CAA OCCURRENCE 22/204

SCHEMPP-HIRTH DISCUS-2b

ZK-GZP

DEPARTURE FROM CONTROLLED FLIGHT

OMARAMA

17 JANUARY 2022

Photo nzcivair.blogspot.com

Foreword

New Zealand's legislative mandate to investigate an accident or incident are prescribed in the Transport Accident Investigation Commission Act 1990 (the TAIC Act) and Civil Aviation Act 1990 (the CA Act).

Following notification of an accident or incident, TAIC may open an inquiry. CAA may also investigate subject to Section 72B(2)(d) of the CA Act which prescribes the following:

> **72B Functions of Authority**
>
> (2) The Authority has the following functions:
>
> (d) To investigate and review civil aviation accidents and incidents in its capacity as the responsible safety and security authority, subject to the limitations set out in section 14(3) of the Transport Accident Investigation Commission Act 1990

The purpose of a CAA safety investigation is to determine the circumstances and identify contributory factors of an accident or incident with the purpose of minimising or reducing the risk to an acceptable level of a similar occurrence arising in the future. The safety investigation does not seek to ascribe responsibility to any person but to establish the contributory factors of the accident or incident based on the balance of probability.

A CAA safety investigation seeks to provide the Director of Civil Aviation with the information required to assess which, if any, risk-based regulatory intervention tools may be required to attain CAA safety objectives.

Contents

Tables

Figures

Annex

Glossary of abbreviations

AL	Alps region
AMSL	above mean sea level
AWS	automatic weather station
BFR	Biennial flight review
C	Celsius
CAA	Civil Aviation Authority
CAR	Civil Aviation Rule(s)
CFI	Chief flying instructor
E	east
ft	foot or feet
GPS	Global Positioning System
GRAFOR	Graphical Aviation Forecast
Km	Kilometre
NZDT	New Zealand Daylight Time
PMO	Principal Medical Officer
S	south
T	true
UTC	Coordinated Universal Time
VHF	very high frequency

Data summary

Aircraft type, serial number and registration:	Schempp-Hirth Discus-2b, s/n 59, ZK-GZP
Number and type of engines:	N/A
Year of manufacture:	2000
Date and time of accident:	17 January 2022, 1415 hours[1] (approximately)
Location:	Near Omarama Latitude[2]: S 44° 31' 14.8" Longitude: E 169° 57' 36.1"
Type of flight:	Private
Persons on board:	Crew: 1
Injuries:	Crew: 1 fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Gliding New Zealand Qualified Glider Pilot Certificate
Pilot-in-command's total flying experience:	1071 hours total, 914 on type
Investigator in Charge:	Mr C Grounsell

[1] All times in this report are NZDT (UTC + 13 hours) unless otherwise specified.

[2] WGS-84 coordinates

Executive summary

On Monday 17 January 2022, at approximately 1500 hours, the Civil Aviation Authority (CAA) was notified that ZK-GZP (GZP), a Schempp-Hirth Discus 2b glider, had crashed on Mount Saint Cuthberts, approximately two nautical miles south-south-west of Omarama aerodrome. Emergency services personnel who reached the scene of the accident found that the pilot had not survived. A CAA field investigation was commenced the next day.

On the day of the accident, the pilot's intention was to conduct a flight in the local area. The glider was launched by an aerotow from Omarama aerodrome and then observed intermittently by the crew of another glider to be ridge flying in an area locally known as 'the nursery'. It was also noted by the crew that at that time, GZP was flying very close to the ridge.

Shortly after this sighting, the wreckage of GZP was observed on the ridgeline by the glider crew who then raised the alarm via VHF radio.

The CAA investigation determined that the accident occurred due to a departure from controlled flight when the glider's airspeed became too slow, resulting in an aerodynamic stall and spin entry. There was insufficient height available for the pilot to effect a recovery before GZP struck terrain.

As a result of the CAA investigation into the pilot's previous occurrences and accidents, the CAA published an article in the CAA Vector magazine (Winter 2023) titled 'Everybody Knew'. The article discusses examples where people may be aware of poor piloting performance or risk-taking and provides advice about appropriate action to address this.

1. Factual information

1.1 History of the flight

1.1.1 On the morning of the day of the accident, the pilot had attended the daily weather briefing held at the aerodrome. The briefing included weather conditions expected for the day.

1.1.2 At approximately 1350 hours, the pilot of GZP commenced an aerotow from the aerodrome. The pilot of the tow plane reported that the glider pilot released from the tow above Black Peak located one nautical mile south-south-west of the aerodrome, approximately 1800 feet above the aerodrome elevation.

1.1.3 Operating in the vicinity of GZP at the same time, was another glider with an instructor and student onboard. The student observed another glider flying below them and commented to the instructor, "Look at that glider, it seems very low".

1.1.4 The instructor recognised the glider as GZP. The glider was observed to be manoeuvring slightly west of the Nursery Ridge and did not seem to be higher than the top of the ridge. It was also apparent from the glider's shadow that it was flying very close to the ridge. It appeared to the instructor that the pilot of GZP was trying to find lift in the weak thermal conditions.

1.1.5 The instructor and student were watching GZP intermittently while they themselves were trying to find thermals. As they commenced a turn, the student saw what he suspected to be an aircraft that had crashed on the ridge.

1.1.6 The instructor and student then repositioned their glider closer to the site of the crashed aircraft and confirmed that it was a glider that had crashed, and they estimated that the crash looked unsurvivable. The instructor then transmitted a ‘PAN PAN’ call on the local radio frequency to raise the alarm.

1.1.7 Emergency services personnel who reached the crash site at approximately 1515 hours confirmed that the crashed glider was GZP and that the pilot had not survived the accident.

1.1.8 The accident occurred at approximately 1430 hours, two nautical miles south-south-west of Omarama aerodrome, at an elevation of approximately 2727ft amsl, latitude S 44° 31' 14.8", longitude E 169° 57' 36.1".

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Other*
Fatal	1	0	0
Serious	0	0	0
Minor/None	0	0	

Table 1: Injuries to persons

1.3 Damage to aircraft

1.3.1 The glider fuselage forward of the leading edge of the wings sustained severe damage. The outer sections of the wings also exhibited severe damage from contact with terrain. The aft fuselage fractured immediately forward of the fin, which resulted in a complete separation of the tailplane from the glider.

1.4 Other damage

1.4.1 Nil.

1.5 Personnel information

Flying hours	All types	Relevant type
Last 24 hours	5.6	5.6
Last 7 days	5.6	5.6
Last 30 days	17.2 (inc 2.5 for BFR)	14.7
Last 90 days	17.2 (inc 2.5 for BFR)	14.7
Total hours	Approximately 1071	Approximately 914

Table 2. Pilot flight hours

1.5.1 The pilot, aged 72 years, held a Gliding New Zealand Qualified Pilot Certificate (QGP). The pilot’s Gliding New Zealand Medical Declaration and Certificate could not be located during the investigation. However, the instructor who conducted the pilot’s biennial flight review (BFR) on 01 January 2022, stated that the medical certificate was current.

1.5.2 Prior to taking up gliding, the pilot had considerable hang gliding experience, having flown hang gliders for approximately 15 to 20 years in both the United Kingdom and New Zealand. He had competed in a number of hang gliding competitions, and it is estimated by a close friend of the pilot, that his flight time on hang gliders would be approximately 1000 hours. He stopped flying hang gliders in 1995.

1.5.3 The pilot commenced glider flying in April 2003 and had accrued approximately 1071 hours gliding experience, with approximately 914 hours on the single-seat Schempp-Hirth Discus-2b glider.

1.5.4 The pilot's gliding logbook reflected that the pilot first flew GZP in November 2007 and he continued to fly the glider regularly until 2014. From 2014 onwards, the pilot's flying became more sporadic, typically only flying over four months during the summer season. The pilot then took a break from flying between 30 November 2019 and 07 December 2020, then another period of inactivity occurred between 24 January 2021 and 01 January 2022.

