British Hang Gliding and Paragliding Association

FORMAL REPORT

Investigation of a hang gliding incident, which occurred at Chabre Mountain, Laragne, France, on 22nd June 2016
In which two pilots were involved and one suffered serious injuries.

Introduction

On June 23rd 2016 the British Hang Gliding and Paragliding Association (BHPA) received reports of an aerial collision between two BHPA members flying hang gliders at Chabre, Laragne in France, which resulted in a serious injury to one of the pilots involved.

The BHPA tasked Mr Ian Currer, BHPA 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 GBR-2016-3434 Ratified 15th February 2017.

Summary

On 22nd June about 14 pilots had launched in preparation for a competition task. Before the task start time was reached, at 12.55pm (local time) two hang gliders collided at approximately 70m (200ft) above the top of ridge.

Both pilots lost control of their gliders and deployed their emergency parachutes. Both struck the north-facing cliff and slid down the vertical rock face to the scree slope at the foot of the cliff 275m (900ft) below. Although both pilots had successfully deployed emergency parachutes, one of these had collapsed or been damaged as the parachute contacted the cliff face. One pilot landed with only minor injuries, the other was seriously injured.

The Investigation concluded that the incident occurred because of the failure of both pilots to maintain adequate situational awareness, and to monitor the position of the other, so as to be able to avoid a collision.

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 the following 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

1.1.1 Between 19th and 25th June, approximately 30 pilots were taking part in the UK National Hang Gliding Championships in the Laragne-Monteglin region of France.

1.1.2 Pilots A and B were competing in the fourth day of the competition, set at Chabre, a south facing ridge with a vertical cliff face on the north side. Conditions at the time of the flight were reported as light, with weak and patchy lift and little turbulence.

1.1.3 Pilot A launched from the south ramp, followed a few minutes later by Pilot B. They were both flying at approximately 75m (200ft) above take off whilst awaiting the start of the day's competition task.

1.1.4 At approximately 12.53pm (local time) the hang gliders of Pilot A and Pilot B collided. The right hand leading edge of Glider A impacted with the left hand wing wire and control frame upright of glider B. The gliders were immediately rotated into each other, and then separated.

1.1.5 Pilot A's glider was badly damaged in the collision and he immediately deployed his emergency parachute. Although his parachute deployed quickly and initially effectively, it was subsequently collapsed or damaged, and Pilot A struck the rock-face several times before impacting the steep scree slope at the foot of the cliff.

1.1.6 Pilot B's glider was also badly damaged in the collision. He deployed his emergency parachute, which was delayed in opening, but eventually opened close to the ground level at the top of the ridge. Pilot B collided with the edge of the north-facing cliff and continued to descend under his emergency parachute. He impacted the ground at the foot of the cliff on the steep scree slope approximately 200m (650ft) below the top. He did not suffer serious physical injury.

1.1.7 Pilot B went to the aid of Pilot A, who was found to be conscious and had landed on top of his glider. Suspecting a spinal injury and with advice from the meet director over the 'phone, Pilot B attempted to secure Pilot A on the steep slope and perform first aid. Pilot B was unable to safely disconnect Pilot A's harness from his hang glider given his position on the glider, and Pilot B was concerned about exacerbating his injuries by moving him.

1.1.8 Pilot A lost consciousness and was having difficulty breathing by the time a rescue helicopter arrived (approximately 90mins after the incident). A member of the emergency services team was lowered nearby and reported the casualty's situation to the helicopter crew, who returned to lower a medical professional.

1.1.9 On the second approach the helicopter downwash blew the damaged hang gliders about, and despite the efforts of Pilot B and a helper, the casualty was dragged, lifted, and dropped in a head-down position by the motion of the damaged glider to which he was still attached. It is reported that Pilot A stopped breathing at this point.

1.1.10 Two other people arrived at the crash site; one was also a medic. Together with the French paramedic they stabilised and prepared Pilot A for helicopter evacuation to Gap hospital.

1.2 Injuries to persons

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

1.3 Damage to the aircraft

Both aircraft including harnesses and emergency parachutes were destroyed in the collision and impact with the ground. They were subsequently disposed of and were not available to the Investigation.

Neither of the pilots' helmets were available to the investigation.

1.4 Personnel information

Pilot A is a 55year old male, he is a current member of the BHPA and holds the Advanced pilot rating. He has held this rating since January 2014. Logbook information has been supplied and records 244 hours since 2003. He had been flying the previous day.

