

British Hang Gliding and Paragliding Association

REPORT

**Investigation of a Paragliding incident
which occurred at Tinto Hill, Lanarkshire
on 30th September 2011
in which the pilot suffered fatal injury.**

Introduction

On 30th September 2011 the British Hang Gliding and Paragliding Association (BHPA) received reports of an air incident at Tinto Hill, Lanarkshire that had resulted in the death of the pilot. The BHPA is authorised to carry out investigations into serious and fatal hang gliding and paragliding incidents by the Air Accident Investigation Branch of the Department for Transport and to produce reports under its delegated authority. The BHPA tasked Mr David Thompson, BHPA Senior Technical Officer, to investigate the incident and submit a report to the Flying and Safety Committee (FSC) of the BHPA for ratification.

BHPA investigation serial number: IR 11/094

Summary

On Friday 30th September 2011 at approximately 4pm, a BHPA Club Pilot rated pilot was attempting to fly his Ozone Swift paraglider at Tinto Hill in Lanarkshire. The pilot was seen to set up his equipment two-thirds the way down the slope in very windy and gusty conditions, but on launching was immediately forced to employ full speed bar and big ears in an attempt to penetrate into wind. He was seen to ascend and drift back before touching down on the top of the hill (out of sight of the witness) and being dragged by the wind across a dry stone wall suffering fatal injuries. The Investigation concluded that the incident occurred as a result of the pilot attempting to fly in extremely windy and gusty conditions and then losing control of his glider before colliding with a dry stone wall.

This document is confidential until ratified.

Date ratified by the BHPA Flying and Safety Committee: 29th March 2012

THE STRUCTURE OF THE REPORT

The structure of this report conforms to that recommended in the BHPA Technical Manual and is intended to follow the principles pertaining to AAIB reports. It is divided into five sections.

Section 1 - Factual information

Section 2 - Analysis

Section 3 - Conclusions

Section 4 - Safety Recommendations

SECTION 1 - FACTUAL INFORMATION

1.1 History of the flight

On Friday 30th September 2011 a paraglider pilot (Witness A) received a phone text informing him that his friend and flying partner (Pilot A) was intending to go to Tinto Hill in Lanarkshire with the intention of paragliding that afternoon. He then checked the weather station on Tinto, which was giving a wind-speed reading of 20mph gusting to 25mph. He decided to collect his paragliding equipment and go to the hill despite the apparent excessive wind speed, on the basis that his friend would already be there and better able to assess the weather conditions.

Whilst making his way to Tinto Hill, Witness A received a further message from Pilot A stating that Pilot A was preparing to fly and giving his radio frequency. When Witness A arrived at the site Pilot A was already in the air. The time was approximately 15.00-15.45. Witness A stated that he felt it was too windy for him to fly and that he would wait for the wind to drop before attempting to fly. At this time there was only one other pilot present on site. Witness B was in the bottom landing field practising ground handling with his new 'speed wing'. Witness B states that on arrival at the site he found the wind to be much stronger than expected and that it was also 'quite gusty'. He estimated the wind in the landing field to be 'about 20kts' (23mph).

Witness A contacted Pilot A using his radio. Pilot A reported that the wind was strong and that he had full speedbar (mechanism operated by foot pressure on a bar, to alter the angle of the wing thereby increasing forward speed) on. Shortly after this conversation Pilot A was seen to pull in 'big ears' (method of intentionally collapsing the wing tips to increase the wing loading and lower the angle of attack of the wing) as well as apply full speed bar. Witness A observed that, even with big ears and full bar, Pilot A did not appear to have any forward speed or noticeable descent rate. Witness A made one further radio transmission to Pilot A but states the response was "unreadable". At this point Witness A returned to his car to collect his jacket. When he returned Pilot A could not be seen. Witness A estimated that Pilot A was in the air for no more than 10 minutes and that it appeared that Pilot A was trying to get down throughout that time.