1.5.5 On 01 January 2022, the pilot successfully completed his BFR at Omarama in a Schemmp-Hirth Duo Discus glider, logging a flight time of 2.5 hours.

1.5.6 Following the BFR, the pilot carried out a further five flights in GZP, totalling 14.7 hours. The pilot also flew GZP on the day before the day of the accident, logging a flight time of 5.6 hours.

1.5.7 A few days prior to the accident, the pilot of GZP had spoken with a glider pilot who was also a gliding instructor. The pilot of GZP mentioned that he had received a 'fright' when GZP stalled and dropped a wing while he was ridge flying. When asked by the instructor at what airspeed the pilot was flying GZP, he replied that he was flying at 45 knots. The instructor thought that this speed was too slow and suggested that the pilot should increase his airspeed to prevent an inadvertent stall.

1.5.8 The day before the accident flight, the pilot had spoken with a close friend regarding a landing incident three days prior, where the pilot had approached to land in GZP at a very low airspeed. Observers watching the landing were concerned as they thought that GZP was about to stall. The pilot admitted to his friend that he had "landed it like a hang glider" during the landing.

1.6 Aircraft information

1.6.1 Schempp-Hirth Discus-2b, serial number 59, was manufactured in Germany in 2000. In 2005, the glider was imported into New Zealand from the USA and registered as ZK-GZP. The last annual maintenance inspection and annual review of airworthiness was completed on 24 November 2021. At this time, GZP had flown 1332 hours since manufacture.

1.6.2 The Schempp-Hirth Discus-2b Flight Manual for GZP states that intentional spins are prohibited. The manual states that the loss of height from the point at which recovery is initiated, to the point at which horizontal flight is first regained, can be about 394 to 492ft without water ballast. Spin recovery is effected by the normal use of opposite control inputs.

1.6.3 The Flight Manual also states that the loss of height during a wings-level stall until regaining normal level flight is up to 131ft, and for a stall in turning flight, the height loss is up to 164ft.

1.7 Meteorological information

1.7.1 The MetService area forecast for the AL (Alps) region, current at the time of the accident, forecast a five knot north-westerly wind at 3000ft, increasing to a 10kt westerly wind at 5000ft, but winds no more than 5kts at 7000 and 10,000ft. The GRAFOR cloud forecast was for scattered cloud (3-4 octas), cloud base 6000-8000ft, with tops above 10,000ft. Refer MetFlight weather briefing at Annex A.

1.7.2 At 1400 hours local time, the automatic weather station (AWS) at Pukaki aerodrome 16NM north of Omarama (the closest AWS to Omarama), recorded; Wind 270°T/6kts 230V330°, Viz 20Km, Cloud few 15,000ft, Temperature 29°C. It is likely that the weather conditions in the Omarama area would be very similar to those recorded at Pukaki aerodrome.

1.8 Aids to navigation

1.8.1 Not applicable.

1.9 Communications

1.9.1 GZP was fitted with a Becker VHF radio. No radio calls were either heard or recorded from GZP, which indicated it was unlikely the pilot had encountered an inflight issue, or he just may not have had time to make a call.

1.10 Aerodrome information

1.10.1 Not applicable.

1.11 Flight recorders

1.11.1 GZP was fitted with a FLARM[3] system which would typically record and send GPS flight data to a ground-based computer. However no flight data was recorded, likely due to the firmware in the FLARM not being current.

1.12 Wreckage and impact information

1.12.1 The accident occurred on the Mount Saint Cuthberts ridgeline which is known by local glider pilots as the 'Nursery Ridge', approximately two nautical miles south-south-west of Omarama aerodrome.

[3] The Flight Alarm system (FLARM) is designed to warn the pilot of the presence of other aircraft in the vicinity.

Figure 1: ZK-GZP location on ridge (CAA photo)

1.12.2 GZP struck the ground in a near vertical attitude, right wing first and slightly inverted. The forward fuselage and cockpit area up to the leading edge of the wings were destroyed. Refer figure 2.

1.12.3 Following the initial impact, the glider travelled a further six metres down the slope before coming to rest inverted.


Figure 2: Accident site (CAA photo)

1.12.4 All parts of the glider were accounted for at the accident site. Although there was considerable disruption to the control mechanisms and control surfaces due to the impact forces involved in the accident, pre-impact control integrity was established as far as possible. As far as could be determined, all damage was attributed to impact overload failure when the glider struck the ground.

1.12.5 All instruments from the cockpit area were destroyed, as were the air brake and trim controls. No useful information could be gained from these to help the safety investigation.

1.12.6 Inspection of the glider's wing structure showed no evidence of hydrostatic deformation. It is considered unlikely that the glider was carrying water ballast in the wings at the time of the accident.

1.13 Medical and pathological information

1.13.1 Post-mortem examination revealed that the pilot died of blunt force trauma injuries consistent with a high-energy impact.

1.13.2 Toxicology tests detected trace levels of alcohol in the pilot's blood of 11 milligrams per 100 millilitres. For comparison purposes, the legal blood alcohol limit for a New Zealand driver 20 years and over is 50 milligrams per 100 millilitres. Trace levels of alcohol of less than five milligrams per 100 millilitres may be due to means other than deliberate ingestion. However, the toxicology report states that; "It is possible that all the alcohol detected was produced post-mortem".

1.13.3 The pilot's medical records were obtained from the medical centre where the pilot was registered. The records were reviewed by the CAA Principal Medical Officer (PMO) who provided the following comment:

"It is much more likely than not that the alcohol level was due to post-mortem decomposition. If it was due, or partially due to ingestion, the blood alcohol level was not likely to have significantly impaired the pilot's ability to fly his glider.

There was no evidence of any medical or toxicological condition that could have contributed to the accident".

1.14 Fire

1.14.1 Fire did not occur.

1.15 Survival aspects

1.15.1 Although the pilot was wearing a parachute, there would have been insufficient height and time available for him to use this prior to GZP striking the ground.

1.15.2 The pilot was restrained in the glider by a combined lap and shoulder harness. However, the impact forces during the accident sequence were not survivable.

1.16 Tests and research

Human factors

1.16.1 A well-known human factor that can affect pilots in emergency situations is the 'startle effect'. SKYbrary defines startle effect as:

"An uncontrollable automatic reflex that is elicited by exposure to a sudden, intense event that violates a pilot's expectations."[4]

[4] Startle Effect: Refer www.skybrary.aero/index.php/Startle_Effect

1.16.2 SKYbrary also highlights the effects and consequences for a pilot who may be experiencing startle effect:

1. Slower information processing.

2. Serious impairment, or complete inability to evaluate and take appropriate action due to intense physiological response.

3. Basic motor response disruption for up to three seconds.

4. Performance of complex motor tasks impacted for up to ten seconds.

5. A brief period of disorientation and confusion.

1.16.3 SKYbrary lists 'aircraft upset', which includes stall and spin, as one of the potential situations where the startle reflex and response may occur.

1.16.4 A pilot who flies different types of aircraft can be at risk of 'negative habit transfer'. In the aviation context this is the transfer of habits or responses from one aircraft type, where they are appropriate, to another aircraft type, where they are not appropriate. This creates a potential threat to safe aircraft operation.[5]

2. Analysis

2.1 Examination of the glider at the accident site eliminated, as far as practicable, any defect, control malfunction, or weight and balance anomaly which may have affected the operation of the glider. The nature of the damage to the glider from the impact with the terrain, suggests that the glider struck the terrain while in a spin.

2.2 On the day of the accident, light winds were forecast with initial weak thermal activity, then thermal intensity increasing later in the afternoon due to surface heating. This was confirmed by the glider pilots flying in the vicinity when the accident occurred. However, the thermals were weak, proving difficult for the pilots to find adequate rising air for their flight.

2.3 The pilot of GZP released from the towplane at approximately 1800 feet above Black Peak. By doing so he was well short of the best-known lift source which was in the vicinity of the Nursery Ridge. Given the forecast weak lift conditions, it would have been prudent for the pilot to have remained on tow for a longer period towards the ridge, arriving at a higher altitude, thereby allowing a greater margin if he encountered difficulties.