Pilot B is a 51year old male, he is a current member of the BHPA and holds Advanced pilot rating. He has held this rating since July 2012. He states he has accrued in excess of 1,000 hours airtime on hang gliders since 1996, and last flew on the previous day.

1.5 Aircraft information

Glider A (flown by Pilot A): Evo 3 Large, manufactured by Avian Ltd, UK. This model is currently uncertified.

Glider B (flown by pilot B): T2C 144, manufactured by Wills Wing, USA. This model was certified by HGMA (United States) in 2009.

Both pilots were wearing Icaro 4fight helmets certified to EN966. Pilot B's was the "long-tail" variant.

Pilot A's emergency parachute was a Metamorphosi Conar 18 purchased in 2001. This model is 28.38sqm. No certification data is available.

Pilot B's emergency parachute was an Independence Annular EVO 22 Certified to EN12491 with a maximum all-up-weight (AUW) of 130Kg.

1.6 Meteorological information

The weather on the day was fine and sunny. The competition forecast quoted the wind speed as 5-10kph with weak to moderate convection. Thermal strength was 3m/sec or less. Visibility was excellent. (The incident occurred well clear of cloud).

1.7 Communications

Both pilot A and Pilot B had radios. There is no evidence that either pilot was using these at the time of the incident.

1.8 Flying Site

Chabre is a south easterly facing ridge situated close to Laragne-Monteglin, in the Sisteron region of France. The take off elevation is 1300m and the landing field elevation is 735m. The ridge is several kilometres long.

The site has a “spine back” with the northerly side comprising a steep wooded slope with a 200m (650ft) near-vertical cliff face at the top and a steep scree slope at the foot of the cliff (see Photo A).

Chabre is a very popular site with pilots from all over the world and has often been used for competitions.

Photo A. *Chabre ridge. From the north side looking west.*

1.9 Flight recorders

Both Pilot A and Pilot B had GPS navigation devices that recorded their flights. The tracklogs have been obtained and the data is discussed in the analysis section of this report.

Both Pilot A and Pilot B had “Go-Pro” digital cameras that were recording during the flights and captured the aerial collision. The video has been obtained and is discussed in the Analysis section of this report.

1.10 Medical and pathological information

Pilot A suffered a serious head and facial injuries, and a serious cervical spine injury. Pilot B received cuts and bruises.

1.11 Survival aspects

1.11.1 Helmets.

During the course of the Investigation it became apparent that both pilots lost their helmets. It is evident from footage from the camera on Pilot A's glider that his helmet became detached at some point during his descent of the cliff. It requires significant force to pull off a helmet that has been correctly fitted and fastened, and is possible that it was caught or damaged by the rock face, although this is not discernible from the camera footage.

It was noted that Pilot A had attached a cord between the visor points on his helmet, and connected a bungee from this cord to his hang point as a head support, an adaptation known to be made by some hang glider pilots to reduce neck fatigue during long flights. Footage from Pilot A's on-board camera shows the bungee was snapped immediately following the collision. It is impossible to determine whether the addition of the bungee and cord caused or contributed to the helmet subsequently becoming detached. Pilot B reported that upon landing, he found Pilot A without a helmet, and with a serious head injury.

Footage from the camera on Pilot B's glider shows Pilot B's helmet was detached during the deployment of his emergency parachute. During deployment the pilot is pulled sharply backwards past the rear wires of the glider. It is possible that this action, or the action of the parachute bridle deploying and becoming taut, caused or contributed to the loss of his helmet.

1.11.2 Emergency Parachutes

Pilot A's emergency parachute was reported to be a Metamorfosi Conar 18 (28.38sqm). This emergency parachute does not have EN certification. In the absence of EN or any other form of certification, the sink rate for the parachute was calculated using the formula supplied in the manufacturers manual. This formula does not include the weight of the glider. Pilot A's clip in weight was approximately 100kg. At 100kg the descent rate in still air and with no other factors is calculated at approximately 5m/s.

Using the BHPA Pilot Handbook sink rate tables, which do include the weight of the glider, with an estimated AUW of 130kg and no other factors, the sink rate is calculated to be in the region of 7.7m/s.

However, it is clear from the video footage that Pilot A's emergency parachute became caught on the cliff face where it was either damaged or collected debris, rendering it ineffective.

Pilot B's emergency parachute was an Independence Annular EVO 22 (36sq.m), certified to EN12491 with a maximum AUW of 130Kg. At 128Kg AUW Pilot B was within the certified weight range.

