

# Gliding Australia Training Manual

## Pilot Guide



### Unit 28 Sideslipping

## Unit 28 - Sideslipping

### WHAT THIS UNIT IS ABOUT

To develop your ability to confidently utilise the Sideslip to increase your descent rate.

### WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- 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

### KEY MESSAGES

- Maintaining a sideslip to a low level just prior to round out is NOT recommended unless you are very experienced, current at sideslipping and competent.
- 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.

### PILOT GUIDE FOR THIS UNIT

- The purpose of a sideslip is to steepen the approach path and increase the rate of descent without increasing speed. For sailplanes without airbrakes or spoilers, the sideslip is the only method of approach path control. Such machines are rare nowadays.
- Some early-generation fibreglass gliders have fairly weak airbrakes and, combined with their very flat glide-angles at the normal approach speed, accurate glidepath control can be difficult. In such sailplanes the sideslip can be a useful aid to supplement the airbrakes, especially in out-landings.
- It is recommended that the manoeuvre be practiced at height using a line reference and then used on approach when some skill has been achieved.
- 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.

#### Entering 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 track.

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- 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.
- The speed in a sideslipping approach should be exactly the same as in a conventional approach. Unfortunately, the nose-mounted pitots fitted to most modern gliders have very large errors in a sideslip and the airspeed indicator is useless in the manoeuvre. It cannot be relied on and therefore should not be used.
- You can maintain an accurate speed in a slipping approach by keeping the nose in the same attitude as for a conventional approach. Because of the dynamics of a sideslip, this will require a slight backpressure on the stick.
- The greater the sideslip angle, the greater the nose-up attitude required and the greater will be the backward stick movement. But as already mentioned, gliders have strong spiral instability and are unable to sustain a sideslip at more than about 10 degrees of bank, so a slip with a pronounced nose-up attitude will not be necessary. This limitation ensures that a high rate of descent in a sideslip cannot be sustained in a glider.

### Recovering from a sideslip

- 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. Maintain a constant attitude by relaxing the backpressure on the stick.
- In the sideslip the glider does not track in the direction the nose is pointing, but at an angle to the same side of the nose 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 (ideally by 300' AGL).
- 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 slip compared with the alternate approach (upper wing into wind).
- Ensure all drift is corrected prior to touch down otherwise wheel damage is possible/likely.

### Failure to establish the correct nose attitude

- If the attitude is nose high on recovery you risk an immediate stall, an uncommanded nose drop and resulting collision with the ground.

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- 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.

### Slipping Turn

- The sideslipping turn may be demonstrated from the sideslip by either increasing the bank or reducing the rudder, so that the glider turns towards the lower wing. Your instructor may demonstrate that a normal turn may be turned into a slipping turn.
- In a slipping turn, as distinct from a straight sideslip, it will be necessary to adopt a higher nose attitude than in a normal turn. This is because the rate of descent in a slipping turn can be very high, much higher than in a straight sideslip and some of the downward velocity resolves itself into an increased forward speed. Hence the high nose attitude. It is obvious that the practice which is necessary to determine exactly how high the nose should be raised must be gained at altitude before it is tried on an approach.
- It must be realised that in a well-developed sideslip it takes some time and loss of height to reduce the rate of descent as recovery is made. This is even more so in the case of a slipping turn.
- Full allowance must be made for any likely wind gradient and recovery must always be made at a reasonable height otherwise it is easy to misjudge and put a wing tip into the ground.
- Sideslipping with spoilers or airbrakes out will usually cause a buffeting on the elevator. Some glider types suffer a strong nose-down pitch when sideslipped with the airbrakes extended. This pitching motion may not be correctable unless the airbrakes are retracted. Your instructor will ascertain whether such a manoeuvre is permissible on the type (see type handling notes) and explore the extent of the buffeting and/or any unusual or undesirable behaviour over the sideslip and speed range before giving instruction.

## FLIGHT EXERCISES FOR THIS UNIT

- Your instructor will demonstrate a sideslip at height, pointing out control movement to establish.
- You will note the heading and track and nose attitude prior to commencing the sideslip and then observe the amount of slip and adjustment of the rudder to stop the turn.
- You will also see a demonstration of the limit of slip and the nose attitude raised to a point higher than a normal stall. It will be pointed out that the airspeed indications will be very inaccurate.
- The recovery will be demonstrated noticing the airspeed when back in balanced flight.
- Then it will be your turn to practice.
- Once you have flown a sideslip at height you will be then shown how to use it when landing.

### When sideslip may be of benefit

- 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.

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- 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.

## THINGS YOU MIGHT HAVE DIFFICULTY WITH

### COMMON PROBLEMS

- The unusual “feel” of the manoeuvre and the nose attitude.
- Balancing aileron and rudder to achieve the desired effect.

## HOW DO YOU DEMONSTRATE COMPETENCE?

- Demonstrate the steps required to enter and exit a sideslip.
- 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 to the left and right and return to normal coordinated flight.

## RESOURCES & REFERENCES

- Australian Gliding Knowledge Pages 140-141

## SELF-CHECK QUESTIONS

Use these questions to test your knowledge of the unit.

- When would sideslipping be beneficial?
- If sideslipping in a turn, would the nose be higher or lower.
- Is the airspeed accurate during a sideslip.