2.4 The reason the pilot elected to release from the aerotow early couldn't be determined. It is possible that he may have been trying to minimise the cost of the aerotow, or he may have been too optimistic regards the lift conditions, and thought he had sufficient skill to gain height from the lower release altitude. Following the release from the aerotow, the pilot then elected to continue flying lower and slower, rather than abandoning the flight and returning to the aerodrome.

2.5 The gliding instructor flying close to GZP at the time of the accident thought that GZP was flying in very close proximity to the Nursery Ridge. It was likely that the accident pilot was similarly having difficulty finding lift due to the weak thermal activity.

[5] Negative habit transfer: Refer to Wikipedia Negative transfer (memory)

2.6 The pilot had previously spoken with a gliding instructor with regards to inadvertently stalling GZP on an earlier flight. It is highly likely, that during the accident flight while attempting to find lift, the pilot has again allowed the glider's airspeed to reduce below the minimum required to avoid an aerodynamic stall resulting in the glider departing from controlled flight. The glider then most likely entered a spin with insufficient height for the pilot to recover before striking the terrain.

2.7 By operating in close proximity to the Nursery Ridge, it was unlikely that a successful spin recovery could have been carried out in the height available, even if the correct recovery procedures had been followed. The information contained in the Flight Manual for GZP states that the expected height loss during a stall recovery could be as great as 164ft or for a spin recovery, 492ft. This aspect, combined with the likelihood of startle effect, may have impeded a timely recognition and recovery of the situation.

2.8 It is apparent from the pilot's comment to his friend that "he flew it [GZP] like a hang glider" during the landing incident, that he was reverting to his previous hang glider flying skills. This may have been due to negative habit transfer. This human error is more likely to occur under stressful situations in flight, such as trying to find lift or landing. A hang glider is capable of flying at much lower airspeeds, which would not be appropriate for the safe operation of a glider such as GZP.

2.9 During October 2022, GlidingNZ published a document on the GlidingNZ website titled *Ten Vicious Traps in Ridge and Mountain Flying,* refer Annex C. The document describes, and provides guidance on, a number of known traps which can catch a pilot out when flying on a ridge or during mountain flying.

2.10 A review of the pilot's occurrence history held by the CAA revealed a number of reported occurrences with regards to his previous flying activities:

- July 2010 struck trees,
- December 2011 landed gear up,
- November 2019 heavy landing.

In addition to the above occurrences, a document was received by the CAA after the accident written by a gliding instructor. The document compiled a number of concerns made by several gliding instructors regarding the pilot's flying abilities.

2.11 The concerns related to apparent erratic flying, poor judgement, getting slow when ridge flying, and failing to accept responsibility for the errors in his flying. The pilot's reputation was such that certain gliding clubs would not accept him as a member, with one refusing to allow the pilot to fly solo in club-owned gliders. The CAA has a process whereby an aviation related concern (ARC) can be submitted to the CAA where there are concerns with an individual's safety performance. The CAA will consider the concern, with the Director being able to undertake administrative action where necessary.

2.12 For the pilot to fly his own glider, he was required to be a member of a gliding club or organisation affiliated to GlidingNZ. The gliding organisation at Omarama aerodrome where the pilot had conducted his BFR, had registered the pilot as a member. The owner of the organisation was aware of the pilot's past flying occurrences and concerns by the incumbent GlidingNZ regional operations officer. However, after the successful BFR, the pilot continued to fly as a member of the organisation, logging a further 14.7 hours flight time up until the time of the accident.

3. Conclusions

3.1 The pilot released from the aerotow lower than would have been prudent for the forecast thermal conditions at the time.

3.2 Due to negative habit transfer, the pilot may have reverted to his previously learned hang glider flying skills, likely flying GZP at a low airspeed.

3.2 While manoeuvring GZP close to terrain, the glider stalled and entered a spin.

3.3 There was insufficient height available to recover from the spin prior to GZP striking terrain.

3.4 Startle effect may have compromised the pilot's ability to react to the stall and spin entry.

3.6 The subsequent impact with the ground was not survivable.

3.7 No pre-accident aircraft defect, or weight and balance anomaly was found.

3.8 Examination of the pilot's medical records by the CAA PMO, did not disclose any medical history that would have been likely to affect his ability as a glider pilot.

4. Safety actions/recommendations

4.1 As a result of the information regarding the pilot's previous occurrences and relevant accidents, the CAA's Engagement, Education, and Communications team produced an article titled 'Everybody Knew', published in CAA's Vector magazine (Winter 2023).
The article discusses examples where people may be aware of poor performance or risk-taking, and provides advice about appropriate action to address this. The article is attached as Annex B to this report.

Report written by:

Colin Grounsell

Mr C Grounsell
Investigator - Safety
Date 29/01/2024

Authorised by:

Ms Dianne Cooze
Manager Investigation and Response Unit

Civil Aviation Authority of New Zealand
Level 15, Asteron Centre
55 Featherston Street
Wellington 6011
OR
PO Box 3555, Wellington 6140
NEW ZEALAND