1.11.3 Helicopter evacuation

The Investigation noted the disturbance of the casualty by the helicopter downwash. Pilot B stated that the glider was picked up, moved several metres and dropped with the unconscious Pilot A still connected to it, landing on his head. The statement of the competition director concurs with this. The condition of Pilot A (breathing and colour) was reported to have deteriorated significantly following this disturbance.

1.12 Organisational and management information

1.12.1 The event had an appointed competition meet director and a safety director. There was an allocated emergency radio frequency. There were French-speaking pilots able to liaise with the local emergency services.

1.12.2 The meet director had allocated a turn direction of "right" after consultation with the pilots. This required pilots to circle to the right when thermalling, whilst still on the Chabre ridge and when in the company of other flyers.

1.12.3 When the accident was reported, the competition director suspended launching, and the safely director contacted the airborne pilots to clear the area for the in-coming helicopter. The competition director made contact with Pilot B and remained in contact with the crash site on an open 'phone line until the evacuation was completed. Witness statements were taken within 24hrs of the incident.

SECTION 2 – ANALYSIS

2.1 The Investigation considered the experience and currency of the pilots involved in the incident. Based on their accrued hours and recent flying activity, both pilots would be regarded as experienced and in current practice. The Investigation considered that the experience and currency of the pilots was not a factor in this incident.

2.2 The Investigation considered the meteorological conditions. Conditions were light and not challenging, with excellent visibility. The Investigation considered that the conditions were not a factor in this incident.

2.3 The Investigation considered the density of air traffic. The air was not unduly busy, as less than half the field had launched, and the flying site is very large. Whilst there were other gliders in the vicinity, which required the pilots' attention, the Investigation did not consider the density of the air traffic to be a factor in this incident.

2.4 The Investigation considered the actions and flight paths of the pilots concerned, based on witness statement evidence, GPS, and video from the pilots' on-board cameras. These cameras were both mounted on the keel tubes of the gliders and gave a pilots'-eye view of the flights, albeit with a limited field of vision.

2.4.1 Pilot A took off at 12:46 (local time) and turned right in a westerly direction along the ridge. He climbed in weak lift above take off altitude before flying back towards the take off in an easterly direction.

2.4.2 Pilot B took off at 12:50 (local time) and gained altitude in a thermal above take off. At approximately 60 seconds prior to the collision, Pilot B was in a low banked left hand turn with Pilot A initially ahead of him to the west, and within his field of vision.

2.4.3 At the same time Pilot A was flying along the ridge in a westerly direction. Pilot A then turned back along the ridge and proceeded to track on an easterly path above the ridge for approximately 30 seconds. During this easterly track Pilot B was within his field of vision and slightly to his right. Refer to Figure 1 (below).

