



GLIDING NEW ZEALAND INCORPORATED

ADVISORY CIRCULAR
AC 2-13

MOUNTAIN & RIDGE SOARING
SAFETY PRINCIPLES

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1 Introduction

It is recognised that glider accidents occurring in mountain and ridge soaring are the most unforgiving in terms of fatalities or serious injuries to pilots, and destruction of gliders. This is true both in NZ and internationally.

Between 1998 and 2022 in NZ, 14 of the 23 fatalities in glider accidents (61 %) involved terrain impact in mountains or ridges.

Generally, the gliders involved were written off, at least for insurance purposes.

GNZ wants to reduce the incidence of such accidents and seeks to:

- Instil a good appreciation of mountain and ridge soaring safety principles in pilots early in their training, and
- Refresh and review understandings of the principles by pilots as opportunities present, including pilot discussions, Biennial Flight Reviews (BFRs) and briefings / clearances for cross-country flights.

GNZ will maintain on its website (Training > Safety Information) best practice information and articles on safety. Included amongst these is the series on Threat and Error Management, and Safety in Mountain Flying. In particular, the article “Ten Traps in Ridge Flying” is a compilation of lessons learned from NZ fatal accidents. Also, the CNVV treatise on mountain flying contains more detailed explanations than this Advisory Circular and is well worth studying by new and experienced pilots alike.

2 Safety Principles

- **Safe speed**
Always maintain a safe speed near the ground. In mountain soaring, the appropriate speed changes from moment to moment. The need to fly slowly to stay in the lift can suddenly change to a need to fly fast enough to enable maneuvering away from the ridge. How fast is fast enough depends on the actual conditions and the glider type and water ballast carried. In turbulent conditions add additional speed to ensure controllability in roll. The wind speed needs to be assessed at the ridge at the relevant altitude.
- **Turn away**
Always make the first **turn away from the ridge/terrain** and use a medium angle of bank.
- **Early decisions**
Decisions to continue to turn towards terrain should be made early when flying parallel to the ridge so as to **preserve the turn away option**. Decisions need to be made during each and every turn until at a safe height above terrain. It is helpful to verbalise the decision to commit to the turn.
- **Co-ordination**
Never over-rudder. As with thermalling, the tail of the slip string should point slightly to the outside of the turn. With this slipping to the inside of the turn, the glider is unlikely to drop a wing on stalling but more likely to fall into an increased sideslip that is easier to control and recover from.
- **Escape route**
Always have an escape route planned that leads to lower terrain immediately, with a safe landing area.

- **Crossing ridges**
When crossing a spur or saddle, **the closer you are to the terrain the more oblique the crossing angle needs to be** in order to preserve the turn back option.
- **Dangerous hill tops**
Beware of flying low and slow over gently contoured hill tops that have wide rounded areas. They may look benign and tempt one to carry on circling over them if the lift further out is weak or broken, but they can catch you out if you encounter sink for whatever reason. If you need to escape, you may not be able to out-glide the terrain.
- **Beware illusions**
Proximity to ridges presents risks of **false horizons** and distance **judgement**. Don't be trapped by false impressions of airspeed and or pitch attitude when flying downwind toward the ridge.
- **Severe turbulence**
Severe turbulence is quite common in the mountainous regions of New Zealand, especially if the wind strengths are high. However, severe turbulence can also occur in even moderate winds due to local effects from gusts, ridge shape, rotor etc. At times it can become difficult to retain controllability and flying within the safe operating limits of the glider. Getting low in the mountains on such days can put you in a seriously compromised situation. It is essential to have good escape plans for wherever you are.
- **Right of way**
When flying with others in the mountain it is of vital importance to consider rights of way. Be aware of where others are and keep a good lookout.
- **Risk of collision**
Collision has become a high risk in the mountains, especially when wave flying as the closing speeds can be very high. It is unlikely that you will have time to react, as from spotting an aircraft head-on you are typically only a couple of seconds to a potential collision. Also, when there is a snow background sometimes it is almost impossible to see other gliders. Although FLARM is extremely useful in these situations, you should not rely on it and should use radio to have a clear picture of where others are and to let them know where you are.
- **Strong wind days**
Consider your ability on strong wind days. Drift is likely to be an issue and needs to be closely monitored. It can be quite insidious at high altitude where the wind is usually a lot stronger. When well above terrain in wave, it is easy to be caught out by significant drift taking you away from your intended path. Just because others are flying does not mean it is safe for your level of experience and ability.
- **Circling near the hill**
It is vitally important when considering circling near a hill that you consider the risk of sudden loss of height if sink is encountered. Many mountain flying accidents have occurred due to insufficient margin when circling near the hill. Both horizontal and vertical separation needs to be considered along with drift due to wind. Circling against slopes (as opposed to figure of eights) is potentially hazardous, particularly in weak climbs. In these conditions, there is a constant need to closely monitor drift and push out from the slope for a few seconds on each turn. Figure of eights should be used if you have any doubt, carefully watching your drift and always turning away from the hill.

3 Students

Students will be introduced to these safety principles early in training as a soaring pilot. These principles will serve developing pilots well as mountain and ridge soaring experience and skills develop.

4 Qualified Pilots

Appreciation and observance of these safety principles will enhance enjoyment of mountain and ridge soaring throughout flying. Opportunities should be taken to refresh understandings and flying practices at pilot discussions, BFRs and briefings.

5 Instructors

Instructors have a key role to play in supporting students and pilots with good briefings and development or confirmation of good flying practices.

Opportunities should be taken when conducting BFRs for pilots to refresh appreciation of these safety principles. This may be achieved at briefings / debriefings and in ridge flight when opportune.

Briefings for pilots flying under supervision should refresh on the safety principles before any solo consolidation flight is approved in the vicinity of ridges.

Obviously, instructors should be experienced and current in mountain and ridge soaring to provide credible support to pilots.

6 Flight Following

For flight following purposes, pilots should make their general intentions known by chatting to other pilots in the vicinity and/or by regular position reports to club base if possible. Use of a GPS flight tracking device (such as a SPOT messenger) is highly recommended, particularly if the area to be flown is likely to be outside VHF radio or FLARM tracking coverage.

Club Standard Operating Procedures (SoPs) should cover the need to actively log all position reports received.

7 Competitions

Unconscious “continuation bias” is an ever-present hazard in competition flying. This cognitive tendency to continue with the task despite soaring conditions worsening is particularly relevant to mountain flying. Before flying solo in competitions based at mountain sites, particularly in the South Island, pilots must have recent experience in similar environments. Visitors to NZ, even if they are experienced, should first fly with a local mountain soaring instructor to gain adequate familiarisation with the area.

References:

GNZ Website: Training > Safety Information

<https://gliding.co.nz/pilots/training/safety-information/>