Tel: +64-4-560 9400
www.caa.govt.nz

Annex A

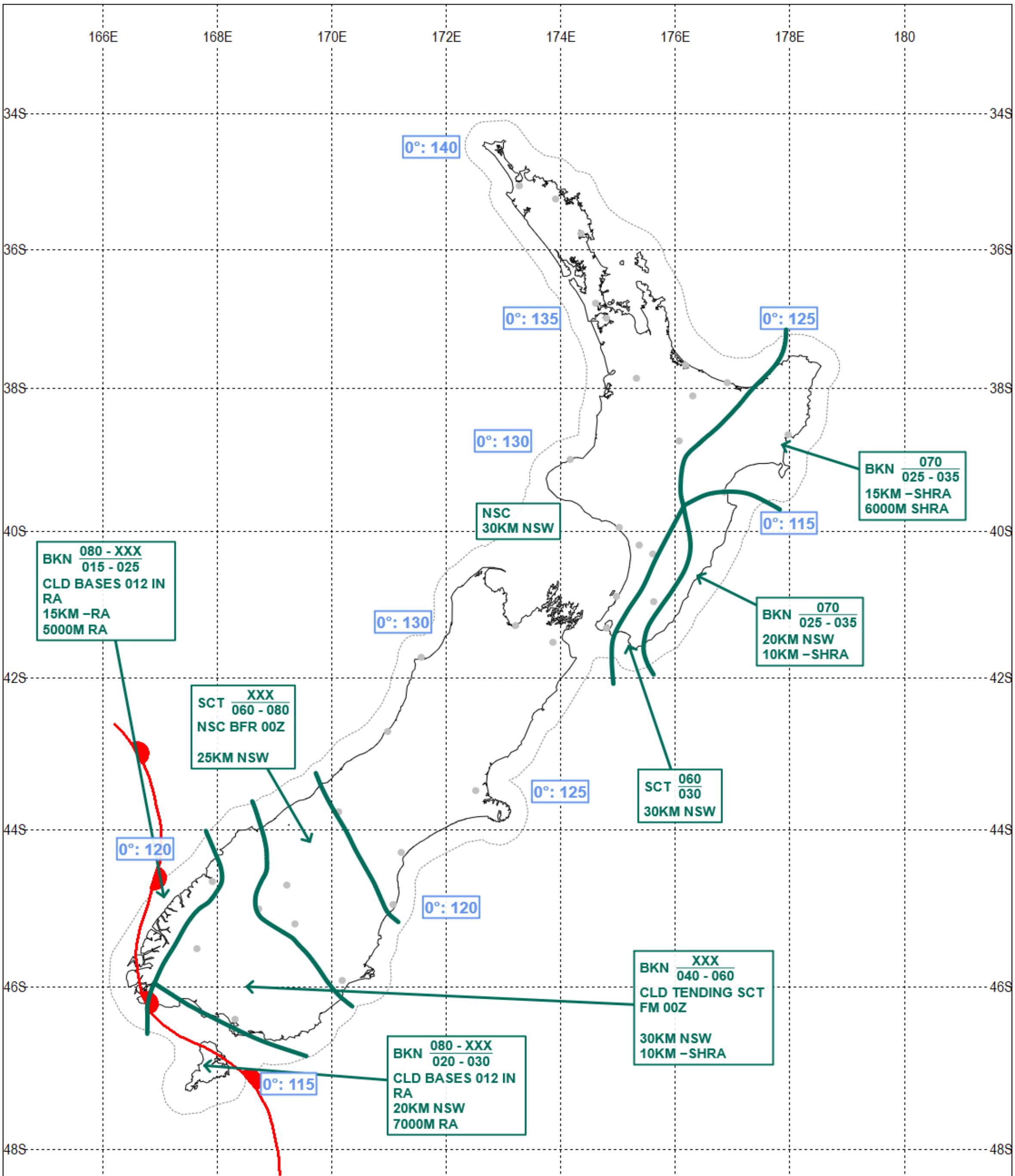
MetFlight Weather Briefing

Commercial Aviation Weather Briefing

METFLIGHT

2022-01-17 02:33:34Z

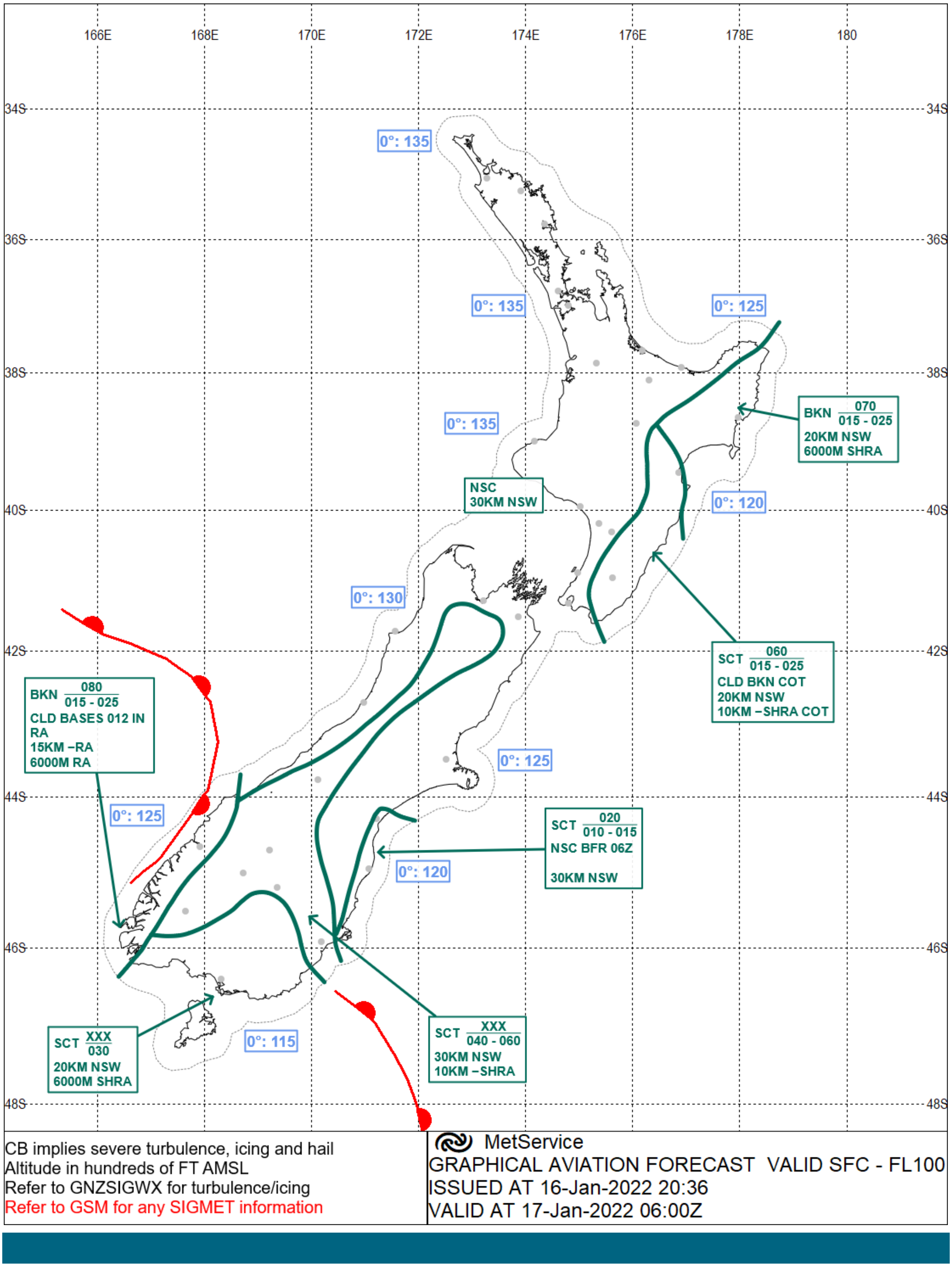
Graphical Aviation Forecast



CB implies severe turbulence, icing and hail
Altitude in hundreds of FT AMSL
Refer to GNZSIGWX for turbulence/icing
Refer to GSM for any SIGMET information

MetService
GRAPHICAL AVIATION FORECAST VALID SFC - FL100
ISSUED AT 16-Jan-2022 20:36
VALID AT 17-Jan-2022 00:00Z

Graphical Aviation Forecast


166E
168E
170E
172E
174E
176E
178E
180
34S
36S
38S
40S
42S
44S
46S
48S
0°: 135
0°: 135
0°: 125
0°: 135
0°: 120
0°: 130
0°: 125
0°: 125
0°: 120
0°: 115
BKN 070 / 015 - 025
20KM NSW
6000M SHRA
NSC
30KM NSW
SCT 060 / 015 - 025
CLD BKN COT
20KM NSW
10KM –SHRA COT
BKN 080 / 015 - 025
CLD BASES 012 IN RA
15KM –RA
6000M RA
SCT 020 / 010 - 015
NSC BFR 06Z
30KM NSW
SCT XXX / 030
20KM NSW
6000M SHRA
SCT XXX / 040 - 060
30KM NSW
10KM –SHRA
CB implies severe turbulence, icing and hail
Altitude in hundreds of FT AMSL
Refer to GNZSIGWX for turbulence/icing
Refer to GSM for any SIGMET information
MetService
GRAPHICAL AVIATION FORECAST VALID SFC - FL100
ISSUED AT 16-Jan-2022 20:36
VALID AT 17-Jan-2022 06:00Z

AAW Listings

NOTE: ALL HEIGHTS IN FEET AMSL (WIND:TRUE/SPEED:KT)

AL: *issued 16-20:52 UTC - VALID 2100 TO 1200 UTC*

```
 AVIATION AREA AL VALID 2100 TO 1200 UTC
  BECOMING                  0800-0900
  3000       32005
  5000       28010 PS11     20005 PS12
  7000       VRB05 PS08
 10000       28005 PS03
```

Graphical NZ SIGWX

TAF Listings

NOTE: ALL HEIGHTS IN FEET ABOVE AD LEVEL (WIND:TRUE/SPEED:KT)

NZWF:

```
TAF NZWF 162224Z 1623/1711 26005KT 30KM FEW060
 BECMG 1700/1702 32010KT
 BECMG 1706/1708 25005KT
 2000FT WIND 32010KT
 BECMG 1706/1708 VRB05KT
 QNH MNM 1009 MAX 1018
```

NZLX:

```
TAF NZLX 162224Z 1623/1711 VRB02KT 30KM FEW040
 BECMG 1705/1707 18012KT
 PROB30 TEMPO 1705/1710 7000 SHRA
 BECMG 1709/1711 VRB02KT
 2000FT WIND 32010KT
 BECMG 1701/1703 VRB05KT
 QNH MNM 1009 MAX 1018
```

NZMC:

```
TAF NZMC 162224Z 1623/1711 18005KT 30KM SKC
 2000FT WIND VRB05KT
 QNH MNM 1010 MAX 1019
```

METAR Listings

NOTE: ALL HEIGHTS IN FEET ABOVE AD LEVEL (WIND:TRUE/SPEED:KT)