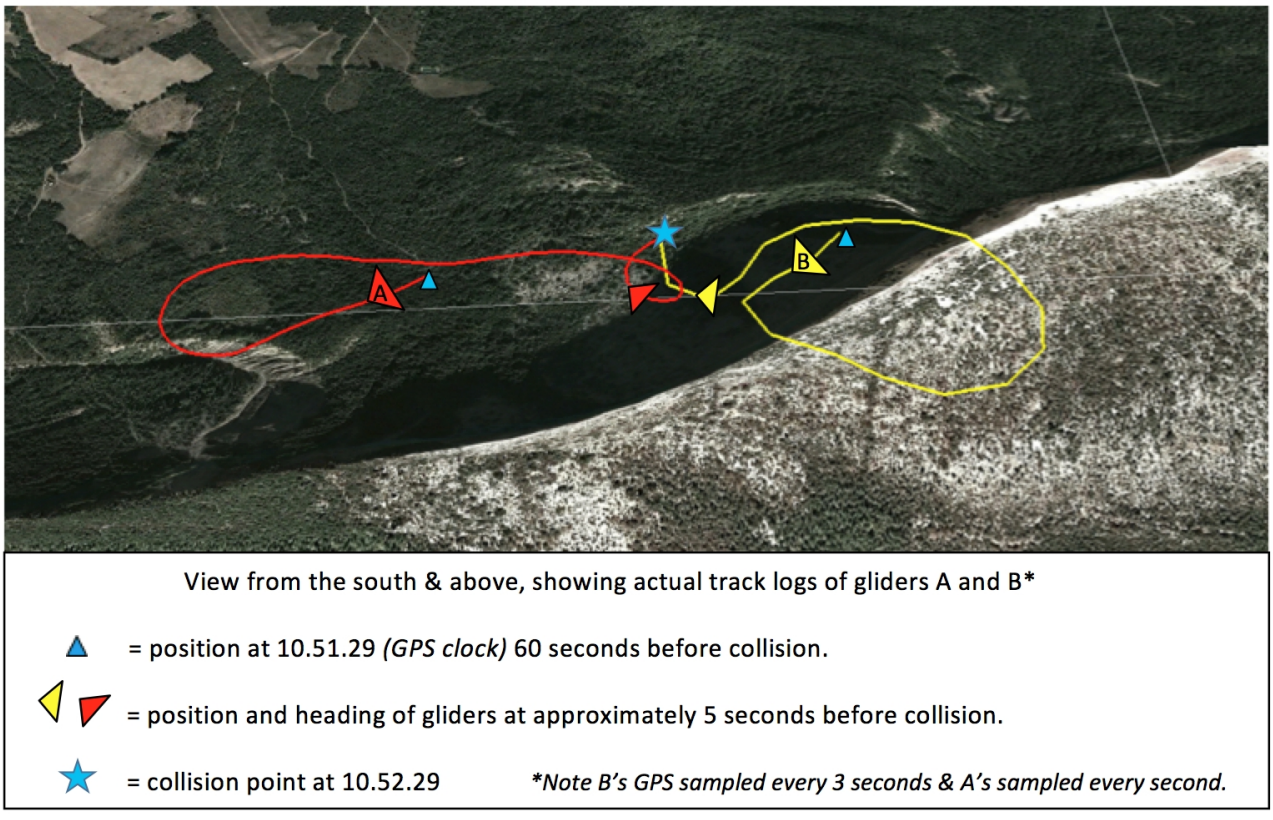

Figure 1. *Visualisation of the tracks of both aircraft during the minute before the collision.*

2.4.4 About 25 seconds before the collision, both pilots were flying towards each other for a period of approximately 10 seconds, and would have been in each other's field of vision.

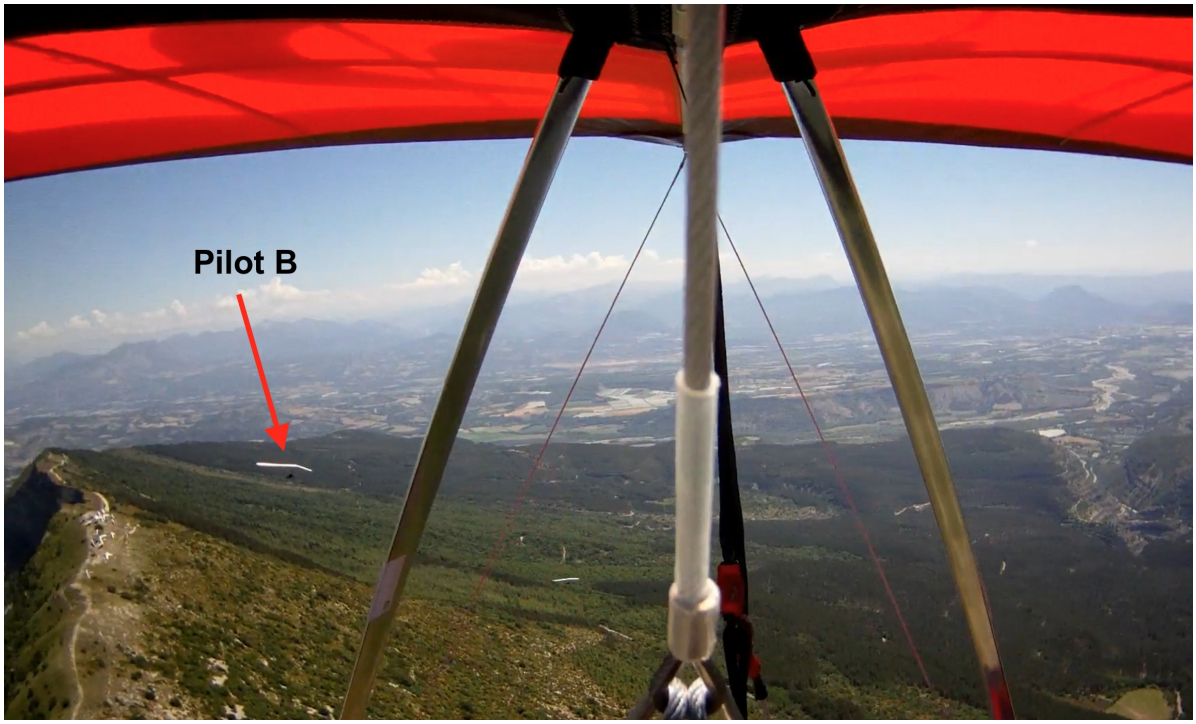

Photo B. *Still shot taken from camera on Pilot A's glider approximately 15 seconds before collision. (Pilot B has been highlighted)*