Witness B describes how he saw Pilot A take off and ascend rapidly to a height of approximately 100ft above the top of the hill. Witness B states that he saw Pilot A being thrown around by the turbulent air. He goes on to describe how Pilot A was 'slowly being blown back towards the top of the hill' despite the big ears and speed bar. Witness B describes how Pilot A appeared to land with the ears still in but with the left side of the wing collapsed a further 25-30%. By this time Witness B states that Pilot A was beyond the crest of the hill and therefore out of his line of sight though he could still see the wing as it sustained the collapse before it too dropped out of sight. Witness B estimates that Pilot A was in the air for approximately 10 to 15 minutes and that, in his opinion, he spent that time attempting to get down to land.

Having introduced themselves, Witness A and Witness B continued to chat unaware that Pilot A was in difficulties. After a while Witness A decided to take Pilot A's car and meet him further up the hill. Witness B continued his ground handling practice. Witness A eventually found Pilot A at approximately 17.00 on the top of the hill, approximately 80m behind the stone wall at the top of the hill. Pilot A did not appear to be breathing or have a pulse. The emergency services were called and both the police and air ambulance attended. Pilot A was pronounced dead at the scene.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	1	-	-
Serious	-	-	-
Minor / None	-	-	-

1.3 Damage to the aircraft

The paraglider was found to be in very good condition apart from some minor damage consistent with the incident.

1.4 Other damage

There was significant damage to an area of dry stone wall on top of the hill consistent with having been struck by a hard object. See Photo 1 below (all photos courtesy of Lanarkshire police).



Photo 1, showing damage to wall with police radio shown for scale.

Approximately two metres in front (on the south side) of the damaged part of the wall there was a gouge in the turf revealing the underlying rock, again consistent with a heavy impact. See photo 2 below.



Photo 2, showing damage to turf with police radio shown for scale.

Considering the ground marks, the damage to the wall and the nature of the injuries sustained by Pilot A, it is likely he crash-landed just in front of the wall before being dragged into and then over it by the strong, gusty wind.

1.5 Personnel information

Pilot A was a 55-year-old male weighing 94kg. He joined the BHPA as a full member on the 22nd August 2005. He carried out his paragliding hill training with the BHPA school Flying Fever, based on the isle of Arran and was awarded his BHPA Club Pilot (CP) rating on 12th October 2006. The school records show all training exercises completed and signed off in the training record book.

Pilot A kept a detailed log of his flying activity. The log shows that since gaining his CP he had flown a total of 93 hours and in a variety of countries including Bulgaria, Lanzarote and Tenerife in Spain. The log shows he flew 25 hours in 2007, 22 hours in 2008, 17 hours in 2009, 14 hours in 2010 and 6 hours in 2011.

1.6 Aircraft information

The paraglider was an orange and white coloured Ozone Swift, size large (100-120kg), serial number SNL-L-29A-015. It was manufactured on 7th September 2010 and certified as LTF 1/2 and EN B. The glider would have been considered the correct size and type for this pilot.

The harness was a Gin Gingo Air-Light with integral airbag, size large.

The pilot had a Gin One-G emergency parachute (size 42) attached to his harness. It was out of the harness container when examined but had not been deployed. It was of a correct size and type and had been correctly fitted.

The pilot was using a Brauniger IQ One alti-vario.

The pilot's helmet was an Apco Aviation, Air Extreme Cloud Chaser full-face helmet, certified to EN 966 for airborne sports. The helmet suffered significant damage in the incident consistent with one or more heavy impacts.

