

Gliding Australia Training Manual

Pilot Guide



Unit 29 Steep Turns

Unit 29 - Steep Turns

WHAT THIS UNIT IS ABOUT

To develop the skills and knowledge to perform steep turns in a glider (60° of bank).

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- GPC Unit 8 - Sustained turns, all controls
- GPC Unit 26 - Competence for first solo

COMPLEMENTARY UNITS

Nil.

KEY MESSAGES

- Ability to maintain nose attitude during turn is critical.
- Lookout is more difficult under 2G or more loading.
- Steep turns can result in stalls or spiral dives if not conducted correctly.
- High G loading for prolonged periods may lead to blood loss to the upper body with resulting grey-out or black-out of flight crew.

PILOT GUIDE FOR THIS UNIT

- This unit will give you the ability to safely manoeuvre at bank angles that will assist you to thermal well, and to teach you how to recognise and recover from a spiral dive.
- A steep turn is no different to any turn of a lesser angle of bank save in degree as all control functions are the same.
- In previous lessons you have learnt that the stall speed increases with bank angle and the associated "G" loading.
- Hence as you can see from the table below, we need to commence the steep turn and maintain a speed comfortably above the stall speed for your bank angle.
- 60 degree stall speed is approximately 1.4 times your normal straight and level stall speed.

ANGLE OF BANK	'G' LOADING	TYPICAL STALLING SPEED (Knots)
0 degrees	1	33
10 degrees	1.02	33
20 degrees	1.06	34
30 degrees	1.15	35
40 degrees	1.2	38

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50 degrees	1.56	41
60 degrees	2.0	46
70 degrees	2.92	56
80 degrees	5.75	79

- Your instructor will demonstrate a steep turn from a medium turn, after selecting a suitable nose attitude for the required speed. Typically, 70 knots but will be confirmed with the Aircraft Flight Manual.
- You will notice that as the bank increases to the required angle (60 degrees) the nose position will be maintained with the elevator.
- You will note that considerable up elevator will be needed to maintain the nose position in a steep turn.
- Your instructor will explain that the High G loading and noise level may mask pre-stall warnings, so extra care is needed.
- Care must be taken to maintain the attitude. If the nose is allowed to drop the speed will build up very rapidly and the glider could enter a spiral dive. If this occurs then the recovering action is to reduce the backpressure on the stick and reduce the angle of bank with the ailerons.
- It's also important that you maintain an effective lookout while turning at this rate! The G Loading makes moving your head more difficult, but you must make the effort.

FLIGHT EXERCISES FOR THIS UNIT

Your flight instructor will:

- Demonstrate a steep turn.
- Point out the speed and angle of bank, and higher G Loading.
- Explain the need for use of back elevator to maintain attitude.
- Demonstrate a recovery to level flight.
- Demonstrate the recovery actions from a spiral dive.
- You will then practice steep turns.

Notes

- If you are competent at 45° bank turns, you should find this relatively easy. Practice turns at increasing angles of bank before trying proper steep turn.
- Application of coordinated aileron and rudder should be smooth and progressive. Larger aileron movement requires commensurate larger rudder pedal movement. Steeper turns will require more back-stick pressure to maintain nose attitude.

THINGS YOU MIGHT HAVE DIFFICULTY WITH

- Maintaining the nose attitude at 60 degrees.
- Maintaining an effective lookout.

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HOW DO YOU DEMONSTRATE COMPETENCE?

- You demonstrate the ability to enter a steep turn (60 degrees), maintain and recover to level flight.

RESOURCES & REFERENCES

SELF-CHECK QUESTIONS

Use these questions to test your knowledge of the unit.

- What is the "G loading in a 60-degree bank.
- What is the normal stall speed of your glider? So what would you expect the stall speed to be at 60 degrees bank?
- How do you recover from a spiral dive.