2.4.5 At this point both pilots should be aware of the other and should be considering the other pilot's position and track before committing to a manoeuvre. Once committed, they should also be monitoring the whereabouts of the other pilot in order to maintain a safe clearance and thereby reduce the risk of a collision. (Refer to Photo B above).

2.4.6 Twelve seconds before the collision, Pilot A began to make a right hand 360 degree turn. Ten seconds before the collision, Pilot B also commenced a right hand 360 degree turn. At this point the pilots had approximately 50 to 60m of horizontal separation.

2.4.7 When Pilot A started his turn, Pilot B was in front of him and in his field of vision. As Pilot A continued his turn round in a westerly direction, Pilot B was then to his rear and therefore no longer visible to him. As Pilot A continued his turn round to the north he would have had the opportunity to see Pilot B to his right over his right shoulder had he maintained a lookout and checked the airspace in which he was turning was clear. At approximately 4 seconds prior to the impact, there was a period of 2 seconds where Pilot A's banked right wing obscured his view of the section of sky containing Pilot B. (Refer to Photo C below).

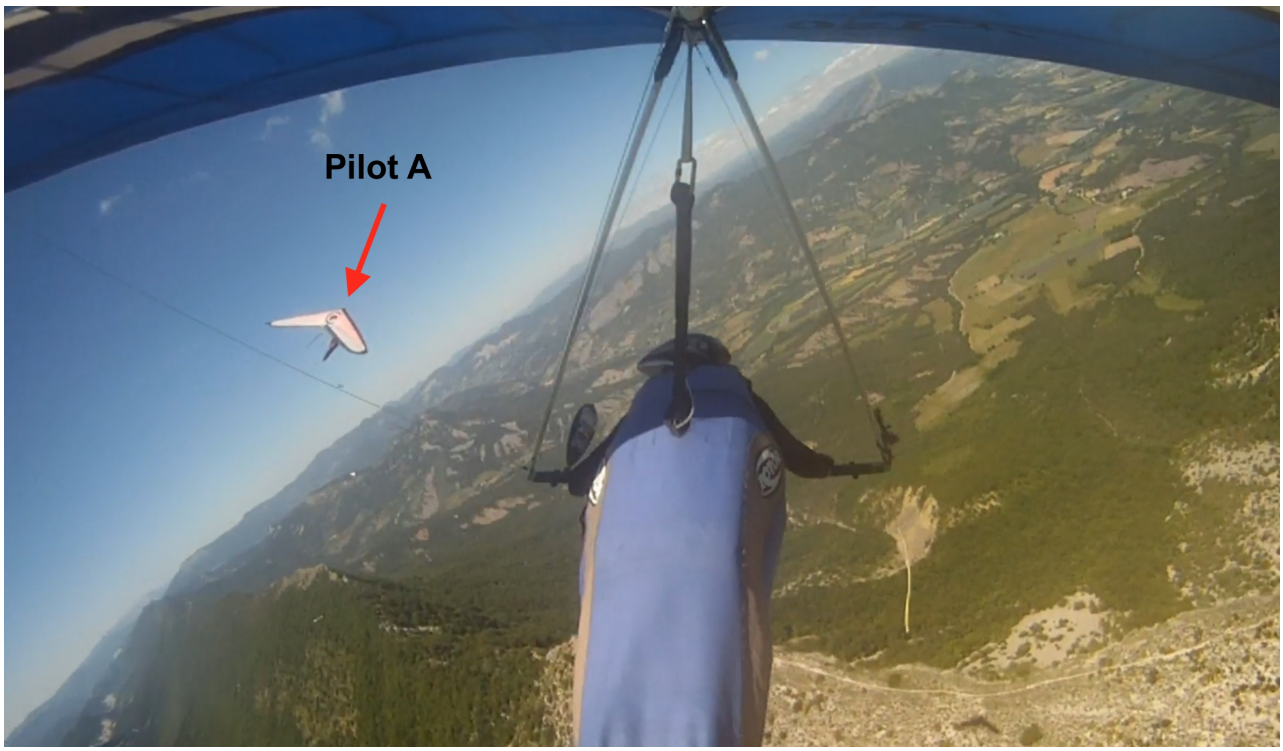

Photo C. *Still from Glider B approximately 2-3 seconds prior to the collision. Pilot A can be seen on the left, with the position of Glider A's wing obscuring Pilot A's view of Glider B.*