1.7 Meteorological information

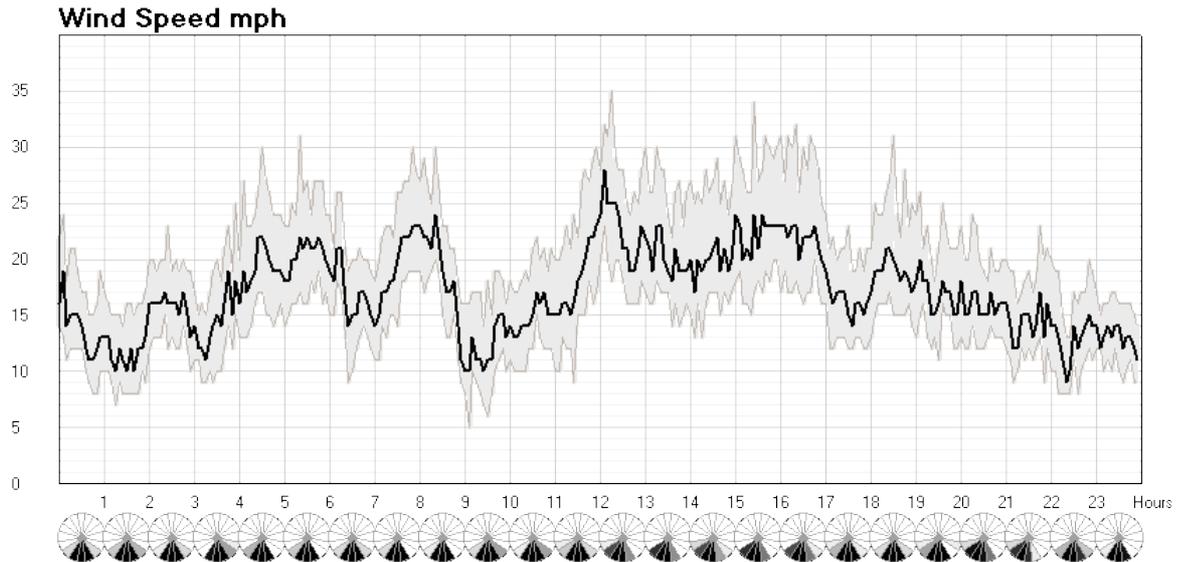
In general it was a fine day with a blustery south to southwesterly wind.

The Lanarkshire and Lothian paragliding club have a weather station on top of Tinto Hill. The opinion of the club members responsible for the weather station is that it reads accurately. The station records temperature, brightness, wind speed and humidity. On the day concerned the station recorded the following readings:

The temperature ranged from an overnight low of 14 degree Celsius to a high of just over 21 degrees Celsius at 12.15pm. Between 12.00 and 17.00 the temperature fluctuated between 20 degrees Celsius and 18 degrees Celsius. The variation can be attributed to the fluctuation of cloud cover as indicated by the fluctuations on the brightness graph. Relative humidity for the same period remained a constant 65%.

Wind speed varied significantly throughout the day. At times during the morning the wind averaged only 10mph. However, from 9.30am onwards the wind strength gradually increases with a peak average of 28mph (gusting to 35mph) at 12.15. During the period Pilot A was in the air, sometime between 15.00 and 16.00, the average wind speed was between 22 and 24mph with gusts well in excess of 30mph.

The graph below, taken from the weather station, shows the average wind speeds for the day in question including gusts and lulls.