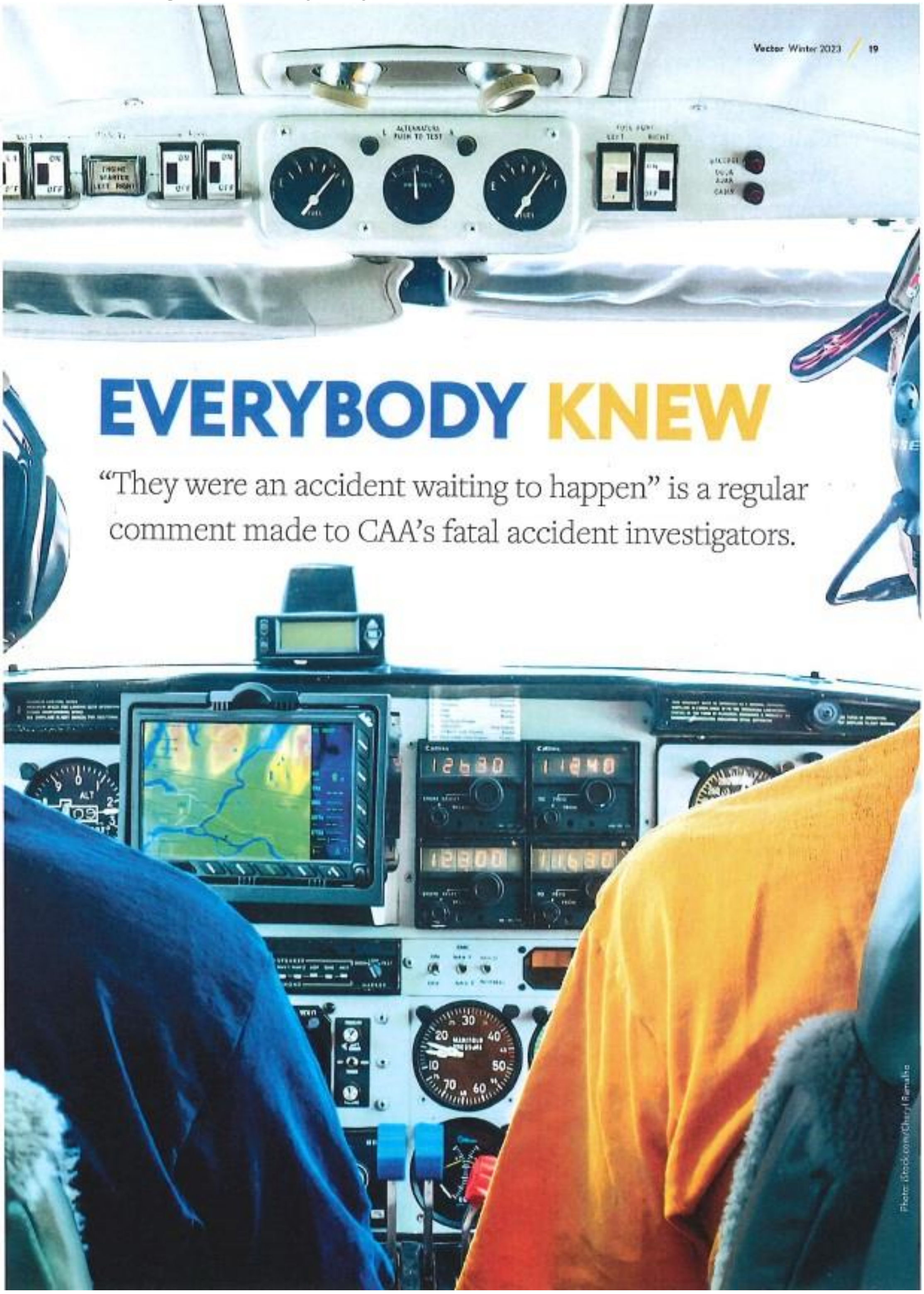
NZUK:

```
METAR 170200Z AUTO 26003KT 20KM NCD 29/01 Q1011
METAR 170130Z AUTO 23003KT 20KM NCD 29/M01 Q1012
METAR 170100Z AUTO 27006KT 230V330 20KM FEW150/// 29/M02 Q1012
METAR 170030Z AUTO 19003KT 20KM SCT150/// 27/01 Q1013
METAR 170000Z AUTO 22005KT 130V360 20KM NCD 27/01 Q1013
METAR 162330Z AUTO 26004KT 100V330 20KM NCD 26/05 Q1013
```


[redacted]

Annex B

CAA Vector magazine - Everybody Knew



"It makes really quite sad reading," says CAA Safety Investigator Colin Grounsell, of a document sent to him, detailing the lead-up to a recent fatal flight.

The document was put together by a senior instructor, outlining the deceased pilot's history and the attempts made to alter his approach to safety.

Colin says, "It appears he had been known quite widely for unsafe flying. And there had been attempts by fellow pilots – and clubs – to guide him into safer flying.

"I guess everybody hoped they could change his decision-making, but in the end, sadly, they couldn't."

The document's author says he, and his fellow instructors, have to keep their finger on the pulse of what's happening at their organisations.

"Sometimes, a pilot regularly infringes safety because they're failing to appreciate their own lack of knowledge – often of conditions – or skill in managing those conditions with appropriate margins for safety.

"But you have some influence over someone in their biennial flight review. Don't conduct just a 20-minute flight – if you and others have had concerns, make it an hour, or two hours. Challenge them, don't make it just a box tick.

"Sometimes it's hard to understand what challenges some pilots have, without a thorough BFR. This can be true for both low-hour pilots, and those who've reached the later years of their flying careers.

"Hence the importance of standards within organisations, and good assessment procedures."

// It appears the deceased pilot had been known quite widely for unsafe flying. //

The instructor suggests that pilots, worried about the flying of a colleague, but unwilling to speak to them themselves, could tell a duty instructor.

"And, if nothing happens, you could approach the CFI.

"But the best way, probably, is to talk to them yourself."

How to approach

It's never easy, however, to try to influence a fellow pilot's flying, says CAA Safety Investigator Lou Child. "But it can be done in roundabout ways.

"Flying communities are quite tight. You could perhaps approach someone you know is a friend of the pilot concerned, and say, 'Hey, you're a good mate of theirs, how do you feel about talking to them about this? We've seen this and think they might need a bit of help. You might think the same thing'.

"Or maybe you go flying with them, and talk about what's happening and why it's happening, during the flight.

"So, getting the message through may be difficult but can be done, especially through connections."

In handling a non-responsive pilot, Nelson Aviation College Safety Officer, Jackie Day, called on CAA Aviation Safety Advisor Carlton Campbell to talk to them.

"This pilot really respected Carlton so he did respond to Carlton's intervention," she says.

And even an innovative approach could work.

Some years ago, when he was safety officer for a flying organisation, the senior instructor, highlighted earlier, observed a Part 149 pilot using an inadequate homemade wooden seat in his aircraft.

"I realised the safety risk of this seat, so I just jumped on it and broke it! Just recently I met that pilot at a reunion. He told me that, once he'd stopped being angry, he really respected me for what I'd done.

"He realised it was better I broke it on the ground, than it broke mid-flight."

Reluctance to dob in a mate

Saying something, either to the pilot concerned, or about them to someone else, can feel uncomfortable, confronting, and daunting, says CAA Chief Advisor of Human Factors, Alaska White.

"But try thinking about what you want to do in a different way – so, from 'dobbing in a mate' to what it really is, which is expressing care and concern for someone else's safety and wellbeing."

The senior instructor, who wrote the document about more intervention in poor flying, says people should not worry about 'dobbing in a mate'.

"I'd rather dob someone in – even if that puts a friendship on the line – than have them involved in a fatal, when I had done nothing to prevent that."

We should have done something

Flight Examiner Willie Sage told *Vector* that some years ago, a line pilot of his acquaintance was involved in a fatal CFIT accident.

