

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Paraglider, Gradient Golden II (26)	
<b>No &amp; Type of Engines:</b>	Not applicable	
<b>Year of Manufacture:</b>	2007	
<b>Date &amp; Time (UTC):</b>	2 May 2008 at 1609 hrs	
<b>Location:</b>	Near Bretton, Eyam, The Peak District	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - 1 (Fatal)	Passengers - N/A
<b>Nature of Damage:</b>	Four broken lines, sustained in the ground impact	
<b>Commander's Licence:</b>	British Hang Gliding and Paragliding Association (BHPA) pilot rating and a Federation Aeronautique International Licence	
<b>Commander's Age:</b>	33 years	
<b>Commander's Flying Experience:</b>	Approximately 250 hours (of which 30 were on a Gradient Golden II) Last 90 days - approx 30 hours Last 28 days - approx 5 hours	
<b>Information Source:</b>	AAIB Field Investigation	

## Synopsis

The paraglider launched with one of its risers twisted and was later seen to suffer an asymmetric collapse of its canopy when at a height of about 150 feet. It descended rapidly in a left spiral and the pilot was unable to recover to normal flight or to successfully deploy his emergency parachute before impacting the ground. The pilot was fatally injured.

## History of the flight

On 2 May 2008 the weather conditions at Eyam Edge, a soaring site in the Peak District, were suitable for paragliding, with a southerly wind of approximately 10 kt, and, throughout the afternoon, three or four

paragliders were airborne simultaneously. At about 1555 hrs, the pilot of a Gradient Golden II paraglider arrived and prepared his equipment for flight. This pilot was well known to the other paraglider pilots and had previously flown from that site.

The Golden II was observed to make a stable takeoff at 1606 hrs, and commenced flying around the site; photographs were taken of the launch. Approximately 3 minutes later, when at a height of about 150 feet, the paraglider was seen to suffer a significant asymmetric collapse of the canopy and it entered a tight descending spiral to the left. Several witnesses reported that the lower

tip of the wing remained deflated, and one witness saw lines over the top of the collapsed tip which prevented the wing from re-inflating.

The paraglider continued in a descending spiral to the left until it struck the ground. The witnesses ran to the scene and, on arrival, they found the pilot at the bottom of a rocky outcrop. His emergency parachute was on the ground beside him but it was still packed and it was not clear to the witnesses whether he had made a very late attempt to deploy the emergency parachute, or it had become dislodged in the accident.

The emergency services were called at 1611 hrs. When the witnesses reached him the pilot was unconscious and shortly afterwards he stopped breathing. Attempts to resuscitate him were unsuccessful.

#### **Pilot information**

The pilot commenced paragliding in 1997, but in 1999 his membership of the British Hang Gliding and Paragliding Association (BHPA) lapsed and it is believed that he stopped paragliding. In 2005 the pilot rejoined the BHPA and completed a refresher course prior to resuming regular flying. He held a BHPA pilot rating and a Federation Aeronautique International licence, which allowed him to participate in international paragliding competitions. He was in regular paragliding practise, flying around 60 hours a year. He had flown approximately 30 hours on his Gradient Golden II paraglider and last flew nine days before the accident.

#### **Gradient Golden II**

The pilot purchased the paraglider on 22 October 2007 and it appeared to be in good condition. The Gradient Golden II is classified by the manufacturer as:

*'an intermediate paraglider, which is suitable for pilots whose abilities range from relative beginners to long-time experts.'*

Following the accident, the manufacturer's UK representative inspected the equipment under the supervision of the AAIB. Four broken lines were identified on the paraglider: on the left side a central A and B line had failed approximately 3 ft above the pilot, and on the right side a stabilo and a central B line had failed where the lines joined the risers. He confirmed that, apart from this damage, which appeared to have been sustained in the ground impact, the equipment seemed to be in good order and unmodified. He noted that the chest harness setting was wider than that which had been used by the Deutsche Hangegleiterverband (DHV) (see below) when they certified the paraglider; however, the manufacturer and the DHV confirmed that the chest harness setting would not have been a significant factor in this accident.

#### **Paragliding terms**

##### *Asymmetric canopy collapse*

An asymmetric canopy collapse occurs when airflow over part of the canopy is disrupted, causing that part of the wing to stall and collapse, and normally results in the canopy turning towards the collapsed side. It is possible to recover the situation by maintaining directional control and, if necessary, pumping smoothly on the controls on the collapsed side, taking care not to stall the remaining canopy. The BHPA pilot's handbook warns that recovery from the worst situations often requires a great deal of height, with highly experienced test pilots having been known to fall thousands of feet whilst attempting to recover from such situations. It advises that pilots should monitor their height and, if necessary, deploy their emergency

parachute. It has not been possible to determine accurately the minimum height for deploying such an emergency parachute, but it would require, at least, a few seconds for it to deploy and become effective. There have been many occasions, however, when the late deployment of the emergency parachute has prevented injuries.