1.8 Communications

N/A

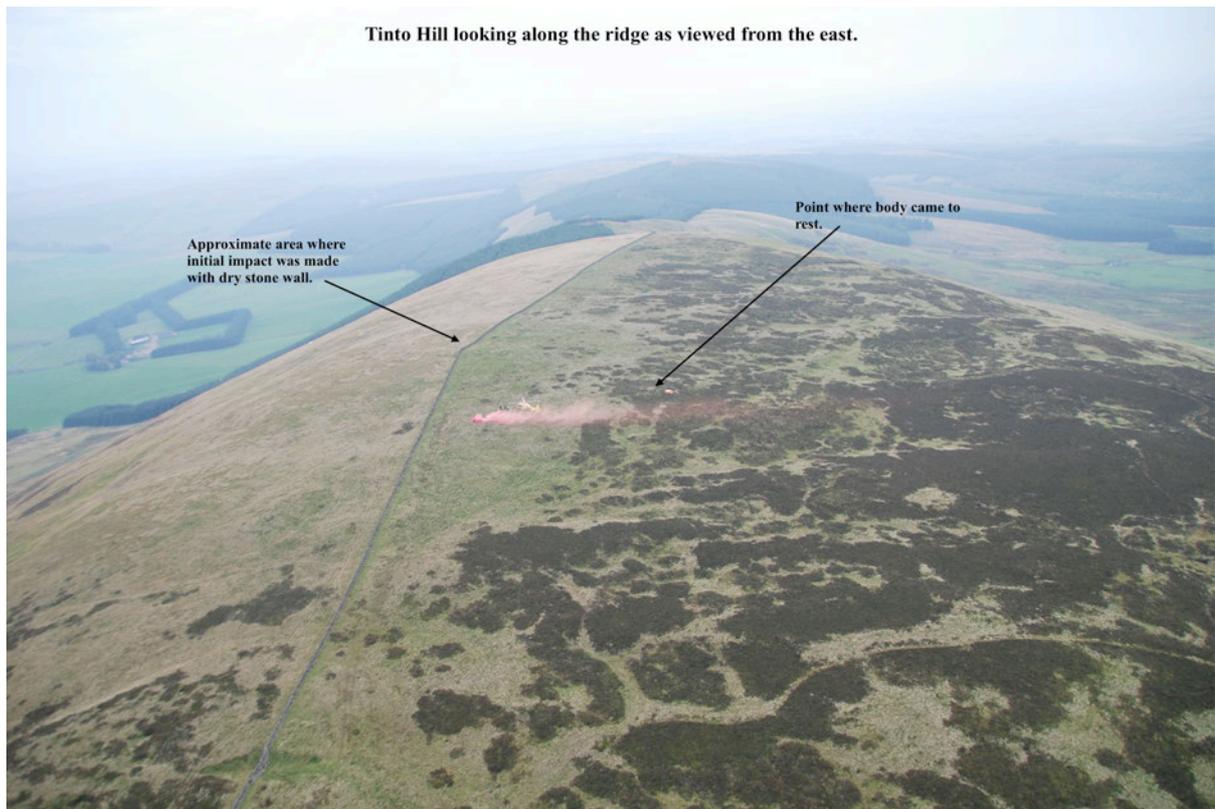
1.9 Aerodrome and approved facilities

Tinto Hill is situated approximately 8 miles south east of Lanark in the Scottish Borders, OS grid ref. NS929343. The hill reaches a height of just over 2300ft and would best be described as a large open hill with a 4km ridge running east to west. Tinto has been a popular hang gliding and paragliding venue for over thirty years. It is suitable for training, club level and cross-country flying. The local club, who own the main take-off areas, have posted the following in the sites guide on their web site:

Hazards: *Obvious hazards are the coniferous trees east of the quarry and a few fences. There is a narrow gap, 'Howgate Mouth' between the quarry and Howgate Hill to the west where there is the possibility of getting 'hoovered' through in stronger winds (keep well out from the hill if this is likely). If ground handling at the top of Greenhill, be aware of the wall. As with all ridge sites, flying in strong wind condition can be hazardous, ensure you have sufficient glider speed and experience to avoid getting blown back over the ridge line.*

The site guide clearly reminds pilots of the dangers of flying in strong winds and to be mindful of the dry stone wall that runs the length of the ridge.

Photo 3 below shows the area where the incident occurred as viewed from the police helicopter.



1.10 Flight recorders

The pilot was not using a GPS recorder.

1.11 Wreckage and impact information

The area where Pilot A came to rest is a relatively flat plateau area on the top of the hill covered in grass and patches of heather.

1.12 Medical and pathological information

Cause of death was given as ‘neck and chest injuries’. The toxicology report showed an alcohol level of 74mg per 100mls of urine.

1.13 Additional information

The Ozone Swift has a trim speed of approximately 21-23mph. Full speed with the speed bar fully applied would be in the order of 29-31mph. With the big ears pulled in and speed bar applied it is estimated that the glider’s speed would have been around 27-28mph.

SECTION 2 – ANALYSIS

- 2.1 The Investigation considered the training and experience of the pilot. Pilot A completed all the required training exercises to BHPA CP standard and was noted as being a “good student” by his training school. His total of 93 hours in just less than six years would be considered as just below average at 15.5 hours per year, the UK average being approximately 20-25 hours per year. However, the average is misleading as Pilot A’s hours became gradually less every year until in 2011 he had logged only 6 hours up until the time of the incident. This would be considered well below average. That said, the majority of the 6 hours had been gained while on a paragliding trip to Bulgaria in the August meaning that, though he had not flown many hours that year, he was at least reasonably

current. The Investigation does not consider the pilot's training or experience level to have been a factor in this incident.