The general manager who'd been employing that pilot observed, after the accident, that he'd had problems with the pilot and was about to take them offline.

"I wish I had," he said to Willie, who says that comment has stayed with him ever since.

Willie told the aviation YouTube™ channel *Kiwi Tales*, that over the years, he's been in charge of a lot of people and has had the responsibility of deciding whether or not they should go flying.

"If you have that gut feeling that you're not happy about someone, or you're worried, you've got to act on it.

"It's no good thinking, 'Oh yeah, that guy had issues, we should have done something about that'."

Jackie Day has a similar regret. Some years ago, a convoy of visiting pilots caused "a bit of havoc" as they joined at Motueka.

"It was clear they weren't prepared for landing at Motueka, but I didn't say anything because I remember just being thankful that everybody had got on the ground safely, including our students.

"Eventually the convoy left but ended up having an accident at another aerodrome. And I kind of wonder to this day if I could have prevented that, by having a chat with them. Maybe it might have encouraged somebody to think twice about what they were about to do and kept them safe in the long run."

So how do you say this?

North Shore Aero Club CFI, Daryl Gillett, says pilots who repeatedly push the margins of safety are a "huge issue".

But when he has to deal with such a pilot, he takes an educational approach.

"Most people are naturally defensive if someone corrects them, even gently, about their flying.

"But you can avoid that reaction if you couch the 'correction' as information. Maybe objectively dissect what's happening, like, 'I noticed you turned to the right after take-off. I'm wondering why you did that? To be safe, it's really important we make left-hand turns because...'.

"Then they understand the reason for the advice, and that it's more about education than 'you broke the rules, and you're going to be penalised'.

"If you're aggressive and threatening, or voicing 'I think you...' type opinions, you'll almost certainly fail to resolve the issue, and the other pilot will be reluctant to listen to advice in future."

Jackie Day takes the same educational approach.

"It's really important to get all the information you can first, before you start talking to a pilot about their flying.

"And it's important those questions are asked in a non-confrontational way, like, 'What do you think happened out there? What was going on for you guys?'"

Jackie gives this illustration of getting information first.

"A pilot joined our circuit when it was really busy. They cut off a few aircraft, had quite a close call, and they made some very poor radio calls.

"And I did go over to talk to them, to find out as much as I could first. It turns out they'd actually had an engine failure and their passenger was trying to make the radio calls, while the pilot was desperately aviating the aircraft to the ground.

"This is just a one-off, of course, but it shows how you don't know what's going on with people if you don't gather your information first."

Alaska White has other tips.

"Try explaining why you feel the way you do about their flying. Or get them thinking beyond themselves – hit them with some 'home truths' about the effect on family, friends, and fellow pilots, if something terrible were to happen to them.

"Make any alternative to continuing the flight that you come up with, beneficial to them. Like asking, 'What's the rush? Wait it out because it's better to get there safe and unharmed'."

Alaska says there's "power in numbers".

"We often think of peer pressure as a bad thing, but a number of people voicing their concerns can be effective in getting someone to change their mind about flying in poor conditions.

"Or you could try calmly asking the person to explain their decision and the reasoning behind it. When they have to explain themselves out loud, often people come to appreciate the reality of what they plan to do."

When they won't listen

Some fatal accident reports in the CAA's archives illustrate how sometimes fellow pilots have tried to intervene, say, with an offer of a bed for the night (VFR into IMC) or directly observing to the pilot concerned how dangerous a particular manoeuvre they just carried out was.

But, tragically, the recipient of that advice and help has sometimes just been determined to do it their way.

"You can't chain someone to a post and force them to stay on the ground," says Alaska White.

"At the end of the day, people will do what they want to do and what they think is right for them at the time.

"But it's better to say something and try to persuade a pilot of a different course of action, than to wish you had."

CAA intervention

It's easier for an aero club or flying school to prevent someone flying, if that person needs to hire an aircraft. This has happened, and the occasional flying school has been known to terminate a student's training contract for repeated poor flying.

But if nothing seems to be working, contacting the CAA is an option – some would say the last option. And to be clear, that doesn't mean the CAA will respond with punitive action.

In fact, the flight examiners who're part of the CAA's licensing and standards team have had real success in mentoring pilots who've previously been struggling to fly safely.

"In one particular case, we saw repeated occurrence reports coming through, including from Airways, about one pilot," says Lou Child.

"So our licensing and standards team rallied, and acting proactively, did some one-on-one mentoring of the pilot concerned.

"It turned out the pilot wasn't deliberately flying unsafely, but had learning needs that, once understood, were mitigated with a different form of instruction.

"That was a real success. We no longer have any reports of unsafe flying or rules breaches by that pilot."

> // Hit them with some 'home truths' about the effect on family, friends, and fellow pilots, if something terrible were to happen to them. //

Annex C

GlidingNZ – Ten Vicious Traps in Ridge and Mountain Flying

Dedication

This document describes a number of traps that can catch a glider pilot out when flying on a ridge or in the mountains. Each trap has caused or contributed to the death of at least one glider pilot in New Zealand in recent years. This document is dedicated to the memory of those pilots.

Trap #1: Being in the Wrong Place for the Type of Lift

There is a difference between wind and thermal sources. If the lift is mainly caused by wind then the glider needs to be positioned where the vertical component of the wind vector is the strongest. If there is little or no wind then the glider needs to be positioned directly above the highest point on the ridge to pick up the thermal coming off the peak.

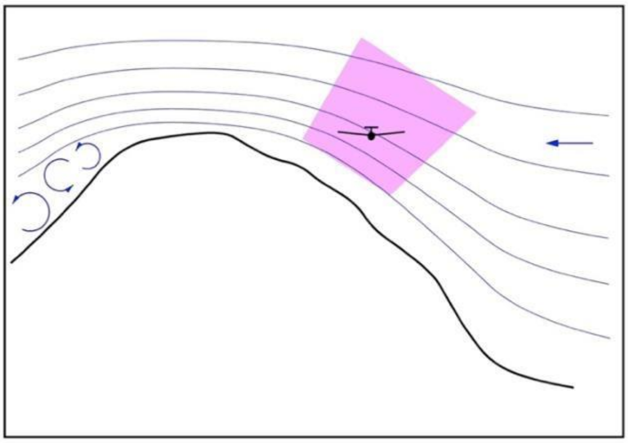


Fig 1: Ridge Lift in Moderate Wind

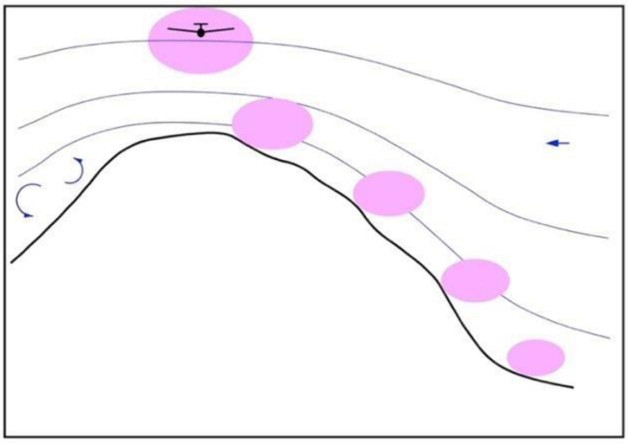


Fig 2: Thermal in Light Wind

Trap #2: Lack of an Escape Route to a Landable Area

Compare the drawings below. On the left the glider can easily leave the ridge and glide down into a wide valley where there are good landing options. On the right the glider is attempting to soar a ridge that is surrounded by ridges and gullies, and is so low there are no landing areas within gliding range. In addition the wind is turbulent due to the terrain upwind.

At some gliding sites there are certain areas over which experienced pilots would never fly - unless they had plenty of height to glide out to a landable area.

