 'internalise' the concepts.
- After the student has achieved the confident ability to fly with coordinated controls describe and demonstrate Sideslipping. Explain that sideslipping is a safe and useful skill to use when seeking to increase the rate of descent of the aircraft.
- A pilot's ability to confidently sideslip is potentially a useful technique to increase the rate of descent and can also be used in crosswind landings. If the student has seen a wing-down crosswind approach, then they have already seen a form of sideslip.
- Sideslipping results in a loss of significant lift generated by the wings as the relative airflow flows across the wing at an angle, hence the glider descends at a higher rate. The sideslip can therefore be used to provide a steeper descent path.
- When the aircraft is sideslipping the airflow into the airspeed indicator via the pitot tube is affected by the angle the fuselage is deflected from straight into the relative airflow. This affects the airspeed instrument reading so the pilot must rely on glider attitude to maintain a safe airspeed.

When sideslip may be of benefit

A sideslip may be of benefit in the following circumstances:

- On approach, flare and landing when visibility ahead is restricted by any combination of sun, rain and canopy haze. A slight sideslip (often with airbrake used normally) of as little as 5-10 degrees can be used to markedly improve forward visibility.
- In a descent when landing in a strong crosswind. In this situation, if the pilot holds the into-wind wing down, the slip into the wind assists with the rate of descent and helps offset the drift caused by the cross wind.

- To prevent a glider being sucked into a cloud using sideslip to enhance the sink rate if used in addition to full air brakes.
- Where the airbrakes are jammed closed (e.g., frozen closed from a high-altitude flight in wave).

Entering and recovering from a sideslip

- To enter a sideslip from straight and level flight:
    - Note the nose attitude for a safe speed.
    - Apply aileron to produce the desired amount of bank – the bank angle determines the descent rate in the sideslip and
    - Apply opposite rudder to prevent turning and maintain a constant heading.
- Note that this results in uncoordinated flight as indicated by the yaw string.
- There is a limit to the amount of sideslip, dependant on the effectiveness of aileron and rudder.
- Identify the track of the glider and ensure the required track is maintained by adjusting the amount of aileron and rudder used.
- The glider's attitude is controlled by use of the elevator as normal. It is important that prior to recovering from the sideslip that the nose attitude is returned to the original position. Note that the ASI does not work effectively in a sideslip so it cannot be used to monitor air speed.
- Sideslip is removed by first confirming a safe nose attitude and then rolling wings level with aileron and simultaneously removing the rudder input.
- In the sideslip the glider does not move in the direction the nose is pointing, but at an angle to the nose on the same side as the lower wing. This must be allowed for when planning to straighten up onto a specific heading.

Sideslip for Landing

- Most gliders have excellent airbrakes so sideslip is not usually required.
- Sideslip can increase the descent rate which can help if a steep approach over high obstacles is required.
- If a very high rate of descent is experienced, recovery must be commenced in time to arrest the rate of descent to a level that is appropriate for landing.
- In the sideslip the forward wing tip is much closer to the ground, so you need to recover at a higher height than a normal round out.
- In a crosswind landing using sideslip, the lower wing is angled into the wind. This reduces the size of the angle required to correct the drift compared with the alternate approach (upper wing into wind).
- Ensure all drift is corrected prior to touch down otherwise wheel damage is possible/likely.
- In post-solo training, prior to outlanding endorsements assessments, it is good to confirm and if necessary, consolidate a student's sideslipping ability as this can enable them to:
    - descend more quickly, if necessary, to land in smaller paddocks over tall trees etc., or
    - land safely if they have misjudged their height or discovered too late that the surface they are landing on has a downward slope.

- Sideslipping is a potentially useful skill, but its use comes with some risk. Flying the approach with coordinated controls and airbrake is the best option if this suits the circumstances. Problems that might occur in using sideslip on approach are:
    - If the attitude is nose high on recovery you risk an immediate stall, an uncommanded nose drop and resulting collision with the ground.
    - If the nose attitude is lower than normal on recovery you will have a much higher airspeed than expected/required, so you risk needing to adjust airbrakes at low altitude and an extended landing distance - which may defeat the reason for doing the sideslip in the first place.

Flight Exercises

Demonstration at height:

- Trainer demonstrates sideslip, pointing out control movement to establish.
- Note the heading and track and nose attitude prior to commencing the sideslip.
- Demonstrate adjusting the amount of slip and adjusting rudder to stop the turn.
- Demonstrate the limit of slip, usually when the glider turns.
- Demonstrate that ASI readings are not useful.
- Recover from the sideslip by removing the bank and the yaw.
- Note the heading and track and nose attitude are back to their original position. Confirm that the airspeed has returned to normal.
- Handover control to the student and guide them through the sideslip. If necessary, they can follow you through on the controls.
- Direct student to vary the nose attitude and then return to the original attitude before recovering.
- Note the airspeed at recovery.
- Demonstrate converting a straight sideslip to a turning sideslip and a normal turn into a slipping turn.

Demonstrate and practice on landing

- Once the student has mastered the sideslip at height you can introduce its use on landing.
- If used in a crosswind approach, demonstrate the lower wing into crosswind (as per a wing-down crosswind landing).
- There are potential risks with this so don't rush and don't demand compliance if they are struggling.
- Focus on maintaining track on the landing path.
- Focus on correct nose attitude prior to recovering from sideslip.
- Recovery at 300' AGL is sufficient followed by a normal landing with airbrakes. Continuing the exercise below this altitude will increase risk, particularly with low experience or uncurrent students.
- Ensure situational awareness of wing relative to the ground and accurate control of nose attitude.

Notes

- Skilled demonstrations by the instructor are essential:
  - Emphasise gradual application of the controls.
  - Be vigilant, ready to take over on first signs of mishandling when sideslips are used on final approach.

COMMON PROBLEMS

Problem	Probable Cause
• In sideslip glider's actual track deviates from desired track.	Student may not understand that glider heading and track will be different in a sideslip. Use a glider model to illustrate the flight path in a sideslip and the difference between heading and track.
	Student is not noticing deviation from desired track or has not applied correction to aileron to vary sideslip in that direction. Instructor can demonstrate use of sideslip to fly along a variety of tracks and how changes to control inputs affect the glider's achieved track.
• Glider emerges from sideslip at high airspeed.	Student may not be monitoring nose attitude in the sideslip or assuming a lower attitude is required. Ask student to assess attitude during sideslip entry and exit.

THREAT AND ERROR MANAGEMENT

- Instructor needs to be current with sideslip landings.
- Ensure correct nose attitude is achieved.
- Monitor lookout and situational awareness throughout practice.
- Set and observe personal minima.

TRAINING MATERIALS AND REFERENCES

- Model Glider for Briefing.
- Pilot Guide GPC Unit 28.
- Australian Gliding Knowledge.