- 2.2 The Investigation considered the equipment used by the pilot. All the equipment used by the pilot was of the correct type and in good condition. The Investigation does not consider the equipment to have been a factor in this incident.
- 2.3 The Investigation considered the site. The site consists of a 4km long ridge running approximately east to west. There is a flat plateau area on top before the ridge slopes away to the south and north. There is a dry stone wall on top of the hill running the length of the ridge in a position towards the southern slope of the ridge. The take-off area is flat and unobstructed and there is plenty of room for launching and landing. Obvious hazards such as the coniferous plantations and the wall are all highlighted in the club site guide and would, in any case, be considered of little consequence in normal paragliding conditions. In short, the hill is ideal for paragliding and hang gliding. The Investigation does not consider the site to have been a factor in this incident.
- 2.4 The Investigation considered the level of alcohol found in Pilot A's urine. The level of alcohol found, at 74mg/100mls represents more than two and a half times the legal limit for operating an aircraft in the UK. The maximum permitted level in the UK being 27 milligrammes of alcohol per 100 millilitres of urine. By way of comparison the limit for driving in the UK is 107 milligrammes of alcohol per 100 millilitres of urine.

The Air Navigation Order states:

PART 19 PROHIBITED BEHAVIOUR

Drunkenness in aircraft

139 (2) A person must not, when acting as a member of the crew of any aircraft or being carried in any aircraft for the purpose of acting as a member of the crew, be under the influence of drink or a drug to such an extent as to impair their capacity so to act.

The phrase 'such an extent as to impair their capacity to act' is effectively defined in the 'Railways and Transport Safety Act 2003' which states:

PART 5 AVIATION: ALCOHOL AND DRUGS

Offences

92 Being unfit for duty

(1) A person commits an offence if—

(a) he performs an aviation function at a time when his ability to perform the function is impaired because of drink or drugs, or

(b) he carries out an activity which is ancillary to an aviation function at a time when his ability to perform the function is impaired because of drink or drugs.

(2) In this section "drug" includes any intoxicant other than alcohol.

(3) Section 94 defines "aviation function" and "ancillary activity" for the purposes of this Part.

93 Prescribed limit

(1) A person commits an offence if—

(a) he performs an aviation function at a time when the proportion of alcohol in his breath, blood or urine exceeds the prescribed limit, or

(b) he carries out an activity which is ancillary to an aviation function at a time when the proportion of alcohol in his breath, blood or urine exceeds the prescribed limit.

(2)The prescribed limit of alcohol is (subject to subsection (3))—

(a) in the case of breath, 9 microgrammes of alcohol in 100 millilitres,

(b) in the case of blood, 20 milligrammes of alcohol in 100 millilitres, and

(c) in the case of urine, 27 milligrammes of alcohol in 100 millilitres.

94 Aviation functions

(1) For the purposes of this Part the following (and only the following) are aviation functions—

(a) acting as a pilot of an aircraft during flight,

CAA SAFETY SENSE LEAFLET 24 states:

Since it takes an extended period of time to remove even low levels of alcohol from the blood, pilots should not fly for at least eight hours after consuming modest amounts of alcohol and up to 24 hours (or longer) following a major celebration!

While it could not be certain as to the exact effect of the alcohol, the Investigation considered that it could have had potential to affect the decision making of Pilot A, and affect his ability to properly control the glider in what turned out to be an emergency situation.

2.5 The Investigation considered the weather conditions. The weather on the day was bright with a gusting southerly wind. At the time of the incident the wind was gusting between 17 and 30+ miles per hour, the average being approximately 22 to 24 miles per hour. Winds of this strength and gustiness would be considered extremely dangerous and well beyond the safe operating environment for paragliding. The maximum wind speed for safe paragliding is dictated by a number of factors. The normal operational wind range would be considered 0 to 16mph. Within this range the glider can (with proper training) be safely controlled and launched. From 16 – 20mph, and with an increased level of expertise and skill, the glider may still be launched safely. However, in this wind range there are other risks such as the increase in the level of turbulence caused by ground features and the fact that the pilot would have very little safety margin were the wind to increase, the normal trim speed of a paraglider being in the region of 20 – 23mph. Another important factor is the gustiness of the wind. Due to the turbulence associated with gusts it would generally be considered safer to fly in a constant wind of 16-17mph than in a wind of 8-15mph. On the day concerned the wind range (gustiness) was in excess of 17mph.