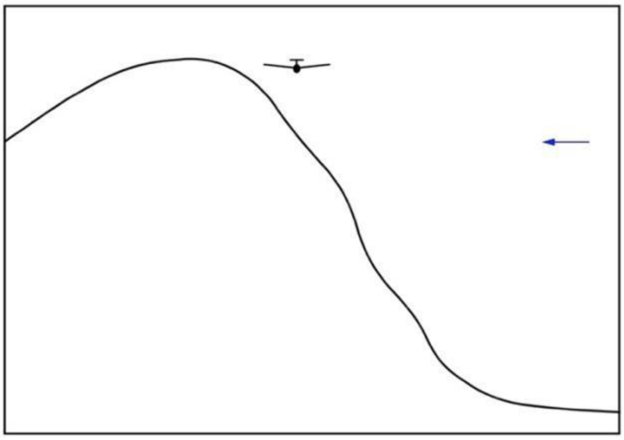


Fig 3: Escape Route Available

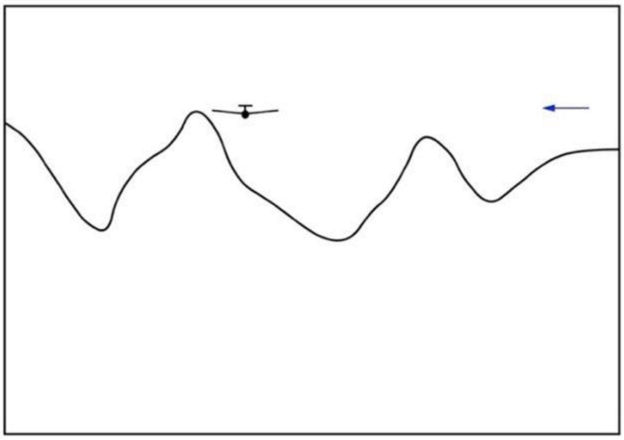


Fig 4: No Escape Route

Trap #3: Failure to Monitor Drift

When flying along the spine of a ridge the pilot has poor visibility straight down, and may not appreciate that the glider is being blown by the wind closer to the ridge, and possibly over onto the lee side. The glider must be pointed partly into wind to offset the drift. If the glider is slowed down then the angle into the wind needs to be increased to maintain position.

If the glider has been allowed to drift back close to the ridge then the pilot will need to dive into the headwind to regain position. Always keep the top of the ridge in view - through the side of the canopy, not directly ahead.

Trap #4: Sudden Loss of Energy

Always be prepared for a sudden loss of height or speed. Wind blowing against a ridge is not smooth - it would have been disturbed by travelling over uneven terrain upwind, plus being heated by ground at different temperatures. One exception is a coastal ridge, where the wind has travelled a long distance over the ocean, and turbulence has mostly died away. Inland ridges require greater caution, and ridges in the lee of other ridges or mountains demand the greatest caution of all.

The recommended safety margins are 200 feet above the terrain directly below you, combined with a minimum speed of 1.5 times the wings-level stall speed. In stronger conditions even greater margins are recommended.

Trap #5: Shallow Slope or Plateau

A shallow slope or plateau can appear "safer" than a steep slope, but this is not true. There is less lift obtainable from a shallow slope, and there is a danger of being unable to out-glide the terrain if the glider experiences a sudden loss of energy.

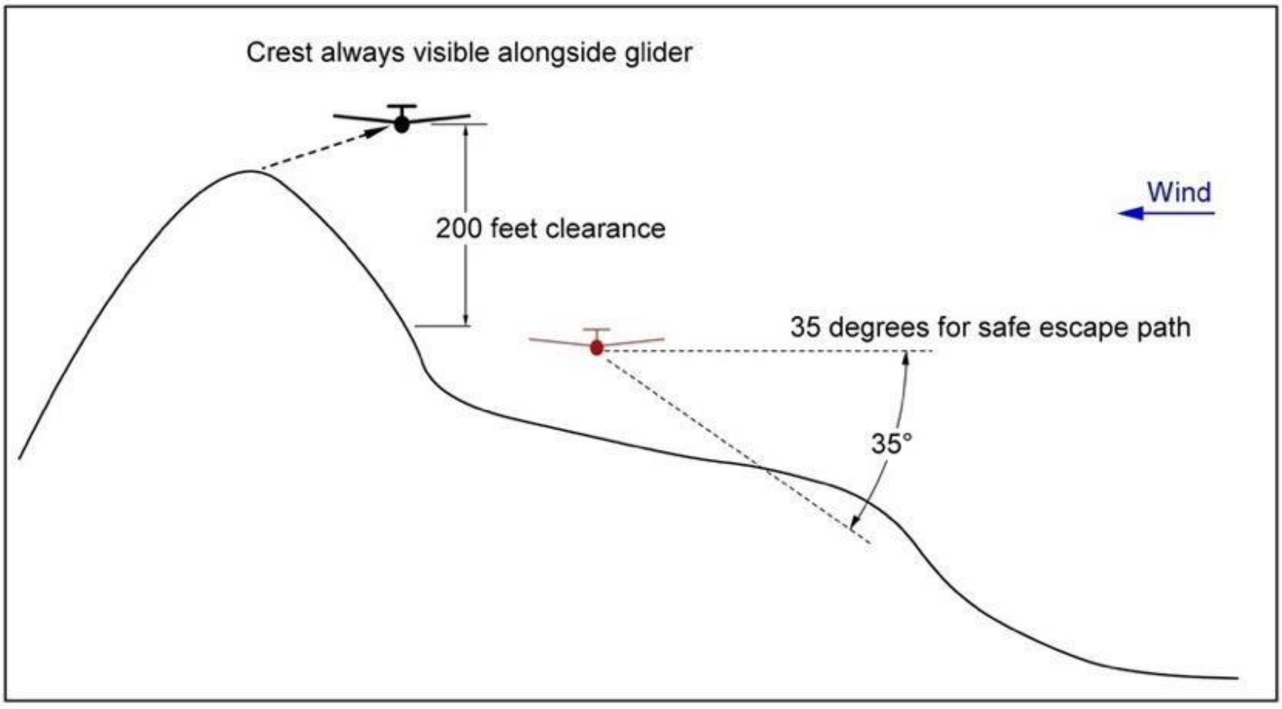


Fig 5: Safe Margins Flying Near a Plateau

Circling above a shallow slope can be particularly dangerous in the mountains. The photo below shows a fatal crash near the Siberia turn point.

Fig 6: Site of Fatal Crash Near Siberia

Trap #6: Rounded Hilltop or Ridge

A thermal lifts off cleanly and predictably from a sharp peak. Soaring over a rounded peak or uneven summit is hazardous, because any thermal over it can be difficult to locate. While hunting for it - with the inevitable surges and sudden energy losses - the pilot may find they are no longer able to glide clear of the hill, or the the glider could be overpowered by a gust under one wing.

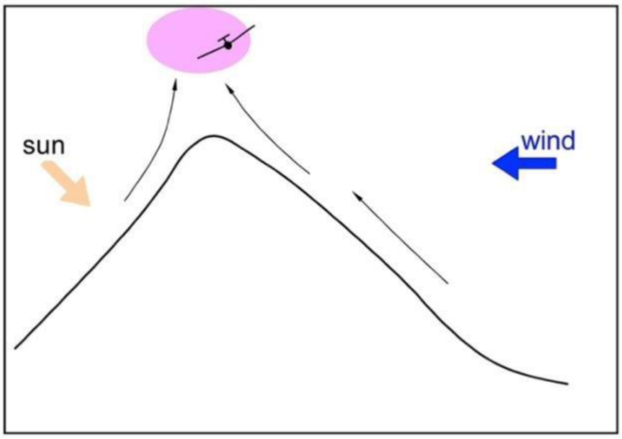


Fig 7: Thermal Above a Sharp Peak

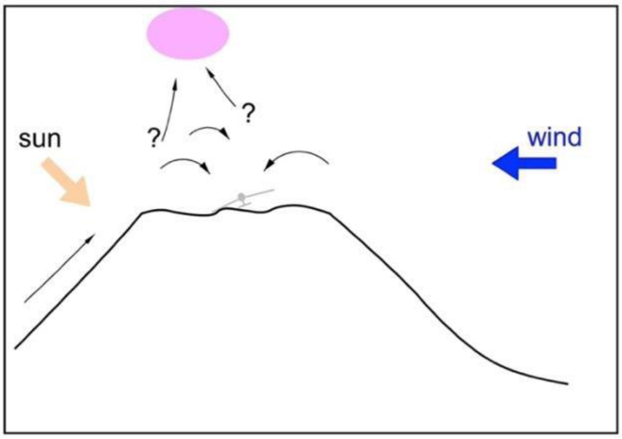


Fig 8: Thermal Above Uneven Summit

Trap #7: Ailerons Overpowered by Differential Lift Force

A difference in lift force can occur between each wing of a glider. This can force the glider into an uncommanded roll (or roll-over), and the ailerons may not be powerful enough to overcome this, especially at low airspeed. If you are between a thermal and the hillside then the differential lift force could roll you towards the hill.