#### *Cravat*

A 'Cravat' is the term used when a collapsed wingtip becomes trapped in the lines. The effect of this is to increase drag on the side of the 'Cravat', which induces a turn in that direction. This can then rapidly develop into a fast spiral descent. The pilot can attempt to correct the turn by shifting his weight and rapidly applying the brake controls on the opposing side. Should the 'Cravat' progress into a spiral, then a significant amount of height will be required to recover. It is therefore imperative that the pilot monitors his height and, if there is insufficient height to effect a recovery, then he should immediately deploy the emergency parachute.

#### *Spiral*

A spiral descent occurs when the paraglider progresses from a fast turn, to a nose-down diving turn with a high rate of descent. If the spiral is not intentional, or is a result of a 'Cravat', then recovery will require the use of brake controls on the opposite side to the direction of the spiral. Due to the high wing loading in a spiral, it may be necessary to use both hands to apply the opposite brake control.

### **Paraglider information**

The sport of paragliding is unregulated in the United Kingdom; consequently, there are no legal requirements for paragliders to be registered, or to conform to any standards, or for paraglider pilots to undergo training and hold any formal qualification. Nevertheless, the majority

of paragliding activity in the United Kingdom occurs under the auspices of the BHPA. Most paragliding clubs and schools are affiliated to the BHPA (although they are not required to be) and training courses at such schools conform to a BHPA approved syllabus, which leads to internationally recognised paragliding qualifications. The BHPA also operates a mandatory reporting scheme for paragliding accidents and incidents, and either conducts its own investigations or provides technical assistance to investigations carried out by the AAIB.

The BHPA requires that all paragliders flown by their members complete an acceptable certification process. This demonstrates that the paraglider has been subject to stringent safety tests and classified, according to its flying characteristics, against standards agreed by the major paragliding federations and associations in Europe. The largest and most widely accepted of these federations is the DHV. Approximately 75% of all paragliders sold worldwide are tested and certified by the DHV.

DHV certify paragliders on a scale of 1 to 3, with 1 being the most suitable paraglider for beginners and 3 being a paraglider suitable only for very experienced pilots. The Gradient Golden II was certified by the DHV as a DHV 1-2. In the event that a DHV 1-2 paraglider suffers an asymmetric collapse, the canopy has been demonstrated to re-inflate before the paraglider has turned through 180°; such testing is carried out in smooth air, with experienced pilots, and without additional complications such as a 'Cravat' or a twisted riser.

The DHV provided technical assistance to the AAIB during this investigation. Initially they examined the possibility that the broken lines could have failed in flight, perhaps during the reinflation of the canopy after the collapse. They tested lines adjacent to the failed lines from the remaining canopy and were able to confirm

that there was no indication of any problems with the suitability of these lines. Furthermore, marks on the broken lines indicated that they had come into contact with a solid object. If the lines had failed in flight it is likely that the canopy would have been badly distorted, and it is probable that one of the experienced paraglider pilots who witnessed the accident would have noticed this. None of the numerous witnesses reported any distortion to the canopy.

The DHV observed that it was clear from a photograph taken just after the paraglider had launched that the right riser was twisted near to its attachment to the harness. An examination of the right riser showed evidence of friction burn marks which may have been caused by the pilot applying the right brake control, with some force, whilst flying with the riser twisted.

### The Eyam Edge site

Eyam Edge is described in the Derbyshire Soaring Club's site guide as:

*'not a great soaring site, at 300 ft from top to bottom, and needing a moderate wind strength to be soarable.'*

The site is flyable when the wind direction is from south to south-west, with 205° being the best wind direction.

Pilots who regularly fly from the site describe it as one which provides a turbulent flight; the small thermals are often disrupted by the moderate wind conditions that are necessary to soar at the site.

Conditions at the site on 2 May 2008 were described, by those who had flown, as typically turbulent. Variometer readings taken from pilots who had flown during the afternoon confirmed these conditions.

### Safety equipment

The RAF Centre of Aviation Medicine assisted the AAIB investigation by examining the pilot's helmet. The pilot was wearing a Kiwi Sports Evolution helmet, which was a full face helmet with a chin bar, but no visor, and was specifically designed for paragliding. It was not possible to establish whether or not the helmet would conform to the current industry standard *EN 966 – Specification for Helmets for Airborne Sports*, but it was considered that the helmet was generally fit for purpose. The emergency parachute was considered to be suitable, had it been deployed with sufficient time for it to inflate.

### Pathology

The post-mortem report concluded that the pilot's death was the result of multiple severe injuries which occurred during the ground impact.

### Analysis

The pilot arrived at the Eyam Edge site and then launched, in a relatively short period of time, with a twisted right riser. A twist in the right riser would have had the effect of increasing friction on the brake control line and making the canopy more difficult to control. It is possible that, shortly after getting airborne, the pilot became aware of this twist but was unable to correct it in flight. Having subsequently suffered an asymmetric canopy collapse and 'Cravat', leading to a descending spiral to the left, he would have needed to apply the right brake to recover. Friction burn marks on the twisted riser indicated that the pilot was using a great deal of force with the right brake but, demonstrably, he had insufficient height to affect a recovery.

If a pilot experiences a canopy collapse which provokes a high rate of descent, at heights of 300 feet or less, then the guidance from both the BHPA and the DHV is to use the emergency parachute immediately.