The readings from the weather station, evidence from the two witnesses and the fact that Pilot A was blown back over the hill top despite the use of his speed bar and having his glider in ‘big ears’, confirms that the wind was of a strength that was unsafe for paragliding.

It is also worth noting that the wind speed experienced by Pilot A as he touched down on top of the hill could have been even higher than those recorded, due to the acceleration of the wind over the brow of the hill. This accelerating “Venturi” effect would have meant that the wind speed on the brow of the hill could have been in the region of 40mph at times and may explain why Pilot A was dragged into and over the wall and then for a further 80 metres before coming to rest.

The Investigation considers the weather conditions to have been an important factor in this incident.

2.6 The Investigation considered the actions of the pilot and the possibility that the pilot was lifted off the ground inadvertently as a result of the gusty conditions. Pilot A set up for a launch approximately two thirds of the way down the main slope, well down from the normal take-off area. Taking off from lower down a slope is a technique sometimes used when the wind strength on the top is considered too strong to facilitate a safe launch. However, this technique, when used in the

wrong environment can be extremely dangerous. The BHPA Pilot Handbook contains a section on taking off in strong winds and in particular the dangers associated with taking off from below the top of the hill. The following is an extract from Section 3, Chapter 12, Page 112;

Taking off in strong winds

For paraglider pilots, winds of more than 26 kph (16 mph) should be treated as 'strong'. With practice, an experienced, competent pilot using a fast canopy may find it possible to take off in winds of up to 30 kph (18 mph). In 'strong' winds it is essential to be completely familiar with the launch characteristics of your canopy. It is even more important to be sure of the wisdom of such a launch: can you be sure the wind will not increase to a level where forward flight is impossible? Can you guarantee finding a landing area free from the rotors and turbulence usual in strong winds? Remember the old aviation saying: 'It is much better to be down here wishing you were up there, than up there wishing you were down here.'

Possibly the most important factor in the technique for taking off in strong winds is choosing the right part of the hill for launch. Taking off at the top of the hill is by far the safest option, as it allows you to assess the true conditions – i.e. wind strength and gustiness. This should be done by briefly ground-handling with the canopy set at standard trim speed and with the use of a good-quality anemometer if you have one. (Launching solely on the evidence of wind-measuring devices is not recommended, as they do not give the degree of 'feel' that you can get by actually ground-handling the canopy.)

*If you cannot handle the canopy and launch from the top of the hill, then it is **too windy for you to fly!***

When assessing conditions at the top of the hill, it is essential that there is enough room for you to be dragged back if it all goes wrong. The hang-glider pilots will not be pleased if you end up wrapped around their kit!

*Taking off from below the top of the hill – where the slope is steeper and the wind appears less strong – is **not recommended**, because from this position it is impossible to make an accurate assessment of the true wind conditions further up. Also, launching from the slope will result in an immediate and rapid take-off, allowing no time to check for line snags or to make corrective inputs to the canopy should it not come up straight. And remember that aborting the launch will be almost impossible once you have started, as you will be airborne as soon as the canopy comes overhead and will invariably be facing backwards. If you have assessed the wind strength incorrectly, this can quite easily result in your gaining height rapidly and then being blown back over the top of the hill, with unpleasant consequences!*

A version of this text was also published in the BHPA members' magazine Skywings on page 6 of the February 2011 edition.

The fact that Pilot A prepared to launch from lower down on the slope (against BHPA published advice) would indicate that he already considered the wind to be strong and would therefore be handling his wing accordingly. He made no mention to Witness A, while they were in radio contact, that he had not intended to take off and attempt to fly. It is therefore concluded that, on the basis of the evidence available, Pilot A took off intentionally. The Investigation considered the decision of the pilot to take off, given the prevailing weather conditions, to have been a major factor in this incident.

SECTION 3 – CONCLUSIONS

- 3.1** The Investigation concludes that the incident occurred as a result of the pilot attempting to fly in extremely windy and gusty conditions and then losing control of his glider before colliding with a dry stone wall.

SECTION 4 - SAFETY RECOMMENDATIONS

The Investigation recommends that the BHPA reminds its members of the legally prescribed alcohol limits for flying in the UK, and of the potentially detrimental effects flying with alcohol in the system can have.