Another possibility is when the airspeed over each wing is very different and you are making a steep turn. This could happen after flying downwind onto a ridge and arriving at ridge-top height. The wind 100 feet above the ridge-top will be moving much faster than wind closer to the ground. The different wind speeds over each wing will cause a differential in lift, especially at high angle-of-attack, which could be so strong that full aileron deflection may not be enough to counteract it.

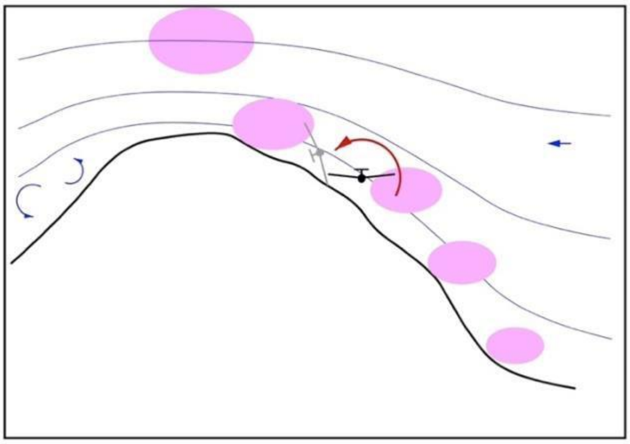


Fig 9: Thermal Gust Can Roll a Glider

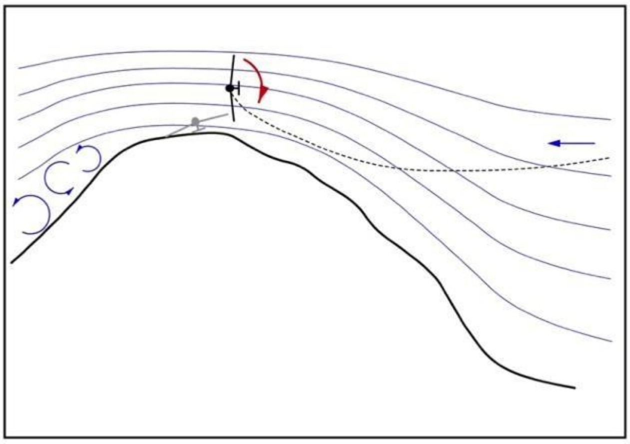


Fig 10: Strong Wind Gradient at Ridge Top

There's a deeper and even more vicious trap hidden inside the uncommanded roll or wing drop. If full opposite aileron is applied to recover then it's possible that the outer part of the lower wing (the part affected by the aileron) will stall because the down-going aileron increases the angle-of-attack of that part of the wing.

The result - which always puzzles the pilot - is that the low wing doesn't come up at all. Instead, it drops even further, while the increased drag from the stalled condition causes the glider to yaw towards the low wing. This trap aggravates the uncommanded turn into the slope.

Refer to *Wing Drop Stall and Recovery* in the Pilot Training Program for more information on the correct recovery, including a video of a glider crash due to exactly this cause. This is why speed and height margins are so necessary when ridge flying.

Trap #8: Reduced Visibility or Poor Depth Perception

The usual culprit is cloud or mist, which can obscure or reduce visibility. Orographic cloud can quickly form upwind of any slope with just a slight change in wind speed, direction or humidity. An existing cloud can "jump forward" and quickly envelop an unsuspecting pilot.

Other causes of reduced visibility, which make it harder or impossible to see the ridge, include flying directly towards the sun (sun-strike), smoke (such as from Australian bush fires), snow and rain. Depth perception can be distorted by snow-covered slopes because of the lack of features. A heavy overcast sky can mean a lack of shadows on the ground, which can have a similar effect. Pilots can fly too close, too low or too slowly under such conditions.

Fig 11: Orographic Cloud with Passing Showers

Trap #9: Late Decision to Stop Circling

In this fatal crash the pilot was circling to the right without gaining any height, but was drifting towards the mountain. After five circles he started to roll the glider from a right turn to a left turn. There was a sudden loss of energy due to leaving the thermal (even though it was weak), plus the glider now had a tail wind component which had the same effect as a gust from behind. The turn away from the ridge was started too late, and took longer than expected. The sudden loss of energy meant that the pilot was unable to complete the turn before the glider impacted the ridge. If the pilot had kept turning to the right it was estimated that he would not have hit the mountain.

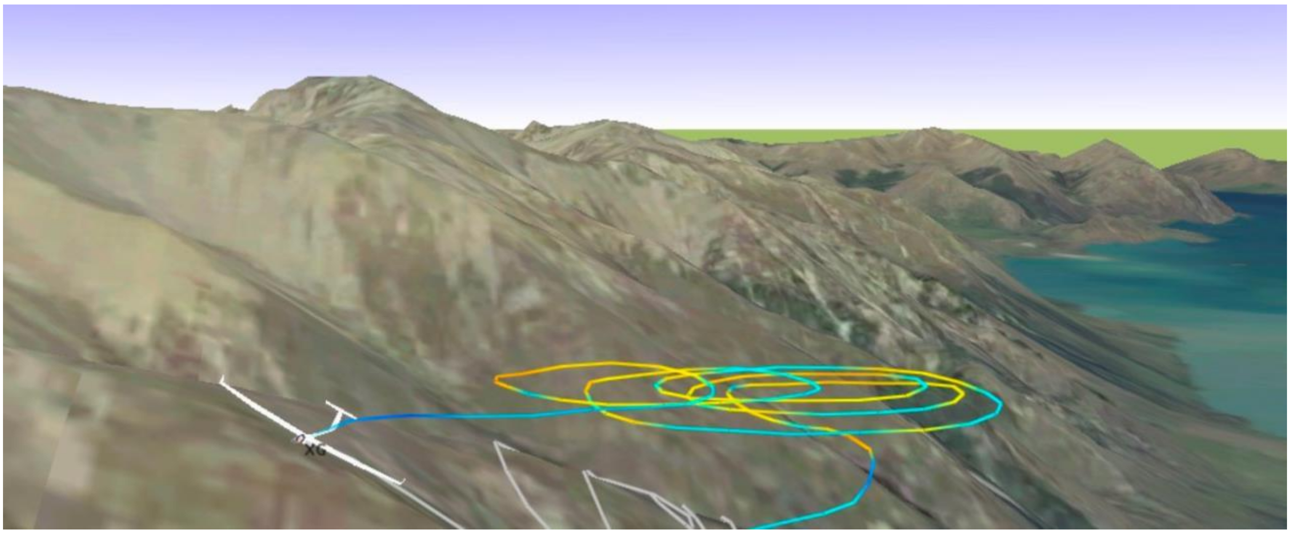


Fig 12: Late Decision to Stop Circling

Trap #10: People Watching on the Ground

It's not unusual to encounter trampers or people on the ground when flying near a ridge. Despite the fact that you don't know these people, and they don't know you, there can be an impulse to "show off" or make a low pass over them. This amounts to an impromptu display, and pilots untrained in display flying can easily become distracted and make other mistakes or exercise poor judgement. Don't be tempted to show off.

Further Reading

Safety in Mountain Flying, CNVV, France. (English version)

Mountain and Ridge Soaring Safety Principles, Gliding NZ Advisory Circular AC 2-13.