2.4.8 When Pilot B started his right turn, Pilot A was in front and then to his left in a westerly direction. Throughout Pilot B's turn, Pilot A remained visible to his left. Pilot B stated that he saw and was aware of Pilot A but chose to focus his attention on the gliders that were below him on the grounds that Pilot A was higher and therefore had a duty to give way to those below him.

2.4.9 The Fédération Aéronautique Internationale (FAI)'s Sporting Code 7A has been adopted by the BHPA Competition Panel for Category 2 UK hang gliding competitions. In its Collision Avoidance guidelines (6.3.3), it refers to the requirement for competitors to adhere to the international rules of the air, and specifies that:

> "Ridge soaring, turning and landing patterns shall be complied with, and a proper lookout kept at all times."

There is no law; regulation or accepted protocol (with the exception of aircraft on landing approach) stating that an aircraft must give way to those at a lower altitude.

2.4.10 Aerial collision avoidance rules are defined in the Standardised European Rules of the Air (SERA). The applicable clauses are:

> SERA 3201
> "Nothing in this Regulation shall relieve the pilot-in-command of an aircraft from the responsibility of taking such action, including collision avoidance manoeuvres based on resolution advisories provided by ACAS equipment, as will best avert collision."
>
> SERA 3205
> "An aircraft shall not be operated in such proximity to other aircraft as to create a collision hazard."

2.4.11 When two or more gliders are thermalling together, it is the responsibility of all the pilots concerned to maintain visual contact and to avoid an aerial collision by maintaining situational awareness and ensuring that the airspace they are turning into will remain clear in line with SERA clauses 3201 and 3205.

2.4.12 The Investigation considered SERA regulation 3210, which states:

"The aircraft that has right of way shall maintain it's heading and speed";

"When two aircraft are converging at approximately the same level, the aircraft that has the other on its right shall give way".

The investigation considers that the meaning of "converging" in this regulation describes two aircraft maintaining a constant course on different headings, which will bring them into conflict should the courses continue.

When two or more gliders are thermalling together they will not be maintaining a constant course but will be in circling flight paths, their climb rates constantly changing. Neither aircraft will be maintaining a constant bank angle and radius of turn. The Investigation finds that for these reasons, the converging rule cannot be applied.

2.4.13 The Investigation considers that the failure of both pilots to adequately monitor the position of the other to have been a major factor in this incident.

SECTION 3 – CONCLUSIONS

3.1 The Investigation concluded that the incident occurred because of the failure of both pilots to maintain adequate situational awareness, and to monitor the position of the other, so as to be able to avoid a collision.

3.2 The Investigation concluded that the following were important factors contributing to the severity of the injuries sustained by Pilot A.

- The loss of his helmet.
- The failure of his emergency parachute as a result of it becoming caught/damaged on the cliff face.
- The disturbance caused by the helicopter downwash.

SECTION 4 - SAFETY RECOMMENDATIONS

4.1 Pilots should be advised, through the BHPA magazine Skywings, that in the event of casualty evacuation by helicopter, all persons including casualties should be disconnected from their gliders and emergency parachutes if possible. All gliders, deployed emergency parachutes and any other loose items must be packed up, moved away or safely secured from the helicopter's downwash.

4.2 Pilots should be reminded, through the BHPA magazine Skywings, of the importance of ensuring that their helmets are well fitted and securely fastened and that they should not be modified by attaching anything that could contribute to the helmet being pulled off by catching on a wire, on a line, or on the terrain.

4.3 Pilots should be reminded, through the BHPA magazine Skywings, that there is no law, regulation or accepted protocol (with the exception of aircraft on landing approach) stating that an aircraft must give way to those at a lower altitude. They should also be reminded that the most important anti-collision rule is that, "nothing… shall relieve the pilot-in-command of an aircraft from the responsibility of taking such action... as will best avert collision."